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PROJECT NO. 39339

REPORT FOR ELECTRIC UTILITY INFRASTRUCTURE STORM HARDENING PURSUANT TO 16 TEX. ADMIN. CODE § 25.95	**§ § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

STORM HARDENING PLAN SUMMARY OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC PURSUANT TO 16 TEX. ADMIN. CODE § 25.95

Contact: Stacey Murphree
Telephone: 713-207-6537
Stacey.Murphree@CenterPointEnergy.com

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On April 29, 2011, CenterPoint Energy Houston Electric, LLC ("CenterPoint Houston" or "the Company") submitted a summary describing the Company's storm hardening plan over a five-year period beginning January 1, 2011. Pursuant to 16 Tex. Admin. Code § 25.95, CenterPoint Houston submits the following summary of material revisions to the storm hardening plan and a detailed summary of the Company's progress in implementing the plan.

Respectfully submitted,

Stacey Murphree
Manager Regulatory Affairs
CenterPoint Energy Service Company LLC
1111 Louisiana St.
Houston, Texas 77002
(713) 207-6537
(713) 207-9840 (fax)
Stacey.Murphree@centerpointenergy.com

ATTACHMENT A

Storm Hardening Plan Summary
Submitted May 1, 2020

STORM HARDENING PLAN SUMMARY
OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC

I. 16 Tex. Admin. Code § 25.95(e)(1)

Construction standards, policies, procedures, and practices employed to enhance the reliability of utility systems, including overhead and underground transmission and distribution facilities

There were no material revisions to the transmission and substation construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems. Minor revisions include the following:

1. Beginning in 2012, new overhead distribution services were limited to transformer banks consisting of three transformers no larger than 167 kVA each. This decreases the exposure of large overhead transformer banks and thus should reduce the number of transformer replacements during a major storm event.
2. All new overhead distribution freeway crossings are built on concrete poles.
3. Beginning in 2017, for transmission facility designs, CenterPoint Houston used the design requirements in the latest National Electrical Safety Code ("NESC") C2 2017 edition, which replaced the NESC C2 2012 edition.
4. Substation equipment maintenance is performed during planned intervals in accordance with North American Electric Reliability Corporation ("NERC") requirements and based on criteria that may include manufacturer's recommendations, equipment history, and operational experience.
5. As part of the Company's Intelligent Grid project, on-line monitoring equipment was installed on select power transformers to observe transformer conditions. The Company is not proactively installing transformer monitoring devices at non-Intelligent Grid locations, but all new transformers being purchased have a pre-installed monitoring device. The on-line monitoring information will assist in analyzing various temperature readings and in monitoring the cooling fans for the transformer. Microprocessor-based relay systems are also being installed on distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.
6. Beginning in 2014, the Company began installing additional guy strains in down guy installations on wood poles that carry energized distribution equipment.

7. Beginning in 2013, the Company began a proactive Underground Residential Distribution ("URD") Cable Life Extension Program ("CLEP") to assess URD spans and determine effective life.

There were no other material revisions to the distribution construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems.

II. 16 Tex. Admin. Code § 25.95(e)(2)

Vegetation Management Plan for distribution facilities, including a tree pruning methodology and pruning cycle, hazard tree identification and mitigation plans, and customer education and notification practices related to vegetation management

16 Tex. Admin. Code § 25.96(c) ("TAC") states that compliance with that section "fully satisfies the vegetation management planning and reporting requirements" of 16 TAC § 25.95(e)(2); therefore, this report does not contain information related to vegetation management.

III. 16 Tex. Admin. Code § 25.95(e)(3)

Plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and/or grid self-healing

There were minor revisions to the Company's plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and grid self-healing. These changes include the installation of Intelligent Grid automation equipment and technology. Electromechanical distribution circuit relays were replaced with microprocessor-based relays at the 31 designated Intelligent Grid substations. Electromechanical relays are being replaced at other substations on an as-needed basis as they approach their end of life. Microprocessor-based relays are being installed on new distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.

In March 2015, the Company installed an Advanced Distribution Management System (ADMS) for situational awareness and management of its distribution system infrastructure in real-

time. The project leverages the management and control of CenterPoint Houston's Advanced Metering System ("AMS") project to support the installation of intelligent grid automation equipment and technology. Together, the AMS and intelligent grid equipment and technology should allow more efficient grid operation, increase grid reliability, and enable grid automated recovery and restoration. The Intelligent Grid is anticipated to limit the effects of power outages by detecting faulted circuits and automatically rerouting power to customers. The Intelligent Grid is expected to reduce the length of power outages.

In 2019, CenterPoint Houston commissioned eighty-six (86) new intelligent grid switching devices as part of normal distribution capacity, reliability, or line protection requirements. CenterPoint Houston continues to expand the intelligent grid in areas that achieve the greatest reliability impact.

By the end of 2019, CenterPoint Houston has added feeder fault information for 762 microprocessor relay feeders across 92 substations to the ADMS system.

CenterPoint Houston completed the installation of advanced meters on all of the Company's 2.2 million customer meters on July 1, 2012. In addition to the enhanced electric market operation, the advanced meters are capable of reporting power outages at customer premises instantaneously. CenterPoint Houston is using data analytics as a tool to process and filter meter data into operational metrics.

IV. 16 Tex. Admin. Code § 25.95(e)(4)

Plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees

CenterPoint Houston's plans regarding distribution post storm damage assessment includes a commitment to complete a detailed and thorough inspection of all system damage after a major storm. Such an assessment will provide additional information that has not been provided by a simple list of facilities that need to be repaired. Damage assessment data is the main factor that finalizes resource levels and is central information for planning and assigning work, determining additional material needs, determining and reporting estimated restoration dates, and documenting facility replacements for mapping records. CenterPoint Houston has established contracts with multiple damage assessment contractors to ensure a timely, complete, and thorough assessment of system damage after a major storm.

There were no other material revisions to the Company's plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees.

V. 16 Tex. Admin. Code § 25.95(e)(5)

Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule

There were no material revisions to the Company's transmission and distribution pole construction standards and pole attachment policies or the transmission pole testing schedule. There were minor revisions to the Company's pole attachment policies. The Company uses its website to provide any prospective attaching entity detailed information regarding CenterPoint Houston's pole attachment practices.[1] This information is in manual form and can be downloaded from the website. Upon installation and from time to time thereafter, CenterPoint Houston may require any non-compliant attachment to be removed and re-attached properly at the sole cost and expense of the attaching entity.

CenterPoint Houston's proactive distribution Pole Maintenance Program provides that a portion of the distribution system poles be assessed annually by contract ground-line crews. Pole assessments include a visual and/or manual assessment. Visual pole assessments are comprised of a field observation for evidence of exterior decay or damage above the ground line. Poles that are seven years old or older are manually excavated and assessed for decay below the ground line, as well as sounded and bored to locate internal voids. Poles of sufficient strength to remain in service until the next scheduled assessment are treated (with a fumigant or preservative, as necessary) and tagged. Poles that are identified for reinforcement during these assessments are either treated and braced, or replaced.

The Pole Maintenance Program also includes visual assessment of guy wires, including checking for guy wires that are damaged, broken, frayed or slack, and assessment of guy strains and anchors.

As part of the grid hardening initiative, pole assessments and treatment have been accelerated, so approximately 10% of the Company's poles are assessed annually, on average, on a rolling ten-year cycle. As such, pole bracings and replacements will increase accordingly.

[1] https://www.centerpointenergy.com/en-us/business/services/electric-utility/pole-attachments/?sa=ho.

Additional foreign poles containing Company facilities that may merit replacement by third parties are also identified.

VI. 16 Tex. Admin. Code § 25.95(e)(6)

Distribution feeder inspection schedule

In addition to the pole maintenance program discussed above, CenterPoint Houston utilizes four other programs that incorporate ground-based inspection programs of overhead distribution facilities. These programs are the Infra-Red Program, the Root Cause Analysis Program for the 10% Circuits, the Hot Fuse Program, and the Feeder Inspection Program. The only programs discussed below are those with material revisions.

(a) The Infra-Red Program

Infra-red technology allows the Company to see the heat generated by deteriorating components on the distribution system. These "Hot Spots" will eventually result in equipment failure and a loss of service. Infra-red technology provides a unique tool to find potential equipment outages before they occur, so that proactive repairs can be made prior to an outage. This program reduces the number of equipment failures and improves reliability by decreasing System Average Interruption Duration Index ("SAIDI") and System Average Interruption Frequency Index ("SAIFI").

All circuits are inspected on an eight-year cycle. 77 benchmark circuits that are representative of the overall CNP system are inspected every two years to ensure that the eight-year cycle is adequate to achieve the desired reliability results. If a circuit is identified as a repeating 4+yr 10% or 300% circuit, then it is advanced on the infra-red inspection schedule to the current year. This additional focus on the circuits with the highest SAIDI and SAIFI minutes is done to address any performance issues. Also, circuits that are heavily loaded (greater than 500 amps) are inspected, as data has proven a higher failure rate of equipment when subjected to higher load.

Infra-red scans are made of the terminal poles at the substation and major equipment on the circuit, including pole-top switches, reclosers, regulators, and capacitors. Scans are also performed on the fuse cutouts, jumpers, splices, and transformers along the circuit backbone. The identified hot spots are reported, and repairs are made. If the problem is severe enough and there

is a danger of imminent failure, then procedures are taken to isolate the device and initiate immediate repairs.

(b) The Root Cause Analysis Program for the 10% Circuits

The program is designed so that the action plan and recommended construction be completed within 120 days.

(c) Feeder Inspection Program

The Feeder Inspection Program will be merged into the Pole Maintenance Program. Through this program, distribution feeders are inspected on a periodic basis to identify and correct issues found with the condition of the feeder that could impact the reliable operation of the feeder. This periodic inspection and maintenance is expected to improve the performance of the feeders under adverse weather conditions. Damaged or broken facilities are identified, reports are made, and work orders to repair are issued accordingly.

(d) "As You Go" Inspections

As many as 700 personnel are in the field on a daily basis. This includes linemen, crew leaders, service consultants, and engineers. As they go about their daily business, they observe the condition of overhead facilities and report any unusual problems. Cameras have been made available to these personnel and they have been instructed to visually record these abnormal conditions. Work orders are then created from these pictures so that crews can be routed to correct the issue.

VII. 16 Tex. Admin. Code § 25.95(e)(7)

Plans and procedures to enhance the reliability of overhead and underground transmission and distribution facilities through the use of transmission and distribution automation

There were no material revisions to the Company's plans and procedures to enhance the reliability of the overhead and underground transmission or substation facilities through automation.

In 2011, CenterPoint Houston instituted a procedure to no longer install automation on line reclosers and pole-top switches. Instead, the Company utilizes the devices in the intelligent grid deployment. These devices are state of the art equipment that allows for the functionality of the existing equipment coupled with enhanced features. The Company is able to program these devices to automatically sectionalize for a fault and then reclose if the fault has had one of the following occur: cleared, auto-sectionalize without a reclose, a remote command to operate, or a local command in the same device. Because one device can be programmed or re-programmed to perform the functionality of several devices, the device can be quickly modified in a distribution system that is changing. The devices are designed to interface with state of the art communication protocols, so that there is an interface with the new distribution communication network.

CenterPoint Houston maintains a hardened transmission primary control center with redundant computer systems separated by firewalls. The transmission control center provides the ability to monitor and remotely operate the Company's transmission network from a secure, storm-hardened facility, including the ability to dynamically rate transmission circuits and restore service to customers impacted by a storm through remote control of switching equipment.

CenterPoint Houston completed construction of a back-up transmission control center in December 2015, in compliance with NERC Reliability Standard EOP-008. The back-up control center is a storm hardened facility with redundant computer systems and can perform the same functions provided by the primary control center in the event the functionality of the existing transmission control center is impaired or lost. In January 2016, the backup control center received certification from NERC/Texas Reliability Entity ("TRE") that the new facility met all requirements to operate the CenterPoint Houston transmission system independent of the primary control center.

VIII. 16 Tex. Admin. Code § 25.95(e)(8)

Plans and procedures to comply with the most recent National Electric Safety Code (NESC) wind loading standards in hurricane prone areas for new construction and rebuilds of the transmission and distribution system

There were no material revisions to the Company's plans and procedures to comply with the most recent NESC wind load standards in hurricane prone areas for new construction and

rebuilds of the transmission and distribution system. CenterPoint Houston adopted the latest NESC C2-2017 design requirements into its design criteria for overhead lines.

IX. 16 Tex. Admin. Code § 25.95(e)(9)

Plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B (or equivalent) standards

All new overhead distribution freeway crossings are built on concrete poles. There were no other material revisions to the Company's plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B or equivalent standards.

X. 16 Tex. Admin. Code § 25.95(e)(10)

Plans and procedures to develop a damage/outage prediction model for the transmission and distribution system

There were no material revisions to the Company's plans and procedures to develop a damage or outage prediction model for the transmission and distribution system.

XI. 16 Tex. Admin. Code § 25.95(e)(11)

Plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities

There were no material revisions to the Company's plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities.

XII. 16 Tex. Admin. Code § 25.95(e)(12)

Plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads

There were no material revisions to the Company's plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads.

XIII. Other Storm Hardening Plans

CenterPoint Houston has the following revised and additional plans to harden its transmission and substation facilities during the next five years.

Project Name	Location (City/County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
Morgans Point-Sandy Point #857.2	La Porte, Harris	Rebuild portion of 138 kV Ckt 96D & 96F to meet the most recent NESC C2-2017 extreme wind loading requirements.	9/1/2020	6/30/2021	$4,502,000
Angleton – Liverpool #1037	Angleton, Brazoria	Rebuild portion of 138kV Ckt 04C to meet the most recent NESC C2-2017 extreme wind loading requirements.	9/10/2018	7/30/2020	$29,000,000
Highlands Tap #1150	Baytown, Harris	Rebuild portion of 138kV Ckt 08G to meet the most recent NESC C2-2017 extreme wing loading requirements.	1/2/2019	7/30/2021	$8,242,000
Moody – Stewart #1016	Galveston, Galveston	Rebuild portion of 138kV Ckt 63C to meet the most recent NESC C2-2017 extreme wind loading requirements.	11/4/2020	5/4/2021	$6,600,000
Rittenhouse Tap #924.2	Houston, Harris	Rebuild portion of 138kV Ckt 86E to meet the most recent NESC C2-2017 extreme wind loading requirements.	1/15/2020	1/30/2021	$3,960,000

IMPERIAL-WA PARISH Airflow Spoilers #22-6	Houston, Harris, Fort Bend	Retrofit portion of 138 kV Ckt 80B with anti-galloping devices to avoid damage from icing conditions.	10/30/2019	8/1/2020	$1,800,000
EAST BERNARD-DYANN Airflow Spoilers #22-7	Houston, Wharton	Retrofit portion of 138 kV Ckt 60B with anti-galloping devices to avoid damage from icing conditions.	11/22/2019	8/1/2020	$840,600
NORTH BELT-TH WHARTON Airflow Spoilers #22-8	Houston, Harris	Retrofit portion of Ckt 95A with anti-galloping devices to avoid damage from icing conditions.	10/28/2019	8/1/2020	$1,970,000
LA MARQUE-WEST GALVESTION Airflow Spoilers #22-9	Galveston/ Galveston	Retrofit portion of 138 kV Ckt 93C with anti-galloping devices to avoid damage from icing conditions.	10/24/2019	8/1/2020	$73,100
ZENITH-ADDICKS Airflow Spoilers #22-11	Houston, Harris	Retrofit portion of 138kV Ckt 76A with anti-galloping devices to avoid damage from icing conditions	10/7/2019	8/1/2020	$221,400
FLEWELLEN-KATY Airflow Spoilers #22-13	Katy, Waller	Retrofit portion of 138 kV Ckt 09H with anti-galloping devices to avoid damage from icing conditions.	12/2/2019	8/1/2020	$698,000
OBRIEN-FLEWELLEN Airflow Spoilers #22-14	Houston, Fort Bend	Retrofit portion of 138 kV Ckt 25D with anti-galloping devices to avoid damage from icing conditions.	12/14/2019	8/1/2020	$90,900

FORT BEND – BRAZOS VALLEY Airflow Spoilers #22-15	Houston, FortBend	Retrofit portion of 138 kV Ckt 09G with anti-galloping devices to avoid damage from icing conditions.	10/15/2019	8/1/2020	$42,600
WEST GALVESTON - STEWART Airflow Spoilers #22-20	Galveston, Galveston	Retrofit portion of 138 kV Ckt 63C with anti-galloping devices to avoid damage from icing conditions.	12/17/2019	8/1/2020	$78,700
Sienna Brazos River Crossing #1018	Fort Bend, Fort Bend	Rebuild portion of 345kV Ckt 99B, 345kV Ckt 18C, 138kV Ckt 80A, and 138kV Ckt 82A and install steel poles to provide resiliency from river erosion.	2/1/2021	5/14/2021	$10,150,000
Sugar Land Brazos River Crossing #1393	Sugar Land, Fort Bend	Rebuild portion of 345kV Ckt 99C and 345kV Ckt 98B and install steel poles to provide resiliency from river erosion.	4/20/2020	11/30/2020	$11,028,000
Matagorda Colorado River Crossing #1400-1	Matagorda, Matagorda	Rebuild portion of 345kV Ckt 27C and 345kV Ckt 18A and install steel poles to provide resiliency from river erosion.	5/1/2021	12/30/2021	$5,872,000

Wharton Colorado River Crossing #1400-2	Wharton, Wharton	Rebuild portion of 138kV Ckt 60B and install steel poles to provide resiliency from river erosion.	9/15/2021	12/17/2021	$3,763,000
West Columbia Substation	Brazoria	Elevate control cubicle, breakers, and equipment terminal boxes to avoid damage from flooding.	1/21/2019	4/1/2020	$1,800,000
Addicks Substation	Harris	Elevate transmission control cubicle, 345 kV breakers, and equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	3/4/2020	5/10/2021	$6,100,000
Addicks Substation	Harris	Elevate distribution control cubicle, structures, breakers, and equipment terminal boxes to avoid damage from flooding.	1/4/2021	5/9/2022	$2,900,000

Greens Bayou Substation	Harris	Move protection and control equipment for 138 kV switchyard into new elevated control cubicle, replace (5) oil-filled breakers, and elevate equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	1/4/2021	5/9/2022	$4,000,000
Greens Bayou Substation	Harris	Elevate 345 kV control cubicle and equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	1/3/2022	5/15/2023	$2,100,000
North Belt Substation	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/9/2023	5/13/2024	$1,500,000
Brays Substation	Harris	Elevate distribution control cubicle an equipment terminal boxes to avoid damage from flooding.	1/8/2024	5/12/2025	$1,500,000

XIV. Detailed Summary of the Company's Progress in Implementing the Plan

Section	Progress During 2019
I. Construction standards, policies, procedures, and practices	• All distribution, substation, and transmission construction standards, planning design criteria, facility design criteria, system protection practices, and maintenance practices were followed.
II. Vegetation management	• Vegetation management will be reported pursuant to 16 TAC § 25.96.
III. Smart Grid	• 86 intelligent grid switching devices were installed in 2019. • DSCADA has the capability to remotely control approximately 1,614 distribution switching devices (523 legacy devices and 1,091 IGSD devices).
IV. Post storm damage assessment of distribution and transmission systems	• Contracts were established with multiple damage assessment contractors to identify distribution damage after a major storm. • Procedures for transmission damage assessment were established.
V. Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule	• All pole construction standards were followed. • All Federal Communications Commission and Company attachment policies were followed. • 100,946 CenterPoint Houston distribution poles were assessed.
VI. Distribution feeder inspections	• 155 distribution circuits were inspected resulting in 812 work orders issued. • 305 distribution circuits had infrared inspections. • As part of the Root Cause Analysis Program, circuit inspections were performed on the 10% and 300% circuits. • As part of the Hot Fuse Program, inspections were made of laterals that had recurring outages.
VII. Transmission, Substation, Distribution and Control Center automation	• Automation was a standard part of transmission, substation and control center operations. • See Section III. Smart Grid above for distribution automation progress. • Construction on the transmission backup control center was completed in December 2015.
VIII. NESC wind loading standards for transmission and distribution	• NESC wind loading requirements for transmission, substation, and distribution facilities were followed.

IX. Consideration for NESC Grade B (or equivalent) standards for distribution	• Freeway and railroad crossings were constructed to B grade requirements pursuant to the NESC. • New overhead freeway crossings were constructed on concrete poles. • Step transformer banks using 250 to 500 KVA transformers were constructed on class H2 poles. • 35 kV regulator banks were built with four pole construction. • Single phase primary tangent construction when built on class 3 poles meets grade B construction.
X. Damage/outage prediction model for the transmission and distribution system	• The Company has several tools for predicting distribution and transmission system damage and potential flooding in substations.
XI. Use of distribution structures owned by other entities	• As part of the Company's pole inspection program, the contractors inspected all foreign poles in the designated areas. • The foreign poles that merit replacement or bracing were handled at the expense of the other entity.
XII. Restoration of service to priority loads and targeted hardening of infrastructure used to serve priority loads	• All guidelines in the Company's Emergency Operations Plan regarding restoration priorities after a major outage event, including priority customers, were followed.

XIII. Other storm hardening plans	• Elevation of the control cubicles at Wharton and Wallisville Substations was completed in 2019. Work began in 2019 to elevate the control cubicle, breakers, and equipment terminal boxes at West Columbia Substation. • Twelve transmission system hardening projects were completed in 2019. These included rebuilding a portion of the West Galveston-Galveston 26th 138kV Ckt 63A, a portion of the AMOCO-Algoa Corner 138kV Ckt 04A, a portion of the MONSAN-AMOCO 138kV Ckt 04B, modify Cedar Bayou-Chambers-King-North Belt-T.H. Wharton 345 kV Ckt. 97A, 97B, 97C, 97E, and 99G; and installing anti-galloping devices to avoid damage from icing conditions on a portion of West Columbia-Lake Jackson 138 KV Ckt 02C; a portion of CROSBY-CONNER 138 KV Ckt 86D; a portion of BRITMOORE-CLODINE 138 KV Ckt 73B; a portion of HOCKLEY-PETERS 138 KV Ckt 65B; a portion of FLEWELLEN-BRAZOS VALLEY 138 KV Ckt 09G; a portion of SOUTH LANE CITY – TEXAS GULF COGEN 138 KV Ckt 60C; a portion of TEXAS GULF COGEN – WEST COLUMBIA 138 KV Ckt 04F; a portion of DOW – STP 345 KV Ckt 27A.

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Contact: Stacey Murphree
Telephone: 713-207-6537
Stacey.Murphree@CenterPointEnergy.com

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Stacey Murphree
Manager, Regulatory & Rates
CenterPoint Energy Service Company LLC
1111 Louisiana St.
Houston, Texas 77002
(713) 207-6537
(713) 207-9840 (fax)
Stacey.Murphree@centerpointenergy.com

ATTACHMENT A

Storm Hardening Plan Summary

Submitted April 30, 2021

3

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time. The project leverages the management and control of CenterPoint Houston's Advanced Metering System ("AMS") project to support the installation of intelligent grid automation equipment and technology. Together, the AMS and intelligent grid equipment and technology should allow more efficient grid operation, increase grid reliability, and enable grid automated recovery and restoration. The Intelligent Grid is anticipated to limit the effects of power outages by detecting faulted circuits and automatically rerouting power to customers. The Intelligent Grid is expected to reduce the length of power outages.

In 2020, CenterPoint Houston commissioned thirty-five (35) new intelligent grid switching devices as part of normal distribution capacity, reliability, or line protection requirements. CenterPoint Houston continues to expand the intelligent grid in areas that achieve the greatest reliability impact.

By the end of 2020, CenterPoint Houston has added feeder fault information for 774 microprocessor relay feeders across 96 substations to the ADMS system.

CenterPoint Houston completed the installation of advanced meters on all of the Company's 2.2 million customer meters on July 1, 2012. In addition to the enhanced electric market operation, the advanced meters are capable of instantaneously reporting power outages at customer premises. CenterPoint Houston is using data analytics as a tool to process and filter meter data into operational metrics that facilitate operational and reliability improvements.

IV. 16 Tex. Admin. Code § 25.95(e)(4)

Plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees

CenterPoint Houston's plans regarding distribution post storm damage assessment includes a commitment to complete a detailed and thorough inspection of all system damage after a major storm. Such an assessment will provide additional information that has not been provided by a simple list of facilities that need to be repaired. Damage assessment data is the main factor that finalizes resource levels and is central information for planning and assigning work, determining additional material needs, determining and reporting estimated restoration dates, and documenting facility replacements for mapping records. CenterPoint Houston has established contracts with multiple damage assessment contractors to ensure a timely, complete, and thorough assessment of system damage after a major storm.

There were no other material revisions to the Company's plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees.

V. 16 Tex. Admin. Code § 25.95(e)(5)

Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule

There were no material revisions to the Company's transmission and distribution pole construction standards and pole attachment policies or the transmission pole testing schedule. There were minor revisions to the Company's pole attachment policies. The Company uses its website to provide any prospective attaching entity detailed information regarding CenterPoint Houston's pole attachment practices.[1] This information is in manual form and can be downloaded from the website. Upon installation and from time to time thereafter, CenterPoint Houston may require any non-compliant attachment to be removed and re-attached properly at the sole cost and expense of the attaching entity.

CenterPoint Houston's proactive distribution Pole Maintenance Program provides that a portion of the distribution system poles be assessed annually by contract ground-line crews. Pole assessments include a visual and/or manual assessment. Visual pole assessments are comprised of a field observation for evidence of exterior decay or damage above the ground line. Poles that are seven years old or older are manually excavated and assessed for decay below the ground line, as well as sounded and bored to locate internal voids. Poles of sufficient strength to remain in service until the next scheduled assessment are treated (with a fumigant or preservative, as necessary) and tagged. Poles that are identified for reinforcement during these assessments are either treated and braced, or replaced.

The Pole Maintenance Program also includes visual assessment of guy wires, including checking for guy wires that are damaged, broken, frayed or slack, and assessment of guy strains and anchors.

As part of the grid hardening initiative, pole assessments and treatment have been accelerated, so approximately 10% of the Company's poles are assessed annually, on average, on a rolling ten-year cycle. As such, pole bracings and replacements will increase accordingly.

[1] https://www.centerpointenergy.com/en-us/business/services/electric-utility/pole-attachments/?sa=ho.

Additional foreign poles containing Company facilities that may merit replacement by third parties are also identified.

VI. 16 Tex. Admin. Code § 25.95(e)(6)

Distribution feeder inspection schedule

In addition to the pole maintenance program discussed above (which as explained in the Company's contemporaneous report under § 25.94 was combined with the Company's Feeder Inspection Program in 2020), CenterPoint Houston utilizes the following programs that incorporate ground-based inspection programs of overhead distribution facilities. These programs are the Infra-Red Program, the Root Cause Analysis Program for the 10% Circuits, the Hot Fuse Program, and the Combine Pole Maintenance and Feeder Inspection Program. The only programs discussed below are those with material revisions.

(a) The Infra-Red Program

Infra-red technology allows the Company to see the heat generated by deteriorating components on the distribution system. These "Hot Spots" will eventually result in equipment failure and a loss of service. Infra-red technology provides a unique tool to find potential equipment outages before they occur, so that proactive repairs can be made prior to an outage. This program reduces the number of equipment failures and improves reliability by decreasing System Average Interruption Duration Index ("SAIDI") and System Average Interruption Frequency Index ("SAIFI").

Circuits are generally inspected on an eight-year cycle. CenterPoint Houston has selected 77 benchmark circuits that are representative of the overall distribution system and are inspected every two years to ensure that the eight-year cycle is adequate to achieve the desired reliability results. If a circuit is identified as a repeating 4+yr 10% or 300% circuit, then it is advanced on the infra-red inspection schedule to the current year. This additional focus on the circuits with the highest SAIDI and SAIFI minutes is done to address any performance issues. Also, circuits that are heavily loaded (greater than 500 amps) are inspected, as data has proven a higher failure rate of equipment when subjected to higher load.

Infra-red scans are made of the terminal poles at the substation and major equipment on the circuit, including pole-top switches, reclosers, regulators, and capacitors. Scans are also

performed on the fuse cutouts, jumpers, splices, and transformers along the circuit backbone. The identified hot spots are reported, and repairs are made. If the problem is severe enough and there is a danger of imminent failure, then procedures are taken to isolate the device and initiate immediate repairs.

(b) The Root Cause Analysis Program for the 10% Circuits

The program is designed so that the action plan and recommended construction be completed within 120 days.

(c) The Combined Pole Maintenance and Feeder Inspection Program

In 2020 the Feeder Inspection Program merged into the Pole Maintenance Program. Through this program, distribution feeders are inspected on a periodic basis to identify and correct issues that could impact the reliable operation of the feeder. This periodic inspection and maintenance is expected to improve the performance of the feeders under adverse weather conditions. Damaged or broken facilities are identified, reports are made, and work orders to repair are issued accordingly.

(d) "As You Go" Inspections

As many as 700 CenterPoint Houston personnel are in the field on a daily basis. This includes linemen, crew leaders, service consultants, and engineers. As personnel perform their daily business, they observe the condition of overhead facilities and report any unusual problems. Cameras have been made available to these personnel, and they have been instructed to visually record any abnormal conditions to support work order creation and dispatching of crews to priority issues.

VII. 16 Tex. Admin. Code § 25.95(c)(7)

Plans and procedures to enhance the reliability of overhead and underground transmission and distribution facilities through the use of transmission and distribution automation

There were no material revisions to the Company's plans and procedures to enhance the reliability of the overhead and underground transmission or substation facilities through automation.

In 2011, CenterPoint Houston instituted a procedure to no longer install automation on line reclosers and pole-top switches. Instead, the Company utilizes the devices in the intelligent grid deployment. These devices are state of the art equipment that allows for the functionality of the existing equipment coupled with enhanced features. The Company is able to program these devices to automatically sectionalize for a fault and then reclose if the fault has had one of the following occur: cleared, auto-sectionalize without a reclose, a remote command to operate, or a local command in the same device. Because one device can be programmed or re-programmed to perform the functionality of several devices, the device can be quickly modified in a distribution system that is changing. The devices are designed to interface with state-of-the-art communication protocols, so that there is an interface with the new distribution communication network.

CenterPoint Houston maintains a hardened transmission primary control center with redundant computer systems separated by firewalls. The transmission control center provides the ability to monitor and remotely operate the Company's transmission network from a secure, storm-hardened facility, including the ability to dynamically rate transmission circuits and restore service to customers impacted by a storm through remote control of switching equipment.

CenterPoint Houston completed construction of a back-up transmission control center in December 2015, in compliance with NERC Reliability Standard EOP-008. The back-up control center is a storm hardened facility with redundant computer systems and can perform the same functions provided by the primary control center in the event the functionality of the existing transmission control center is impaired or lost. In January 2016, the backup control center received certification from NERC/Texas Reliability Entity ("TRE") that the new facility met all requirements to operate the CenterPoint Houston transmission system independent of the primary control center.

VIII. 16 Tex. Admin. Code § 25.95(e)(8)

Plans and procedures to comply with the most recent National Electric Safety Code (NESC) wind loading standards in hurricane prone areas for new construction and rebuilds of the transmission and distribution system

There were no material revisions to the Company's plans and procedures to comply with the most recent NESC wind load standards in hurricane prone areas for new construction and rebuilds of the transmission and distribution system. CenterPoint Houston adopted the latest NESC C2-2017 design requirements into its design criteria for overhead lines.

IX. 16 Tex. Admin. Code § 25.95(e)(9)

Plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B (or equivalent) standards

All new overhead distribution freeway crossings are built on concrete poles. There were no other material revisions to the Company's plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B or equivalent standards.

X. 16 Tex. Admin. Code § 25.95(e)(10)

Plans and procedures to develop a damage/outage prediction model for the transmission and distribution system

There were no material revisions to the Company's plans and procedures to develop a damage or outage prediction model for the transmission and distribution system.

XI. 16 Tex. Admin. Code § 25.95(e)(11)

Plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities

There were no material revisions to the Company's plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities.

XII. 16 Tex. Admin. Code § 25.95(c)(12)

Plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads

There were no material revisions to the Company's plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads.

XIII. Other Storm Hardening Plans

CenterPoint Houston has the following revised and additional plans to harden its transmission and substation facilities during the next five years.

Project Name	Location (City/ County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
Highlands Tap #1150	Baytown, Harris	Rebuild portion of 138kV Ckt 08G to meet the most recent NESC C2-2017 extreme wing loading requirements.	1/2/2019	7/30/2021	$8,242,000
Moody – Stewart #1016	Galveston, Galveston	Rebuild portion of 138kV Ckt 63C to meet the most recent NESC C2-2017 extreme wind loading requirements.	11/4/2020	12/1/2022	$6,568,353
Morgans Point-Sandy Point #857.2	Houston, Harris	Rebuild portion of 138kV Ckt 95B to meet the most recent NESC C2-2017 extreme wind loading requirements.	9/1/2021	12/31/2021	$8,500,000

WWE: Str #04215-04244 Airflow Spoilers #22-21	Houston, Harris, Fort Bend	Retrofit portion of 138 kV Ckt 04F, 60C with anti-galloping devices to avoid damage from icing conditions	9/6/2021	5/6/2022	$250,000
WWE: Str #04618-05984 Airflow Spoilers #22-22	Houston, Wharton	Retrofit portion of 138 kV Ckt 02B, 02K with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #32714-31410 Airflow Spoilers #22-23	Houston, Harris	Retrofit portion of Ckt 04C, 04D, 04B,04A with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #11740-11758 Airflow Spoilers #22-24	Galveston/ Galveston	Retrofit portion of 138 kV Ckt 93C with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #31343-08028 Airflow Spoilers #22-25	Houston, Harris	Retrofit portion of 138kV Ckt 05B, 04A, 93B with anti-galloping devices to avoid damage from icing conditions	9/6/2021	5/6/2022	$250,000
WWE: Str #05426-05437 Airflow Spoilers #22-26	Katy, Waller	Retrofit portion of 138 kV Ckt 60A, 60E, 09G with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #03183-03219 Airflow Spoilers #22-27	Houston, Fort Bend	Retrofit portion of 138 kV Ckt 25D, 73D with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000

WWE: Str #18740-18729 Airflow Spoilers #22-28	Houston, FortBend	Retrofit portion of 138 kV Ckt 77C, 66B with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE. Str #27594-21441 Zenith to Klug Airflow Spoilers #22-29	Galveston, Galveston	Retrofit portion of 138 kV Ckt 09J, 76A with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #22086-22069 Airflow Spoilers #22-30	Galveston, Galveston	Retrofit portion of 138 kV Ckt 73E, 81J with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #23194-23219 Airline to Hardy 610 & I-45 Airflow Spoilers #22-31	Galveston, Galveston	Retrofit portion of 138 kV Ckt 21J, 03D with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #16645-16633 Airflow Spoilers #22-32	Galveston, Galveston	Retrofit portion of 138 kV Ckt 38B with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #14726-28832 Airflow Spoilers #22-33	Galveston, Galveston	Retrofit portion of 138 kV Ckt 87F, 88E with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000

WWE: Str #13467-13397 Airflow Spoilers #22-34	Galveston, Galveston	Retrofit portion of 138 kV Ckt 85A, 87C, 87B, 87A, 88A with anti-galloping devices to avoid damage from icing conditions	9/6/2021	5/6/2022	$250,000
WWE: Str #16068-16088 Airflow Spoilers #22-35	Galveston, Galveston	Retrofit portion of 138 kV Ckt 94C, 08G with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
WWE: Str #26782-32856 Airflow Spoilers #22-36	Galveston, Galveston	Retrofit portion of 138 kV Ckt 86D, 86J with anti-galloping devices to avoid damage from icing conditions.	9/6/2021	5/6/2022	$250,000
Greens Bayou Erosion Relocate Str#10659 #1060	Houston, Harris	Rebuild portion of 138kV Ckt 77A, 21A and install steel poles to provide resiliency from river erosion.	9/13/2021	12/31/2021	$680,000
Sienna Brazos River Crossing #1018	Fort Bend, Fort Bend	Rebuild portion of 345kV Ckt 99B, 345kV Ckt 18C, 138kV Ckt 80A, and 138kV Ckt 82A and install steel poles to provide resiliency from river erosion.	2/1/2021	5/14/2021	$8,500,000
Brazos River Relocate #1033	Houston, Harris	Rebuild portion of 138kV Ckt 95B and install steel poles to provide resiliency from river erosion.	9/13/2021	12/31/2021	$4,000,000

Clear Creek Crossing #1349	Houston, Harris	Rebuild portion of 138kV Ckt 04A and install steel poles to provide resiliency from river erosion.	9/1/2019	12/31/2021	$1,365,000
Sugar Land Brazos River Crossing #1393	Sugar Land, Fort Bend	Rebuild portion of 345kV Ckt 99C and 345kV Ckt 98B and install steel poles to provide resiliency from river erosion.	10/2/2019	7/27/2020	$9,700,000
Matagorda Colorado River Crossing #1400-1	Matagorda, Matagorda	Rebuild portion of 345kV Ckt 27C and 345kV Ckt 18A and install steel poles to provide resiliency from river erosion.	5/1/2021	12/30/2021	$5,872,000
Wharton Colorado River Crossing #1400-2	Wharton, Wharton	Rebuild portion of 138kV Ckt 60B and install steel poles to provide resiliency from river erosion.	9/15/2021	12/17/2021	$3,763,000
Addicks Substation	Harris	Elevate transmission control cubicle and equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary	3/4/2020	10/20/2021	$5,750,000

Addicks Substation	Harris	Elevate distribution control cubicle, structures, breakers, and equipment terminal boxes to avoid damage from flooding.	1/1/2022	5/15/2023	$2,900,000
Greens Bayou Substation	Harris	Move protection and control equipment for 138 kV switchyard into new elevated control cubicle, replace (5) oil-filled breakers, and elevate equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	2/3/2021	5/15/2022	$3,500,000
Greens Bayou Substation	Harris	Elevate 345 kV control cubicle and equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	1/1/2022	5/15/2023	$2,100,000
North Belt Substation	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding	1/1/2023	5/15/2024	$1,500,000

North Belt Substation	Harris	Elevate transmission control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2024	5/15/2025	$2,500,000
Brays Substation	Harris	Elevate distribution control cubicle an equipment terminal boxes to avoid damage from flooding.	1/1/2025	5/15/2026	$1,500,000

XIV. Detailed Summary of the Company's Progress in Implementing the Plan

Section	Progress During 2020
I. Construction standards, policies, procedures, and practices	• All distribution, substation, and transmission construction standards, planning design criteria, facility design criteria, system protection practices, and maintenance practices were followed.
II. Vegetation management	• Vegetation management will be reported pursuant to 16 TAC § 25.96.
III. Smart Grid	• 35 intelligent grid switching devices were installed in 2020. • DSCADA has the capability to remotely control approximately 1,649 distribution switching devices (523 legacy devices and 1,126 IGSD devices).
IV. Post storm damage assessment of distribution and transmission systems	• Contracts were established with multiple damage assessment contractors to identify distribution damage after a major storm. • Procedures for transmission damage assessment were established.

V. Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule	• All pole construction standards were followed. • All Federal Communications Commission and Company attachment policies were followed. • 65,054 CenterPoint Houston distribution poles were assessed across 509 circuits
VI. Distribution feeder inspections	• 324 distribution circuits had infrared inspections. • As part of the Root Cause Analysis Program, circuit inspections were performed on the 10% and 300% circuits. • As part of the Hot Fuse Program, inspections were made of laterals that had recurring outages.
VII. Transmission, Substation, Distribution and Control Center automation	• Automation was a standard part of transmission, substation and control center operations. • See Section III. Smart Grid above for distribution automation progress. • Construction on the transmission backup control center was completed in December 2015.
VIII. NESC wind loading standards for transmission and distribution	• NESC wind loading requirements for transmission, substation, and distribution facilities were followed.
IX. Consideration for NESC Grade B (or equivalent) standards for distribution	• Freeway and railroad crossings were constructed to B grade requirements pursuant to the NESC. • New overhead freeway crossings were constructed on concrete poles. • Step transformer banks using 250 to 500 KVA transformers were constructed on class H2 poles. • 35 kV regulator banks were built with four pole construction. • Single phase primary tangent construction when built on class 3 poles meets grade B construction.
X. Damage/outage prediction model for the transmission and distribution system	• The Company has several tools for predicting distribution and transmission system damage and potential flooding in substations.
XI. Use of distribution structures owned by other entities	• As part of the Company's pole inspection program, the contractors inspected all foreign poles in the designated areas. • The foreign poles that merit replacement or bracing were handled at the expense of the other entity.
XII. Restoration of service to priority loads and targeted hardening of infrastructure used to serve priority loads	• All guidelines in the Company's Emergency Operations Plan regarding restoration priorities after a major outage event, including priority customers, were followed.

XIII. Other storm hardening plans	• Elevation of the control cubicles at Wallisville Substation was completed in 2020. Elevation of the control cubicle, breakers, and equipment terminal boxes at West Columbia Substation was completed in 2020. Work began in 2020 to elevate the control cubicle and equipment terminal boxes at Addicks Transmission Substation. • Ten transmission system hardening projects were completed in 2020. These included rebuilding the Rittenhouse Tap (Hardy-Aldine) 138 kV Ckt 86E; and installing anti-galloping devices to avoid damage from icing conditions on a portion of Imperial – West Columbia 138kV Ckt 80B; a portion of East Bernard – DYANN 138kV Ckt 60B; a portion of North Belt-T H Wharton 138kV Ckt 95A; a portion of La Marque – West Galveston 138kV Ckt 93C; a portion of Zenith – Addicks 138kV Ckt 76A; a portion of Flewellen – Katy 138kV Ckt 09H; a portion of Obrien – Flewellen 138kV Ckt 25D; a portion of Fort Bend – Brazos Valley 138kV Ckt 09G; and a portion of West Galveston – Stewart 138kV Ckt 63C.

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PROJECT NO. 39339

REPORT FOR ELECTRIC UTILITY INFRASTRUCTURE STORM HARDENING PURSUANT TO 16 TEX. ADMIN. CODE § 25.95	**§ § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

STORM HARDENING PLAN SUMMARY OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC PURSUANT TO 16 TEX. ADMIN. CODE § 25.95

Contact: Stacey Murphree
Telephone: 713-207-6537
Stacey.Murphree@CenterPointEnergy.com

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STORM HARDENING PLAN SUMMARY OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC PURSUANT TO 16 TEX. ADMIN. CODE § 25.95

On April 29, 2011, CenterPoint Energy Houston Electric, LLC ("CenterPoint Houston" or "the Company") submitted a summary describing the Company's storm hardening plan over a five-year period beginning January 1, 2011. Pursuant to 16 Tex. Admin. Code § 25.95, CenterPoint Houston submits the following summary of material revisions to the storm hardening plan and a detailed summary of the Company's progress in implementing the plan.

Respectfully submitted,

Stacey Murphree
Manager, Regulatory & Rates
CenterPoint Energy Service Company LLC
1111 Louisiana St.
Houston, Texas 77002
(713) 207-6537
(713) 207-9840 (fax)
Stacey.Murphree@centerpointenergy.com

ATTACHMENT A

Storm Hardening Plan Summary

Submitted April 29, 2022

STORM HARDENING PLAN SUMMARY
OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC

I. 16 Tex. Admin. Code § 25.95(e)(1)

Construction standards, policies, procedures, and practices employed to enhance the reliability of utility systems, including overhead and underground transmission and distribution facilities

There were no material revisions to the transmission, substation, and distribution construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems. Minor revisions include the following:

1. Beginning in 2012, new overhead distribution services were limited to transformer banks consisting of three transformers no larger than 167 kVA each. This decreases the exposure of large overhead transformer banks and thus should reduce the number of transformer replacements during a major storm event.
2. All new overhead distribution freeway crossings are built on concrete poles.
3. Beginning in 2017, for transmission facility designs, CenterPoint Houston used the design requirements in the latest National Electrical Safety Code ("NESC") C2 2017 edition, which replaced the NESC C2 2012 edition.
4. Substation equipment maintenance is performed during planned intervals in accordance with North American Electric Reliability Corporation ("NERC") requirements and based on criteria that may include manufacturer's recommendations, equipment history, and operational experience.
5. As part of the Company's Intelligent Grid project, on-line monitoring equipment was installed on select power transformers to observe transformer conditions. The Company is not proactively installing transformer monitoring devices at non-Intelligent Grid locations, but all new transformers being purchased have a pre-installed monitoring device. The on-line monitoring information will assist in analyzing various temperature readings and in monitoring the cooling fans for the transformer. Microprocessor-based relay systems are also being installed on distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.
6. Beginning in 2014, the Company began installing additional guy strains in down guy installations on wood poles that carry energized distribution equipment.

7. Beginning in 2013, the Company began a proactive Underground Residential Distribution ("URD") Cable Life Extension Program ("CLEP") to assess URD spans and determine effective life.

There were no other material revisions to the distribution construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems.

II. 16 Tex. Admin. Code § 25.95(e)(2)

Vegetation Management Plan for distribution facilities, including a tree pruning methodology and pruning cycle, hazard tree identification and mitigation plans, and customer education and notification practices related to vegetation management

16 Tex. Admin. Code § 25.96(c) ("TAC") states that compliance with that section "fully satisfies the vegetation management planning and reporting requirements" of 16 TAC § 25.95(e)(2); therefore, this report does not contain information related to vegetation management.

III. 16 Tex. Admin. Code § 25.95(e)(3)

Plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and/or grid self-healing

There were minor revisions to the Company's plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and grid self-healing. These changes include the installation of Intelligent Grid automation equipment and technology. Electromechanical distribution circuit relays were replaced with microprocessor-based relays at the 31 designated Intelligent Grid substations. Electromechanical relays are being replaced at other substations on an as-needed basis as they approach their end of life. Microprocessor-based relays are being installed on new distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.

In March 2015, the Company installed an Advanced Distribution Management System ("ADMS") for improved situational awareness and management of its distribution system

infrastructure in near real-time. The project leverages the management and control of CenterPoint Houston's Advanced Metering System ("AMS") project to support the installation of intelligent grid automation equipment and technology. Together, the AMS and intelligent grid equipment and technology will allow for a more efficient grid operation, increase grid reliability, and enable enhanced grid automated recovery and restoration. The Intelligent Grid is anticipated to minimize the effects of power outages by detecting faulted circuits sooner and automatically rerouting power to affected customers. The Intelligent Grid is also expected to reduce the length of customer power outages.

In 2021, CenterPoint Houston commissioned fifty-eight (58) new intelligent grid switching devices as part of normal distribution capacity, reliability, or line protection requirements. CenterPoint Houston continues to expand its deployment of intelligent grid technology in areas that will achieve the greatest reliability impact.

By the end of 2021, CenterPoint Houston had added feeder fault information for 774 microprocessor relay feeders across 96 substations to the ADMS system.

CenterPoint Houston completed the installation of advanced meters on all of the Company's 2.2 million customer meters on July 1, 2012. In addition to the enhanced electric market operation, the advanced meters are capable of instantaneously reporting power outages at customer premises. CenterPoint Houston is using data analytics as a tool to process and filter customer meter data into operational metrics that facilitate operational efficiencies and reliability improvements.

IV. 16 Tex. Admin. Code § 25.95(e)(4)

Plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees

CenterPoint Houston's plans regarding distribution post storm damage assessment includes a continued commitment to complete a detailed and thorough inspection of all system damage after a major storm. This assessment provides additional information that has not been previously provided by a simple list of facilities that need to be repaired. Damage assessment data is the main factor that finalizes resource levels and is central information for planning and assigning work, determining additional material needs, determining and reporting estimated restoration dates, and documenting facility replacements for mapping records. CenterPoint Houston has established

contracts with multiple damage assessment contractors to ensure a timely, complete, and thorough assessment of system damage after a major storm.

There were no other material revisions to the Company's plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees.

V. 16 Tex. Admin. Code § 25.95(e)(5)

Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule

There were no material revisions to the Company's transmission and distribution pole construction standards and pole attachment policies or the transmission pole testing schedule. There were however minor revisions made to the Company's pole attachment policies. The Company uses its website to provide any prospective attaching entity detailed information regarding CenterPoint Houston's pole attachment practices. This information is in manual form and can be downloaded from the website. Upon installation, and from time to time thereafter, CenterPoint Houston may require any non-compliant attachment to be removed and re-attached properly at the sole cost and expense of the attaching entity.

CenterPoint Houston's proactive distribution Pole Maintenance Program provides that a portion of the distribution system poles be assessed annually by contract ground-line crews. Pole assessments include a visual and/or manual assessment. Visual pole assessments are comprised of a field observation for evidence of exterior decay or damage above the ground line. Poles that are seven years old or older are manually excavated and assessed for decay below the ground line, as well as sounded and bored to locate internal voids. Poles of sufficient strength to remain in service until the next scheduled assessment are treated (with a fumigant or preservative, as necessary) and tagged. Poles that are identified for reinforcement during these assessments are either treated and braced or replaced.

The Pole Maintenance Program also includes visual assessment of guy wires, including checking for guy wires that are damaged, broken, frayed or slack, and assessment of guy strains and anchors.

As part of the grid hardening initiative, pole assessments and treatment have been accelerated, so approximately 10% of the Company's poles are assessed annually, on average, on

a rolling ten-year cycle. As such, pole bracings and replacements will increase accordingly. Additional foreign poles containing Company facilities that may merit replacement by third parties are also identified.

VI. 16 Tex. Admin. Code § 25.95(e)(6)

Distribution feeder inspection schedule

In addition to the pole maintenance program discussed above (which as explained in the Company's contemporaneous report under § 25.94 was combined with the Company's Feeder Inspection Program in 2020), CenterPoint Houston utilizes the following programs that incorporate ground-based inspection programs of overhead distribution facilities. These programs are the Infra-Red Program, the Root Cause Analysis Program for the 10% Circuits, the Hot Fuse Program, and the Combine Pole Maintenance and Feeder Inspection Program. The only programs discussed below are those with material revisions.

(a) The Infra-Red Program

Infra-red technology allows the Company to see the heat generated by deteriorating components on the distribution system. These "Hot Spots" will eventually result in equipment failure and a loss of service. Infra-red technology provides a unique tool to find potential equipment outages before they occur, so that proactive repairs can be made prior to an outage. This program reduces the number of equipment failures and improves reliability by decreasing System Average Interruption Duration Index ("SAIDI") and System Average Interruption Frequency Index ("SAIFI").

Circuits are generally inspected on an eight-year cycle. CenterPoint Houston has selected 77 benchmark circuits that are representative of the overall distribution system and are inspected every two years to ensure that the eight-year cycle is adequate to achieve the desired reliability results. If a circuit is identified as a repeating 4+yr 10% or 300% circuit, then it is advanced on the infra-red inspection schedule to the current year. This additional focus on the circuits with the highest SAIDI and SAIFI minutes is done to address any performance issues. Also, circuits that are heavily loaded (greater than 500 amps) are inspected, as data has proven a higher failure rate of equipment when subjected to higher load.

Infra-red scans are made of the terminal poles at the substation and major equipment on the circuit, including pole-top switches, reclosers, regulators, and capacitors. Scans are also performed on the fuse cutouts, jumpers, splices, and transformers along the circuit backbone. The identified hot spots are reported, and repairs are made. If the problem is severe enough and there is a danger of imminent failure, then procedures are taken to isolate the device and initiate immediate repairs.

(b) The Root Cause Analysis Program for the 10% Circuits

The program is designed so that the action plan and recommended construction be completed within 120 days.

(c) The Combined Pole Maintenance and Feeder Inspection Program

In 2020 the Feeder Inspection Program merged into the Pole Maintenance Program. Through this program, distribution feeders are inspected on a periodic basis to identify and correct issues that could impact the reliable operation of the feeder. This periodic inspection and maintenance is expected to improve the performance of the feeders under adverse weather conditions. Damaged or broken facilities are identified, reports are made, and work orders to repair are issued accordingly.

(d) "As You Go" Inspections

As many as 700 CenterPoint Houston operations personnel are deployed in the field daily. This includes linemen, crew leaders, service consultants, and engineers. As personnel perform their daily business, they are encouraged to continually observe the condition of overhead facilities and report any unusual facility problems for effective resolution. Cameras have been made available to these field personnel, and they have received instructions to visually record any abnormal facility conditions to support work order creation and the dispatching of crews to priority issues.

VII. 16 Tex. Admin. Code § 25.95(e)(7)

Plans and procedures to enhance the reliability of overhead and underground transmission and distribution facilities through the use of transmission and distribution automation

In 2021, there were no material revisions to the Company's plans and procedures to enhance the reliability of the overhead and underground transmission or substation facilities through automation.

In 2011, CenterPoint Houston instituted a procedure to no longer install automation on line reclosers and pole-top switches. Instead, the Company utilizes the devices in the intelligent grid deployment. These devices are state of the art equipment that allow for the functionality of the existing equipment coupled with enhanced features. The Company can program these devices to automatically sectionalize for a fault and then reclose if the fault has had one of the following occurrences: cleared, auto-sectionalize without a reclose, a remote command to operate, or a local command in the same device. Since one device can be programmed or re-programmed to perform the functionality of several devices, the device can be quickly modified in a distribution system that is ever changing. The devices are designed to interface with state-of-the-art communication protocols, so that there is an interface with the new distribution communication network.

CenterPoint Houston maintains a hardened transmission primary control center with redundant computer systems separated by firewalls. The transmission control center provides the Company the ability to monitor and remotely operate its transmission network from a secure, storm-hardened facility, including the ability to dynamically rate transmission circuits and restore service to customers impacted by a storm through remote control of switching equipment.

CenterPoint Houston completed construction of a back-up transmission control center in December 2015, in compliance with NERC Reliability Standard EOP-008. The back-up control center is a secure and storm hardened facility with redundant computer systems and can perform the same functions provided by the primary transmission control center in the event the functionality of the existing transmission control center is impaired or lost. In January 2016, the backup transmission control center received certification from NERC/Texas Reliability Entity ("TRE") that the new facility met all requirements to operate the CenterPoint Houston transmission system independent of the primary control center.

VIII. 16 Tex. Admin. Code § 25.95(e)(8)

Plans and procedures to comply with the most recent National Electric Safety Code (NESC) wind loading standards in hurricane prone areas for new construction and rebuilds of the transmission and distribution system

There were no material revisions to the Company's plans and procedures to comply with the most recent NESC wind load standards in hurricane prone areas for new construction and rebuilds of the transmission and distribution system. CenterPoint Houston adopted the latest NESC C2-2017 design requirements into its design criteria for overhead lines.

IX. 16 Tex. Admin. Code § 25.95(e)(9)

Plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B (or equivalent) standards

All new overhead distribution freeway crossings are built using concrete poles. There were no other material revisions to the Company's plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B or equivalent standards.

X. 16 Tex. Admin. Code § 25.95(e)(10)

Plans and procedures to develop a damage/outage prediction model for the transmission and distribution system

There were no material revisions to the Company's plans and procedures to develop a damage or outage prediction model for the transmission and distribution system.

XI. 16 Tex. Admin. Code § 25.95(e)(11)

Plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities

There were no material revisions to the Company's plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities.

XII. 16 Tex. Admin. Code § 25.95(e)(12)

Plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads

There were no material revisions to the Company's plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads.

Temporary Mobile Generation

As a result of H.B. 2483 passed during the 2021 Texas Legislative session, transmission and distribution utilities may lease and operate temporary mobile generation units to aid in the restoration of distribution level customers during a widespread power outage, as defined by PURA § 39.918(a). CenterPoint Houston has leased up to approximately 500 MW of temporary mobile generation units, with actual output depending on ambient and other operating conditions. As part of the lease, the temporary mobile generation provider will provide certain services related to the leased temporary mobile generation units.

During a widespread power outage, CenterPoint Houston will operate its temporary mobile generation units in its sole discretion, based on good utility practice, based on the actual conditions of a particular event, based on system and customer needs, in coordination with appropriate government officials and regulators, and subject to the provisions in CenterPoint Houston's Tariff. Some temporary mobile generation units have been pre-positioned at certain locations in CenterPoint's service area, but individual units may be relocated in coordination with the temporary mobile generation provider as operating conditions, road conditions, and other safety considerations permit.

XIII. Other Storm Hardening Plans

CenterPoint Houston has the following revised and additional plans to harden its transmission and substation facilities during the next five years.

Project Name	Location (City/ County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
Moody – Stewart #1016	Galveston/ Galveston	Rebuild portion of 138kV Ckt. 63C to meet the most recent NESC C2-2017 extreme wind loading requirements.	7/1/2021	5/31/2022	$32,987,000
WWE: Str #04215-04244 Airflow Spoilers #22-21	Lane City/Wharton	Retrofit portion of 138 kV Ckt. 04F, 60C with anti-galloping devices to avoid damage from icing conditions.	1/4/2022	12/6/2022	$2,100,000
WWE: Str #04618-05984 Airflow Spoilers #22-22	Damon/Brazoria	Retrofit portion of 138 kV Ckt. 02B, 02K with anti-galloping devices to avoid damage from icing conditions.	2/7/2022	12/30/2022	$2,750,000
WWE: Str #32714-31410 Airflow Spoilers #22-23	Angleton/Brazoria	Retrofit portion of Ckt. 04C, 04D, 04B,04A with anti-galloping devices to avoid damage from icing conditions.	11/1/2021	12/3/2022	$8,620,000
WWE: Str #11740-11758 Airflow Spoilers #22-24	Galveston/ Galveston	Retrofit portion of 138 kV Ckt. 93C with anti-galloping devices to avoid damage from icing conditions.	3/28/2022	4/20/2022	$400,000

WWE: Str #18740-18729 Airflow Spoilers #22-28	Hockley/Harris	Retrofit portion of 138 kV Ckt. 77C, 66B with anti-galloping devices to avoid damage from icing conditions.	3/7/2022	5/6/2022	$800,000
WWE: Str #27594-21441 Zenith to Klug Airflow Spoilers #22-29	Katy/Harris	Retrofit portion of 138 kV Ckt. 09J, 76A with anti-galloping devices to avoid damage from icing conditions.	10/2/2022	12/1/2022	$3,090,000
WWE: Str #16645-16633 Airflow Spoilers #22-32	Houston/Harris	Retrofit portion of 138 kV Ckt. 38B with anti-galloping devices to avoid damage from icing conditions.	3/2/2022	5/6/2022	$250,000
WWE: Str #13467-13397 Airflow Spoilers #22-34	Morgans Point/Harris	Retrofit portion of 138 kV Ckt. 85A, 87C, 87B, 87A, 88A with anti-galloping devices to avoid damage from icing conditions.	2/21/2022	4/29/2022	$5,572,250
WWE: Str #16068-16088 Airflow Spoilers #22-35	Houston/Harris	Retrofit portion of 138 kV Ckt. 94C, 08G with anti-galloping devices to avoid damage from icing conditions.	12/13/2021	4/15/2022	$1,359,534

WWE: Str #33913-33915 Airflow Spoilers #22-37	Baytown/Chambers	Retrofit portion of 138 kV Ckt. 86D, 86J with anti-galloping devices to avoid damage from icing conditions.	2/8/2022	5/31/2022	$298,000
Greens Bayou Erosion Relocate Str#10659 #1060	Houston/Harris	Rebuild portion of 138kV Ckt. 77A, 21A and install steel poles to provide resiliency from river erosion.	1/4/2021	5/13/2022	$1,994,000
Sienna Brazos River Crossing #1018	Fort Bend, Fort Bend	Rebuild portion of 345kV Ckt. 99B, 345kV Ckt. 18C, 138kV Ckt. 80A, and 138kV Ckt. 82A and install steel poles to provide resiliency from river erosion.	2/1/2021	5/17/2022	$11,740,000
Fort Bend Brazos River Crossing (Structures 6449-6453) #1033-1	Houston/ Harris	Rebuild portion of 138kV Ckt. 80B and install steel poles to provide resiliency from river erosion.	8/2/2021	8/30/2022	$7,738,000
Matagorda Colorado River Crossing #1400-1	Matagorda, Matagorda	Rebuild portion of 345kV Ckt. 27C and 345kV Ckt. 18A and install steel poles to provide resiliency from river erosion.	10/29/20	6/30/22	$7,224,000

Fort Bend Brazos River Crossing (Structures 35367-35370) #1078-1	Houston/ Harris	Rebuild portion of 138kV Ckt. 60A and install steel poles to provide resiliency from river erosion.	6/15/22	03/30/2023	$4,453,000
Addicks Substation	Harris	Elevate distribution control cubicle, structures, breakers, and equipment terminal boxes to avoid damage from flooding.	1/1/2022	5/15/2023	$2,900,000
Greens Bayou Substation	Harris	Move protection and control equipment for 138 kV switchyard into new elevated control cubicle, replace (5) oil-filled breakers, and elevate equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	2/3/2021	5/15/2022	$3,500,000

Greens Bayou Substation	Harris	Elevate 345 kV control cubicle and equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	1/1/2022	5/15/2023	$2,100,000
Lake Jackson Substation	Brazoria	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	4/1/2022	12/15/2023	$2,000,000
North Belt Substation	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2023	5/15/2024	$2,000,000
North Belt Substation	Harris	Elevate transmission control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2024	5/15/2025	$3,000,000
Brays Substation	Harris	Elevate distribution control cubicle an equipment terminal boxes to avoid damage from flooding.	1/1/2025	5/15/2026	$2,000,000

XIV. Detailed Summary of the Company's Progress in Implementing the Plan

Section	Progress During 2021
I. Construction standards, policies, procedures, and practices	• All distribution, substation, and transmission construction standards, planning design criteria, facility design criteria, system protection practices, and maintenance practices were followed.
II. Vegetation management	• Vegetation management will be reported pursuant to 16 TAC § 25.96.
III. Smart Grid	• 58 intelligent grid switching devices were installed in 2021. • DSCADA has the capability to remotely control approximately 1,704 distribution switching devices (520 legacy devices and 1,184 IGSD devices).
IV. Post storm damage assessment of distribution and transmission systems	• Contracts were established with multiple damage assessment contractors to identify distribution damage after a major storm. • Procedures for transmission damage assessment were established.
V. Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule	• All pole construction standards were followed. • All Federal Communications Commission and Company attachment policies were followed. • 102,638 CenterPoint Houston distribution poles were assessed across 381 circuits
VI. Distribution feeder inspections	• 97 distribution circuits had infrared inspections. • As part of the Root Cause Analysis Program, circuit inspections were performed on the 10% and 300% circuits. • As part of the Hot Fuse Program, inspections were made of laterals that had recurring outages.
VII. Transmission, Substation, Distribution and Control Center automation	• Automation was a standard part of transmission, substation and control center operations. • See Section III. Smart Grid above for distribution automation progress. • Construction on the transmission backup control center was completed in December 2015.

VIII. NESC wind loading standards for transmission and distribution	• NESC wind loading requirements for transmission, substation, and distribution facilities were followed.
IX. Consideration for NESC Grade B (or equivalent) standards for distribution	• Freeway and railroad crossings were constructed to B grade requirements pursuant to the NESC. • New overhead freeway crossings were constructed on concrete poles. • Step transformer banks using 250 to 500 KVA transformers were constructed on class H2 poles. • 35 kV regulator banks were built with four pole construction. • Single phase primary tangent construction when built on class 3 poles meets grade B construction.
X. Damage/outage prediction model for the transmission and distribution system	• The Company has several tools for predicting distribution and transmission system damage and potential flooding in substations.
XI. Use of distribution structures owned by other entities	• As part of the Company's pole inspection program, the contractors inspected all foreign poles in the designated areas. • The foreign poles that merit replacement or bracing were handled at the expense of the other entity.
XII. Restoration of service to priority loads and targeted hardening of infrastructure used to serve priority loads	• All guidelines in the Company's Emergency Operations Plan regarding restoration priorities after a major outage event, including priority customers, were followed.

XIII. Other storm hardening plans	• Elevation of the control cubicles at Wallisville Substation was completed in 2020. Elevation of the control cubicle, breakers, and equipment terminal boxes at West Columbia Substation was completed in 2020. Elevation of the control cubicle & terminal boxes at Addicks Transmission Substation was completed in November 2021. Work began in 2020 to elevate the control cubicle and equipment terminal boxes at Addicks Distribution Substation. Work to begin on Lake Jackson in 2022 to elevate the control cubicle and equipment terminal boxes. • Five transmission system hardening projects were completed in 2021 meet the most recent NESC C2-2017 extreme wind loading requirements. These included rebuild and reconductor portion of 138kV Ckt. 08G of the Highland Tap; rebuild and reconductor a portion of 138kV Ckt. 08G Crosby - PSARCO; rebuild and reconductor a portion of 138kV Ckt. 66F Highland – Highlands Corner; rebuild and reconductor a portion of 138kV Ckt. 95B Morgans Point to Sandy Point; modify 138kV Ckt. 04A Clear Creek Crossing; rebuild and reconductor a portion of 138kV Ckt. 60B; rebuild and reconductor a portion of 345kV Ckt. 99C and Ckt. 98B. Six transmission system hardening project completed in 2021 to install anti-galloping devices and avoid damage from icing conditions to retrofit a portion of 138kV Ckt. 03D & 21J Greens Bayou Plant – White Oak Sub and Hardy- Airline; retrofit a portion of 138kV Ckt. 60A, 60E & 09G North of Fort Bend Sub; retrofit portion of 138 kV Ckt. 25D, 73D Flewellen – Obrien; retrofit portion of 138 kV Ckt. 73E, 81J West of Eureka Sub; retrofit portion of 138 kV Ckt. 87F, 88E East of S.R. Bertron Sub; retrofit portion of 138 kV Ckt. 86D, 86J Connor Sub Tap.

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PROJECT NO. 39339

REPORT FOR ELECTRIC UTILITY INFRASTRUCTURE STORM HARDENING PURSUANT TO 16 TEX. ADMIN. CODE § 25.95	**§ § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

STORM HARDENING PLAN SUMMARY OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC PURSUANT TO 16 TEX. ADMIN. CODE § 25.95

Contact: Stacey Murphree
Telephone: 713-207-6537
Stacey.Murphree@CenterPointEnergy.com

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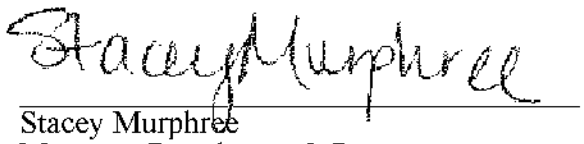
REPORT FOR ELECTRIC UTILITY INFRASTRUCTURE STORM HARDENING PURSUANT TO 16 TEX. ADMIN. CODE § 25.95	§ § § §	**PUBLIC UTILITY COMMISSION OF TEXAS**

STORM HARDENING PLAN SUMMARY OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC PURSUANT TO 16 TEX. ADMIN. CODE § 25.95

On April 29, 2011, CenterPoint Energy Houston Electric, LLC ("CenterPoint Houston" or "the Company") submitted a summary describing the Company's storm hardening plan over a five-year period beginning January 1, 2011. Pursuant to 16 Tex. Admin. Code § 25.95, CenterPoint Houston submits the following summary of material revisions to the storm hardening plan and a detailed summary of the Company's progress in implementing the plan.

Respectfully submitted,



Stacey Murphree
Manager, Regulatory & Rates
CenterPoint Energy Service Company LLC
1111 Louisiana St.
Houston, Texas 77002
(713) 207-6537
(713) 207-9840 (fax)
Stacey.Murphree@centerpointenergy.com

ATTACHMENT A

Storm Hardening Plan Summary
Submitted April 28, 2023

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STORM HARDENING PLAN SUMMARY
OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC

I. 16 Tex. Admin. Code § 25.95(e)(1)

Construction standards, policies, procedures, and practices employed to enhance the reliability of utility systems, including overhead and underground transmission and distribution facilities

There were no material revisions to the transmission and substation construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems. There were however several major revisions to distribution construction standards and practices as outlined below:

1. Beginning in 2022, all new distribution freeway crossings are built underground where feasible. If underground is not feasible, then overhead crossings are built on concrete poles. This design decreases the occurrence of overhead lines obstructing major throughfares during a major storm event.
2. Beginning in 2022, the Company adopted NESC Rule 250C (Extreme Wind) and 250D (Extreme Ice with Concurrent Wind Loading) to apply to all new and replacement distribution structures regardless of height. This adoption will harden distribution structures to better withstand extreme weather events.
3. Beginning in 2022, distribution lines in some areas within the Company's territory have been identified to be at risk of damage from galloping conductors. In these designated areas a special tangent pole framing is used for new or replacement construction. This design hardens distribution lines and structures to better withstand ice buildup during cold weather.
4. Beginning in 2022, distribution critical infrastructure such as switching devices, large transformer banks, regulator banks, double circuits, junction poles, terminal poles, and structures in the first circuit section outside the substation will utilize poles with an engineered material.
5. The Company has begun utilizing cutout mounted reclosers on distribution 12kV multi-phase and 35kV single-phase lateral circuits to reduce the number of outages resulting from momentary faults.

6. For new distribution poles installed using hydro excavation, crushed limestone is used as the backfill material. This backfill provides a more stable foundation and improve pole support and reduce leaning poles.
7. Beginning in 2014, the Company began installing additional guy strains in down guy installations on wood poles that carry energized distribution equipment.
8. Beginning in 2013, the Company began a proactive Underground Residential Distribution ("URD") Cable Life Extension Program ("CLEP") to assess URD spans and determine effective life.
9. Beginning in 2017, for transmission facility designs, CenterPoint Houston used the design requirements in the latest National Electrical Safety Code ("NESC") C2 2017 edition, which replaced the NESC C2 2012 edition.
10. Substation equipment maintenance is performed during planned intervals in accordance with North American Electric Reliability Corporation ("NERC") requirements and based on criteria that may include manufacturer's recommendations, equipment history, and operational experience.
11. As part of the Company's Intelligent Grid project, on-line monitoring equipment was installed on select power transformers to observe transformer conditions. The Company is not proactively installing transformer monitoring devices at non-Intelligent Grid locations, but all new transformers being purchased have a pre-installed monitoring device. The on-line monitoring information will assist in analyzing various temperature readings and in monitoring the cooling fans for the transformer. Microprocessor-based relay systems are also being installed on distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.

There were no other material revisions to the distribution construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems.

II. 16 Tex. Admin. Code § 25.95(e)(2)

Vegetation Management Plan for distribution facilities, including a tree pruning methodology and pruning cycle, hazard tree identification and mitigation plans, and customer education and notification practices related to vegetation management

16 Tex. Admin. Code § 25.96(c) ("TAC") states that compliance with that section "fully satisfies the vegetation management planning and reporting requirements" of 16 TAC § 25.95(e)(2); therefore, this report does not contain information related to vegetation management.

III. 16 Tex. Admin. Code § 25.95(e)(3)

Plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and/or grid self-healing

There were minor revisions to the Company's plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and grid self-healing. These changes include the installation of Intelligent Grid automation equipment and technology. Electromechanical distribution circuit relays were replaced with microprocessor-based relays at the 31 designated Intelligent Grid substations. Electromechanical relays are being replaced at other substations on a year over year program basis. Microprocessor-based relays are being installed on new distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.

In March 2015, the Company installed an Advanced Distribution Management System ("ADMS") for improved situational awareness and management of its distribution system infrastructure in near real-time. The project leverages the management and control of CenterPoint Houston's Advanced Metering System ("AMS") project to support the installation of intelligent grid automation equipment and technology. Together, the AMS and intelligent grid equipment and technology will allow for a more efficient grid operation, increase grid reliability, and enable enhanced grid automated recovery and restoration. The Intelligent Grid is anticipated to minimize the effects of power outages by detecting faulted circuits sooner and automatically rerouting power to affected customers. The Intelligent Grid is also expected to reduce the length of customer power outages.

In 2022, CenterPoint Houston commissioned one hundred and fifty (150) new intelligent grid switching devices as part of normal distribution capacity, reliability, or line protection requirements. CenterPoint Houston continues to expand its deployment of intelligent grid technology in areas that will achieve the greatest reliability impact.

To date, CenterPoint Houston had added feeder fault information for 774 microprocessor relay feeders across 96 substations to the ADMS system.

CenterPoint Houston completed the installation of advanced meters on all the Company's 2.2 million customer meters on July 1, 2012. In addition to the enhanced electric market operation, the advanced meters are capable of instantaneously reporting power outages at customer premises. CenterPoint Houston is using data analytics as a tool to process and filter customer meter data into operational metrics that facilitate operational efficiencies and reliability improvements.

Beginning in 2022, the Company has begun utilizing distribution 12kV multi-phase and 35kV single-phase lateral circuits cutout mounted reclosers to reduce the number of outages resulting from momentary faults.

IV. 16 Tex. Admin. Code § 25.95(e)(4)

Plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees

CenterPoint Houston's plans regarding distribution post storm damage assessment includes a continued commitment to complete a detailed and thorough inspection of all system damage after a major storm. This assessment provides additional information that has not been previously provided by a simple list of facilities that need to be repaired. Damage assessment data is the main factor that finalizes resource levels and is central information for planning and assigning work, determining additional material needs, determining and reporting estimated restoration dates, and documenting facility replacements for mapping records. CenterPoint Houston has established contracts with multiple damage assessment contractors to ensure a timely, complete, and thorough assessment of system damage after a major storm.

There were no other material revisions to the Company's plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees.

V. 16 Tex. Admin. Code § 25.95(e)(5)

Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule

There were no material revisions to the Company's transmission and distribution pole construction standards and pole attachment policies or the transmission pole testing schedule. There were however minor revisions made to the Company's pole attachment policies. The Company uses its website to provide any prospective attaching entity detailed information regarding CenterPoint Houston's pole attachment practices. This information is in manual form and can be downloaded from the website. Upon installation, and from time to time thereafter, CenterPoint Houston may require any non-compliant attachment to be removed and re-attached properly at the sole cost and expense of the attaching entity.

CenterPoint Houston's proactive distribution Pole Maintenance Program provides that a portion of the distribution system poles be assessed annually by contract ground-line crews. Pole assessments include a visual and/or manual assessment. Visual pole assessments are comprised of a field observation for evidence of exterior decay or damage above the ground line. Poles that are seven years old or older are manually excavated and assessed for decay below the ground line, as well as sounded and bored to locate internal voids. Poles of sufficient strength to remain in service until the next scheduled assessment are treated (with a fumigant or preservative, as necessary) and tagged. Poles that are identified for reinforcement during these assessments are either treated and braced or replaced.

The Pole Maintenance Program also includes visual assessment of guy wires, including checking for guy wires that are damaged, broken, frayed or slack, and assessment of guy strains and anchors.

As part of the grid hardening initiative, pole assessments and treatment have been accelerated, so approximately 10% of the Company's poles are assessed annually, on average, on a rolling ten-year cycle. As such, pole bracings and replacements will increase accordingly. Additional foreign poles containing Company facilities that may merit replacement by third parties are also identified.

VI. 16 Tex. Admin. Code § 25.95(e)(6)

Distribution feeder inspection schedule

In addition to the pole maintenance program discussed above (which as explained in the Company's contemporaneous report under 16 TAC § 25.94 was combined with the Company's Feeder Inspection Program in 2020), CenterPoint Houston utilizes the following programs that incorporate ground-based inspection programs of overhead distribution facilities. These programs are the Infra-Red Program, the Root Cause Analysis Program for the 10% Circuits, the Hot Fuse Program, and the Combine Pole Maintenance and Feeder Inspection Program. The only programs discussed below are those with material revisions.

(a) The Infra-Red Program

Infra-red technology allows the Company to see the heat generated by deteriorating components on the distribution system. These "Hot Spots" will eventually result in equipment failure and a loss of service. Infra-red technology provides a unique tool to identify potential equipment outages before they occur, so that proactive repairs can be made prior to an outage. This program is designed to reduce the number of equipment failures, customer outages, and improves system reliability by decreasing System Average Interruption Duration Index ("SAIDI") and System Average Interruption Frequency Index ("SAIFI").

Circuits are generally inspected on an eight-year cycle. CenterPoint Houston has selected 83 benchmark circuits that are representative of the overall distribution system and are inspected every two years to ensure that the eight-year cycle is adequate to achieve the desired reliability results. If a circuit is identified as a repeating 4+yr 10% or 300% circuit, then it is advanced on the infra-red inspection schedule to the current year. This additional focus on the circuits with the highest SAIDI and SAIFI minutes is done to address any performance issues. Also, circuits that are heavily loaded (greater than 500 amps) are inspected, as data has proven a higher failure rate of equipment when subjected to higher load.

Infra-red scans are made of the terminal poles at the substation and major equipment on the circuit, including pole-top switches, reclosers, regulators, and capacitors. Scans are also performed on the fuse cutouts, jumpers, splices, and transformers along the circuit backbone. The identified hot spots are reported, and necessary repairs are made. If the problem is severe enough, and there is a danger of imminent equipment failure, then procedures are taken to isolate the device and initiate immediate repair and equipment replacement.

(b) The Root Cause Analysis Program for the 10% Circuits

The program is designed so that the action plan and recommended construction be completed within 120 days.

(c) The Combined Pole Maintenance and Feeder Inspection Program

In 2020 the Feeder Inspection Program merged into the Pole Maintenance Program. Through this program, distribution feeders are inspected on a periodic basis to identify and correct issues that could impact the reliable operation of the feeder. This periodic inspection and maintenance is expected to improve the performance of the feeders under adverse weather conditions. Damaged or broken facilities are identified, reports are made, and work orders to repair are issued accordingly.

(d) "As You Go" Inspections

As many as 700 CenterPoint Houston operations personnel are deployed in the field daily. This includes linemen, crew leaders, service consultants, and engineers. As personnel perform their daily business, they are encouraged to continually observe the condition of overhead facilities and report any unusual facility problems for effective resolution. Cameras have been made available to these field personnel, and they have received instructions to visually record any abnormal facility conditions to support work order creation and the dispatching of crews to priority issues.

VII. 16 Tex. Admin. Code § 25.95(e)(7)

Plans and procedures to enhance the reliability of overhead and underground transmission and distribution facilities through the use of transmission and distribution automation

In 2022, there were no material revisions to the Company's plans and procedures to enhance the reliability of the overhead and underground transmission or substation facilities through automation.

In 2011, CenterPoint Houston instituted a procedure to no longer install automation on line reclosers and pole-top switches. Instead, the Company utilizes the devices in the intelligent grid deployment. These devices are state of the art equipment that allow for the functionality of the existing equipment coupled with enhanced features. The Company can program these devices to automatically sectionalize for a fault and then reclose if the fault has had one of the following occurrences: cleared, auto-sectionalize without a reclose, a remote command to operate, or a local command in the same device. Since one device can be programmed or re-programmed to perform the functionality of several devices, the device can be quickly modified in a distribution system that is ever changing. The devices are designed to interface with state-of-the-art communication protocols, so that there is an interface with the new distribution communication network.

CenterPoint Houston maintains a hardened transmission primary control center with redundant computer systems separated by firewalls. The transmission control center provides the Company the ability to monitor and remotely operate its transmission network from a secure, storm-hardened facility, including the ability to dynamically rate transmission circuits and restore service to customers impacted by a storm through remote control of switching equipment.

CenterPoint Houston completed construction of a back-up transmission control center in December 2015, in compliance with NERC Reliability Standard EOP-008. The back-up control center is a secure and storm hardened facility with redundant computer systems and can perform the same functions provided by the primary transmission control center in the event the functionality of the existing transmission control center is impaired or lost. In January 2016, the backup transmission control center received certification from NERC/Texas Reliability Entity ("TRE") that the new facility met all requirements to operate the CenterPoint Houston transmission system independent of the primary control center.

VIII. 16 Tex. Admin. Code § 25.95(e)(8)

Plans and procedures to comply with the most recent National Electric Safety Code (NESC) wind loading standards in hurricane prone areas for new construction and rebuilds of the transmission and distribution system

CenterPoint Houston adopted the latest NESC C2-2017 design requirements into its design criteria for overhead lines. Beginning in 2022, the Company adopted NESC Rule 250C (Extreme

Wind) and 250D (Extreme Ice with Concurrent Wind Loading) to apply to all new and replacement distribution structures regardless of height.

IX. 16 Tex. Admin. Code § 25.95(e)(9)

Plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B (or equivalent) standards

All new distribution freeway crossings are built underground where feasible. If underground construction is not feasible, then an overhead crossing utilizing concrete poles will be constructed.

There were no other material revisions to the Company's plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B or equivalent standards.

X. 16 Tex. Admin. Code § 25.95(e)(10)

Plans and procedures to develop a damage/outage prediction model for the transmission and distribution system

There were no material revisions to the Company's plans and procedures to develop a damage or outage prediction model for the transmission and distribution system.

XI. 16 Tex. Admin. Code § 25.95(e)(11)

Plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities

There were no material revisions to the Company's plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities.

XII. 16 Tex. Admin. Code § 25.95(e)(12)

Plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads

There were no material revisions to the Company's plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used

to serve priority loads.

Temporary Emergency Electric Energy Facilities

As a result of H.B. 2483 passed during the 2021 Texas Regular Legislative session, transmission and distribution utilities may lease and operate temporary emergency electric energy facilities to aid in the restoration of distribution level customers during certain widespread power outages, as defined by PURA § 39.918(a). CenterPoint Houston has leased up to approximately 500 MW of temporary emergency electric energy facilities, with actual output depending on ambient and other operating conditions. As part of the lease, the temporary emergency electric energy facilities provider will provide certain services related to the leased temporary emergency electric energy facilities. These facilities are placed inside distribution substations spread across the service territory to allow a faster deployment during a potential ERCOT load shed event.

During a widespread power outage, CenterPoint Houston will operate its temporary emergency electric energy facilities at its sole discretion, based on good utility practice, based on the actual conditions of a particular event, based on system and customer needs, in coordination with appropriate government officials and regulators, and subject to the provisions in CenterPoint Houston's Tariff. Some temporary emergency electric energy facilities have been pre-positioned at certain locations in CenterPoint's service area, but individual facilities may be relocated in coordination with the temporary emergency electric energy facilities provider as operating conditions, road conditions, and other safety considerations allow.

XIII. Other Storm Hardening Plans

CenterPoint Houston has the following revised and additional plans to harden its transmission and substation facilities during the next five years.

Project Name	Location (City/ County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
Moody – Stewart #1016	Galveston/ Galveston	Rebuild portion of 138kV Ckt. 63C to meet the most recent NESC C2-2017 extreme wind loading	11/9/21	5/20/23	$34,463,000

		requirements.			
WWE: Str #04215-04244 Airflow Spoilers #22-21	Lane City/Wharton	Retrofit portion of 138 kV Ckt. 04F, 60C with anti-galloping devices to avoid damage from icing conditions.	1/4/2022	2/20/2023	$2,100,000
WWE: Str #04618-05984 Airflow Spoilers #22-22	Damon/Brazoria	Retrofit portion of 138 kV Ckt. 02B, 02K with anti-galloping devices to avoid damage from icing conditions.	2/7/22	2/28/23	$2,750,000
WWE: Str #32714-31410 Airflow Spoilers #22-23	Angleton/Brazoria	Retrofit portion of Ckt. 04C, 04D, 04B,04A with anti-galloping devices to avoid damage from icing conditions.	2/24/22	5/30/23	$8,620,000
WWE: Str #27594-21441 Zenith to Klug Airflow Spoilers #22-29	Katy/Harris	Retrofit portion of 138 kV Ckt. 09J, 76A with anti-galloping devices to avoid damage from icing conditions.	11/7/22	5/24/23	$3,090,000
WWE: Str #13467-13397 Airflow Spoilers #22-34	Morgans Point/Harris	Retrofit portion of 138 kV Ckt. 85A, 87C, 87B, 87A, 88A with anti-galloping devices to avoid damage from icing conditions.	2/21/22	3/31/23	$5,572,250

Greens Bayou Erosion Relocate Str#10659 #1060	Houston/Harris	Rebuild portion of 138kV Ckt. 77A, 21A and install steel poles to provide resiliency from river erosion.	3/18/22	1/15/23	$1,994,000
Sienna Brazos River Crossing #1018	Fort Bend, Fort Bend	Rebuild portion of 345kV Ckt. 99B, 345kV Ckt. 18C, 138kV Ckt. 80A, and 138kV Ckt. 82A and install steel poles to provide resiliency from river erosion.	4/7/21	1/13/23	$19,423,000
Matagorda Colorado River Crossing #1400	Matagorda, Matagorda	Rebuild portion of 345kV Ckt. 27C and 345kV Ckt. 18A and install steel poles to provide resiliency from river erosion.	10/29/20	4/30/23	$8,857,000
Fort Bend Brazos River Crossing (Structures 35367-35370) #1078-1	Houston/ Harris	Rebuild portion of 138kV Ckt. 60A and install steel poles to provide resiliency from river erosion.	10/3/22	6/30/23	$5,956,000
Greens Bayou Substation	Harris	Move protection and control equipment for 138 kV switchyard into	2/3/2021	4/15/2023	$3,500,000

		new elevated control cubicle, replace (5) oil-filled breakers, and elevate equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.			
Greens Bayou Substation	Harris	Elevate 345 kV control cubicle and equipment terminal boxes to avoid damage from flooding. Upgrade remote end relaying as necessary.	1/1/2022	5/15/2023	$2,100,000
Lake Jackson Substation	Brazoria	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	4/1/2022	12/15/2023	$2,000,000
North Belt Substation	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	4/1/2023	12/15/2024	$2,000,000
North Belt Substation	Harris	Elevate transmission control cubicle and equipment terminal boxes to avoid	1/1/2024	5/15/2025	$3,000,000

		damage from flooding.			
Brays Substation	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	6/1/2022	12/15/2023	$2,000,000
Treaschwig	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	5/24/2022	12/15/2023	$3,000,000
Brazos Valley	Fort Bend	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2025	5/15/2026	$2,000,000
Parkway	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2025	5/15/206	$2,000,000
Telephone	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2026	5/15/2027	$2,000,000

Freeman	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/12026	5/15/2027	$1,700,000

XIV. Detailed Summary of the Company's Progress in Implementing the Plan

Section	Progress During 2022
I. Construction standards, policies, procedures, and practices	• All distribution, substation, and transmission construction standards, planning design criteria, facility design criteria, system protection practices, and maintenance practices were followed.
II. Vegetation management	• Vegetation management will be reported pursuant to 16 TAC § 25.96.
III. Smart Grid	• 129 new intelligent grid switching devices were installed in 2022. • DSCADA has the capability to remotely control approximately 1,815 distribution switching devices (502 legacy devices and 1,313 IGSD devices).
IV. Post storm damage assessment of distribution and transmission systems	• Contracts were established with multiple damage assessment contractors to identify distribution damage after a major storm. • Procedures for transmission damage assessment were established.
V. Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule	• All pole construction standards were followed. • All Federal Communications Commission and Company attachment policies were followed. • 104,820 CenterPoint Houston distribution poles were assessed across 433 circuits
VI. Distribution feeder inspections	• 350 distribution circuits had infrared inspections. • As part of the Root Cause Analysis Program, circuit inspections were performed on the 10% and 300% circuits. • As part of the Hot Fuse Program, inspections were made of laterals that had recurring outages.

VII. Transmission, Substation, Distribution and Control Center automation	• Automation was a standard part of transmission, substation and control center operations. • See Section III. Smart Grid above for distribution automation progress. • Construction on the transmission backup control center was completed in December 2015.
VIII. NESC wind loading standards for transmission and distribution	• NESC Rule 250C (Extreme Wind) and 250D (Extreme Ice with Concurrent Wind Loading), requirements for transmission, substation, and distribution facilities were followed.
IX. Consideration for NESC Grade B (or equivalent) standards for distribution	• New Freeway crossings utilized underground construction where feasible. In all other situations, concrete pole construction was utilized • Railway crossings were constructed to B grade requirements pursuant to the NESC. • All critical infrastructure was installed on poles composed of a non-wood, engineered material like fiberglass, ductile iron, and/or concrete. • Single phase primary tangent construction when built on class 3 poles meets grade B construction.
X. Damage/outage prediction model for the transmission and distribution system	• The Company has several tools for predicting distribution and transmission system damage and potential flooding in substations.
XI. Use of distribution structures owned by other entities	• As part of the Company's pole inspection program, the contractors inspected all foreign poles in the designated areas. • The foreign poles that merit replacement or bracing were handled at the expense of the other entity.
XII. Restoration of service to priority loads and targeted hardening of infrastructure used to serve priority loads	• All guidelines in the Company's Emergency Operations Plan regarding restoration priorities after a major outage event, including priority customers, were followed.

XIII. Other storm hardening plans	• In 2022, CenterPoint Houston also relocated the control cubicle at the Treaschwig Substation to mitigate damage from flooding. CenterPoint Houston also continued activities with elevating the Addicks Transmission Substation control cubicle and equipment terminal boxes. Additionally, CenterPoint Houston also coordinated the efforts to elevate the Greens Bayou 345KV Substation control cubicle and equipment terminal boxes. • One transmission system hardening project was completed in 2022 to meet the most recent NESC C2-2017 extreme wind loading requirements. This included the rebuilding and reconductor portion of 138kV Ckt. 80B Brazos River Crossing. Five transmission system hardening project completed in 2022 to install anti-galloping devices and avoid damage from icing conditions to retrofit a portion of 138kV Ckt. 93C-1 LaMarque – W. Galveston; retrofit a portion of 138kV Ckt 77C-1 Hockley - LCRA Macedonia and a portion of 138kV Ckt 66B-1 Tomball – Hockley; retrofit a portion of 69 kV Ckt. 38B-1 Clinton – Greens Bayou; retrofit a portion of 138kV Ckt 94C-3 from Switch#7945 – PSArco and a portion of 138kV Ckt 08G-1 Crosby-Highlands – PSArco; retrofit a portion of 138 kV Ckt. 80B-1 W.A. Parish – Imperial Sub.

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PROJECT NO. 39339

REPORT FOR ELECTRIC UTILITY INFRASTRUCTURE STORM HARDENING PURSUANT TO 16 TEX. ADMIN. CODE § 25.95	**§ § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

STORM HARDENING PLAN SUMMARY OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC PURSUANT TO 16 TEX. ADMIN. CODE § 25.95

Contact: Stacey Murphree
Telephone: 713-207-6537
Stacey.Murphree@CenterPointEnergy.com

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REPORT FOR ELECTRIC UTILITY INFRASTRUCTURE STORM HARDENING PURSUANT TO 16 TEX. ADMIN. CODE § 25.95	**§ § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

STORM HARDENING PLAN SUMMARY OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC PURSUANT TO 16 TEX. ADMIN. CODE § 25.95

On April 29, 2011, CenterPoint Energy Houston Electric, LLC ("CenterPoint Houston" or "the Company") submitted a summary describing the Company's storm hardening plan over a five-year period beginning January 1, 2011. Pursuant to 16 Tex. Admin. Code § 25.95, CenterPoint Houston submits the following summary of material revisions to the storm hardening plan and a detailed summary of the Company's progress in implementing the plan.

Respectfully submitted,

Stacey Murphree
Manager, Regulatory & Rates
CenterPoint Energy Service Company LLC
1111 Louisiana St.
Houston, Texas 77002
(713) 207-6537
(713) 207-9840 (fax)
Stacey.Murphree@centerpointenergy.com

ATTACHMENT A

Storm Hardening Plan Summary

Submitted May 1, 2024

STORM HARDENING PLAN SUMMARY
OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC

I. 16 Tex. Admin. Code § 25.95(e)(1)

Construction standards, policies, procedures, and practices employed to enhance the reliability of utility systems, including overhead and underground transmission and distribution facilities

There were no material revisions to the transmission and substation construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems. There were however several major revisions to distribution construction standards and practices as outlined below:

1. Beginning in 2022, all new distribution freeway crossings are built underground, where feasible. If underground installation is not feasible, then an overhead crossing is constructed on concrete poles. This design decreases the occurrence of overhead lines and hardens aboveground crossings that may obstruct major throughfares during a major storm event.
2. Beginning in 2022, the Company adopted NESC Rule 250C (Extreme Wind) and 250D (Extreme Ice with Concurrent Wind Loading) to apply to all new and replacement distribution structures regardless of height. This adoption will harden distribution structures to better withstand extreme weather events.
3. Beginning in 2022, distribution lines in some areas within the Company's territory have been identified to be at risk of damage from galloping conductors. In these designated areas a special tangent pole framing is used for new or replacement construction. This design hardens distribution lines and structures to better withstand the effects of galloping conductors during cold weather.
4. Beginning in 2022, distribution critical infrastructure such as switching devices, large transformer banks, regulator banks, double circuits, junction poles, terminal poles, and structures in the first circuit section outside the substation will utilize poles of an engineered material.
5. The Company has begun utilizing cutout mounted reclosers on distribution 12kV multi-phase and 35kV single-phase lateral circuits to reduce the number of outages resulting from momentary faults.

6. For new distribution poles installed using hydro excavation, crushed limestone is used as the backfill material. This backfill provides a more stable foundation and improves pole support, reducing leaning poles.

7. Beginning in 2014, the Company began installing additional guy strains in down guy installations on wood poles that carry energized distribution equipment.

8. Beginning in 2013, the Company began a proactive Underground Residential Distribution ("URD") Cable Life Extension Program ("CLEP") to assess URD spans and determine effective life.

9. Beginning in 2023, for transmission facility designs, CenterPoint Houston used the design requirements in the latest National Electrical Safety Code ("NESC") C2 2023 edition, which replaced the NESC C2 2017 edition.

10. Substation equipment maintenance is performed during planned intervals in accordance with North American Electric Reliability Corporation ("NERC") requirements and based on criteria that may include manufacturer's recommendations, equipment history, and operational experience.

11. As part of the Company's Intelligent Grid project, on-line monitoring equipment was installed on select power transformers to observe transformer conditions. The Company is not proactively installing transformer monitoring devices at non-Intelligent Grid locations, but all new transformers being purchased have a pre-installed monitoring device. The on-line monitoring information will assist in analyzing various temperature readings and in monitoring the cooling fans for the transformer. Microprocessor-based relay systems are also being installed on distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.

There were no other material revisions to the distribution construction standards, policies, procedures, and practices employed to enhance the reliability of CenterPoint Houston's systems.

II. 16 Tex. Admin. Code § 25.95(e)(2)

Vegetation Management Plan for distribution facilities, including a tree pruning methodology and pruning cycle, hazard tree identification and mitigation plans, and customer education and notification practices related to vegetation management

16 Tex. Admin. Code § 25.96(c) ("TAC") states that compliance with that section "fully satisfies the vegetation management planning and reporting requirements" of 16 TAC § 25.95(e)(2); therefore, this report does not contain information related to vegetation management.

III. 16 Tex. Admin. Code § 25.95(e)(3)

Plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and/or grid self-healing

There were minor revisions to the Company's plans and procedures to consider infrastructure improvements for its distribution system based on smart grid concepts that provide enhanced outage resilience, faster outage restoration, and grid self-healing. These changes include the installation of Intelligent Grid automation equipment and technology. Electromechanical distribution circuit relays were replaced with microprocessor-based relays at the 31 designated Intelligent Grid substations. Electromechanical relays are being replaced at other substations on a year over year program basis. Microprocessor-based relays are being installed on new distribution feeders. These relays will provide timely information on substation feeder fault information, and overall feeder performance.

In March 2015, the Company installed an Advanced Distribution Management System ("ADMS") for improved situational awareness and management of its distribution system infrastructure in near real-time. The project leverages the management and control of CenterPoint Houston's Advanced Metering System ("AMS") project to support the installation of intelligent grid automation equipment and technology. Together, the AMS and intelligent grid equipment and technology will allow for a more efficient grid operation, increase grid reliability, and enable enhanced grid automated recovery and restoration. The Intelligent Grid is anticipated to minimize the effects of power outages by detecting faulted circuits sooner and automatically rerouting power to affected customers. The Intelligent Grid is also expected to reduce the length of customer power outages.

In 2023, CenterPoint Houston commissioned one hundred and thirty-two (132) new intelligent grid switching devices as part of normal distribution capacity, reliability, or line protection requirements. CenterPoint Houston continues to expand its deployment of intelligent grid technology in areas that will achieve the greatest reliability impact.

To date, CenterPoint Houston had added feeder fault information for 774 microprocessor relay feeders across 96 substations to the ADMS system.

CenterPoint Houston completed the installation of advanced meters on all the Company's 2.2 million customer meters on July 1, 2012. In addition to the enhanced electric market operation, the advanced meters are capable of instantaneously reporting power outages at customer premises. CenterPoint Houston is using data analytics as a tool to process and filter customer meter data into operational metrics that facilitate operational efficiencies and reliability improvements.

Beginning in 2022, the Company has begun utilizing distribution 12kV multi-phase and 35kV single-phase lateral circuits cutout mounted reclosers to reduce the number of outages resulting from momentary faults.

IV. 16 Tex. Admin. Code § 25.95(e)(4)

Plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees

CenterPoint Houston's plans regarding distribution post storm damage assessment includes a continued commitment to complete a detailed and thorough inspection of all system damage after a major storm. This assessment provides additional information that has not been previously provided by a simple list of facilities that need to be repaired. Damage assessment data is the main factor that finalizes resource levels and is central information for planning and assigning work, determining additional material needs, determining and reporting estimated restoration dates, and documenting facility replacements for mapping records. CenterPoint Houston has established contracts with multiple damage assessment contractors to ensure a timely, complete, and thorough assessment of system damage after a major storm.

There were no other material revisions to the Company's plans and procedures to enhance post storm damage assessment, including enhanced data collection methods for damaged poles and fallen trees.

V. 16 Tex. Admin. Code § 25.95(e)(5)

Transmission and distribution pole construction standards, pole attachment policies, and pole testing schedule

There were no material revisions to the Company's transmission and distribution pole construction standards and pole attachment policies or the transmission pole testing schedule. There were however minor revisions made to the Company's pole attachment policies. The Company uses its website to provide any prospective attaching entity detailed information regarding CenterPoint Houston's pole attachment practices. This information is in manual form and can be downloaded from the website. Upon installation, and from time to time thereafter, CenterPoint Houston may require any non-compliant attachment to be removed and re-attached properly at the sole cost and expense of the attaching entity.

CenterPoint Houston's proactive distribution Pole Maintenance Program provides that a portion of the distribution system poles be assessed annually by contract ground-line crews. Pole assessments include a visual and/or manual assessment. Visual pole assessments are comprised of a field observation for evidence of exterior decay or damage above the ground line. Poles that are seven years old or older are manually excavated and assessed for decay below the ground line, as well as sounded and bored to locate internal voids. Poles of sufficient strength to remain in service until the next scheduled assessment are treated (with a fumigant or preservative, as necessary) and tagged. Poles that are identified for reinforcement during these assessments are either treated and braced or replaced.

The Pole Maintenance Program also includes visual assessment of guy wires, including checking for guy wires that are damaged, broken, frayed or slack, and assessment of guy strains and anchors.

As part of the grid hardening initiative, pole assessments and treatment have been accelerated, so approximately 10% of the Company's poles are assessed annually, on average, on a rolling ten-year cycle. As such, pole bracings and replacements will increase accordingly. Additional foreign poles containing Company facilities that may merit replacement by third parties are also identified.

VI. 16 Tex. Admin. Code § 25.95(e)(6)

Distribution feeder inspection schedule

In addition to the pole maintenance program discussed above (which as explained in the Company's contemporaneous report under 16 TAC § 25.94 was combined with the Company's Feeder Inspection Program in 2020), CenterPoint Houston utilizes the following programs that

incorporate ground-based inspection programs of overhead distribution facilities. These programs are the Infra-Red Program, the Root Cause Analysis Program for the 10% Circuits, the Hot Fuse Program, and the Combine Pole Maintenance and Feeder Inspection Program. The only programs discussed below are those with material revisions.

(a) The Infra-Red Program

Infra-red technology allows the Company to see the heat generated by deteriorating components on the distribution system. These "Hot Spots" will eventually result in equipment failure and a loss of service. Infra-red technology provides a unique tool to identify potential equipment outages before they occur, so that proactive repairs can be made prior to an outage. This program is designed to reduce the number of equipment failures, customer outages, and improves system reliability by decreasing System Average Interruption Duration Index ("SAIDI") and System Average Interruption Frequency Index ("SAIFI").

Circuits are generally inspected on an eight-year cycle. CenterPoint Houston has selected 83 benchmark circuits that are representative of the overall distribution system and are inspected every two years to ensure that the eight-year cycle is adequate to achieve the desired reliability results. If a circuit is identified as a repeating 4+yr 10% or 300% circuit, then it is advanced on the infra-red inspection schedule to the current year. This additional focus on the circuits with the highest SAIDI and SAIFI minutes is done to address any performance issues. Also, circuits that are heavily loaded (greater than 500 amps) are inspected, as data has proven a higher failure rate of equipment when subjected to higher load.

Infra-red scans are made of the terminal poles at the substation and major equipment on the circuit, including pole-top switches, reclosers, regulators, and capacitors. Scans are also performed on the fuse cutouts, jumpers, splices, and transformers along the circuit backbone. The identified hot spots are reported, and necessary repairs are made. If the problem is severe enough, and there is a danger of imminent equipment failure, then procedures are taken to isolate the device and initiate immediate repair and equipment replacement.

(b) The Root Cause Analysis Program for the 10% Circuits

The program is designed so that the action plan and recommended construction be completed within 120 days.

(c) The Combined Pole Maintenance and Feeder Inspection Program

In 2020 the Feeder Inspection Program merged into the Pole Maintenance Program. Through this program, distribution feeders are inspected on a periodic basis to identify and correct issues that could impact the reliable operation of the feeder. This periodic inspection and maintenance is expected to improve the performance of the feeders under adverse weather conditions. Damaged or broken facilities are identified, reports are made, and work orders to repair are issued accordingly.

(d) "As You Go" Inspections

As many as 700 CenterPoint Houston operations personnel are deployed in the field daily. This includes linemen, crew leaders, service consultants, and engineers. As personnel perform their daily business, they are encouraged to continually observe the condition of overhead facilities and report any unusual facility problems for effective resolution. Cameras have been made available to these field personnel, and they have received instructions to visually record any abnormal facility conditions to support work order creation and the dispatching of crews to priority issues.

VII. 16 Tex. Admin. Code § 25.95(e)(7)

Plans and procedures to enhance the reliability of overhead and underground transmission and distribution facilities through the use of transmission and distribution automation

In 2023, CenterPoint Houston started deployment of TripSaver® devices. TripSavers® are devices installed on distribution lines that detect downstream faults and can trip and reclose. This restores power automatically to the affected customers without having to send a truck to re-fuse the line and restore power. CenterPoint Houston has installed approximately 2,622 TripSavers® devices to convert a sustained outage to a momentary one so that customers' lights will remain on.

In 2011, CenterPoint Houston instituted a procedure to no longer install automation on line reclosers and pole-top switches. Instead, the Company utilizes the devices in the intelligent grid deployment. These devices are state of the art equipment that allow for the functionality of the

existing equipment coupled with enhanced features. The Company can program these devices to automatically sectionalize for a fault and then reclose if the fault has had one of the following occurrences: cleared, auto-sectionalize without a reclose, a remote command to operate, or a local command in the same device. Since one device can be programmed or re-programmed to perform the functionality of several devices, the device can be quickly modified in a distribution system that is ever changing. The devices are designed to interface with state-of-the-art communication protocols, so that there is an interface with the new distribution communication network.

CenterPoint Houston maintains a hardened transmission primary control center with redundant computer systems separated by firewalls. The transmission control center provides the Company the ability to monitor and remotely operate its transmission network from a secure, storm-hardened facility, including the ability to dynamically rate transmission circuits and restore service to customers impacted by a storm through remote control of switching equipment.

CenterPoint Houston completed construction of a back-up transmission control center in December 2015, in compliance with NERC Reliability Standard EOP-008. The back-up control center is a secure and storm hardened facility with redundant computer systems and can perform the same functions provided by the primary transmission control center in the event the functionality of the existing transmission control center is impaired or lost. In January 2016, the backup transmission control center received certification from NERC/Texas Reliability Entity ("TRE") that the new facility met all requirements to operate the CenterPoint Houston transmission system independent of the primary control center.

VIII. 16 Tex. Admin. Code § 25.95(e)(8)

Plans and procedures to comply with the most recent National Electric Safety Code (NESC) wind loading standards in hurricane prone areas for new construction and rebuilds of the transmission and distribution system

CenterPoint Houston adopted the latest NESC C2-2023 design requirements into its design criteria for overhead lines. Beginning in 2022, the Company adopted NESC Rule 250C (Extreme Wind) and 250D (Extreme Ice with Concurrent Wind Loading) to apply to all new and replacement distribution structures regardless of height.

IX. 16 Tex. Admin. Code § 25.95(e)(9)

Plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B (or equivalent) standards

All new distribution freeway crossings are built underground, where feasible. If underground construction is not feasible, then an overhead crossing utilizing concrete poles will be constructed.

There were no other material revisions to the Company's plans and procedures to review new construction and rebuilds to the distribution system to determine whether they should be built to NESC Grade B or equivalent standards.

X. 16 Tex. Admin. Code § 25.95(e)(10)

Plans and procedures to develop a damage/outage prediction model for the transmission and distribution system

There were no material revisions to the Company's plans and procedures to develop a damage or outage prediction model for the transmission and distribution system.

XI. 16 Tex. Admin. Code § 25.95(e)(11)

Plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities

There were no material revisions to the Company's plans and procedures for use of structures owned by other entities in the provision of distribution service, such as poles owned by telecommunications utilities.

XII. 16 Tex. Admin. Code § 25.95(e)(12)

Plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads

There were no material revisions to the Company's plans and procedures for restoration of service to priority loads and for consideration of targeted storm hardening of infrastructure used to serve priority loads.

Temporary Emergency Electric Energy Facilities

As a result of H.B. 2483 passed during the 2021 Texas Regular Legislative session, transmission and distribution utilities may lease and operate temporary emergency electric energy facilities to aid in the restoration of distribution level customers during certain widespread power outages, as defined by PURA § 39.918(a). CenterPoint Houston has leased up to approximately 500 MW of temporary emergency electric energy facilities, with actual output depending on ambient and other operating conditions. As part of the lease, the temporary emergency electric energy facilities provider will provide certain services related to the leased temporary emergency electric energy facilities. These facilities are placed inside distribution substations spread across the service territory to allow a faster deployment during a potential ERCOT load shed event.

During a widespread power outage, CenterPoint Houston will operate its temporary emergency electric energy facilities at its sole discretion, based on good utility practice, based on the actual conditions of a particular event, based on system and customer needs, in coordination with appropriate government officials and regulators, and subject to the provisions in CenterPoint Houston's Tariff. Some temporary emergency electric energy facilities have been pre-positioned at certain locations in CenterPoint's service area, but individual facilities may be relocated in coordination with the temporary emergency electric energy facilities provider as operating conditions, road conditions, and other safety considerations allow.

XIII. Other Storm Hardening Plans

CenterPoint Houston has the following revised and additional plans to harden its transmission and substation facilities during the next five years.

Project Name	Location (City/ County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
Moody – Stewart #1016	Galveston/ Galveston	Rebuild portion of 138kV Ckt. 63C to meet the most recent NESC C2-2017 extreme wind loading requirements.	11/9/21	2/26/2024	$26,585,653

Project Name	Location (City/ County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
WWE: Str #13467-13397 Airflow Spoilers #22-34	Morgans Point/Harris	Retrofit portion of 138 kV Ckt. 85A, 87C, 87B, 87A, 88A with anti-galloping devices to avoid damage from icing conditions.	2/21/22	4/19/2024	$,3680,540
WWE: Str #23724-28832 Airflow Spoilers #22-38	Baytown/Harris	Retrofit portion of 138 kV Ckt. 88E, 87F with anti-galloping devices to avoid damage from icing conditions.	3/15/2024	12/15/2025	$1,316,946
WWE: Str#12958-33112 Airflow Spoilers #22-39	Deer Park/Harris	Retrofit portion of 138 kV Ckt. 88D, 061 with anti-galloping devices to avoid damage from icing conditions.	3/15/2024	12/15/2025	$290,611
WWE: Str#12920-12912 Airflow Spoilers #22-40	Harris	Retrofit portion of Ckt. 88B, 06M, with anti-galloping devices to avoid damage from icing conditions.	3/15/2024	12/15/2025	$294,290
WWE: Str#12920-12954 Airflow Spoilers #22-41	Deer Park/Harris	Retrofit portion of 138 kV Ckt. 88B, with anti-galloping devices to avoid damage from icing conditions.	3/15/2024	12/15/2025	$358,666
WWE: Str#13745-13736 Airflow Spoilers #22-42	Deer Park/Harris	Retrofit portion of 138 kV Ckt. 14A with anti-galloping devices to avoid damage from	3/15/2024	12/15/2025	$294,290

Project Name	Location (City/ County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
		icing conditions.			
WWE: Str#13667-24035 Airflow Spoilers #22-43	Chambers	Retrofit portion of 138 kV Ckt. 14A & 97D with anti-galloping devices to avoid damage from icing conditions.	3/15/2024	12/15/2025	$904,941
Lake Jackson Substation	Brazoria	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	4/1/2022	12/15/2025	$2,000,000
North Belt Substation	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	4/1/2023	12/15/2024	$2,000,000
North Belt Substation	Harris	Elevate transmission control cubicle and equipment terminal boxes to avoid damage from flooding.	10/1/2024	12/15/2025	$3,000,000
Brays Substation	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid	6/1/2022	12/15/2025	$2,000,000

Project Name	Location (City/ County)	Description	Estimated (or Actual) Start Date	Estimated Completion Date	Estimated Project Cost
		damage from flooding.			
Treaschwig	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	5/24/2022	5/15/2024	$3,000,000
Brazos Valley	Fort Bend	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2025	5/15/2026	$2,000,000
Parkway	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	1/1/2025	5/15/206	$2,000,000
Telephone	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid damage from flooding.	5/1/2024	12/15/2026	$2,000,000
Freeman	Harris	Elevate distribution control cubicle and equipment terminal boxes to avoid	1/12026	5/15/2027	$1,700,000