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DOCKET NO. 56548

APPLICATION OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC FOR APPROVAL OF ITS TRANSMISSION AND DISTRIBUTION SYSTEM RESILIENCY PLAN	**§ § § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

APPLICATION OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC FOR APPROVAL OF ITS TRANSMISSION AND DISTRIBUTION SYSTEM RESILIENCY PLAN

CenterPoint Energy Houston Electric, LLC ("CenterPoint Houston" or the "Company") requests that the Public Utility Commission of Texas ("Commission") approve the Company's Transmission and Distribution System Resiliency Plan (the "Resiliency Plan"). In support of its Application and request, the Company states the following:

I. SUMMARY

In 2023, the 88th Texas Legislature passed and the Governor signed into law H.B. 2555,[1] which created Public Utility Regulatory Act ("PURA") § 38.078 and permits an electric utility to request Commission approval of the electric utility's transmission and distribution system resiliency plan. In passing H.B. 2555, the 88th Legislature made the following findings:

- protecting electrical transmission and distribution infrastructure from extreme weather conditions can effectively reduce system restoration costs to and outage times for customers and improve system resiliency and overall service reliability for customers;
- it is in the state's interest for each electric utility to seek to mitigate system restoration costs to and outage times for customers when developing plans to enhance electrical transmission and distribution infrastructure storm resiliency; and
- all customers benefit from reduced system restoration costs.[2]

With these specific legislative findings in mind and consistent with the Company's past, current, and future focus on and prioritization of resiliency-related projects, the Company has developed its Resiliency Plan to mitigate the impact of certain resiliency event-related impacts that have occurred and will occur in the future in the Company's service area. The following table

[1] H.B. 2555, 88th Leg., R.S. (2023).

[2] *Id.*, Section 1, Subsections (3)-(5).

summarizes the resiliency measures related to system hardening, grid modernization, flood control, information technology, physical security, vegetation management and wildfire mitigation in the Company's Resiliency Plan.

Figure APP-1.

Resiliency Measure	Estimated Capital Costs (millions)	Estimated Incremental O&M Expense (millions)	Estimated Timeframe (years)
System Hardening	$1,452.9	$1.5	2025-2027
Grid Modernization	$214.7	$1.0	2025-2027
Flood Mitigation	$37.6	-	2025-2027
Information Technology to Support Operations	$260.7	$14.46	2025-2027
Information Technology	$54.1	$0.25	2025-2027
Physical Security	$34.5	$0.09	2025-2027
Vegetation Management	-	$25.0	2025-2027
Wildfire Mitigation	$137.2	$43.7	2025-2027
Total	**$2,191.7**	**$85.9**	

Note: As noted in the Resiliency Plan for some measures, the Company may accelerate certain measures subject to available funding, personnel and materials; therefore the above estimates of capital costs and expenses could vary as detailed in the Resilience Plan.

The Company requests that the Commission approve the Company's Resiliency Plan and the corresponding Resiliency Measures. The Company also requests that the Commission approve: the proposed utility-scale microgrid pilot program and associated study, design, implementation, and operation costs; the proposed funding for a City of Houston employee responsible for overseeing resiliency issues; and include certain accounting language in any Commission order approving the Company's Resiliency Plan permitting the Company to establish a regulatory asset for deferral of distribution-related costs, as permitted by PURA § 38.078(k).

II. JURISDICTION AND NOTICE

The Commission has jurisdiction of this proceeding under PURA §§ 14.151 and 38.078. As required by 16 Tex. Admin. Code ("TAC") § 25.62(d)(1)(A)-(E), the Company will provide notice of this proceeding to:

- all municipalities in the Company's service area that have retained original jurisdiction;
- all parties in the Company's most recent base-rate proceeding;
- the Office of Public Utility Counsel; and
- the Electric Reliability Council of Texas ("ERCOT").

Additionally, since one of the resiliency measures in the Company's Resiliency Plan entails the upgrading of functionality of the Company's AMS smart meters, the Company will provide notice as required under 16 TAC § 25.130.[3]

III. AUTHORIZED REPRESENTATIVES

The telephone number and address of CenterPoint Houston's authorized business representative are as follows:

Stacey Murphree
CenterPoint Energy Service Company, LLC
Manager, Regulatory and Rates
1111 Louisiana Street, 19th Floor
Houston, Texas 77002
(713) 207-6537
stacey.murphree@centerpointenergy.com

The telephone numbers and addresses of CenterPoint Houston's authorized legal representatives are:

Patrick H. Peters III
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CenterPoint Energy Service Company, LLC
1005 Congress Avenue, Suite 650
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(512) 397-3032
patrick.peters@centerpointenergy.com

Sam Chang
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CenterPoint Energy Service Company, LLC
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Austin, Texas 78701
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[3] Alternatively, and to the extent required by the Commission, the Company will file for Commission review and approval an AMS smart meter deployment plan if required by the Commission pursuant to PURA § 39.107 and 16 TAC § 25.130.

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Houston, Texas 77002
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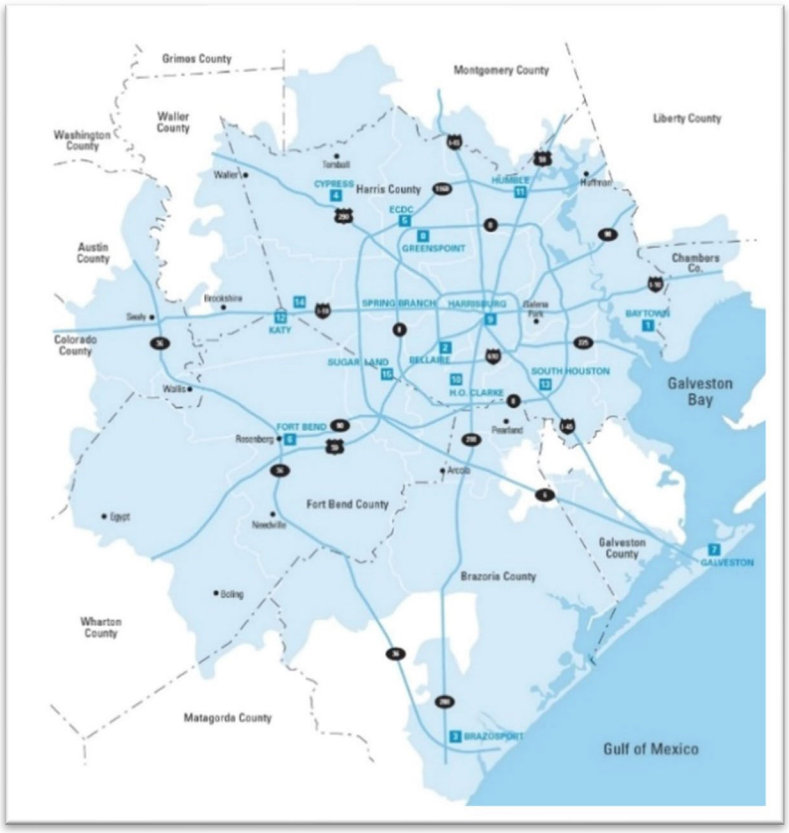
CenterPoint Houston requests that all information and documents in this filing be served on each of the persons above at their respective physical or email addresses.

IV. GENERAL OVERVIEW

A. Overview of the Company's Service Area, Customer Profile, and Customer Growth

The Company's service area is comprised of approximately 5,000 square miles located in and around the Greater Houston Area and the Texas Gulf Coast. The map below generally illustrates the Company's service area.

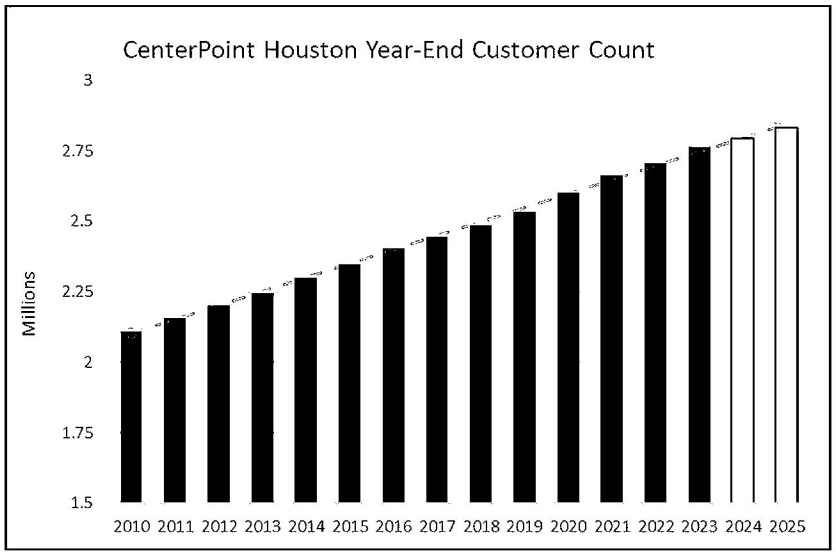
Figure APP-2.



While the Company's service area is only approximately 2% of the geographic area of Texas, the Company's customers account for 25% of the load in the ERCOT power region. This is due to the large number of customers within the Company's service footprint. As such, the Company currently provides electric delivery service to approximately 2.8 million residential, commercial, and industrial customers. Among the Company's customers are also several important public-serving facilities and infrastructure such as the Texas Medical Center, the Port of Houston, the George Bush Intercontinental Airport, and William P. Hobby Airport, as well as several chemical refining facilities that consume large amounts of electricity.

The Company's current customer count of approximately 2.8 million customers is the result of rapid and sustained customer growth over the past decade. Consistent with the past rapid and sustained growth, the customer growth in the Company's service area is anticipated to continue growing by 2% annually for the foreseeable future. The chart below illustrates the customer growth in the Company's service area.

Figure APP-3.



B. The Company's Commitment to Enhancing Resiliency

The Company has an obligation and a commitment to provide safe and reliable electric delivery service to the customers in the Company's service area, which includes making necessary capital expenditures to meet the needs of the past and future rapid and sustained customer growth. Another component of the Company's obligation and commitment to provide safe and reliable electric delivery service is making capital expenditures to enhance the resiliency of the Company's transmission and distribution system, as expected by customers and regulators. Over the past five years, the Company has invested approximately $1.46 billion in capital expenditures for resiliency-related projects. The following table provides examples of resiliency projects related to system hardening and modernization that were implemented by the Company in the past five years and the corresponding capital costs.

Figure APP-4.

Year	Resiliency Project	Cost (millions)
2019	**Total**	**$100**
	IGSD Installation	$7
	Transmission System Hardening	$11
	Substation Elevation	$12
	Distribution Pole Replacement/Bracing	$20
	Substation Security	$9

	S90 Tower Replacements	$1
	69/138 kV Conversions	$40
2020	**Total**	**$84**
	IGSD Installation	$1
	Transmission System Hardening	$12
	Substation Elevation	$18
	Distribution Pole Replacement/Bracing	$29
	Substation Security	$5
	S90 Tower Replacements	$3
	69/138 kV Conversions	$16
2021	**Total**	**$250**
	IGSD Installation	$5
	Transmission System Hardening	$159
	Substation Elevation	$13
	Distribution Pole Replacement/Bracing	$30
	Substation Security	$20
	S90 Tower Replacements	$20
	69/138 kV Conversions	$3
2022	**Total**	**$617**
	Distribution Resiliency – Circuit Rebuild	$40
	Distribution Resiliency – TripSaver	$7
	IGSD Installation	$12
	Transmission System Hardening	$274
	Substation Elevation	$20
	Distribution Pole Replacement/Bracing	$61
	Substation Security	$24
	S90 Tower Replacement	$55
	69/138 kV Conversions	$49
	Medical Center Substation	$75
2023	**Total**	**$410.4**
	Distribution Resiliency – Circuit Rebuild	$40
	Distribution Resiliency – TripSaver	$5
	IGSD Installation	$13
	Transmission System Hardening	$166
	Substation Elevation	$20
	Distribution Pole Replacement/Bracing	$52
	Substation Security	$10
	S90 Tower Replacement	$14
	69/138 kV Conversions	$90
	Medical Center Substation	$0.4
	Total for 2019 - 2023	**$1,461.4**

7

In addition to making capital expenditures related to resiliency, the Company has also engaged in aggressive vegetation management. The table below summarizes the approximately $96 million the Company spent on vegetation management from 2020-2022.

Figure APP-5.

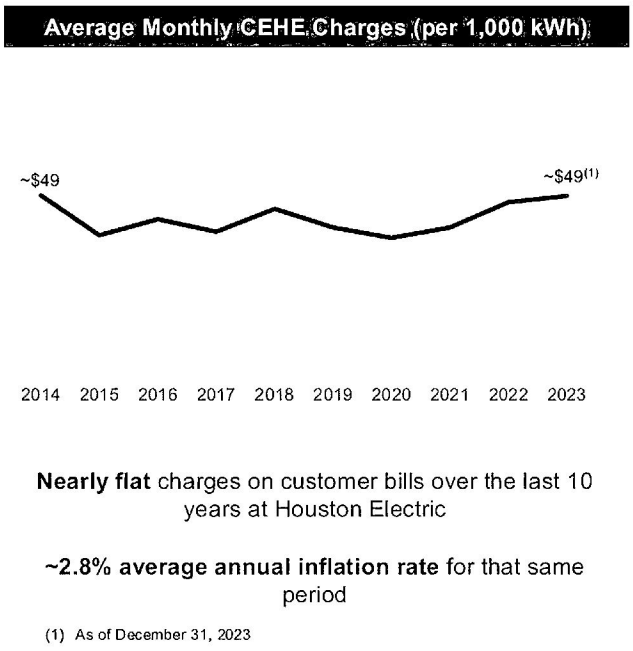
Year	Amount Spent
2020	$30 million
2021	$31.4 million
2022	$34.6 million
Total	**$96 million**

C. Customer Affordability

The Company believes it is important to focus not only on the overall cost of providing its services (its revenue requirement), but also the cost of the Company's services to the average residential customer (its rates). Rates impact the ability of individual customers to afford electric service. The average residential customer's electric bill attributable to the Company's rates has remained relatively flat over the past ten years, as reflected in the table below.

Figure APP-6.

Average Monthly Charges per 1,000 KWh



There are three factors working to help contain average residential customer rates. First, customer

growth spreads the cost of increased investments over an ever-larger number of customers, so that incremental capital investment does not result in the same incremental increase in rates. Second, since 2019, three securitization charges related to the transition to competition and hurricane restoration costs (TC2, TC3, and SRC/ADFIT) have been retired, resulting in a total reduction of $4.48 per month for the average residential customer. A fourth securitization charge (TC5) will be retired by October 2024, resulting in a similar reduction in the amount of $1.92 per month. Together, the retirement of these securitization charges will reduce average residential customer bills by approximately $6.40. Third, the Company has focused on reducing its operations and maintenance ("O&M") expenses by an average of 1-2% per year. The result is that the Company can increase its investment in its transmission and distributions system while keeping average customer charges within normal inflation rates and maintaining affordability.

Additionally, the Company has also worked hard to identify and pursue opportunities to obtain federal funding to offset the cost of its resiliency investments. In 2023, the Company submitted a $100 million application in the first round of the Department of Energy Grid Resilience and Innovation Partnerships ("GRIP") Program to fund high wind and flood mitigation projects but was not ultimately selected for a grant. In January 2024, the Company submitted two concept papers, each seeking approval for $100 million in the second round of GRIP Program grant applications, again seeking to fund high wind and flood mitigation projects, as well as more resilient metering technology. The Company was informed by the Department of Energy in March 2024 that the concept paper to fund $100 million in high wind and flood mitigation projects was encouraged for a full grant application, which the Company intends to submit in April 2024. The Company will also apply for funding at the state level when the Texas Department of Emergency Management opens its process to administer the Texas allocation of GRIP funding.

Further, in line with the Legislature's rationale in passing H.B. 2555, the added costs from implementing the Company's Resiliency Plan will ultimately result in lower restoration costs following Resiliency Events, thereby further maintaining affordability.

D. Resiliency Events in the Company's Service Area

Because of the proximity of the Company's service area to the Texas Gulf Coast, the resiliency events that typically occur and have occurred in the Company's service area are primarily related to extreme weather events, specifically extreme heat, high winds, heavy rains,

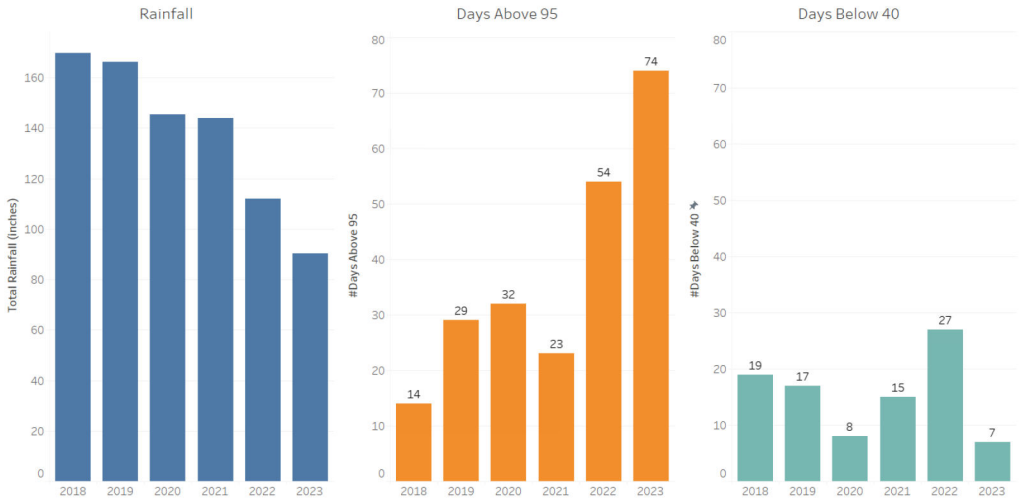
lightning, flooding, tropical storms, tornadic activity, hurricanes, and freezes. Notable extreme weather event-related Resiliency Events in the Company's service area are Hurricane Ike in 2008, a thunderstorm and wind event in 2013, flooding in 2015, Hurricane Harvey in 2017, a microburst event in 2017, an ice storm in 2018, tornadoes in 2019, Winter Storm Uri in 2021, Hurricane Nicholas in 2021, a tornado in 2022, a tornado in 2023, and a microburst event in 2023. The Figure APP-7 below summarizes the extreme weather-related resiliency events that occurred in the Company's service area over the past five years.

Figure APP-7.

Year	Date	Total Customers Affected	Restoration Time
2019	April 7th-8th	233,687	28 hours, 20 minutes
	May 9th-11th	238,015	48 hours, 55 minutes
	September 17th-20th	180,431	73 hours, 5 minutes
2020	April 29th	256,057	16 hours, 15 minutes
	May 15th-16th	114,575	28 hours, 5 minutes
	May 27th-29th	423,000	32 hours, 15 minutes
2021	February 14th-19th	8,127,986	116 hours, 40 minutes
	September 17th-18th	706,429	120 hours, 5 minutes
	October 28th-29th	308,585	32 hours, 55 minutes
2022	January 8th-9th	79,138	27 hours, 20 minutes
	March 22nd	49,743	5 hours, 40 minutes
2023	January 24th-26th	207,547	57 hours, 10 minutes
	May 14th	53,985	9 hours, 50 minutes
	June 8th-10th	362,363	34 hours
	June 21st-25th	574,582	77 hours, 40 minutes

In addition to extreme weather events, the Company's service area also experiences heavy precipitation and extreme temperatures. The following graph, Figure APP-8, summarizes the precipitation and temperature changes in the Company's service area from 2018 to 2023.

Figure APP-8.



Many of the resiliency measures in the Company's Resiliency Plan will address and mitigate the impacts of extreme weather-related resiliency events. For example, the Company proposes to harden its transmission and distribution system by replacing and/or upgrading structures and poles to meet the Company's current wind loading standards. Likewise, the Company proposes to install TripSaver® devices on the Company's distribution system, thus mitigating the number and duration of outages caused by an extreme weather-related resiliency event and facilitating quicker restoration times. In addition to mitigating the impact of extreme weather-related resiliency events, the Company also proposes resiliency measures that will enhance the Company's physical and cybersecurity posture.

V. OVERVIEW OF THE COMPANY'S REQUEST

A. Overview of the Petition

This Petition contains the following exhibits:

- Exhibit 1: The Company's Resiliency Plan;
- Exhibit 2: The Direct Testimony of Company witness Jason M. Ryan;
- Exhibit 3: The Direct Testimony of Company witness Brad A. Tutunjian;
- Exhibit 4: The Direct Testimony of Company witness Ronald W. Bahr;
- Exhibit 5: The Direct Testimony of Company witness Jeff W. Garmon;

- Exhibit 6: The Direct Testimony of Guidehouse witness Eugene L. Shlatz, including Exhibit ELS-2, an expert report from Guidehouse Inc. ("Guidehouse"), a third-party, independent expert consultant retained by the Company to evaluate the Company's Resiliency Plan;
- Exhibit 7: The Direct Testimony of Guidehouse witness Dr. Joseph B. Baugh;
- Exhibit 8: The Company's proposed form of notice for this proceeding; and
- Exhibit 9: The Company's proposed protective order.

A summary of each witness' testimony is provided below:

Witness	Subjects Addressed
Jason M. Ryan (Company witness)	Mr. Ryan provides the public policy and Company goals that drive the Company's Resiliency Plan, explains the financial context in which the Company developed its Resiliency Plan, and explains the Company's ability to implement the resiliency measures in the Resiliency Plan while maintaining customer affordability.
Brad A. Tutunjian (Company witness)	Mr. Tutunjian provides an overview of the Company's service area and customer profile, the extreme weather event-related resiliency events that have occurred and are anticipated to occur in the future in the Company's service area, and the operational resiliency measures in Company's Resiliency Plan and anticipated customer benefits associated with such resiliency measures.
Ronald W. Bahr (Company witness)	Mr. Bahr provides an overview of the information technology resiliency measures in the Company's Resiliency Plan and anticipated customer benefits associated with such resiliency measures.
Jeff W. Garmon (Company witness)	Mr. Garmon provides an overview of the Company's policies and procedures on the classification of distribution and transmission capital investment and to the treatment of expenditures, explains that the Company will apply its policies and procedures for expenditures related to the resiliency measures in the Company's Resiliency Plan, and requests certain accounting language, as permitted by PURA § 38.078(k).
Eugene L. Shlatz (Third-party, independent expert witness)	Mr. Shlatz provides an independent analysis and review of the operational resiliency measures in the Company's Resiliency Plan and explains that such resiliency measures are reasonable and provide benefits to the Company's customers.

Witness	Subjects Addressed
Dr. Joseph B. Baugh (Third-party, independent expert witness)	Dr. Baugh provides an independent analysis and review of the information technology resiliency measures in the Company's Resiliency Plan and explains that such resiliency measures are reasonable and provide benefits to the Company's customers.

B. Overview of the Company's Resiliency Plan

The Company's Resiliency Plan has twenty-five resiliency measures that, in total, will harden and modernize the Company's transmission and distribution system; implement flood mitigation measures; enhance the Company's information technology, including information technology used in support of operations; enhance the physical security of the Company's substations; proactively conduct vegetation management on select distribution circuits; and mitigate the identified risk of wildfires. Additionally, as part of the Company's Resiliency Plan, the Company is proposing two pilot programs and one activity: (1) a pilot program that would assess the extent to which utility-scale microgrids may assist in restoration efforts during a resiliency event; (2) a pilot program in which the Company funds a City of Houston employee that would oversee resiliency matters on behalf of the City; and (3) the transition and migration of the Company's SAP software to a cloud based application. The Company estimates that the twenty-five resiliency measures will cost approximately $2.19 billion in capital costs and will cost approximately $85.9 million in incremental O&M expense over the three-year period from 2025-2027.[4] Figure APP-9 below summarizes each resiliency measure in the Company's Resiliency Plan.

[4] Some resiliency measures in the Company's Resiliency Plan may extend beyond the three-year period and thus there may be additional capital costs and additional incremental operations and maintenance expense beyond the three-year period. Additionally, and subject to available funding, personnel, and materials, the Company may accelerate some future resiliency projects, which would entail additional capital costs and additional incremental operations and maintenance expense.

Figure APP-9.

Resiliency Measure	Estimated Capital Costs (millions)	Estimated Incremental O&M Costs (millions)	Estimated Timeframe (years)
System Hardening			
Transmission System Hardening	$376.0	$0.75	2025-2027
S90 Tower Replacements	$103.8	None	2025-2027
69kV-138kV Conversion Projects	$268.4	None	2025-2027
Coastal Resiliency Upgrades	$259.0	$0.75	2025-2027
Substation Transformer Fire Protection Barriers	$2.4	None	2025-2027
Distribution Pole Replacements/Bracing	$99.3	None	2025-2027
Distribution Resiliency – Circuit Rebuilds	$312.8	None	2025-2027
Strategic Undergrounding/Freeway Crossings	$31.2	None	2025-2027
Subtotal	**$1,452.9**	**$1.5**	
Grid Modernization			
TripSaver®	$58.9	$0.03	2025-2027
IGSD Installation	$53.8	$0.82	2025-2027
Texas Medical Center Substation	$102.0	$0.15	2025-2027
Subtotal	**$214.7**	**$1.0**	
Flood Control			
Substation Flood Control	$30.6	None	2025-2027
Control Center Facility Upgrades	$7.0	None	2025-2027
Subtotal	**$37.6**	**None**	
Information Technology to Support Operations			
Advanced Aerial Imagery Platform/Digital Twin	$9.9	$0.06	2025-2027
Advanced Distribution Technology	$225.8	$15	2025-2027
Digital Substation	$25.0	($0.6)	2025-2027
Subtotal	**$260.7**	**$14.46**	
Information Technology			
Voice and Mobile Data Radio System Refresh	$15.6	None	2025-2027

Resiliency Measure	Estimated Capital Costs (millions)	Estimated Incremental O&M Costs (millions)	Estimated Timeframe (years)
Backhaul Microwave Communication	$12.1	None	2025-2027
Data Center Refresh and Resiliency	$2.9	$0.25	2025-2027
Network Security and Vulnerability Management	$1.0	None	2025-2027
IT/OT Cybersecurity Monitoring Program	$22.5	None	2025-2027
Subtotal	**$54.1**	**$0.25**	
System Security			
Substation Physical Security Fencing	$15.0	None	2025-2027
Substation Security Upgrades	$19.5	$0.09	2025-2027
Subtotal	**$34.5**	**$0.09**	
Vegetation Management			
Targeted Critical Circuit Vegetation Management	None	$25	2025-2027
Subtotal	**None**	**$25**	
Wildfire Mitigation			
Wildfire Mitigation Projects	137.2	$43.7	2025-2027
Subtotal	**$137.2**	**$43.7**	
Total for all Resiliency Measures	**$2,191.7**	**$85.9**	

Note: As noted in the Resiliency Plan for some measures, the Company may accelerate certain measures subject to available funding, personnel and materials, therefore the above estimates of capital costs and expenses could vary as detailed in the Resilience Plan.

In addition to the resiliency measures summarized above, the Company is also proposing to include two pilot programs and one activity: (1) a utility-scale microgrid pilot program, (2) a pilot program to fund a City of Houston department that would be responsible for overseeing resiliency issues for the City of Houston (with funding not to exceed $200,000 per year), and (3) the transition and migration of the Company's SAP software to a cloud based application.

The Company engaged Guidehouse to provide independent advisory and assessment services. The Guidehouse analysis included not only meeting and interviewing Company subject matter experts,

conducting vulnerability analysis for weather-related Resiliency Events, and assessing the proposed Resiliency Measures using a cost-benefit framework, but also a comparison of the proposed Resiliency Measures to those adopted by other electric utilities.

The Guidehouse independent risk and cost-benefit analysis confirmed that each Operations and Physical Security Resiliency Measure is either cost-effective based on the calculated BCA ratio or otherwise provides qualitative benefits that support inclusion in the Resiliency Plan. Further, the survey of peer utility practices indicates that the proposed resiliency measures are generally consistent with those deployed at peer utilities.

The Guidehouse independent analysis and qualitative assessment of Technology Resiliency Measures found that the Company's Resiliency Plan appropriately prioritizes technology resilience measures that help mitigate cyber security risk. Findings from the survey of peer utility practices indicates that the proposed resiliency measures are consistent with other utilities as well.

C. Overview of the Company's Requested Accounting Language

PURA § 38.078(k) permits deferral of distribution-related costs relating to the implementation of an electric utility's resiliency plan. As part of Commission approval of the Company's Resiliency Plan, the Company requests the following accounting language in any Commission order approving the Company's Resiliency Plan:

> CenterPoint Houston may defer all or a portion of the distribution-related costs relating to the implementation of the Company's Resiliency Plan for future recovery as a regulatory asset, including depreciation expense and carrying costs at the Company's weighted average cost of capital established in the Commission's final order in the Company's most recent base rate proceeding, and use Commission-authorized cost recovery alternatives under 16 TAC §§ 25.239 and 25.243 or another general rate proceeding.

VI. PROTECTIVE ORDER

The Company has designated certain documents included in this Application as either Protected Material or Highly Sensitive Protected Material under the terms of the proposed

protective order and anticipates it being necessary for the Company or other parties to submit additional documents containing confidential material during discovery in this case. The Company therefore requests approval of the proposed protective order attached as Exhibit 9. The proposed protective order is the Commission protective order and has been approved in prior Commission proceedings. Until a protective order is issued in this proceeding, the Company will provide access to the confidential information submitted with this Application to parties that agree in writing to be bound by the proposed protective order as if it had been issued by the Commission.

VII. CONCLUSION AND REQUEST

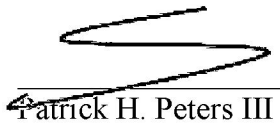
The Company anticipates that the resiliency measures in its Resiliency Plan will provide benefits to its customers by enhancing resiliency of the Company's transmission and distribution system, by reducing the total number of customers affected by an outage due to a resiliency event, by reducing total outage times due to a resiliency event, and by reducing system restoration costs incurred in response to a resiliency event. As demonstrated by the Company's track record in controlling and reducing operations and maintenance expense, the Company anticipates being able to implement the resiliency measures in the Company's Resiliency Plan while maintaining the Company's commitment to customer affordability. Thus, the Company requests that the Commission:

- approve the Company's Resiliency Plan and the Company's proposed resiliency measures;
- approve the Company's microgrid pilot program;
- approve the Company's pilot program to fund a City of Houston employee that would be responsible for overseeing resiliency issues; and
- include the Company's requested accounting language in the Commission's order approving the Company's Resiliency Plan.

The Company also requests that the Commission grant the Company such other relief to which the Company is entitled.

Date: April 29, 2024

Respectfully submitted,



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Transmission and distribution system resiliency plan

CenterPoint Energy Houston Electric, LLC

CenterPoint Energy

Energy for what matters most™

Table of Contents

I. Executive Summary

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
System Hardening					
Transmission System Hardening	Harden transmission structures by replacing wooden structures with steel or concrete structures and mitigate galloping conductors through the use of air flow spoilers; harden 5 to 30 miles of the transmission system per year	Capital: $376 million Incremental O&M: $750,000	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado ▪ Hurricane Extreme temperature event ▪ Icing on conductors	Improved structural integrity Higher wind loading capabilities Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
S90 Tower Replacements	Replacement of S90 towers; replace 30 S90 towers in total	Capital: $103.8 million Incremental O&M: None	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado ▪ Hurricane	Improved structural integrity Higher wind loading capabilities Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
69kV-138kV Conversion Projects	Rebuild and reconductor 69kV transmission circuits to 138kV; upgrade approximately 108 miles of 69 kV transmission circuits	Capital: $268.4 million Incremental O&M: None	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado ▪ Hurricane	Improved structural integrity Higher wind loading capabilities Mitigate loss of transmission during

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
				Extreme temperature event ▪ Heat ▪ Freeze	extreme weather events by providing multiple paths of redundancy Capacity for future load growth
Coastal Resiliency Upgrades	Construct additional transmission circuits to the coastal portion of the Company's service area; upgrade current 69kV transmission circuits will be upgraded to 138kV, install new underwater cables, re-route existing transmission line, and construct a new transmission circuit	Capital: $259 million Incremental O&M: $750,000	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado ▪ Hurricane Extreme temperature event ▪ Heat ▪ Freeze Third-party damage	Mitigate loss of transmission during extreme weather events or third-party damage by providing multiple paths of redundancy Capacity for future load growth Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Substation Transformer Fire Protection Barriers	Construct fire barriers at 4 substations per year (12 total)	Capital: $2.4 million Incremental O&M: None	2025 - 2027	Substation fire	Mitigate damage from substation fires Reduce the number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Distribution Pole Replacement/Bracing Program	Replace or brace approximately 5,000 wooden distribution poles	Capital: $99.3 million	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado	Improved structural integrity Higher wind loading capabilities

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
	per year (approximately 15,000 in total)	Incremental O&M: None		▪ Hurricane Third-party damage ▪ Vehicular collision	Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Distribution Resiliency – Circuit Rebuilds	Rebuild approximately and upgrade approximately 300-350 miles of distribution circuit per year (approximately 900-1,050 miles in total)	Capital: $312.8 million Incremental O&M: None	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado ▪ Hurricane	Improved structural integrity Higher wind loading capabilities Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Strategic Undergrounding / Freeway Crossings	Replace wooden distribution poles and equipment on overhead distribution lines at freeway; replace approximately 10 freeway crossings per year (approximately 30 freeway crossings in total)	Capital: $31.2 million Incremental O&M: None	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado ▪ Hurricane Third-party damage ▪ Vehicular collision	Improve structural integrity Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Modernization					
TripSaver®	Replace approximately 2,500 standard fuses per year with TripSaver®	Capital: $58.9 million	2025 - 2027	Extreme weather-related Resiliency Events	Faster restoration Reduce the frequency and number of customers

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
	devices (approximately 7,500 TripSaver® devices installed in total)	Incremental O&M: $30,000			impacted by outages Reduce total outage times Reduce system restoration costs
IGSD Installation	Install approximately 150 IGSDs per year (450 IGSDs installed in total)	Capital: $53.8 million Incremental O&M: $815,000	2025-2027	Extreme weather-related Resiliency Events	Faster restoration Reduce time and expense associated with dispatching field personnel to restore an outage Reduce number of customers impacted by an outage Reduce total outage time
Texas Medical Center Substation	Construction of a substation to serve the Texas Medical Center	Capital: $102.0 million Incremental O&M: $150,000	2025-2027	Extreme weather-related Resiliency Events	Redundancy
Flood Mitigation					
Substation Flood Control	Elevate approximately 3 substations per year (9 substations elevated in total)	Capital: $30.6 million Incremental O&M: None	2025-2027	High water or flooding events	Reduction of risk of equipment failure or misoperation

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
Control Center Facility Upgrades	Construct a protective flood wall at the Company's back-up control center	Capital: $7 million Incremental O&M: None	2025-2027	High water or flooding events	Mitigation of damage or inoperability of back-up control center due to flooding or high water events
Information Technology to Support Operations					
Advanced Aerial Imagery Platform / Digital Twin	Digitize a replication of the Company's transmission and distribution system by combining LiDAR imagery data, device data (meters, IGSDs, sensors, etc.), weather data, inspection data, and monitoring data and inputting the combined data into advanced software platforms	Capital: $9.9 million Incremental O&M: $60,000	2025-2027	Resiliency Events related to extreme weather events	Enhanced ability to proactively plan and implement projects to mitigate outages attributable to extreme weather events
Advanced Distribution Technology	Replace the Company's current smart meters with the next generation smart meters; replace approximately 700,000 meters per year	Capital: $225.8 million Incremental O&M: $15 million	2025-2027	Resiliency Events that cause outages	Premise-level underfrequency load shedding Local load management Advanced fault detection Improved restoration capability
Digital Substation	Upgrade communications equipment at approximately 4-5 substations per year	Capital: $25 million Incremental O&M:	2025-2027	Resiliency Events related to extreme weather events	Enhanced communication capability from substation to the Company's control room

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
	(approximately 12-15 total substations)	$(600,000)			
Information Technology					
Voice and Mobile Data Radio System Refresh	Upgrade the fleet mobile and portable radio communications equipment used to dispatch and communicate with the Company's field personnel	Capital: $15.6 million Incremental O&M: None	2025 - 2027	Resiliency Events that cause outages	Maintain communications capability to and with the Company's field personnel
Backhaul Microwave Communication	Replace the Company's existing microwave radio links and upgrade the Company's backbone point-to-point microwave links	Capital: $12.1 million Incremental O&M: None	2025 - 2027	Resiliency Events that cause outages	Provide visibility, and command and control for substations operations Avoid radio frequency interference Avoid hardware failures Support communication during restoration
Data Center Refresh	Upgrade the Company's existing data centers to provide for more virtual communications paths; develop a multi-cloud environment in support of disaster recovery migration; integrate cloud environments to create a hybrid environment; implement a new SAN fabric	Capital: $2.9 million Incremental O&M: $246,960	2025 - 2027	Resiliency Events that cause outages	Provide visibility, and command and control for substations operations Avoid radio frequency interference Avoid hardware failures Support communications during restoration

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
Network Security and Vulnerability Management	Implement application security; assess, prioritize, and mitigate cybersecurity vulnerabilities; deploy advanced firewalls, network sensors, and other cyber technologies at approximately 400 sites	Capital: $1 million Incremental O&M: None	2025 - 2027	Resiliency Events that cause outages Unauthorized access Loss of critical or sensitive data	Provide capability to monitor and control the distribution grid during the resilience event Reduce risk of disruption of critical computing systems or energy delivery systems Prevents loss of critical/sensitive data Ensure increased compliance with regulatory requirements by implementing measures to protect software and its components from vulnerabilities and threats
OT Cybersecurity Monitoring Program	Deploy advanced firewalls, network sensors, and other cyber technologies at approximately 400 sites	Capital: $22.5 million Incremental O&M: None	2025 - 2027	Resiliency Events that cause outages Unauthorized access Loss of critical or sensitive data	Provide capability to monitor and control the distribution grid during the resilience event Identify and respond to outage events
Physical Security					
Substation Physical Security Fencing	Enhance security fencing at approximately at 15 substations per year (15 substations in total)	Capital: $15 million Incremental O&M: None	2025 - 2027	Physical intrusion and vandalism	Enhance physical deterrence capability Deter and reduce the possibility of unauthorized entry, theft, and vandalism within substations

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
Substation Security Upgrades	Enhance security systems at 12 substations per year (36 substations in total)	Capital: $19.5 million Incremental O&M: $90,000	2025 - 2027	Physical intrusion and vandalism	Enhance physical deterrence capability Deter and reduce the possibility of unauthorized entry, theft, and vandalism within substations
Vegetation Management					
Targeted Critical Circuit Vegetation Management	New targeted vegetation management along distribution circuits identified as being relay exempt from the Company's load shed process due to serving critical load public safety customers (3-year trim cycle)	Incremental O&M: $25 million over a 3-year period	2025 - 2027	Extreme wind events ▪ Microburst ▪ High wind ▪ Tornado ▪ Hurricane Heavy rain and major storm Extreme freezes Extreme heat	Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Wildfire Mitigation					
Wildfire Mitigation Projects	Installation of overhead covered conductors, camera & monitoring system, relay protection schemes, circuit sectionalization, and additional vegetation management and transmission wood pole replacement	Capital: $137.2 million Incremental O&M: $43.7 million	2025 - 2027	Wildfire	Enhance wildfire detection capability Mitigate physical damage caused by wildfires Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs

Resiliency Measure	Description	Estimated costs	Estimated implementation timeframe	Resiliency Event(s) impact to be mitigated	Anticipated customer benefits
Microgrid Pilot Project					
Microgrid Pilot Project	Coordinate with third-party entities in the study, design, implementation, and operation of microgrids in the Company's service area	Capital: $35.0 million Incremental O&M: $1.5 million	2025 - 2027	Resiliency Events that cause outages	Monitor and assess microgrid performance during Resiliency Events Operational data and experience would inform potential benefits and potential future integration of microgrids in the Company's service area

II. Glossary of Acronyms

AI	Artificial intelligence
AMI	Advanced metering infrastructure
AMS	Advanced metering system
ASTM	American Society for Testing and Materials
Company	CenterPoint Energy Houston Electric, LLC
Commission	Public Utility Commission of Texas
Critical Circuit VM	Targeted Critical Circuit Vegetation Management
Critical load public safety customer	A customer for whom electric service is considered crucial for the protection or maintenance of public safety, including but not limited to hospitals, police stations, fire stations, and critical water and wastewater facilities
DI Apps	Distributed intelligent applications
DOE	Department of Energy
EOP	Emergency Operations Plan
ERCOT	Electric Reliability Council of Texas
Good Utility Practice	Any of the practices, methods, or acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods, or acts that, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety, and expedition. Good utility practice is not intended to be limited to the optimum practice, method, or act, to the exclusion of all others, but rather is intended to include acceptable practices, methods, and acts generally accepted in the region.
GPS	Global positioning system
Guidehouse	Guidehouse Inc.
IEC	International Electrotechnical Committee

kV	Kilovolt
LiDAR	Light detection and ranging
LTE	Long-term evolution
mph	Miles per hour
NESC	National Electrical Safety Code
NWS	National Weather Service
O&M	Operations and maintenance
PMR	Pole mounted router
PSPS	Public safety power shut-off
PURA	Public Utility Regulatory Act, Tex. Util. Code §§ 11.001-66.016
Resiliency Event	An event involving extreme weather conditions, wildfires, cybersecurity threats, or physical security that poses a material risk to the safe and reliable operation of the Company's transmission and distribution systems
Resiliency Measure	A measure designed to prevent, withstand, mitigate, or more promptly recover from the risks posed to the Company's transmission and distribution system by a Resiliency Event
Resiliency Plan	The Company's Transmission and Distribution System Resiliency Plan
Resiliency Plan Rule	16 Tex. Admin. Code § 25.62
Resiliency Plan Statute	Tex. Util. Code § 38.078
RFP	Request for Proposal
ROW	Right-of-way
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SAN	Storage Area Network
SCADA	Supervisory Control and Data Acquisition

SOC	System Operation Control
TAC	Texas Administrative Code
TripSaver	TripSaver® II Cutout-Mounted Recloser devices
UFLS	Underfrequency load shedding

III. Introduction

A. The Company's Commitment to Enhancing Resiliency

The Company has an obligation and a commitment to provide safe and reliable electric delivery service to the customers in the Company's service area. As part of the Company's obligation and commitment to provide safe and reliable electric delivery service, the Company allocates a portion of its capital expenditures to resiliency-related projects. For example, over the past five years, the Company spent approximately $1.46 billion in capital expenditures for resiliency-related system hardening and modernization projects. The following Figure RP-1 provides examples of resiliency-related system hardening and modernization projects that were implemented by the Company during the past five years and the corresponding capital costs.

Figure RP-1.

Year	Resiliency Project	Cost (millions)
2019	**Total**	**$100**
	IGSD Installation	$7
	Transmission System Hardening	$11
	Substation Elevation	$12
	Distribution Pole Replacement/Bracing	$20
	Substation Security	$9
	S90 Tower Replacements	$1
	69/138 kV Conversions	$40
2020	**Total**	**$84**
	IGSD Installation	$1
	Transmission System Hardening	$12
	Substation Elevation	$18
	Distribution Pole Replacement/Bracing	$29
	Substation Security	$5
	S90 Tower Replacements	$3
	69/138 kV Conversions	$16
2021	**Total**	**$250**
	IGSD Installation	$5
	Transmission System Hardening	$159
	Substation Elevation	$13
	Distribution Pole Replacement/Bracing	$30
	Substation Security	$20
	S90 Tower Replacements	$20
	69/138 kV Conversions	$3
2022	**Total**	**$617**
	Distribution Resiliency – Circuit Rebuild	$40
	Distribution Resiliency – TripSaver	$7

Year	Resiliency Project	Cost (millions)
	IGSD Installation	$12
	Transmission System Hardening	$274
	Substation Elevation	$20
	Distribution Pole Replacement/Bracing	$61
	Substation Security	$24
	S90 Tower Replacement	$55
	69/138 kV Conversions	$49
	Medical Center Substation	$75
2023	**Total**	**$410.4**
	Distribution Resiliency – Circuit Rebuild	$40
	Distribution Resiliency – TripSaver	$5
	IGSD Installation	$13
	Transmission System Hardening	$166
	Substation Elevation	$20
	Distribution Pole Replacement/Bracing	$52
	Substation Security	$10
	S90 Tower Replacement	$14
	69/138 kV Conversions	$90
	Medical Center Substation	$0.4
	Total for 2019 - 2023	**$1,461.4**

In addition to making capital investments related to resiliency, the Company has also engaged in vegetation management. Figure RP-2 below summarizes the approximate amount the Company spent on vegetation management from 2020-2022, as reported in the annual Vegetation Management report that is filed with the Commission in Project No. 41381.

Figure RP-2.

Year	Vegetation Management	Amount Spent
2020	**Total**	**$30 million**
	Scheduled Vegetation Management (Proactive Tree Trimming)	$25.2 million
	Unscheduled Vegetation Management (Reactive Tree Trimming)	$3.6 million
	Tree Risk Management (Proactive Hazard Tree Removal)	$60 k
	Emergency and Post-Storm Activities	$719k
2021	**Total**	**$31.4 million**
	Scheduled Vegetation Management (Proactive Tree Trimming)	$26.5 million
	Unscheduled Vegetation Management (Reactive Tree	$3.5 million

Year	Vegetation Management	Amount Spent
	Trimming)	
	Tree Risk Management (Proactive Hazard Tree Removal)	$164 k
	Emergency and Post-Storm Activities	$1.2 million
2022	**Total**	**$34.6 million**
	Scheduled Vegetation Management (Proactive Tree Trimming)	$28.2 million
	Unscheduled Vegetation Management (Reactive Tree Trimming)	$3.7 million
	Tree Risk Management (Proactive Hazard Tree Removal)	$911 k
	Emergency and Post-Storm Activities	$1.8 million
	Total for 2020 - 2022	**$96 million**

B. Resiliency Plan Purpose and Scope

The Resiliency Plan Statute permits an electric utility to file for Commission review and approval of the electric utility's proposed transmission and distribution system resiliency plan. The Resiliency Plan Rule details the substantive requirements for a proposed transmission and distribution system resiliency plan. This Resiliency Plan describes the Company's Resiliency Measures related to transmission and distribution system hardening, grid modernization, flood control, information technology to support operations, information technology, physical security and cybersecurity, vegetation management, and wildfire mitigation. As required by the Resiliency Plan Rule, this Resiliency Plan discusses the Resiliency Event-related risks faced by the Company and historical Resiliency Events that have occurred in the Company's service area. Additionally, this Resiliency Plan also provides capital cost and O&M expense estimates, implementation timeframes, the Resiliency Event-related impacts to be mitigated, the anticipated benefits, and criteria for measuring effectiveness for each Resiliency Measure in the Company's Resiliency Plan. The Resiliency Measures in the Company's Resiliency Plan will be implemented on a program basis. The Company's Resiliency Plan is intended to provide the Company maximum discretion and flexibility as it relates to implementation of Resiliency Measures on a specific portion or portions of the Company's transmission and distribution system or the Company's service area. In implementing an individual Resiliency Measure or a group of Resiliency Measures in the Resiliency Plan, the Company will consider factors such as the Company's past operational experience with Resiliency Events, the number and type of customers that may benefit from the implementation of a Resiliency Measure, operational and engineering considerations, availability of material and personnel, and Good Utility Practice.

C. Role of Guidehouse as an Independent Third-Party Expert

The Company retained Guidehouse to serve as an independent third-party expert in providing an assessment and recommendations on the Resiliency Measures in the Company's Resiliency Plan. The work conducted by Guidehouse included the following:

- Quantification of benefits for each Resiliency Measure in the Resiliency Plan, when appropriate,

using data collected by the Company from prior storms and applying forecasted risk;

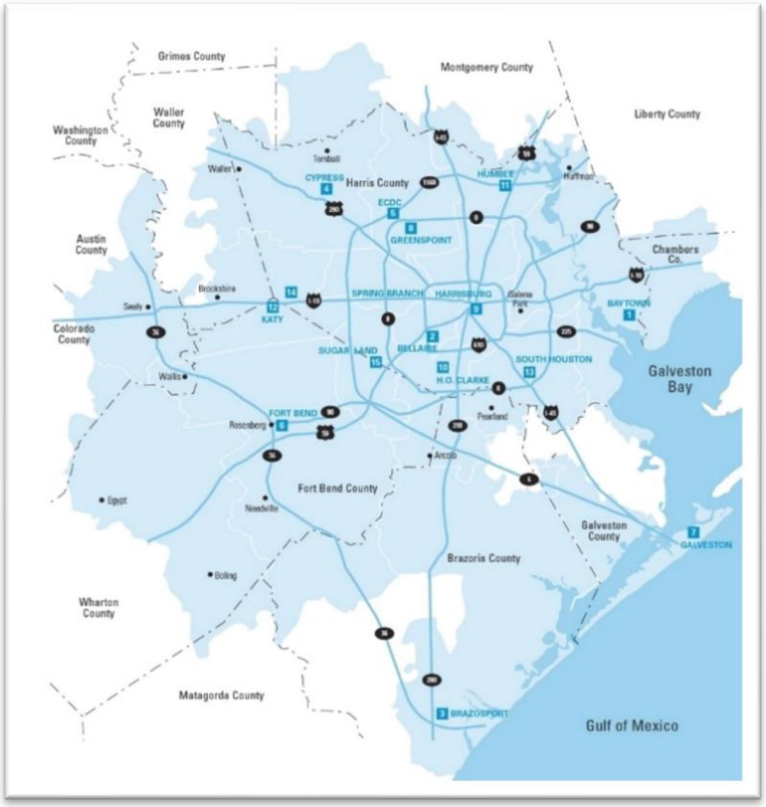
- Conducting a forecast of weather variability and hazards in the Company's service area;
- Comparing the Resiliency Measures in the Resiliency Plan to those of leading utility practices; and
- Proposing metrics reporting and program effectiveness measures.

IV. Overview of the Company's Service Area, Customer Profile, and Transmission and Distribution System

A. Geographic Description of the Company's Service Area

The Company's service area is comprised of approximately 5,000 square miles located in and around the Greater Houston Area and the Texas Gulf Coast. The Company's service area includes the City of Houston and cities and other areas located in Harris County, Montgomery County, Chambers County, Galveston County, Brazoria County, Fort Bend County, Wharton County, and Colorado County. The map below generally illustrates the Company's service area.

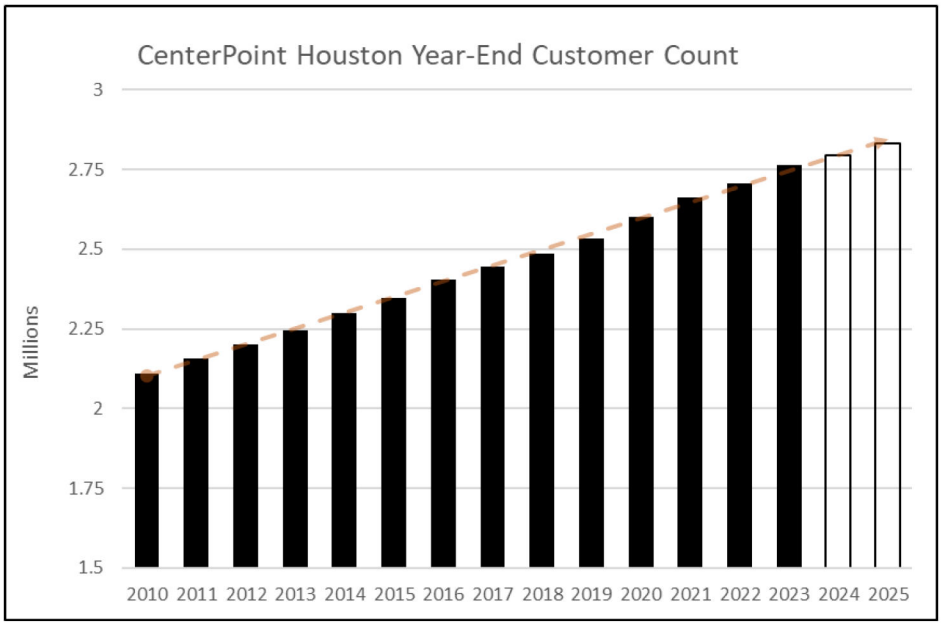
Figure RP-3.



B. Rapid and Sustained Customer Growth and Diversity of Customer Load

The Company's service area is approximately 2% of the geographic area of Texas, but the Company's customers account for 25% of the load in the ERCOT power region. The Company provides electric service to approximately 2.8 million residential, commercial, and industrial customers. The Company's service area has experienced rapid and sustained customer growth during the past decade, and this customer growth is anticipated to continue near 2% per year for the foreseeable future. The chart below illustrates the customer growth in the Company's service area.

Figure RP-4.



The Company's service area includes important public-serving facilities and infrastructure such as: the Texas Medical Center, the Port of Houston, the George Bush Intercontinental Airport, and William P. Hobby Airport and several petrochemical and refining facilities.

C. The Company's Transmission and Distribution System

To provide safe and reliable electric service to the Company's approximately 2.8 million residential, commercial, and industrial customers, the Company maintains and operates a transmission and distribution system comprised of:

- approximately 3,700 miles of overhead transmission lines that deliver electricity at 69 kV, 138 kV, and 345 kV;
- over 280 substations that reduce voltage to serve distribution customers;
- approximately 56,000 miles of distribution lines (approximately 30,000 miles of overhead

distribution and 26,000 miles of underground distribution); miscellaneous associated equipment (e.g., step-down transformers, insulators, capacitors, fuses);

- a telecommunications network; and
- supporting information technology hardware and software.

V. Overview of Resiliency Events in the Company's Service Area

A. Resiliency Event Definitions and Occurrences

The following Figure RP-5 defines the magnitude threshold by which an event is deemed a Resiliency Event by the Company.

Figure RP-5.

Resiliency Event	Definition and Related Magnitude Threshold
Extreme Weather Resiliency Events[1]	
Extreme heat	Broken up into three categories: (1) heat advisory; (2) heat indices of 95-99 degrees Fahrenheit for 2 consecutive days; or (3) 100-104 degrees Fahrenheit for any duration
High winds	Sustained wind speeds of 40-57 mph
Heavy rain	A thunderstorm producing damaging winds (e.g., downed trees) or winds 58 mph or more and/or hail three-quarter of an inch or greater in diameter.
Lightning	Lightning activity level labeled 1-6: LAL1 – No thunderstorms. LAL2 – Isolated thunderstorms. Light rain. Lightning is very infrequent 1-5 cloud to ground strikes in a 5-minute period. LAL3 – Widely scattered thunderstorms. Light to moderate rain. Lightning infrequent. 6-10 cloud to ground strikes in a 5-minute period. LAL4 – Scattered thunderstorms. Moderate Rain. Lightning is frequent. 11-15 cloud to ground strikes in a 5-minute period. LAL5 – Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense. More than 15 cloud to ground strikes in a 5-minute period. LAL6 – Dry lightning (same as LAL3 without rain). This type has potential for extreme fire activity and is normally highlighted in fire weather forecasts with a red flag.

[1] As defined by the National Weather Service.

Resiliency Event	Definition and Related Magnitude Threshold
Extreme Weather Resiliency Events[1]	
Wildfire	An unplanned, unwanted fire burning in a natural area, such as a forest, grassland, or prairie.
Flooding	A covering, overflow or submerging of water onto normally dry land. The inundation of a normally dry area caused by rising water in an existing waterway, such as a river, stream, or drainage ditch. Ponding of water at or near the point where the rain fell. Flooding is a longer-term event than flash flooding: it may last hours, days or weeks.
Tropical storm	A tropical cyclone in which the maximum sustained surface wind speed ranges from 39 mph to 73 mph.
Tornadic activity	A violently rotating column of air touching the ground, usually attached to the base of a thunderstorm.
Hurricane	A tropical cyclone in which the maximum sustained surface wind is 74 mph or more.
Freeze	Temperatures at or near the surface (ground) are expected to be 32 degrees or colder Fahrenheit over a widespread area for a climatologically significant period of time.
Physical Security Resiliency Events	
Vehicular Collision	Vehicles involved in accidents involving or colliding with distribution poles and/or equipment or transmission structures or other company facilities
Foreign Material	Objects that get caught within the conductors and cause a short to either ground or another phase (tree limb, mylar balloon, wildlife, etc.)
Domestic Terrorism	Ballistic attacks, electromagnetic pulses, intentional vehicles crashes
Barge contact	Barges that make contact with transmission structures or transmission lines
Technology-Specific Resiliency Events	
Theft of Expensive or Long-lead Time Tech. Components	Theft requiring replacement of technology components used at substation, operational facilities, or data centers that would delay the repair or restoration of service
Vendor Outages	Internet provider, cloud services, telecommunications and outages.
Cybersecurity Attacks	Distributed Denial-of-Service (dDoS), ransomware, malware, phishing, exploitation of known but unpatched vulnerabilities, social engineering, supply chain attacks, system misconfigurations, missing or poor encryption practices, insider threats and external actors via physical- and cyber-attacks.

Figure RP-6 below summarizes the Resiliency Events that have occurred in the Company's service area, the total number of customers affected by an outage by the Resiliency Event, and restoration time for the Resiliency Event for the years 2019 through 2023.

Figure RP-6.

Year	Resiliency Event	Total Customers Affected	Restoration Time
2019	April 7th-8th: Fast moving disturbance produced dangerous thunderstorms with tornados, strong damaging winds, lightning, and heavy rain.	233,687	28 hours, 20 minutes
	May 9th-11th: Stalled cold front combined with high instability, deep tropical moisture, and several disturbances produced strong thunderstorms and gusts, frequent cloud-to-ground lightning, heavy rainfall, and flooding.	238,015	48 hours, 55 minutes
	September 17th-20th: Tropical Storm Imelda produced torrential rain, flooding, strong winds, and lightning.	180,431	73 hours, 5 minutes
2020	April 29th: A strong squall and associated cold front produced very strong, gusty winds, frequent lightning, and heavy rain.	256,057	16 hours, 15 minutes
	May 15th-16th: Daytime heating, elevated moisture levels, and instability combined to produce scattered showers and thunderstorms, frequent lightning, strong gusty winds, and heavy rainfall. Subsequently, a strong upper-level disturbance pushed a line of severe thunderstorms with frequent lightning, strong damaging winds gusting up to 60 mph, and heavy downpours.	114,575	28 hours, 5 minutes
	May 27th-29th: An upper-level disturbance combined with daytime heating and an unstable environment produced severe thunderstorms with severe wind gusts, frequent lightning, and heavy rainfall.	423,000	32 hours, 15 minutes

Year	Resiliency Event	Total Customers Affected	Restoration Time
2021	February 14th-19th: Winter Storm Uri.	8,127,986	116 hours, 40 minutes
	September 17th-18th: Hurricane Nicholas produced powerful, gusty winds, heavy rain, and flooding.	706,429	120 hours, 5 minutes
	October 28th-29th: High winds sustained at 30-35mph with gusts up to 50mph.	308,585	32 hours, 55 minutes
	July 22nd: Akamai Internet Outage. External DNS provider system issue that impacted the availability of the corporate web page.	Indeterminate	2 hours
2022	January 8th-9th: A warm front brought strong gusty winds, tornados, lightning, and heavy rain.	79,138	27 hours, 20 minutes
	March 22nd: Strong thunderstorms, heavy rain, frequent lightning, and wind gusts nearing 40 mph.	49,743	5 hours, 40 minutes
2023	January 24th-26th: A strong disturbance brought severe thunderstorms with frequent lightning, hail, damaging wind gusts, tornadoes, and heavy rain.	207,547	57 hours, 10 minutes
	May 14th: Frequent lightning and heavy rain.	53,985	9 hours, 50 minutes
	June 8th-10th: Scattered storms that brought strong wind gusts, small hail, and frequent lightning strikes.	362,363	34 hours
	June 21st-25th: Thunderstorms brought frequent lightning, hail, and damaging winds.	574,582	77 hours, 40 minutes
	April 4th: AT&T/Comcast Fiber Cuts. Simultaneous damage to both AT&T and Comcast network fiber causing regional network connectivity interruption.	N/A	13 hours

Note: Total Customers Affected represents the non-distinct customer count for each event.

B. Related Risks of Resiliency Events

Due to the proximity of the Company's service area to the Texas Gulf Coast, the Resiliency Events that have typically occurred, and have an increasing probability of occurring in the future, are primarily related to extreme weather events, specifically: extreme temperature, wind and water events (e.g., prolonged heat, high winds, microbursts, heavy rains, lightning, flooding, tropical storms, tornadic activity, hurricanes, and freezes). Notable extreme weather event-related Resiliency Events in the Company's service area are: Hurricane Ike in 2008, a thunderstorm and wind event in 2013, flooding in 2015, Hurricane Harvey in 2017, a microburst event in 2017, an ice storm in 2018, tornadoes in 2019, Winter Storm Uri in 2021, Hurricane Nicholas in 2021, a tornado in 2022, a tornado in 2023, and a microburst event in 2023. In addition to Resiliency Events related to extreme weather events, Resiliency Events attributable to third parties, such as vehicular collisions, have occurred in the Company's service area.

Figures RP-7 and RP-8 below explain how Resiliency Events translate to system susceptibilities and the potential impact that each Resiliency Event may have on the Company's transmission and distribution system.

Figure RP-7.

System Susceptibility to Resiliency Events	
Resiliency Event	**Examples of System Susceptibilities**
Extreme Weather Resiliency Events	
Extreme Heat	Transformer failures, IGSD failures, conductor failures, capacitor bank failures, increased risk of wildfires
High Winds	Conductor slap (clashing), splice failures, pole failures, wildfires, galloping conductors, trees/debris in conductors, wind damage
Heavy rain	Flooding of substations, rising waters encroaching on conductors and sensitive equipment, storm surges, pole failures, inability of crews to access areas to complete restoration
Lightning	Transformer failures, conductor failures, arrestor failures, capacitor bank failures, fires
Flooding	Flooding of substations, rising waters encroaching on conductors and sensitive equipment, storm surges, pole failures, inability of crews to access areas to complete restoration
Tropical Storms	Conductor slap (clashing), splice failures, conductor failures, pole failures, transformer failures, flooding of substations, rising water encroaching on conductors and equipment, wind damage, trees/debris in conductors, inability of crews to access areas to

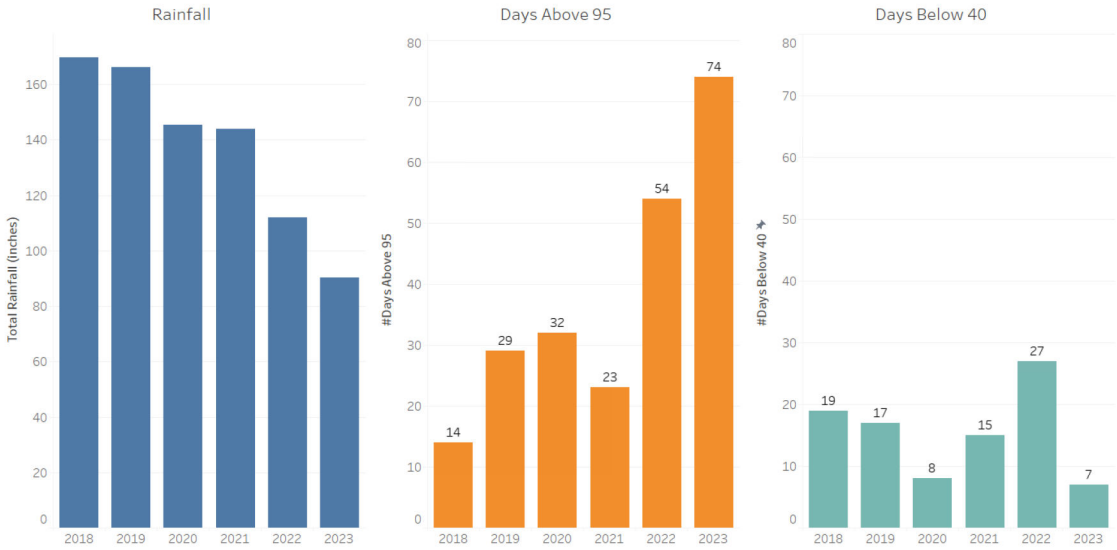
System Susceptibility to Resiliency Events	
Resiliency Event	**Examples of System Susceptibilities**
Extreme Weather Resiliency Events	
	begin restoration, wind damage
Hurricanes	Conductor slap (clashing), splice failures, conductor failures, pole failures, transformer failures, flooding of substations, rising waters encroaching on conductors and equipment, storm surges, structure failures, wind damage, trees/debris in conductors, inability of crews to access areas to begin restoration
Tornadic activity	Conductor slap (clashing), splice failures, conductor failures, pole failures, structure failures, trees/debris in conductors
Freezes	Conductor failures, pole failures, transformer failures, impact on power generation capabilities
Wildfires	Conductor failures, pole failures, transformer/substation failures, tower failures, conductor clashing, conductor vegetation contact, contamination from ash/smoke
Physical Damaged-Related Resiliency Events	
Vehicular Collisions	Pole failures, conductor failures, equipment failures, structure failures
Foreign Material Contact	Pole failures, breaker failures, equipment and/or structural failures
Barge Contact	Transmission structure failures, conductor failures
Technology-Specific Resiliency Events	
Cyberattacks	Damage to the technology environment, unpermitted access to sensitive data, cascading system outages, loss of systems control and capabilities
Vendor Outages	Loss of telecommunications services, internet services, or cloud services
Domestic Terrorism	Damage to physical systems impacting integrated IT/OT systems, damage to the technology environment, cascading system outages
Theft of Expensive or Long-lead Time Technology Components	Theft requiring replacement of technology components used at substation, and operational facilities, or data centers that would delay the repair or restoration of service

Figure RP-8.

Resiliency Event									
Attribute contributing to Resiliency Event Impact	**Micro-burst**	**High Wind**	**Hurricane**	**Flooding**	**Extreme Temperature**	**Freeze**	**Wildfire**	**Physical Attack/ Damage**	**Technology Specific Events**
Lack of comprehensive system data visualization for analysis	X	X	X	X	X	X	X	X	X
Unavailability of meter-level load shedding					X	X			
Presence of wooden poles susceptible to wind/fire damage	X	X	X	X			X		
Presence of older transmission structures with lower wind rating	X	X	X	X		X	X		
Presence of older 69kV transmission system with limited ampacity to serve load under contingency conditions	X	X	X		X	X			
Coastal area transmission and distribution system with higher risk of impact from weather events	X	X	X		X	X	X		
Multiple transformers within a substation with risk of cascading fire damage					X		X		
Need for accessibility to substations, thus increasing risk of physical attacks								X	
Proximity of substation to coastal areas and low-lying areas increasing risk of flooding			X	X					
Limited capability to bring in all necessary telemetry	X	X	X	X				X	X
Higher outage risk to distribution circuits near freeways	X	X	X					X	
Overhead conductors with increased risk of temporary faults due to lightning and vegetation	X	X	X	X		X	X	X	
Presence of distribution structures with lower wind rating	X	X	X				X		

The Company's service area also experiences heavy precipitation and extreme temperatures. The following Figure RP-9 summarizes the precipitation and temperature changes in the Company's service area from 2018 to 2023.

Figure RP-9.



Although the Company's service area is subject to extreme temperatures and sometimes drought conditions, there historically had been little impact from wildfires that occurred within or around the Company's service area. Typically, however, high wind events in our service territory have been accompanied by rain, thus mitigating the risk for wildfires. However, in 2011 there were notable wildfires around Texas, with one wildfire within the Company's service area (Riley Road wildfire), and in 2023 the Company saw heightened wildfire risks in parts of its service territory when we experienced prolonged periods of drought and high heat. The Company will continue to review and monitor conditions by leveraging data from the Texas A&M Forest Service and the National Weather Service to continue to mitigate the risks of wildfires and in case the need arises to enact the PSPS. The Resiliency Measures that can be leveraged for wildfire risk mitigation include:

- Wildfire Mitigation Measure,
- IGSD Resiliency Measure,
- TripSaver Resiliency Measure,
- Distribution Pole Replacements/Bracing Resiliency Measure,
- Strategic Undergrounding/Freeway Crossings Resiliency Measure,
- Transmission System Hardening Resiliency Measure, and
- 69 kV-138 kV Conversion Projects Resiliency Measure.

Other wildfire measures the Company continues to foster include a robust vegetation management program, inspections, hazard tree inspections, tree clearing, processes for mowing rights of way and

spraying herbicides/fire retardants in certain areas at risk for fires, etc. These measures, in conjunction with the previously mentioned Resiliency Measures, will continue to assist in mitigating the wildfire risk in extreme wind events. Conditions are continually changing, so the Company will remain vigilant and continue to monitor conditions to remain prepared to deploy appropriate wildfire protection measures, including evaluating and determining if the PSPS plan will need to be initiated to minimize the risks of wildfires.

In addition to weather-related Resiliency Events, the Company has experienced Resiliency Events that are attributable to third-parties. For example, the Company's distribution system has been damaged due to vehicular collisions, and the Company's transmission system has been damaged due to barges coming into contact with the Company's transmission line structures.

VI. Resiliency Measures

The Company's Resiliency Plan has twenty-five Resiliency Measures (grouped in 8 categories) that will harden the Company's transmission and distribution system to better withstand certain events, modernize the Company's transmission and distribution system, provide increased flood control protection, make the grid smarter by enhancing the Company's information technology used for operations, enhance the physical security of the Company's transmission and distribution system, improve the Company's posture against cybersecurity threats, proactively conduct vegetation management on select distribution circuits and mitigate wildfire risks. The Company estimates that the twenty-five Resiliency Measures will cost approximately $2,192 million in capital costs and approximately $85.9 million in incremental O&M expense over the three-year period from 2025-2027.

Figure RP-10 below summarizes each Resiliency Measure and the Resiliency Event(s)-related impact that the Resiliency Measure is intended to address.

Figure RP-10.

	Tornado/ Microburst	High Wind	Hurricane	Flooding	Extreme Temp/ Heat	Freeze	Wildfire	Physical Attack/ 3rd Party Damage	Theft of Tech Components	Vendor Outages	Cybersecurity
System Hardening											
Transmission System Hardening	X	X	X			X	X				
S90 Tower Replacements	X	X	X			X	X				
69kV - 138 kV Conversion Projects	X	X	X		X	X	X				

	Tornado/ Microburst	High Wind	Hurricane	Flooding	Extreme Temp/ Heat	Freeze	Wildfire	Physical Attack/ 3rd Party Damage	Theft of Tech Components	Vendor Outages	Cybersecurity
System Hardening											
Coastal Resiliency Upgrades	X	X	X		X	X	X	X			
Substation Transformer Fire Protection Barriers					X		X				
Distribution Pole Replacement/ Bracing	X	X	X					X			
Distribution Resiliency - Circuit Rebuilds	X	X	X								
Strategic Underground/ Freeway Crossings	X	X	X		X	X	X	X			
Grid Modernization											
TripSaver	X	X	X			X	X				
IGSD Installation	X	X	X			X	X				
Texas Medical Center Substation	X	X	X	X	X	X					
Flood Mitigation											
Substation Flood Control				X							
Control Center Facility Upgrades				X							
Information Technology to Support Operations											
Advanced Aerial Imagery/Digital Twin	X	X	X	X	X	X	X				

	Tornado/ Microburst	High Wind	Hurricane	Flooding	Extreme Temp/ Heat	Freeze	Wildfire	Physical Attack/ 3rd Party Damage	Theft of Tech Components	Vendor Outages	Cybersecurity
System Hardening											
Advanced Distribution Technology	X	X	X	X	X	X	X	X	X	X	X
Digital Substation	X	X	X	X	X	X	X	X	X		X
Information Technology											
Voice and Mobile Data Radio System Refresh	X	X	X	X	X	X	X	X	X	X	X
Backhaul Microwave Communication	X	X	X	X	X	X	X	X	X	X	X
Data Center Refresh and Resiliency	X	X	X	X	X	X	X	X	X	X	X
Network Security and Vulnerability Management											X
IT/OT Cybersecurity Monitoring Program											X
System Security											
Substation Physical Security Fencing								X	X		
Substation Security Upgrades								X	X		
Vegetation Management	X	X	X		X	X	X				
Wildfire Mitigation	X	X	X		X	X	X				

Some Resiliency Measures in the Company's Resiliency Plan may extend beyond the three-year period, and thus there may be additional capital costs and additional incremental O&M expenses beyond the three-year period.

A. System Hardening: PURA § 38.078(b)(1), 16 TAC § 25.62(c)(1)(A)

The Company's Resiliency Plan has eight Resiliency Measures that will harden the Company's transmission and distribution system. The Company estimates that the eight Resiliency Measures that will harden the Company's transmission and distribution system will cost approximately $1,453 million in capital costs and $1.5 million in incremental O&M expense and will be implemented over a three-year period from 2025-2027. The Company's eight hardening Resiliency Measures are summarized below in Figure RP-11.

Figure RP-11.

System Hardening Resiliency Measures	Estimated Capital Costs (millions)	Estimated Incremental O&M Expense (millions)	Estimated Timeframe (years)
Transmission System Hardening	$376.0	$0.75	2025-2027
S90 Tower Replacements	$103.8	None	2025-2027
69kV-138kV Conversion Projects	$268.4	None	2025-2027
Coastal Resiliency Upgrades	$259.0	$0.75	2025-2027
Substation Transformer Fire Protection Barriers	$2.4	None	2025-2027
Distribution Pole Replacements/Bracing	$99.3	None	2025-2027
Distribution Resiliency – Circuit Rebuilds	$312.8	None	2025-2027
Strategic Undergrounding/Freeway Crossings	$31.2	None	2025-2027
Subtotal	**$1,452.9**	**$1.5**	

1. Transmission System Hardening

a. Description

The Transmission System Hardening Resiliency Measure will replace wooden transmission structures (single pole and H-frame) with steel or concrete structures in line segments where a substantial number of poles do not meet the Company's current wind loading design standard for

138kV structures.[2] This Resiliency Measure also includes the installation of air flow spoilers to mitigate galloping conductors along transmission lines, further mitigating potential failures during high wind and icing events. The Company is targeting approximately 5 to 30 miles of transmission lines per year, or approximately 50 miles over the three-year period.

A complete system outage is not required for installation, though segment outages may be. This resiliency measure will work in conjunction with similar existing system hardening measures as well as with other Resiliency Measures included in this Plan.

The following Figure RP-12 illustrates examples of the types of wooden transmission structures to be replaced through the Transmission System Hardening Resiliency Measure.

Figure RP-12.

b. Relevant Details

The following Figure RP-13 summarizes the Transmission System Hardening Resiliency Measure.

[2] The Company's current wind loading standard is from ASCE 7-16 and is based on the 100-year MRI Exposure C or D (dependent on proximity to Gulf of Mexico).

Figure RP-13.

Transmission System Hardening Resiliency Measure	
Estimated capital costs from 2025-2027	$376.0 million[3]
Estimated incremental O&M expense from 2025 - 2027	$750,000
Estimated overall project duration	2025-2027 (but extends through 2032)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado • Hurricane Wildfires Extreme temperature event Icing on conductors
Anticipated benefits	Improved structural integrity Higher wind loading capabilities Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other relevant details	Availability of material and personnel may impact cost estimates

i. Prioritization

The Company will consider factors such as geographic location, history of extreme wind and ice related outages, inspection of poles, pole loading, etc. to determine which transmission circuits will be hardened.

ii. History of Effectiveness

Transmission system hardening projects have historically resulted in the modification of several transmission structures, incorporating updates more capable of higher wind loading that can withstand the more extreme wind speeds seen in recent years. The

[3] The Company's plan to harden its transmission system extends beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future transmission system hardening projects that include all or a portion of such projects in the Transmission System Hardening Resiliency Measure. The Company estimates that accelerating future transmission hardening projects will cost approximately $100 - 120 million in additional capital costs and approximately $250,000 per year in additional incremental O&M expense from 2025 - 2027.

Company anticipates being able to restore service to customers quicker after extreme wind events like microbursts, high winds, and hurricanes because transmission structures will be strengthened against higher wind speeds, thus sustaining less overall failure rates of poles.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated three alternatives to the proposed replacement of wooden transmission structures with steel or concrete poles.

First, single, stronger wooden poles offer a marginal increase in resiliency. Further, new wooden H-frame are considered an obsolete design standard for resiliency.

Second, an alternative to replacing poles is to relocate lines underground. This option was rejected as cost prohibitive for almost all existing 138kV transmission lines as the cost of undergrounding transmission lines is 5 to 10 times more costly than overhead lines.

Third, the Company could reduce outage exposure on at-risk lines by constructing new lines to operate at the same or higher voltage along the same or new rights-of-way. These new lines would be built to a higher capacity line rating to meet future load growth. However, this alternative is far more costly and, therefore, determined to be inferior to the proposed use of concrete or steel structures.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the number of hardened transmission structures that fail will be used to determine program effectiveness. The Company will track and report to the Commission annually the failure rate of hardened transmission structures during a resiliency event. The Company will also document total existing poles that are below existing wind loading standards that fail on transmission lines and report to the Commission those failures.

2. S90 Tower Replacements

a. Description

The S90 Tower Replacements Resiliency Measure will replace 90-degree single circuit steel towers (S90 towers) to bring the transmission tower structures up to the new NESC standards to meet more rigorous extreme wind loading conditions. The S90 Towers Replacement Resiliency Measure is anticipated to replace thirty S90 towers, with twenty-seven S90 towers being replaced in 2025 and three S90 towers being replaced in 2026 and 2027. Upon completion of the 30 identified towers, the Company will evaluate the system again to determine if additional replacements are necessary.

A complete system outage is not required for installation, though segment outages may be. This Resiliency Measure will work in conjunction with similar existing system hardening measures as well as with other Resiliency Measures included in this Plan.

The following Figure RP-14 illustrates an example of lattice tower structures (left) to be replaced with new 90-degree steel towers (left) through the S90 Tower Replacement Resiliency Measure.

Figure RP-14.

b. Relevant Details

The following Figure RP-15 summarizes the S90 Towers Replacements Resiliency Measure.

Figure RP-15.

S90 Towers Replacements Resiliency Measure	
Estimated capital costs from 2025-2027	$103.8 million
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025- 2027 (but extends through 2029)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado • Hurricane Wildfires
Anticipated benefits	Improved structural integrity Higher wind loading capabilities Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other relevant details	Availability of material and personnel may impact cost estimates A complete system outage or segment outage is not required for replacement, though the work will be done in conjunction with other hardening efforts

i. Prioritization

The Company will identify towers on the Company's transmission system that need replacing, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. The Company will consider factors such as geographic location, history of extreme wind-related outages, inspection of structures, structure loading, etc. to determine which S90 towers will be replaced.

ii. History of Effectiveness

Transmission system hardening projects have historically resulted in the addition of several transmission structures, incorporating updates capable of higher wind loading that can withstand the more extreme wind speeds seen in recent years. An improvement of this program includes the restoration of service to customers quickly after events like microbursts, high winds, and hurricanes as the core structures will be strengthened and improved with these high impact, low frequency events causing less damage to transmission structures.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated two alternatives to the proposed replacement of S90 Towers. One alternative to replacing lattice towers is to relocate overhead lines underground. This option was rejected as cost prohibitive for almost all transmission lines constructed with towers.

Another alternative that the Company considered is constructing new transmission lines to operate at the same or higher voltage (along the same or new rights-of-way). These new lines would be built to a higher capacity line rating to meet future load growth. However, this alternative is far more costly and, therefore, is deemed non-viable.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the number of new towers that fail will be used to determine program effectiveness. The Company will track and report to the Commission annually the total number of new towers that fail during major storms. The Company will also document transmission line performance resulting from failed new structures causing outages on transmission lines.

3. 69kV-138kV Conversion Projects

a. Description

The 69kV-138kV Conversion Projects Resiliency Measure will upgrade the Company's 69 kV transmission circuits by rebuilding and reconductoring the transmission circuits to 138 kV, thus allowing for greater switching options. The 69kV-138kV Conversion Projects Resiliency Measure will upgrade approximately 108 miles of 69kV transmission circuits.

The program has several purposes: (1) remove aged 69kV transformers and replace deteriorated poles or structures that do not meet the Company's current wind loading design standard; (2) eliminate the need to maintain 69kV spare equipment; (3) provide additional 138kV paths into downtown Houston to relieve high loading on existing 138kV circuits; and (4) further enhance grid resiliency by increasing line ratings via voltage conversion. For these conversions, the Company proposes to replace wood poles with concrete or metal monopoles and replace conductor, insulators, and associated hardware. The steel or concrete structures used to upgrade the 69kV circuits will meet the Company's current design standard for transmission structures, and the upgraded circuits will be designed to the meet the current NESC standards.

A complete system outage is not required for installation, though segment outages may be required. This Resiliency Measure will work with similar existing system hardening measures as well as with other Resiliency Measures included in this Plan.

b. Relevant Details

The following Figure RP-16 summarizes the 69kV-138kV Conversion Projects Resiliency Measure.

Figure RP-16.

69kV-138kV Conversion Projects Resiliency Measure	
Estimated capital costs from 2025-2027	$268.4 million
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025-2027 (but extends through 2028)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado • Hurricane Extreme temperature event • Heat • Freeze Wildfires
Anticipated benefits	Improved structural integrity Higher wind loading capabilities Mitigate loss of transmission during extreme weather events by providing multiple paths of redundancy Capacity for future load growth
Other relevant details	Availability of material and personnel may impact cost estimates Projects may undergo ERCOT review

i. Prioritization

The Company will identify the 69kV transmission circuits that will be upgraded to 138kV, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. The Company will consider factors such as age of the 69kV circuit, geographic location, history of extreme wind-related and temperature-related outages, customer load, etc. to determine which 69kV transmission circuits will be hardened.

ii. History of Effectiveness

Upgrading 69 kV transmission circuits to 138 kV increases ampacity (maximum amount of current able to be carried), thus providing increased switching capabilities and reduced outage durations after resiliency events.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated two alternatives to the proposed conversion of 69kV transmission lines to operate at 138kV.

One alternative to upgrading 69kV transmission circuits is to relocate 69kV lines underground. This option was rejected as cost prohibitive since the cost of underground lines is 5 to 10 times more than the cost of overhead lines and would also prolong the Company's conversion of its 69kV network.

The other alternative is to reduce outage exposure on at-risk 69kV lines by relocating lines along new ROW with less exposure to resiliency events. However, this option was eliminated from consideration due to added cost, desire to retain and maximize use of existing ROW, and limited opportunities for relocation.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the number of outages on converted 69kV lines will be used to determine program effectiveness. The Company will track and report to the Commission the total number of line outages on converted 69kV transmission lines resulting from resiliency events.

4. Coastal Resiliency Upgrades[4]

a. Description

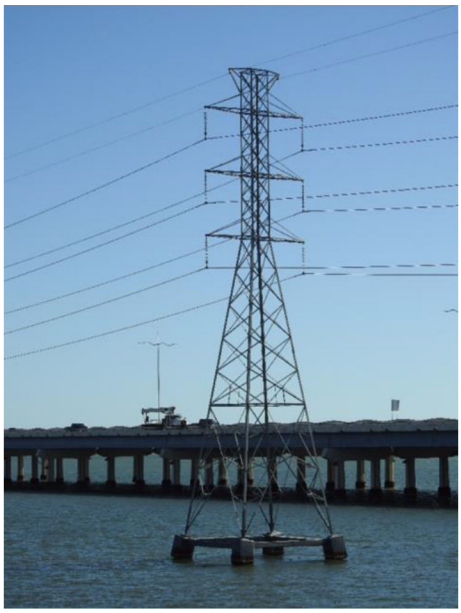
The Coastal Resiliency Upgrades Resiliency Measure will construct additional transmission circuits to certain coastal portions of the Company's service area to allow greater loading capabilities and switching flexibility so that customers may still receive service even if a circuit is compromised. Current 69kV transmission circuits will be upgraded to 138kV, and new underwater cables will be installed. Additionally, a transmission line will be re-routed, and a new transmission circuit will be constructed.

A complete system outage is not required for installation, though segment outages may be required. This Resiliency Measure will work with similar existing system hardening measures as well as with other Resiliency Measures included in this Plan.

The following Figure RP-17 illustrates an example of current coastal towers to be replicated through the Coastal Resiliency Upgrade Resiliency Measure.

[4] The Company is providing a separate, confidentially filed portion of the Company's Resiliency Plan that provides additional specificity on the Coastal Resiliency Upgrades Resiliency Measure.

Figure RP-17.



b. Relevant Details

The following Figure RP-18 summarizes the Coastal Resiliency Upgrades Resiliency Measure.

Figure RP-18.

Coastal Resiliency Upgrades Resiliency Measure	
Estimated capital costs from 2025-2027	$259.0 million[5]
Estimated incremental O&M expense from 2025 – 2027	$750,000
Estimated overall project duration	2025-2027 (but extends through 2028)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs

[5] The Company's Coastal Resiliency Projects extend beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future coastal resiliency projects and include all or a portion of such projects in the Coastal Resiliency Project Resiliency Measure. The Company estimates that accelerating future coastal resiliency projects will cost approximately $75 - 85 million in additional capital costs and approximately $250,000 per year in additional incremental O&M expense from 2025 - 2027.

Coastal Resiliency Upgrades Resiliency Measure	
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado • Hurricane Extreme temperature event • Heat • Freeze Wildfires Third-party damage
Anticipated benefits	Mitigate loss of transmission during extreme weather events by providing multiple paths of redundancy Capacity for future load growth Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration cost
Other relevant details	Availability of material and personnel may impact cost estimates Projects may undergo ERCOT review

i. Prioritization

Prioritization will be on select coastal portions of the Company's service area and based on specific risk criteria.

ii. History of Effectiveness

The Company successfully completed a hardening project near certain coastal portions of the Company's service area by replacing wooden transmission structures with concrete transmission structures.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated two alternatives to the proposed upgrades to the transmission system serving certain coastal portions of the Company's service area.

The first alternative considered was third-party construction of conventional generation such as combustion turbines or alternative resources such as energy storage. While viable, there would be considerable challenges for third-party owners to obtain a permit for a thermal generation source. Similarly, the size of an energy storage system large enough to meet load under contingency conditions would be costly. Further, each source could be subject to failure during major floods and

storm surges.

Second, new lines could be located either underwater or overhead to the coastal islands; however, this option was rejected due to environmental impacts and relatively high costs. Further, both of these alternatives did not fully resolve the contingency exposure for a loss of transmission lines.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will track and report to the Commission annually the total number of outages and interruptions of supply avoided. Because N-1-1 (common mode) failures are infrequent, it is likely that no outages will be reported for most years.

5. Substation Transformer Fire Protection Barriers

a. Description

The Company's Substation Fire Protection Barriers Resiliency Measure will install physical fire protection barriers, either concrete or metal, to protect power transformers and other equipment vulnerable to damage caused by the catastrophic failure of adjacent transformers. The Company proposes to install four fire protection barriers a year. Although substation transformer failures are uncommon compared to other distribution equipment failures (e.g., broken poles), the consequences and impact of a catastrophic failure can be severe. An enormous amount of energy is released when a transformer catastrophically fails, with the possibility of extensive damage to nearby equipment from associated fire and debris. The potential for lengthy outages and costly repairs if this were to occur is high. Extinguishing the fire also presents challenges to fire department personnel.

The Company will identify the substations that will have fire protection barriers installed, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. A complete system outage is not required for installation, though segment outages may be required.

The following Figure RP-19 illustrates a transformer fire that occurred at a Company substation in 2016.

Figure RP-19.

b. Relevant Details

The following Figure RP-20 summarizes the Substation Transformer Fire Protection Barriers Resiliency Measure.

Figure RP-20.

Substation Transformer Fire Protection Barriers Resiliency Measure	
Estimated capital costs from 2025-2027	$2.4 million
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025-2027 (but extends through the next 25 years)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme Temperature Substation fire Wildfires
Anticipated benefits	Mitigate damage from substation fires Reduce the number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other relevant details	Availability of material and personnel may impact cost estimates

i. Prioritization

The Company will consider factors such as: geographic location, the number of transformers at a substation, the number of distribution circuits connected to a substation, whether a substation serves a critical load public safety customer to determine which substations will have fire protection barriers installed.

i. History of Effectiveness

The addition of fire protection barriers in substations has been proven effective in containing or limiting fire damage to just the affected transformer or connected equipment without affecting adjacent transformers and equipment.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, concluded that there are no viable alternatives for protecting equipment from catastrophic transformer failures.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will estimate outages avoided and damage averted for each future transformer failure where transformer fire protection barriers are installed to measure program effectiveness. The Company will track and report to the Commission annually the total number of substation transformer failures where fire protection barriers are installed. For each of these substations where fire protection barriers are installed, the Company will indicate whether the fire protection barrier prevented damage to adjacent transformers and other substation equipment.

6. Distribution Pole Replacement/Bracing

a. Description

The Company's Pole Replacement/Bracing Resiliency Measure is designed to replace poles that have been identified during scheduled inspections as not meeting the Company's minimum remaining strength criteria. Poles will either be replaced or braced with trussing brackets to meet the Company's current extreme wind and ice loading design standard. Although existing poles meet the design standard in effect at the time they were built, they may not meet changes in the design standard due to increased extreme weather severity and frequency. To improve pole resiliency strength in high wind conditions and to expand the life of new poles, the Company has introduced composite (fiberglass) and metal (ductile iron) poles, although wood is the preferred option for some replacements depending on location and judgement of area engineering or operations personnel. The Company proposes to replace or brace up to 6,000 poles per year.

The following Figure RP-21 illustrates examples of distribution pole bracing and pole replacements to be addressed through the Pole Replacement/Bracing Resiliency Measure.

Figure RP-21.

All new distribution poles and replacements will be designed to applicable hurricane level extreme wind speeds of 110 mph or 132 mph, depending on the location of the distribution pole in the Company's service area. Figure RP-22 below summarizes the minimum criteria used for distribution pole replacements.

Figure RP-22.

	Wood	Fiberglass	Ductile Iron
Circuit North of US59/HWY 90 (110 MPH)	CL 2	X	X
Circuit South of US59/HWY 90 (132 MPH)	CL 2	X	X
Lateral Poles (110 & 132 MPH)	CL 4	X	X
Secondary Poles (110 & 132 MPH)	CL 6	X	X
IGSD			X
Regulator Rack (Exterior Poles)			X
Transformer Banks (>250's)			X
Double Circuit Poles		X	X
Junction Poles		X	X
Substation Getaway (within 1st Section)		X	X
Capacitor Banks		X	X
Pole Top Switches		X	
Three Phase Terminal Poles		X	

The Company will identify wooden distribution poles that need to be replaced or braced based on the minimum design guide in the above table, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. A complete system outage is not required for installation, though segment outages may be required.

b. Relevant Details

The following Figure RP-23 summarizes the Distribution Pole Replacement/Bracing Resiliency Measure.

Figure RP-23.

Distribution Pole Replacement/Bracing Resiliency Measure	
Estimated capital costs from 2025-2027	$99.3 million[6]
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025-2027 (but extends through the next 10 years)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado • Hurricane Wildfires Third-party damage • Vehicular collision
Anticipated benefits	Improved structural integrity Higher wind loading capabilities Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other relevant details	Availability of material and personnel may impact cost estimates

i. Prioritization

The Company will consider factors such as the number of customers served, whether a circuit serves a critical load public safety customer, SAIDI and SAIFI performance, and pole age to determine which distribution poles will be replaced.

ii. History of Effectiveness

Wooden distribution poles are widely accepted infrastructure, but are more susceptible to

[6] The Company's Distribution Pole Replacement/Bracing Projects extend beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future distribution pole replacement/bracing resiliency projects and include all or a portion of such projects in the Distribution Pole Replacement/Bracing Project Resiliency Measure. The Company estimates that accelerating future pole replacement/bracing projects will cost approximately $30 - 40 million in additional capital costs and no additional incremental O&M expense from 2025 - 2027.

the weather, wildlife, and have lower wind ratings relative to composite fiberglass or ductile iron poles. Installing composite fiberglass or ductile iron poles that meet current design standards allow for greater wind loading capability, thereby lowering damage and restoration times following microbursts, high winds, and hurricanes.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, concluded that the only alternative to replacing like for like/bracing poles that have deteriorated to below the Company's minimum strength criteria is to adopt a lower design standard. This option was rejected as non-viable because the Company is required to meet the minimum NESC requirements.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will track and report to the Commission annually the total number of replacement/braced poles that fail during resiliency events. The number of poles that fail under the new standard vs the legacy poles that fail will be used to determine program effectiveness.

7. Distribution Resiliency – Circuit Rebuilds

a. Description

The Company's Distribution Resiliency – Circuit Rebuilds Resiliency Measure is responsive to increased frequency and severity of extreme weather events. The Resiliency Measure is designed to replace and improve pole strength by meeting current NESC design standards on circuits where a substantial number of poles were installed under the prior standard at the time of construction but do not meet the Company's current and higher extreme wind and ice design standard. This Resiliency Measure includes utilizing non-wood engineered structures, hardening substation getaways, the removal/replacement of equipment, as well as a combination of trussing, cross arm replacement, and/or pole replacement.

The distribution circuits that the Company targets for resiliency rebuild through the installation of more robust poles and associated equipment are those most susceptible to failure during major storms and other extreme weather events and that do not meet current engineering design standards. Replacement poles will meet the Company's current extreme wind and ice design standard.

The Distribution Resiliency – Circuit Rebuilds Resiliency Measure will upgrade approximately 300-350 miles of distribution circuit per year. All new distribution poles and replacements will be designed to applicable extreme wind loading criteria, specifically Rule 250C and Rule 250D of the NESC. The Company will identify the distribution circuits that will be upgraded, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. A complete system outage is not required for installation, though segment outages may be required.

b. Relevant Details

The following Figure RP-24 summarizes the Distribution Resiliency – Circuit Rebuilds Resiliency Measure.

Figure RP-24.

Distribution Resiliency – Circuit Rebuilds Resiliency Measure	
Estimated capital costs from 2025-2027	$312.8 million[7]
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025-2027 (but extends through the next 30 years)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado • Hurricane
Anticipated benefits	Improved structural integrity Higher wind loading capabilities Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other relevant details	Availability of material and personnel may impact cost estimates The Company has applied for DoE grants related to this Resiliency Measure

i. Prioritization

The Company will consider factors such as: the number of customers served, whether a circuit serves a critical load public safety customer, SAIDI and SAIFI performance, and pole age to determine which distribution circuits will be upgraded.

[7] The Company's plan to rebuild distribution circuits extends beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future distribution circuit rebuild projects that are anticipated to include all or a portion of such projects in the Distribution Resiliency – Circuit Rebuilds Resiliency Measure. The Company estimates that accelerating future distribution circuit rebuild projects will cost approximately $95 - 115 million in additional capital costs and no additional incremental O&M expense from 2025 - 2027.

ii. History of Effectiveness

Wooden distribution poles are widely accepted infrastructure, but are more susceptible to the weather, wildlife, and have lower wind ratings relative to composite fiberglass or ductile iron poles. Installing composite fiberglass or ductile iron poles that meet current design standards allow for greater wind loading capability, thereby lowering damage and restoration times following microbursts, high winds, and hurricanes.

c. Alternatives Considered

Similar to the Distribution Pole Replacement/Bracing Resiliency Measure, in reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the only alternative to replacing poles that have deteriorated to below the Company's minimum strength criteria is to adopt a lower design standard. This option was rejected as non-viable because the Company is required to meet the minimum NESC requirements.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the number of replaced poles that fail under the current NESC design standards will be used to determine program effectiveness. The Company will track and report to the Commission annually the total number of replacement poles that fail during resiliency events. The Company will also document the number of outages resulting from pole failures of replaced poles vs the pole failures of legacy poles on circuits that have been rebuilt to the current design standard.

8. Strategic Undergrounding/Freeway Crossings

a. Description

The Strategic Undergrounding/Freeway Crossings Resiliency Measure will replace wooden distribution poles and equipment on overhead distribution lines at freeway crossings or other strategic locations that are at risk of failure during major storms and other extreme weather events, or which could result in significant outages if damaged by third parties. For overhead crossings, replacement poles will be concrete and meet the Company's current extreme wind and ice design standard. For underground crossings, terminal poles will be replaced with fiberglass or concrete poles and meet the Company's current extreme wind and ice design standard.

The Company will identify the freeway crossings that will be upgraded, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. The Strategic Undergrounding/Freeway Crossings Resiliency Measure will replace approximately ten freeway crossings per year (eight overhead, two underground). A complete system outage is not required for installation, though segment outages may be required.

The following Figure RP-25 illustrates an example of a freeway crossing to be addressed through the Strategic Undergrounding/Freeway Crossings Resiliency Measure.

Figure RP-25.

b. Relevant Details

The following Figure RP-26 summarizes the Strategic Undergrounding/Freeway Crossings Resiliency Measure.

Figure RP-26.

Strategic Undergrounding/Freeway Crossings Resiliency Measure	
Estimated capital costs from 2025-2027	$31.2 million
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025-2027 (but will extend through next 10 years)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado • Hurricane Extreme Temperature • Heat • Freeze Wildfires

Strategic Undergrounding/Freeway Crossings Resiliency Measure	
	Third-party damage • Vehicular collision
Anticipated benefits	Improve structural integrity Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other relevant details	Availability of material and personnel may impact cost estimates

i. Prioritization

The Company will consider factors such the condition of the Company's equipment at freeway crossings, load at risk, and customer outage exposure.

ii. History of Effectiveness

Strategic undergrounding and freeway crossing evaluations have proven to be effective and improve the resiliency of circuits both in areas where undergrounding is found to be of significant improvement or, in the case of freeway crossings, where the overhead poles are hardened through the use of concrete poles or the circuit is converted to underground have shown to be more effective in mitigating extreme wind events.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the only viable alternative to the reinforcement of freeway crossings by installing new poles is to relocate the lines underground. The Company proposes to relocate crossings underground where concrete poles and overhead lines are not feasible, or where there are multiple crossings at one location. It is possible to terminate the line at the dead-end poles adjacent to the highway with one of the terminations connected to an alternative feeder. However, this alternative requires a nearby alternate distribution circuit source to make this a cost-effective option, making opportunities to reconfigure freeway crossings limited. The Company will consider this alternative where feasible.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will monitor the upgraded freeway crossings that fail during resiliency events and report to the Commission the Company's findings.

B. Modernization: PURA § 38.078(b)(2), 16 TAC § 25.62(c)(1)(B)

The Company's Resiliency Plan has three Resiliency Measures that will modernize the Company's transmission and distribution system. The Company estimates that the three Resiliency Measures that will modernize the Company's transmission and distribution system will cost approximately $214.7 million in

capital costs, approximately $1.0 million in incremental O&M expense, and will be implemented over a three-year period from 2025-2027. The Company's three modernization Resiliency Measures are summarized below in Figure RP-27.

Figure RP-27.

Modernization Resiliency Measures	Estimated Capital Costs (millions)	Estimated Incremental O&M Expense (millions)	Estimated Timeframe (years)
TripSaver	$58.9	$0.03	2025-2027
IGSD Installation	$53.8	$0.82	2025-2027
Texas Medical Center Substation	$102.0	$0.15	2025-2027
Subtotal	**$214.7**	**$1.0**	

1. TripSaver

a. Description

The TripSaver Resiliency Measure will replace existing standard fuses with TripSaver® II Cutout-Mounted Recloser devices ("TripSaver"). The Company's TripSaver program reduces the number of sustained interruptions on distribution circuit lateral line sections for transient outage events such as those that occur during momentary tree contact. TripSaver replaces existing fused cutouts located along the first tap from the main line distribution circuit. For momentary faults, the TripSaver opens and recloses in an attempt to clear momentary faults. For sustained faults, the TripSaver will open and lock out the lateral branch portion of the circuit. Distribution feeders targeted for TripSaver installations include locations most susceptible to lateral line section outages, locations with a relatively high number of customers or load at risk. Figure RP-28 below shows a TripSaver offered by an electric utility equipment supplier.

The TripSaver Resiliency Measure will replace approximately two thousand five hundred standard fuses per year with TripSaver devices. The Company will identify the standard fuses that will be replaced with TripSaver devices, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. A complete system outage is not required for installation, though segment outages may be.

Figure RP-28.

b. Relevant Details

The following Figure RP-29 summarizes the TripSaver Resiliency Measure.

Figure RP-29.

TripSaver Resiliency Measure	
Estimated capital costs from 2025-2027	$58.9 million [8]
Estimated incremental O&M expense from 2025 – 2027	$30,000
Estimated overall project duration	2025-2027 (but extends through the next 10 years)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme weather events Extreme wind events • Microburst • High wind • Tornado Hurricane Extreme Temperature • Heat • Freeze Wildfires
Anticipated benefits	Faster restoration Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other relevant details	Availability of material and personnel may impact cost estimates

i. Prioritization

The Company will evaluate factors such as: the number of customers served, whether a circuit serves a critical load public safety customer, and SAIDI and SAIFI performance to determine the installation locations on distribution circuits.

[8] The Company's plan to install TripSaver extends beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future TripSaver projects that are anticipated to include all or a portion of such projects in the TripSaver Resiliency Measure. The Company estimates that accelerating future TripSaver projects will cost approximately $18 - 22 million in additional capital costs and will cost approximately $10,000 per year in additional incremental O&M expense from 2025 - 2027.

ii. History of Effectiveness

TripSaver devices have significantly reduced the frequency and duration of sustained interruptions during high wind events at a low cost in locations where these devices have already been installed. Further, peer utility benchmarking survey results confirm the installation of TripSaver, or similar technologies is consistent with practices deployed at other utilities.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated the following two alternatives to TripSaver devices:

First, the Company considered reclosing circuit breakers. In lieu of TripSaver devices, the Company could install single-phase or multi-phase reclosing circuit breakers on lateral taps in locations where the reclosers could better coordinate with upstream breakers. However, reclosers essentially provide the same functionality as TripSaver devices for most faults, but at higher cost, and therefore the Company eliminated this from consideration as a preferred alternative.

Second, the Company considered reconfiguring or constructing new feeders or substations. Constructing new distribution feeders for the purpose of reducing outage exposure on laterals via reconfiguration and permanent load transfer could be a viable alternative on circuits where new load justifies the addition of new feeders. However, this solution is typically far less cost effective than TripSaver as it is costly to construct new circuits or substations. Further, this would result in increased outage exposure on the newly built distribution lines and substations.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will track and report to the Commission annually on the systemwide performance of TripSaver operations during resiliency events. Because TripSaver operations are not recorded via SCADA, the number of successful avoided interruptions will be calculated based on counter readings made during periodic review inspections.

2. IGSD Installation

a. Description

The Company's IGSD Resiliency Measure will reduce the number of customers interrupted by faults occurring on main line sections of distribution circuits. The Company proposes to install up to 150 IGSD devices per year, or alternatively stated, 50 schemes per year, either fully automated or remotely operated by distribution system operators, over the three-year Resiliency Plan. Distribution feeders targeted for IGSDs include locations most susceptible to main line outages with additional consideration of the magnitude of load at risk (e.g., serving greater than 4,000 customers) and those that serve critical customers or facilities (e.g., hospitals or facilities providing emergency services during storms). A technology program included in this Resiliency

Measure is the installation of remote equipment required to enable communications between the IGSD device and the utility's control systems used by distribution controllers. The components allow for communications using both the LTE Cellular and the Company's 700MHz radio system, which mitigates the risk of public carrier outages to the LTE Cellular system. The package is designed to include a battery back-up system.

Candidate feeders for IGSD require minimum line upgrades and have sufficient available capacity to accept loads from adjacent feeders or feeders from another substation following an outage on the main line section of the alternate circuit. Further, both the circuit where the load will be transferred from and the circuit receiving the load (and vice-versa) should have sufficient load on the non-faulted line sections to justify the installation.

The Company will identify the IGSD installation locations, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work.

The following Figure RP-30 illustrates an example of an IGSD device addressed through the IGSD Resiliency Measure.

Figure RP-30.

b. Relevant Details

The following Figure RP-31 summarizes the IGSD Installation Resiliency Measure.

Figure RP-31.

IGSD Installation Resiliency Measure	
Estimated capital costs from 2025-2027	$48.7 million (and $5.1 million for telecommunications remote equipment)[9]
Estimated incremental O&M expense from 2025 – 2027	$750,000 (and $64,800 for cellular expenses)
Estimated overall project duration	2025-2027 (but extends through the next 20 years)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme weather events Extreme wind events • Microburst • High wind • Tornado • Hurricane Extreme Temperature • Heat • Freeze Wildfires
Anticipated benefits	Faster restoration Reduce time and expense associated with dispatching field personnel to restore an outage Reduce number of customers impacted by an outage Reduce total outage time
Other relevant details	Availability of material and personnel may impact cost estimates; costs may also be impacted by commercial carrier rate changes

i. Prioritization

In determining the location of IGSD installations, the Company will consider factors such as: overall distribution system protection needs, failure replacement, distribution circuits that are 300% of systemwide SAIDI or SAIFI, and overall distribution planning needs. Additionally, the Company will consider the number of customers served and whether a circuit serves a critical load public safety customer.

[9] The Company's plan to install IGSD devices extends beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future IGSD projects that are anticipated to include all or a portion of such projects in the IGSD Resiliency Measure. The Company estimates that accelerating future IGSD projects will cost approximately $15 - 20 million in additional capital costs and will cost approximately $250,000 per year in additional incremental O&M expense from 2025 - 2027.

ii. History of Effectiveness

IGSD Installation has resulted in fewer sustained outages and reduced the time and expense associated with the Company dispatching personnel to restore outages. The capability of IGSD to significantly reduce the number of sustained customer interruptions during severe storms and other extreme weather events at relatively low cost is high. The installation of IGSD schemes is consistent with practices deployed at other utilities based on peer utility benchmarking survey results.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated the following two alternatives to IGSD devices: including less sophisticated fault isolation schemes and the installation of new feeders to reduce outage exposure.

First, in lieu of IGSD devices, the Company could install single-phase or multi-phase reclosing circuit breakers on lateral taps in locations where the reclosers could better coordinate with upstream breakers. Reclosers provide the same functionality as IGSD devices for most faults, but have reduced communications information and visibility from the control centers, and therefore the Company eliminated this from consideration as a preferred alternative.

Second, constructing new distribution feeders to reduce outage exposure on laterals via reconfiguration and permanent load transfer could be a viable alternative on circuits where new load justifies the addition of new feeders. However, this solution is typically far less cost effective than IGSD as it is costly to construct new circuits or substations. Further, this would result in increased outage exposure on the newly built distribution lines and substations.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will monitor the number of successful load transfers achieved by IGSD schemes during resiliency events to determine the measure's effectiveness and report to the Commission the Company's findings. Because the number of IGSD operations are recorded via SCADA, and the number of customers per line segment are known, the number of avoided interruptions by new IGSDs can be determined.

3. Texas Medical Center Substation

a. Description

The Texas Medical Center Substation Resiliency Measure will construct a new substation, the Hermann Substation, to serve the Texas Medical Center. The Company's Texas Medical Center Substation Resiliency Measure will enhance resiliency, redundancy, and reliability for the Texas Medical Center and surrounding greater Houston area, especially as it pertains to extreme weather events. The new Hermann Substation will ultimately contain 5 transformers to supply current and future loads as well as reduce loads served by other nearby substations. The Company intends to leverage this new substation to reduce loading for two other substations while supplying backup

power to 22 large customers with a total of 70 MW of load located within the Texas Medical Center area. The total cost is $102 million over the three-year Resiliency Plan, with a total cost of $214.6 million that includes spending that will occur outside of the three-year Plan.

The Company has purchased land and has commenced the design and engineering phase. The Company anticipates construction to begin in June 2024 and to be completed by the end of 2026. A complete system outage is not required for installation, though segment outages may be.

The following Figure RP-32 illustrates an example of a substation similar to the one to be addressed through the Texas Medical Center Substation Resiliency Measure.

Figure RP-32.

b. Relevant Details

The following Figure RP-33 summarizes the Texas Medical Center Substation Resiliency Measure.

Figure RP-33.

Texas Medical Center Substation Resiliency Measure	
Estimated capital costs from 2025-2027	$102.0 million
Estimated incremental O&M expense from 2025 – 2027	$150,000
Estimated overall project duration	2025-2027 (but extends through 2028)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Extreme weather events • Flooding Extreme wind events

Texas Medical Center Substation Resiliency Measure	
	• Microburst • High wind • Tornado • Hurricane Extreme Temperature • Heat • Freeze
Anticipated benefits	Reduce time and expense associated with dispatching personnel to restore outages Reduce the frequency and number of customers impacted by outages Reduce total outage times
Other relevant details	Availability of material and personnel may impact cost estimates

i. Prioritization

The Medical Center Substation Resiliency Measure is a priority because of the unique nature of the area to global health care and the impact of outages due to extreme weather conditions over the past five years (e.g. extreme temperature events' potential impact on infrastructure and the occasional flooding associated with extreme water events (e.g. Hurricane Harvey)). The Texas Medical Center Substation will be installed within the Company's distribution system located in the Texas Medical Center and will materially improve the resiliency within the Texas Medical Center and greater Houston area by adding additional 12 kV and 35 kV circuits to both the surrounding greater Houston area, and the Texas Medical Center area as well.

ii. History of Effectiveness

Based on prior Company experience, constructing additional substations provides redundancy in service and alleviates capacity concerns in an area. The Company anticipates that the new Texas Medical Center Substation will result in fewer sustained customer outages and reduce both the time and expense associated with the Company dispatching personnel to restore outages in the Texas Medical Center area.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated two alternatives to the construction of a new substation to serve the current and future Texas Medical Center and area load.

First, two existing nearby substations have been expanded to the extent possible and would require purchasing more land adjacent to one of the two locations, effectively making this option like the

preferred option of a new substation. This option is further complicated due to constraints for circuit paths coming out of the existing substation if the additional land purchase option is pursued. Due to these constraints, this option was deemed not viable.

Second, building a new substation in a different area was extensively investigated by the Company with 15 potential locations identified and analyzed. Of the15 potential locations, 8 were determined to be viable with this location ultimately selected as the others were eliminated due to cost, Transmission Routing studies/Certificates of Convenience and Necessity, existing distribution infrastructure, property for sale, distance to load, ROW path limitations, etc.

d. Measuring Efficacy

Improved resiliency of the circuits that will be interconnected to the new Texas Medical Center Substation will be provided through dual feeders connected to customers, which will reduce the length of the customer interruptions over the course of a year and will be tracked. In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will track and report to the Commission annually the performance of the circuits as they are placed into service in a similar fashion to the method of reporting metrics for other programs with distribution circuits that serve those distribution customers.

C. Flood Mitigation: PURA § 38.078(b)(5), 16 TAC § 25.62(c)(1)(E)

The Company's Resiliency Plan has two Resiliency Measures that will mitigate the impact of flooding or high-water events on the Company's transmission and distribution system.

The Company estimates that the two Resiliency Measures that will modernize the Company's transmission and distribution system will cost approximately $37.6 million in capital costs, no incremental O&M expense, and will be implemented over a three-year period from 2025-2027. The Company's two flood control Resiliency Measures are summarized below in Figure RP-34.

Figure RP-34.

Flood Mitigation Resiliency Measures	Estimated Capital Costs (millions)	Estimated Incremental O&M Expense (millions)	Estimated Timeframe (years)
Substation Flood Control	$30.6	None	2025-2027
Control Center Facility Upgrades	$7.0	None	2025-2027
Subtotal	**$37.6**	**None**	

1. Substation Flood Control

a. Description

The Company's Substation Flood Control Resiliency Measure should protect at-risk substations that are vulnerable to flooding or have previously encountered high water conditions that results in damage, cause critical equipment to fail, or mis-operate and result in customer outages. Substations most susceptible to flooding are often located along the Gulf Coast shoreline or adjacent to rivers and streams. The projected impact of flooding and extent of the Company's service area included in the 100-year, 200-year, and 500-year floodplain is expected to increase over time, as evidenced by historical increases in flood depth and flooded fraction. In the Galveston area, 97% of substations are currently at risk of flooding for a hypothetical 500-year flood in 2025.

Several of the Company's substations have already experienced high-water conditions in prior weather events, that have caused equipment failure and extended customer outages and costly repairs. For example, Hurricane Harvey caused severe flooding throughout the Company's service territory with 17 substations experiencing significant inundation, including 8 substations taken out of service as a precautionary measure. To address this risk, the Company proposes to raise vulnerable substation equipment such as protective relays, switchgear, and remote terminal units (i.e., SCADA communications) to at least 2 feet above the design flood based on 500-year flood likelihood within the respective floodplain.

A technology program included in this resiliency measure will also raise the substation site telecommunication huts to the same level as the correlating control house. The telecommunications huts house the data transmitting equipment that allows the substation to be continuously monitored for operation in real-time. If the telecommunication hut is inundated with water for any amount of time, communications with the substation is lost and personnel must be dispatched to regain operational visibility. Submersion may also damage the equipment. Raising the telecommunication huts will therefore improve the Company's ability to make operational decisions during extreme water events.

The Substation Flood Control Resiliency Measure will elevate approximately 3 substations per year for a total of approximately 9 substations from 2025-2027. The Company will identify the substations that are at-risk to flooding or high-water events, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. A brief outage to network connectivity will occur which is managed through the Company outage management process and personnel will be on-site during the cut-over. No substation power outages will occur.

The following Figure RP-35 illustrates an example of a previously flooded substation; the Substation Flood Control Resiliency Measure is designed to protect the substations that are at risk of flooding.

Figure RP-35.

b. Relevant Details

The following Figure RP-36 summarizes the Substation Flood Control Resiliency Measure.

Figure RP-36.

Substation Flood Control Resiliency Measure	
Estimated capital costs from 2025-2027	$27.0 million (and $3.6 million for telecommunication hut raising)
Estimated incremental O&M expense from 2025 - 2027	None
Estimated overall project duration	2025-2027 (but extends through 2031)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	High water or flooding events
Anticipated benefits	Reduction of risk of equipment failure or mis-operation Mitigate the impact of flooding or highwater events on equipment Enhance substation performance during flooding events Reduce the frequency and number of customers impacted by outages Reduce total outage time
Other relevant details	Availability of material and personnel may impact cost estimates The Company has applied for DoE grants related to this Resiliency Measure

i. Prioritization

The Company will consider factors such as: geographic location, flood risk, the number of distribution circuit customers connected to a substation, whether the substation serves a critical load public safety customer (or how many) to determine which substations are best candidates for elevation.

ii. History of Effectiveness

When Substation Flood Control has been implemented, the risk of impact to substation assets from flooding is minimal. The Company has been implementing Flood Control Measures since the late 1990s and the program's target substations that have a balance of less than 10 substations that require Flood Control Measures retroactively.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated three alternatives to elevating substations.

First, impermeable barriers that prevent water intrusion can be placed outside of the fence perimeter. Some utilities and other industries have installed perimeter barriers to limit water intrusion during high water events, but often only as a short-term measure. The Company is proposing to install perimeter barriers as an interim measure in some strategic substation locations until the completion of permanent upgrades. The installation of perimeter barriers are dependent on the permeability of the ground around the substation.

Second, high velocity pumps capable of draining large volumes of water during heavy rains or floods can be installed along with containment facilities at sensitive equipment locations. The Company eliminated this option from consideration because while these systems are effective for modest rainfall, they are ineffective during major water events like floods or hurricanes.

Third, relocating existing or constructing new substations in areas located above the floodplain are possible options. However, the cost of purchasing the land for new locations and the relocation or new construction is relatively high compared to the other alternatives considered. Thus, the Company eliminated this option from consideration. Further, these conditions do not exist for any of the substations proposed for flood control mitigation by the Company in its current 3-year Resiliency Plan, however, relocation may be a suitable option for some substations included in future resiliency plans.

Finally, as discussed above, the alternative to raising telecommunications huts at raised substations is to perform reactive repairs each time water damages the hut, and to dispatch necessary personnel to maintain substation operational visibility during high water events. This option requires significant monitoring and use of company personnel. Raising telecommunications huts preemptively is a superior alternative in terms of cost, efficacy, personnel allocation, and customer outages during critical events.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will evaluate the number of substations that have equipment elevated and yet experience water damage to substation equipment (e.g., control house, circuit breakers, transformers) for actual flood events.

The Company will track and report to the Commission annually on future flood conditions at each of the substations where equipment is elevated, including water elevation and equipment at risk for each flooding event. The term "flooding event" is defined as any flooding occurrence negatively impacting equipment within substations. The Company will estimate customer outages avoided and damage averted for each future major flooding event to measure program effectiveness.

2. Control Center Facility Upgrades

a. Description

The Control Center Facility Upgrades Resiliency Measure will construct a protective flood wall at the Company's back-up control center. The backup control center is a critical facility since it provides essential backup to the Company's primary control center. The backup control center can also function as the Company's primary distribution operations center when needed. Flooding would result in the loss of critical data and functionality of monitoring devices and control systems. Damage would be extensive as servers, control stations, and other facility equipment could be damaged beyond repair. The loss of the backup control center would jeopardize the Company's ability to maintain continuous contingency support of critical operating systems.

b. Relevant Details

The following Figure RP-37 summarizes the Control Center Facility Upgrades Resiliency Measure.

Figure RP-37.

Control Center Facility Upgrades Resiliency Measure	
Estimated capital costs from 2025-2027	$7.0 million
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025-2027 (but extends through the next 6 years)
Net salvage value	None
Resiliency Event(s) addressed	Flooding or high-water events
Anticipated benefits	Mitigation of damage or inoperability of back-up control center due to flooding or high-water events Enhance substation performance during flooding events

Control Center Facility Upgrades Resiliency Measure	
	Reduce the frequency and number of customers impacted by outages Reduce total outage times
Other relevant details	Availability of material and personnel may impact cost estimates

i. Prioritization

The Company's backup control center is an important component of the Company's operations because it provides redundancy in the event the Company's primary control center becomes inoperable. Since the Company's service area is located near the Texas Gulf Coast and has a history of experiences with flooding and other high-water events, such as the Memorial Day flood (2015) and Hurricane Harvey (2017), the Company prioritizes mitigating the impact of flooding or high-water events throughout its entire system.

ii. History of Efficacy

When Control Center Flood Control measures have been implemented, the risk of impact to Control Center assets is minimal. The Company has been implementing Flood Control Measures since the late '90s. This program targets this facility and mitigates high water concerns for this facility.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, considered alternatives for the Control Center Facility Upgrades Resiliency Measure that included the building of a new control center within a different location, the use of temporary flood containment walls, or the use of pumps to mitigate the flood waters.

The new facility would be more costly than building of the concrete wall and was removed as an option. Temporary walls were found to be effective in a temporary (short term) flooding situation but were not as robust during an event that would inundate the control center with water and was consequently removed as an option as well. High velocity pumps were also found to be a good alternative in a temporary (short term) flooding of event but could be inundated with water and potentially fail and were consequently found not to be a viable option for the potential elevation and duration of the extreme water event that could likely occur at this location.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will track and report to the Commission annually future flood events that impact the backup control center, including water elevation and equipment at risk for each event. The Company will estimate and report on the damage averted for each flooding event that would have resulted in water intrusion into the facility to measure program effectiveness.

D. Information Technology to Support Operations: PURA § 38.078(b)(6), 16 TAC § 25.62(c)(1)(F)

The Company's Resiliency Plan has three information technology Resiliency Measures that will modernize and enhance the information technology software and equipment used in support of Company operations. The Company estimates that the three Information Technology Resiliency Measures that will support the Company's transmission and distribution system operations will cost approximately $260.7 million in capital costs, approximately $14.46 million in incremental O&M expense, and will be implemented over a three-year period from 2025-2027. The three information Resiliency Measures are summarized below in Figure RP-38.

Figure RP-38.

Information Technology Resiliency Measures	Estimated Capital Costs (millions)	Estimated Incremental O&M Expense (millions)	Estimated Timeframe (years)
Advanced Aerial Imagery Platform/Digital Twin	$9.9	$0.06	2025-2027
Advanced Distribution Technology	$225.8	$15.0	2025-2027
Digital Substation	$25.0	$(0.6)	2025-2027
Subtotal	**$260.7**	**$14.46**	

1. Advanced Aerial Imagery Platform/Digital Twin

a. Description

The Company's Advanced Aerial Imagery Platform/Digital Twin Resiliency Measure is designed to improve and enhance the visibility of the transmission, substation, and distribution systems managed by the Company by creating a virtual replication of the physical infrastructure and equipment installed. The Advanced Aerial Imagery Platform/Digital Twin Resiliency Measure combines LiDAR imagery data, device data (meters, IGSDs, sensors, etc.), weather data, inspection data, and monitoring data and inputs the combined data into advanced software platforms. This allows for the overlay of imagery to better determine vegetation management risk, to utilize and analyze data analytics for equipment and infrastructure failure, and to improve performance by modeling the impact of extreme weather events. This data analysis will improve and streamline processes, leading to a reduction in engineering design time, improvements in installation expediency and replacement of equipment before failure, and increased resiliency and ultimately lead to customer benefits.

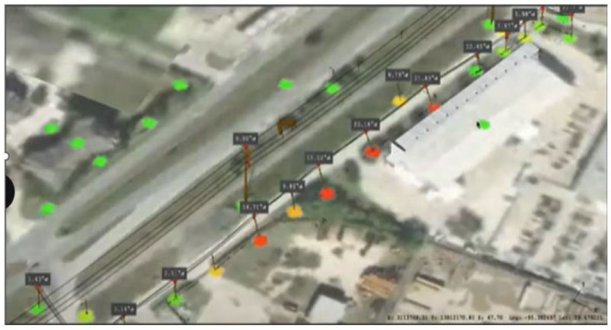
The Company proposes to leverage this software in tandem with other software to "rank" improvement projects based on the value added to customers by optimizing the project portfolio. Utilizing this software's data analytics capabilities will help improve efficiencies, reduce costs over time, and allow for greater optimization and focus on system improvements that will have the

greatest resiliency benefits for customers. The software is also capable of "learning" from historical data and leverages prior analyses to improve current model performance by identifying system resiliency patterns and trends for upgrades needed to address extreme weather events, encroachments from vegetation (or other sources), and remediation of broken/leaning equipment.

The Advanced Aerial Imagery Platform/Digital Twin Resiliency Measure will enhance the Company's ability to identify and determine extreme weather-related risk to the Company's transmission and distribution system and to identify and determine potential projects that may mitigate the impact of such risk. No system outages are required for installation.

The following Figure RP-39 illustrates a screen shot example of the Digital Twin program which will improve and enhance the visibility of the transmission, substation, and distribution systems by digitizing a complete replication of the physical infrastructure and equipment installed.

Figure RP-39.



b. Relevant Details

The following Figure RP-40 summarizes the Advanced Aerial Imagery Platform/Digital Twin Resiliency Measure.

Figure RP-40.

Advanced Aerial Imagery Platform/Digital Twin Resiliency Measure	
Estimated capital costs from 2025 – 2027	$9.0 million (and $0.9 million for Information Technology support)
Estimated incremental O&M expense from 2025 – 2027	$60,000
Estimated overall project duration	2025-2027 (but extends through the next 10 years)
Net salvage value	N/A
Resiliency Event(s) addressed	Extreme wind events • Microburst • High wind • Tornado

Advanced Aerial Imagery Platform/Digital Twin Resiliency Measure	
	• Hurricane Extreme temperature event • Heat • Freeze Wildfires
Anticipated benefits	Enhanced ability to proactively plan and implement projects to mitigate outages attributable to extreme weather events Determine future improvements to the Company's transmission and distribution system to mitigate the impact of future resiliency events Reduce restoration times Preemptively mitigate damage from resiliency events Reduce the frequency and number of customers impacted by outages Reduce total outage times Reduce system restoration costs
Other Relevant Details	Cost estimates may be impacted by the need to reformat data to align with advanced data analytics techniques The Company has applied for DoE grants related to this Resiliency Measure

i. Prioritization

The Advanced Aerial Imagery/Digital Twin Resiliency Measure will be for the Company's entire service area. There is not a relevant order of installation, as information is collected and analyzed for all locations concurrently.

ii. History of Effectiveness

The Advanced Aerial Imagery/Digital Twin is a new program that the Company is developing. The Company has previously used mapping tools to visualize areas of impact for potential weather events to help coordinate a response that has been effective versus not preparing for resiliency events.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, compared the benefits of the proposed Advanced Aerial Imagery Platform/Digital Twin Resiliency Measure to the Company's existing methodology and determined that the software offers significant improvements, including reduced analysis time and a progression of improvements in design and project location achieved by AI "learning."

One alternative the Company considered was to build in-house software to perform similar functions. This option was rejected by the Company because it would take much more time to

complete versus the immediate availability of the proposed Advanced Aerial Imagery/Digital Twin.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, proposes to perform an analysis of events to determine the correctness of the algorithms for the digital twin models.

The Company will track and report to the Commission annually the percentage of programmatic decisions made using the digital twin. Adjustments may need to be made, but the Company believes that improvements in resiliency of the Company's transmission and distribution system should be seen.

2. Advanced Distribution Technology

a. Description

The Advanced Distribution Technology Resiliency Measure will replace the Company's current smart meters with next generation advanced meters (such as shown in Figure RP-41 below) that have improved and expanded functionality. The Advanced Distribution Technology Resiliency Measure will also upgrade the hardware and software used by the Company to support smart meter operation, such as the development of software and DI Apps. The primary technologies the program will deploy are: (1) next generation of advanced meters; (2) PMR firmware upgrades; (3) deployment of mesh network or similar network solutions; (4) DI App licensing; and (5) headend software compatible with next generation meters. Key capabilities include enhanced fault detection, load shedding, local load management and premise-level UFLS, and improved restoration capabilities.

Under 16 TAC § 25.130(g)(4), an electric utility may add or enhance features provided by its AMS, as technology evolves. The Company's installation of Advanced Distribution Technology enhances various features of its AMS, including communications with load control devices, automated readings, and remote disconnection and reconnection capabilities. In accordance with Commission rules, the Company will notify the Commission and REPs three months in advance of deploying the enhanced technology with a description of the features, the deployment and notification plan, and the cost of such enhancements. The Company will follow the monthly progress report process until the installation of the Advanced Distribution technology is completed.

The Company estimates that the rate of meter replacements will be approximately seven hundred thousand smart meters per year. A complete system outage is not required for installation.

Figure RP-41.

b. Relevant Details

The following Figure RP-42 summarizes the Advanced Distribution Technology Resiliency Measure.

Figure RP-42.

Advanced Distribution Technology Resiliency Measure	
Estimated capital costs from 2025-2027	$225.8 million[10]
Estimated incremental O&M expense from 2025 - 2027	$15 million
Estimated overall project duration	2025-2027 (but deployment extends through the 2029)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	All future Resiliency Events that cause outages
Anticipated benefits	Premise-level underfrequency load shedding Local load management Advanced fault detection Improved restoration capability Provide better and more granular visibility into the Company's distribution system Enable a granular control of the Company's system when responding to an outage Utilize programming logic and reporting to allow for greater visibility into DER and EV interconnected to the Company's distribution grid
Other relevant details	Availability of inventory and personnel may impact cost estimates

[10] The Company's plan to install next generation advanced meters extends beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future installation projects that are anticipated to include all or a portion of such projects in the Advanced Distribution Technology Resiliency Measure. The Company estimates that accelerating future ADT projects will cost approximately $60 - 70 million in additional capital costs and approximately $5 million per year in additional incremental O&M expense from 2025 - 2027.

i. Prioritization

The Company will use a data-driven approach to determine the order of the replacements. Minimizing impacts to daily market operations will be a key consideration. The Company plans a three-phased process to replace current smart meters with next generation advanced meters. First, The Company will replace meters in the ordinary course of business, phasing these meters in targeted portions of our service areas. Second, as current smart meters fail, they will be replaced with next generation advanced meters. Finally, the Company will install next generation advanced meters in all new customer premises.

ii. History of Effectiveness

Advanced Distribution Technology is a new program that the Company is developing. Upgrading meters with next generation meters with improved functionality is recognized within the electric utility industry as an effective tool for mitigating the impacts of resiliency events. The Company's current smart meters have enabled the Company to quickly identify customer outages and have facilitated faster market transactions including disconnections, move-ins, and move-outs. The Company anticipates that the upgraded technology will improve the Company's response to system outages, improve resiliency, and benefit customers overall.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, evaluated two alternatives to its proposed Advanced Distribution Technology Resiliency Measure:

One alternative to the Advanced Distribution Technology Resiliency Measure, and for purposes of UFLS, is to install remote-controlled switches to disconnect load during a load shed event. This option requires installing several switches on a circuit and upgrading communication infrastructure to accommodate the increased demand. It also requires the evaluation of circuit configuration and additional manual switching to ensure that services to critical loads such as hospitals are not inadvertently disconnected.

Second, the Company could install additional sensors or remote telemetry devices to improve detection of faults, determine load imbalances, and enable accurate transformer loading measurements. However, this option is cost-prohibitive due to the number of additional devices and the telecommunication infrastructure needed to accommodate the devices.

Each alternative described above requires the installation of numerous additional devices and infrastructure. As the Company's existing meters are nearing the end of their useful life, the continued use of the current smart meter technology is resulting in a higher meter failure rate, especially during extreme temperature events. Additionally, spare equipment, customer support, and supply chain constraints may cause meters to become limited the longer that the current smart meter devices remain in use. Since the next generation meters are available and can provide

similar enhanced capabilities as these alternatives, it is financially, technologically, and operationally more advantageous to pursue the ADT program. The Company believes that leveraging the additional capabilities of the next generation of meters is more cost-efficient and provides more benefits to customers.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined it will track and report to the Commission annually the total number of overloaded transformer failures during resiliency events for upgraded ADT meters. The Company will also track outage duration during ERCOT-directed load sheds (after premise-level load shed is implemented). The number of failures for overloaded transformers with next generation meters and the reduction in outage durations during load-shed events will be used to measure the effectiveness of this program.

3. Digital Substation

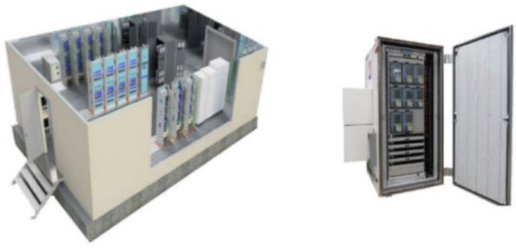
a. Description

The Digital Substation Resiliency Measure will upgrade the relaying equipment at the Company's substations by converting from an analog, copper-based protective relay system and use digital protective relays leveraging fiber optic communications. The Company's proposed Digital Substation Resiliency Measure is in the early stages of design and development. In support of this Resiliency Measure, the Company is evaluating the benefits of adopting increased digitization and automation in accordance with the IEC's 61850 communications protocol. The 61850 protocol promotes use of digital equipment, adoption of cybersecurity measures, and large amounts of data capture to enhance resiliency and reliability and offers real-time monitoring of critical substation equipment. Key features of the Company's Digital Substation program include the replacement of copper wiring with less costly fiber optics for easier conversion to digital communications, enhanced situational awareness for better and faster operational decisions, adoption of compact digital protective relays allowing for a more compact substation control facility, standardized configurations for increased speed of installation, centralized communications/data collection busses (i.e., via merging units), and proactive detection of equipment abnormalities and incipient failure with an overall smaller substation design footprint. These features will help drive down O&M costs, collectively enhance reliability and resiliency, and, over time, lower the cost of constructing new substations.

The Digital Substation Resiliency Measure will upgrade equipment at approximately four to five substations per year, and approximately twelve to fifteen from 2025-2027. The Company will identify the substation equipment that will be upgraded, commence the design and engineering phase, place work orders, and dedicate appropriate resources for the work. No system outage is required for installation.

The following Figure RP-43 illustrates an example of an existing substation control house and a digital substation module.

Figure RP-43.



b. Relevant Details

The following Figure RP-44 summarizes the Digital Substation Resiliency Measure.

Figure RP-44.

Digital Substation Resiliency Measure	
Estimated capital costs from 2025 – 2027	$25.0 million[11]
Estimated incremental O&M expense from 2025 – 2027	$(600,000)
Estimated overall project duration	2025-2027 (but extends through the next ten years)
Net salvage value	Salvage Value: None Removal costs: Are included as part of capital project costs
Resiliency Event(s) addressed	Resiliency Events related to extreme weather events Physical threats
Anticipated benefits	Enhanced ability to proactively plan and implement projects to mitigate outages attributable to extreme weather events Make data transmission from the Company's substations to the Company's control center more efficient and secure Allow the Company to make better and timelier assessments of substation operations Provide modern physical protection for substation control house equipment
Other relevant details	Availability of inventory and personnel may impact cost estimates The Company has applied for DoE grants related to this Resiliency Measure

[11] The Company's plan to upgrade relaying equipment at substations extends beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future digital substation projects that are anticipated to include all or a portion of such projects in the Digital Substation Resiliency Measure. The Company estimates that accelerating future digital substation projects will cost approximately $10 - 15 million in additional capital costs and will save approximately $200,000 per year in O&M expense.

i. Prioritization

The Company has ordered the substations so as to maximize efficiency and prioritize reliability. Specifically, the Company identified and grouped similar projects to provide efficiency in engineering design. Once the similar projects were identified, the Company considered the age of the existing infrastructure and the ability to coordinate the projects with the concurrent flood mitigation program. The resulting substation order is designed to streamline the project process to reduce the total engineering and design time to aid in fast turnaround and quick repeatability.

ii. History of Effectiveness

The Digital Substation Resiliency Measure is a new program that the Company is developing. However, this new protocol process is recognized within the electric utility industry as an effective tool for making data transmission from substations to control centers more efficient and secure, allowing the Company to make better and more timely assessments of substation operations.

b. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the alternative is to continue utilizing the analog and copper-based communication system for the Company's substation control houses. Continued use of an analog and copper-based communication system is less secure and more costly compared to a digital and fiber-based communication system. The Company believes that using a digital and fiber-based communication system is more cost efficient and has additional operational benefits and aligns with good utility practices seen within the industry.

c. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined that because the Digital Substation Resiliency Measure is in its initial stages, the use of traditional metrics to measure program benefits and performance is not applicable. However, the Company will annually report to the Commission on its progress, including key features and benefits associated with digitization and automation measures as implementation proceeds.

E. Information Technology: PURA § 38.078(b)(6), 16 TAC § 25.62(c)(1)(F)

The Company's Resiliency Plan has five information technology Resiliency Measures. The Company estimates that the five Information Technology Resiliency Measures will cost approximately $54.1 million in capital costs, approximately $0.25 million in incremental O&M expense, and will be implemented over a three-year period from 2025-2027. The Company's five information technology Resiliency Measures are summarized below in Figure RP-45.

Figure RP-45.

Information Technology Resiliency Measures	Estimated Capital Costs (millions)	Estimated Incremental O&M Expense (millions)	Estimated Timeframe (years)
Voice and Mobile Data Radio System Refresh	$15.6	None	2025-2027
Backhaul Microwave Communication	$12.1	None	2025-2027
Data Center Refresh	$2.9	$0.25	2025-2027
Network Security and Vulnerability Management	$1.0	None	2025-2027
IT/OT Cybersecurity Monitoring Program	$22.5	None	2025-2027
Subtotal	**$54.1**	**$0.25**	

1. Voice and Mobile Data Radio System Refresh

a. Description

The Voice and Mobile Data Radio System Refresh Resiliency Measure will upgrade the fleet mobile and portable radio communications equipment used to dispatch and communicate with the Company's field personnel that are responsible for repair and maintenance work in the field, including during outage restoration work. Manufacturer support for the Company's current mobile data radio system is ending, and spare equipment is limited. Upgrading portable radio communications equipment helps the Company to continue to be able to communicate with field personnel in areas or periods with limited cellular communications. The upgraded equipment will also have operational improvements over the Company's existing system, such as GPS tracking, over-the-air programming, text messaging, and enhanced encryption.

The voice and mobile data radio system will be implemented in a phased approach by service area to minimize disruptions to personnel and prioritized by areas where we can provide overlapping coverage with the existing system with minimal capacity losses. As each group is transitioned to the new equipment, training will be provided at or near the time of installation and the talk groups will be "tied" together from the new and old system to allow for a seamless transition.

b. Relevant Details

The following table summarizes the Voice and Mobile Data Radio Refresh Resiliency Measure in Figure RP-46.

Figure RP-46.

Voice and Mobile Data Radio System Refresh Resiliency Measure	
Estimated capital costs from 2025 – 2027	$15.6 million
Estimated incremental O&M expense from 2025 – 2027	None
Estimated overall project duration	2025-2027 (but extends through 2029)
Net salvage value	None
Resiliency Event(s) addressed	All Resiliency Events that may cause outages
Anticipated benefits	Maintain communications capability to and with the Company's field personnel in instances with limited cellular coverage, including during resiliency events.
Other relevant details	Availability of inventory and personnel may impact cost estimates Design changes and vendor selection could impact the cost estimates

i. Prioritization

There will be an initial pilot with three pilot tower sites identified and grouped. After testing this, the voice and mobile data radio system will be implemented in a phased approach by service area to minimize disruptions to personnel and prioritized by areas where we can provide overlapping coverage with the existing system with minimal capacity losses. As each group is transitioned to the new equipment, training will be provided at or near the time of installation and the talk groups will be "tied" together from the new and old system to allow for a seamless transition.

ii. History of Effectiveness

In the Company's experience, the voice and mobile data radio system has been critical to the safety of personnel and safe operations. During restoration events, areas regularly do not have adequate cell coverage and the system has been the only means for field personnel to communicate with management and other team members. The ability to communicate with other individuals in the organization about status and issues is important to the restoration activities, in addition to standard operating procedures.

The Company has also found radio communications to be efficient for notifying all crews in a given area, which is critical to the safety of personnel and safe operations. Cellular communications are inherently inefficient when trying to communicate in a "one to many" scenario. Situational awareness is key when multiple crews including contractors are involved in circuit operations. A single radio call can inform multiple groups without the need for individual names and phone numbers.

c. Alternatives Considered

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, considered continuing using the Company's current fleet mobile and portable radio communications equipment. However, system support for the current mobile data radio system is ending, and critical spare equipment are limited from manufacturers. Not implementing the Voice and Mobile Data Radio System Refresh Resiliency Measure could result in too few radios and unavailable radio coverage to support operation activities. The Company is in the process of using a competitive request for proposals to select a specific program for this project, though no decisions have been made at this point, beyond the resolution that the Voice and Mobile Data Radio System Refresh Resiliency Measure needs to be implemented.

The Company also considered relying on private LTE communications, but the Company determined that a private LTE communications program could not be adopted in time to meet the Company's short-term, and mid-term needs. Additionally, it is unclear whether private LTE can effectively be used as a replacement for radio. The Company is aware of several utilities that utilize private LTE as a supplement to (and not a replacement of) their radio systems.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the following performance metrics will be tracked:

- Dispatch speed,
- Field tests completed,
- Remoteness of communications, Decrease in maintenance time,
- Annual number of End-of-life equipment replacements to:
    - Maintain continuity,
    - Avoid truck rolls, and
    - Integrate GPS tracking and text messaging

2. Backhaul Microwave Communication

a. Description

The Company uses microwave equipment for monitoring and controlling field devices, including substations. Microwave equipment serves as a backup system for field devices that have fiber optic control and as the primary communication system for sites that are not fiber optic compatible. Much of The Company's current microwave equipment is nearing obsolescence and thus support is limited, and it is incompatible with newer platforms. The Backhaul Microwave Communication Resiliency Measure will replace this aging microwave equipment with new equipment that is compatible with the Company's newer microwave equipment, enabling the use of a single network management tool to see issues and remotely troubleshoot.

b. Relevant Details

The following Figure RP-47 summarizes the Backhaul Microwave Communication Resiliency Measure.

Figure RP-47.

Backhaul Microwave Communication Resiliency Measure	
Estimated capital costs from 2025 - 2027	$12.1 million
Estimated incremental O&M expense from 2025 - 2027	None
Estimated overall project duration	2025-2027 (but extends through 2029)
Net salvage value	None
Resiliency Event(s) addressed	All Resiliency Events that may cause outages
Anticipated benefits	Provide visibility, and command and control for substations operations Avoid radio frequency interference Avoid hardware failures Support communication during restoration
Other relevant details	Availability of inventory and personnel may impact cost estimates

i. Prioritization

Implementation will be prioritized by age of the equipment by section. For instance, this effort focuses on the South ring, West ring then the East ring, based on age and risk of failure. The geography has backhaul microwave communications in rings that divide up the service area. The work focuses on one ring at a time.

ii. History of Effectiveness

Redundancy is one of the primary methods for ensuring a resilient electric delivery service. Having a secondary method of communication available during extreme weather or cybersecurity events has helped reduce the risk of critical data loss. Additionally, enhancements to the microwave system directly impact the Company's ability to perform remote operations effectively.

c. Alternatives Considered

The Company currently uses fiber optic cable as the primary form of communication except for field equipment in remote or difficult to access locations. In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, considered running fiber optic cable to this remote field

equipment, but determined this approach was not economically feasible. Fiber is costly, installation requires significant lead time and can present easement and permitting issues.

The Company is maintaining the equipment but is now reaching the end of life/aging equipment and vendor support life cycles.

Additionally, the Company also considered whether it was necessary to continue to utilize microwave equipment as a secondary communication source in locations with fiber optic access and determined that the added redundancy justified the cost. For resiliency, it is best practice to have two paths of communication to a site in the event of an outage/unavailability of one communication path. For instance, there could be construction activities that damage optic fiber or a weather event that negatively affects a microwave radio.

d. Measuring Efficacy

In reviewing the Resiliency Plan, the Company, in collaboration with Guidehouse, determined the following performance metrics will be tracked:

- Amount of end-of-life equipment replaced by modern vendor-supported systems,
- Decrease in maintenance time, and
- Increased collection of data points.

3. Data Center Refresh

a. Description

The Data Center Refresh Resiliency Measure consists of the following projects:

Resilient Communications to Plan for Unplanned Outages: In the event of an outage at the primary data center, the Company manually adjusts data routing to switch over to a backup data center, which takes about three hours. This project will install an automatic turnover system which automatically routes data to a backup cloud-based data center. This will decrease the Company's vulnerability to network outages, increasing resiliency.

Disaster Recovery Enterprise Toolset: This project is a new cloud-based recovery plan that will replace the Company's existing data center-based recovery process. This toolset enables partial automation and greater redundancy, improving the Company's overall recovery process during disasters.

On-Premises Infrastructure Refresh: This project will replace aging equipment with cloud-enabled equipment, that will enable the utilization of newer and more cost-effective resiliency applications.

SAN Fabric Redesign: This project involves designing and implementing a new, comprehensive SAN fabric to support the company's data center services. The redesign reduces the risk of SAN related outages, which have occurred in the past due to isolated storage packets.

Tiered Storage Solution: This project involves developing a single storage platform that will allow for multi-protocol usage as well as cloud native capabilities of replication, tiering, and archiving customer-related data.

b. Relevant Details

The following Figure RP-48 summarizes the Data Center Refresh Resiliency Measure.

Figure RP-48.

Data Center Refresh Resiliency Measure	
Estimated capital costs from 2025 - 2027	$2.9 million[12]
Estimated incremental O&M expense from 2025 – 2027	$246,960
Estimated overall project duration	2025-2027
Net salvage value	N/A
Resiliency Event(s) addressed	All Resiliency Events that may cause outages
Anticipated benefits	Provide visibility, and command and control for substations operations Avoid radio frequency interference Avoid hardware failures Support communications during restoration
Other relevant details	N/A

i. Prioritization

Resilient Communications to Plan for Unplanned Outages: This effort is a singular task, so no prioritization needed.

Disaster Recovery Enterprise Toolset: This effort is a singular task, so no prioritization needed.

On-Premises Infrastructure Refresh: This effort will replace hardware based on age, beginning with the oldest.

SAN Fabric Redesign: This effort will redesign based on physical data center, beginning

[12] The Company's plan to refresh data center infrastructure extends beyond 2027. Subject to available funding, personnel, and materials, the Company may accelerate future data center projects that are anticipated to include all or a portion of such projects in the Data Center Refresh Resiliency Measure. The Company estimates that accelerating future data center projects will cost approximately $5 - 7 million in additional capital costs and $350,000 - $375,000 additional incremental O&M expense from 2025 - 2027.