CenterPoint Energy
Storm Adequacy Review

CenterPoint Energy
Houston, Texas

March 25, 2009

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Executive Summary

Purpose of Report

KEMA was engaged by CenterPoint Energy to review the Company's emergency operating plans and processes, and evaluate the system damage incurred during the 2008 Hurricane Ike with respect to the Company's infrastructure design and maintenance programs.

The purpose of this report is to document CenterPoint Energy's response, which examined the Company's preparation post Hurricane Rita, and how that assisted in preparing for Hurricane Ike. It also includes a high level review of the CenterPoint Energy emergency operations plan (EOP) and the execution of that plan.

KEMA has extensive experience assisting clients to develop transmission and distribution (T&D) system designs, T&D maintenance practices, and emergency response programs. Our client experience affords us, unique insights to the realities of distribution operations and outage management.

Impact of Hurricane Ike

Beginning on September 12, 2008, Hurricane Ike's destructive 100-mile-per-hour winds, wind-blown debris and surge caused severe damage to CenterPoint Energy's transmission, substations and distribution system. Over 90 percent of the Company's customers lost power in what was to become the largest power outage in the Company's history. The implementation of CenterPoint Energy's Emergency Operations Plan enabled work crews to systematically and efficiently address customer emergencies, reconstruct downed power lines, repair flooded substations and restore transmission lines. CenterPoint Energy used over 13,700 linemen and tree trimmers, of which over 11,700 came from other electric territories. The Company replaced over 8,500 poles, 5,300 transformers, 850,000 pounds of wire and 413,000 feet of cable on the distribution system alone.

In the first six days after the hurricane, CenterPoint Energy returned electricity to 1 million of the 2.1 million affected customers. Despite this accomplishment, the Company has come under criticism and/or questioning about the adequacy of

CenterPoint Energy's electric distribution system design, maintenance programs, and emergency recovery programs by some customers, local government officials, and the Public Utility Commission of Texas (PUCT).

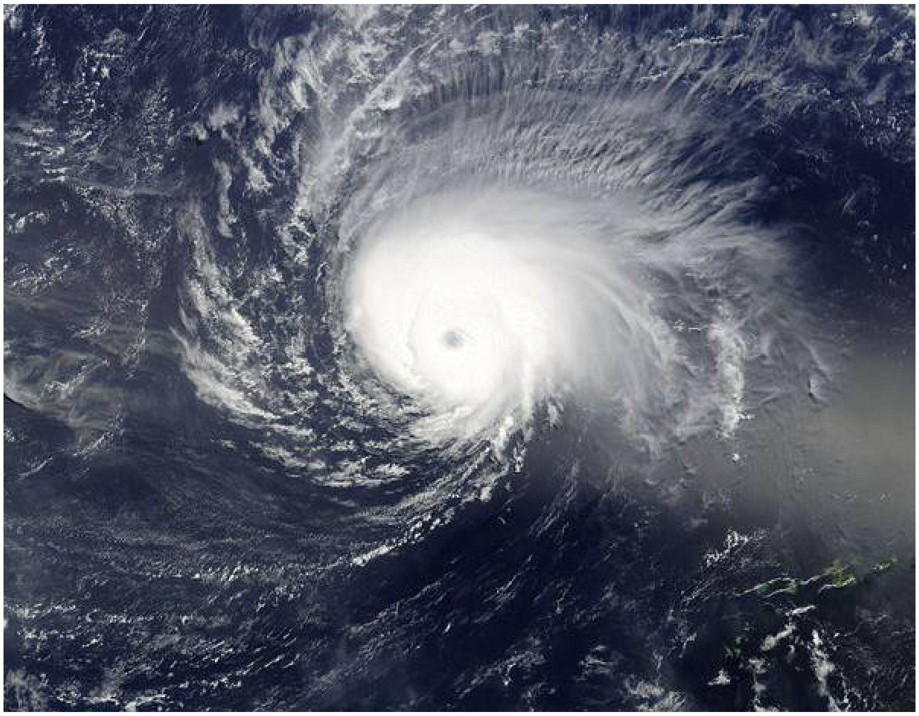


Exhibit ES-0-1: Hurricane Ike[1]

Overview of Conclusions

CenterPoint Energy's Texas service territory experienced severe weather inflicting the most extensive damage to the electric transmission and distribution infrastructure in the Company's history and creating the largest restoration effort ever performed by CenterPoint Energy. Hurricane Ike caused widespread damage to trees and power lines resulting in power outages encompassing the Houston area. Over 90% of the CenterPoint Energy over two million electric customers lost power during the event.

In response to the storm, CenterPoint Energy quickly ramped up from its normal field complement of 1,312 CenterPoint Energy line and contract personnel to almost 13,000 electric line crews and tree crews, in addition to the transmission and substation workforce and numerous corporate personnel, to support the restoration efforts. The response by CenterPoint Energy's management to secure additional resources from contractor companies and other utilities was a significant factor in the Company's ability to fully restore the system in eighteen days.

The magnitude of the supporting logistics, which was transparent to the average customer, was the equivalent of bringing the population of a small town into the area and providing all necessary logistical services; food service, lodging, parking, vehicle support, security, and personal needs to accommodate the population. In addition, the operational logistics for fieldwork such as materials, equipment and supervision were extensive and far exceed requirements in normal operating periods. These restorations were a massive effort by any standard. In overall review of the effort put forth by CenterPoint Energy, KEMA concluded that:

> *CenterPoint Energy, its employees, and contractors performed very well restoring power after Hurricane Ike, which was a record-breaking and destructive hurricane. CenterPoint Energy's restoration plan, while not designed to address the magnitude of the storm damage incurred and the overwhelming volume of restoration activities, did provide a framework for an effectively executed restoration response. A key driving force was CenterPoint Energy's "Can Do" attitude, which enabled them to rise to the challenge of this enormous restoration effort.*

This review focused on three areas; post-Ike restoration, distribution design and maintenance (including an infrastructure review based on a technical study of the system resilience as response to the storms) and the emergency restoration plan. In summary, KEMA found the following:

- CenterPoint Energy's non-storm reliability indices have been relatively constant,
- CenterPoint Energy's design standards are consistent with good engineering standards for the typical wind and weather conditions anticipated in its electric service territory,
- CenterPoint Energy's pole inspection practices are consistent with industry practices, and while the vegetation management program is based on different parameters, it appears to be effective,

- CenterPoint Energy's emergency operating plan (EOP) and elements of its information processes were designed for more moderate storms, which the Company typically experienced. As a result, CenterPoint Energy developed information solutions when it expanded the staging sites from 4 to 10, and
- CenterPoint Energy's reaction to Hurricane Ike was immediate and its response was appropriate given the management tools present at the time.

1. Introduction

1.1 Overview

KEMA was engaged to present its findings in support of the Company's potential filing with the Public Utility Commission of Texas (PUCT). The scope of this engagement included reviews of the Company's emergency operating plans and processes; high-level evaluation of the system damage incurred during the 2008 Hurricane Ike and review of Company programs in the area of infrastructure design and maintenance. This report details the methodology used by KEMA to collect and analyze information, the findings resulting from that analysis and conclusions KEMA believes portray the Company's ability to withstand and manage severe weather events.

This report examines the performance of the CenterPoint Energy infrastructure during Hurricane Ike. At the request of CenterPoint Energy, KEMA consultants have evaluated the distribution system infrastructure from the perspectives of age, physical condition, and maintenance practices. KEMA has also evaluated the design and construction standards of the Company and the vegetation maintenance practices in place currently and over the years preceding these events. Finally, KEMA has evaluated the emergency operating plan and procedures of CenterPoint Energy and the execution of those plans during the Ike restoration.

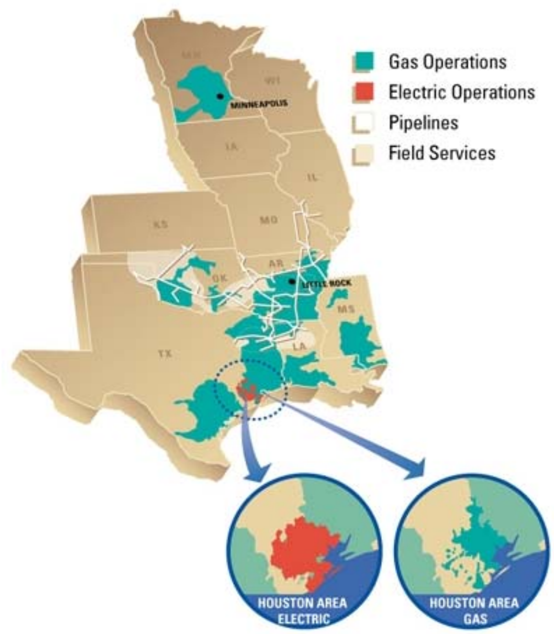
1.2 CenterPoint Energy Background

CenterPoint Energy provides electric transmission and distribution, natural gas distribution, competitive natural gas sales and services, interstate pipelines and field services operations. The Company delivers electricity to over two million metered customers in a 5,000 square mile area.

CenterPoint Energy Electric Transmission and Distribution Fast Facts

Data as of December 31, 2007[2]

Metered Delivery Customers	**2 million**	
Average Metered Customers by Classification		
Residential	1,733,319	87%
Commercial	259,682	13%
Industrial	2,085	<1%
Municipal /Public Utilities	788	<1%
Kilowatt Hours Delivered in 2007	**76.29 billion**	
Residential	23,999,085	31%
Commercial	21,071,547	28%
Industrial	31,058,615	41%
Municipal /Public Utilities	160,209	<1%
Transmission and Distribution		
Overhead Distribution Lines	27,421 pole miles	
Overhead Transmission Lines	3,738 circuit miles	
Underground Distribution Lines	18,955 circuit miles	
Underground Transmission Lines	28.4 circuit miles	
Substations	229	
Service Centers	14	



1.3 Situation

The geographic area in which CenterPoint Energy provides electric service is often subject to severe weather. The weather can take the form of tornadoes, lightning, severe thunderstorms that can occur with little or no warning on any hot summer day, significant ice storms and hurricanes. The impact of severe weather on an electric transmission and distribution system can vary greatly from one occurrence to another. The storm impact is dependent upon many variables, including such things as the specific geographic area affected, age and condition of the electric facilities, vegetation density and condition both inside and outside the utility easement, electric system operating configuration at the time of the event and the nature of the weather event. In all cases however, CenterPoint Energy, like many other electric utilities around the country, strives to ensure electric service is maintained during weather events and when interruptions do occur, strives to restore service in the fastest possible time while maintaining safety of the electric system for the public and the workforce.

In 2008, the gulf coast and CenterPoint Energy's territory, experienced several hurricanes, with Ike being one of the most severe storms in history to hit Texas. As illustrated in Exhibit 1-1 below, recent weather records show that severe weather is becoming more common in all parts of the US and what once was classified as an unusual event is becoming more commonplace. Damage to the utility infrastructure is occurring at higher rates and many utility companies are performing in-depth evaluations of the condition of the electric infrastructure and its ability to withstand severe weather events. Specifically, utility companies are asking if the infrastructure performed as expected given the age, condition, and other attributes of the system and considering the severity of the event in question.

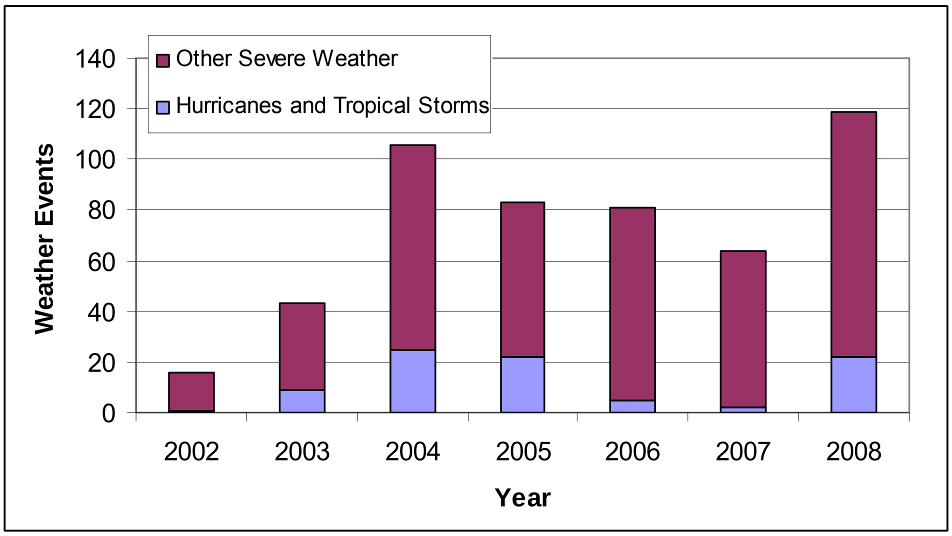


Exhibit 1-1: 2002-2008 Severe Weather Events in the US[3]

The findings of the KEMA review indicate that CenterPoint Energy does a credible job in all areas of design, construction, operation, and maintenance of the electric system. CenterPoint Energy's practices in these areas are consistent with industry standards and what is considered good utility practice. Overall, the CenterPoint Energy system design, construction, operation, and maintenance indicate that the infrastructure is sound and is of the quality one would expect of a leading electric utility.

Given this general assessment, why did CenterPoint Energy customers experience extended electric service outages during Ike? In summary, the wind and surge experienced in Ike examined by KEMA was of severity and localized intensity that the utility infrastructure was not designed to withstand, nor would be expected to withstand, using industry accepted design and construction methods, particularly when the damage is of the extent shown in Exhibit 1-2 on the next page. Furthermore, the expectation of an electric utility to build a system that would withstand such weather is questionable when considering the potential impact on rates and public concern over aesthetics of utility facilities in their community.

In order to ensure that an electric system has adequate storm resilience, a utility must undertake an extensive analysis to quantify both the probability of certain weather conditions and the probability of the infrastructure to withstand those conditions over an expected facility life in excess of thirty years. Add to this the changes in community development, community regulations on utility construction, growth of vegetation and impact of private landowners and public official's management of vegetation, and the variables to consider in building a storm-hardened system become quite numerous. System hardening is not simply about putting in stronger poles or placing facilities underground. It is about, doing the best possible job with the resources available while maintaining a reasonable cost structure balanced against good service reliability. An infrastructure can be built that will withstand severe weather, but the cost is prohibitive to customers and regulators.

Exhibit 1-2: Damage inflicted on the Texas Coastline[4]

When a hurricane occurs, leaving hundreds of thousands of customers without service, there is an expectation by the customers, the Commission and the local and state governments that the utility will work to restore service quickly. This is a reasonable expectation; however, the time required to achieve the restoration of all customers could take days, if not weeks, depending on the severity of the damage. CenterPoint Energy, as with other utilities, has a formal plan to manage the restoration efforts, which has been proven to work well in smaller weather events. However, Ike was not a smaller weather event, leaving over 90% of over two million customers without service for an extended period. CenterPoint Energy has not recently experienced storms of Ike's magnitude and had to adapt its plan to the demands created by this abnormal event.

Realizing the potential magnitude, CenterPoint Energy quickly began the process of obtaining additional resources from both contractors and mutual aid utility partners. CenterPoint Energy mobilized its own forces to begin the damage assessment, first response, and tree removal to permit the process of determining the extent of the damage as well as clearing the easements to allow line crews to begin the re-construction of the distribution systems. This initial activity brought together numerous resources to orchestrate the preliminary activities to receive the additional resources and get them actively engaged in restoring the system.

In parallel, the Distribution Evaluation Center (DVal) began assembling the information to be given to customers, government officials and senior management. The core plan served CenterPoint Energy well as it provided the basic blueprint for conducting these activities.

CenterPoint Energy had implemented a number of leading edge practices that smoothed the transition from normal to complex emergency operations, which will be discussed in the sections that follow.

2. Project Approach and Methodology

KEMA approaches projects of this type with techniques and tools that support both the quantitative and qualitative analyses that are required for a full understanding of the operations and organizations under study. Because much of the project involves analysis of data from various systems and reports, a number of data modeling and analysis techniques are used.

To ensure that a wide range of viewpoints are considered, KEMA employs a team of experienced utility management consultants, including many with utility operating experience. These consultants are in constant contact on-site during the data gathering stage. During the analysis stage, the KEMA team presented their initial conclusions to the entire KEMA team for review, comment and suggestion, before the beginning of report writing. During the report writing stage, drafts are circulated among the team members for input in their areas of expertise and to provide information that they have obtained that may impact other areas of the project. A similar approach is used for the project management phase.

The following outline presents that approach used by KEMA in the CenterPoint Energy study:

- Data collection:
  - Request detailed information (in advance of interviews, where possible)
  - Data interpretation and integration
- Interviews:
  - Interview key participants in the areas of focus (at various levels)
  - Review and confirm the data collected
  - Seek additional information on issues identified in interviews
- Analysis/synthesis:
  - All information is reviewed, analyzed, integrated, etc.
  - Identification of areas for further study
  - Preliminary findings and conclusions
- Follow-on information collection and verification
- Finalize findings and conclusions

Due to the aggressive timeline requested by CenterPoint Energy for this project, KEMA's scope did not include the development of specific recommendations that may result from KEMA's findings and conclusions.

3. Data Summary

3.1 Weather Data

Weather data is used to determine the severity of the storm, durations and locations impacted. Primarily the weather data will focus on wind speeds, storm path and storm surge. It is not necessarily the category of the storm, but rather the combination of storm elements that determines the level of damage left in its wake. Ike was a category two storm that did much more damage than what most people would have expected, except for the weather professionals who saw the potential for excessive damage and the potential for loss of life.

3.2 Asset Data

Asset data was used to ascertain the amount of exposure (equipment susceptible to failure), the equipments' prior physical condition (to the extent this information was available), characteristics that make the equipment unique and the equipments' geographic location relative to the storm's elements. Asset data focuses on poles, transformers and conductor for the distribution system as these asset classes are more easily tracked and often significant when considering failed equipment. The following is a summary of the asset data received from CenterPoint Energy:

- Graphical Information System (GIS) – data included pole, wire, and transformer data,
- Pole Information – data included location, class (size), and height,
- Transformer Information – data included size, location, and phasing,
- Wire Information – data included, size, phasing, circuit ID, and length,
- CenterPoint Energy Territory Maps – the maps support tying asset and storm information to the geography as defined by the CenterPoint Energy service territory, and
- Customer Counts – total customer counts on a per circuit basis.

3.3 Maintenance Data and Standards

Maintenance data and standards will give some indication as to what type of equipment is typically used and how it is maintained. The following data was included in the project:

- Distribution Standards – OH General & Construction Standards, along with UG Distribution Standards; provide the engineer and technician the guidelines for building and maintaining the electrical infrastructure,
- Outage Analysis System (OAS) – this data provides outage records for storm and non-storm events (1/1/2004 – 10/1/2008),
- Pole Inspection & Treatment Data – this information provides pole inspection and rejection rates along with expenditures for the period 2000 to 2008.
- Vegetation Management – vegetation or tree trimming related spending along with circuit lengths and customer counts.

3.4 Impact Data

Impact data provides an indication of the impact Hurricane Ike had on CenterPoint Energy's transmission and distribution systems. This is primarily in terms of reliability (the impact on customers) and the extent of equipment replaced as a result of the weather event.

3.5 Data Analysis

The data listed above served several important functions and was analyzed and filtered accordingly. Three lines of data gathering and analysis can be distinguished and provide the following information:

1. Provide a baseline or the state of the system prior to Ike's impact. This is determined by the system's composition (pole attributes and general circuit attributes – this can be further defined as the exposure to the storm and exposure to vegetation), system conditions (e.g., pole age and condition based on inspection results, vegetation densities, etc.) and methodologies and practices (e.g., pole inspection and vegetation management programs)

used by the company prior to the storm. This provides insight into why the system is in the current condition and may form the basis for recommendations for improvement and / or show what practices are noteworthy and have helped in mitigating damages that the system has sustained during the storm events,

2. Determine the severity of Ike as it impacted CenterPoint Energy's transmission and distribution systems, and

3. Ascertain the level of damage sustained due to Ike and how it impacted customers. The number of sustained (extended) outages per circuit primarily defined severity of damages. Also, the number of locked out feeders, poles issued, transformers issued, and conductors issued during the restoration have been used as indicators of the level of damage.

4. Weather Summary

4.1 Hurricanes

A hurricane is a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface.

All Atlantic and Gulf of Mexico coastal areas are subject to hurricanes or tropical storms. The Atlantic hurricane season lasts from June to November, with the peak season from mid-August to late October.

Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Winds can exceed 155 miles per hour. Hurricanes and tropical storms can also spawn tornadoes and microbursts, create storm surges along the coast, and cause extensive damage from heavy rainfall.

Hurricanes can produce widespread torrential rains. Floods are the deadly and destructive result. Slow moving hurricanes and tropical storms moving into mountainous regions tend to produce especially heavy rain. Excessive rain can trigger landslides or mud slides, especially in mountainous regions. Flash flooding can occur due to intense rainfall. Flooding on rivers and streams may persist for several days or more after the storm.

Between 1970 and 1999, more people lost their lives from freshwater inland flooding associated with land falling tropical cyclones than from any other weather hazard related to tropical cyclones.

The primary ways in which a hurricane can cause destruction is by winds (either direct or thrown debris), rainfall and flooding, tornadoes, and storm surge.

Storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level to heights impacting roads, homes and other critical infrastructure. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides. Because much of the United States' densely populated Atlantic and Gulf Coast coastlines lie less than 10 feet above mean sea level, the danger from storm tides and surges, is tremendous.

The storm surge combined with wave action can cause extensive damage, severely erode beaches and coastal highways. With major storms like Katrina, Camille, and Hugo, complete devastation of coastal communities occurred. Many buildings will withstand hurricane force winds until their foundations, undermined by erosion, are weakened and fail.

4.2 Storm Measurements

Hurricanes and storm systems in general are inherently complex and storm severity can be difficult to define. A storm system can be described in terms of various measurements; such as wind speeds, overall storm path and speed, storm surge, rainfall, lightning (all of which vary over time and position). Measurements are dependent upon sensors (both electrical, mechanical, and of the human variety) to record the characteristics of the weather event, which are fallible and can be sparsely located; however, the technology used is constantly improving along with the frequency with which data can be collected.

Standardized severity definitions and the metrics that they characterize (although they serve a useful function) can be misleading in that they often emphasize a particular attribute that comprises but is not the sole attribute defining the severity of the storm and are by nature arbitrary (a measurement in terms of ranges and multiple variables does not necessarily have a meaningful combined unit of measurement) and often quantized into numbers easy to recount. It's important to note that just as the variables that can be measured to equate severity can vary so too can the standardized severity metric change.

4.2.1 Saffir-Simpson Hurricane Scale

The most commonly accepted hurricane severity index is the Saffir-Simpson Hurricane scale. Exhibit 4-1 outlines the characteristics that make up the various hurricane severity categories. A major drawback with this index is that it does not take the area of impact into account.

It does provide a quick qualitative feel for the type of damage to be expected and is easy to calculate and explain. Some credence is given to preparation for an oncoming storm based on this commonly used scale by the public and as a rough estimate of anticipated damage.

Category	Sustained Wind (MPH)	Storm Surge	Damage
1	74–95 mph	4–5 ft.	Minimal: Unanchored mobile homes, vegetation and signs.
2	96–110 mph	6–8 ft.	Moderate: All mobile homes, roofs, small crafts, flooding.
3	111–130 mph	9–12 ft.	Extensive: Small buildings, low-lying roads cut off.
4	131–155 mph	13–18 ft.	Extreme: Roofs destroyed, trees down, roads cut off, mobile homes destroyed. Beach homes flooded.
5	≥156 mph	≥18 ft.	Catastrophic: Most buildings destroyed. Vegetation destroyed. Major roads cut off. Homes flooded.

Exhibit 4-1: Saffir-Simpson Hurricane Scale[5]

4.2.2 Hurricane Severity Index

The hurricane severity index (HSI)[6], attempts to better capture the storm's area of impact, which can have a greater impact on storm surge than max wind speed, which is the focus of the Saffir-Simpson scale. The index has greater granularity (2-50 possible points), with the higher the value the higher the severity as demonstrated by Exhibit 4-2.

The following criteria are used to develop the storms severity using HSI:

- Up to 25 points are assigned based on total area of coverage of 35, 50, 65, and 87mph+ wind fields.
- Up to 25 intensity points are assigned based on the exponential relationship between wind speed and wind force exerted on an object. (When wind speed doubles, the force on an object quadruples.)

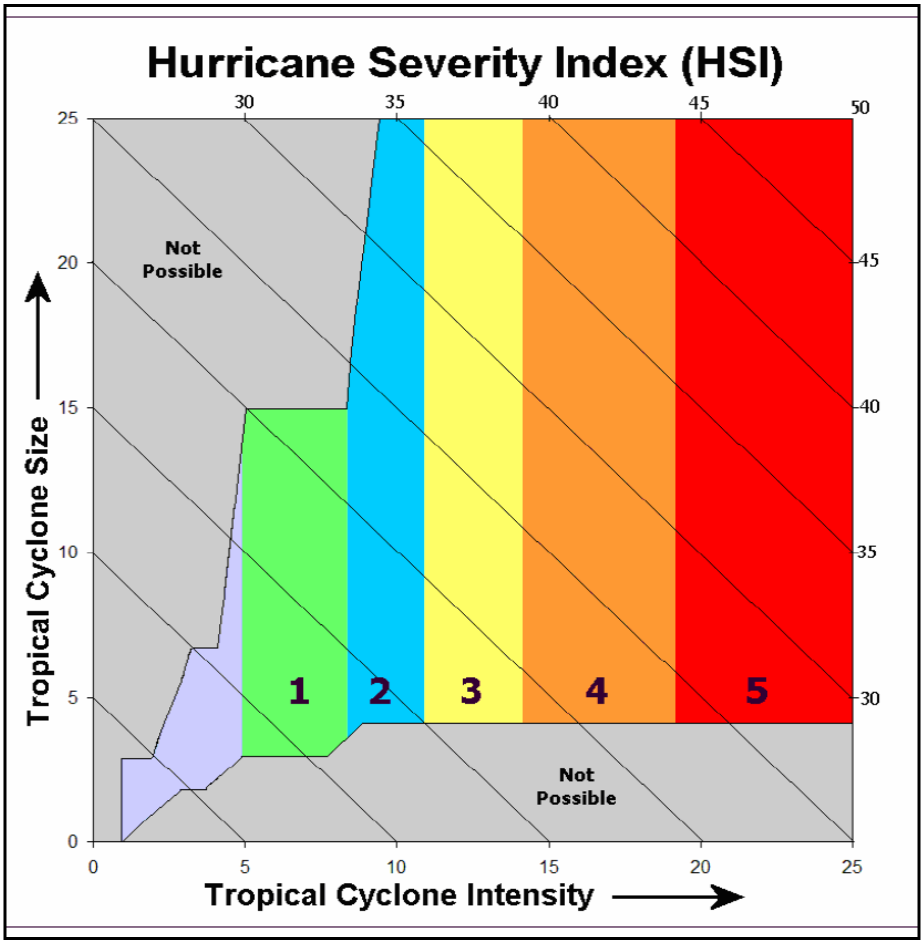


Exhibit 4-2: Hurricane Severity Index[7]

4.3 Hurricane Ike

In late August, a well defined tropical disturbance off the coast of Africa slowly tracked westward and eventually became Tropical Storm Ike on September 1. By the afternoon of September 3, Ike had intensified to hurricane status. With the aid of nearly zero vertical wind sheer, a strong low over the northwestern Atlantic and an upper-level trough in control over the eastern Atlantic, Ike was able to intensify quickly into a Category 4 storm with a peak intensity of 233 km/h (126 knots or 145 mph) and a pressure of 935 mb. Ike's minimum central pressure of 935 mb, recorded on September 4, is the lowest pressure for the 2008 season. Strong northwesterly sheer on September 5 weakened Ike to a Category 3 storm as it moved westward towards Cuba, but as conditions improved, Ike (shown in

Exhibit 4-3) strengthened back to a Category 4 Hurricane on September 6. Hurricane Ike made landfall in Cuba near Cabo Lucrecia on September 7 with winds estimated at 203-213 km/h (110-115 knots or 127-132 mph)[8].

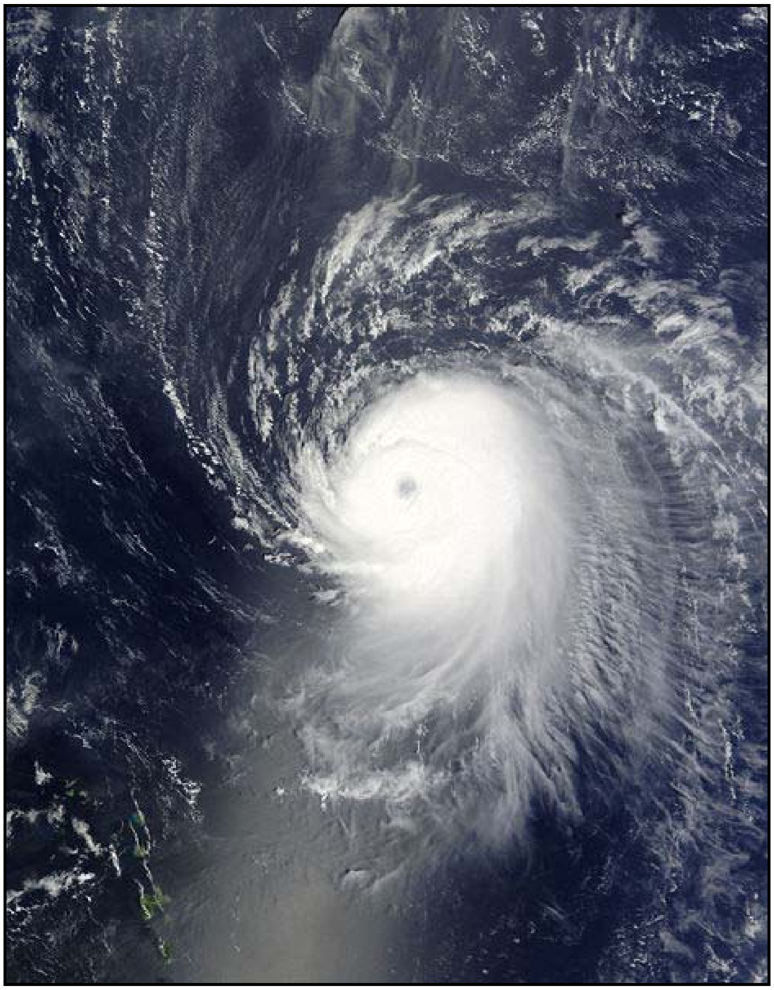


Exhibit 4-3: Hurricane Ike Satellite Image

By September 9, Ike emerged into the southern Gulf of Mexico as a Category 1 hurricane. Unlike Ike's history in the Atlantic, the hurricane was not as quick to re-intensify in the Gulf, however, it was able to grow in diameter encompassing nearly the entire Gulf of Mexico. The unusually large storm produced hurricane force winds as far as 193 km (120 miles) from the center and tropical storm force winds extending 445 km (275 miles). The large wind field caused tides around Galveston Island to rise as much as nine feet, 24 hours before the storm made landfall. When Hurricane Ike made landfall at Galveston Island during the early morning hours of September 13, its winds were sustained at 176 km/h (95 knots or 109 mph) and the pressure was at 952 mb, enough to be a strong Category 2 hurricane. At the time of landfall, aircraft dropsondes and land-based Doppler radar measured wind speeds approximately 91 meters (300 feet) above the surface at 209 km/h (115 knots or 130 mph). These strong winds caused significant damage to the high-rise buildings in the downtown Houston area as well as some of the oil refineries in Texas City. Already suffering from the destruction that Hurricane Gustav created, the Gulf Coast oil companies had nearly 100% of its crude oil production, as well as 98% of all natural gas production disrupted from Ike[9]. Along the coast storm surge was the major cause of damage associated with Ike as tidal gauges in the northwestern Gulf registered well above normal during a 3-day period. Some of the hardest hit areas included Galveston and the area just north of the island on the Bolivar Peninsula where the towns of Crystal Beach, Caplen, and Gilchrist were destroyed with storm surge above the 20 foot level in some areas.

By the afternoon on September 13, Ike barely maintained tropical storm status as it moved across eastern Texas and northwestern Arkansas. After merging with a cold front on the morning of September 14, Ike weakened to a tropical storm, but not before causing major flooding and wind damage to the Ohio Valley region. Record daily rainfall totals were broken as Wichita, Kansas set a new 24-hour rainfall record of 10.31 inches and Helena, Oklahoma set a daily record of 8.74 inches on the 12th. On the 13th, Chicago O'Hare airport set a daily record of 6.64 inches and LaPorte, IN set a daily record of 6.73 inches. Preliminary reports indicate that there were 8 deaths in the U.S., but there are about 130 missing persons from the Houston/Galveston area[10].

The storms path is pictorially summarized by Exhibit 4-4. The area of impact (as a tropical storm and hurricane, the storm system had farther reaching impacts) is shown in Exhibit 4-5. Ike was a 30, at landfall according to the Hurricane Severity Index as demonstrated in Exhibit 4-6.

Although Ike struck near Galveston, Texas as only a category 2 hurricane the enormous area covered by Ike's hurricane winds and its gigantic area of tropical storm winds brought huge waves and very high surge to the coast, both more representative of what would be expected from an average size category 4 or 5 hurricane, except that those extreme affects covered a larger coastal and inland area than that observed from an average sized hurricane so that more areas felt impacts from Ike[11].

The combination of surge and additional water rise from battering high waves destroyed homes in west Galveston, flooding homes and businesses in north Galveston, flooding many homes and businesses around Galveston Bay. In many wave and surge areas, homes vanished beneath the pounding surf.

Wave heights were estimated to be near 40-50 feet and water rise, based on high water marks, is estimated to be 15-20 feet near the Bolivar Peninsula; portions of southeast Galveston Bay may have seen water briefly and very locally exceed 20 feet.

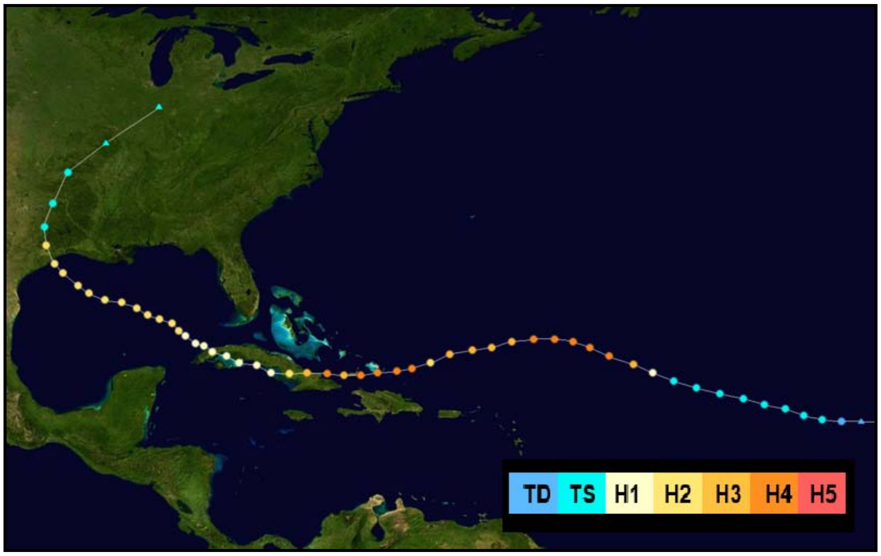


Exhibit 4-4: Hurricane Ike Track[12]

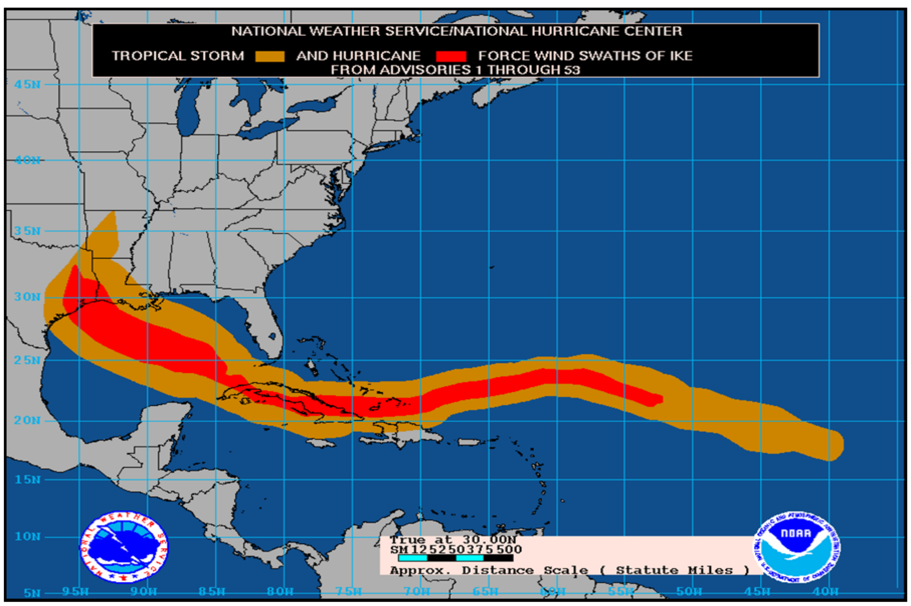


Exhibit 4-5: Weather Hazard Area of Impact[13]

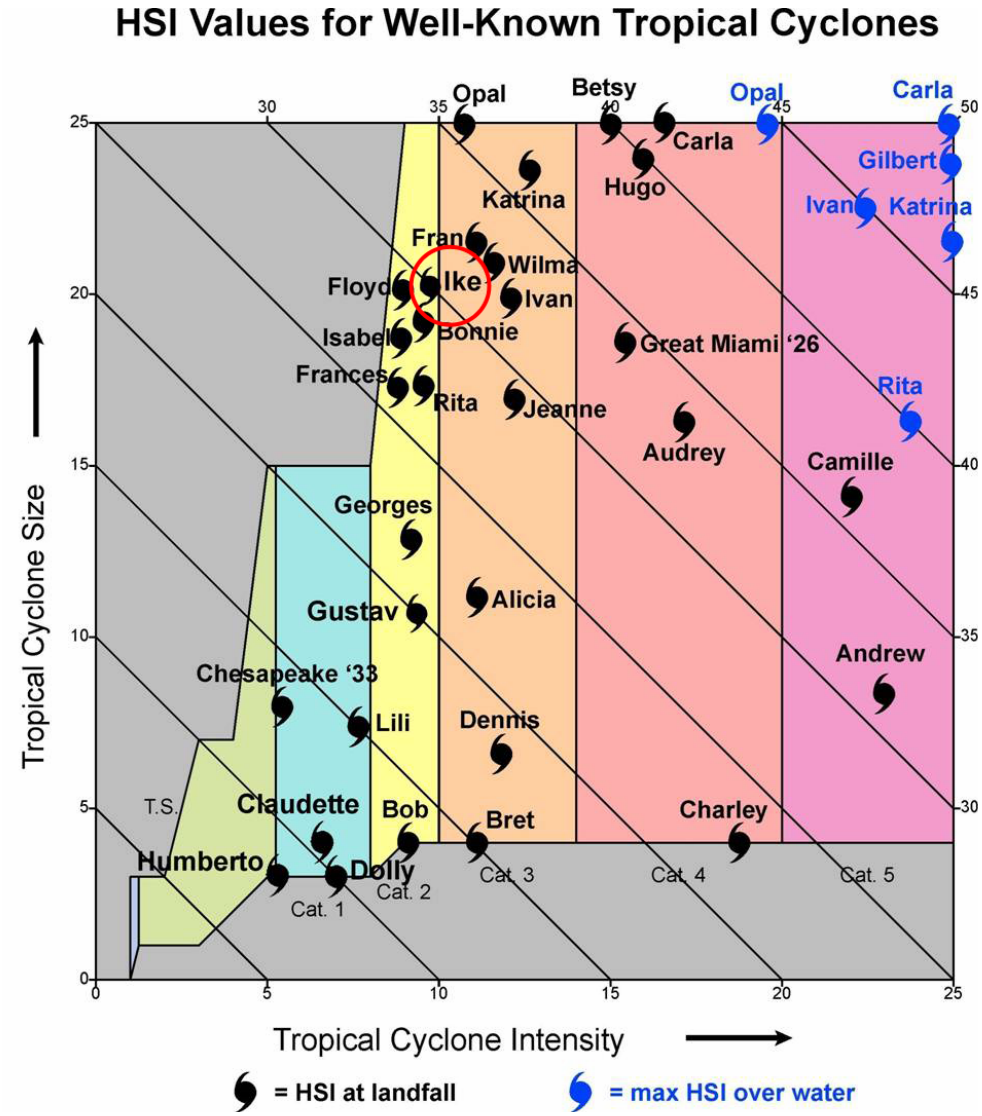


Exhibit 4-6: HSI Values for Well-Known Tropical Cyclones[14]

Wind speeds varied substantially as outline by Exhibit 4-7, which shows the storms path along with parts of Texas and Louisiana along with the Gulf of Mexico. Hurricane force winds were maintained for a portion of the storms inland path. Exhibit 4-8 shows how recorded wind speeds varied over time; it also illustrates gusts (as opposed to sustained wind speeds) varied for the Southwest Houston area.

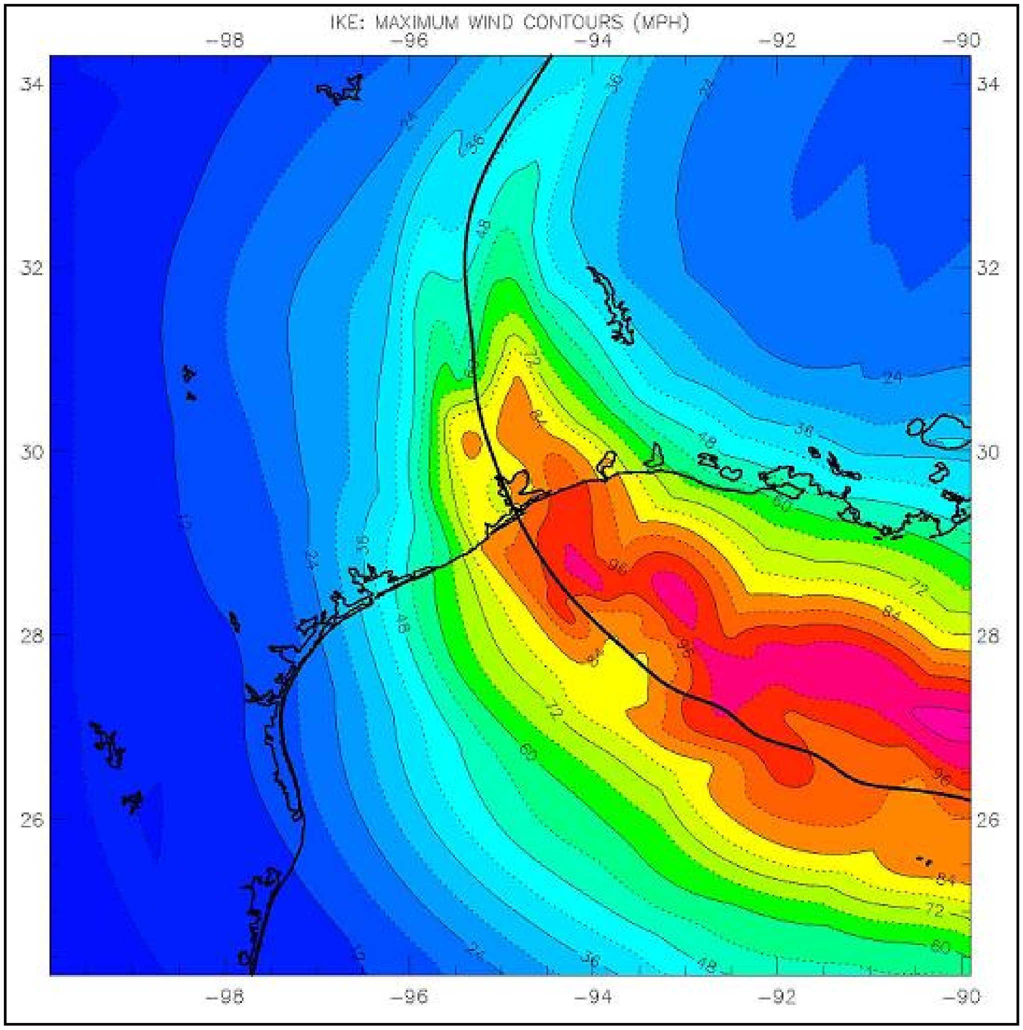


Exhibit 4-7: Wind Speed Contour Map[15]

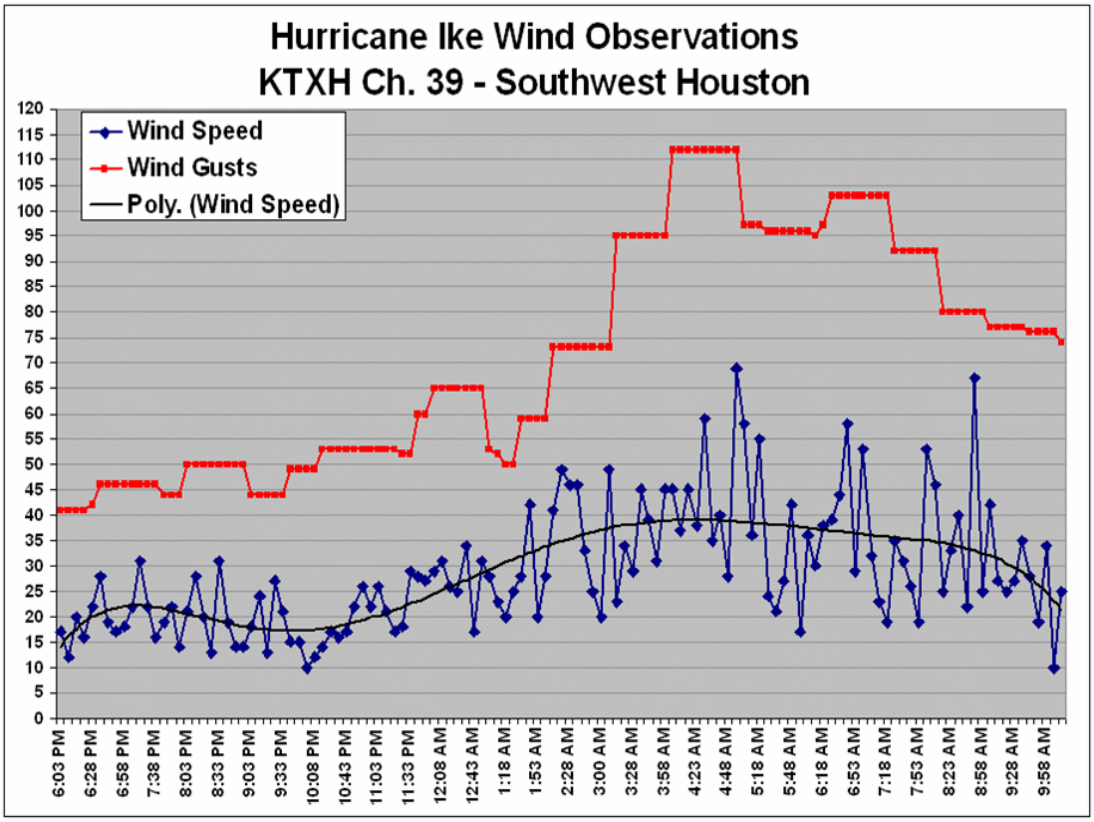


Exhibit 4-8: Hurricane Ike, Wind Observations[16]

The storm's relatively large size made for a substantial storm surge (high water marks are shown in Exhibit 4-9). At least one area experienced storm surges of more than 20 feet above typical water levels.

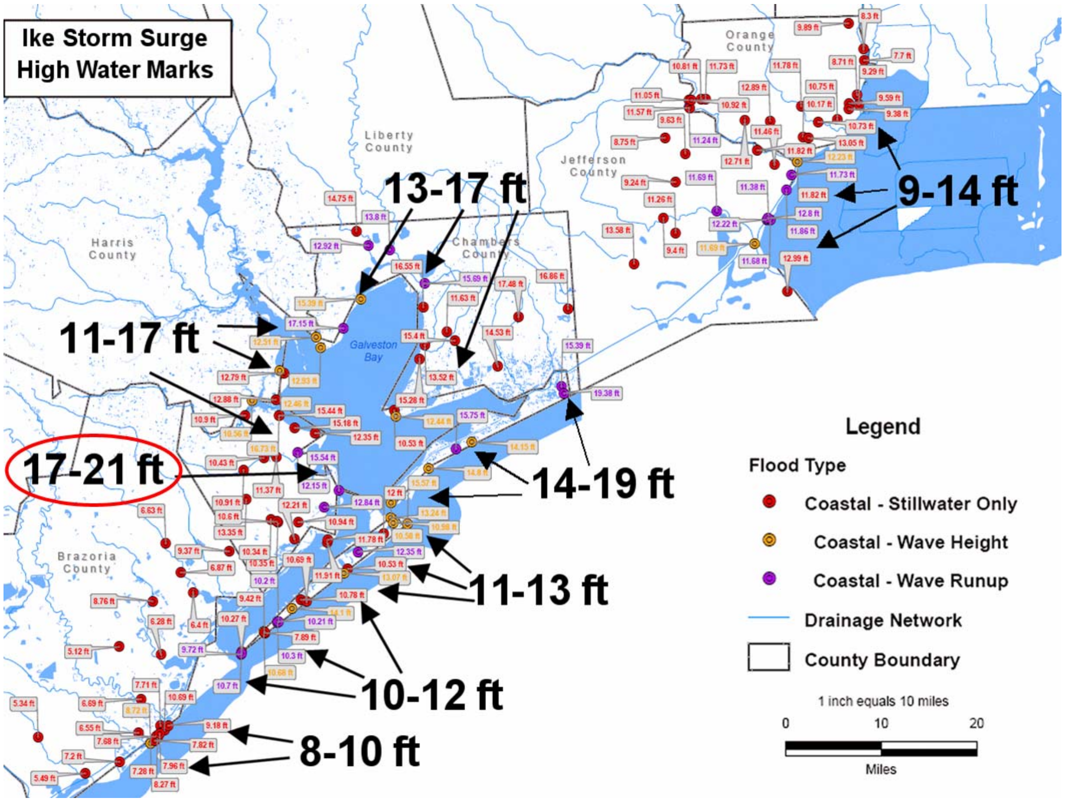


Exhibit 4-9: Storm Surge, High Water Marks[17]

A substantial amount of rainfall accompanied the storm along its path as is typical of hurricanes. Several areas experienced as much as 18 inches of rain over the 2 day period as defined by and illustrated in Exhibit 4-10. Rainfall of the magnitudes illustrated will weaken structures and flood areas, erode ground and cause sizeable damage to the area.

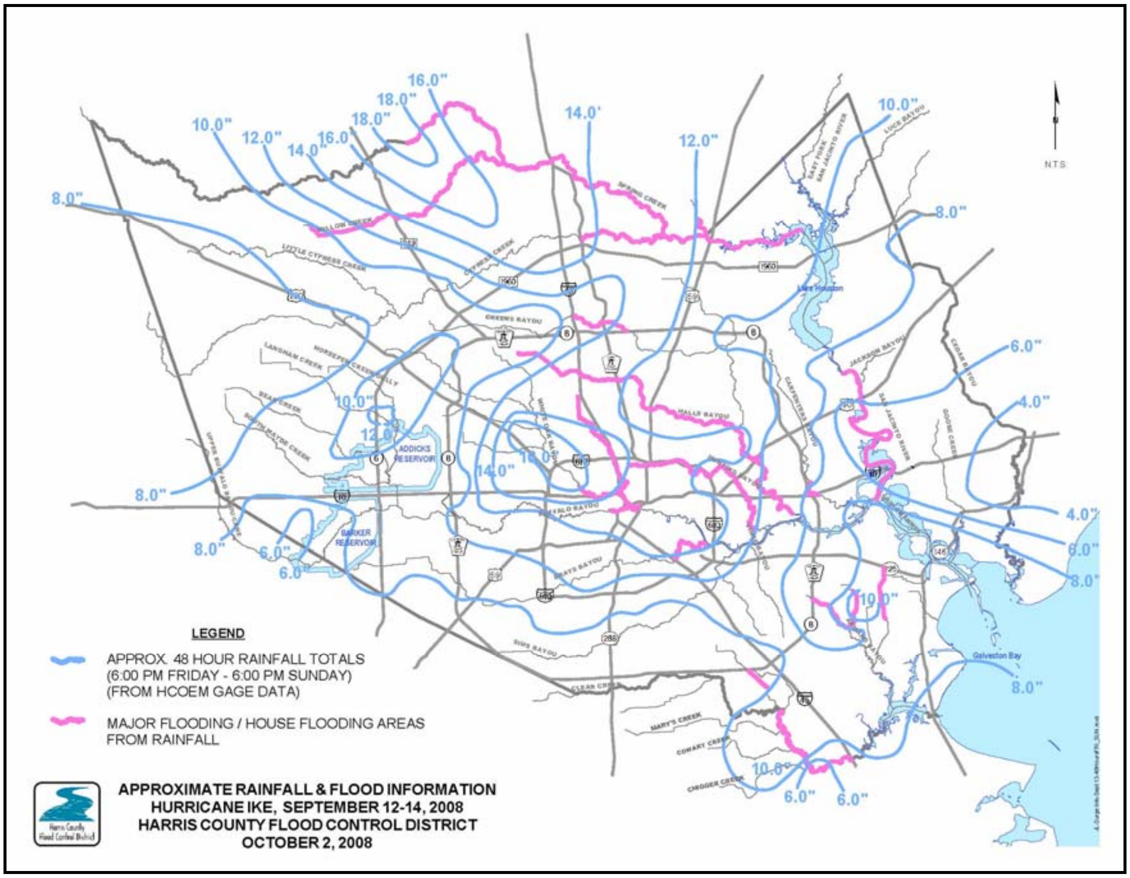


Exhibit 4-10: 48 Hour Rainfall, Harris County

5. Asset Base

CenterPoint Energy maintains the wires, poles and electric infrastructure serving over 5,000-square-mile electric service territory in the Houston metropolitan area. While CenterPoint Energy employees ensure the reliable delivery of power from power plants to homes and businesses, they neither generate power nor sell it to customers[18].

In terms of electrical systems damage, Ike primarily damaged distribution infrastructure, which will be represented here. The focus is on poles, transformers and conductor.

5.1 Service Area Summary

CenterPoint Energy's system is comprised of 12 service areas. Service areas size and customer base vary substantially as outlined by Exhibit 5-1.

	Demographics		Conductor Mileage			
	Circuits	Customers	Overhead	Underground	Lateral	Underground Primary
BAYTOWN	159	203642	1079	4	1507	7
BELLAIRE	297	359397	915	64	1100	19
CYPRESS	41	127726	677	6	1305	8
FORT BEND	63	93057	715	0	2139	0
GALVESTON	51	65142	314	5	590	2
GREENSPOINT	114	311506	1063	14	887	18
HO CLARKE	134	199231	929	6	1487	4
HUMBLE	42	124432	505	9	412	13
KATY	46	127779	647	11	854	6
SOUTH HOUSTON	183	250622	907	9	889	23
SPRING BRANCH	122	150199	513	21	459	6
SUGAR LAND	122	256151	781	26	214	16
Grand Total	1374	2268884	9045	175	11843	122

Exhibit 5-1: Service Area Demographics

5.2 Circuit Summary

CenterPoint Energy's distribution system supplies over two million customers with electricity service. Customers are fed through the transmission system to 221 substations; substations support 1492 feeders (circuits), which make up the distribution system. This means there is approximately 7 feeders, or circuits per substation and on average about 1340 customers per circuit (the amount of actual customers per a circuit varies substantially. CenterPoint Energy has declared for categorical purposes the majority of its feeders as urban (with roughly 119 customers per total circuit mile) and 82 feeders as rural (averaging approximately 21 customers per total circuit mile), the remaining 6 do not have such a designation.

5.3 Pole Summary

The GIS provided pole class, height, and location. The CenterPoint Energy system consists of primarily wooden poles made of Southern Yellow Pine. In order to ascertain pole strength, a major factor to be determined is pole class; defining the pole diameter (a low pole class is thicker, therefore, generally stronger than a higher pole class).

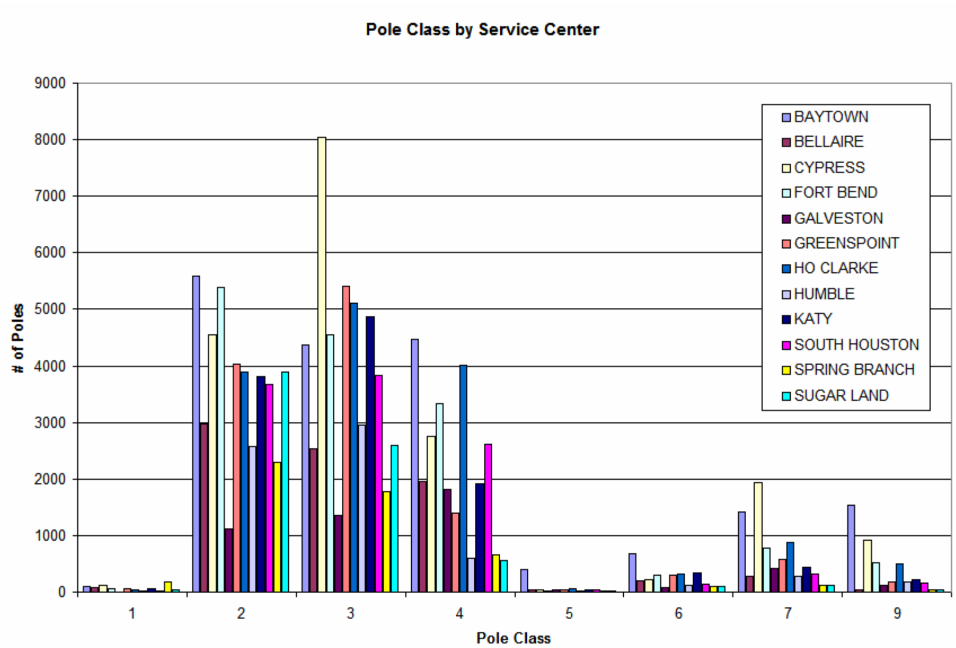


Exhibit 5-2: Pole Class by Service Center

Exhibit 5-2 provides the number of poles by class / district. Note, that the distributions of pole classes are moderately consistent from district to district. Cypress does have relatively more class 3 poles and less class 4 poles.

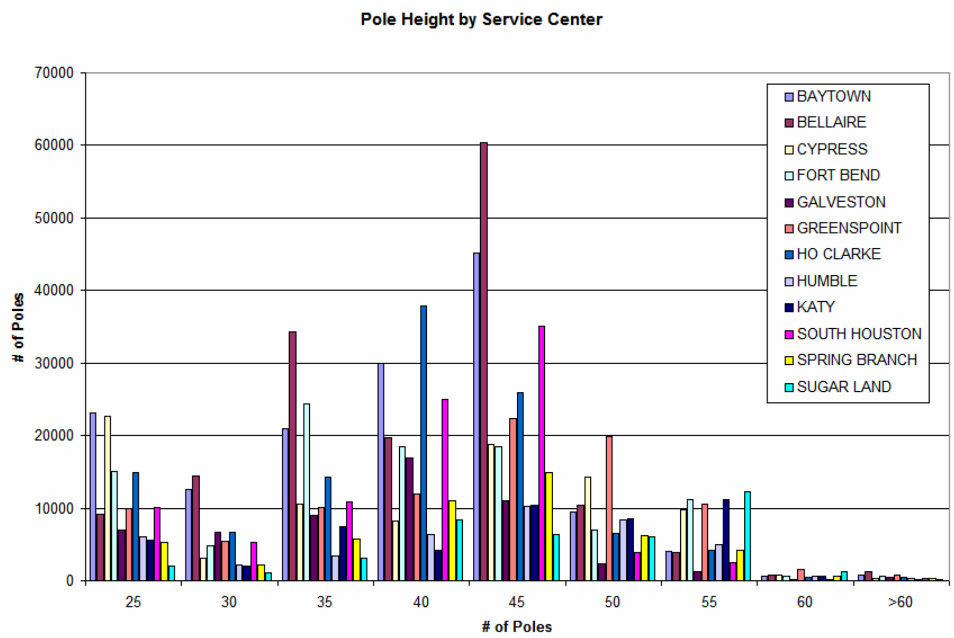


Exhibit 5-3: Pole Height by Service Center

Pole height contributes to the physics of a structural failure. Pole heights defined are broken down by district in order to determine if there are any apparent vulnerabilities. As shown in Exhibit 5-3, the pole heights vary little by district. The primary range of pole heights used is between 35 and 45 feet tall. The taller poles may have more surface area and therefore may experience higher torque at the potential breaking point (not always ground level) at the same wind speed. The shorter class poles (25 and 30 feet) are typically used for secondary and service. CenterPoint Energy uses "back-lot" distribution design, which accounts for the larger number of shorter poles.

The distribution of poles across the system typically correlates fairly highly to that of customers. Exhibit 5-4 illustrates sparse and pole dense regions. Pole dense regions by definition have more equipment per area; therefore, have greater exposure to failure and the elements.

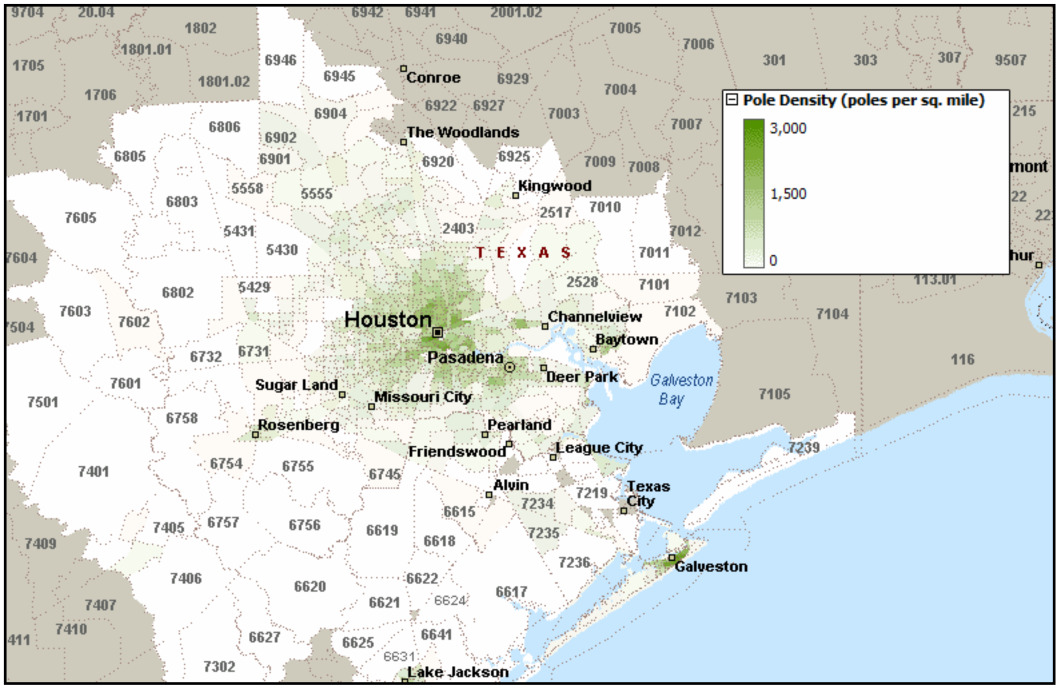


Exhibit 5-4: Pole Density

5.4 Transformer Summary

Exhibit 5-5 shows the distribution of transformers by size across the different CenterPoint Energy service centers. By far, CenterPoint Energy uses a majority of 25, 50, and 75 kVA transformer sizes. This is typical of most utilities. Exhibit 5-5 also shows that for a given size, it is used across all of the CenterPoint Energy territory.

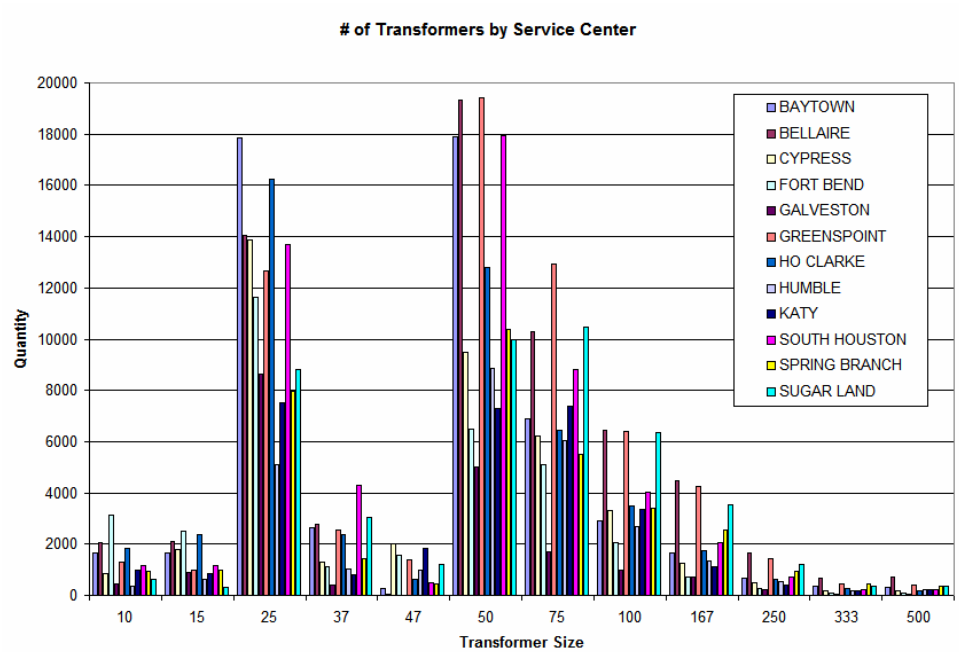


Exhibit 5-5: Dist. Transformers by Service Center

As with poles, transformers are not evenly distributed across CenterPoint Energy's service territory. Exhibit 5-6 shows pockets and thinly distributed areas of exposure. Transformer density will loosely correlate with population density.

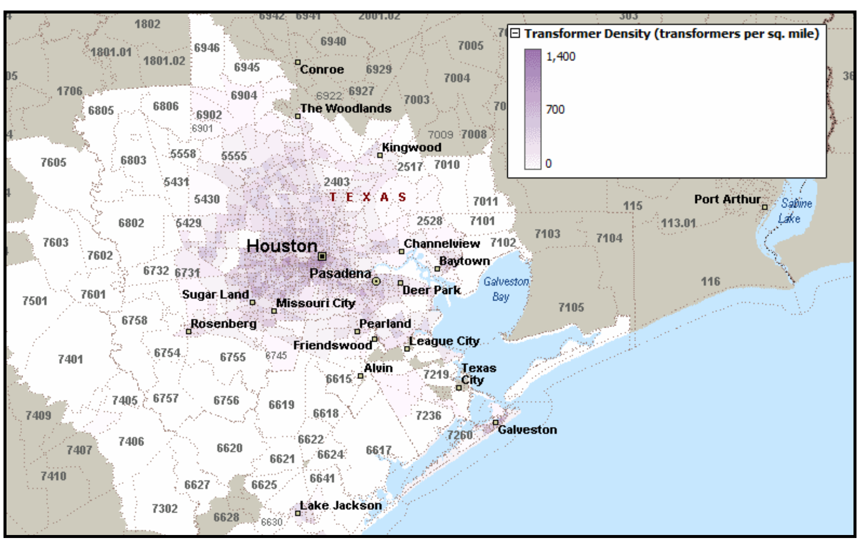


Exhibit 5-6: Transformer Density

5.5 Conductor Summary

Exhibit 5-7 and Exhibit 5-8 shows the distribution of wire by size across the different CenterPoint Energy service centers. As seen from Exhibit 5-8, the large majority of primary wire is 600 MCM. Depending on the type of wire used, this wire is between 0.8 and 1.0 inches in diameter. The larger the wire diameter, the stronger the wire is (see Exhibit 5-7).

Wire Size	Diameter (inches)	Strength (Pounds)
#12 CU	0.081	337
#6	0.184	563
#4	0.232	881
#2	0.292	1350
#1/0	0.368	1990
#2/0	0.414	2510
#4/0	0.522	3830
336 MCM	0.665	6150
600 MCM	0.891	10700
795 MCM	1.026	13900
2000 MCM	1.631	34200

Exhibit 5-7: Wire Size Characteristics[19]

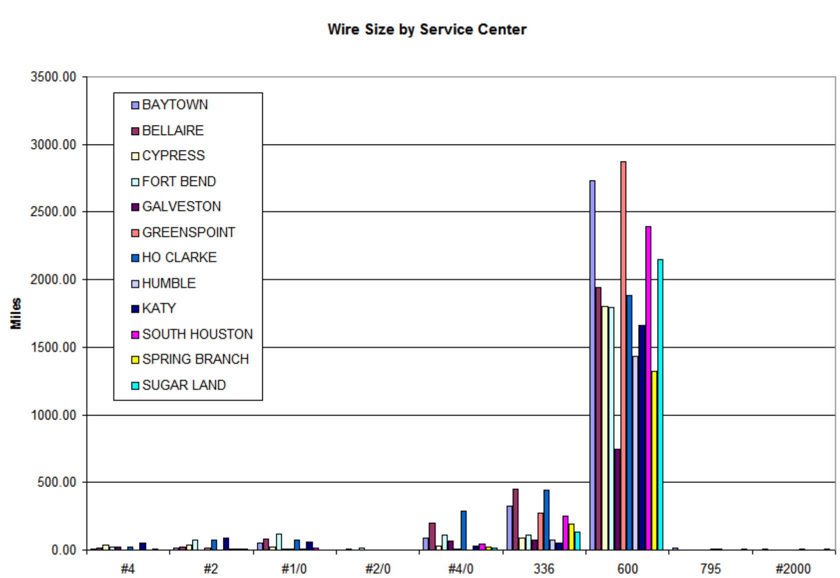


Exhibit 5-8: Primary Wire by Service Center

Exhibit 5-9 displays the lateral wire used by each CenterPoint Energy service center. By far, CenterPoint Energy uses a majority of #4 and #2 wire sizes. This is typical of most utilities.

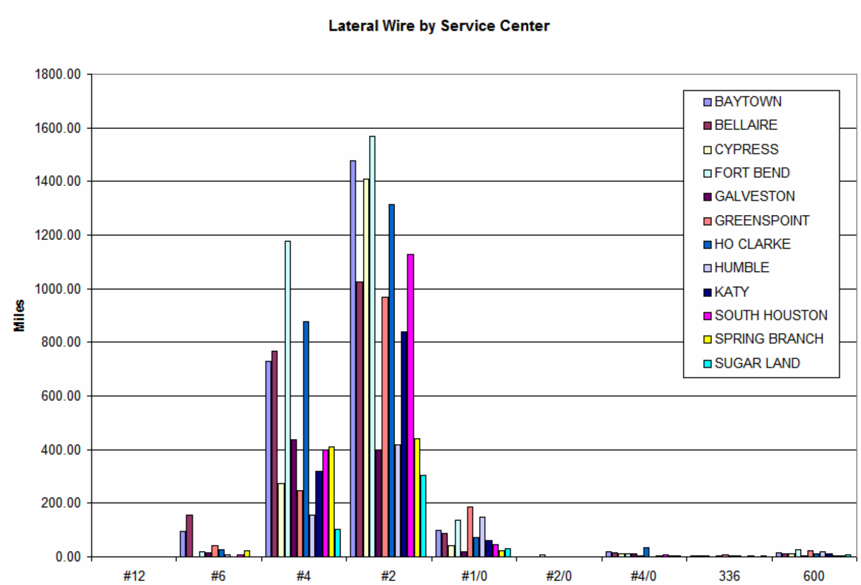


Exhibit 5-9: Lateral Wire by Service Center

Note, due to terminology, the wire sizes shown across the bottom of Exhibit 5-8 and Exhibit 5-9 are in order of diameter (smallest to largest).

6. Distribution Standards and Maintenance

This section focused on reviews of engineering practices and standards related to distribution system integrity and strength. The focus of the investigation was on the impact of the standards and practices on the infrastructure's ability to withstand storms of the type and magnitude of Ike.

6.1 Engineering Standards

KEMA reviewed CenterPoint Energy's engineering standards to evaluate the standards used by the Company in the area of distribution pole loading and strength calculations. The KEMA analysis will provide a general review of the applicable sections of the National Electric Safety Code (NESC) and the requirements on distribution designs.

Two primary documents house CenterPoint Energy's engineering and construction standards:

- **03-PRE** (Arms & Poles) – This is the introductory article located in the CenterPoint Energy's Overhead Distribution Standards that provides the basic concepts, and engineering considerations for distribution line design at CenterPoint Energy.

- **25-500** (Guidelines for "B" Grade Construction), **25-600** (Guidelines for "C" Grade Construction) and associated documents (all located in the CenterPoint Energy's Overhead Distribution Standards) – These standards are the detailed construction standards used in the construction of new facilities as well as the rehabilitation or rebuilding of existing facilities. These standards have been developed in conformance with all applicable national, state and local codes and meet the minimum standards of the NESC.

Together, these documents provide designers, engineers, construction personnel and others with the necessary information to specify and build distribution facilities to meet company, customer, and code requirements.

6.1.1 Overview of NESC requirements

The governing safety standard for distribution pole strength is the NESC. This code provides minimum design specifications to ensure public safety. It is not intended to be a design manual, nor is it intended to address issues other than public safety. A pole meeting the NESC requirements can be considered safe, but may or may not be the best solution from the perspective of economics or reliability.

The NESC defines three different grades of safety requirements depending upon the public safety issues related to a particular installation. These are termed Grade B, Grade C, and Grade N, with Grade B being the highest requirement. In general, the NESC requires distribution structures to meet Grade C construction except when crossing railroad tracks or limited-access highways (these require Grade B construction).

According to the NESC, a structure must be able to withstand loading due to combined ice buildup and wind (the ice adds weight and increases surface area exposed to wind). For the purpose of determining the loading calculations for safety when considering wind and ice, the NESC has three primary rules. Rule 250B addresses ice & wind, Rule 250C addresses extreme wind, and Rule 250D addresses extreme ice with concurrent wind loads.

Rule 250B “Combined ice and wind district loading” divides the United States into three loading zones termed heavy, medium, and light (also referred to Zone 1, 2, & 3). Exhibit 6-1 shows these zones. These zones determine the loading criteria for overhead line designs with consideration for combined ice and wind loads. The state of Texas includes all three zones, but CenterPoint Energy territory is completely located in the Light Loading Zone.

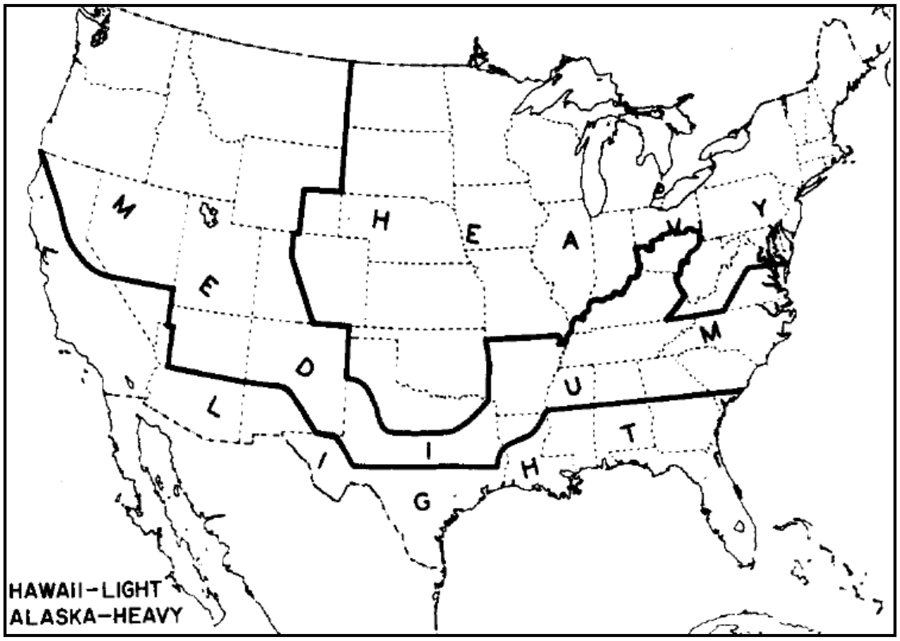


Exhibit 6-1: Overhead Line Loading Districts (NESC Figure 250-1)

Rule 250C "Extreme wind loading" provides extreme wind criteria to be considered in pole loading calculations. Exhibit 6-2 shows the extreme wind speed criteria of the NESC changed in 2002, and are now based on three-second gust speeds as opposed to one minute sustained winds as defined in earlier editions of the Code. It is important to note that only structures taller than 60 feet (18m) above ground or water level must meet these extreme wind criteria. Most distribution structures are not in this category.

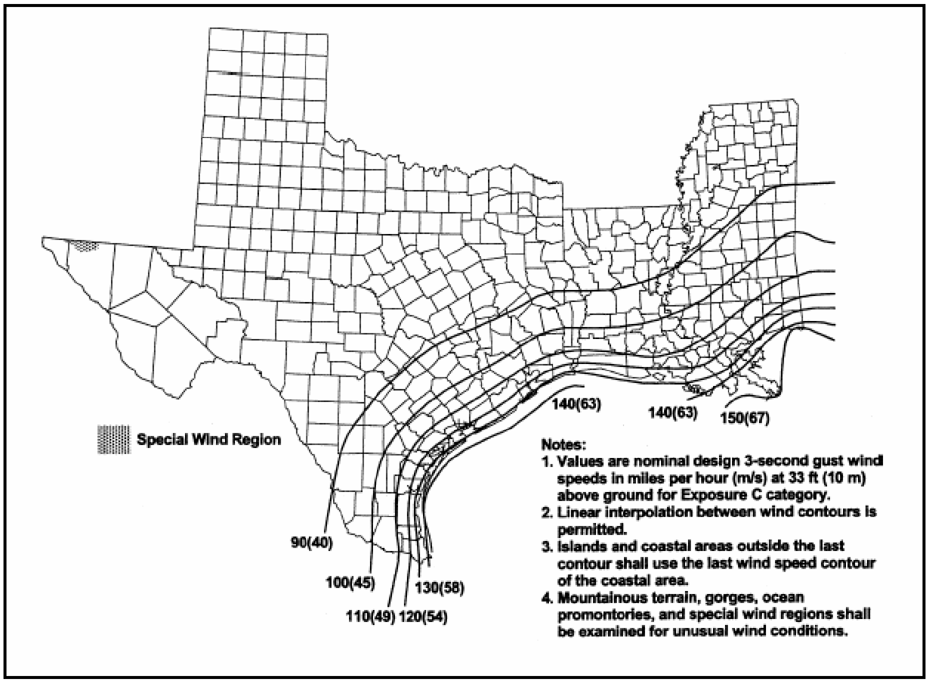


Exhibit 6-2: Basic Wind Speed Map (NESC Figure 250-2(c))

Rule 250D "Extreme ice with concurrent wind loading" was added in the 2007 edition of NESC. This rule addresses concurrent ice and wind load due primarily to freezing rain conditions as shown in Exhibit 6-3. Like Rule 250C, this is an "extreme" condition rule and as such does not apply to structures less than 60 feet above ground or water level. Again, most distribution structures do not come under this rule.

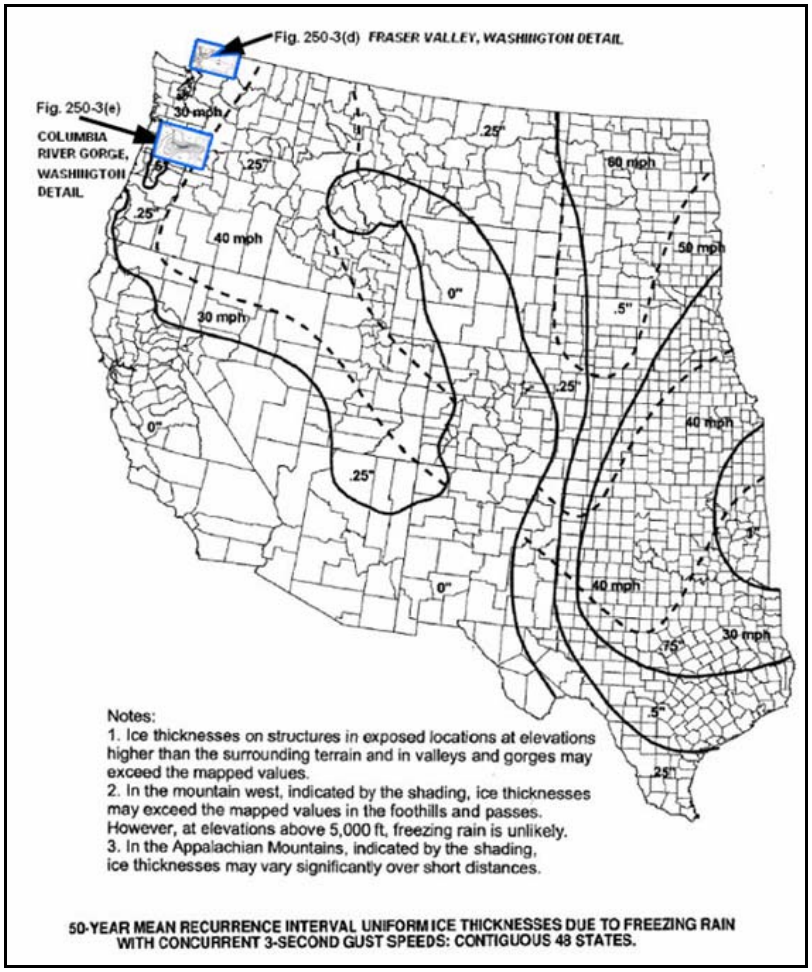


Exhibit 6-3: Uniform ice thickness with concurrent wind (NESC Figure 250-3(a))

Summary of NESC Requirements for distribution poles in CenterPoint Energy's Service Territory:

- Grade C construction is required for most distribution structures,
- According to the NESC light loading zone (which CenterPoint Energy is located), distribution structures must be designed for zero ice buildup and 60 mph winds,
- Extreme wind loading requirement for CenterPoint Energy territory (for structures more than 60 feet high) varies from 95 to 135 miles per hour, and

- Extreme ice loading with concurrent wind for CenterPoint Energy territory (for structures more than 60 feet high) is 0.5 inch radial ice and 30 mile per hour wind (Grade B) and 0.4 inch radial ice with 30 mph wind (Grade C).

6.2 Review of Design Standards and Practices

Standard distribution line design and construction at CenterPoint Energy is based on Grade C requirements. Grade B construction is also used, as required by the Code, for specific situations such as railroad crossing, limited access highway crossings, and navigable waterway crossings.

The Distribution Construction Standards manual defines the pole size to be used in a given construction situation. The manual contains pole sizing charts for Grade B and C construction as defined by NESC.

As mentioned earlier, structures of less than 60 feet above ground or water level are not required to meet the extreme wind or ice conditions specified in rules 250-C and 250-D of NESC. CenterPoint Energy stocks wooden poles in lengths between 25 feet and 70 feet. The only pole size that would be in excess of 60 feet (above ground or water level) would be the class 1 - 70 foot pole (assuming a pole embedment of 9 feet for a 70 foot pole). This would be the only instance where rules 250-C and/or 250-D of NESC would apply. By specifying a class 1 pole for all applications requiring a 70 foot pole, all NESC loading conditions are applied.

In normal work planning and design, division engineering personnel are responsible for designing all extensions, upgrades, or replacements of distribution lines. It is the responsibility of those personnel to adhere to Company standards in line design and construction. If situations are encountered that have unique or unusual requirements, the field personnel contact the engineering standards department for guidance and assistance in ensuring that appropriate design considerations are met. Both division engineering personnel and the standards department use a commercially available software tool that assists in the design of distribution lines. This tool performs structural, electrical, and clearance calculations to ensure all NESC codes and CenterPoint Energy standards are met.

In addition to electric facility design, a major consideration in pole loading is the addition of foreign utility attachments to the electric facility structures. The use of power poles by telephone, CATV, broadband and other communications providers is common practice in the industry with those providers being given certain rights of access to electric facilities by the Federal Communications Commission. The addition of communications cables to power poles can have a significant impact on total pole load, to the extent that safety margins are sometimes consumed or exceeded by the additional facilities.

In order to ensure that poles are adequate for the addition of such cables, CenterPoint Energy has in place an application process that communications companies follow to request attachment to poles. This process includes detailed load analysis of the poles in question to ensure appropriate strength capacity is available. If not available, the pole is typically changed to a larger size to accommodate the additional equipment. CenterPoint Energy uses a contract engineering firm to perform the pole loading analysis.

6.3 Pole Inspection & Maintenance

CenterPoint Energy has had a wood pole inspection and maintenance program in place for a number of years. This program is consistent with those found throughout the industry and includes a Company standard for inspection, treatment, reinforcement, and replacement. CenterPoint Energy’s specifications for inspection and treatment of in-service wood poles are well documented and consistent with both NESC and ANSI guidelines, which are the governing standards for pole strength and suitability for service.

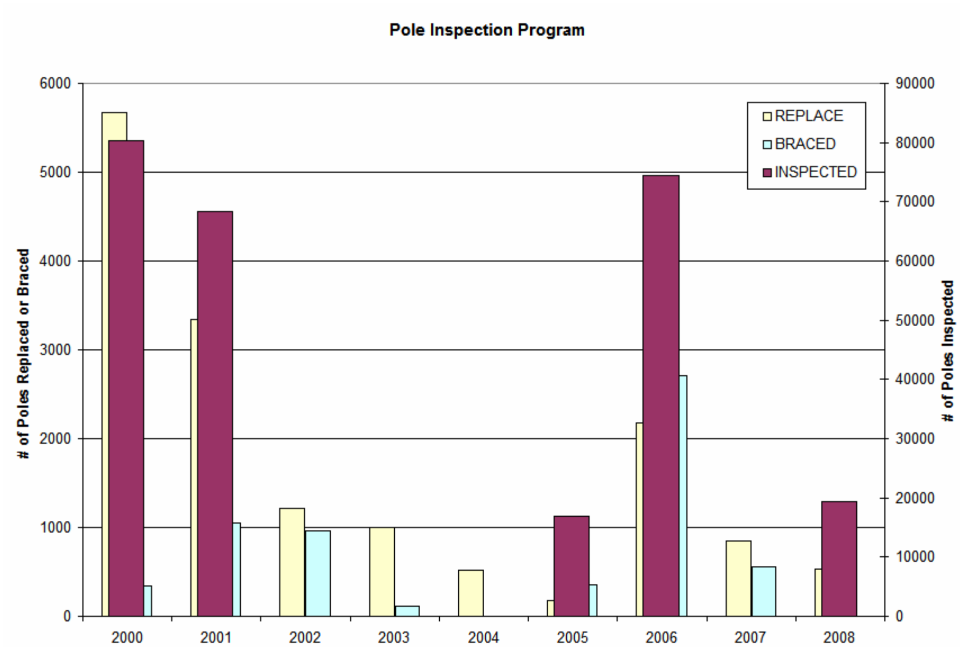


Exhibit 6-4: Pole Inspection Program

CenterPoint Energy uses a combination of CenterPoint Energy crews and outside contractors to inspect, treat, and replace poles. As seen from Exhibit 6-4 there were a few years where little pole inspection was done. It is interesting to note, that the number of poles braced or replaced was fairly uniform. In year 2004 and 2005 was the amount lower and it was increased in 2006 to compensate.

6.4 Vegetation Management

The vegetation management program at CenterPoint Energy is typical of programs found in most electric utility companies including the challenges most companies face in program funding, cycle schedules, and resource management. In recent years CenterPoint Energy has made (and continues) a concerted effort to put the vegetation program on a regular trim cycle trim based on reliability indices. Circuits are ranked based on vegetation and wind caused outages. Those circuits with the highest outages are then scheduled for trimming. All circuits are reviewed within a 3 year cycle for 35 kV lines and a 5 year cycle for 12 kV lines.

Exhibit 6-5 illustrates vegetation dense areas within CenterPoint Energy's service territory. High vegetation densities in the same area as high electrical equipment create challenges for the utility in both routine operations and maintenance and particularly in storm conditions (these locations are illustrated by Exhibit 6-6, darker green indicates a higher percentage of vegetation). High numbers of tree related outages are often experienced during stormy weather, often caused by trees outside of the utility trim zone and therefore, essentially out of the utility's area of influence or control. Most utilities are challenged to balance the need for vegetation maintenance for system reliability with the public's desire for large and dense areas of vegetation for aesthetics.

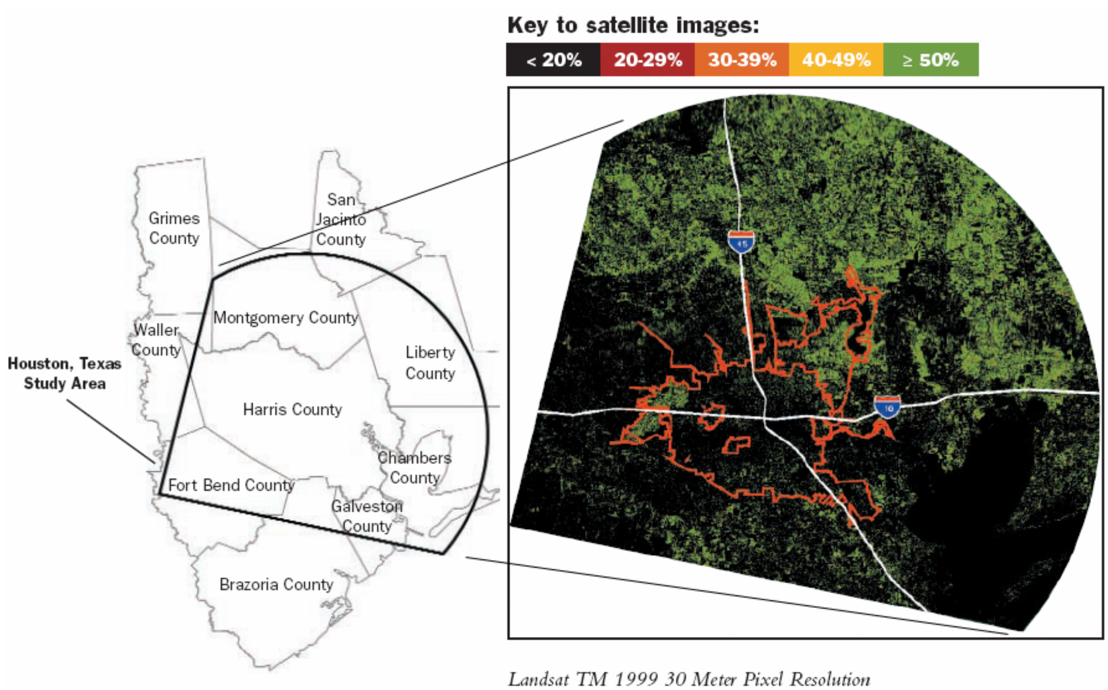


Exhibit 6-5: Houston, Vegetation Density[20]

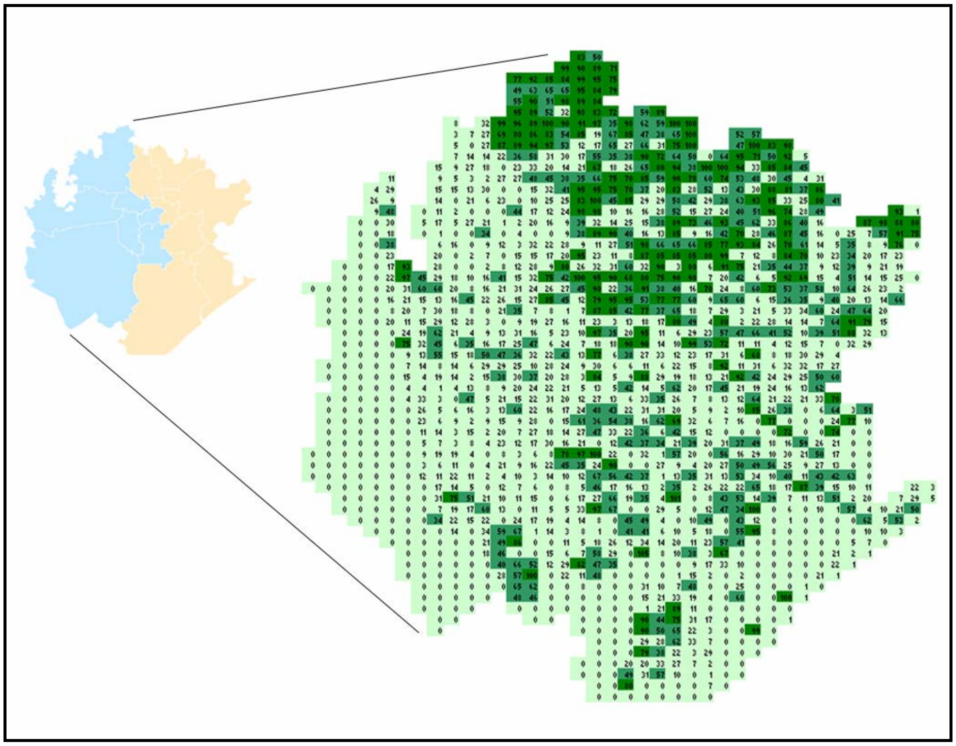


Exhibit 6-6: CenterPoint Energy System Vegetation Density

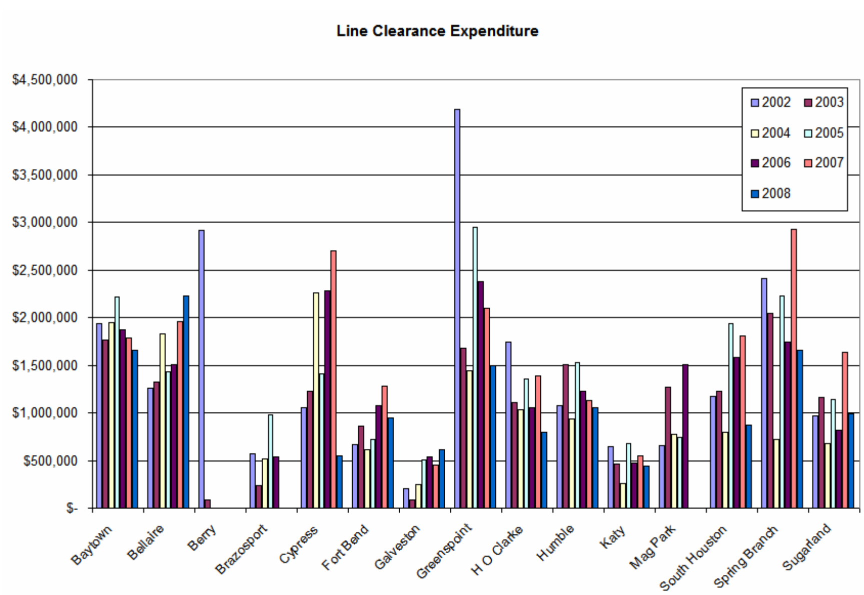


Exhibit 6-7: Line Clearance Expenditure by Service Center

Exhibit 6-7 shows the total line clearance operations expenditure by service center. The amount spent in each service center varies due to the size of the service center and the amount of tree coverage near the distribution lines.

Note: Berry, Brazosport, and Mag Park Service Centers were merged with other areas between 2002 and 2008.

6.5 Distribution Line Equipment Maintenance

As part of its efforts to improve system reliability and overall system integrity, CenterPoint Energy has begun a structured distribution circuit inspection program. The company has routinely performed inspections and maintenance on various components of the distribution system. Pole inspections and vegetation maintenance previously discussed are two examples.

The distribution equipment inspection process is broken down into three main categories: Overhead (OH), Underground Residential Distribution (URD), and Major Underground (MUG).

Primary sources that initiate OH equipment inspections are:

1. 10% Circuit Analysis – circuit indices are monitored and circuits are selected for in-depth analysis based on outage history,

2. Infrared Analysis – completed on a five year cycle on all major equipment. All connectors, mechanical parts, switches, transformers, and capacitors will be viewed for hot-spots, and

3. Fuse Outages – monitored for the number of times it operated. If a fuse operated three times in 90 day period or four times in 12 month period, an action report is generated and sent to service center. Service Center generates a work order to inspect the equipment.

URD inspections are primarily driven by the following sources:

1. Loop Equipment Failure – if a loop experiences three equipment failures in a 12 month period, a work order is generated to inspect the cable and equipment, and

2. Fuse Outages – monitored for the number of times it operated. If a fuse operated three times in 90 day period or four times in 12 month period, an action report is generated and sent to the service center. Service Center generates a work order to inspect the equipment.

MUG equipment has an inspection cycle of six months to five years. Equipment and cables are visually inspected and relays are tested.

6.6 Conclusions

6.6.1 KEMA analysis has found that CenterPoint Energy has adequate standards in place to ensure that pole loading and line design meet the appropriate criteria as defined by NESC.

As the primary purpose of this study has been to evaluate CenterPoint Energy's practices as they relate to severe storms and potential storm damage, our review has not found any indication of design standard or process deficiencies that might have contributed to the extent of damage experienced during severe weather in 2008.

6.6.2 The use of software tools to calculate loading of poles creates consistent designs across CenterPoint Energy territory.

In using these design tools, all division engineering and standards engineering personnel apply the same rules and calculations to all distribution projects.

In summary, KEMA finds that CenterPoint Energy's design practices are consistent with normal industry practices.

7. Reliability and Impacts

Weather hazards can have a profound impact on electrical service. As shown in Exhibit 7-1, in recent years there has been a relative increase in hurricane related damage. In general a larger category storm will show an increase in the extent of damage (due to the limitations of the Saffir-Simpson scale as elaborated on in Storm Measurements this will not always correlate as is clearly illustrated by the damage Ike inflicted), Exhibit 7-2 illustrates this relationship. Ike was by far the most costly hurricane for the U.S. in 2008 and will likely go into the record books in the top 5 costliest hurricanes in U.S. history, possibly in the top three[21].

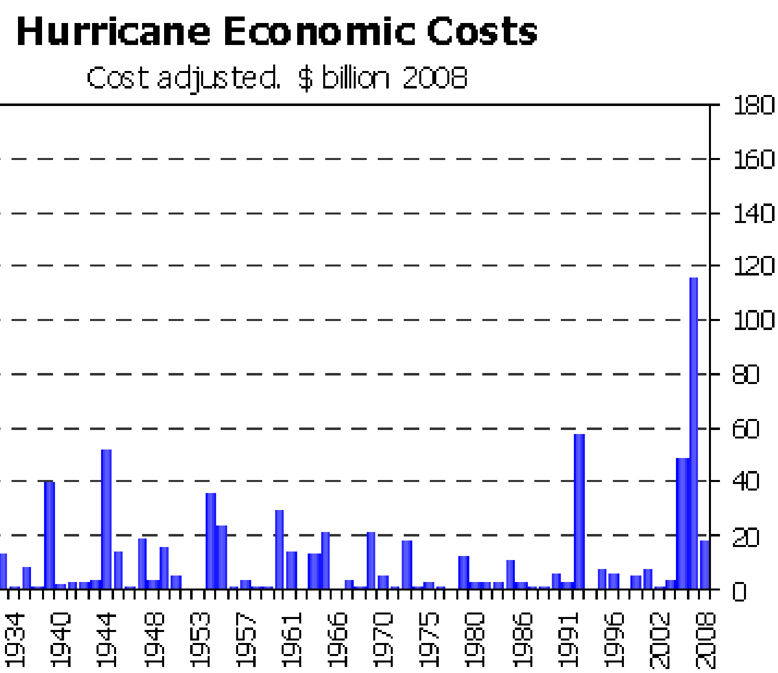


Exhibit 7-1: Hurricane Related Economic Adjusted Costs[22]

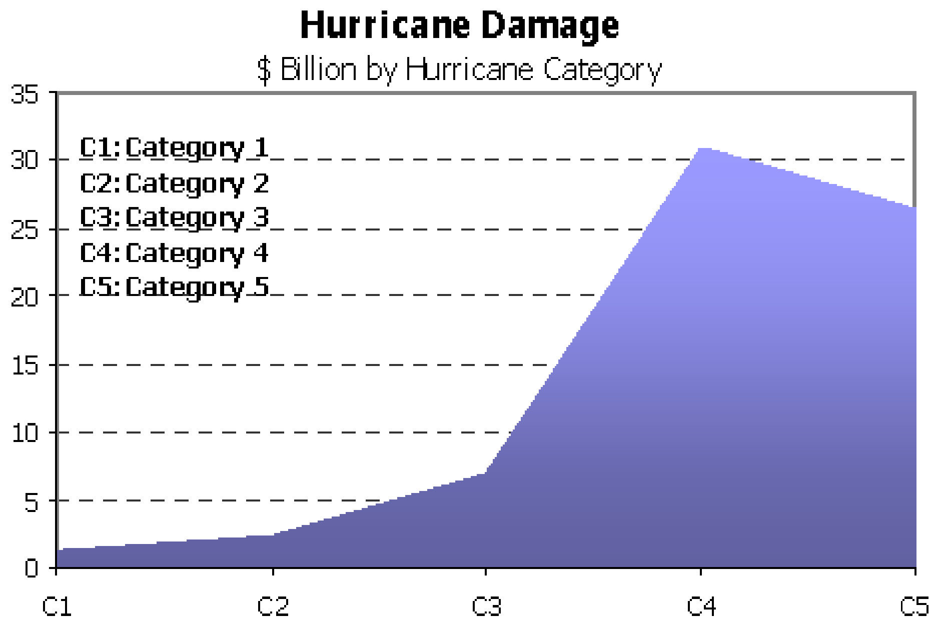


Exhibit 7-2: Hurricane Damage by Saffir-Simpson Category[23]

Note that metrics and statistics as reported here are unofficial and are based on unedited and unfiltered outage data. A portion of the momentary interruptions (momentary interruptions are normally defined as events that were restored within five minutes) that occur on CenterPoint Energy's system are tracked, these have been excluded for this analysis. Scheduled outages have been excluded. Outages are typically reported in terms of customer based indices.

Exhibit 7-3 illustrates the amount of sustained outage events over the past several years; 2008, although only reported through October, shows a noticeable increase compared with prior years due to the contribution of Hurricane Ike related events. Outage events often show a positive linear strong correlation with the system average interruption duration and frequency indices (SAIDI and SAIFI respectively). Major events are excluded by utilities for reporting purposes and therefore would not contribute to SAIDI and SAIFI; however, this comparison is still telling as to the relative magnitude of electrical outage event contributors.

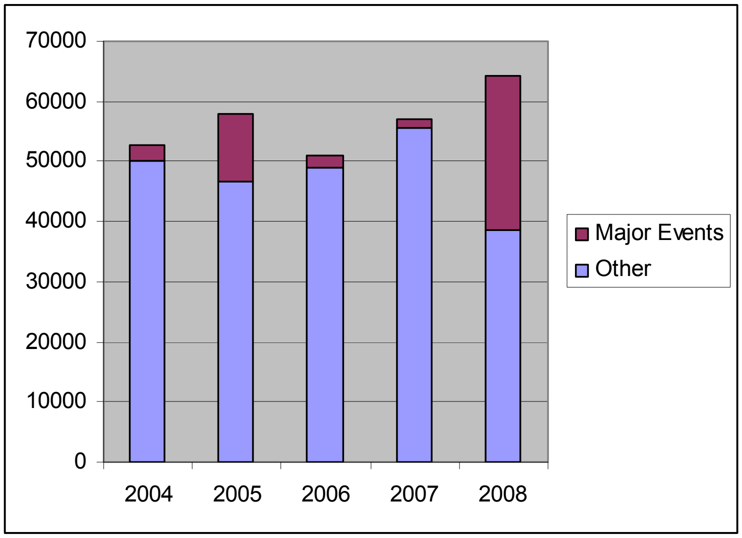


Exhibit 7-3: Interruption Events by Year

Exhibit 7-4 shows the layout of CenterPoint Energy's typical geographical operating areas (blue and yellow) along with the locations of Staging Sites (red) for reference purposes.

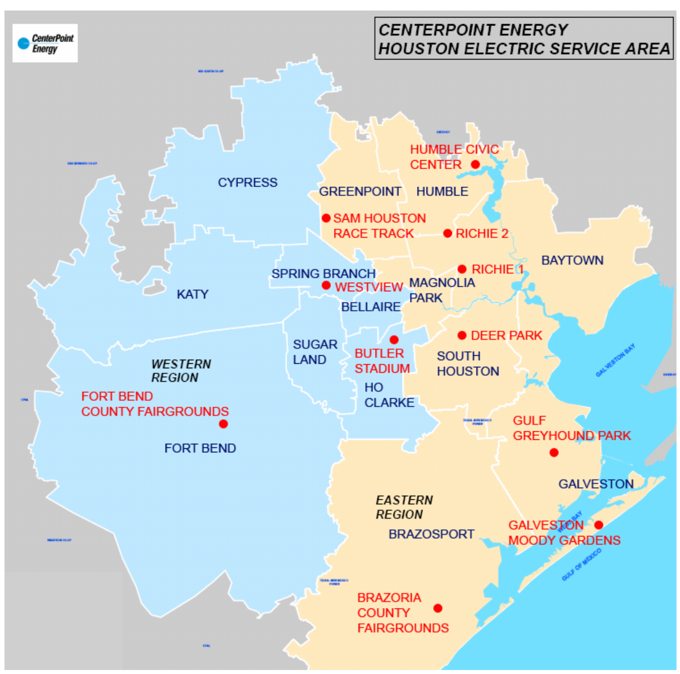


Exhibit 7-4: Service Areas and Staging Sites

Exhibit 7-5 shows outage events by service area, higher areas may not necessarily be poorer in terms of reliability as the exposure and customers is not constant across service areas.

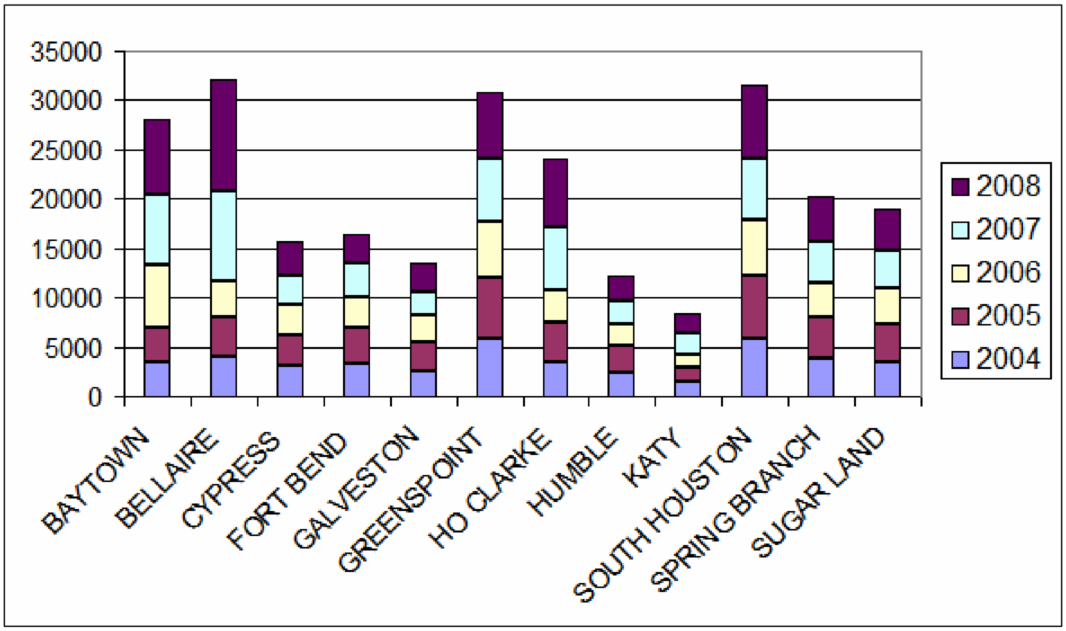


Exhibit 7-5: Interruption Events by Service Area by Year

Exhibit 7-6 shows the number of total customers that experience a sustained outage this is analogous to the frequency of outages. This includes outages due to major events (only planned outage events are excluded). Aggregated customer interruptions by year show a strong linear correlation to the number of outage events (correlation coefficient of .85). This simply implies that the on average the amount of customers experiencing an outage per outage event on average is fairly consistent.

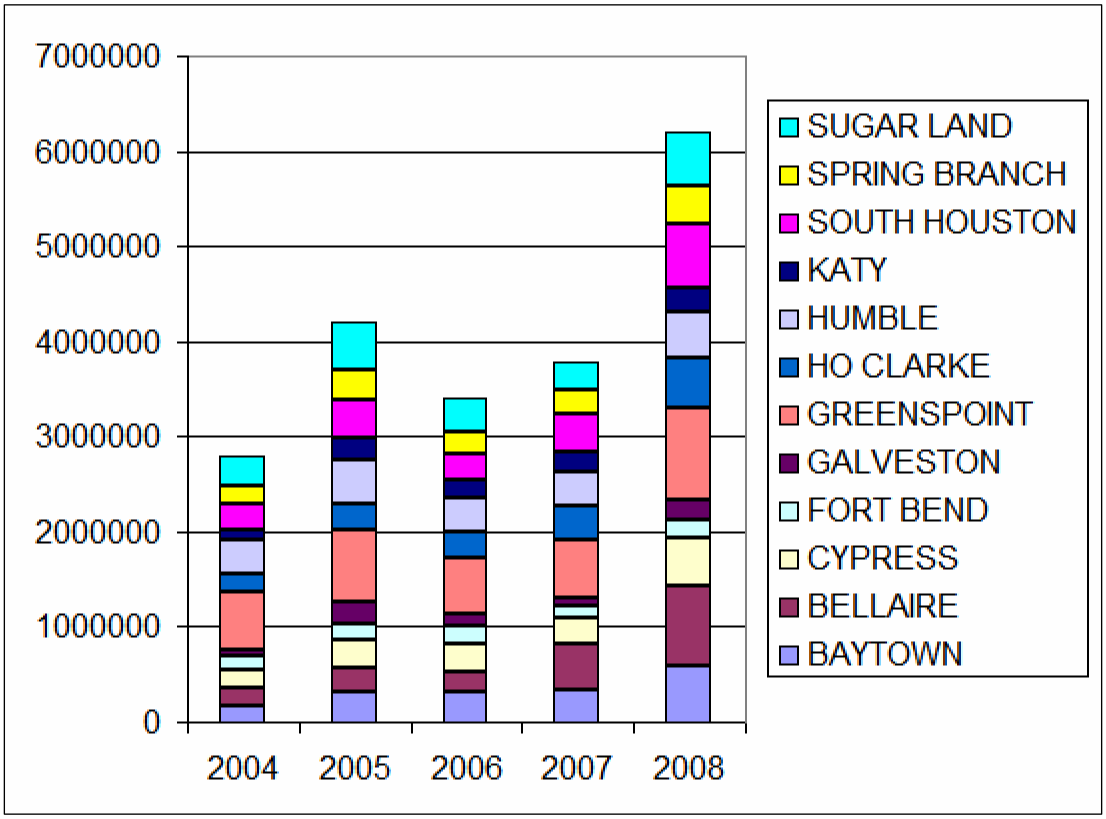


Exhibit 7-6: Interrupted Customers by Year by Service Area

To more clearly illustrate the impact of Ike on the various service areas refer to Exhibit 7-7 Interruption Events, Major Events by Service Area. Depending where along the circuit the outage event has occurred the amount of impacted customers will vary. Outage events near the end of feeders or on laterals may have less of an impact compared to outage events that happen along the backbone of the feeder depending upon circuit protection.

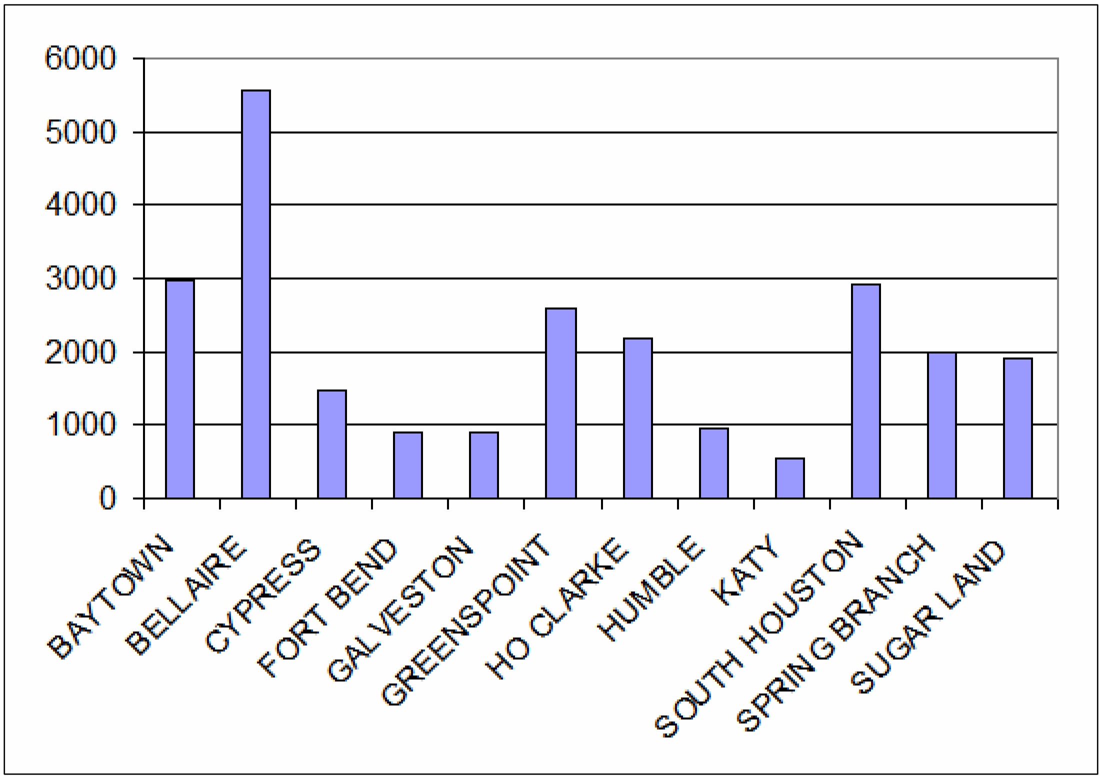


Exhibit 7-7: Interruption Events, Major Events by Service Area

7.1 Conclusions

7.1.1 Outside of the Galveston area, the damage occurred where there was a nexus of customers, trees and distribution lines.

Exhibit 7-8 show outage and customer count, vegetation coverage, primary wire length, and service area size normalized to a common scale. The service centers that exhibit the highest combination of these factors (customers, vegetation, and wire) are Greenspoint, Bellaire, Baytown, and South Houston (in order). Ike tracked on the eastern side of CenterPoint Energy territory where a majority of damage was caused by wind-blown debris and storm surge flooding. The Service Centers that had the highest outages were Bellaire, Baytown, South Houston, and Greenspoint (in order).

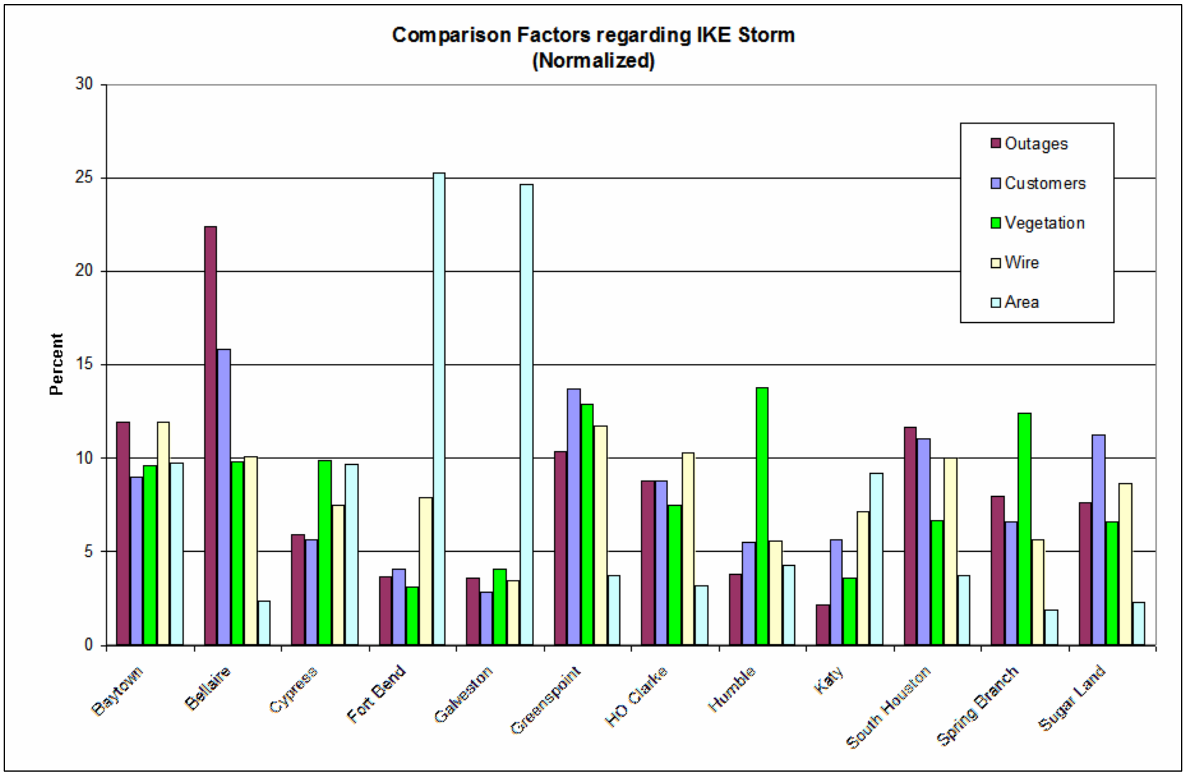


Exhibit 7-8: Normalized Data by Service Area

8. Project Area – Emergency Planning Management Structure

8.1 Industry Practices

Restoration plans always include an organization design. First and most prevalent type of organization is the Emergency Operations Center (EOC). The second is the Incident Command Center (ICC).

The EOC's organization is generally divided into three primary areas; the strategic central command, the tactical service center, and executive management. The strategic central command is generally named the EOC and is primarily responsible for:

- Determining the size of the restoration or the level of damage and is set after a preliminary damage sweep is completed,
- Setting the overall restoration target, which is the internal length of time it will take to restore all customers, generally this is set as a range or an overall number of days or weeks,
- Determining and obtaining the appropriate number of line, tree and other crews required to complete the restoration work within the target set,
- Providing the logistical support to house, feed and transport foreign crews during the event,
- Ensuring all restoration materials necessary are available and delivered to the crews,
- Balancing the restoration effort across the impacted service area, so as to return service to all areas at about the same time,
- Keeping senior or executive management informed of the progress of restoration and any special needs which require executive approval, and
- Providing updated restoration times and other progress information to all the customer and government facing organizations.

The tactical service centers take their general direction from the EOC and the emergency restoration plan (ERP). This group is responsible for prosecuting the actual restoration, which includes:

- Setting the circuit restoration priorities based on previously established corporate guidelines, these may be reviewed with local governments,
- Performing the damage assessment used to refine the restoration times and determine the specific requirements for restoring service,
- Planning the restoration effort,
- Assigning crews to specific substations or circuits,
- Integrating foreign crews with the in-house crews to efficiently work the restoration,
- Ensuring tree crews are ahead of line crews to clear the work areas of major tree obstacles,
- Ensuring the order of restoration is followed; backbone (feeders), laterals and then services,
- Coordinating with local public safety and other local government units to aid in the efficient restoration of power,
- Managing the restoration in their local service areas,
- Reporting to the EOC the progress and special requirements, and
- Ensuring the safety of the crews and the general public.

The third group, executive management, while not directly involved in the details of the restoration has the following critical activities:

- Ensuring the operation's organization has all the people, equipment and materials needed to effectively conduct the restoration,
- Managing the political aspects of the restoration and dealing with any inquiries that will likely arise as the restoration progresses,

- Making proactive media announcements with advice from the EOC and the company's media organization, and
- Providing the overall direction and keeping morale up within the company, as these events really exact a large toll on the workforce.

The second organizational type is much newer and has been adopted and promulgated by Homeland Security is the Incident Command Center structure (ICC). The essence of the ICC is to have a fully defined command structure, which is common across all businesses and government agencies. One title in one entity means and does the same thing as the same title in another entity. Further, the ICC can expand from a very small operation, such as a house fire with the fire department personnel in charge, to a very large natural disaster encompassing many different agencies and businesses and moving the ownership to the local, state or federal level. The common naming convention allows individuals in other agencies to identify their counterparts elsewhere. To date, only a few utilities have adopted this structure, as the EOC structure meets all their requirements and allows them to effectively interface with local and state EOCs.

8.2 CenterPoint Energy Practices

CenterPoint Energy's EOP management structure is the most granular that KEMA has examined to date, providing for unique focuses on each of the key areas. As shown in Exhibit 8-1, CenterPoint Energy's EOP structure approximates the EOC form, but with some differences. There are several layers, which include:

- CVal – Central evaluation, which is comprised of the executive management team,
- DVal – Distribution evaluation, which is comprised of the distribution line operations, engineering, staging area management, and dispatch functions; specifically the EOP identifies the following participants:
  - Division Operations Vice President,
  - Operations Supervisor,

- Director Distribution Support and Metering,
- Director Projects Management,
- Logistic Network Manager,
- Staging Site Supervisor, and
- Administration Support

- TVal – Transmission evaluation includes transmission line and engineering functions,
- SVal – Substation evaluation includes the substation functions and the RTO which controls the substations,
- UVal - Major Underground Evaluation Center – Responsible for the assessment and restoration of all three phase major underground facilities, and
- Service Area Centers – which perform the actual distribution restoration efforts.

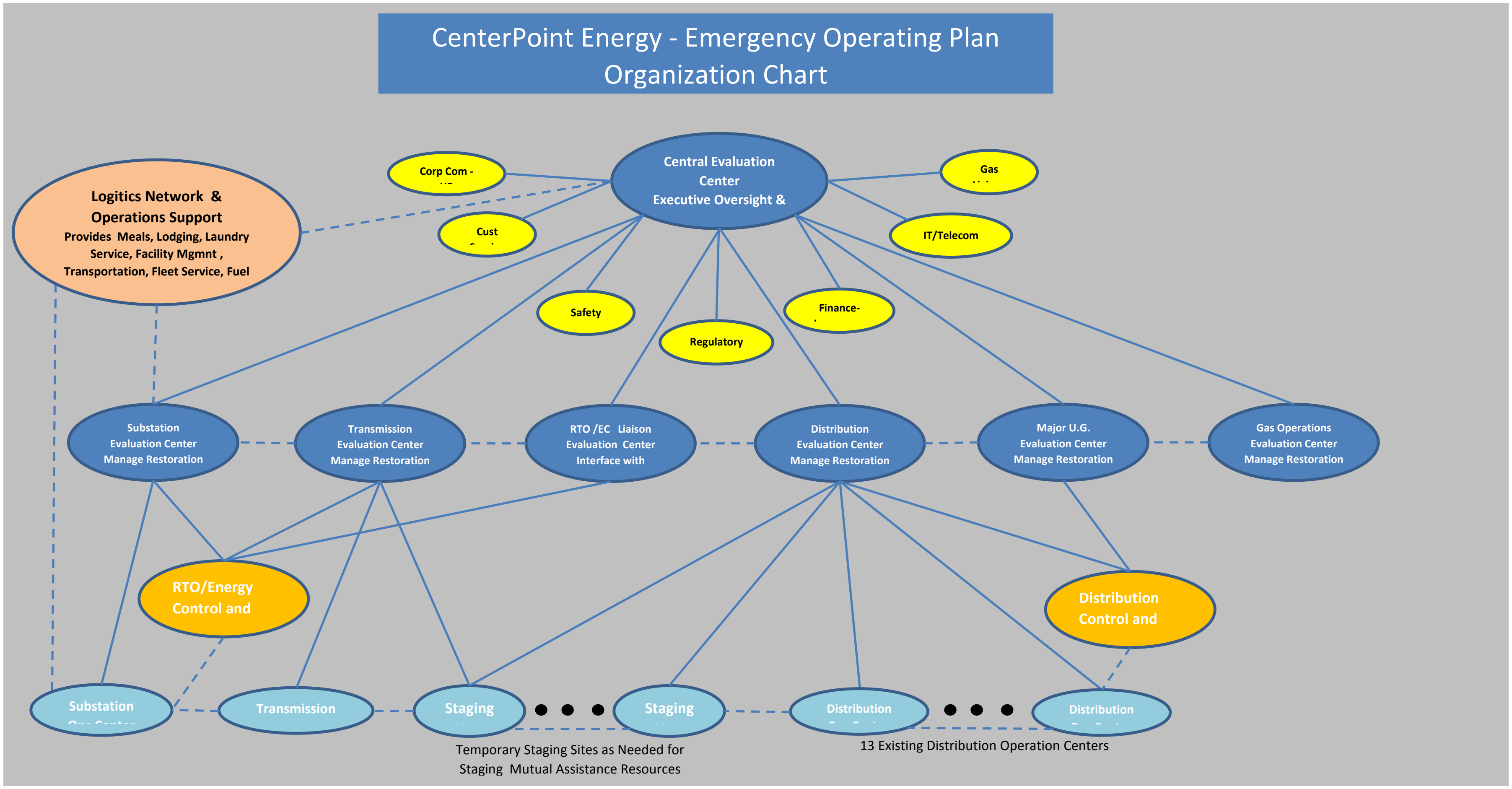


Exhibit 8-1: CenterPoint Energy's EOP Organization

8.3 Conclusions

8.3.1 CenterPoint Energy's EOP Structure is a Leading Practice

CenterPoint Energy's EOP structure, represented by the four entities (DVal, TVal, SVal, and UVal), is a strong organization design and is in KEMA's opinion a leading practice. Each of the four lower evaluation groups; transmission, substation, distribution and underground are designed to control the restoration of their respective areas managing highly specialized and different workforces. In a recent KEMA study, another utility initially didn't have this design and had to create a transmission group to focus on the extensive damage to their transmission system, while the remainder of the company focused on the distribution restoration.

The one key difference with this other utility was that the transmission function was subordinate to the distribution EOC. In essence, collapsing the EOC organization around the distribution function and eliminating the need for a CVal group. Furthermore, in other systems, the damage to transmission and substation is usually minimal making DVal the most critical element and potentially creating a one over one reporting relationship with CVal.

One of the reasons for creating this structure at CenterPoint Energy was to separate senior management from the tactical side of the restoration effort. This is a generally accepted practice by most electric utilities. In this manner, senior management can provide both a buffer and strategic eye over the entire restoration effort without getting involved in the fine details. Senior management provides a buffer between outside interests, which may seek to have one area restored first over another and the line management directing the local restoration. Senior management also asks the critical questions which keep the EOC (in CenterPoint Energy's case, DVal) focused on returning the maximum number of customers as quickly as possible.

As for their part in the restoration, Service Area management performs the restoration according to the EOP and the local circuit priorities established well in advance of the event. On occasions DVal will reallocate resources from one service area to another to ensure a balanced restoration effort. Reallocation should be done in a planned fashion, which allows crews to complete their current work before moving to the new area. Planned reallocation allows for efficient work planning, logistical and materials support to be also simultaneously reallocated.

8.3.2 CenterPoint Energy's EOP Organizational Structure is Complex

To overcome the complexity of the organization, CenterPoint Energy established an EOP advisory council to gain broader integration and acceptance throughout the company. It is a more common and simplified approach for a utility's EOP organization to be part of the energy delivery business unit than a planning or engineering group.

9. Emergency Restoration – Annual Plan

The ability to respond to any type of emergency begins with capability planning. In the electric utility industry, system damage due to weather or other natural causes is the most common emergency. The ability to respond efficiently and effectively to widespread system outages is a direct result of comprehensive planning and training for such an event.

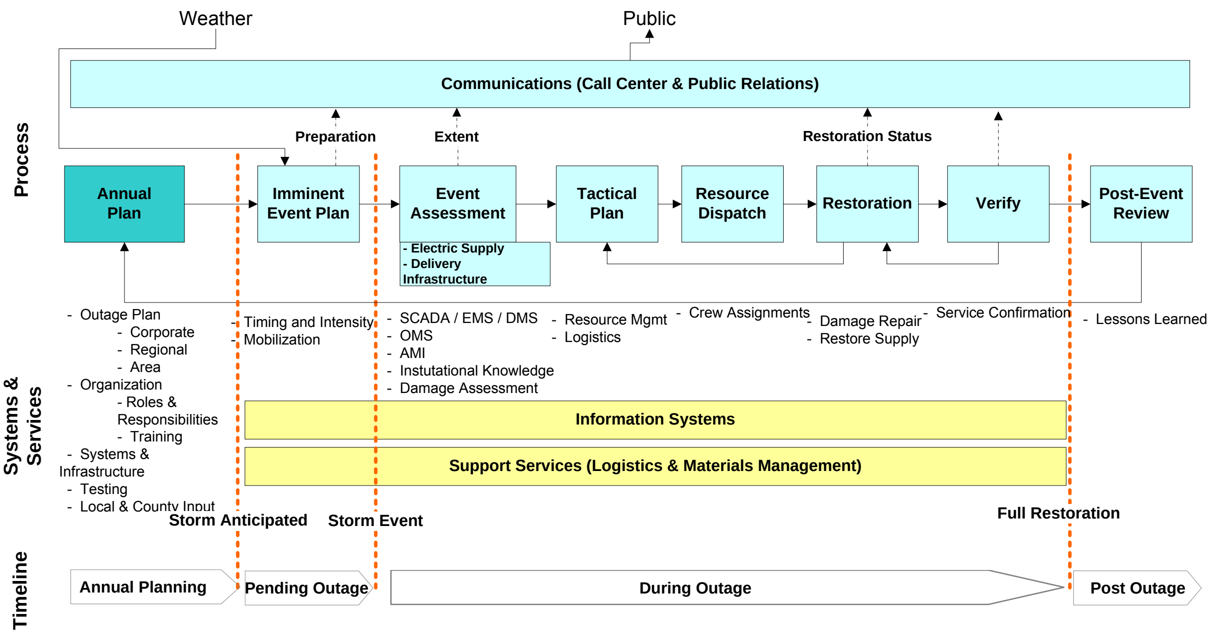


Exhibit 9-1: Outage Management Process – Annual Plan

9.1 Industry Practices

Throughout the electric utility industry, companies routinely review and update emergency response plans (ERP) on an annual basis. Generally, the responsibility for managing these plans is assigned to a specific person or group located in the T&D operations function. Depending upon the type of emergencies to be handled, annual planning may involve detailed personnel training and drills with emergency simulations. Annual planning by leading utilities includes the review and incorporation of improvements resulting from previous event experience, also from the experience of other companies learned through various industry committees and working groups.

The leading practice in the industry is to incorporate the various event levels into the EOP so as to indicate the most appropriate action for a given level of sustained damage. One such example is to incorporate a restoration island procedure when there is significant system damage. The restoration island area is typically a substation and its feeders or a specific feeder (and no smaller than a single feeder). Potential restoration islands are determined by operations management in conjunction with the EOC. One field supervisor will be assigned to manage all the restoration activities inside the restoration island boundaries. This concept is discussed later in this section.

9.2 CenterPoint Energy Practices

Consistent with industry leading practices, CenterPoint Energy modifies and updates the Emergency Operations Plan (EOP) on an annual cycle. Lessons learned from events during the previous year, as well as potential improvements from other sources, are incorporated as improvements into the EOP. Updates can emanate from the EOP Coordinator or EOP Council, which is represented by management from all parts of CenterPoint Energy's business.

9.3 Conclusions

9.3.1 CenterPoint Energy's EOP provides a consistent approach for responding to small and medium sized events.

As highlighted above, CenterPoint Energy's EOP structure, which represents the four entities (DVal, TVal, SVal, UVal), is a strong organization and offers what KEMA would consider to be a leading practice. This is a good structure for responding to events of most sizes if executed properly. Each of the four lower evaluation groups; transmission, substation distribution and underground are designed to control the restoration of their respective areas managing highly specialized and different workforces.

The intent of the EOP is to define consistent emergency procedures for the Company, which should provide a consistent and uniform approach to the public. As written, the plan defines the roles and responsibilities of personnel and leaves specific actions to the individuals. The plan implies the following specific guiding principles for all CenterPoint Energy actions:

- Offers an approach based on the use of the Company's outage management system for dealing with small and medium sized events,
- Identifies broadly various emergency levels, but is not directly scalable beyond small and medium sized emergencies
- Ensures employee and public safety, and
- Maintains environmental stewardship.

9.3.2 The current EOP would benefit from expanded storm definitions.

The leading practice within the industry is to categorize events and tailor the appropriate response for each category. Generally, there are at least three levels of emergency conditions defined using any combination of the following descriptors:

- Number of customers without service,
- The amount of time estimated to restore all customers, and
- Estimated level of damage.

Exhibit 9-2 shows one company's approach to defining specific categories. In each category, management has gone to great lengths to define clearly the weather conditions that apply including the impact to their service territory in the form of the projected number of customers impacted and projected restoration time. This level of specificity, allows them to make more informed judgments about what is likely to happen so that appropriate restoration decisions and actions can be planned.

Storm Category & Resource Requirements	Typical Weather Conditions	Projected Number Customers Affected	Estimated Restoration Time
1 - Upgraded (Regional resources)	• Thunderstorms, rain and moving fronts • Moderate to sustained winds • Moderate frequent gusts • Condition is short to mid term • Light to moderate damage to electric system • Moderate wet snow	Up to 7,000	8-12 Hours
2 – Serious (Other Company Resources)	• Heavy thunderstorms, rain • Strong sustained winds • Strong frequent gusts • Condition exists for several hours • Heavy damage to electric system • Heavy, wet snow	Up to 15,000	12-24 Hours
3 – Serious (Foreign Resources)	• Severe thunderstorms, Extremely heavy rains • Strong sustained winds • Severe frequent gusts • Condition exists 12-18 hours or longer • Extensive damage to electric system • Heavy, wet snow	Up to 40,000	1-2 Days
4 – Full Scale	• Nor'easter type storms, heavy rains • Strong sustained winds • Severe frequent gusts • Tropical storms • Condition exists for 6-12 hour	40,000-60,000	2-3 Days
5 – Full Scale Coastal Storm	• Hurricanes Category 1-2 • 25-50% Damage to distribution system • Condition exists for 12 hours	60,000-80,000	$\leq$ 1 week
	• Hurricane Category 3-5 • >50% Damage to distribution system • Condition exists for >12 hours	>100,000	> 1 week

Exhibit 9-2: Leading Practice for Storm Definition[24]

Exhibit 9-3 shows CenterPoint Energy's definitions of storm categories, which is reasonable but excludes expanded descriptions of severe hurricane level storms (STORMCON FOUR).

Category	Level Of Activation	Event Forecast Lead Time Guide
I (A system-wide emergency)	STORMCON ONE	Tropical depression formed in location favorable for strengthening and system has movement towards Texas/Louisiana coastline; or Siberian breakout or strong arctic fronts heading to Texas. Impact 4-5 days.
	STORMCON TWO	Conditions favorable for strengthening to tropical storm within 12 hours or storm named and predicted to enter Gulf of Mexico, landfall for Galveston or Freeport within 10% range; or Arctic or Siberian breakout forecast below freezing temperature and freezing precipitation. Impact projected within 72 hrs.
	STORMCON THREE	Storm named and conditions favorable for intensification; Hurricane Watch issued; landfall probabilities for Galveston or Freeport rose to 13-18% range; or Arctic or Siberian breakout with below freezing temperatures and freezing precipitation, Winter Storm Watch issued. Impact within 48 hrs.
	STORMCON FOUR	Hurricane Warning has been issued, landfall probabilities for Galveston or Freeport increased to 35-45%, Galveston access restricted within 12 hours; or Winter Storm Warning issued, freezing rain with temperatures below freezing predicted with icing of bridges and roads. Impact within 24 hrs or less.
II (An ERCOT system emergency affecting the generation supply and transmission system only OR an emergency affecting a major portion of the transmission system)	STORMCON THREE or Condition Three	Transmission Control notification of event and seriousness of event.
	STORMCON FOUR or Condition Four	Based on Transmission Control's projected seriousness of event and time of impact.

Category	Level Of Activation	Event Forecast Lead Time Guide
III (A system-wide distribution emergency affecting both Regions or major event)	STORMCON TWO STORMCON THREE STORMCON FOUR	Severe weather showing on radar or lightning detection system and conditions favorable for formation of tornadoes with impact on region or service areas within 4 hours. Very severe lightning, high winds and tornadoes sighting verified by radar or visual reports with impact on region or service areas within 2 hours. Severe lightning, tornadoes on the ground, significant service interruption being recorded; or major flooding occurring in underground parking facilities and vaults, Medical Center and downtown areas.
IV **Localized** (Localized damage to the distribution system or a major event effecting two or less Regions OR localized damage to a substation or transmission system OR facility disaster)	STORMCON TWO STORMCON THREE STORMCON FOUR	Conditions more localized in nature.
V **Crisis Management** (Facilities rendered partially or totally uninhabitable OR threat received probable or imminent**)**	Condition Green – Red	Low Risk – Severe Risk

Exhibit 9-3: Determinants Applied to Emergency Definitions and Event Levels

CenterPoint Energy's approach to defining storm levels centers on after the fact determinants; affected areas and to a lesser degree, the resources determined necessary to restore electricity.

Before the events of September 2008, the only recent storm to affect CenterPoint Energy's territory was Hurricane Rita, which was a category 2 (at landfall) storm in 2005 (the next most recent storm was Hurricane Alicia, which was a category 3 storm in 1983). Although Hurricane Rita was a sizeable hurricane, the damage incurred was more isolated than the widespread destruction to the distribution system experienced with Ike.

9.3.3 CenterPoint Energy would benefit from additional checklists in the EOP to support a deeper resource pool for restoration.

The leading practice in the industry is to have comprehensive checklists for each position identified in the emergency restoration plan (ERP). As employee turnover occurs throughout the organization, additional checklists would benefit new personnel who do not have experience with a restoration effort. The purpose of the individual checklist is to serve as a tickler to remind the individuals assigned to those positions the actions and decisions they are responsible for implementing. It is important to remember that emergency plans are only implemented infrequently and as such roles and responsibilities can become blurred without regular use, even with annual drills. The most comprehensive plans incorporate multiple checklists per position. Generally, this includes; a pre-event list to get ready, during event list for the key activities needed to support the restoration, and a post list to permit proper closeout of the function.

Although CenterPoint Energy had the vision to determine appropriate EOP actions and milestones in response to a day or night time landfall, as shown below in Exhibit 10-3 and Exhibit 10-4, there were insufficient checklists, whether manual or technology-based, that would have assisted with the EOP execution.

Emergency response role employees are asked to perform unusual tasks on short notice during periods of potential stress. A role-specific checklist ensures the employee completes all expected tasks, obtains all information needed, and provides proper feedback to customers and other stakeholders.

9.3.4 CenterPoint Energy Performed Hurricane Drills and Training.

Leading practice is to have annual drills and training session for the key functional areas defined in the ERP. Drills scheduled near the start of the storm season offer an excellent means to get employees thinking about their roles and how they will function during an actual event. Training allows new and existing employees to review in detail their roles and responsibilities and in the case of damage assessors permits them to review how to adequately define the field failures and provide useful information for the crews and management. In one utility the training is scheduled multiple times at multiple locations during the period just prior to the storm season and individuals are assigned to attend and records are kept.

CenterPoint Energy performed annual hurricane drills and training for personnel assigned to EOP roles, although the training was not part of a formal system of training evaluation and lacked measurement or analysis. However, the training CenterPoint Energy provided to its FCCs was successful as evidenced by their safety record managing approximately 11,000 mutual assistance and contractors during the restoration process.

Because emergency response roles may be different from normal assignments, participation in the annual one day hurricane drill is important to future events attendance. Because emergency response roles are assumed on short notice and with limited time for preparation, checklists, supporting technology, and other tools and aids should be available for employees.

9.3.5 CenterPoint Energy management recognized the EOP did not include a restoration island concept and rapidly adjusted the restoration execution.

Despite the fact that the EOP identified different categories of events, it didn't incorporate the different levels of response necessary to support the identified categories.

In severely damaged distribution systems, the usual approaches to restoration don't apply. Instead the leading practice is to carve out small manageable sections of the most severely damages areas and assign them to an individual with the crews necessary to restore. Then working from the substation out, begin repairing the mains (backbones) and getting them hot to the first switch or tie point. Then work the laterals, followed by the secondaries, usually a small crew. The important element is that this one individual controls the entire restoration effort for this island and all clearances are funneled though him. He then communicates with the dispatch function to gain or release clearances. This restoration island approach provides the following benefits:

- Reduces the number of contacts and people communicating with the dispatch function,
- Focuses the restoration effort in these hard hit areas,
- Allows the creation of more accurate restoration times,
- Simplifies the requests and delivery of equipment and materials,
- Ensures the right crew types are present for the work at hand,
- Crews will work in contiguous areas reducing windshield time, consequently completing more work in the same time period,
- Areas will be restored more consistently,
- Crews will not have to wait for work assignments, as they will be assigned to work a specific feeder or set of feeders.
- Improves the coordination and expectations between crew types, and
- Simplifies and improves the accuracy of the detailed damage assessment.

CenterPoint Energy's EOP basically called for the outage analysis system to define the work, and with the aid of work management systems, create work packages. This works in small and medium sized events but creates a number of issues in larger events, including:

- Work packages may take too long to create causing delays in crew assignments,
- Didn't offer a full picture of the extent of the damage in an area,
- Potentially sub optimized the movement of the right mix of crews,
- Didn't necessarily address all the damage done to a feeder or lateral,
- Potentially cause crews to spend more time moving between work sites instead of focusing on a feeder,
- Compound the delivery of materials and equipment to the right locations, and
- Created an environment where the dispatch function was overwhelmed with requests for clearances.

CenterPoint Energy management viewed the early efforts to assess damage and restore electricity, and determined another approach was required. CenterPoint Energy developed a restoration methodology similar to the restoration island concept.

10. Emergency Restoration – Imminent Event Plan

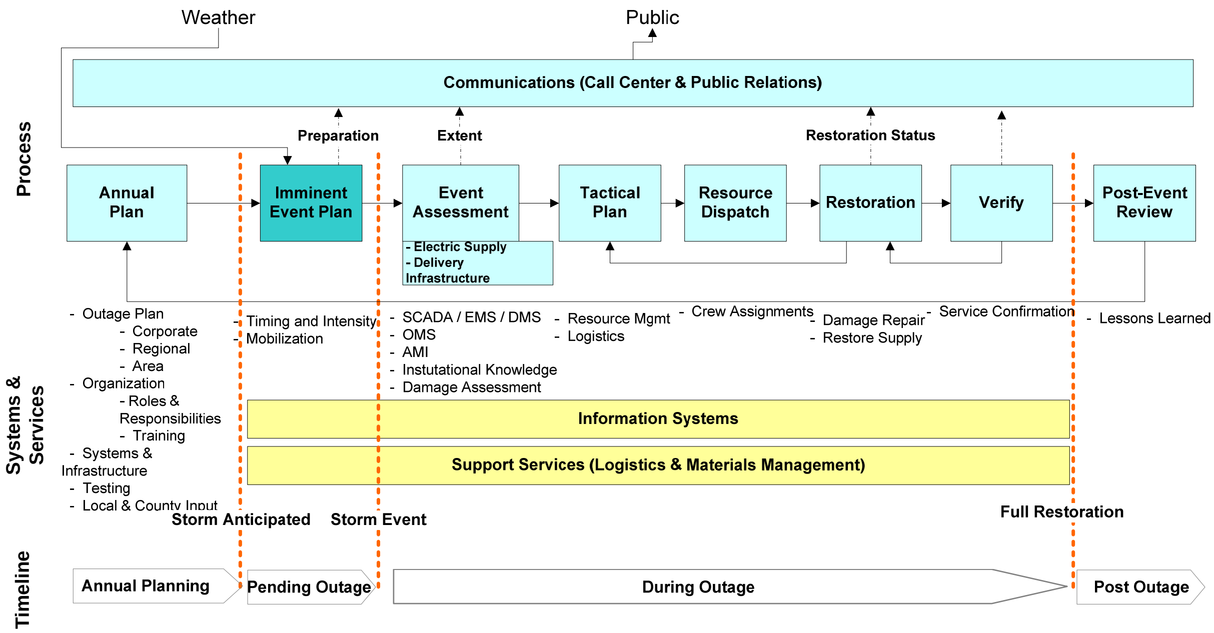


Exhibit 10-1: Outage Management Process – Imminent Event Plan

10.1 Industry Practices

Throughout the electric utility industry, companies have plans in place that detail when and to what extent that company's emergency response plan goes into effect. The first stage of the plan is, most often, the advance planning and mobilization that occur in anticipation of a specific event. The best example of this action is found in companies exposed to tropical storms and hurricanes where significant advanced warning allows for mobilization on an escalating scale. As part of any emergency response plan there must be detailed information on the various stages of planning, mobilization, and the "triggers" for those stages. This early planning and mobilization is tailored to the company and the specific exposure it experiences. Whether the company is in an area of exposure for hurricanes, tornadoes, earthquakes, sub-tropical storms, ice, or wind will determine what the specific plans and triggers are appropriate.

10.2 CenterPoint Energy Practices

Like other utilities, CenterPoint Energy's practice in this area is driven by the amount of advance notice the Company has of impending severe weather. CenterPoint Energy had sufficient notice of Ike's likely arrival and intensity. While storms are developing in the Gulf of Mexico, CenterPoint Energy's Real Time Operations (RTO) staff monitors meteorology reports from Impact Weather Service while various departments throughout the Company initiate preliminary preparations.

Based on National Weather Service predictions, if the projected impact to CenterPoint Energy's system is expected to be at night, at 78 hours prior to landfall the Emergency Operations Plan (EOP) is activated. At 66 hours, material and Logistics Network suppliers and staging site owners are notified of activation and put on alert. At 54 hours prior to impact, the Central Evaluation (CVal) is activated, and at 42 hours prior to impact, mutual assistance and contractors are alerted. At 36 hours prior to impact, Logistics Network suppliers are directed to execute their plan, staging sites are activated as needed and normal operations are suspended. At 30 hours prior to landfall, crews are released in rotation to secure homes and families.

CenterPoint Energy's EOP had developed a pre-storm EOP timeline, which outlined major milestones for restoration efforts as shown below in Exhibit 10-2. This foresight was instrumental in laying the foundation for communicating the plan and executing the initial restoration efforts.

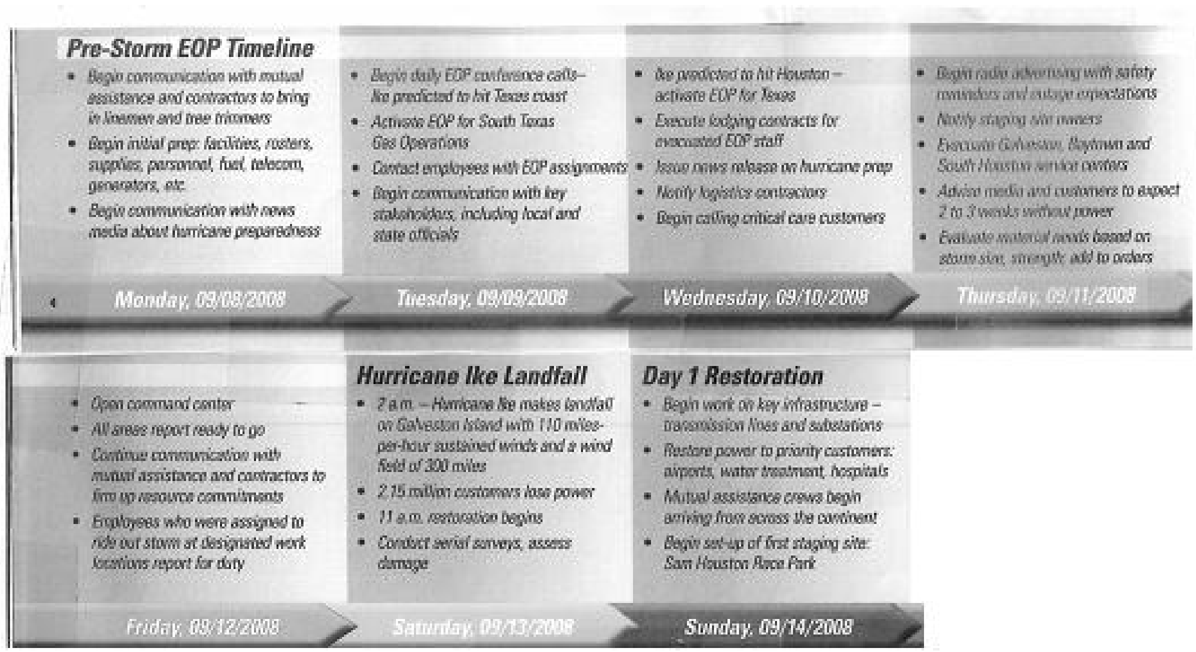


Exhibit 10-2: CenterPoint Energy Pre-Storm EOP Timeline

10.3 Conclusions

10.3.1 CenterPoint Energy predefined major EOP milestones for day and night time landfall.

CenterPoint Energy had the foresight to determine appropriate EOP actions and milestones in response to a day or night time landfall, as evidenced by Exhibit 10-3 and Exhibit 10-4. This initiative can be credited with providing the foundation necessary for CenterPoint Energy to activate its EOP and mobilization resources to restore electricity.

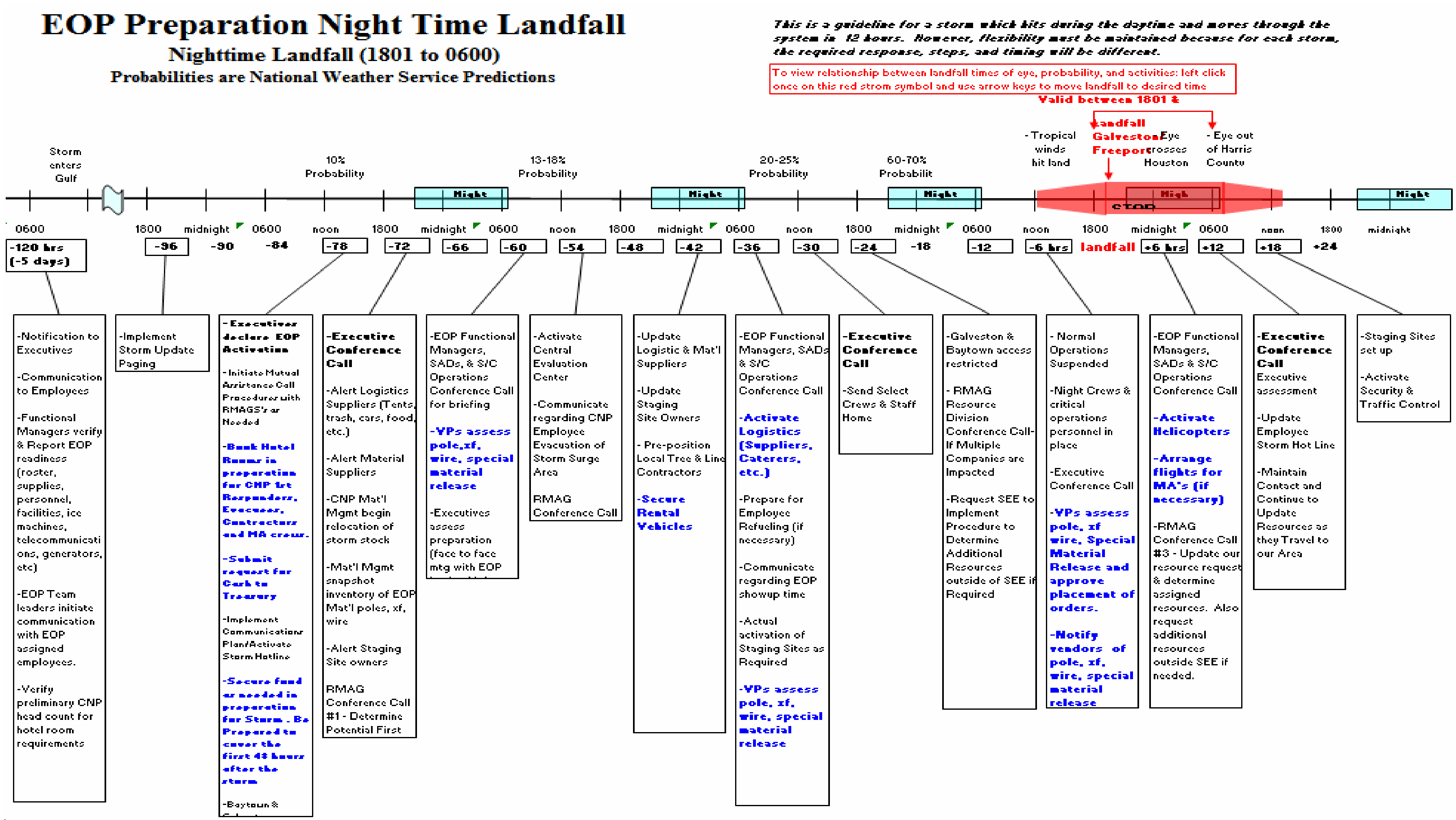


Exhibit 10-3: Nighttime Landfall Timeline

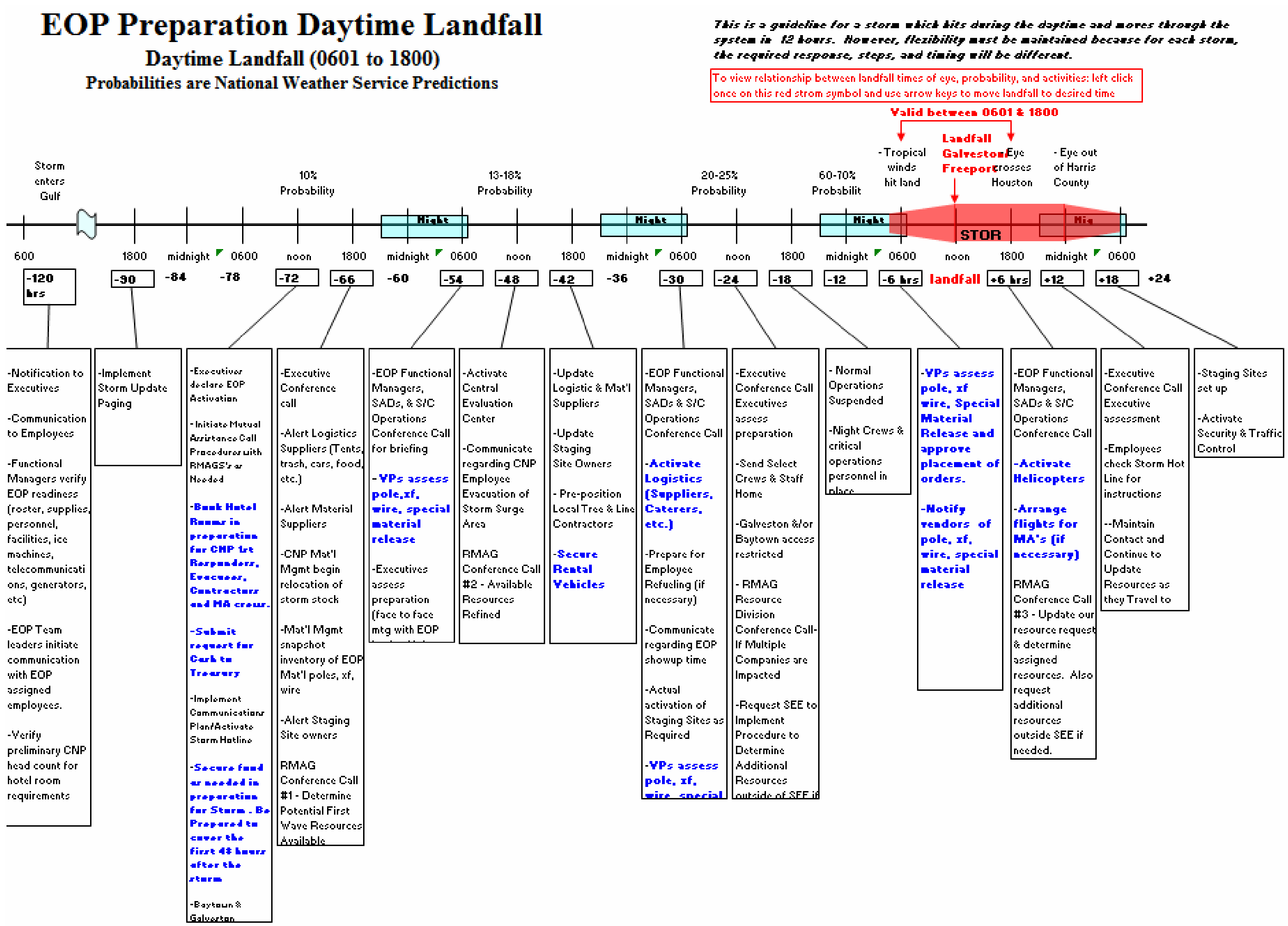


Exhibit 10-4: Daytime Landfall Timeline

10.3.2 Ike's approach provided advance warning and allowed for pre-mobilization.

Ike was being tracked in the Mid-Atlantic Ocean as noted in Exhibit 10-6 below. Hurricane landfall can be predicted to a certain degree and weather forecasters often use different models to predict areas and timing of hurricane landfall. Hurricane forecasters must look at all of the models' results, which frequently give widely different pictures of the future. When a hurricane is 36 to 72 hours from predicted landfall, probabilities are quite low. The numbers increase as the storm gets closer. For example, if a storm is forecast to be directly over a location in 72 hours, the maximum probability is only 10 percent. Probabilities are low out to 72 hours due to the forecast errors that occur through such a long period. At 48 hours from predicted landfall, the maximum is 13-18 percent. At 36 hours, the maximum is 20-25 percent, and at 24 hours, the maximum probability is 35-45 percent. When the storm is less than 24 hours from forecast landfall, values increase to 60-70 percent.

Many times the different data sources are too conflicting for forecasters to have a high degree of confidence in their predictions. The projected path of Ike offered CenterPoint Energy a warning that a hurricane event was impending. As a result, CenterPoint Energy was able to mobilize for the restoration response in advance.

Based upon the estimated storm size, CenterPoint Energy's activation of the EOP was based upon the timing of the event and the level of emergency response anticipated. Exhibit 10-5 below from CenterPoint Energy's EOP defines the storm categories.

A key element of the emergency response was the ability of CenterPoint Energy to augment staffing of field crews when additional crew resources were anticipated to expedite restoration.

Category	Description
I	A system-wide emergency
II	An ERCOT system emergency affecting the generation supply and transmission system only
	An emergency affecting a major portion of the transmission system
III	A system-wide distribution emergency affecting both Regions or major event
IV	Localized damage to the distribution system or a major event effecting two or less Regions
	Localized damage to a substation or transmission system Facility disaster
V	Facilities rendered partially or totally uninhabitable. Threat received probable or imminent

Exhibit 10-5: CenterPoint Energy Storm Category Definitions

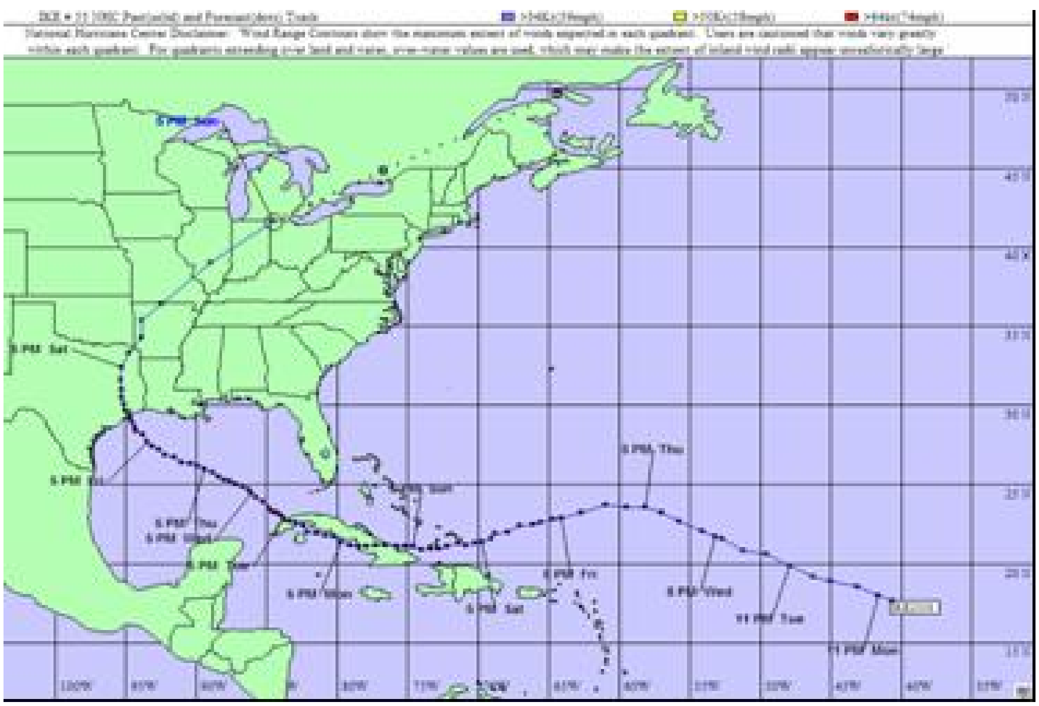


Exhibit 10-6: Hurricane Ike's Path

10.3.3 CenterPoint Energy appropriately used a weather service to assess potential impact on service territory.

It is an accepted practice within the industry for dispatch offices and emergency operations centers to subscribe to national weather services to receive as much advance notification of an impending weather event as possible. CenterPoint Energy adopted this practice and uses a service called Impact Weather Service to monitor National Oceanic Atmospheric Administration (NOAA)) weather data for weather forecasts and lightning strikes. Based on this information, CenterPoint Energy observes the development of pending severe weather and alerts divisions and EOP management appropriately.

10.3.4 CenterPoint Energy experienced early, unannounced arrivals of contractors and mutual assistance.

Similar to other utilities in similar circumstances, some contractor and mutual assistance crews did not provide CenterPoint Energy with adequate estimates of their arrival dates. However, CenterPoint Energy was able to in-process the personnel and assign them to staging sites to begin work.

CenterPoint Energy, like other leading utilities, began securing additional resources in advance of a pending storm. As soon as there is a high probability that a storm will strike, utilities begin the process of acquiring resources. In order to better manage and control external resources, leading edge utilities have developed processes and procedures that guide a dedicated group of utility employees to secure mutual assistance crews and arrange logistical support.

CenterPoint Energy used contract and mutual aid resources to supplement in house restoration resources. CenterPoint Energy had a slight difficulty in contacting and mobilizing the most available mutual aid resources. Some mutual aid assistance was delayed due to crews that were working to restore power to the gulf coast states affected by Hurricane Gustav. The mutual aid crew delays did not affect the

CenterPoint Energy restoration effort as a great deal of mutual aid assistance was already secured.

11. Emergency Restoration – Event Assessment

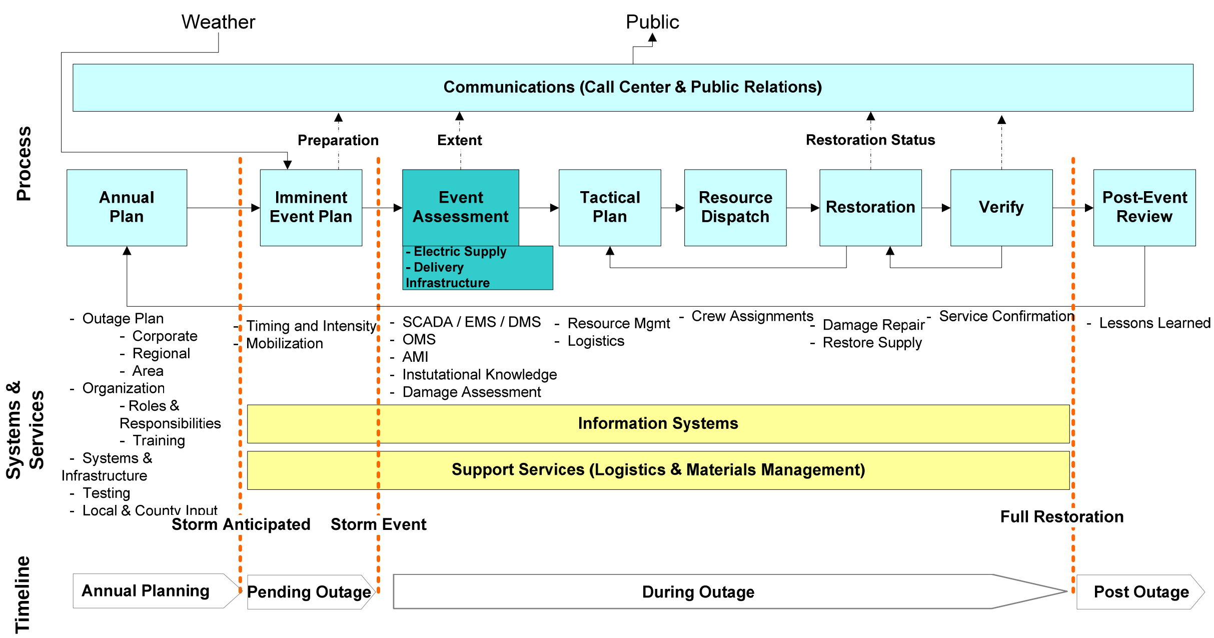


Exhibit 11-1: Outage Management Process – Event Assessment

11.1 Industry Practices

Quickly and accurately assessing damage from a major event varies widely throughout the industry. Those companies on the leading edge of this process are equipped with technology that enables earlier decision making on what areas need the most attention, in terms of on-site assessment and overall extent of damage. In all companies any technology used to facilitate this process is a tool to assist the early focus of the physical assessment. Technology deployed to field assessors permits building of a database containing the number of sites requiring repair, materials and labor estimates, and restoration estimates. In utilities employing outage management systems, the information from this technology will provide EOC management with a more robust and a more clear understanding of the level of damage. Throughout the industry however, this is largely a labor intensive process that requires smooth processes and focused responses in order to provide early information for effective decisions on resource allocation.

11.2 CenterPoint Energy Practices

CenterPoint Energy uses three primary business tools to assess the magnitude of the major event. They are:

- SCADA and EMS system observations,
- Outage Analysis System (OAS) which logs all customer trouble calls and has the industry generic name of outage management system (OMS),
- Field damage assessments documented in a SharePoint website

CenterPoint Energy's EOP defines responsibilities for assessing field damage during major events. These responsibilities include:

- Conducting an initial high-level damage assessment or more generically the sweep, and a
- Detailed field damage assessment.

High-level damage assessments are coordinated and dispatched at the service area level. The Distribution Restoration Strategy section of the EOP provides a general description of a damage assessment but lacks any real specificity. The CenterPoint Energy practice of documenting employee observations on the way into their work location provided some high-level assessment.

The use of helicopter patrols to conduct a quick assessment of the distribution system damage was used by leadership and construction crew leaders to provide valuable information on the extent of the damage to the distribution system. The original intent of the helicopter patrols was to get a more detailed damage assessment and to document the details of the damage via the use of laptop computers. Application of the detailed assessment via helicopters proved to be ineffective due to the difficulty of observing detailed damage to distribution equipment and lack of connectivity of the air-cards used on the assessor's laptops. Further, the FAA initially would not permit air traffic over the impacted areas. Helicopters were also used for the initial damage assessment of transmission circuits.

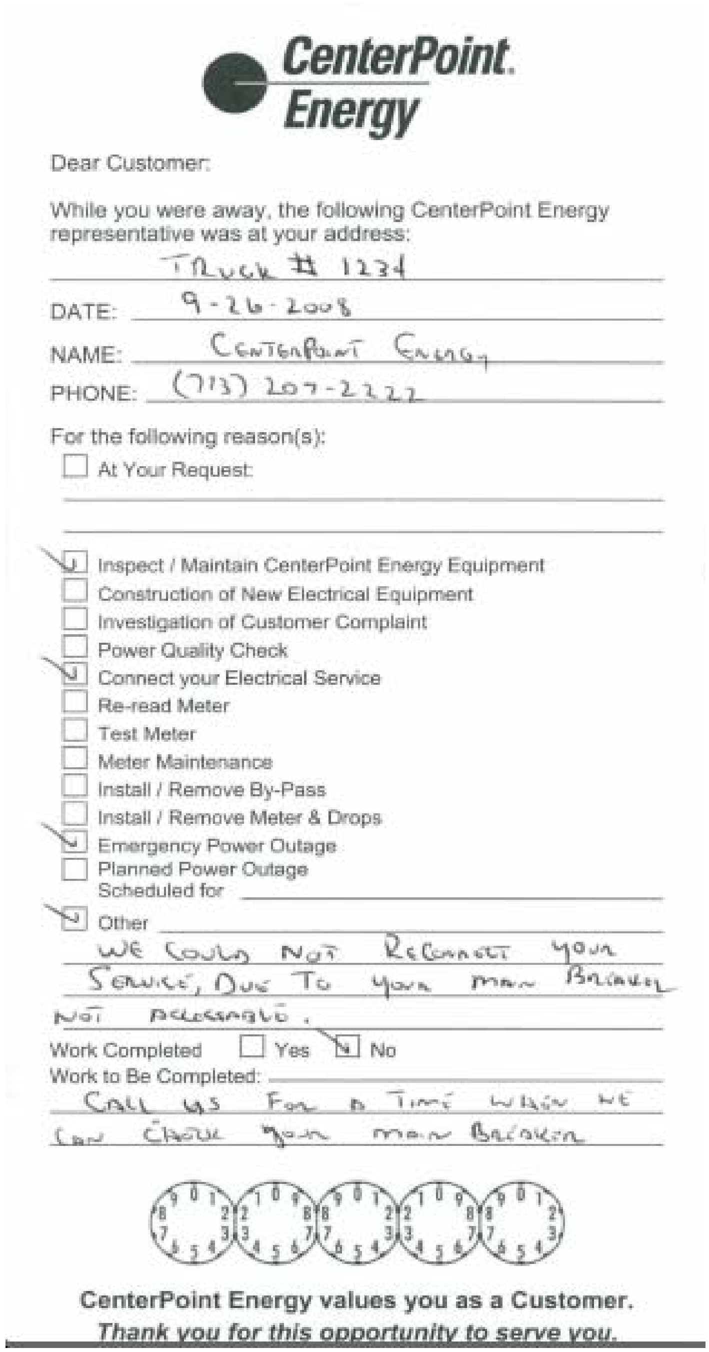
The Patrol Inspection Leader dispatches Patrol Inspectors to pre-determined priority circuits. The Patrol Inspectors are CenterPoint Energy's primary damage assessors. Each Service Area has a list of priority circuits and generally conducts damage assessments according to the following priorities:

- Circuit mainline (backbone),
- Laterals,
- Transformers, and
- Secondary services.

Field patrols will document their findings on maps and field notes inspection forms clearly documenting the location of downed poles and wires, trees in the line, damaged transformers, damaged service drops, etc., and deliver the marked up maps and inspection forms to the Patrol Inspection Leader. The Patrol Inspection Leader will consolidate the inspection data for each circuit into SharePoint as a work package. The Service Area Operations Supervisor will review each work package in SharePoint and provide an estimate of the crew-hours or crew-days to complete the work in each work package. This information was then conveyed to the Distribution Evaluation Center (DVal), who determined crew movement, crew reassignment and/or use of assistance from outside utilities and contractors would be evaluated based upon restoration targets.

Patrol Inspectors place the highest priority on public safety concerns, especially wire down reports. At a wire down location, Patrol Inspectors prevent the public from entering the hazardous area. Then the Patrol Inspector will guard the hazardous condition until either a First Responder or Cut and Clear crew can confirm the area is de-energized.

Field patrolling generally continued for the duration of the major event. Once all the major damage on feeder backbones and laterals is identified, Patrol Inspectors will transition to assessing damage on secondaries and service connections. It is important to note that the damage assessment process can take days or weeks depending on the level of damage and access to the damaged areas. When Patrol Inspectors assess damage on secondaries and service drops, a door tag is hung to inform the customer of CenterPoint Energy's responsibility for electric service restoration and the actions the customer should take to repair customer owned electric facilities such as weather heads prior to the Company restoring service. See Exhibit 11-2 for an example a of door tag.



CenterPoint Energy

Dear Customer:

While you were away, the following CenterPoint Energy representative was at your address:

TRUCK # 1234

DATE: 9-26-2008

NAME: CenterPoint Energy

PHONE: (713) 207-2222

For the following reason(s):

- [ ] At Your Request:
- [x] Inspect / Maintain CenterPoint Energy Equipment
- [ ] Construction of New Electrical Equipment
- [ ] Investigation of Customer Complaint
- [ ] Power Quality Check
- [x] Connect your Electrical Service
- [ ] Re-read Meter
- [ ] Test Meter
- [ ] Meter Maintenance
- [ ] Install / Remove By-Pass
- [ ] Install / Remove Meter & Drops
- [x] Emergency Power Outage
- [ ] Planned Power Outage Scheduled for
- [x] Other

WE COULD NOT RECONNECT YOUR SERVICE, DUE TO YOUR MAIN BREAKER NOT ACCESSABLE.

Work Completed [ ] Yes [x] No

Work to Be Completed: CALL US FOR A TIME WHEN WE CAN CHECK YOUR MAIN BREAKER

CenterPoint Energy values you as a Customer.

Thank you for this opportunity to serve you.

Exhibit 11-2: Door Tag Hanger

11.3 Conclusions

11.3.1 CenterPoint Energy appropriately used the SCADA system as the primary tool to determine the initial scope and magnitude of the event.

It is common practice in the industry to have a Supervisory Control and Data Acquisition (SCADA) system installed. The SCADA is a system that allows the remote monitoring and control of key electrical equipment at substation locations throughout the system. SCADA systems, initially installed in transmission substation facilities, have been installed in many distribution substations providing indication and control of distribution substation equipment in the past 30 years. SCADA applications at the distribution level generally will only indicate that a feeder is energized or de-energized and generally does not provide any insight as to the state of the feeder outside the substation fence. Although this is beginning to change with the emergence of micro-processor based relaying devices which are replacing the older electro-mechanical relays, these new relays provide substantially more information, particularly about a fault on the line.

CenterPoint Energy through SCADA receives the first indication of the magnitude of a major event. The CenterPoint Energy SCADA system is deployed in distribution substations providing indication of the system power flows. As feeders trip off-line, SCADA registers these events in seconds and displays the results on SCADA displays in the RTO and in OAS. During Ike, the DVal received the first report of the extent of disruption to the power grid from the SCADA system. This initial SCADA information is the primary source of information for the DVal in determining the extent and magnitude of the system disruption at the onset of the event.

11.3.2 Correctly, management decided to terminate the high-level assessment based on the data being received from other resources indicating extensive system damage to a significant portion of the system.

Leading industry practice during major events is to conduct a high-level assessment of the circuits during the first six to eight hours after the initiation of the event. Leading utilities conduct an initial statistical assessment of the affected areas. The assessment process begins by driving the damaged system starting at the Substation (feeder header) and following the feeder along its path. This statistical assessment is designed to provide rough counts of downed lines, broken poles, and downed trees to the EOC. There is no attempt by damage assessors or field supervisors assigned to this statistical assessment to capture details of any single event; that is done later. This statistical assessment is critical information for the EOC to determine resource requirements and is needed to estimate the duration of the restoration effort.

KEMA's interviews revealed that during Ike, the high-level assessment was terminated due to the amount of data being received from the detailed assessments. DVal felt that enough data was received from both detailed and high-level assessments to determine resource requirements and directed the high-level assessors to perform detailed assessments.

CenterPoint Energy has a formal model to predict the order-of-magnitude of expected customers affected associated with impending weather conditions. Consequently, the DVal relies on its experience gained from historical events and real-time SCADA and OAS information to make an initial estimate of the event's magnitude. But CenterPoint Energy management has not experienced storms of these magnitudes in the past leaving a gap in their knowledge base which is not captured in the EOP. DVal could see the growing level of damage from the SCADA activity and made a call to obtain additional resources through mutual assistance. It was not until damage assessment reports were received from the field that DVal was able to compile a comprehensive assessment of the extent of system damage and make an educated estimate of restoration times.

Without the aid of an initial high-level statistical estimate of system damage, it is difficult for management to accurately quantify resource requirements other than taking the position of "obtaining every possible resource that is available." This can hamper the ability of Corporate Communications to provide the public with early order of magnitude assessment of the storm. Without the input from a high-level damage assessment process CenterPoint Energy could only ascertain from the number of customers out, the number of devices predicted out by the OAS, and the number of feeders locked out by SCADA that the event would require significant restoration time.

11.3.3 The Foreign Crew Coordinators (FCC) provide direct feedback of an estimated repair time, however, this completion time for a specific repair may not be the same as a restoration time during large-scale events.

When an assigned crew reaches the work site, they perform a quick analysis of what must be repaired and the time needed to complete the repairs. This information is communicated back to the dispatcher in order to refine the estimate of repair time. However, during major events the estimated repair times provided by the FCC or repair crew may not be accurate in determining a restoration of service time during major events as there may be additional system damage both up and down stream side of the feeder preventing restoration of service.

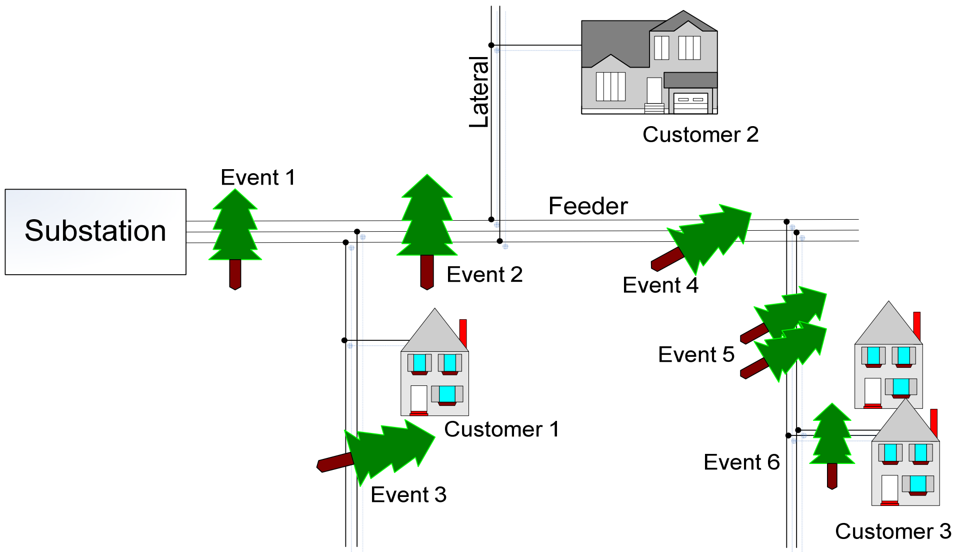


Exhibit 11-3: Outage Event Example

Exhibit 11-3 shows KEMA's reasoning for not equating restoration time with repair time. In this diagram, six emergency events (indicated by tree symbols) are identified on the feeder, its laterals, and services. Customer 1 may be associated with Event 1 in the OAS. When Event 1 is repaired, Customer 1 is returned to service. In this case, restoration time equates to repair given by the crew. Customer 2 may also be associated with Event 1, but because of a second feeder event, the restoration time would be the total time needed to repair for Events 1 and 2. The restoration time for Customer 3 will be the total time needed to repair events 1, 2, 4, 5 and 6. Compounding Customer 3's time is that its repairs cross from the feeder to the lateral and then the service; this means the actual repair time will be far greater than the simple sum previously stated. Repairs are done to Feeder (Event 1, 2 and 4), then the laterals (Event 5) and finally, the secondaries (Event 6).

12. Emergency Restoration – Execution

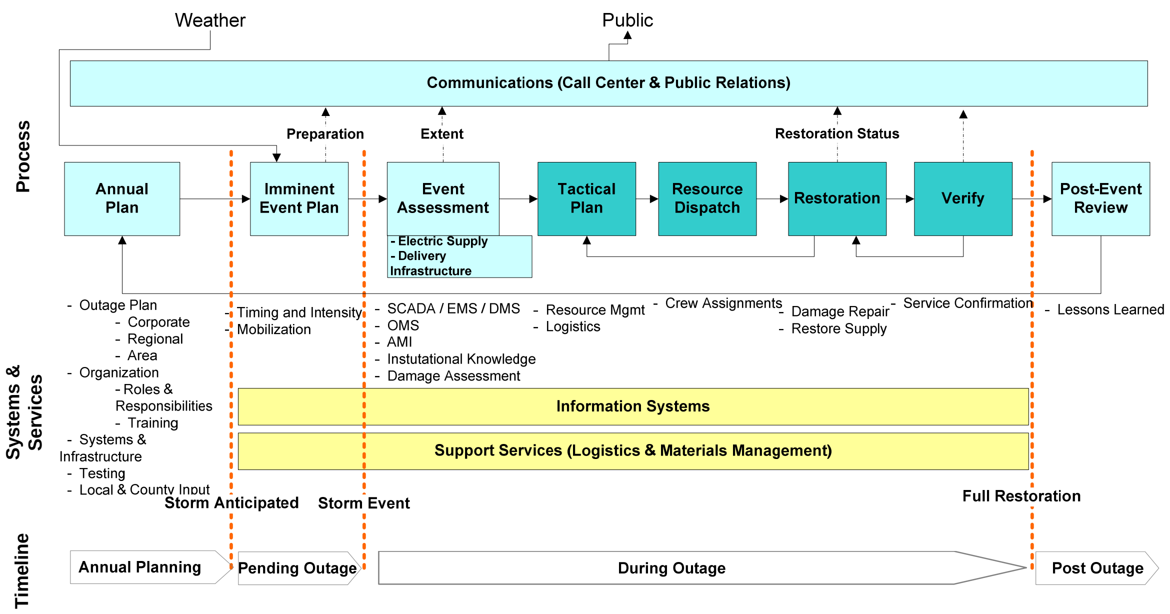


Exhibit 12-1: Outage Management Process – Execution

12.1 Industry Practices

Reliable utility services (electric, gas and water) are essential to maintain our standard of living and provide the infrastructure for our advanced economy. Utility employees recognize their "public service" role and generally exhibit a strong sense of duty, timeliness, compassion, and teamwork, which supports reliability. These attributes form the "utility culture". Consistently, the utility industry has seen increased levels of performance from its employees during the most adverse times and situations, such as outage events.

In addition to strong employee dedication to the "public service" role, effective execution of major event restoration requires the ability to quickly mobilize large numbers of resources, efficiently dispatch resources, and manage material disbursements and provide logistical support for the army of individuals involved in the restoration effort.

Industry leading practices include the ability to quickly re-assign employees from day-to-day responsibilities into a major event mode, have employees well rehearsed in their storm restoration roles, and efficiently choreograph restoration activities under challenging conditions.

12.2 CenterPoint Energy Practices

CenterPoint Energy recognizes the success of their storm restoration efforts depends upon the readiness of their employees to respond quickly to fulfill their storm roles, either within their normal job or an EOP assignment. While some employees continue to perform their regular job during emergency operations, in many cases employees assume roles different than their regular responsibilities. Employees in a reserved EOP pool, in an unassigned EOP pool, or having no EOP assignment, report on their regular work schedule to their regular work location as soon as conditions permit. Employees continue in their regular job function until released to report to an EOP restoration position by their supervisor.

Exhibit 12-2: CenterPoint Energy Post Storm EOP Timeline

12.3 Conclusions

12.3.1 CenterPoint Energy employees consistently demonstrated tremendous dedication and regularly went ‘above-and-beyond’ during the restoration efforts.

CenterPoint Energy employees exhibited a strong public service attitude in the execution of storm restoration duties. Even though Ike was the largest major event in the Company’s history, employees went "above and beyond" in supporting the restoration efforts. In one such case, an employee had a large tree fall on their house causing significant damage “basically cut the house in half” and still came into work on time. Even though there were limited detailed procedures defining roles and responsibilities, CenterPoint Energy efficiently re-assigned day-to-day employee responsibilities to support the storm restoration effort. In one such case, employees from gas operations were used to direct the heavy flow of traffic at the staging sites.

During KEMA’s review process, there was never any suggestion that CenterPoint Energy employees lacked dedication to the restoration effort.

12.3.2 The Central Evaluation (CVal) and Distribution Evaluation (DVal) twice-daily conference calls facilitated a reasonable understanding of the volume work to be done.

The leading industry practice is to have a central communications exercise multiple times a day to update all internal parties on the restoration effort. Further, it allows storm managers to adjust crew numbers in the field to affect a uniform recovery effort. During these exercises it is critical to ensure the right information is being presented.

For macro crew deployment and re-assignment, CVal and DVal analyzed damage assessment data, customer calls in OAS and field observations by first responders and repair crews that were working the “cut & clear” process. This information was analyzed and a strategy was developed before the CVal call. As part of the call script, crew strategy was discussed and confirmed with each Service Area Director and staging site manager. By developing a macro crew movement strategy CVal ensures that a balanced restoration is being executed across the service territory. In addition to the crew movement strategy, CVal ensures that all service areas and staging sites are following the EOP.

12.3.3 DVal was effective at preventing outside influences from impacting the order of restoration allowing service areas to continue their priority work.

The leading practice by utilities faced with this level of restoration is to bring the system backbone and laterals back as quickly and uniformly as possible across their system. This returns the greatest number of customers to full service quickly while ensuring that no one area is favored over another for restoration.

During the restoration effort, the DVal staff was able to support service areas resources special requests for restoration support. Conversely, Senior Management did not exert pressure for preferential treatment of any individual customer. A Priority Desk was established to respond to “priority” requests from outside agencies. DVal focused exclusively on working the storm restoration effort and was not sidetracked with requests to restore high profile customers. As a result, operations had senior management’s support for a fair, even handed customer restoration strategy.

12.3.4 While CenterPoint Energy had no difficulty mobilizing additional resources, its Service Areas and staging sites experienced bottlenecks in effectively dispatching resources to work sites.

Overall, the process of managing an extraordinary increase in crew resources worked well, yet there were some issues uncovered. These are explained in the following sub-sections.

Despite CenterPoint Energy's EOP, its initial coordination and preparation for receiving contract and mutual aid resources; the sheer numbers and unpredictable arrival times caused bottlenecks in the processing of outside resources.

One of the core issues with any large restoration effort is the receiving of foreign and mutual aid crews. Typically, what is experienced in these large events is crews arriving at different time from the original estimate by their home based management. This situation put significant stress on the receiving site teams as crews begin to bunch up creating a logistical problem. Also given the time spent traveling many of these crews are due a rest period, which prevents them from moving to their first field assignment. Some companies use more than one in-processing site, which can be outside of the territory. Generally these are not always used as staging sites. The in-processing includes all foreign crews receiving a safety briefing, assignment of FCC and their security identification.

CenterPoint Energy faced the same issue as the crews began arriving. CenterPoint Energy used one large staging site to "check-in" all contractors and foreign crews and then disperse them to other staging sites for their work assignments. Some crews arrived earlier than expected and other crews arrived without the "check-in" staging site having prior knowledge of their arrival. Information flowing from the DVal lacked specificity as to arrival times of some foreign and contract crews.

An additional issue was the potential impact on public perception, which was significant when the public had been without service and observed a large number of resources waiting at the check-in site for processing.

12.3.5 CenterPoint Energy quickly realized that the four predefined staging sites would not meet the needs of the restoration effort and opened six additional staging sites.

A common theme across the industry during large restoration efforts is the challenge of maintaining operational oversight in the coordination of restoration work and handling the administrative burden associated with issuing work clearances to a large number of field resources. Leading practices within the industry has been to establish command centers located at staging areas within affected operating centers that can take on the following needed activities:

- Conduct daily work status updates and safety briefings for in-house, foreign and mutual aid resources,
- Issue work orders, pouches or assignment to a particular work area,
- Provide job aids, such as system and geographic maps, construction standards, and the like,
- Park and fuel large vehicles,
- Support crew logistics,
- Distribute materials,
- Allow a tactical post situated close to damaged areas, and
- Manage work clearances within the affected region.

The deployment of large numbers of crews to a staging site created management issues for the four pre-defined staging sites. As a result, CenterPoint Energy identified and coordinated the opening of seven additional staging sites.

12.3.6 CenterPoint Energy's practice of providing Foreign Crew Coordinators (FCC) was instrumental in efficiently managing the number of contract and mutual aid crews on-site during the restoration effort and should be considered a leading practice.

A leading practice across the industry is to provide foreign crews with a guide to accomplish the following:

- Guide foreign crews around the system,
- Assign work order packages,
- Support the clearance and field switching processes,
- Provide a communications link back to field operations and dispatch,
- Chase materials, and
- Relieve the foreign crews of some of the administrative burden inherent in storm restoration.

Utilities can take a number of different approaches to this including using retirees, training “Bird Dogs”, and breaking up local crews to be integrated into the foreign crews. The goal in all of these options is to eliminate any utility imposed “road blocks” for the foreign crews to ensure maximum productive work time possible.

CenterPoint Energy used its most experienced linemen to act as Foreign Crew Coordinators (FCC). Some of these FCC's were previously trained in the FCC process, but due to the large number of foreign crews on the property, CenterPoint Energy had to add additional FCC's. The FCC's gave foreign crew's local knowledge of the geographical area, work practices, and provided overall supervision to the foreign crews. The knowledge of the CenterPoint Energy FCC's allowed the foreign crews to focus solely on restoration work and to be more productive.

12.3.7 CenterPoint Energy quickly realized the potential for delays and decentralized its dispatching function to effectively manage distribution system switching and clearance granting.

One of the key bottlenecks KEMA has identified in large restoration efforts is a crew request for clearances and clearance releases from the dispatching function. This is critical for two reasons. First, is the safety of the crews working on the system. Second, is the need to maintain the most current configuration of the distribution system so switching activities will not create any additional operational problems. Under normal conditions this set of activities pose no great delays for field forces. However, during major restoration efforts, crews can routinely experience delays up to several hours waiting on clearances. This is a direct result of the sheer number of crews making requests and the time it takes to process them.

CenterPoint Energy encountered the same issues. CenterPoint Energy adapted and reassigned centralized resources to dispatch foreign crews, and paired 'Foreign Crew Coordinators' from service centers with foreign crews to assist with local knowledge of the system. In addition, CenterPoint Energy implemented a "Switching Coordinator" in each of the service areas to handle switching and clearance order requests from the field. As a result, field switching and clearance order requests bottlenecks were reduced.

The practice of decentralizing dispatching worked well and enhanced the productivity of both contract and mutual aid crews. Tracking and documenting real-time distribution system configuration was a challenge for the dispatchers at the service areas. This configuration control issue was created by limitations in the geographical switching application and the result of field forces switching circuit segments around to restore as many customers as possible in the shortest period of time.

12.3.8 Safety training both before and during the restoration process was excellent with only one major safety incident with crewmen and tree trimmers working extended hours for several weeks.

CenterPoint Energy provided sufficient staff of safety personnel to address all work safety issues, accidents or incidents for CenterPoint Energy employees, visiting utility and contract crews. In addition, CenterPoint Energy Safety staff served as the interface between the Company and Safety personnel of visiting utility and contract crews. CenterPoint Energy Safety conducted safety orientations for all contract and mutual aid crews at the check-in staging site before they were allowed to begin working on the CenterPoint Energy system. CenterPoint Energy Safety also conducted daily safety briefings with internal and external Safety Representatives to communicate any safety issues from the previous day. CenterPoint Energy Safety conducted jobsite inspections of internal and external crews to ensure that safety rules are being followed and good work practices were being used.

12.3.9 In another leading practice CenterPoint Energy benefited by engaging retirees to assist in the management of contractors and mutual aid crews.

The use of recently retired field personnel to supplement active field forces is a leading practice adopted by many utilities faced with a major restoration effort.

Given the scale of the restoration events, even with the mobilization of in-house personnel, CenterPoint Energy was still stretched for crew managing ability and engaged the assistance of retirees with familiarity of the T&D system, knowledge of CenterPoint Energy's processes, and experience in managing field crews.

12.3.10 CenterPoint Energy's adoption of industry leading practices in prioritizing restoration work restored the largest number of customers as quickly as possible.

The leading practice by utilities faced with this level of restoration is to bring the system backbone and laterals back as quickly and uniformly as possible across their system. This returns the greatest number of customers to full service quickly while ensuring that no one area is favored over another for restoration.

Each CenterPoint Energy Service Area has a list of priority circuits and generally conducts repairs according to the following priorities:

- Circuit mainline (backbone),
- Laterals,
- Transformers, and
- Secondary services.

12.3.11 CenterPoint Energy had to appropriately adjust its restoration process in areas impacted by the surge to prevent further damage and safety issues to customer facilities.

In areas hit by the storm surge, local area management decided to initially open all distribution transformer fuses to prevent serious additional damage to customer property. In addition, prior to restoring transformers, all meters were booted to allow transformers to be energized and allow customers with completed local electrical inspections to be energized by a single person crew after the inspections were approved.

Booting the old meters prior to restoring customers' service was a leading practice as it created a safer environment for the customer and allowed CenterPoint Energy to use a single person crew to install the new meters. CenterPoint Energy also set up a post storm procedure on Galveston Island to support the reconnection of service to customers after their electrical inspections were completed. KEMA considers these procedures to be a leading practice employed by CenterPoint Energy.

13. Emergency Restoration – Information Systems and Processes

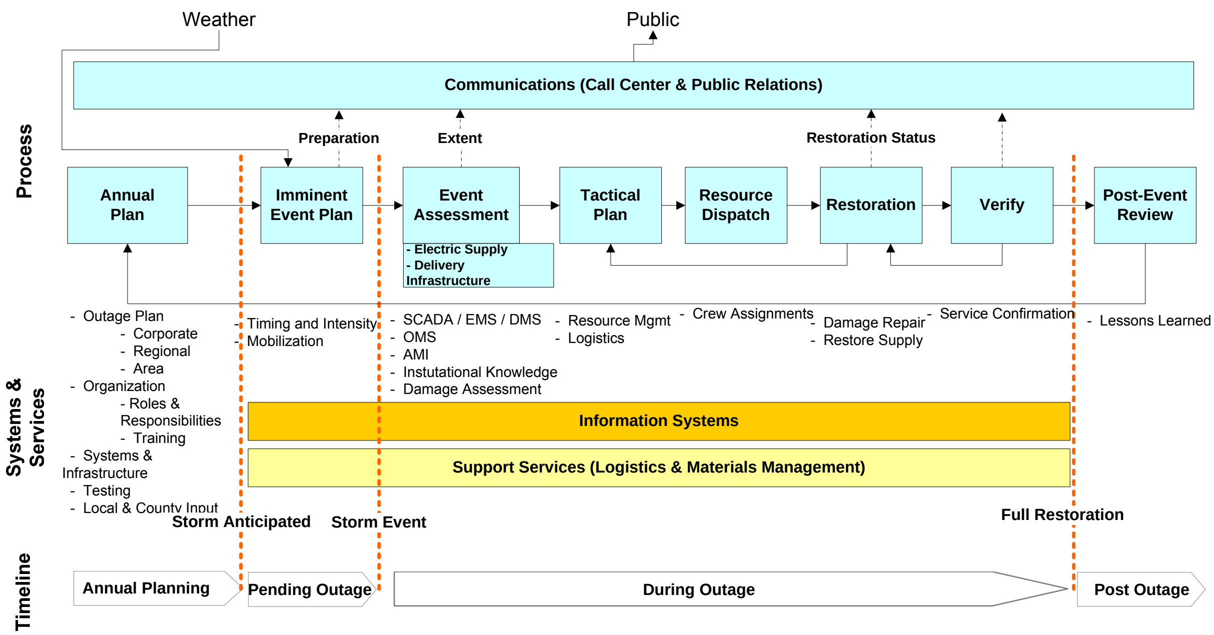


Exhibit 13-1: Outage Management Process – Information Systems

13.1 Industry Practices

Exhibit 13-2 below illustrates a leading set of integrated information systems for supporting outage management processes.

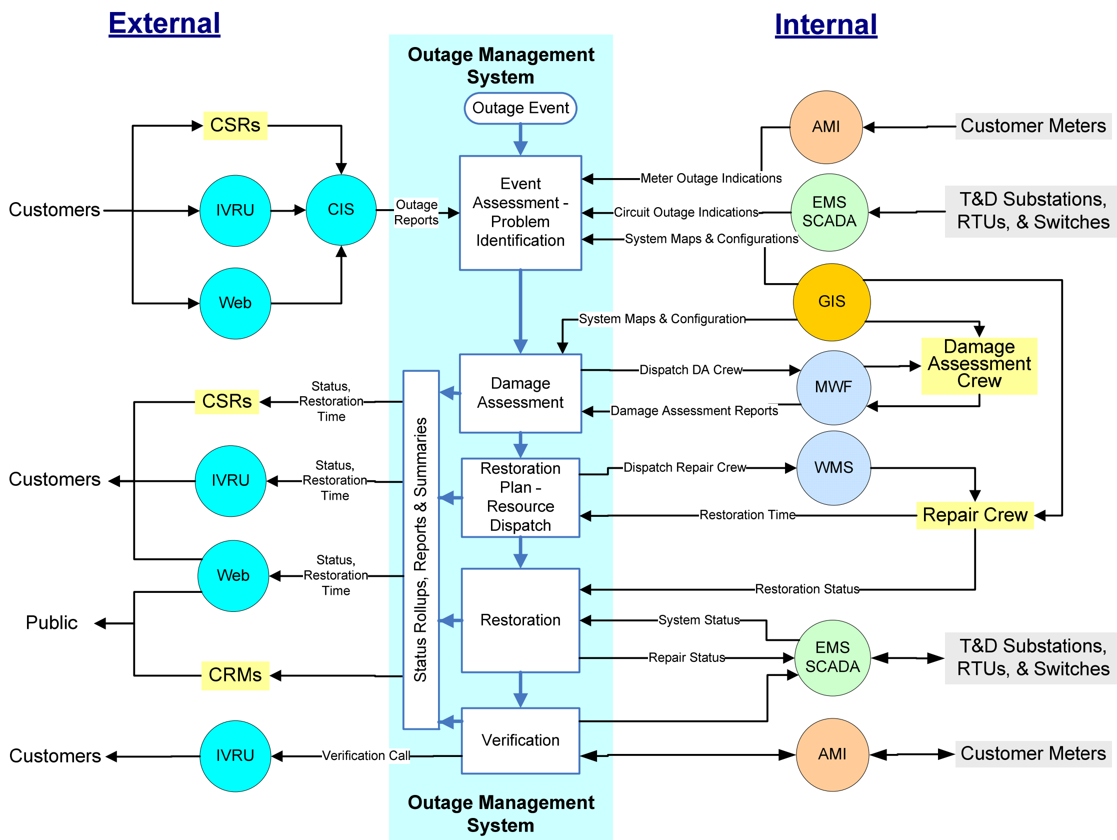


Exhibit 13-2: Leading Practice Integrated Systems for Outage Management Processes

The key components of this solution include:

- **Customer Information System (CIS):** Managing information about customers, customer services, metering and billing, with supporting Interactive Voice Recognition Unit (IVRU), web posting and other customer and public communications including outage and restoration status.
- **Outage Management System (OMS):** Managing trouble tickets, outage analysis and assessment, crew dispatch and restoration process.
- **Advanced Metering Infrastructure (AMI):** Automated meter reading, meter data management, meter “last gasp” outage reporting and processing, and automated remote interrogation of the AMI network for power restoration verification.

- **Systems Operations Supervisory Control and Data Acquisition (SCADA), Energy Management System (EMS) and Distribution Management System (DMS):** Real-time monitoring of the electric transmission and distribution network, energy supply, equipment operating status, and remote switching and control.

- **Geographic Information System (GIS):** Detailed geographic mapping of utility transmission and distribution facilities and equipment, network connectivity, equipment information and field configuration.

- **Work Management System (WMS):** Work order processing and management, resource assignment, job status and completion tracking

- **Mobile Workforce Management (MWF):** Automates field crew operations with mobile workforce dispatch, scheduling and routing, remote electronic connectivity, and automatic vehicle location.

- **Interactive Voice Response Unit (IVRU):** In the context of outage management, the IVRU routes calls to CSRs and enables allows customers to self-report and receive outage information.

A leading OMS maintains an up-to-date distribution system connectivity model that reflects the as-operated current configuration of the electric system. Reported outages are analyzed against the physical system model compared to the current operating status of key equipment, e.g., substations, transformers, and switches.

A leading OMS has business rules that allow the efficient management of large-scale outages and restoration efforts. Proper integration of key systems, including CIS, IVRU, EMS, and MWF significantly reduces the need for manual and redundant data entry, and allows efficient transfer of data to those who need it.

The SCADA/EMS systems supply valuable real-time information about operating conditions and system configuration. When combined with the OMS connectivity model, circuit outages can be quickly identified and outage reports mapped and analyzed. This information is especially useful during severe storm conditions when multiple damages can occur along feeders and laterals and more than one protective device opens.

A leading OMS provides a library of planned switching scenarios the switching coordinator uses to manage outages. Restoration procedures and processes can also be defined in the OMS to help with large-scale distribution outage restorations. The procedures define the correct sequence of events to safely and effectively restore circuits. The sequencing is coordinated with the real-time system status from the EMS.

Integration between the OMS and a mobile workforce management (MWF) system allows dispatching of OMS analysis results to field personnel. Field information, such as outage validation, cause, and estimated time to restore are sent back electronically to the OMS, passing seamlessly to the CIS for call center notification and IVRU message updates.

Integrating GIS to the OMS allows electric connectivity data to regularly pass to the OMS for developing the model that reflects the as-operated configuration of the electric system in the field.

Many utilities also use the GIS for the analysis and tracking of damage assessment reports from the field. Since the GIS has spatially referenced facilities and geographic references (streets, easements, parcels), it is a useful system in which to record and track damages to facilities that are reported by field assessors and to help plan the restoration effort. Utilities that have specific facility information such as structure type, attachments, and conductor data in their GIS can use this information to determine the material, supplies and resources required for the restoration effort. This information is also used to refine estimated time to restore (ETR).

A common issue in the utility industry during large restoration efforts is the challenge of having adequate and timely power status information for all of the individual, impacted customers. This is of particular concern since the primary thrust of restoration is to focus on the major issues that caused the primary problem. In this triage effort it is a key expectation that most, if not all, customers will be restored. There is however, the possibility that a “nested” outage, has occurred, that is, a situation wherein an additional fault has occurred that prevents full restoration of power to every customer. This can be a case where an individual service line or local transformer has failed, in addition to the primary supply source. This additional failure further complicates the restoration process since the initial triage effort focuses on the major contributors to the outage to restore the maximum number of customers.

The final phase of restoration is often hampered by the fragmented nature of those customers still without power. Some customers may not be at home or “expect” that the utility knows that their individual power has not been restored. These “single customer” numbers can be 10% to 15% of the total customers lost at the peak of the event, depending on the severity of the storm and the tree cover over the distribution system.

Many utilities have found that the primary benefit of an automatic outage and restoration feature is realized by using the capability to individually interrogate a specific meter to determine its state. Since the active outage reporting condition (“last gasp”) is transitory, that is, the status condition is repeated for as long as the meter can produce this message which is sustained by a supplemental power source (typically 10 to 30 seconds) it can be used to supplement other normal outage response elements, such as SCADA or distribution automation for additional information. However, when power is restored, smart meters can be programmed to transmit a power restoration message that would indicate that service to the meter has been restored. This information can assist in the identification of any nested outages that exist.

Further, using the bi-directional communications network that supports smart meters, the utility also has the ability to “ping” any individual meter or group of meters. This then can provide a positive means to confirm power restoration.

Since these meters also actively monitor power flow, a further feature that can be provided is to check to see that consumption exists once power is restored. This can be used to help ensure that internal situations, such as a customer premise circuit breaker has tripped can be identified.

The outage notification capabilities of an AMI must be developed and integrated along with enhancements to the utility’s outage and restoration capabilities. The existence of an AMI alone does not provide enhanced restoration features.

Additionally, at the beginning of an outage event the massive volume of "last gasp" meter information must be filtered out to avoid overloading the outage and restoration system. SCADA, damage assessment and other means of detecting outages are better suited to understanding a massive outage at the beginning of an event.

A leading AMI system, when integrated with OMS, provides for automated reporting of customer outages using the "last gasp" capability of the meters. OMS can automatically determine if a customer's meter matches a specific outage report and then provide a specific outage status. This function can be operative within the utility's IVRU or implemented within the local carrier network for maximum customer call volume capabilities.

13.2 CenterPoint Energy Practices

CenterPoint Energy has made a significant investment in its systems infrastructure and is on the leading edge of technology adoption within the industry.

Exhibit 13-3 summarizes CenterPoint Energy's systems infrastructure as it supports outage restoration.

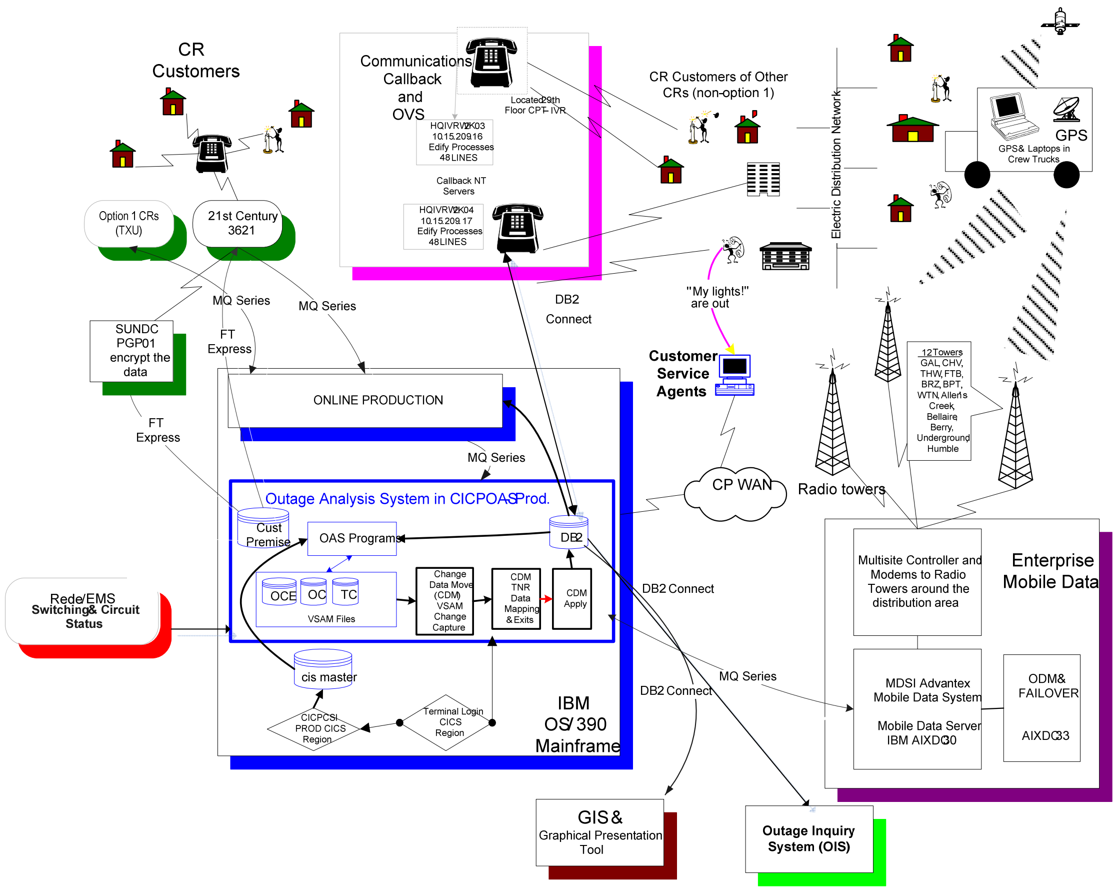


Exhibit 13-3: CenterPoint Energy Technology and Workflow for Outage Restoration

The following is a description of how outage events are handled on a daily basis at CenterPoint Energy.

1. Customer Service Representatives (CSRs) receive calls and log trouble reports into the Outage Analysis System (OAS) trouble screen in CIS. Once a trouble ticket is created in OAS, OAS provides an Estimated Restoration Time based on the localized trouble level as well as the dispatching status of the trouble ticket. This information can be viewed by the CSR. CSRs will also get notification of an outage when the SCADA/EMS sends an alert to the OAS that a device has opened. The OAS will identify customers affected by the outage event.

The OAS, a home-grown, mainframe based technology, was installed in 1985. Since that time, CenterPoint Energy implemented continuous improvements/ enhancements to the effectiveness of the system. In addition, CenterPoint Energy has greatly extended the system functionality through interfaces to other CenterPoint Energy systems.

2. The OAS analyzes customer calls to determine the most likely system protection device that operated, automatically creates a restoration work order, and records specific details of an outage event. One can think of this as a circuit breaker operating in the home and someone initially checks to see if it operated and if so, can then investigate what caused the breaker to operate in the first place. This is the same general thinking behind OAS. OAS identifies the likely protective device that operated and in conjunction with a work management tool creates an order for a troubleman or lineman to investigate the underlying problem.

3. Inbound customer's outage calls are handled by call takers (CSRs), and the Interactive Voice Response Unit (IVRU). When calling, there is first an attempt to identify the caller by their ANI (Automatic Number Identification). If this is not possible, they are prompted to enter this information into the phone and the IVRU system will attempt a lookup. If recognized, the caller's trouble ticket is created within the system and a message is played to the caller. If the database cannot recognize the caller, they are transferred to a CSR to be entered manually. CenterPoint Energy's "hit rate" of identifying callers as specific customers is low because they have not been passed this information from the Competitive Retailers (see section 14.2 of this report. When available, the estimated restoration times are communicated. As indicated in Exhibit 13-3, during large scale outages, the Callback and Outage Verification System (OVS) places calls to customers when crews resolve an outage order to indicate that power has been restored in the vicinity. If particular customers respond that they still do not have power; additional trouble ticket(s) are issued.

The responsibilities of Competitive Retailers for trouble calls during outage events are determined by the level of service they provide. For outages, Option One CRs (TXU is the only Option One CR serving the CenterPoint Energy service area), have the same responsibility as CenterPoint Energy in handling customer calls, as depicted in Exhibit 13-3. As an Option One CR, they handle all customer calls, even those that occur during storm restoration. While all the other CRs have call centers, they typically direct their customers to call CenterPoint Energy, and the Competitive Retailer Relations function in CenterPoint Energy coordinates communications with all CRs to encourage synchronization of IVRU messages to customers, especially during large scale outages. Reliant is an Option Two CR, but due to the volume of calls they received during Ike, they offered to field calls and provide consistent information for CenterPoint Energy.

4. Outage call overflows are handled by a third party IVRU, which accepts outage calls, and interfaces directly with the OAS.

5. CenterPoint Energy uses web-based internal and external inquiry and display applications to provide access to outage and restoration information. The OAS feeds CenterPoint Energy's web-based Outage Inquiry System (OIS), refreshing the data whenever the OAS is updated. The use of the OIS enables access to multiple cross-functional users during significant outage events, preventing OAS system slowdowns. The Outage Tracker web application provides more limited pre-defined inquiry and map display functionality to both internal and external users and is available on both CenterPoint Energy's Intranet as well as on CenterPoint Energy.com on the Competitive Retailers' Support landing page. The application provides graphic display of selected map layers. Exhibit 13-4 depicts Outage Tracker on a normal (non-storm event) day, updated at 15 minute intervals. During (non-catastrophic) storm events, Competitive Retailers (CRs) use the application to keep abreast of CenterPoint Energy restoration status and, depending on the service level they offer, to provide outage status information to their customers.

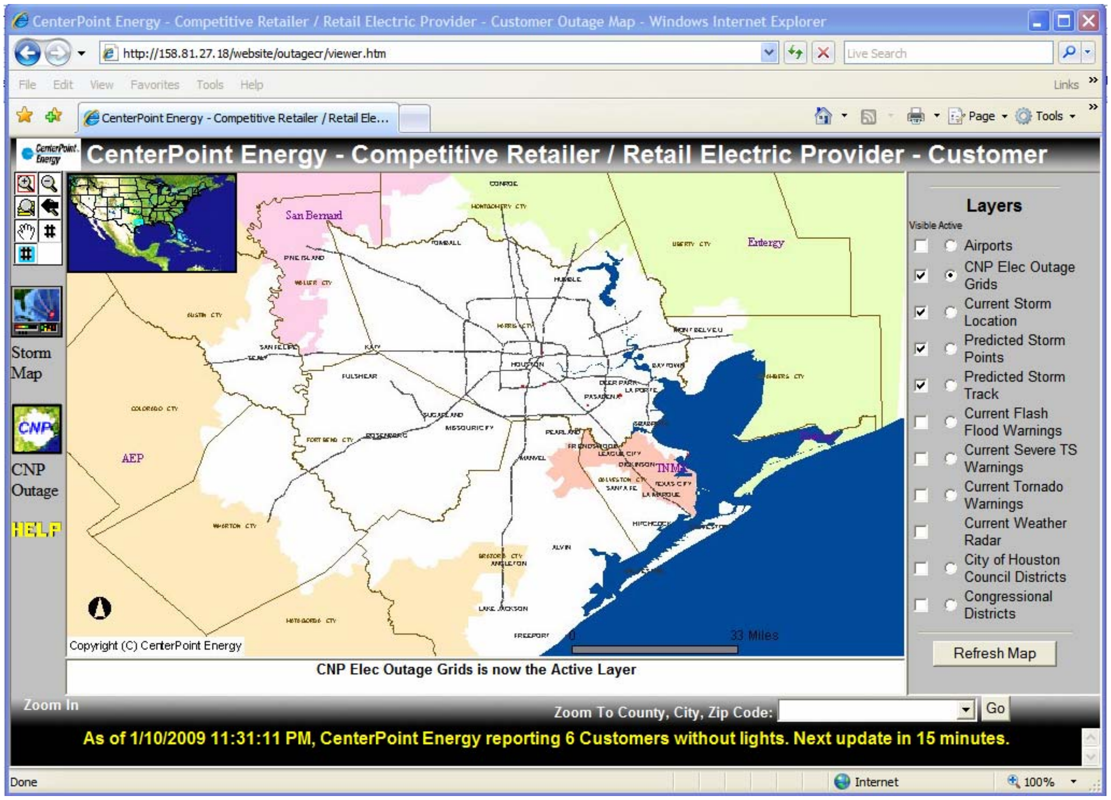


Exhibit 13-4: Outage Tracker Application

During the Hurricane Ike restoration, CenterPoint Energy also provided an overview of current system outages and restoration effort by zip code to the general public. This information was updated multiple times each day and was available from the home page of CenterPoint Energy.com.

Exhibit 13-5 and Exhibit 13-6 are examples of how this information was displayed on CenterPoint Energy's website.

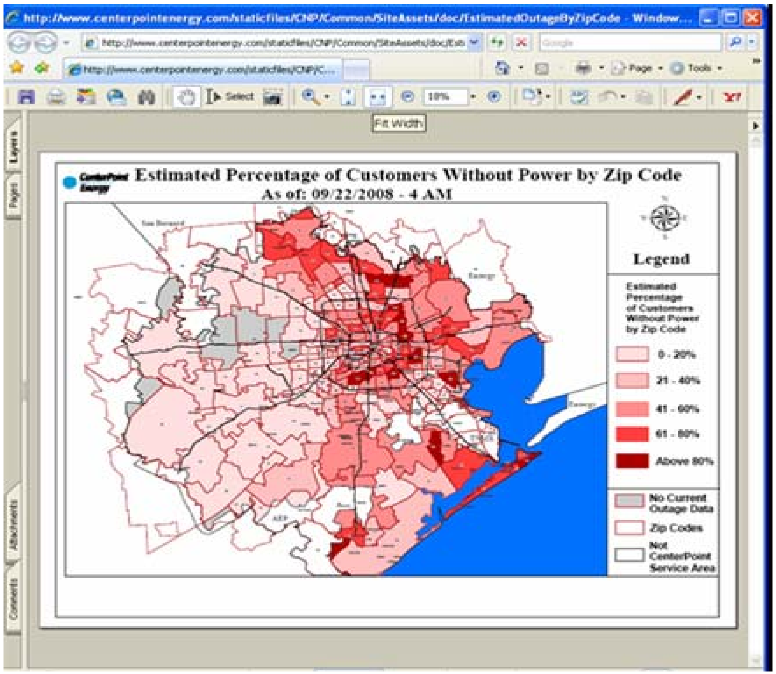


Exhibit 13-5: Example 1 of CenterPoint Energy's web based outage information

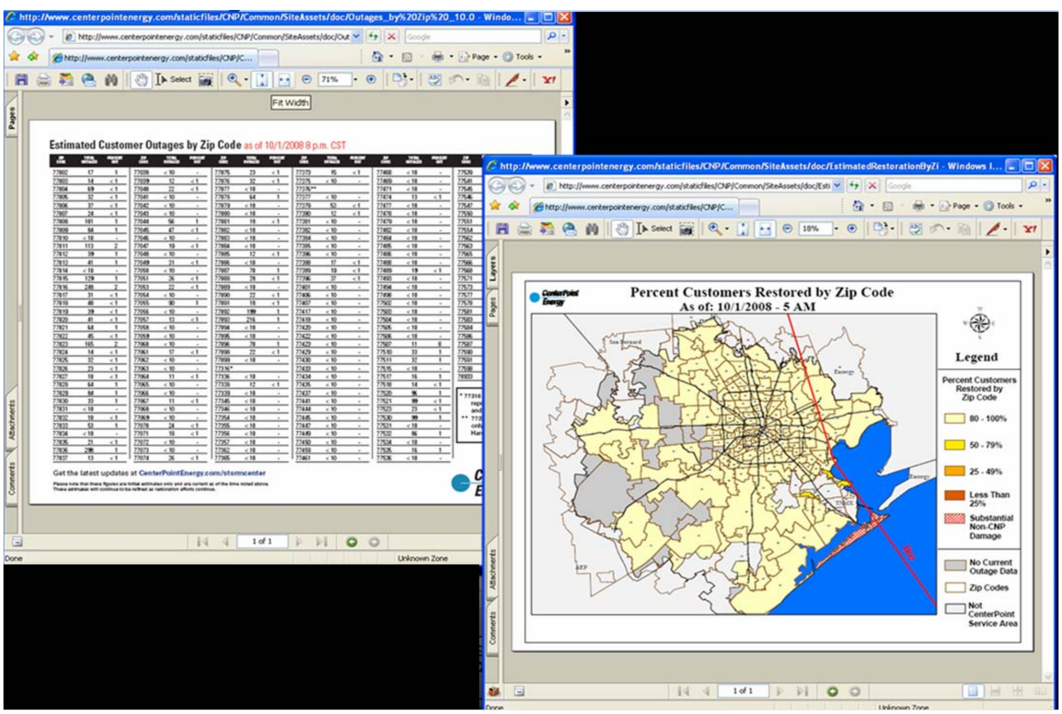


Exhibit 13-6: Example 2 of CenterPoint Energy's web based outage information

Consistent with the industry standard for emergency planning, CenterPoint Energy's EOP addresses staff and associated resources to monitor and service these systems during emergency events.

13.3 Conclusions

13.3.1 As is common with utility OMS, the CenterPoint Energy OAS estimated restoration time calculation module was not designed to fully support the magnitude of damage experienced during Hurricane Ike.

OAS is designed to support small to medium restoration efforts. The OMS calculation of estimated restoration times are known to be unreliable under these circumstances due to the volume of potential "nested" outages. Understanding that the estimated restoration times in OAS may be inaccurate, CenterPoint Energy appropriately did not use the estimated restoration time in OAS. Further, OAS can not determine if additional faults occur after the initial one if they are downstream of the initial fault, which created the record in OAS.

13.3.2 As is common for all utility OMS, due to the severity of the damage, the magnitude of restoration effort and the existence of nested outages, CenterPoint Energy's OAS generated customer outage/restoration numbers vary widely ("whipsaw") as bulk outages are cleared and the nested outages emerge.

An OMS business logic groups in-bound outage information from customer calls into a prediction of a single system failure, generally identified as the most likely upstream isolating device on the feeder or lateral. This logic does not take into consideration that, during large-scale events, system damage has most likely occurred at additional downstream locations and is not isolated to the OMS predicted single location.

Once the system damage is repaired, field resources clear the OMS trouble ticket entry. If the OMS has grouped multiple customers to this trouble ticket, upon clearing, the OMS assumes that all the grouped customers are restored. During major events, this is rarely the case, as downstream damage remains to be determined and then repaired. As damage assessors continue to identify downstream damage, or customers call for a second time, the OMS issues new trouble orders. This can result in double counting customer outage counts even though the customers were never originally restored to service ("whipsawing").

CenterPoint Energy appropriately responded to this common situation by shutting down some OAS functionality related to restoration estimates and refreshing OAS outage data each evening based on actual crew work performed. This type of work around is a common practice in utilities when they initially experience large events.

13.3.3 In response to the dynamics of CenterPoint Energy's distribution system, to restore customers through alternate switching, CenterPoint Energy took a different approach and decentralized dispatchers into the field.

CenterPoint Energy, like other utilities facing extensive outages, could not effectively dispatch the large volumes of contract and mutual aid resources with the existing divisional dispatch staffing levels. CenterPoint Energy re-assigned centralized resources to dispatch foreign crews, and paired 'Foreign Crew Coordinators' from service centers with foreign crews to assist with local knowledge of the system. This practice worked well and enhanced the productivity of both contract and mutual aid crews. Tracking and documenting real-time distribution system configuration was a challenge for the dispatchers at the service centers. Further, CenterPoint Energy's distribution system has additional line switching capabilities not always found in other utilities. As a result of this enhanced capability, the number of switching configurations dramatically increases. If this information is not forwarded to the dispatch function it is easy to lose control of the feeder configuration.

13.3.4 Both the impact of the web-based Outage Tracker application for Competitive Retailers and the overall volume of web traffic during restoration were not anticipated and exceeded CenterPoint Energy's bandwidth and web hosting capacity.

On day 3 of the restoration, CenterPoint Energy issued a market notice to CRs communicating that a new feature had been added to the CenterPoint Energy Outage Tracker System that could estimate customer outages by area for every zip code in the service territory. The system enhancement also provided outage counts by service center, county, city, congressional district and City of Houston council district. Customer Service Representatives (CSRs) at two of the largest CRs (TXU, also an Option One CR) and Reliant accessed the application on their desktops via the CenterPoint Energy CR Support web page, and turned on a feature available during "normal" storm restorations for on demand refresh. The use of this feature triggered a telecommunications capacity bottleneck, causing the system to be unavailable to all users, internal and external. Consequently, a subsequent market notice to CRs was issued later the same day, informing the CRs that use of the new feature using the live application had consumed enormous bandwidth causing the system to crash and become unavailable. Other applications and programs that were running on the same server that handles external CenterPoint Energy web sites also went down. The CR application site was taken out of service because CenterPoint Energy did not have enough capacity to handle the high volume of usage. An alternative source for the information was implemented that did not access the live Outage Tracker application. This new "Outage and Restoration Updates" page provided outages by zip code in static files and was updated with new maps (outage and restored) and customer count by zip code, at it's peak, up to four times each day.

CenterPoint Energy was able to partner with the City of Houston to develop the zip code maps used to replace the application. One of CenterPoint Energy's technology vendors referred CenterPoint Energy to a third party web hosting firm to help address the web hosting issue. The new static maps provided by CenterPoint Energy to the CRs were the same maps that were provided to the general public. Reliant was able to provide some additional functionality for their customers utilizing a different technology to present the same information.

While the Outage Tracker application can provide outage and restoration data at a more granular and meaningful level than zip code, to use this or other applications in future EOP planning will require addressing the bandwidth limitations that currently exist.

13.3.5 Without a robust CIS system within the Customer Service function, it was difficult to capture caller information and demonstrate to repeat callers that CenterPoint Energy was aware or still aware of their outage.

The Customer Information System (CIS) used in the electric call center is a mainframe legacy system that has limited function to record customer interactions, such as calls to the call center, and no capability for automated recording of calls. The system is only used to open new trouble tickets, by code such as a fire, down line, etc. While the CSR can record information regarding a call in a comments section of the application, because of the length of time this takes on the call, they were directed not to record calls during the restoration. CIS also has the capacity to enter duplicate trouble tickets if a customer calls back before the prior ticket is closed out. Without recognition of a customer's previous calls, the CSR is challenged with building customer confidence that CenterPoint Energy is aware of their situation and managing their outage. Generally, this dissatisfaction results in increased, unnecessary calls. This situation needs further verification because there are several potential causes for this condition. It could be a limitation in the CIS itself, or a limitation in the integration functionality between the CIS and the OIS. Since it appears that OIS is regularly being updated by the OAS, a limited integration between CIS and OIS could also be a cause of this limitation.

13.3.6 CenterPoint Energy's backbone communications system (voice and data) had limited storm damage and was restored using the EOP procedures.

The CenterPoint Energy private communications networks (Radio, SCADA, Fiber, Microwave) did well; they were designed for this type of outage. CenterPoint Energy has a resilient back haul network; no microwave structures failed; and they had microwave and fiber back up (or replaced) in 2-3 hours. CenterPoint Energy utilized EOP checklists to get ready for the storm. Once the storm hit, there was also enough flexibility to provide high speed communications at sites in various environments physically (i.e. VSAT receivers where land lines were difficult to secure, Verizon air cards). CenterPoint Energy's Enterprise Mobile Data System had limited storm damage and was rapidly brought back into service. The only delays occurred early in the restoration in the North Houston area.

14. Emergency Restoration – Customer Service

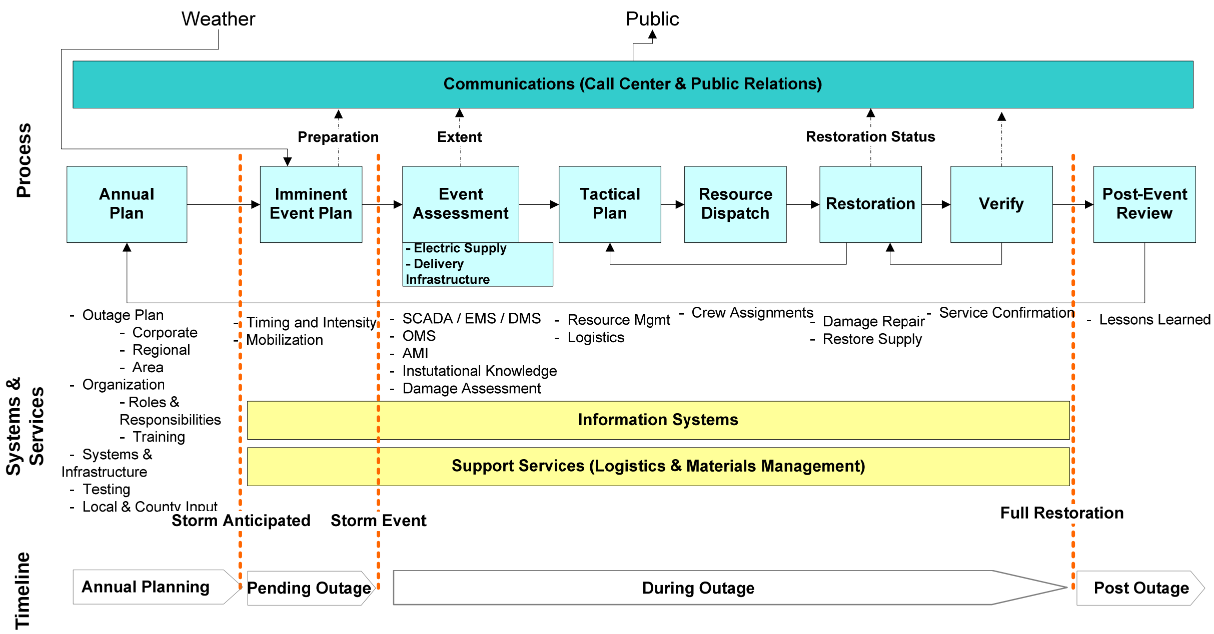


Exhibit 14-1: CenterPoint Energy Inbound Call Flow and Technology Schematic

14.1 Industry Practices

The leading practice in electric utility customer service functions is to provide the first two-way communication with the customer before, during, and after outage events. As an outage event unfolds, the call center shifts from its initial role of receiving outage information from customers to providing restoration estimates designed to help customers cope with or react to the outage event. Near the expected end of the restoration period, the call center shifts to receiving outage information from individual customers still without power.

The customer service function includes the call center and its supporting technology. Generally, the supporting technology includes an Automatic Call Director (ACD), an Interactive Voice Response Unit (IVRU), and the utility's network telecommunications provider's network ("cloud") and related contracted-for overflow or backup capabilities. Utilities typically use various customer service and/or outage reporting systems to manage interaction with customers.

The volume of calls received is dependent on the:

- Severity of the outage,
- Customers' emergency preparations, degree of customer discomfort
- Quality of the utility's external communications,
- Visibility and progression of the restoration,
- Availability and accuracy of restoration estimates, and
- Customers' communications capability during the outage event.

The call center should have access to information requested by customers. During outages, customers want specific actionable information to make their decisions. Each customer call that does not provide requested information might increase future call volume, as well as the frustration levels of customers and Customer Service Representatives (CSRs). At the same time, the utility may not have yet completed damage assessment or developed a specific restoration estimate for each area or outage.

14.2 CenterPoint Energy Practices

CenterPoint Energy's 400-seat virtual call center is consistent with industry leading designs. The call center provides two-way communication with the customer before, during, and after outage events. The call center is equipped with an ACD and IVRU. The call center is a blended center that receives electric calls from the Houston service area, as well as gas customer calls from a six state service area. Electric calls average roughly 4–6,000 calls per day during normal conditions and the average daily FTEs for the electric queue are 42-44 CSRs. Under normal (not storm) conditions, the CenterPoint Energy call center targets service levels measured as 70% of the calls are answered within 30 seconds. This target has been generally met for the months immediately preceding Ike.

Calls are initially received and if there is a wait for an available agent, the call is transferred to an IVRU queue. After playing an IVRU message, the system will recognize the caller or request the caller enter appropriate outage information and a trouble ticket will be issued within the OAS system. If the caller is unrecognized after these attempts, they may hang up or stay on hold and be transferred into an agent queue to be handled in person.

CenterPoint Energy provides both local and "800" numbers for residential and small business customer contact, plus dedicated numbers for police, fire calls and other public safety concerns. The CenterPoint Energy call centers are designed to be "virtual" with the ability to shift calls among CenterPoint Energy facilities in Texas and Louisiana, home based Kelly Services agents, and, if necessary, to a 3rd party staff augmentation firm located in North Carolina. CenterPoint Energy also uses a Twenty First Century High Volume Call Answering (HVCA) system for handling outage periods with high volumes of calls or when agents are unavailable. Information is shared from the Outage Information System (OIS) regularly to ensure the IVRU and/or the HVCA have information to communicate to customers. Exhibit 14-2 shows the inbound call flows.

Due to the nature of the Texas deregulated utility regulatory environment, CenterPoint Energy customer service receives only outage calls into their electric operations call center. These calls into the electric call center are predominantly to report outages or check on status. Calls for more operational needs should be handled by the customer's Competitive Retailer's call center. Occasionally, due to confusion in the marketplace, customers call for billing, meter reading, status on service requests, etc. but they are referred to their Competitive Retailer (CR) . Because CRs have not transferred ANI information for their customers to CenterPoint Energy there is very limited caller/customer identification information in the CenterPoint Energy customer database. The implications of this are that callers cannot be recognized by their phone number (ANI) by an IVRU or an agent and must give their home address information to a live agent in order to be recognized. Even in normal operating conditions, this reduces the effectiveness of the CenterPoint Energy call center's automated services for identifying callers, logging trouble tickets and playing restoration messages to the caller. The ANI information has not been consistently supplied by the CR to CenterPoint Energy.

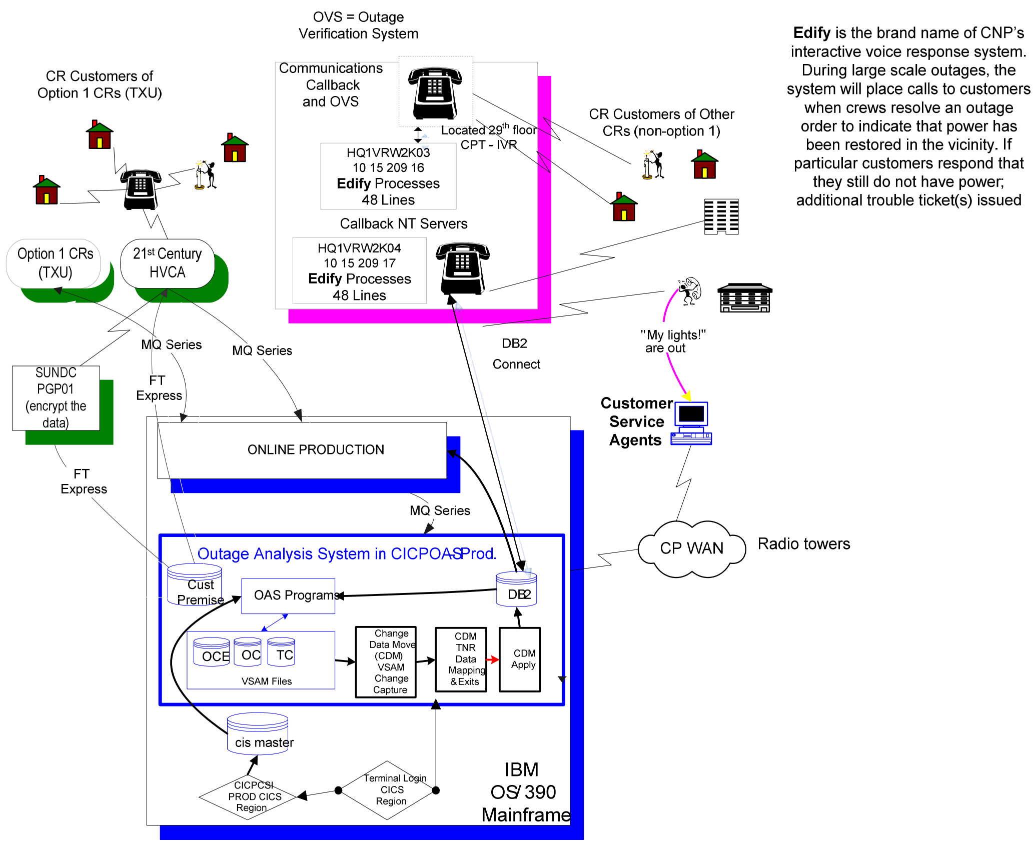


Exhibit 14-2: CenterPoint Energy Inbound Call Flow and Technology Schematic

14.3 Conclusions

14.3.1 CenterPoint Energy's call center EOP operations and personnel handled call volumes averaging ten times normal daily volumes during the Ike restoration.

Prior to Ike making landfall, CenterPoint Energy customer service turned on the HVCA system (Friday night, September 12th and Saturday morning, September 13th) to handle inbound calls while the CSR staff was riding out the storm.Once the storm had passed, over 350 call takers were deployed to handle calls. The majority of these CSRs were located in the CenterPoint Energy Tower in downtown Houston. Additional sites included seats in Shreveport, LA (50), and two Houston area facilities: Harrisburg (28) and Greenspoint (37).The facilities were utilized during the restoration with CSRs at Greenspoint for the first week, Harrisburg for the first few days and Shreveport for the first two weeks.

The CenterPoint Energy EOP calls for CenterPoint Energy to ensure an adequate number of CSRs are available to answer the phone. CenterPoint Energy trains other headquarter department employees annually to act as a resource for additional call center support. CSRs and other EOP assigned personnel are trained in the use of CenterPoint Energy's CIS system and training/drilling is offered often. Advanced workshops had been run very recently to assure understanding of systems and procedures as well as individual computer logon procedures were active. Especially valuable were the CSRs from the gas side of the business that began to handle electric calls. During the early stages of the restoration, the only gas calls that were accepted were of an emergency nature. Additionally, CenterPoint Energy can use former call center employees. Finally, contracted resources from Kelly Services (home agents) normally used in the electric call center and iQOR contracted resources in North Carolina were added into the queue to handle calls.

Customer Service management has built strong ties with their employees in the call center. In the aftermath of Hurricane Rita in October 2005, CenterPoint Energy experienced confusion among employees regarding which employees were required to report for work after the storm. Many newer employees followed public service announcements about evacuating out of town and were unavailable to CenterPoint Energy. Over the last three years, CenterPoint Energy has been very deliberate in the hiring and on-boarding of new employees to ensure they understand how the Company and its customers were depending on them during a hurricane restoration. CenterPoint Energy's call center staff is very new with 70% having only one year or less of tenure.   Customer Service had a very high participation rate by all of their employees, the only exceptions being family emergencies. During the outage once spouses of CSRs began to return to work, CenterPoint Energy's Human Resources management developed a program with the YMCA that provided childcare and the building's wellness center was available for showers.

Inbound activities for the first 2-3 days' calls were to report outages and CSRs would log and prioritize the calls if necessary using the "hot seat". The hot seat is a liaison between CSRs and dispatch that notifies dispatch once a trouble ticket is entered by a CSR and a call is placed by the CSR to the hot seat. During the first few days, Corporate Communications, through the media, communicated to customers not to call in to the call center as CenterPoint Energy knew where the power was out. On September 13th, when the magnitude of the damage was evident but not quantified, CenterPoint Energy communicated through media channels that customers should be "prepared to be without power for up to four weeks and possibly longer depending on the severity of the damage." It was further communicated that CenterPoint Energy was still determining the extent of the damage and restoration times. The CSRs were requested to only enter trouble tickets and respond to any questions they could. Messages communicated were mostly consistent with what callers were hearing via the media.

After four days, callers wanted to know restoration information for their specific house/business service. Around this time, CenterPoint Energy Corporate Communications had begun providing restoration tables by zip code to the media and put them on the website. After a few more days, these tables were translated into maps with estimated restoration times by zip code. The CSRs began to use these same tables and then maps to assist customers that didn't check or (or couldn't access) the website. Zip code estimates were reasonable for general areas, but as the restoration proceeded were insufficient to give more detailed estimates by address. With multiple substations and feeders serving each zip code and each sub-station having different ETRs for main circuits it was very challenging to give a specific, reliable time for restoring a zip code. As customers were directed to the web site via the media and introductory messages when calling CenterPoint Energy, the overall call volume began to shrink, as indicated in Exhibit 14-3.

Call volume also decreased further when Customer Service began playing an introductory message for callers on September 16th. In the first two days of playing an introductory message, 30% of the inbound callers listened to the message and ended their call. As evidenced in Exhibit 14-3, this freed up CSRs for other callers still in queue and improved metrics measuring customer responsiveness (i.e. abandonment, busy outs). The message, as well as CSR talking points, were changed one or more times per day based on Corporate Communications scripting. It also referred callers to the web site if they had access. After listening to the message, if the caller stayed on the line they were transferred to an open IVRU port. After listening to the IVRU message, the caller could enter appropriate information requested, hang up or stay on hold and be transferred into an agent queue. Call Center management has recommended that initial recorded messages be started on the first day of future major restorations and has included this procedure in the EOP for the call center going forward.

Overall, with call volumes ten times normal and electric call-based CSR personnel swelling from 42-44 agents to 350 agents across multiple locations, service levels on 15 of the 18 restoration days remained over the 70% target (for normal, non-storm conditions).

14.3.2 CenterPoint Energy electric customers experienced inconsistent call center service levels during the 18 days of Ike restoration.

The EOP plan for Customer Service is lacking in several key areas as detailed in the following findings.

14.3.2.1 There are no EOP targets for call center performance during a major restoration.

It is difficult to assess service received by customers, as there are no EOP targets identified for service performance. During normal conditions, service levels are targeted at 70% of calls answered within 30 seconds. During an outage the size of Ike, it may be reasonable to assume that service levels would not be consistent with normal conditions, however, with no targets set for EOP, it is difficult to assess performance and even more difficult to assess customer experience without conducting surveys of callers. Normal service level measurements aren't as important or accurate during an outage similar to Ike if a substantial percentage of callers get a busy signal, or abandon their calls through frustration.

As an example, the call center exceeded normal condition service levels for the first 4 days (averaging 85% service levels vs. a goal of 70%). During the same four days the peak period blockage rate (percentage of callers that received a busy signal during high call periods) was 25% and the abandonment rate (percentage of callers once the call center received the call that hung up without speaking to a person) was roughly 10%. However, on the fifth day, the call center began playing informational messages up front and the web site was offering restoration maps by zip code. The performance numbers for the next four days were: SL (97%), Blockage (less than 2%), and Abandonment (2.3%). Both four day Service Levels far exceeded goals under normal conditions, but customer experience was most likely better the second four days. Additionally, EOP call center targets will provide management with information to assess changes introduced and how they affected key performance indicators.

Call volume again increased after CenterPoint Energy changed the IVRU message on September 22nd to call now if your neighbors have power and you don't. Customers wanted to know about their specific power status at their address. Even having been told early on in the restoration that power might not be restored for up to four weeks, without an ability to get specific information about their situation, callers grew frustrated and some continued to call back, still without satisfaction.

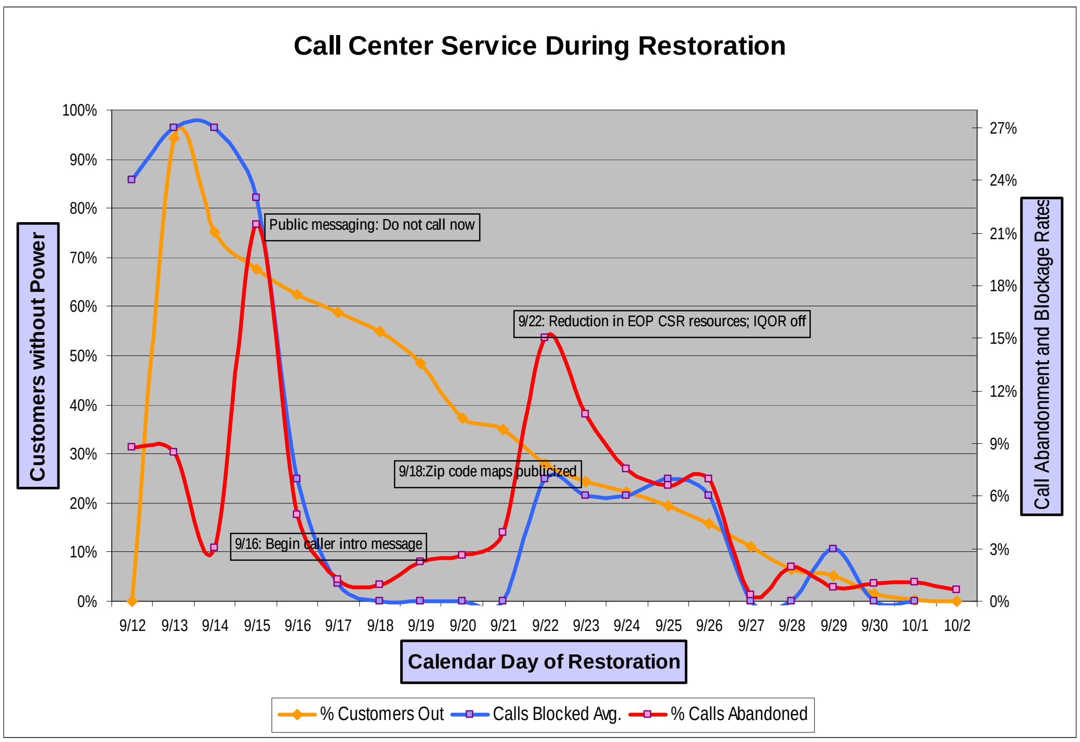


Exhibit 14-3: Call Center Abandonment & Blockage Rates During Restoration

14.3.2.2 Competitive Retailers did not consistently provide CenterPoint Energy with their customer information, including name, service address, and key contact numbers.

Without this information, much of the leading edge call center technology for identifying customers and addressing their restoration issues has little value and CSR productivity is negatively impacted. With ANI technology in place in leading call centers within and outside the utility industry, recognition of existing callers is valuable to the productivity of the CSR and most customers have come to expect this type of service from large call centers. CenterPoint Energy has this technology in place in their call center. During the Ike restoration, as well as under normal conditions, CenterPoint Energy was unable to recognize any more than 40% of callers due to no or limited customer information (ANI). This reduces the value of IVRU applications that can identify callers and play restoration messages and elongates the calls for CSRs by trying to identify the caller.

14.3.2.3 The use of a single, branded phone number has not been part of the CenterPoint Energy communications plan for customers to call customer service during an outage.

During the restoration, customers used both local and 800#s for contacting the center. Competitive Retailers publish CenterPoint Energy customer service numbers in their bills, as well as referring callers from their call center to a CenterPoint Energy phone number. There is no specific number that CenterPoint Energy has encouraged them to use; it is up to the discretion of the CR. Approximately 70-80 trunks were allocated to the local phone number(s) and 48 for the electric 800 number. By not knowing how many calls will come into either set of trunks, the call center can't manage their resources effectively. During the first four days of outage, the 800 number callers received busy signals nearly 60% of the time, while those calling the local number were blocked less than 5% as shown in Exhibit 14-3. CSRs may have been waiting for calls while customers were getting busy signals.

14.3.2.4 CSRs were not required to capture caller information throughout the restoration.

After identifying a caller, CSRs were instructed during the restoration not to capture customer information or log the call into a contact history database. The concern was that capture of this information would make the call handle times go up and lower the service level for the customers calling in. Without the contact history, CSRs were unable to give the caller confidence that CenterPoint Energy was aware of their previous call and/or outage.

14.3.2.5 Messaging was not synchronized throughout the Customer Service operation or across the Company.

CSR messages were not always consistent with the messages used by the rest of the Company, especially Corporate Communications. Sometimes customers would receive different information when calling back and reaching a different CSR. Information from CVal was not always communicated down to the CSR level effectively or consistently. Communications with the team was via email or paper handouts by supervisors, there were no meetings or briefing prior to a shift change.

Both Call Center and Communications management have recognized the need to craft specific scripts, not just talking points and communicate these during shift change debriefings. Additionally, assignment of dedicated Corporate Communications staff to the call center during a major restoration was recommended to be included in the EOP. The EOP does not dictate how the call center should provide estimated restoration times or ranges for callers during the later stages of the restoration.

14.3.3 The EOP does not have a comprehensive CSR back-up scenario if the call center becomes unusable.

In an outage of similar size to Ike, if the Tower location becomes unavailable, the CenterPoint Energy EOP does not identify enough CSR workplaces across their facilities to accommodate the number of CSRs that were needed during Ike. The alternate locations at Greenspoint, Harrisburg and other locations together cannot match the facilities at the CenterPoint Energy Tower.

14.3.4 The current EOP does not include a process or routine for customer bill estimations in the event of a storm the magnitude of Ike where meter reading was suspended for a long duration.

CenterPoint Energy informed the PUCT that customer meter reading would be suspended. However, since there was no bill estimation process or routine defined in the EOP, CenterPoint Energy Electric Market Operations had to develop this process from scratch, and it then had to be communicated to the Competitive Retailers (CRs). Due to the duration of meter reading suspension, 23 billing cycles had to be estimated. CenterPoint Energy was also unable to complete any customer connects and/or disconnects on behalf of the CRs during this period of time. As CenterPoint Energy worked out the details with the CRs, and subsequently, as the bills were released, a public relations problem ensued, exacerbated by certain media stories.

15. Emergency Restoration –Communications

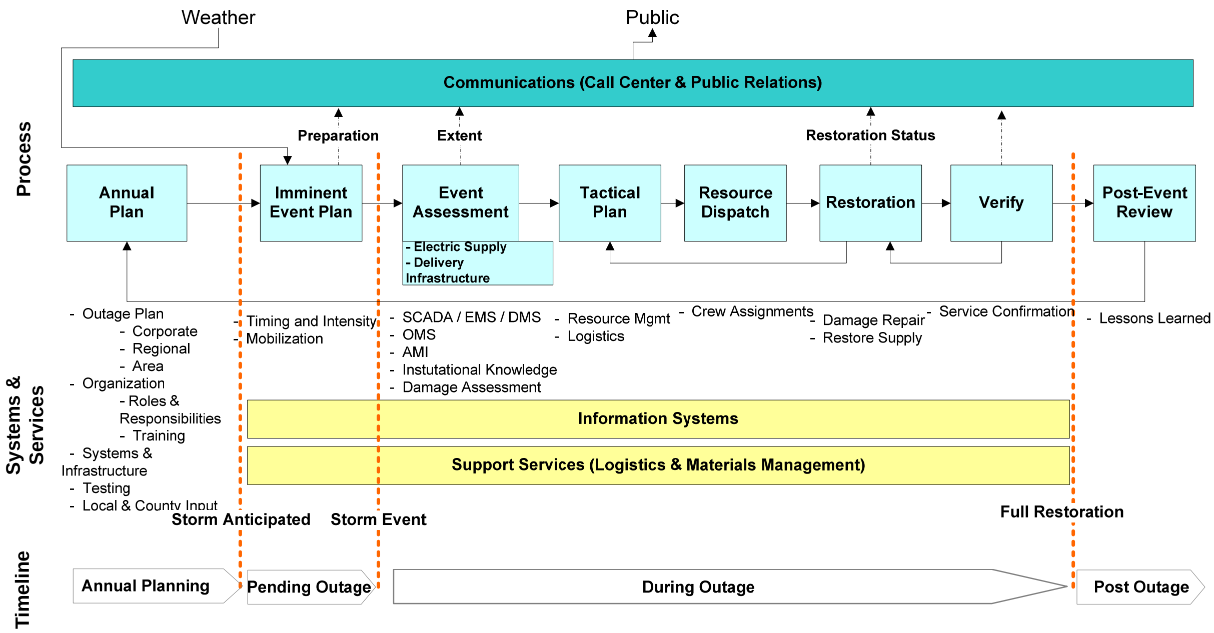


Exhibit 15-1: Outage Management Process – Communications

15.1 Industry Practices

A typical utility's external communications function provides information to customers before, during, and after outage events. External communications must also address the business community's needs to predict when service, and therefore, business, will be resumed. Government bodies such as local, county, state and regional authorities need restoration information to support public functions such as shelters, traffic control, food transportation and other essential public safety services such as healthcare and law enforcement. While it has similar functions as the call center, external communications is subject to customers' ability to receive TV, radio, print and internet media during outage events. Additionally, the media may act as a filter or interpreter, or even report news that dilutes the utility's intended message. Some utilities have messages pre-placed with radio stations to be played during storms to ensure the purity and clarity of its message gets to its customers. During restoration, the utility may decide to purchase radio time to send specific updated messages to its customers.

A typical utility's internal communications function provides information to department heads, employees and company contractors/suppliers before, during, and after outage events. Internal communications must inform and train employees and associates regarding an Emergency Response Plan (ERP), activation of an ERP, and the progression of resolution once the ERP is activated. This includes specific roles for employees in the ERP, when employees are expected to report to work, company progress during restoration and any specific messages that might be relevant at that time. Timely delivery of this information must take into account potential disaster recovery scenarios that will impact telecommunications channels, thus including in the ERP other methods to provide information accessibility to field and office employees as well as non-employees. It is important for management to have the ability to encourage employees, as well as inform as consistently as possible to ensure that there is a common understanding of current status or relevant issues enabling employees to participate effectively in their assigned ERP roles. Since employee roles will change during the activation of an ERP, enabling quick decision making by frontline employee teams, it's important for all employees, including executive management, to understand and acknowledge these emergency roles in order for emergency plans to be effectively implemented.

15.2 CenterPoint Energy Practices

This section addresses both the external and internal communications strategies and their execution.

15.2.1 External Communications

CenterPoint Energy has a Corporate Communications organization, a Competitive Retailer Relations function, a Key Accounts Management Function, a Community Relations function, and a Government Relations function; all are positioned to deliver messages and information to all affected customers, key accounts, communities, competitive retailers, and other governmental organizations during emergency events.

During an emergency event, all of these departments participate in a twice-daily emergency evaluation conference call initiated and managed by CenterPoint Energy's EOP Central Evaluation Center (CVal) structure. Representatives from the communications departments both rely on these calls for accurate and up-to-date restoration information as well as provide input to the conference call regarding new information from areas such as key accounts and competitive retailer relations.

As part of its annual EOP update, CenterPoint Energy developed for 2008 an external EOP and Manual. Additionally, CenterPoint Energy has developed an internal EOP SharePoint site that includes training presentations, employee EOP assignments, and EOP rosters. The EOP Plan includes specific sections for External Communications during an emergency event.

15.2.2 Internal Communications

CenterPoint Energy's Corporate Communications function has responsibility for internal as well as external communications. The EOP calls for Corporate Communications to provide employee communications prior to, during and after an emergency event. CenterPoint Energy has developed an internal EOP SharePoint site training presentations, employee EOP assignments, and EOP rosters. For internal communication regarding EOP activation, Corporate Communications updates the STORM Hotline and provides instructions on reporting for duty or any changes in assignments. The plan also includes pre-written scripts and phone numbers to call and record messages for employee access.

15.3 Conclusions

15.3.1 External Communications

15.3.1.1 CenterPoint Energy's 2008 Emergency Operating Plan's (EOP) Communications Plan for both external

and internal communications, is comprehensive and detailed.

As indicated in the Imminent Event Plan portion (section 10) of this report, CenterPoint Energy had the foresight to determine appropriate EOP actions and milestones in response to a day or night time hurricane landfall. This initiative provided the foundation for the activation steps included in the EOP Communications plan.

Exhibit 15-2 and Exhibit 15-3 depict activation of the EOP plan as it relates to communications planning. CenterPoint Energy's EOP activation planning begins up to 5 days prior to the storm event. The scenario shown here assumes a daytime landfall of noon.

Also included in Exhibit 15-2 and Exhibit 15-3 are proactive communications planning activities that occur prior to EOP activation, such as hurricane season advertising and sponsorship of the annual hurricane workshop.

Post-restoration planning activities that incorporate lessons learned from the storm event to include in the next revision of the EOP and in ongoing Corporate Communications initiatives.

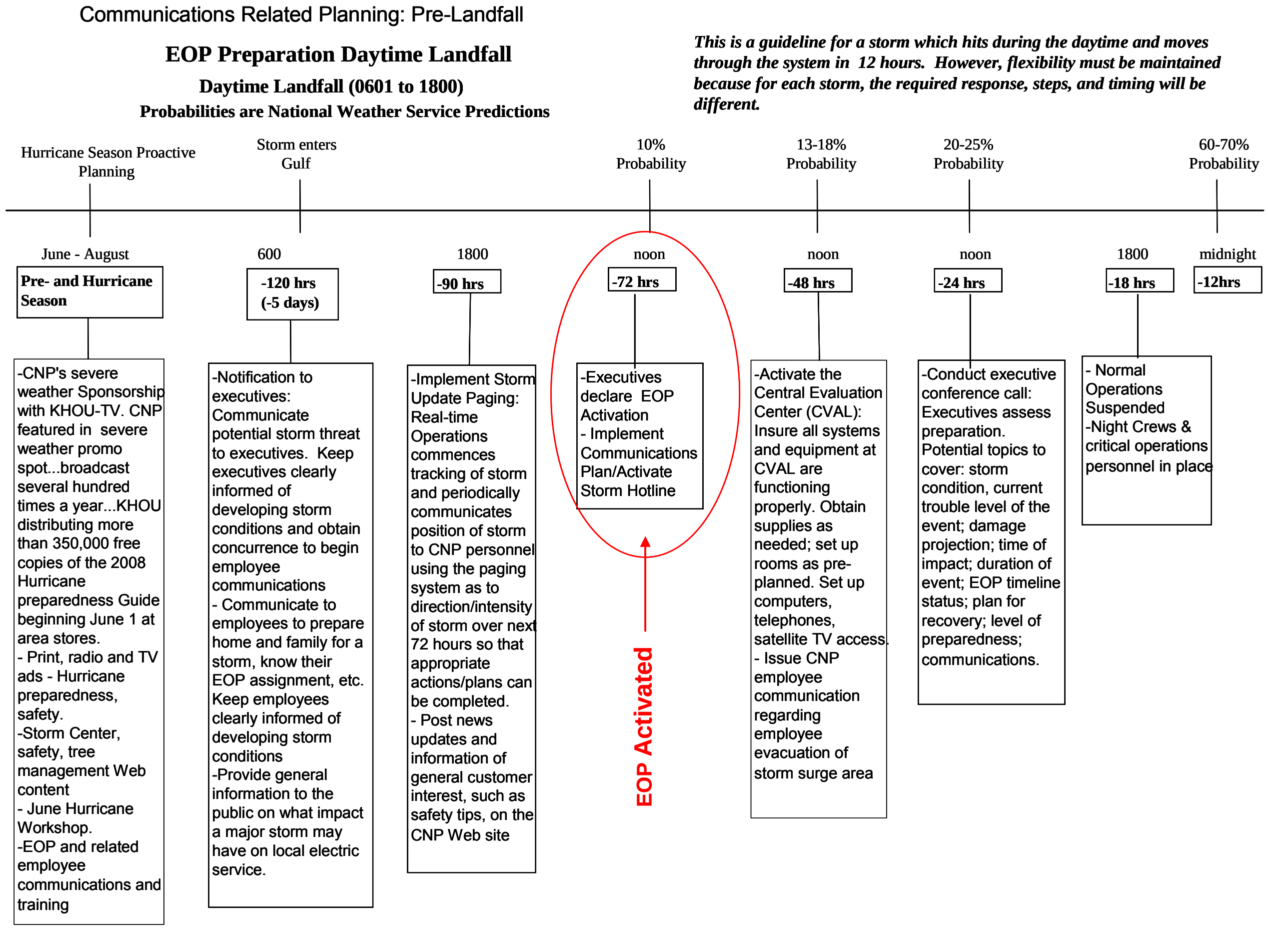


Exhibit 15-2: EOP – Communications Pre-Storm Event

Once the EOP is activated, both internal and external communications are further detailed in the Communications EOP as it relates to the storm restoration process as depicted in Exhibit 15-3.

Communications Related Planning: Post-Landfall

EOP Preparation Daytime Landfall
Daytime Landfall (0601 to 1800)
Probabilities are National Weather Service Predictions

Communications Team EOP Responsibilities

- Provide restoration maps for posting on the CNP Web site and for use by the media
- Communicate with employees through e-mail, voicemail, the STORM Hotline and Automated Notification System
- Direct video and photography during the emergency to record damage to equipment and restoration work by crews.
- Provide information updates to CNP management, the Call Center, Government Relations, CRs, and other key constituents.
- Prepare TV, radio, and/or newspaper ads, to address the situation.

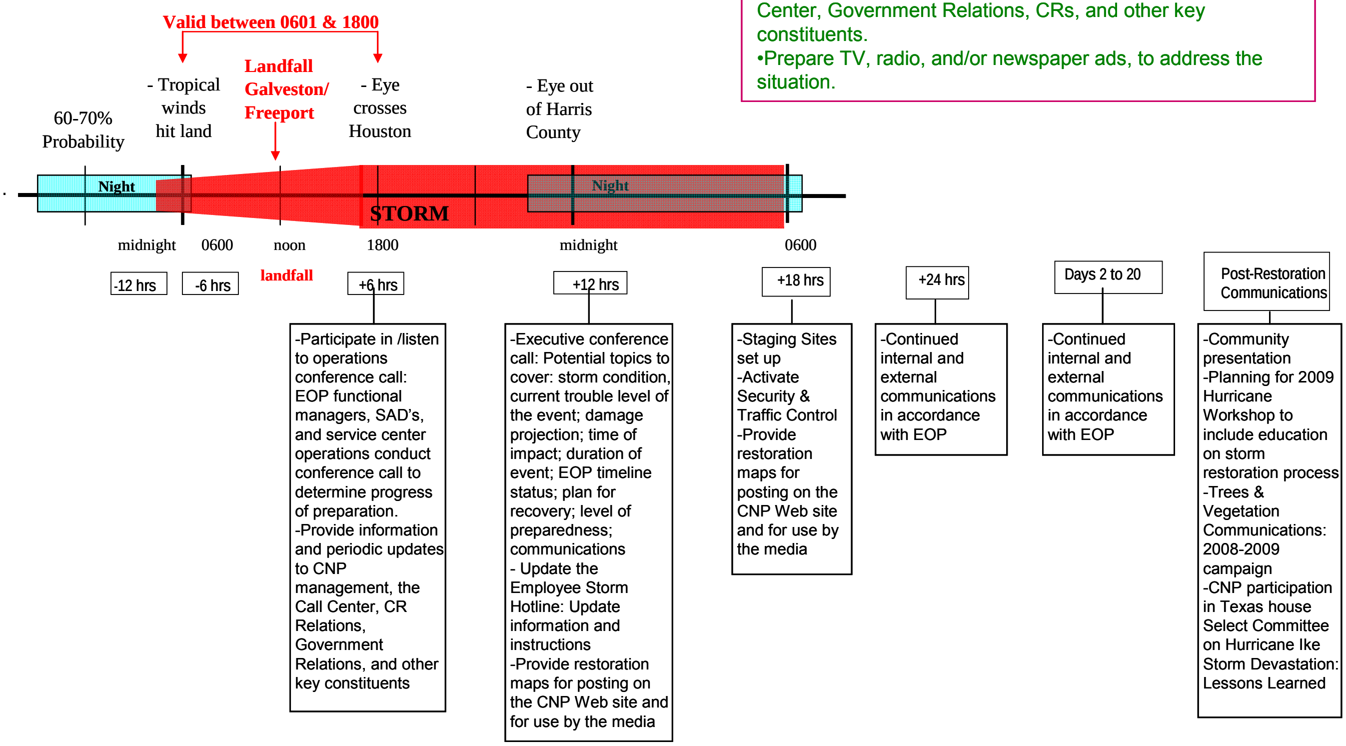


Exhibit 15-3: EOP – Communications During and Post Restoration

15.3.1.2 CenterPoint Energy's messaging was coordinated, except for customer service.

The CVal twice daily briefings, statistics reporting, and participation by the communications team were well planned and facilitate getting management, field operations personnel, customer service representatives, and other CenterPoint Energy personnel "on the same page" in terms of messages being communicated to the media, customers, and other external stakeholders.

However, the procedures for informing Customer Service were not adequately developed.

The CVal conference calls provided a very useful method for intra-company communications, especially related to synchronizing messages for external communications. Corporate Communications staff knew their roles and worked effectively across the corporation to assist in consistent messaging.

Information flow from CVal to departments was not always consistent, but most of these problems occurred within departments in the way they disseminated/filtered appropriate information to their respective employees. However, not all functional managers were well represented on the CVal calls; most notably Customer Call Center Managers. Consequently, CSRs were not always kept abreast of media messages and restoration activities, sometimes leading to misinformed responses to customer inquiries.

15.3.1.3 The strong relationships and communications channels established between the CenterPoint Energy key account managers and their customer contacts facilitated restoration management with these accounts.

Key Account managers have built strong relationships over the years with key account contacts. This resulted in better preparation for emergency events and assisted in quickly providing actionable restoration information to the right people, including account facilities management. These key accounts include critical customers such as hospitals, large municipalities such as the City of Houston, large chain accounts, and schools. Key account managers were able to provide actionable restoration information to their accounts. Post-storm key account interviews provide evidence of how well key account management worked in managing storm restoration processes and expectations. The account managers have worked with many of the key accounts to install back-up generation for use in outage events. CenterPoint Energy has also set up procedures to coordinate the orderly switchover of these customers with generators back to utility power when service is restored, a leading industry practice.

15.3.1.4 Hurricane season and pre-storm advertising and education are leading industry practices.

Pre-storm advertising regarding safety issues and estimated restoration length helped prepare the community for the extent of damage and set expectations for up to a four week outage. CenterPoint Energy aired pre-hurricane preparedness radio ads (a total of 255 spots) on September 11th and 12th on 22 Houston area radio stations.

CenterPoint Energy's hurricane season advertising served to assist safety planning for the public in advance of any major outage events. This advertising included a 2008 Hurricane Preparedness Guide (as part of CenterPoint Energy's Severe Weather Sponsorship with a Houston area television station – KHOU). KHOU distributed more than 350,000 free copies of the Hurricane Preparedness Guide and Tracking Chart beginning June 1st at area convenience stores and other retail outlets. CenterPoint Energy was also featured in a promotional spot broadcast several hundred times a year on local TV Channel 11. CenterPoint Energy co-sponsored a Houston/Galveston National Weather Service 2008 Hurricane Workshop on June 7th, free and open to the public. CenterPoint Energy's presentations included safety information and likely outage duration timelines in the event of storms of differing magnitudes. CenterPoint Energy advertises throughout the year regarding electric safety and tree trimming/vegetation management in print, radio, TV and Web formats.

CenterPoint Energy also has a Public Safety department with four full-time personnel that discuss normal safety issues as well as hurricane preparedness. At the 2008 Hurricane Workshop event, one CenterPoint Energy senior executive stated that if a Category 3 hurricane hits the Houston area, outages will last 2-3 weeks.

During storm restoration, 36 Houston community newspapers donated space for a CenterPoint Energy post-Hurricane Ike safety tips advertisement. Also, during the restoration, door hangers and flyers were distributed to specific customers regarding equipment repairs (weatherhead and/or meter box damage) required before power could be restored to those premises.

15.3.1.5 Public use of the CenterPoint Energy website and internet communications regarding restoration progress, demonstrated the value of multiple communications channels during emergency events.

CenterPoint Energy utilized multiple channels for communicating with interested customers, the media, and other external stakeholders: TV, radio and print media; CenterPoint Energy's website; IVRU; conference calls; emails; and printed newsletter/flyers. The website outage and restoration maps were referenced extensively by the public, the media, government officials, and regulators, and were well received as a source of information during the first six days of the outage event. Public access to the zip code restoration maps also served to reduce call inquires to CenterPoint Energy's call center.

The first outage maps were issued on September 13 at 11:00 a.m. and included a PDF version of the outages by region, as well as a total CenterPoint Energy service area map. This release also included a PDF table of an estimated number of customers by Zip Code affected by Hurricane Ike. From 9/13 – 9/16, these tables were updated 2 – 3 times/day. Throughout the timeframe of 9/17 – 9/19, they were updated 4 times per day and then for the duration of the recovery period, they were updated at least twice daily. As restoration details became available, the tables were translated into maps and refined to provide more detailed estimates of the restoration efforts.

15.3.1.6 There was cooperation between CenterPoint Energy and the Competitive Retailers (CRs) during the restoration.

The CR Relations function employs a leading industry practice using CenterPoint Energy CR Account Managers who interact with CRs doing business in CenterPoint Energy's service area. Much like the Key Account Managers, the relationships that the CR Account Managers have established with their accounts provide a consistent and actionable communications conduit during outage restoration events. The CR Relations section of the Communications EOP resulted from the after action review following Hurricane Rita.

Competitive Retailer Relations issued seventy-six official Market Notices before, during and after the Hurricane Ike event. These notices were delivered to the Market's ERCOT Retail Market Subcommittee (RMS) ListServe distribution list, and to an independent list of specific contacts / categories within CenterPoint Energy's Retail Electric Providers Address Book database. Market Notices were distributed between September 10, 2008 and October 31, 2008, and all were also posted on the "Market Notices" section on the Competitive Retailers Support location on the CenterPoint Energy Corporate website. The majority of the notices posted after October 2nd were related to the clean-up of issues resulting from the suspension of field and dispatching operations (i.e., meter reading, response to move-in and move-out requests) during Ike restoration, and the subsequent billing issues and backlog of customer service requests that ensued.

Market notices to CRs during restoration included all changes to customer messaging (such as IVRU messaging) and media messages to assist in consistent responses to customers. This is further detailed in Exhibit 15-5.

15.3.1.7 CenterPoint Energy's Crew Spokesperson role is a leading industry practice, but the function needs further development.

CenterPoint Energy has defined EOP crew spokesperson roles. These employees ride with the field crews during restoration to respond to inquiries from customers, media, and other public stakeholders. The spokesperson role is to interact with both the internal crew employees and with customers and the media. The spokesperson also made sure that information being distributed to field employees in newsletters was communicated. A leader is assigned to the crew spokespersons for each service center as a manager/coordinator. The spokesperson role allows the crews to continue with their work as opposed to being distracted by questions and concerns from the public. As CenterPoint Energy personnel describe this, it "allows lineman to be boots up". The role also provides consistency in the messages being conveyed to the public. In addition, the crew spokespeople, along with customer service CSRs, were the sounding board for what customers were saying, (rumors, questions, etc.) that Corporate Communications then uses as input for crafting messages for the CVal calls. Corporate Communications is then responsible for ensuring that the crew spokespersons have the most up-to-date information/messages being communicated to the public.

Execution of this role during Hurricane Ike resulted in mixed reviews. When the spokespersons were well trained and/or were good communicators, the results were very positive; if not, very negative. Media often used the negative results and miscommunication to accentuate CenterPoint Energy's restoration efforts to the public. In addition to more formal training for all Crew Spokespersons, Crew Spokesperson leaders need training on how to organize, deploy and receive feedback from those in the field.

15.3.1.8 CenterPoint Energy has a well-defined plan for communicating to the public via multiple channels prior to and during a major outage event, but CenterPoint Energy was not proactive in influencing, countering, or controlling media messages.

CenterPoint Energy has a well defined process for conveying restoration information to the public via press releases, the Web, advertising, the crew spokesperson role, and even hardcopy newsletters when telecommunications are down.

The consistency of messages through multiple channels was well coordinated during the Hurricane Ike restoration through approximately day 7 of the restoration. Up to this point, the media was content with the information being released by CenterPoint Energy. However, once the public began to question the progress of the restoration, the media began to take control of the messages, even inviting customers to report outages to TV stations instead of to CenterPoint Energy.

As indicated in Exhibit 15-4: and Exhibit 15-5, CenterPoint Energy issued 64 press releases from September 10th, prior to the outage event (Ike landfall on September 13th) through EOP deactivation on October 2nd; these press releases were in sync with the CR market notices, the Web-based outage maps, and the communications updates to state and federal regulators. However, during this same period, there were at least 40 media (TV, radio, posted to media Web sites) interviews of CenterPoint Energy personnel (by phone, on air) that were not planned or controlled by CenterPoint Energy; and only two CenterPoint Energy initiated press conferences and 3 CenterPoint Energy-initiated interviews. Utilities that plan these events proactively have found that they retain more control of messaging to the public.

KEMA's review of TV and radio coverage indicates that claims of preferential treatment (neighborhoods, premises), inadequate tree trimming expenditures, and claims of lack of urgency in the restoration process were mentioned along with CenterPoint Energy's storm messaging, thus diluting CenterPoint Energy's intended message and reducing the public's confidence in CenterPoint Energy's capabilities and outage restoration efforts.

The timing of CenterPoint Energy's external messaging prior to and during the Hurricane Ike restoration process is depicted in Exhibit 15-4: and Exhibit 15-5.

09/08/2008 Day -5

- Communicated with local and national media about hurricane preparedness
- Kenny Mercado, division senior vice president of CenterPoint Energy's Electric Operations, TV interview: discusses how CNP is preparing for the storm

09/09/2008 Day -4

- Began communicating with key stakeholders (local and state officials)

09/10/2008 Day -3

- EOP activated
- Issued press release on hurricane prep: "Customers need to be prepared to be without power for at least 2 weeks." Release included important electric and gas safety tips.
- Began calling critical care customers
- CR Relations issued additional market notice to CRs and EDI providers: "CNP Activates Emergency Operating Plan (EOP) for Hurricane Ike [Meter Reading Operations Suspended, Disconnect for Non-Pay Activity Suspended, Critical Care Customers Notified]"

09/11/2008 Day -2

- Began radio advertising
- Continued to respond to media inquiries
- Kenny Mercado, division senior vice president of CenterPoint Energy's Electric Operations, provided TV interview on Texas Cable New Network: Communicated about mutual assistance crews, emphasized strength of Ike as being much more serious than Rita. Told audience to expect extended outages and walked through the process CNP would use to restore power.
- CR Relations market notice to CRs and EDI providers: "CenterPoint Energy is NOT performing any Disconnect for Non-Pay (DNP) executions effective immediately throughout the CNP Service Territory"

09/12/2008 Day -1

- CNP issued press release on pending storm impact: "Customers need to be prepared to be without power for at least two weeks and possibly longer depending on the severity of the damage...CenterPoint Energy has technology in place today that indicates which power lines are out, so in the first few days after a storm, customers are asked to limit calls to the company to only true emergencies - such as reporting downed power lines." Release included important electric and gas safety tips.
- In addition to content in press release, CR Relations issued additional market notice: CNP Field Operations Update: " [MVI / MVO Worked as Able, Meter Tests, Re-Reads, Change Orders Not Worked, All Construction Ceased, No Field Activities Saturday]".
- Company issued 1st TPUC Outage & Restoration reports in pre-defined reporting format showing stats by county and zip code.
- Company issued 1st DOE Electric Emergency Incident Report (form OE-417)

09/13/2008 Day 0

- 2 am: Hurricane Ike made landfall near Galveston
- 11 am: When winds subsided below 40 mph in the southern part of service territory, crews began restoring power
- Company issued 4 press releases; key messages: CenterPoint Energy begins power restoration and damage assessment following Hurricane Ike; "Customers need to be prepared to be without power for up to four weeks and possibly longer depending on the severity of the damage"; Customers asked not to call; Post-storm natural gas safety tips; Crews restore power to 112,000 customers in the first 8 hours of recovery; Crews restore power to 112,000 customers in the first 8 hours of recovery.
- The first Outage Maps were posted on CNP's external web site at 11:00 a.m. and included a PDF version of the outages by region, as well as a total CNP service area map. This release also included a PDF of an estimated number of customers by Zip Code affected by Hurricane Ike. From 9/13 - 9/16, these maps were updated 2 - 3 times/ day.
- CNP CR Relations issued 2 market notices mirroring content in the press releases.
- Company issued 3 Outage & Restoration reports to TPUC at 1:00 am, 5:00 am, and 12:30 pm.
- 2nd DOE Electric Emergency Incident Report (form OE-417) issued. CNP issued these reports to TPUC daily throughout the restoration.

Exhibit 15-4: Timing of External Messaging Pre-Storm

PHASE 1: Damage assessment and priority restoration
Emphasis on transmission lines and substations (days 1 to 4)

- Issued 15 press releases. Key messages: Number of customer restored; key critical facilities restored; explanation of restoration process and priorities; electric and gas safety reminders; asked customers NOT to call to report outages, only to report emergencies; directed the public to CNP's web site for map of power outages and restoration progress; informed customers of their responsibilities re. damage to meter enclosures or weatherheads and removal of debris left by tree trimming crews.
- CR Relations issued market notices concerning suspension of CNP field and dispatching operations: "[Meter Reading and Switch Readings Estimated, Suspension of All Meter Reading, DNP, MVI, MVO ... Until Further Notice]".
- 09/16/08 press release: With 63% of customers still without power, ""Using our computer restoration model which is based on historical data and damage assessment data... we are confident that we will have power restored to as much as 75 percent of our customers next week," said Kenny Mercado, CenterPoint Energy's senior vice president of Electric Operations. "...we will soon be able to project restoration times for specific geographic areas."
- Day 4: Transmission lines and majority of substation capabilities restored. Issued media advisory: Mutual assistance crews answer call to speed power restoration efforts – Interviews and visual opportunities; interview with Kenny Mercado, Senior VP of Electric Operations.
- Began issuing TPUC Outage & Restoration by county and zip code status reports multiple times each day throughout restoration
- Began issuing T&D equipment and customer outage stats daily through duration of the restoration effort to both DOE and TPUC
- Began issuing DOE update report daily through the duration of the restoration effort; including outage updates, impact on area (economic, health and welfare), CNP resource issues, and DOE/Federal aid needed and/ or provided.

Days 1 to 4
09/14/08 – 09/17/08

PHASE 2: On day 5, armies of tree trimmers followed by linemen swept areas and made repairs that restored power to the greatest number of customers

- Throughout the timeframe of 9/17 - 9/19, CNP increased updates to the web site outage and restoration maps to four times/day and then for the duration of the recovery period, they were updated at least twice daily.
- Issued 15 press releases. Key messages: Announced phase two of the CNP EOP restoration process ; "Our goal is to continue to make repairs to damaged lines that will restore power to the greatest number of customers,...We're also committed to providing restoration timeline updates by zip code, especially for customers served by damaged transformers or individual service drops that take the longest to restore."; Updated power restoration forecast; Provided answers to FAQs; Call before you dig.
- **Day 7 – 09-20-08 – Achieved 50% restoration milestone – over 1M customers restored.**

Day 7
09/20/08

- Asked customers to call if neighbors have power and you don't.
- Revised messaging used in Interactive Voice Response (IVR) System for incoming customer calls: If most of your neighborhood is still without power, referred the caller to zip code maps; if most of your area has been restored, and you still do not have power, asked caller to stay on the line to speak with a CSR.
- 36 Houston Community Newspapers donate space to run CNP power restoration and safety ads
- Issued 7 press releases. Key messages: Steps customers can take to help get their home ready to receive electric service and stay safe; customer outage updates.
- CR Relations issued market notices: Asking CRs to utilize similar language in their IVR Systems and their CSRs' interaction with retail customers; CNP prepared to accept limited specific service order requests.
- **Day 10 – 09-23-08 – Achieved 75% restoration milestone – 1.58M customers restored**
- Day 10 – CNP initiated news conference (at Greenspoint Service Center Loading Dock) to reassure the public of commitment to the community and that the Company has the right resources, experience and know-how to restore everyone's power. CNP participants are Floyd LeBlanc (moderator), David McCllanahan (current state of restoration, CNP EOP plan, cost of restoration and what it means to customers), and Tom Standish (Major damage assessment, process and timeline of restoration, forecast).

Day 10
09/23/08

Transformer and customer level repairs and restoration

- Issued 9 press releases. Key messages: Outage updates; **After completion of major line repairs, crews focused on more localized outages at transformer (10 customers or less) and individual lines to homes and businesses**; customers should call to help company identify isolated pockets of outages – make sure your equipment is ready to receive power.
- CR Relations market notices: CNP estimated usage – the company adjusted the normal estimation routines to factor in the extended period of customer outages – the adjustment schedule was posted in the market notice.

Day 14
09/27/08

- Issued 4 press releases. Key messages: Outage updates; **CNP completes major restoration of our transmission, substation and distribution infrastructure – 2M customers restored.**
- Tom Standish, Senior VP & President of Regulated Operations, wrote an essay published in the Houston Chronicle, "Let's Build the Power Grid of the Future"...calling for investment in intelligent grid and metering technology to help avoid long outage durations.
- CR Relations market notice: Announced strategic plan to accept and process backlogged enrollment transactions and resume meter reading; estimates that all CRs combined are holding approximately 75,000 orders that have collected during the time the field and dispatch activities were suspended during the EOP execution.

Day 16
09/29/08

- Issued 5 press releases. Key messages: Outage updates; **CNP has restored power to all customers who can safely receive electric service**; EOP concluded, work continues in isolated cases for those customers needing customer-owned equipment repairs or replacement of temporary fixes.

Day 18
10/01/08

Exhibit 15-5: Timing of External Messaging Post-Storm

15.3.2 Internal Communications

15.3.2.1 Employees understood the EOP jobs they were expected to perform and their responsibilities for being on call.

CenterPoint Energy management's communications to employees after hurricane Rita was effective in setting expectations regarding employees' roles and responsibilities during emergency events. CenterPoint Energy also conducts regular training and EOP drills.

15.3.2.2 CenterPoint Energy's communications with employees, contractors and mutual aid crews was informative, timely, and effective.

The Communications EOP calls for the setup of a Storm Hotline (recorded message accessible by local telephone number) for CenterPoint Energy employees to be updated at least twice a day prior to the storm and throughout the restoration. The Storm Hotline messages began by giving the caller the date and time that the message was current and how many customers are still without power and the number that had been restored so far, as well as other key external and internal messages regarding the restoration. At the end of the message, there was also information if a caller had questions and didn't know where to go for information.

While the Communications EOP did not take into consideration how communications would reach field employees in the event of telecommunications loss, the CenterPoint Energy communications team innovated a newsletter and associated distribution approach. Both an Ike Employee Newsletter and an Ike Mutual Assistance Newsletter for mutual aid crews were developed. Both of these newsletters were distributed each morning including restoration photos, statistics, CenterPoint Energy executive messages, media messages for crew spokespersons, and in the employee newsletters administrative guidelines such as filling out time reports for the restoration, etc. These newsletters were delivered electronically to office employees and printed for field employees each morning for distribution as they were eating breakfast. This unique method for communicating has not been seen by KEMA among other major utilities and is considered a leading practice.

16. Supply Chain

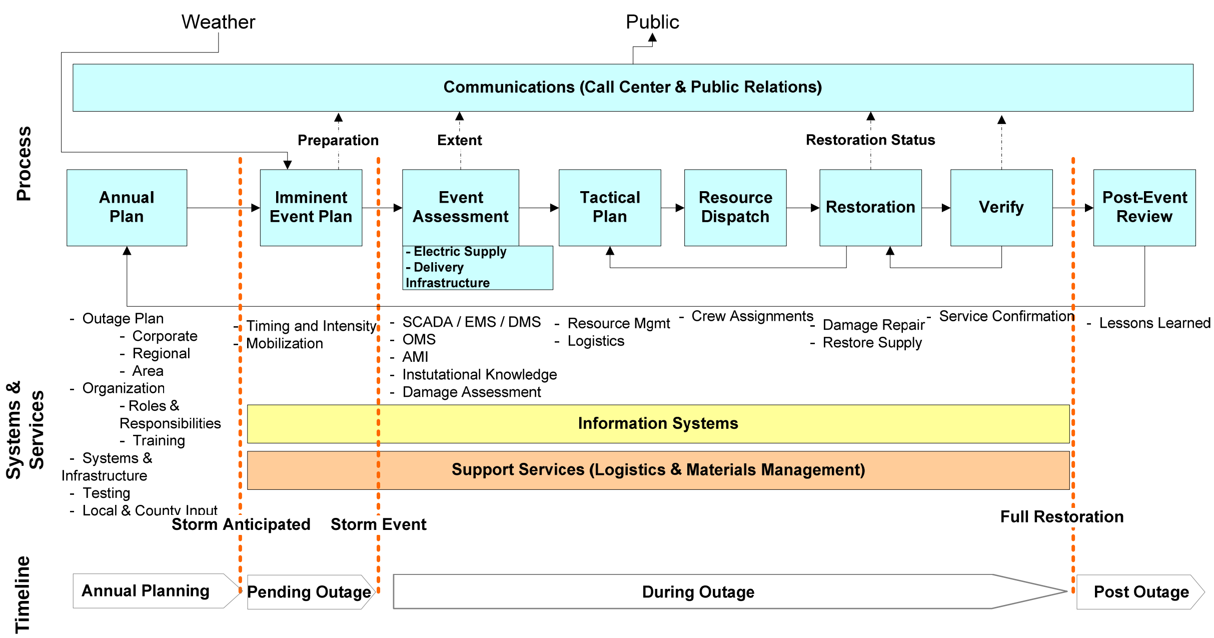


Exhibit 16-1: Outage Management Process – Supply Chain

16.1 Industry Practices

At all utilities, an outage event requires the availability of materials needed to repair or replace damaged infrastructure. These materials must be delivered to the right location in a timely fashion to maintain crew productivity. The supply chain must receive specific requests for materials from operating centers and must communicate delivery times and locations to field operations. The effectiveness of the supply chain directly affects the planning and execution of any storm event.

Due to long lead times for certain materials, the supply chain (purchasing, inventory control, storerooms, and distribution functions) requires planning to respond to an outage event. Pre-stocking of outage reserves within operating center storerooms or at other locations is needed to ensure rapid response and reduce transportation requirements during outage events. Further, major restorations consume materials at rates well above any reasonable level of outage reserves. The establishment of dedicated storm reserve stock is a relatively small cost compared to the economic impact of an extended outage on customers and to the community. Storm reserve stock is a wise investment to ensure timely restoration from a major outage. The supply chain must have plans in place to manage rapidly changing inventories, restock storerooms and crews effectively and order, track and expedite materials from suppliers.

Leading practices include emergency response language in the terms and conditions of contracts with major suppliers. This language prevents price gouging and sets expectations for the supplier to respond quickly to orders for large quantities and accelerated delivery of materials and equipment critical to restoration.

Another leading practice is to have pre-stocked trailers with all the usual line hardware. These trailers are only deployed during declared restoration emergencies. Further, to ensure sound physical inventory control they are staffed with storeroom personnel who are familiar with the items carried. The storeroom person is also responsible for maintaining the proper stores levels to prevent local shortages. Generally, these trailers include a layout map so items can be placed strategically to facilitate crews or a runners' ability to locate the material needed. These trailers are moved to critical staging areas to keep the materials as close to the crews as realistically possible.

16.2 CenterPoint Energy Practices

On an annual basis, Purchasing and Logistics (P&L) evaluates and executes adjustments to the central inventory in preparation for the storm season. The goal is to provide an initial supply of material to support a five (5) day restoration effort. This will allow for the delivery of replenishment quantities based on the actual damage assessments. Storm Reserve stock is managed by pre-determining three stocking levels for each item.

- Level 1 is the amount kept on hand to respond to routine emergency work in normal circumstances

- Level 2 is the amount kept on hand during storm season due to increased risk
- Level 3 is the anticipated level needed during a storm restoration and is placed on order when triggered by the EOP and authorized by top management, usually 48 hours before predicted storm strike or landfall.

Five (5) Storm Kits were pre-packed and strategically pre-positioned in advance of the approaching storm at the following Service Centers:

- Greenspoint Service Center: 1 Storm Kit
- Katy Service Center: 2 Storm Kits
- Sugar Land Service Center: 1 Storm Kit
- Cypress Service Center: 1 Storm Kit

In accordance with the EOP timeline, P&L will prepare the remaining Service Center kits and deliver them to the Service Centers. Staging Site kits will be pulled after the Service Center kits are pulled and delivered since staging sites set up would begin at + 18 hours. These storm kits are not pre-loaded into trailers, but must be pulled and loaded. Each kit may require from 6 to 10 trailers.

Upon EOP activation, P&L activates a Distribution Material Evaluation Center (DMEC), which operates from the Central Warehouse Facility in the South Houston Complex. This facility is co-located with the Central Transformer Shop and the Fleet Maintenance Shop.

The DMEC consists of coordinators for purchasing, materials management, central distribution, field materials operations, and material substitutions. The plan calls for the logistical contractor to work out of the Center, who is responsible for coordinating expedited freight requirements, material handling equipment rentals, and other transportation and material handling needs from the Distribution Material Evaluation Center. Other key suppliers who work with CenterPoint Energy in this fashion include the distribution equipment supplier and the major distribution wire and cable suppler.

Staging sites are set up to accommodate foreign crews. Stocks of material are maintained at each site and are replenished from the Central Warehouse and the Central Transformer Shop. Temporary depots are used to receive and manage poles, by direct delivery from suppliers.

16.3 Conclusions

The Distribution Material Evaluation Center (DMEC) performed well before, during, and after the restoration began. A flexible and nimble supply chain organization responded to unexpected circumstances, such as unanticipated extent of damage and the requirement to manage and replenish 11 staging sites. This expansion of the EOP plan created the need to recover storm reserve stock from the Service Centers and redistribute it to staging sites because the expanded plan called for most material pick up at the staging sites, not the service center. CenterPoint Energy had pulled 1 staging site kit in preparation for an earlier storm (Gustav) and decided to leave that kit ready at the Central warehouse. As Ike was approaching, working with operations, the 5 service center kits were retrieved and created a 2nd staging site kit that was located at Central. There was enough material at Central and Irby (their primary supplier) to create a 3rd staging site kit that was ready for delivery when needed.

A daily materials conference call was attended by the materials management team, temporary depot managers, service center stores personnel, and staging site materials leaders. As a result, restoration was not delayed due to lack of materials.

A material reclamation procedure was used to assure that contract and mutual aid crews returned CenterPoint Energy owned material before leaving the service territory and to inspect and return materials to stock when possible.

Assistance from major suppliers contributed significantly in the overall materials acquisition and delivery. The presence of their representatives dramatically improved the Center's ability to locate items, resolve technical problems and approve substitutions if required, create purchase orders, and arrange expedited delivery. Manufacturers' representatives had access to their on-line equipment catalogs, drawings, and specifications. This innovation is an industry leading practice.

16.3.1 Staffing of the Distribution Material Evaluation Center with key decision makers and with representatives from major suppliers enabled rapid reaction to unanticipated requirements.

Staff at the DMEC proved to be innovative and flexible in reacting to the unanticipated demand. The DMEC staff consisted of persons to manage:

- Materials Management,
- Purchasing,
- Materials distribution,
- Field storerooms and temporary storage areas, and
- Material evaluation and substitutions.

The DMEC staff was augmented with representatives from major suppliers, including technical personnel from major distributors and manufacturers of key equipment and materials.

16.3.2 CenterPoint Energy had the foresight to hire a professional freight logistics management company.

As part of CenterPoint Energy's EOP planning, a freight management outsourcing company was retained by CenterPoint Energy, who managed the acquisition and assignment of specialized vehicles. The freight management company also managed inbound shipments from suppliers to assure that materials were delivered to the correct location. They arranged for the leasing of tractor/trailers, delivery trucks, forklifts, and pole trailers.

Innovations that evolved during restoration contributed to material availability at the staging sites, such as:

- The use of logging trucks to move poles, and

- Specially marked truck convoys escorted by the Houston Police Department.

16.3.3 Planned use of existing information systems and using SharePoint for material reports failed due to communications limitations and CenterPoint Energy implemented a paper back-up system.

Communication systems at the Central Warehouse all worked, but data entry got backlogged. After a few days the material management systems were abandoned for a paper back up system. The EOP called for extensive use of SharePoint as a reporting and record keeping medium. Very few locations could make SharePoint work, so it was abandoned in favor of paper forms. Paper copies of the storm kit inventory were used to indicate the items and quantities needed at each location. These forms were then faxed or telephoned in to the DMEC.

16.3.4 To cope with the scope of this restoration, CenterPoint Energy developed a method to estimate material requirements and communicate with the staging sites.

A daily inventory was taken at each staging site and sent to Purchasing. Daily consumption, based on these inventories was used to make replenishment decisions. Initially most material was ordered based on what was used the day before. Some requirements came from DVal, but most came by telephone, radio, and courier. Consumption of poles was tracked at staging sites with a daily inventory and planned replenishment as necessary.

The DMEC began to anticipate the type of material that would be needed for each phase of work. A forecasting tool was developed using an Excel spreadsheet which helped predict quantities of material needed based on predicted outage duration, rate of daily consumption, and material in the on-order pipeline.

Receipts from suppliers were entered into accounting systems for invoice approval, but granularity on material issues is limited to three “blanket” work orders for transmission, distribution, and substations.

17. Support Logistics

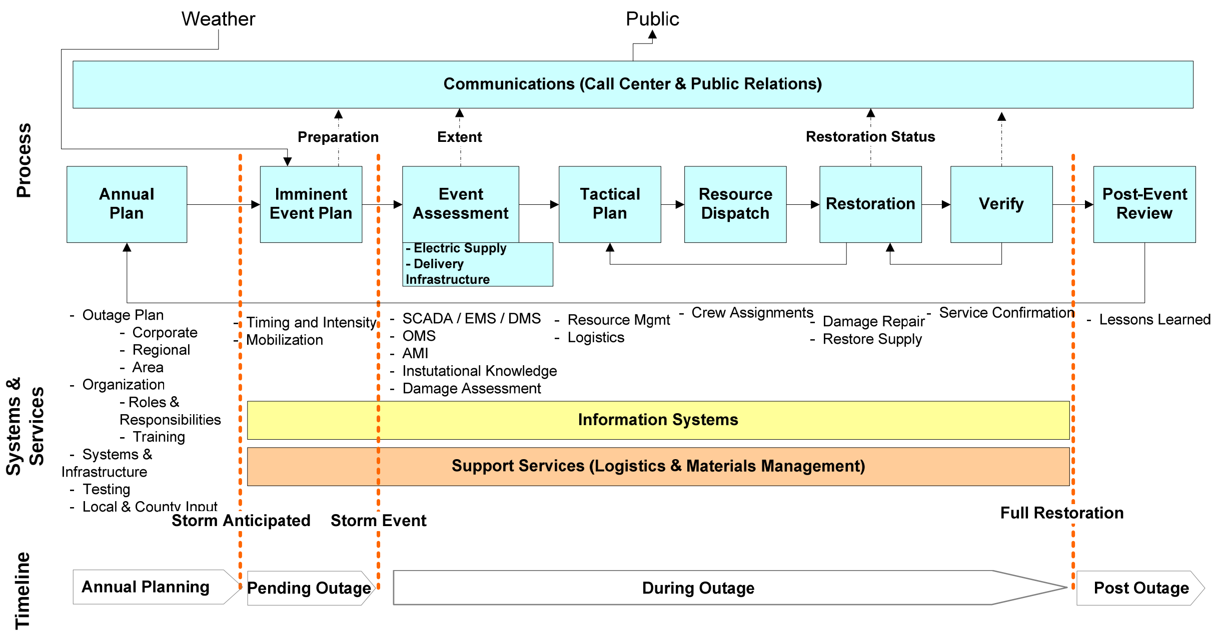


Exhibit 17-1: Outage Management Process – Support Logistics

17.1 Industry Practices

The typical utility must be prepared to provide support such as food and lodging for both its own employees while working long outage shifts and foreign restoration crews. This requirement is complicated by the typical 14-16 hour shifts used during the early phases of restoration, which leave little time for needed rest and travel to accommodations.

For efficiency, many utilities arrange catering services that deliver lunches to crews at their work locations and provide breakfast and dinner at the beginning and end of the workday. This alleviates the need for crews to travel from the work site for meals. The hotel/motel accommodations also require creativity, as the parking lots must be able to accommodate a large line trucks and other vehicles. In some circumstances, local hotel/motels cannot be used if they are still without power. A well-designed support logistics program avoids undue use of facilities that the utility's customers may also need such as hotel/motel rooms and restaurants.

17.2 CenterPoint Energy Practices

A logistics management network was established and operated out of the DVal primarily to support contract and mutual aid crews. Pre-storm contracts with hotels and suppliers of cots, tents, field kitchens, portable toilets, and portable showers provided equipment and supplies. Pre-storm contracts for buses and vans provided transportation of crews from the staging sites to accommodations. The EOP anticipated setting up 4 staging sites, and the Ike restoration expanded to 10 staging sites.

17.3 Conclusions

The logistics management network responded to unanticipated demand for food, lodging, and transportation. There was an adequate number of general duty and specialized vehicles made available from the CenterPoint Energy fleet and from pre-arranged contracts. The fueling contractor made an adequate number of fuel trucks available. The large demand for fuel caused by arriving foreign aid crews early in the restoration challenged the numbers of personnel and equipment, but the demand was adequately satisfied.

The demand for telecommunications equipment to support 10 staging sites was not anticipated. Access to information systems was limited at these sites; however the use of air-cards for laptops, cell phones and satellite connections satisfied the most critical communications needs. The lack of mobile-data capability for the mutual assistance crews made information systems, which rely on that data of limited use.

17.3.1 Unanticipated extent and severity of damage led to the establishment of 10 staging sites and 3 temporary material depots.

Pre-storm arrangements were in place for nearly all of the logistics equipment and supplies needed and this is an industry leading practice. Pre-arranged outsourced services for the acquisition and management of vehicles, fueling, and generator maintenance helped satisfy the unprecedented need for these services. These pre-arranged services were scalable to allow equipping and servicing all 10 staging sites.

Three temporary depot locations were set up to receive, inspect, and store poles before transferring them to staging sites. Each one was co-located with a service center at South Houston, Greenspoint, and Sugar Land. The South Houston location, where the central transformer shop is located, received all the transformers.

17.3.2 General purpose vehicles and specialized equipment were made available by CenterPoint Energy Fleet and from pre-arranged services.

The Corporate Fleet Office made CenterPoint Energy fleet vehicles available to the DVal for dispatch. Fleet leased "a couple of hundred" light trucks and cars from local rental agencies on a pre-arranged contract. The assignment of these vehicles was managed at the DVal. Vehicles to move materials, and specialized equipment (bulldozers, etc.) were all provided by suppliers and managed by the DVal. Requests for vehicles were routed to staging site managers and then to DVal.

The Corporate Fleet Office assigned mechanics (approximately 50) to staging sites to be managed by the site managers. Once the initial mobilization was complete, fleet personnel, other than mechanics, helped with fueling.

17.3.3 The assigned fueling coordinator and fuel supplier were able to adapt to unanticipated demand.

A fueling coordinator was located in a conference room at the South Houston Complex. Their responsibility was managing underground storage tanks (UST), skid mounted tanks, mobile “wet hose” fuelers, and fuel transports.

CenterPoint Energy has an alliance partner fueling supplier with emergency response language in contract terms and conditions. This supplier was invaluable in acquiring and delivering fuel supplies. Due to the volume requirements and refinery shutdowns, the fueling supplier pulled fuel from San Antonio and Dallas when needed. Fuel was also provided to some city and state facilities and rescue units when requested. Occasional fuel outages were experienced at staging sites because foreign crews arrived from long distance travel unannounced and filled up their trucks. Replacing 3000 gallon skid tanks with 8000 gallon skid tanks and placing “wet hose” tankers on each staging site resolved the situation.

Fueling was done at night, so that trucks would be ready to depart upon crew arrival each morning. A few crew delays occurred on the first day while waiting for fuel but never exceeded 90 minutes. However, by end of first day a system for tracking fuel levels at the various sites kept everyone fueled without delay.

Fuel record keeping systems could not keep up with the volume. Templates were developed in advance to track fuel supplied to incoming contractor and mutual assistance crews, but soon were abandoned due to volume of activity.

18. Appendices

18.1 List of Appendices

18.2 Comparative Data of Line Design and Pole Loading

COMPANY CODE	A	B	C	D	E	F	G
No. of customers	4,700,000	310,000	520,000	2,202,625	650,000	5,271,365	4,400,000
Customer class distribution							
Residential	34%	60%	60%	91%	60%	88%	88%
Commercial	46%	35%	20%	8%	20%	9%	11%
Industrial	20%	15%	20%	1%	20%	1%	1%
Percent OH/UG	64/36	60/40	70/30	71/29	67.5/32.5	80/20	83/17
Pole loading/design criteria	CA GO 95	NESC	NESC Gr B	NESC	NESC	CA GO 95	NESC Hvy Ldg
Max wind speed for design	100 mph	85 mph over 60 '	-	-	60 mph	56 mph	NESC
(wood, steel, concrete, composite)	w, s, composite	w,c,s,comp	w,s,comp	w	w,c	w	w, com
Setting depths of poles	Generally 10%+2 feet w/ 6' min.						
Typical span length (in feet)							
Feeders	200	250	200-300	200	200	150-300	138
Laterals	200	200	200-300	200-300	100	150-300	155
Software used for pole calcs	In-house	IDF-PRO	In-house,PLS	Unknown	O-CALC	In-house	In-house
Size of OH wire							
Feeders	336 ACSR	336 & 795	477	636 Al	336 Al	715 AA	336 AAC
Laterals	1/0 ACSR	#2	#2	1/0 ACSR	#2 AAAC	#4 ACSR	#4 & 1/0 ACSR
Use tree wire or spacer cable	Yes 1/0 ACSR	No	No	Yes,336&636	336/ 2/0 /#2	4/0 1/0	Yes
Type of insulators for storm prone areas	Porc & poly-clamp	Porc & poly	-	-	Porc-tie type	porc&poly/tie/clamp	n/a
Use different hardware to mount insulators	No	No	No	No	No	No	No
Framing used in storm areas	c-arm, delta	c-arm, vert	-	c-arm	c-arm,vert, delta	c-arm, delta	n/a
Any extra structural design for storm areas	Storm guys, washers	side guys	no	no	storm guys	no	no
Special UG design for storm areas	No	Bog shoes	No	No	No	Submersible	No
Special design for environ. Sensitive areas	No	Yes	No	No	Ye	Yes	Yes
Use any break away devices	No	No	No	No	No	No	s/l pole bases
Use special wire to reduce wind load	No	No	T2-2 (4/0) dplx	No	No	No	No
Any other special products for storm loading	No	No	No	No	No	No	PLP dampers
Equip used to install heavy poles (>5K lbs)							
Investigating new construction/materials	No	No	No	No	Trng on pole calcs	No	No

[1] National Oceanic and Atmospheric Administration (NOAA), http://www.ncdc.noaa.gov/oa/climate/research/2008/hurricanes08.html#ike

[2] CenterPoint website and 2007 annual report, newer delivery customer count is 2.27 million, http://www.centerpointenergy.com/about/companyoverview/fastfacts/.

[3] Energy Information Administration, note that 2008 is through September, http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html

[4] U.S. Geological Survey (USGS), http://coastal.er.usgs.gov/hurricanes/ike/photo-comparisons/bolivar.html

[5] Federal Emergency Management Agency (FEMA)

[6] Developed by ImpactWeather, CenterPoint's weather data service provider.

[7] ImpactWeather, http://impactweather.com/pdf/hsi.pdf

[8] NOAA, http://www.ncdc.noaa.gov/oa/climate/research/2008/hurricanes08.html#ike

[9] From the Associated Press

[10] NOAA, http://www.ncdc.noaa.gov/oa/climate/research/2008/hurricanes08.html#ike

[11] http://www.weather.com/newscenter/hurricanecentral/2008/ike.html?from=storm_names

[12] NOAA, http://www.ncdc.noaa.gov/oa/climate/research/2008/hurricanes08.html#ike

[13] NOAA

[14] ImpactWeather

[15] NOAA, http://www.aoml.noaa.gov/hrd/Storm_pages/ike2008/wind.html

[16] ImpactWeather

[17] ImpactWeather

[18] CenterPoint Energy, Inc., http://www.centerpointenergy.com/about/companyoverview/

[19] Southwire Company - Document 11-2 AAC

[20] American Forests, Urban Ecosystem Analysis For the Houston Gulf Coast Region

[21] http://www.weather.com/newscenter/hurricanecentral/2008/ike.html?from=storm_names

[22] NOAA and Economic Observatory, http://serviciodeestudios.bbva.com/TLBB/tlbb/sveN/ing/namerica/usa/infocus/historico/index.jsp#0

[23] NOAA and Economic Observatory, http://serviciodeestudios.bbva.com/TLBB/tlbb/sveN/ing/namerica/usa/infocus/historico/index.jsp#0

[24] From a Northeast Utility's Storm Report