

# ***Texas Strong: Hurricane Harvey Response and Restoration***

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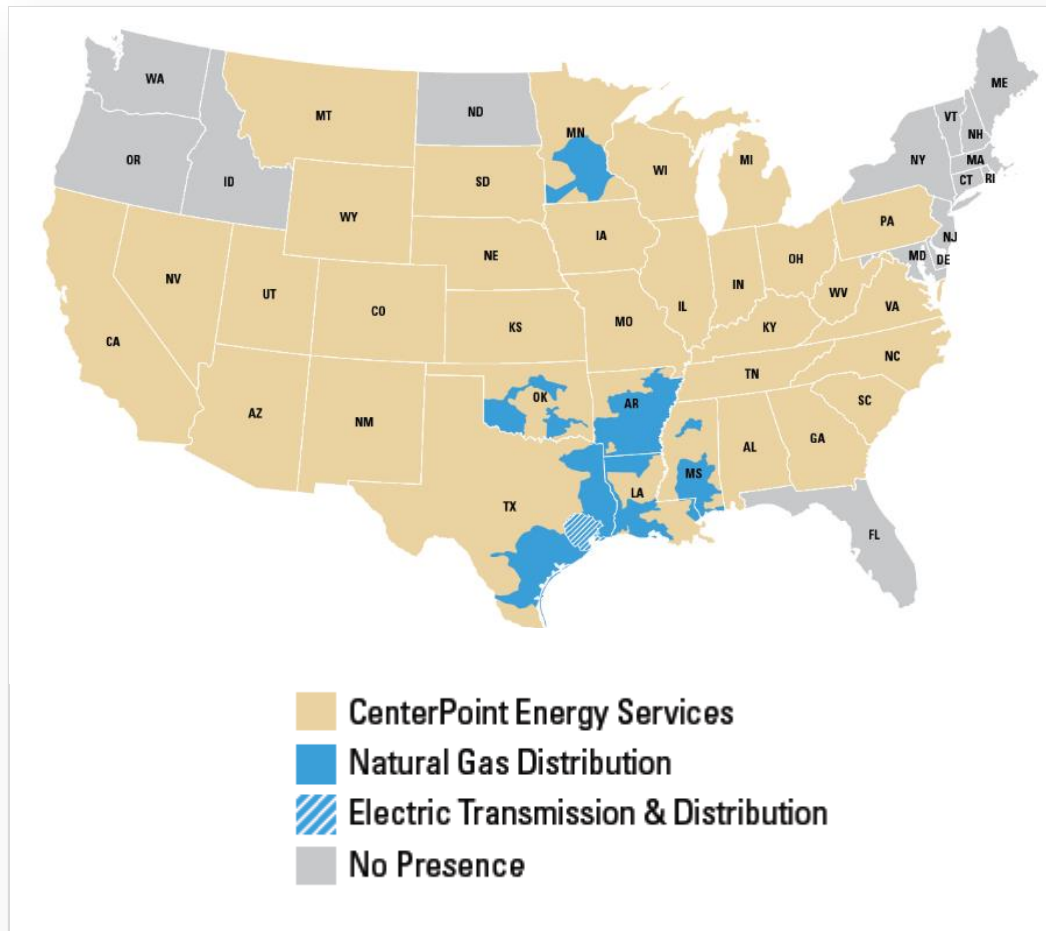
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# About CenterPoint Energy

An Electric and Natural Gas Utility



Source: Form 2016 10-K

## Electric Transmission and Distribution

- Electric utility operations with ~2.4 million metered customers across ~5,000 square miles in and around Houston, Texas
- 19<sup>th</sup> largest U.S. investor-owned electric utility by customer base<sup>(1)</sup>
- 86,828,902 MWh delivered

## Natural Gas Distribution

- Regulated gas distribution jurisdictions in six states with ~3.4 million customers
- 6<sup>th</sup> largest U.S. gas distribution company by customer base<sup>(1)</sup>
- Delivered 411 bcf of natural gas

## Energy Services

- Non-regulated competitive natural gas supply and related energy services serving ~33,000 commercial and industrial customers across 33 states
- Delivered 777 bcf of natural gas

<sup>(1)</sup> As of Dec. 31, 2015 per EEI and AGA

# Advance Preparations – Emergency Operating Plans



- Our Electric and Natural Gas businesses each has an Emergency Operations Plan
- Annual drill to test our emergency response
- Coordinate our EOP with state and local officials
- Work with a mutual assistance network that allows us to provide/receive assistance to/from other utilities across the country following natural disasters
  - On average, CenterPoint Energy sends linemen 4-6 times per year to help other utilities restore power
- Contracts for fuel, lodging and materials are executed in advance so we're ready if a storm strikes



# Timeline



employees<sup>1st</sup>



**Aug. 22, 2017**  
Electric and Gas Operations, logistics, fleet, service centers and facilities make preparations  
  
Begin posting storm readiness tips and safety information on social media

**Aug. 23, 2017**  
Regulatory and Gov't Relations work with officials  
  
News release distributes on hurricane preparedness  
  
Email to employees on preparedness

**Aug. 24, 2017**  
Electric and Gas Operations activate EOP  
  
Media interviews  
  
Publish social media messages on preparedness and safety  
  
Increase in employee messages on preparedness and EOP assignments

**Aug. 25, 2017**  
Harvey makes landfall as a Category 4 hurricane near Port Aransas, Texas  
  
Over the next five days, Harvey drops more than 50 inches of rain across our service territory

**Aug. 26, 2017**  
Activate Incident Command Center  
  
Issue news release on damage assessment and restoration update  
  
First wave of mutual assistance crews for Gas and Electric Operations

**Aug. 26-early Sept. 2017**  
Electric Operations builds a mobile substation to restore service to the Memorial area  
  
Gas Operations helps the city of Beaumont address a breach in the pipeline under the Neches River

**Sept. 1, 2017**  
CNP announces Employee 1<sup>st</sup> Fund to support impacted employees  
  
CNP announces \$1.25 Million to assist Harvey recovery

**Sept. 7-8, 2017**  
Electric Operations resumes normal operations for most employees on Sept. 7  
  
Gas Operations resumes normal operations on Sept. 8  
  
A Corporate Response Team is established to manage ongoing issues

# Wind Event vs. Water Event

## Hurricane Ike



## Hurricane Harvey



# Hurricane Harvey – A Record-breaking Storm



- After making landfall as a Category 4 storm near Port Aransas, Texas, Hurricane Harvey stalled, impacting south Texas, southeast Texas and Louisiana for days



- Maximum sustained winds were **130 mph winds** at landfall
- **51.88 inches** of rainfall in southeast Texas, breaking the single-storm record of 48 inches set in 1978 and more than 10-year annual average



- More than **42,000** lightning strikes across electric service territory
- Harvey spawned tornadoes in southeast Texas, Louisiana, Alabama, Mississippi, Tennessee and North Carolina

# Restoration Execution

*Restore Power Safely and Efficiently*



1. Restore service to key facilities vital to public safety, health and welfare and secure downed power lines
2. Repair major lines and fuses that restore power to greatest number of customers in least amount of time
3. Repair transformers, which typically serve about 10 customers
4. Repair individual electric drops to homes



# Impact of Grid Modernization

## *Benefits of Advanced Metering System (AMS) and Intelligent Grid*



- The Smart Grid, including distribution automation devices such as intelligent grid switches, allowed us to quickly isolate problems on our grid and restore service to customers through those devices.
  - Operated more than **250** of these devices during the event impacting more than **140,000 customers**
  - Were able to avoid almost **41 million outage minutes** for our customers
  - **16.71 SAIDI minutes** saved due to automation
- AMS meters increased efficiency during the storm
  - Executed **45,000 orders** remotely at **97% performance**
  - Billed **700,000 accounts** with actual readings at **98.9% performance**
  - Executed remote turn off/on for safety reasons
- Use of real-time analytics to assess, monitor and resolve cases
  - Aided in developing better situational awareness
  - Allowed us to correlate weather and flooding information with outages, providing operations with critical decision-making tools





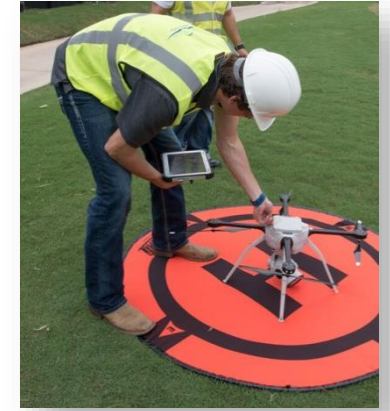
# Impact of Grid Modernization

## *Use of Technology during Storm*



- Drones helped to assess damage and evaluate work conditions

- More than **500 locations** were tracked using **15 drones**
- Enabled real-time situational awareness, accelerating restoration assessments
- Allowed us to efficiently direct crews to accessible locations
- Infrared capabilities helped identify equipment that needed further inspection



- Mobile data on each crew kept outage management efficient

- Ability to use **Power Alert Service (PAS)** to keep customers informed

- AMS meters provide outage information that enables our predictive analytics engine to supply data to PAS and IVR systems, ultimately allowing for better, more detailed customer updates

- Memorial mobile substation

- Memorial substation impacted by several feet of water
- **50MVA** mobile substation installed on private property in **7 days**
- Provided service to more than **9,000 customers** without power



- Flood wall at Grant substation helped protect service to Texas Medical Center

# Harvey by the Numbers

## Electric Operations Response



- **293** total electric circuits locked out and **4,494** total electric fuses out
- **8** substations out of service and **9** substations inaccessible due to high water
- More than **2,200** employees plus **1,500** contractors & mutual assistance personnel from **7** states
- **308** SAIDI minutes with **1.2 million** customers impacted
- **755 million** total minutes out over 10 days



# Harvey by the Numbers

## Electric Operations Response



- **5** staging sites
- **352,000** total hours worked during EOP event (160 hours per employee)
- Approximately **85 crew spokespersons** used
- **104,412** meals served
- More than **12,000** hotel rooms utilized



# Harvey by the Numbers

## *Electric Operations Response*

- More than **1.27** million total restorations
- More than **1,200** safety orientations and **120** crew safety observations
- **36** air boats, **15** drones and **15** amphibious vehicles used



# Harvey by the Numbers

## Gas Operations Response



- Responded to **8,246** gas emergency orders
- **130,016** gas meters assessed for damage
- Approximately **53,000** gas meters submerged under water that required remediation
- Approximately **460** crossings inspected of which **7** required remediation



# Harvey by the Numbers

## Gas Operations Response

- More than **1,050** EOP responders
- Mutual assistance resources from **4** states
  - Approximately **60** internal and contractor crews traveled to Sinton/Victoria area (Day 1)
  - Approximately **80** internal crews from Arkansas, Oklahoma and North Texas traveled to Houston (Day 5)
  - Approximately **15** internal crews from Louisiana and adjacent Texas offices (Lufkin and Huntsville) traveled to Beaumont (Day 6)
- **21,168** meals served
- CNP coordinated with city of Beaumont to address breach in **18-inch** gas pipeline under the Neches River
  - A remote methane leak detector (RMLD) mounted on a drone to check methane levels in Neches River
  - Divers, air boats, drones and high-profile vehicles used during response



# Harvey by the Numbers

## Gas Operations Response



- Inspected **863** stations
  - **83** submerged due to flood waters of which **75** required remediation
    - Relief valves, debris removal, fencing
- Advanced Leak Survey Technology
  - Surveyed **554** miles in South Texas within five days (wind impacted areas)
- Reviewed **83** photos for safety compliance before posting publicly



# Harvey by the Numbers

## Customer Service Response



- **485,455** calls to the call center
- **147,612** were answered by agents with IVR handling the remainder
- **352,629** outage notifications delivered through PAS service
- **22,257** new PAS enrollments



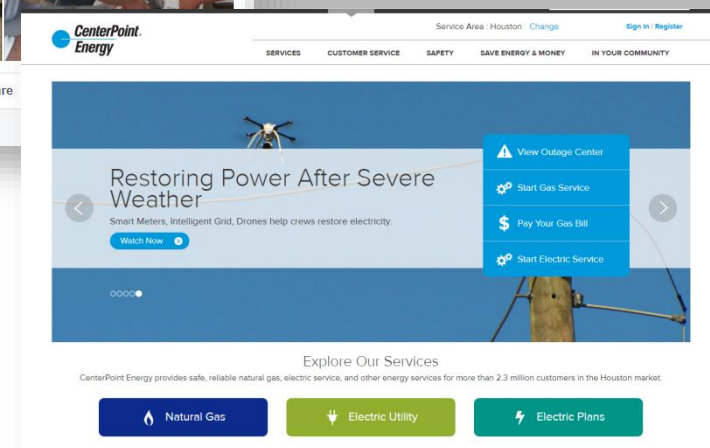


# Harvey by the Numbers

## Customer Service Response



- **160** Facebook posts that reached **1,095,314** people
- **566** tweets that reached **2,531,685** people
- **630,206** visits to CenterPointEnergy.com
- At the height of the storm, web traffic was more than **600%** higher than average
- Translated more than **50** communications into Spanish



# Harvey by the Numbers

## Community Giving and Employee Support



- **\$1.25 million** donated to Harvey recovery and relief efforts
- More than **\$125,000** donated to CNP Employees 1<sup>st</sup> Fund; company matching contributions up to **\$200,000**
- Contributed **\$50,000** to city of Beaumont for special assistance
- **301** calls to the EOP Employee Assistance hotline

employees<sup>1</sup>st



# Harvey by the Numbers

## Community Giving and Employee Support



- **340** employees impacted with home or vehicle damage
- **34** responses from employees offering shelter to another employee
- **68** responses to CNP rideshare program
- **46** children cared for in EOP daycare at CNP Tower



# Hurricane Comparisons



Year	Name	Cat.	Winds - Sustained (mph)	Tropical Storm Wind Field (Miles)	Electric Outages	Restoration
1983	Alicia	3	115	125	750,000	16 days
1989	Hugo	4	140	190	696,000	18 days
1992	Andrew	4	160	105	1.4 million	34 days
2004	Charley	4	150	170	874,000	14 days
2005	Katrina	3	125	230	970,000	6 weeks
2005	Rita	3	115	205	719,000	6 days
2005	Wilma	3	120	230	3.2 million	18 days
2008	Ike	2	110	450	2.15 million	18 days
<b>2017</b>	<b>Harvey</b>	<b>4</b>	<b>130</b>	<b>270</b>	<b>1.27 million</b>	<b>10 days</b>



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