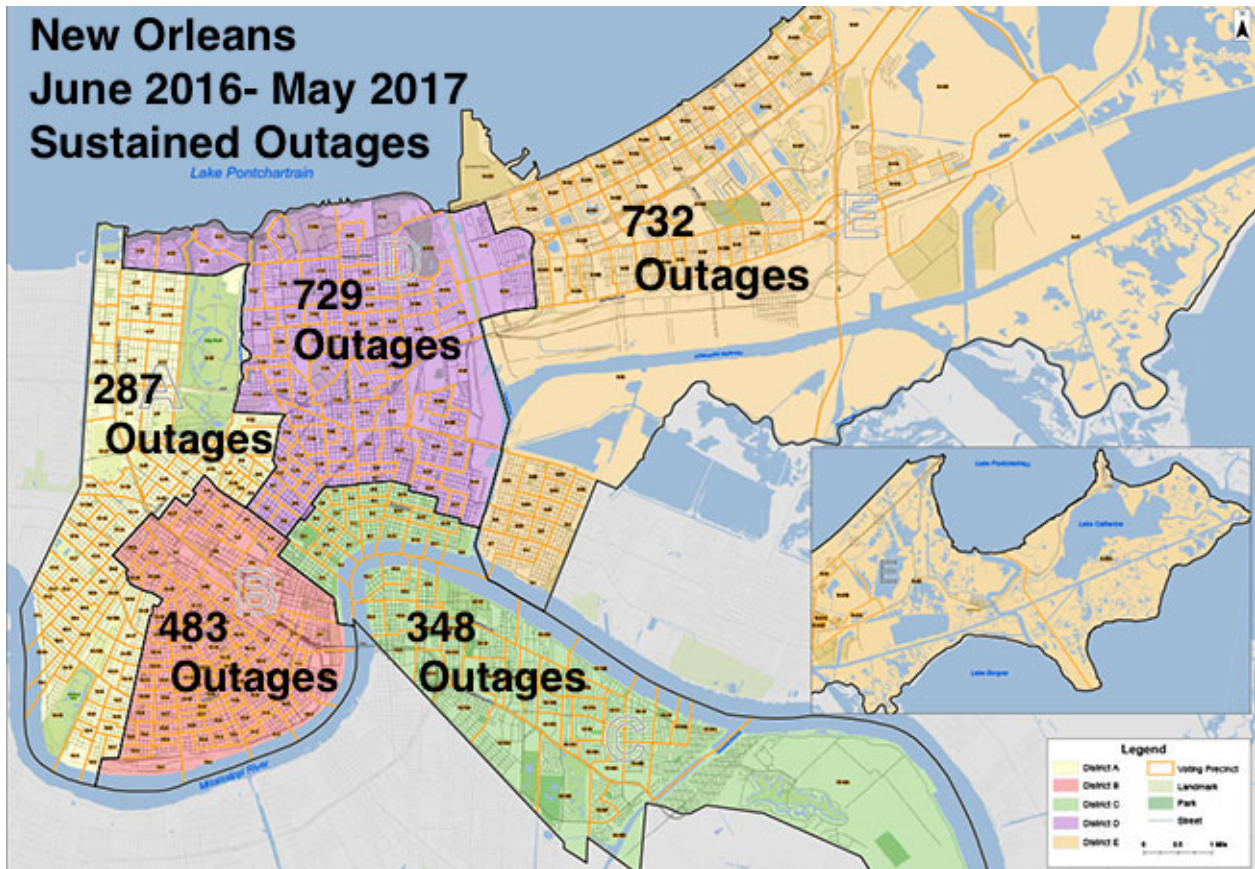


New Orleans has been Kept in the Dark

Making Sense of Outages, Reliability, & Resilience



September 2017



Outage, Reliability, and Resilience Facts

New Orleans has power outage issues today:

Outages: 2,599 in New Orleans from June 2016- May 2017

2,466: Average sustained outages every year in New Orleans from 2011 to 2016

98% of outages related to distribution system

2% related to transmission

0% related generation

In 2016-2017, over half of all outages related to Entergy "equipment failure" on distribution system.

A generating power plant will not solve any of the outages we currently experience.

Entergy has misrepresented the role of the Michoud power plant in emergency situations.

During 2008 Hurricane Gustav, Michoud power plant did not supply power to the city. Three other power plants, Nine Mile, Little Gypsy, and Waterford, remained connected to New Orleans. Michoud did not generate power for the city during the 33 hours of "disintegration" from the grid.

Michoud was often shut down and taken off-line ahead of storm landfall because of its vulnerable location.

Michoud was flooded during Katrina and was unable to supply power to the city for 8 months.

Understanding the function and importance of Reliability and Resilience:

Reliability - power when you need it. Dependable electricity service from a system that has enough energy resources at all times, taking into account reasonably expected unscheduled and scheduled outages of system components and normal weather events.

Resilience - how quickly a system can return to normal following a significant interruption, like hurricane or major grid disruption.

Where Entergy's Arguments Fall Short

Recently, Entergy has been vocal about their concern for *reliability* in our city, primarily in support of building a new power plant. However, the root causes of the thousands of outages that occur annually have not been addressed and neither of the utility's proposed power plants would solve any of the outages New Orleans customers already experience each year.

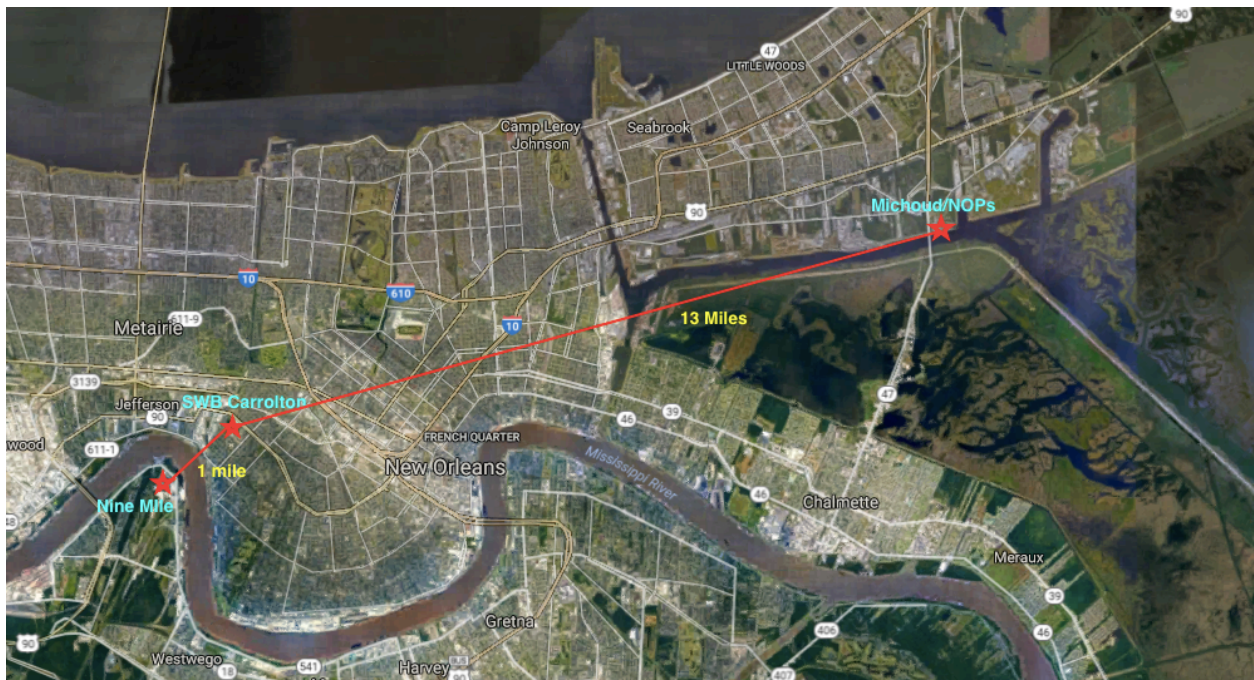
The utility has also suggested that a new plant would maintain New Orleans' *resilience* in the face of storms. Unfortunately, only the *smaller* of the two proposed plants could run independently from the grid and could provide emergency power in a worst-case scenario. Even this option, with "black start capability" that could self-start without grid-connection, would still be sited in a location vulnerable to flooding and storm surge. In fact, while still in use, the gas plant that was in the Michoud/NOPS location was shut-down and taken off-line ahead of major storms, precisely because of its vulnerability, and was flooded with six (6) feet of water² during Hurricane Katrina, requiring eight (8) months of restoration to bring it back into use.

The assertion that New Orleans' energy system was more resilient when we had a gas plant at Michoud is un-true. The experience with Hurricane Gustav, in 2008, was a clear example of New Orleans' inability to depend on a Michoud-area plant for reliability OR resilience. Entergy documents³ show that the power served to New Orleans during and following Hurricane Gustav, even when New Orleans was "islanded", came from Nine Mile situated across the Mississippi River from the Carrollton neighborhood, and the Little Gypsy and Waterford power plants up the river. Michoud was not part of a resilience solution.

² Entergy New Orleans Michoud Power Plant Returns to Service, April 13, 2006. [http://www-temp.entergy.com/News_Room/newsrelease.aspx?NR_ID=824]

³ Entergy New Orleans, Inc. Public Response to Alliance for Affordable Energy, Request For Information from Entergy, AAE 2-47, Council Docket No. UD-16-02

Finally, Entergy's argument that a new power plant sited in New Orleans East could support the resilience of New Orleans' drainage needs again ignores history, the vulnerability, and distance of the site from critical city infrastructure. In the map below, note that Nine Mile is closer to both the central needs of the city and, perhaps more importantly, it is 13 times closer to the city's crucial water infrastructure at Carrollton and Claiborne than the Michoud/NOPS site. To add an additional plant on the vulnerable east side of the city to shore up power needs on the far west side of the city makes little sense, especially when it was not proven to be helpful or resilient, and a dependable power source is already in place just one mile away.



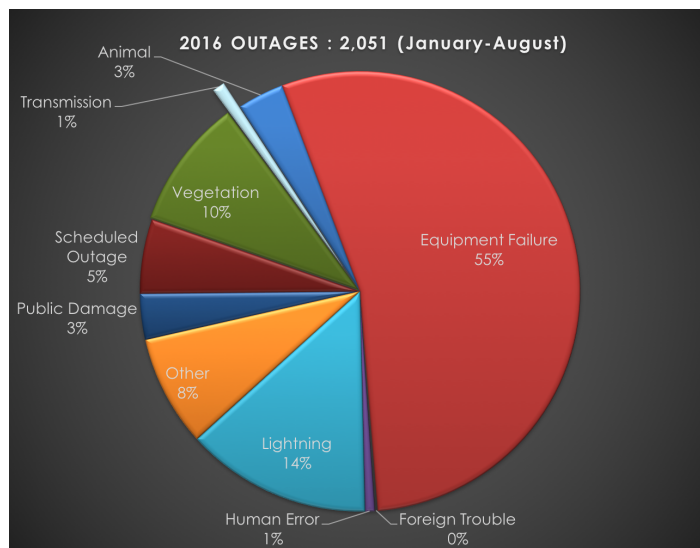
City of New Orleans : Red lines below are illustrative of straight-line distance, and are not indicative of existing transmission lines

If our city and utility are serious about resilience and reliability, the Council's outage investigation and docket are essential for assessing the actual vulnerabilities and solutions required. What's more, distribution reliability and

resilience are vital pieces of modern energy resource planning⁴⁵, and should be included as an aspect of the council's Integrated Resource Planning policy to ensure coordinated efforts to improve and plan New Orleans real energy needs, and in the short-term should inform council decisions on related resource spending. The Council's attention to this matter is a responsible first step in ensuring reliability and resilience are part of coordinated efforts to improve and maintain New Orleans' critical infrastructure.

New Orleans Has Been Kept in the Dark

Excessive Outages Requires Investigation



Entergy New Orleans' electrical system experiences power outages and disturbances nearly every day. These outages impact business, safety, and quality of life for New Orleans customers. Outages can damage expensive electronics like computer equipment and appliances, reduce productivity

or even cause negative health impacts. In response to calls from citizens who are tired of being in the dark, New Orleans City Council opened an investigation⁶ into the causes of the frequent outages and reliability problems, and expects Entergy to find and implement solutions.

⁴ Scheller, Maria. Integrated Resource Planning Models need Stronger Resilience Analysis, 2014. [http://www.ourenergypolicy.org/wpcontent/uploads/2014/10/Integrated_Resource_Planning_Models_Need_Stronger_Resiliency_Analysis.pdf]

⁵ Integrated Resource and Resilience Planning, March, 2017 [https://www.icf.com/-/media/files/icf/projects/eecdp/irrp_project-summary.pdf?la=en.]

⁶ Resolution R-17-427, August 10, 2017, Resolution directing Entergy New Orleans, Inc. to Investigate and Remediate Electric Service Disruptions and Complaints, and to Establish Minimum Electric Reliability Performance Standards and Financial Penalty Mechanisms.

This paper aims to clarify the distinctions among 1) regular outages that are currently impacting the city, 2) potential reliability concerns related to future demands on the system, and 3) resilience in the face of storms, and to highlight connections among various Council energy decisions. Each of these are serious matters for New Orleans, and scrutiny is warranted in order to respond to existing problems and prevent misguided spending. The Council's action is in direct response to residents' current concerns, and is an opportunity to address the inter-connected nature of other energy decisions.

Reliability vs Resilience

“Reliable power” means that your lights and appliances stay up and running on sunny days and through reasonably serious weather, without excessive outages or disruptions. This is distinct from “resilience” which describes how quickly a system can return to normal after a major event like a storm, hurricane, or grid dysfunction. Both reliability and resilience are vital, but reliability is the most basic of the two, is important every day of the year, and is foundational to resilience.

Keeping the lights on is a utility's primary responsibilities to their customers. Poor reliability has major and easily documented impacts on business but somewhat minor effects on residences and are thus very hard to quantify. On the other hand, poor resilience can cause serious damage and loss, when power is needed to protect other critical infrastructure like drainage, hospitals, and police stations.

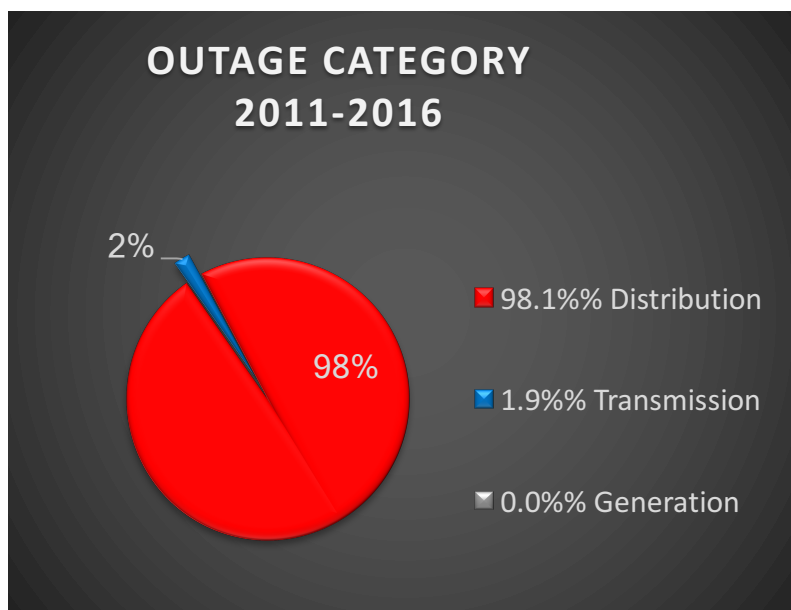
Entergy's proposals to build a new power plant insist on a need for the plant to solve reliability concerns. The utility forecasts a *transmission* concern from an overloaded system in a handful of years that they insist should be solved with more generation. The record shows that a *transmission* solution is an alternative, and is less expensive than either proposed power plant. Even more cost-effectively, the transmission issue could be solved by reducing customer

demand, through efficiency or other conservation technologies, or even installing energy storage, all of which could reduce the potential for “overloading.” Unfortunately, it appears Entergy did not consider combining these cost-effective ways of solving this or any of the other existing outage problems New Orleans experiences today.

Historically, when a utility plans future resources to reliably serve their customers, “resource adequacy,” is the focus, meaning the utility has enough generating and demand-side capacity to meet all customer needs on the hottest day of the year. New Orleans’ reliability concerns are not for lack of available generating capacity as the energy market is full of very inexpensive power⁸. For this reason, New Orleans generation reliability is not in question, and a traditional power plant is not the most cost effective solution. Especially while the distribution system is already failing.

Outages

Despite the assertion that generation will solve New Orleans’ reliability concerns the truth is, from 2011-2016, 98.1% of the outages experienced in New Orleans were related to the *distribution* system¹⁰,



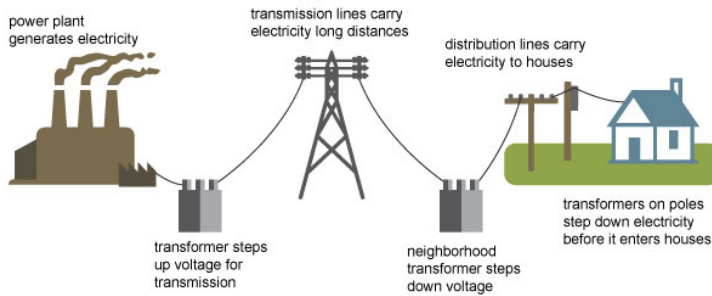
as opposed to *transmission* (1.9%) or lack of *generation* (0%). New Orleans cannot afford to continue to ignore this infrastructure issue and hope that new

⁸ Supply and Demand Forces Questions about Proposed Gas Plants, May 2, 2017, <http://www.all4energy.org/blog/supply-and-demand-forces-questions-about-proposed-gas-plants>

¹⁰ Entergy New Orleans, Inc. Public Response to Alliance for Affordable Energy, Request For Information from Entergy, AAE 2-1, Council Docket No. UD-16-01

generation will solve the problem. It won't. And New Orleans surely knows the danger of deferring critical maintenance.

Electricity generation, transmission, and distribution



Source: Adapted from National Energy Education Development Project (public domain)

Distribution, transmission, and generation are the three main components of an electric utility system. Disturbances can happen anywhere along the system, from planned outages at

power plants, not having enough generating capacity from plants, an overloaded transmission system, weather events, or squirrels on the lines. Unless you generate energy yourself (e.g. rooftop solar) or have distributed energy resources (e.g. battery storage), the energy that powers your life comes via a system of equipment owned and managed by the utility. If you live in New Orleans the last leg of the journey, the lines, poles, and transformers that run through neighborhoods, are the main source of disruptions.

What impacts Distribution Reliability?

There are things that can disrupt your dependable source of power, including lightning, squirrels¹³, trees¹⁴ and even Mylar balloons¹⁵ caught in the power lines. However, Entergy documents show that none of these four, uncontrollable causes, even in aggregate, are leading factors in our outage problem.



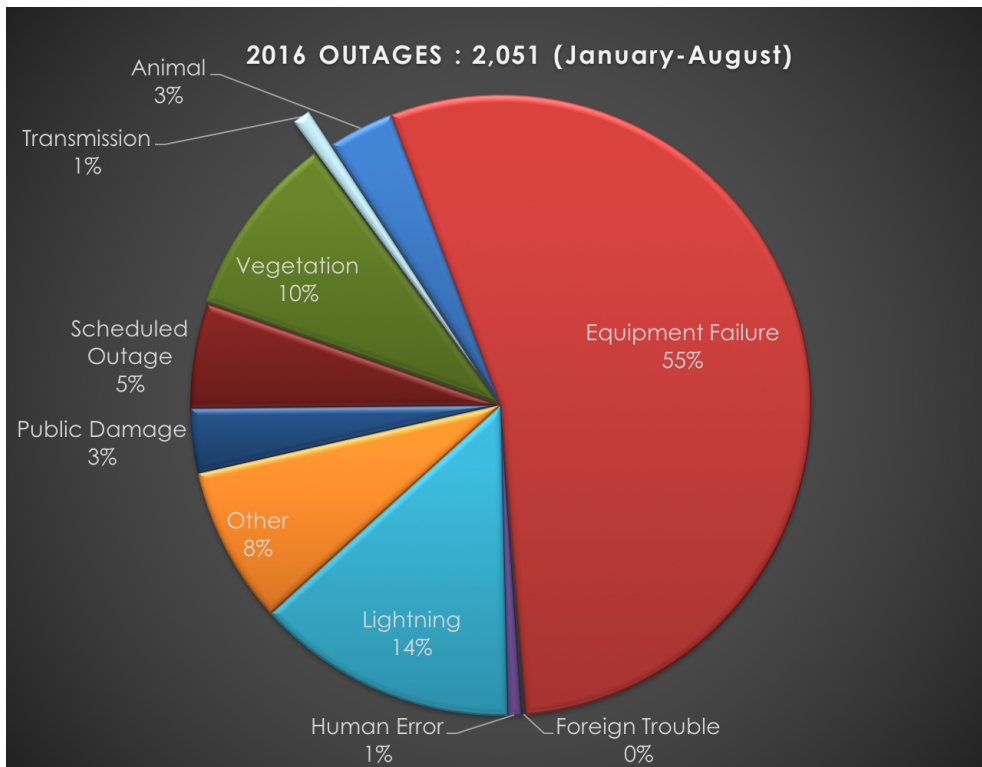
¹³ categorized as Animals

¹⁴ categorized as Vegetation

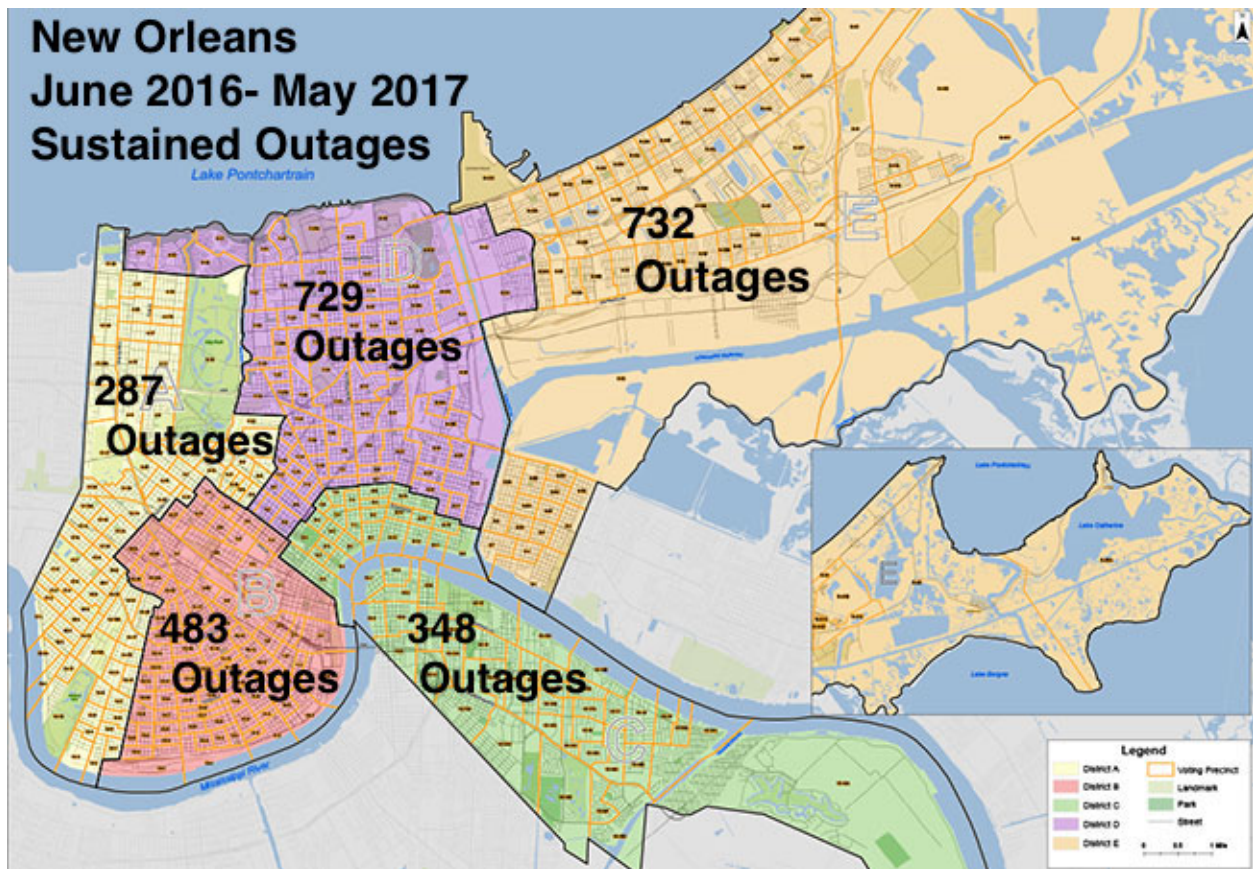
¹⁵ categorized as Foreign Trouble

What are the causes of outages in New Orleans?

According to Entergy New Orleans data, the majority of outages experienced from January to August 2016 in the city could be traced to “*equipment failures.*” On the other hand, customer disruptions from lightning, animals, vegetation, and “foreign trouble” like balloons all totaled are still overshadowed by the number of disruptions from failure of Entergy’s equipment. New Orleans has been consistently told that outages cannot be controlled because of harsh weather, our canopy of trees, and animals. The data simply does not support this. It is important to note that no utility is 100% reliable, and it would be cost-prohibitive to build that much redundancy, but outages at this rate, especially related to equipment failure, are excessive.



Where Are the Outages?



When Councilman Jared Brossett requested outage data this June following constituent phone calls, Entergy's responses uncovered some of the facts of New Orleans' outage problems. For example, Council districts D and E (including the Gentilly, New Orleans East, Lower Ninth Ward neighborhoods) experience the greatest percentage of total outages in the city, meaning citizens in these neighborhoods are more vulnerable to outages than those Uptown or in the French Quarter.

Power Quality

The outages described here are only "sustained" outages, typically defined as greater than 5 minutes. Shorter disruptions, called "momentary outages", are in addition to these numbers. Momentary outages can impact electronics, and as these electronics become more a part of every-day life and business, brief losses in service become more problematic, causing significant damage.

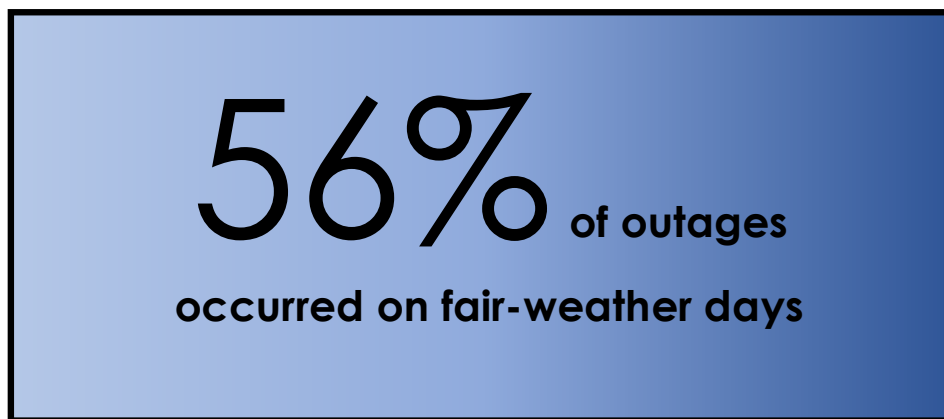
Momentary outages and other “power quality”¹⁷ issues have also impacted New Orleans Sewerage and Water Board. In fact, the New Orleans S&WB stated in a filing to the City Council in February of 2017,

“S&WB is deeply concerned regarding “dips” it has experienced in ENO’s electric service over the last few months. Some of these service dips have led directly to S&WB equipment failures, and a few have forced S&WB to issue boil water advisories.”¹⁸

Additionally, the S&WB reported to the Council, in 2015, while the Michoud plant was still on-line, that a surge in power caused a similar disruption and boil-water advisory.¹⁹ These kinds of disruptions affect not just New Orleans’ electric system, but also the health and safety of our water system and are a critical subject for examination in the Council’s investigation into Entergy’s reliability.

When are the outages?

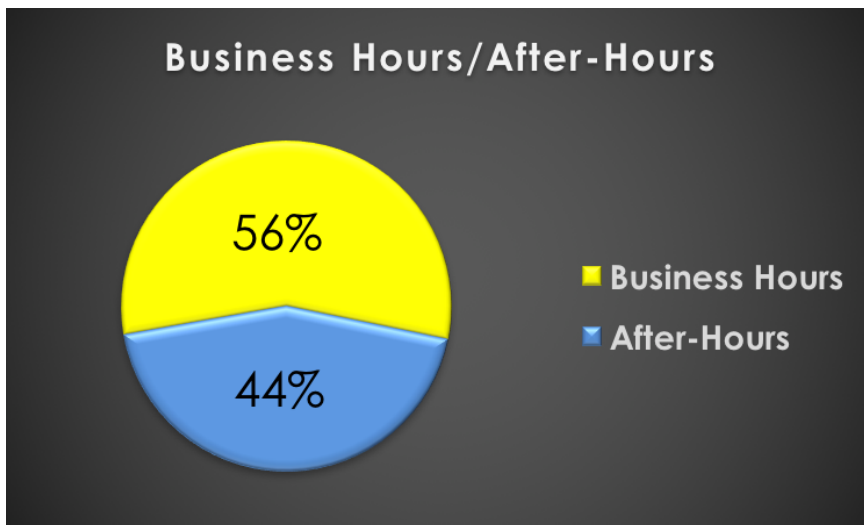
Over the last year (May 2016- June 2017), most of Entergy’s outages in New Orleans occurred during fair-weather days, again indicating our problems are not a result of lightning, wind, rain, or weather-related issues we cannot defend against.



¹⁷ Power Quality refers to a broad class of undesirable features of poor electricity. These include: too great over/under voltages, variations in electricity frequency and inability to respond to rapid changes in demand. All of these problems impact how a customer experiences reliable service, and are much easier and cheaper to solve with distributed technology than with large centralized electric generation.

¹⁸ Sewerage and Water Board of New Orleans’ Comments regarding Potential Improvements to Integrated Resource Planning Requirement, Docket No. UD-17-01, February 27, 2017.

¹⁹ Sewerage and Water Board report on the Boil Water Advisory, July 24-July 25, 2015.



In addition, the majority of outages occurred from 8:00 AM- 5:00 PM, during business hours, impacting commerce and productivity.

Next steps and long term solutions

From August 2017-February 2018, the council, their advisors, Entergy, and intervenors, including neighborhood associations and individuals, will engage in an investigation docket to find the root causes of outages.

We must direct our focus to our distribution system in order to reduce the outages we are already experiencing. As the utility develops its mitigation plan, Entergy and the Council should consider the potential benefits of grid modernization, including distributed resources (energy storage, Volt/Var Optimization) that could improve reliability and resilience concerns.

For example, Entergy New Orleans has already applied the Council to deploy Advanced Metering Infrastructure, or “smart meters” and a back-end system to use data and improve transparency for customers. Smart meters, and the connectivity they bring, have proven to be valuable tools in improving outage duration, as the cause and location of the issue can be more efficiently ascertained. The Council was concerned to see the number of outages that lasted longer than two hours (48% of outages during business hours and 54% during off-hours). The implementation of Entergy’s AMI will improve these outage times as AMI has done across the country.

Part of the solution must be coordination with other critical infrastructure in the city, like Sewerage and Water Board, the City, and The Orleans Levee District, as each of these agencies provide crucial services and are interdependent upon one another.

To ensure reliability becomes a priority to the utility, the council may require minimum standards that the utility must meet. Many regulators, including the Louisiana Public Service Commission (LPSC) have instituted standards, and according to the Council's advisors, Entergy New Orleans outages and duration currently exceed LPSC's standards.

As the Council's resolution opening the investigation suggests, their standards may be enforced through penalties should the Entergy not meet their required benchmarks, as was done with PEPCO, a Maryland utility.²⁰ Standards typically do not penalize for outages related to major storms or other major events days when more than 10% of customers are disrupted. The Council should be thoughtful about the definitions used as the foundation for reliability and not merely use the one measured on the utility's side of the meter. Instead the focus should be trained on the customers' side, particularly since this is where greater reliability is achievable and at lower cost.

Finally, incentivizing utilities to improve their quality of service through "performance-based ratemaking" is a step beyond penalties that the City Council could employ. Currently Entergy New Orleans' ability make money is not linked to performance, but is simply linked to the cost to serve each customer and the rate of allowed profit connected to capital projects. As the utility modernizes its services and brings more offerings to customers, and the Council

²⁰ Stephens, Joe. Maryland Public Service Commission fines PEPCO \$1 Million, December 21, 2011. https://www.washingtonpost.com/local/maryland-public-service-commission-fines-pepco-1-million/2011/12/21/gIQAwRiz9O_story.html?utm_term=.c62e0463d68f

legislates specific goals related to emissions reductions as they have resolved to do²¹ the utility's successes meeting these goals should be appropriately rewarded.

What can you do?

- 1. Educate yourself: Read documents filed in various proceedings at the council and take a look at analysis of other businesses and organizations.**
- 2. Speak up at, Attend, or Watch Council Utility meetings and make your opinions heard to your district and both at-large councilmen — if not at meetings, you can email or call Council offices.**
- 3. Join proceedings as an “intervenor” or “interested party”.**
- 4. Discuss your experiences with your neighbors.**
- 5. Write letters to the editor: Gambit, TP, Advocate, CityBusiness, etc.**
- 6. Support the Alliance, La 350, Sierra Club, Deep South Center for Environmental Justice, your neighborhood association or any other non-profit that is taking part in the proceeding.**

Participate in the current political process by voting and asking candidates their position on energy matters.

If want to know more about why you missed the end of that Saints game, if a downed power line impacted your neighborhood, or if you had to send employees and customers away because your lights went out, follow the Alliance's website for updates as the process goes forward.

The Alliance for Affordable Energy is committed to supporting your engagement with this important issue. Feel free to contact us with your questions about getting involved and potential solutions to our outage problems.

²¹ Resolution R-17-428, Resolution Regarding Climate Action for a Resilient New Orleans Strategy