Blackout Tracker

United States Annual Report 2016

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Introduction

Welcome to Eaton's Blackout Tracker Annual Report for 2016. This marks the ninth year that Eaton has been following the fallout from power failures across the nation — from minor events that affected a handful of homes or businesses to massive outages resulting from Hurricane Matthew, human error and a wide variety of other sources. This year alone, we have compiled data on nearly 4,000 blackouts that caused problems for utility customers across all 50 states.

This annual report is based on reported power outages in the U.S., with sources of data including: news services, newspapers, websites (including those of newspapers and TV stations) and personal accounts. We at Eaton hope that you not only find this report insightful, but that it prompts you to take appropriate action to prepare for power outages that could affect you and your business.

The main body of the report follows this introduction and is organized into two sections:
1. Overview of national power outage data
2. Power outage data by state

In all, 3,879 outages were tabulated and used as the basis for the 2016 report, a jump of nearly 9 percent compared to the 3,571 outages we tracked in 2015. The number of people affected by outages also increased between 2015 and 2016. However, it is important to note that complete data is often unavailable on certain aspects of reported outages, including the number of people affected and the duration of the blackout.

The following chart outlines some overall data we have accumulated since 2008:

Year	Total number of outages	People affected
2008*	2,169	25.8 million
2009	2,840	13.5 million
2010	3,149	17.5 million
2011	3,071	41.8 million
2012	2,808	25.0 million
2013	3,236	14.0 million
2014	3,634	14.2 million
2015	3,571	13.2 million
2016	3,879	17.9 million

Partial-year data. Data collection began on February 16, 2008.

Downtime just keeps going up — in both cost and prevalence

Downtime isn't for the faint of heart, a truth confirmed by a recent investigation by Talari Networks. The survey of more than 400 IT professionals, combined with a separate cost-of-downtime study by IHS Markit, assessed the price tag of a network outage at more than $9,000 per minute, with larger enterprises losing tens of millions of dollars every hour their networks are down. Even worse, nine out of 10 large corporations reported that they had experienced at least one network outage in the past year, and 69 percent endured two or more — with some 60 percent of network outages lasting more than an hour.

In all, the annual monetary damages resulting from power outages, surges and spikes are estimated to cost more than $150 billion to the U.S. economy. But despite the grim reality

associated with downtime, a ray of hope remains: by investing in a quality power protection solution to safeguard critical systems, the risks and potentially devastating consequences can be significantly lessened.

The dirt on power outages

Researchers may have hit pay dirt when it comes to predicting where blackouts will strike. A soil-based model designed to forecast outages caused by hurricanes yielded 91 percent accuracy when tested in the days before Hurricane Matthew in October 2016. The approach, which relies on NASA's Soil Moisture Active Passive (SMAP) satellite to pinpoint where trees are more likely to contact power lines during severe weather, was put into effect by researchers from The Ohio State University, University of Michigan and Texas A&M. Using satellite maps of soil moisture to help project where power would go out along the East Coast, the team was able to forecast five days ahead of time that 4.5 million people would experience outages in Georgia, North Carolina, South Carolina and Virginia. With the actual number determined to be 4.1 million, researchers overestimated by just 9 percent.

The model is based on the theory that healthy trees that receive just the right amount of moisture are less prone to storm damage, making soil moisture a good indicator of where outage crews will be needed. The project, which aims to curtail outages by helping utility companies properly allocate equipment and restoration crews ahead of storms, received its data from SMAP, which researchers then cross-referenced with population density, land use, average wind speed, and the duration and intensity of storms in order to make their forecast model.

Researchers are now expanding the project to include outages caused by thunderstorms, winter storms and wind storms, which impact a much larger portion of the United States than hurricanes. It's welcome news for utility customers, considering that a 2012 report from the Congressional Research Service named severe weather as the single biggest cause of outages in the United States. Approximately 62 percent of those outages were attributed to broken tree branches or falling trunks contacting power lines.

Utility companies remain target for hackers

2016 ended with a blackout bombshell: officials announced that the state-sanctioned Russian hackers suspected of meddling in the presidential election also attempted to hack into the U.S. electricity grid. Accessing a laptop at Vermont's Burlington Electric Department, the hackers used the same malware code that U.S. intelligence officials had already linked to hacks targeting the Hillary Clinton campaign — further heightening concerns over domestic cyber security.

Officials first discovered the breach during a system-wide scan requested by the Department of Homeland Security, which was prompted by an Obama administration report outlining Russia's alleged role in the election hacks. Although the hackers are not believed to have disrupted the utility's operations, several officials acknowledged that the penetration is alarming, considering any disruption to the power grid could have disastrous consequences.

While it wasn't immediately clear what the hackers' intensions were, officials theorized that they may have been investigating the complexity of penetrating the grid. It wouldn't be the first time that Russia has been accused of such an incident. In 2015, they allegedly attacked the Ukraine's power grid, causing blackouts throughout the capital region. In the wake of the Vermont utility revelation, Ukrainian President Petro Poroshenko accused Russian hackers of initiating more than 6,500 cyber-attacks against various Ukrainian state institutions in the previous two-month period.

Aging infrastructure comes under microscope after outage grounds airliner

Hundreds of thousands of Delta Air Lines passengers were forced to endure severe turbulence August 8 — without ever leaving the ground! — after a brief power failure at the carrier's Atlanta hub spiraled into a global aviation disaster. Backup systems failed to kick in, causing a computer system meltdown that resulted in more than 2,100 flights being canceled over a multiple-day period at a staggering cost of $150 billion, the company later revealed.

Not surprisingly, passengers were inconvenienced and angered by the event, and freely shared their frustrations with the world via social media. The incident — in which a piece of failed switchgear was attributed to more than 2,100 flights being canceled over a multiple-day period — underscored the devastation that can result from aging infrastructure.

While the aviation giant continued operations in the wake of the outage, many organizations wouldn't be so lucky. In fact, more than 40 percent of all companies that experience such a disaster never again reopen their doors for business. A growing number of companies are falling prey to potentially fatal issues in large part because their existing infrastructures are unable to accommodate the rising demands of today's enterprises. With many legacy sites built during the boom of the late 90s now more than 20 years old, they have become prone to a wide variety of issues including insufficient capacity, wear and tear, end of life, and inadequate power and cooling. Yet many organizations are forced to continue squeezing life out of their existing equipment due to the expense of constructing new facilities.

In fact, one survey of 1,750 IT industry insiders found that 91 percent believed their data center facilities were not adequately equipped to meet the needs of current consumers and clients — even though 75 percent reported having upgraded their infrastructure within the past three years. Even more troubling, 41 percent acknowledged that data center-related issues had resulted in lost revenue.

Overall, North American businesses lose $26.5 billion each year due to IT downtime and data recovery, according to data collected by Forsythe *FOCUS* magazine —and aging infrastructure continues to be a common thread among these downtime events. Although many companies have deployed new hardware as technology has evolved, the underlying infrastructure remains decades old, which can complicate overall management while impacting performance and security.

Five lessons learned from the Delta's downtime disaster

Despite the significant ramifications of Delta's downtime — from monetary losses exceeding $150 million to potential damage to the airline's reputation — some valuable lessons emerged in the aftermath of the incident, especially for IT professionals. To help prevent other organizations from having their wings clipped by a similar catastrophe, experts recommend the following measures:

1. **Troubleshoot *before* turmoil.** Practice exactly how you will work to restore your critical systems in the event of an emergency (and long before an unexpected outage forces your hand). Have a plan to quickly implement any necessary remedies, as well as teams identified to work on restoration.

2. **Review your IT environment on a regular basis.** Keep a pulse on your network, systems, software, architecture and even your staff. Do single points of failure exist for critical systems? Do necessary systems have required redundancy? Unexpected

outcomes can result when personnel changes, systems merge, upgrades occur, or when elements are added to or removed from network and system architectures. As one IT pro mused following Delta's debacle: "Kind of amazing they haven't figured out how to make their system redundant, distributed, and/or robust. It makes zero sense that a power outage in Atlanta should have any effect on a flight going from Salt Lake City to Seattle."

3. **Don't put all of your eggs in one basket.** Or tie all your critical functions to one system, as the case may be. The airliner's snafu underscores how an error in one geographical location can have a drastic ripple effect, cascading into a crisis that disrupted travel across the U.S. and beyond. The computer crash affected ticketing, flight planning and customer tracking systems, ultimately forcing the airline to declare a "ground stop" that halted takeoffs around the world. Adding insult to injury, many affected travelers reported that they never received messages or updates from Delta on their flight status because communications systems were in disarray.

4. **Don't trust outdated equipment.** Delta's outage —ultimately attributed to failed switchgear — came just weeks after a similar disaster at Southwest Airlines, in which more than 2,000 flights were canceled after a faulty network router sparked an outage. Incidents like these demonstrate that software, hardware and power systems for huge operations like airlines are just as critical as physical infrastructure that needs to be regularly upgraded and maintained.

5. **Invest in a high-quality backup solution.** Research from IDC shows infrastructure failures cost large enterprises $100,000 per hour, and the failure of critical applications can ring in at up to a million dollars an hour. Yet one of the most reliable and cost-effective measures you can take to prevent downtime is the installation of a premium (and preferably, redundant) uninterruptible power system (UPS). Keep in mind, like other critical IT systems, UPSs should be inspected regularly and upgraded as needed.

Growth slated for data center UPS market

Fueled by the growing inclination to transform enterprise data centers into core computing hubs, experts are now forecasting a complementary trend: a surge in the data center UPS market. In fact, a recent Global Market Insights report projected that the U.S. data center UPS market will surpass $6.65 billion by 2022. Wide acceptance of cloud computing across enterprises, coupled with organizations' reduced tolerance to data loss, were identified as key factors driving the growth of this industry, according to the report.

Indeed, today's enterprises are increasingly relying on centralized hosting services to ease organizational operations. Yet with this model comes additional risk to the network infrastructure, as an unplanned outage has the potential to cause a failure of the entire system. As a result, many organizations are opting to safeguard operations by deploying large-scale data center UPSs, resulting in the subsequent boost to the market share. Other factors likely to drive data center UPS sales are adoption of cloud computing technology, escalating concerns regarding data loss, and increasing numbers of power outages and voltage fluctuations.

Why is the grid so vulnerable to hurricanes?

When Hurricane Matthew blasted the Florida coast in early October, leaving more than 1 million people in the dark, some wondered why the state's utility companies weren't better prepared.

In reality, they were — at least as much as they could be. But despite having invested $2 billion over the last decade in an effort to strengthen the grid, including measures such as replacing wooden poles with concrete versions, the grim fact is that no system is completely storm-proof — and hurricanes pose a number of challenges when it comes to safeguarding against their destruction, such as high winds and flooding.

One issue is that the nationwide grid — a long-distance system that evolved more than a century ago when power systems were built locally — has so many poles and wires. During a hurricane, these long-distance transmission wires are vulnerable to threats such as falling trees and flying debris. And if a single transmission line is knocked out of service, it can potentially affect tens of thousands of customers.

Another problem is that many ground-level electric substations, such as those in Florida, were built very close to sea level, making them extremely susceptible to flooding during major storms. Even worse, the number of flood-endangered substations in the southeastern part of the state is projected to triple to 119 by 2070, according to a senior energy analyst at the Union of Concerned Scientists.

By many accounts, the grid problem is only getting worse, with major U.S. outages having multiplied twentyfold over the last three decades, according to Massoud Amin, an engineering professor at the University of Minnesota who attributes the increase to unprecedented weather conditions and aging infrastructure.

In the end, disasters like Hurricane Matthew could provide an opportunity to not just rebuild the grid, but to make it more resilient.

Surgery returns to the dark ages — literally

A Cleveland-area dermatologist had just removed a suspicious lesion from a patient's abdomen Dec. 6 when a tree branch fell onto a nearby power line, leaving the University Hospital dermatology building in the dark. While the larger hospital — where surgeries are routinely performed — maintained power with the aid of generators, the dermatology office's backup only extended to medical devices and refrigeration — not the lights.

Thankfully, the cautery device used to stem bleeding had a battery backup, but since it's difficult to ascertain what to cauterize in the dark, doctors had to think quick. A staff member pulled out a cell phone and flipped on its light, as did the patient, who was conscious during the procedure with only a local anesthetic. When the lights didn't return until 43 minutes later, a fourth-year resident tasked with closing the incision ultimately donned a surgical headlamp to sew the final stitches.

Shelter blackout gets tails wagging

Every dog has his day — and for the 200 canines residing at the St. Louis-area Stray Rescue, that day was June 16. When a power outage knocked out the shelter's air conditioning as temperatures climbed to 99 degrees, the facility's owner took to social media asking the community to help get the dogs into cooler spaces.

Dozens of volunteers stepped up, and by lunchtime all but a dozen dogs had been claimed by foster parents. But what happened the following day was a case of true puppy love: at least 20 volunteer families decided they weren't willing to part ways with their foster dogs and decided to adopt them. Stray Rescue expected that number to climb, as other one-night foster parents reported they were getting their homes in order or making plans to pick the dogs back up after planned vacations.

Monkey blamed for blacking out an entire nation

With the potential to cause irreparable damage, power outages can by no means be considered monkey business. Except, that is, when they literally are.

Indeed, a vervet monkey was responsible for leaving an entire nation in the dark on June 7, after it fell on a transformer at a Kenyan hydroelectric dam. After scaling the roof of a 225-megawatt Gitaru Power Station owned by Kenya Electricity Generating Company, the curious creature lost its footing, tumbling onto a transformer below and instigating a domino effect.

With a (not-so-proverbial) monkey on its back, the first transformer shut off electrical flow, which resulted in other transformers at the station tripping, as well. The subsequent loss of more than 180 megawatts at the power station then triggered a national power blackout that lasted four hours.

Not surprisingly, Business Daily Africa reported that local companies were the hardest hit by the outage, with many shops having to rely on significantly more expensive electricity from backup generators.

The top 10 most significant U.S. blackouts of 2016

From hurricanes to blizzards to bolts of lightning, power failures were attributed to an array of damaging events in 2016, taking a toll on the lives of millions of electricity customers. Here, we round up some of the most significant:

1. **No throwing out the welcome "Matt."** The southeastern U.S. was blasted by Hurricane Matthew in early October, leading to massive power outages. Fueled by 75 mph winds, the Category 1 storm moved very close to the coasts of Florida, Georgia, South Carolina and North Carolina. At the height of the hurricane, more than 1 million were left without power in Florida, as well as more than 800,000 across the Carolinas, 300,000 in Georgia, and 392,000 in Virginia.

2. **Adding fuel to fire.** As if a wildfire wasn't damaging enough, an April 21 blaze also resulted in a large-scale outage in Brunswick County, N.C., leaving some 508,000 customers in the dark. The utility said flames destroyed poles for a Duke Energy transmission line, which in turn affected the power supply to several substations.

3. **One for the record books.** A blizzard that began on Jan. 22 dumped heavy snow from the Mid-Atlantic to southern New England and was rated as a Category 4 or "Crippling" winter storm on NOAA's Northeast Snowfall Impact Scale (NESIS). It also ranked fourth among the most powerful winter storms to impact the Northeast U.S. since 1950. The blizzard left nearly 200,000 customers in the dark, some for several days.

4. **Horrific Hermine.** Sweeping across Georgia and Florida on Sept. 2, Hurricane Hermine left more than 275,000 outages in her wake. Heavy rain and gusty winds that continued in the aftermath also contributed to more downed trees and a subsequent spate of power outages.

5. **Behind-the-wheel blackout.** There's a reason those teenage driver insurance premiums are so high. Just ask the 28 Papillion, Neb., residents who lost power for a full week after a teen drove into an apartment complex, displacing several residents from the building and damaging power equipment that took 7 days to repair and replace. (Oh, and full disclosure: even sky-high rates wouldn't have helped in this incident, as the culprit had no insurance — or even a license!)

6. **Woes in Washington.** Powerful storms trounced the Seattle region on March 13, causing widespread damage and leaving some 176,000 customers in the dark. One man was killed when he was crushed by a falling tree.

7. **Who says it never rains in California?** The 200,000 San Francisco Bay Area residents who were left without power Oct. 16 would beg to differ after a massive weekend storm left them in the dark.

8. **Blackout bolt**. According to the old adage, lightning never strikes the same place twice — and it doesn't have to when it causes the amount of damage a single bolt invoked August 7 in Rio Rancho, N.M. The charge of electricity knocked out power to more than 170,000 customers.

9. **Cut to power forces students to cut class.** An electrical failure was blamed for a 6-day blackout that affected San Francisco's Ocean Campus Multi-Use Building and the surrounding areas. The Sept. 6 power failure displaced approximately 100 classes, the majority of which were relocated to other rooms. Yet three courses were unable to find a replacement class and instead, had to be cancelled.

10. **April showers.** Torrential rainfall throughout Houston in mid-April brought devastation far beyond knocking out power to more than 125,000 utility customers. The massive storms claimed the lives of at least five people and forced the evacuation of hundreds.

The top 10 most unusual U.S. blackouts of 2016

Just when you thought it couldn't get any stranger, 2016 ushered in a whole slew of unusual outages. Can you say lions, tigers and bears? Believe it or not, we tracked two out of the three! Here's a look at 10 … ok, we just had to make it 11 … of the most peculiar blackouts of the year:

1. **A carjacking gone terribly wrong.** As if crashing into a power pole, causing an outage and ending up in critical condition at the hospital wasn't bad enough. The driver — responsible for a March 16 blackout in Sanford, Fla. — faced criminal charges after police learned he was a carjacker who had stolen the vehicle.

2. **Gardening glitch.** Firefighters who responded August 3 to reports of smoke in the Chicago suburb of Gurnee were surprised to find the culprit was a lawn mower. The

motored device apparently knocked over an electrical box, shorting out some wires and causing a small outage.

3. **Crane strain.** A crane fell over onto power lines in New Britain, Conn., causing an April 21 blackout to 1,444 people. The construction worker jumped to safety as he felt the crane he was working on at the Crystal Ballroom start to tip. The bucket of the crane was hovering along the roof line of a new building designed to expand the banquet hall when the accident occurred.

4. **Something fishy.** South Seattle residents endured a two-hour power outage Dec. 13 at the hands — or, more aptly, the gills — of a fish. The utility said a bird (possibly an eagle) dropped a fish (possibly a salmon) onto power lines, cutting electricity to 172 customers. And in case you were wondering, the utility also revealed the fate of the fish (spoiler alert: it didn't make it!).

5. **King of the power pole.** Tribal officials in Polson, Mt., rescued a mountain lion from the top of a power pole April 6. The utility intentionally cut electricity to allow tribal game wardens and biologists to tranquilize the lion. Once sedated, the cat tumbled to the ground, but apparently wasn't injured in the fall.

6. **Not-so-lucky bear.** A lineman investigating a July 1 outage in Castle Rock, Colo., determined that a connection was broken right above a transformer. He later found a dead bear below the power pole, and believes the animal was electrocuted after climbing the pole and grabbing the wire.

7. **Lights out, cold turkey.** A flock of wild turkeys was responsible for cutting power to 1,600 Medford, Ore., residents and businesses after the birds flew into power lines on Dec. 10.

8. **Smooth sailing — not!** A large cargo ship made a wrong turn in Stockton, Calif., on Jan. 20, cutting power to 5,000 customers. The ship was delivering fertilizer to the port when its attached crane hit a power line as it moved to a different dock.

9. **A four-alarm outage.** Can you say ironic? A Sherman Oaks, Calif., firefighter had a medical emergency of his own on March 30 and lost control of his fire engine, crashing into a number of parked cars. The collision then knocked down power lines, which subsequently started — yes! — a small fire inside a nearby liquor store.

10. **Don't cough and drive.** A driver had a coughing attack then lost control of his car in Tulsa on July 4, hitting a light pole and knocking out power to 136 customers.

11. **And don't argue and drive, either.** Power was knocked out for 1,700 people in Lakewood, Colo., August 4 after a fatal accident damaged power poles. When police arrived on the scene, they found no vehicle, yet a man was lying in a lane of traffic. Police later tracked down the man's sister-in-law, who told authorities they had been arguing while driving and he jumped from the moving vehicle. She indicated that she was attempting to control the vehicle when she struck the power poles. Her brother-in-law later died of his injuries.

The most significant data center outages of 2016

The damage that can result from an unplanned data center outage took center stage in 2016, played out in large part by press coverage surrounding several commercial airline power failures. As a result, awareness has heightened around the need for organizations to execute carefully considered risk mitigation strategies and disaster recovery plans.

Meanwhile, the costs associated with these failures continue to rise, a fact confirmed by the Ponemon Institute in The 2016 Cost of Data Center Outages report. The group, which polled 63 data center organizations in the U.S. that had experienced an outage in the past 12 months, found the average cost of a data center outage in 2015 was a staggering $740,357. The price tag was up 38 percent from 2010, while the increase in the maximum downtime cost ($2,409,991) was even greater, climbing 81 percent over that same time period.

The most expensive cost was found to be business disruption, followed by lost revenue and end-user productivity, IT productivity, detection, recovery, ex-post activities and equipment.

Among the publication's other key findings:

- The average total cost per minute of an unplanned outage increased from $5,617 in 2010 to $7,908 in 2013 to a current price tag of $8,851
- The average cost of a data center outage rose from $505,502 in 2010 to $690,204 in 2013 to $740,357 in the latest study, representing a 38 percent increase in the cost of downtime
- Maximum downtime costs are rising faster than average, increasing 81 percent since 2010 to a current high of $2,409,991
- UPS failure, including UPS and batteries, is the No. 1 cause of unplanned data center outages, accounting for one-quarter of all such events
- Cybercrime represents the fastest growing cause of data center outages, accounting for 2 percent of outages in 2010, 18 percent in 2013 and now 22 percent of those polled in the latest downtime study

Below, in chronological order, are 10 data center blackouts that occurred in the U.S. in 2016. While it is difficult to ascertain the exact financial impact of all of these outages, it is reasonable to expect that they were significant.

1. **Verizon**, Jan. 14 — Location not released. The outage, which was attributed to a maintenance operation, took down JetBlue's electronic systems. The incident caused flight delays and shut down the airline's website, along with its online booking and check-in systems, resulting in thousands of missed and delayed flights. The lengthy downtime that followed the outage affected thousands.

2. **City of Sacramento**, Jan. 20 — Sacramento, Calif. Websites were down for approximately one hour, including the city's main page and that of the Sacramento Police Department and the Sacramento Fire Department.

3. **Quantum Data Center**, Jan. 26 — Mount Laurel, N.J. The outage caused a betting hub malfunction for Sportech, which in turn forced several racetracks to abandon their cards. Both Sam Houston in Texas and Turf Paradise in Phoenix had to cancel their cards after delaying the starts of their first races.

4. **GitHub,** Jan. 28 — Location not released. The popular online repository for open source code and hosting services went down for two hours due to a power outage in its primary data center, impacting several services critical to operations.

5. **Business Wire**, April 11 — Location not released. A power failure at a third-party co-location facility was blamed for halting the dissemination of content at the press-release distribution company, relied on by many of the largest U.S. companies. The breakdown occurred during one of the busiest times of the day for news — minutes after regular trading closed in U.S. stock markets.

6. **Cogeco,** June 9 — Atlanta, Ga. The Peer1 data center experienced a partial power outage that affected some of the customers in the facility.

7. **The National Science Foundation**, July 21 — Arlington, Va. A capacitor explosion knocked out data centers, networks and business applications at the NSF, crippling its systems through the night and for most of the next day.

8. **Delta Air Lines,** August 8 — Atlanta, Ga. The outage that grounded some 2,100 flights worldwide over the span of three days came with a $150 million price tag, according to the airline. The turbulent incident was attributed to a piece of failed switchgear.

9. **Pensacola State College**, Oct. 15 — Pensacola, Fla. The campus' Information Technology Services went black for 12 hours in order for technicians to replace a power distribution unit.

10. **Ford Motors**, Oct. 31 — Dearborn, Mich. A fire at the automotive giant's U.S. corporate headquarters briefly shut down data center operations and prevented the company from gathering sales data from dealerships across America. Luckily, battery backups on-site preserved all stored data.

What you can do to protect your business

In today's business climate, there is a clear expectation for 100% uptime, making business continuity a chief concern. Yet when an unplanned outage occurs, the focus of IT personnel must be shifted to resolving the issue and reducing data loss. But what if there were a way to monitor and control power so potential issues could be identified and resolved before they escalate?

Eaton's [PredictPulse](TM) remote monitoring service and [Intelligent Power Manager](IPM) (IPM) software help to accomplish that, plus so much more. When used together, they deliver the support of Eaton's technical alarm experts — who keep tabs on an organization's power devices 24x7 and alert key personnel to any anomalies — along with the ability to remotely monitor, manage and control power devices. If there's an extended power event, IPM also helps maximize the runtime of critical equipment and ensure data integrity. The solution not only keeps downtime to a minimum, but contributes to business continuity and helps IT professionals rest easier.

Overview of 2016 national power outage data

This section provides aggregate data for the U.S. and includes all the data found in the subsequent state section.

Outage summary

Total number of people affected by outages *(This is the sum of the number of people affected by reported power outages in the USA for 2016.)*	17,904,414
Total duration of outages *(This is the sum of the durations of the reported power outages.)*	186,850 minutes (approximately 3,114 hours or 130 days)
Total number of outages *(The sum of the number of reported power outages.)*	3,879
Average number of people affected per outage *(This number is determined by dividing the "Total number of people affected by outages" by the number of outages that reported the number of people affected. Not all reports of outages included number of people affected. The number of outages used for this calculation can be found in the note following this table.)*	4,616
Average duration of outage *(This number is determined by dividing the "Total duration of outages" by the number of outages that reported durations. Not all reports of outages included the duration. The number of outages used for this calculation can be found in the note following this table.)*	48 minutes

Notes: Total number of people affected (and average) is based on 2,699 (69%) of the total reported outages. Total duration of outages (and average) is based on 792 (20%) of the total reported outages. These are the number of outages that had reports that included data for number of people affected and duration, respectively.

Top states with most reported outages

2016	2015	2014
1. California (470)	1. California (417)	1. California (537)
2. Texas (197)	2. Texas (201)	2. Texas (178)
2. New York (197)	3. New York (173)	3. Michigan (164)
3. Michigan (192)	4. Ohio (155)	4. Pennsylvania (148)
4. Ohio (184)	5. Michigan (152)	4. New York (148)
5. North Carolina (152)	6. Pennsylvania (144)	5. Ohio (143)
6. Pennsylvania (146)	7. North Carolina (121)	6. New Jersey (105)
7. Virginia (118)	8. Virginia (106)	7. Washington (104)
8. Florida (107)	9. Washington (104)	8. Illinois (102)
9. Massachusetts (106)	10. Indiana (100)	9. North Carolina (100)

Number of reported power outages by state

Number of power outages by date
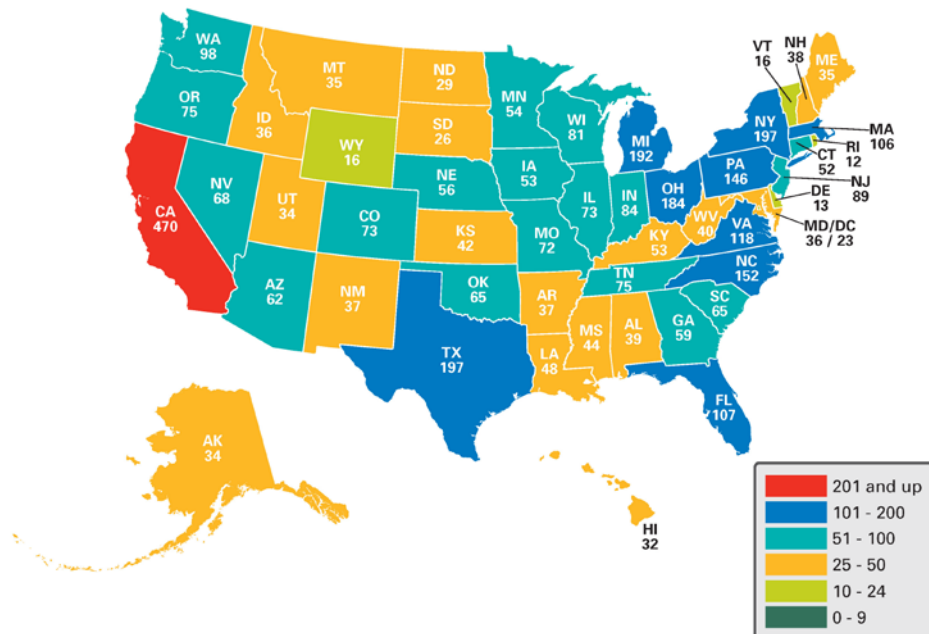
Top states for outages caused by weather/falling trees

2016 (1,279 total outages)	2015 (1,069 total outages)	2014 (1,081 total outages)	2013 (966 total outages)
1. California (116)	1. California (96)	1. California (81)	1. California (65)
2. Texas (72)	2. Texas (72)	2. Texas (57)	2. Michigan (60)
2. Michigan (72)	3. Michigan (43)	3. Pennsylvania (52)	3. Texas (47)
3. North Carolina (67)	4. Ohio (42)	4. Michigan (49)	4. New York (41)
3. Ohio (67)	5. North Carolina (41)	5. Ohio (47)	4. Ohio (41)
4. New York (60)	6. Washington (35)	6. New York (44)	4. Virginia (41)
5. Pennsylvania (48)	7. New York (35)	7. North Carolina (41)	5. Pennsylvania (38)
6. Florida (46)	8. Pennsylvania (34)	8. Georgia (35)	6. Illinois (30)
7. Massachusetts (41)	9. Oklahoma (33)	9. Virginia (32)	6. New Jersey (30)
8. Virginia (38)	10. Connecticut (33)	9. Wisconsin (32)	7. Missouri (27) Wisconsin (27) North Carolina (27)

Top states for outages caused by vehicle accident

2016 (483 total outages)	2015 (419 total outages)	2014 (356 total outages)	2013 (354 total outages)
1. California (59)	1. California (55)	1. California (55)	1. California (53)
2. Texas (29)	2. North Carolina (29)	2. Texas (20)	2. Texas (23)
3. Ohio (26)	3. Texas (28)	3. Virginia (17)	3. New York (21)
4. Pennsylvania (24)	4. Pennsylvania (23)	4. Pennsylvania (14)	4. Pennsylvania (21)
5. North Carolina (22)	5. Ohio (18)	5. Michigan (14)	5. Ohio (16)
6. Florida (21)	6. New Jersey (15)	6. Ohio (13)	6. Virginia (16)
6. New York (21)	7. Florida (13)	7. Florida (12)	7. New Jersey (15)
7. Oregon (16)	7. Michigan (13)	8. Oregon (11)	8. Massachusetts (12)
8. New Jersey (16)	8. New York (12) Tennessee (12)	9. Oklahoma (11) New Jersey (11) Indiana (11) New York (11)	9. Alabama (11) Arizona (11) North Carolina (11)

Top states for outages caused by faulty equipment/human error

2016 (942 total outages)	2015 (942 total outages)	2014 (1,026 total outages)	2013 (921 total outages)
1. California (119)	1. California (133)	1. California (202)	1. California (159)
2. New York (52)	2. New York (55)	2. Michigan (51)	2. Pennsylvania (42)
3. Michigan (47)	3. Ohio (52)	3. New York (45)	3. New Jersey (41)
4. Texas (39)	4. Texas (49)	4. Pennsylvania (42)	4. Ohio (37)
5. Pennsylvania (35)	5. Michigan (43)	5. Texas (39)	5. Texas (36)
6. Ohio (34)	6. Pennsylvania (42)	6. Ohio (38)	6. Massachusetts (35)
6. Virginia (34)	7. Virginia (38)	7. New Jersey (33)	7. Michigan (35)
7. Nevada (33)	8. New Jersey (31)	8. Washington (32)	8. New York (32)
8. North Carolina (32)	9. North Carolina (26)	9. Massachusetts (28)	8. Washington (32)
9. New Jersey (27)	10. Oregon (21) Colorado (21)	10. Illinois (26)	9. Virginia (30)

Reported power outages by cause

Legend:
- Animal (169)
- Faulty Equipment/Human Error (925)
- Planned (189)
- Unknown (818)
- Vehicle Accident (483)
- Weather/Trees (1,279)
- Overdemand (3)
- Theft/Vandalism (13)
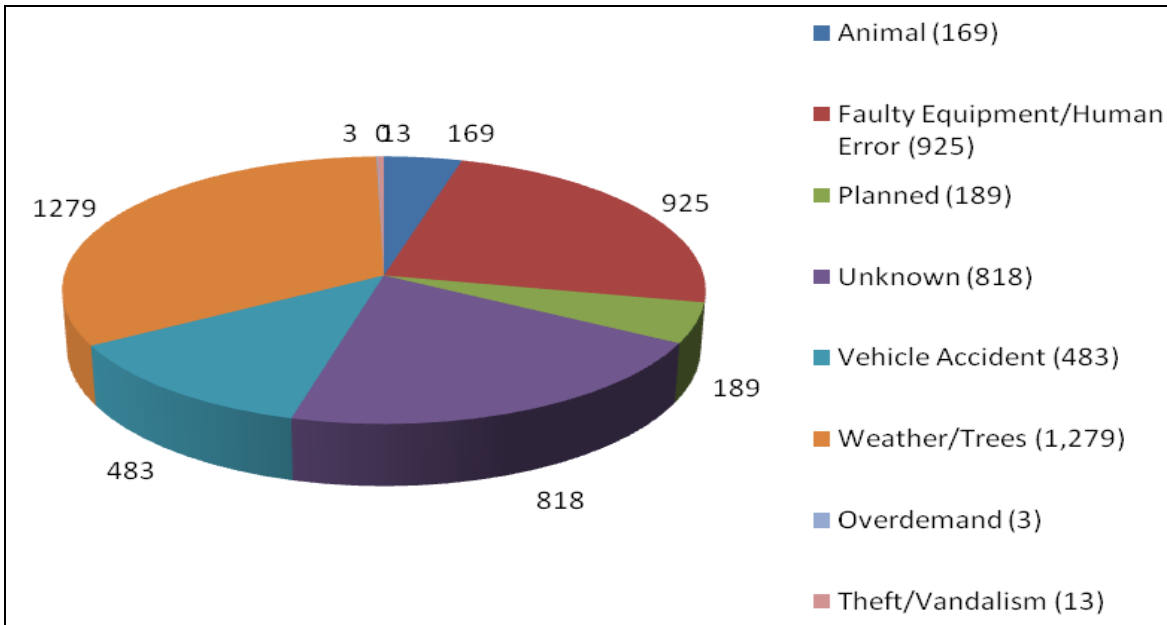
Note: Each power outage was grouped into one of eight possible causes. The number adjacent to the pie piece is the number of outages attributable to that cause.

Reported power outages by month
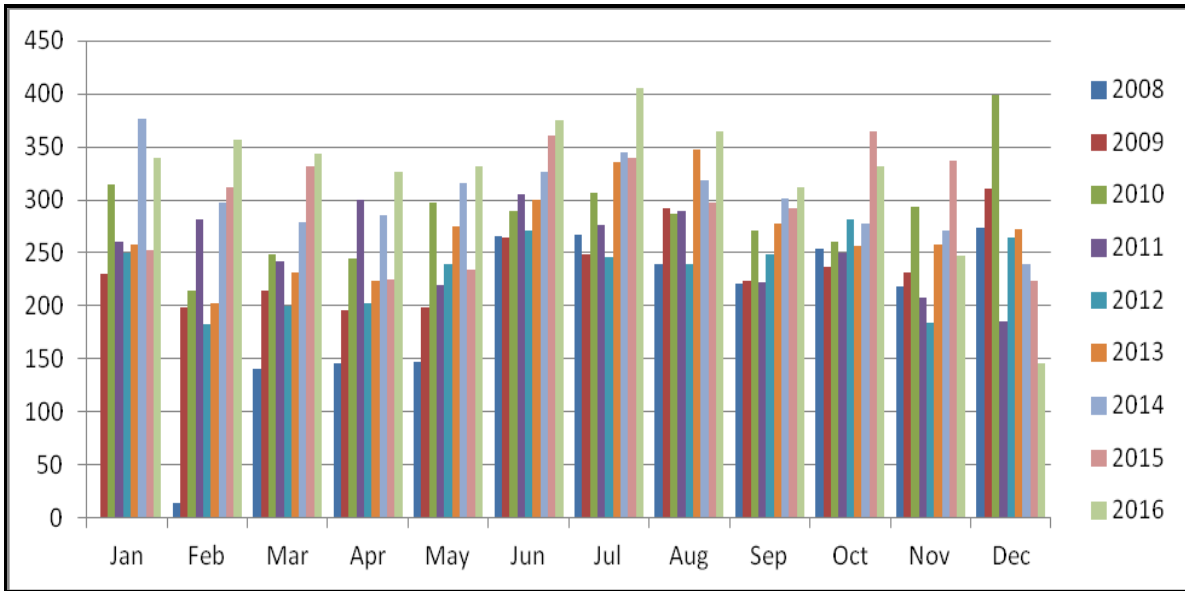
Reported power outages by animal type
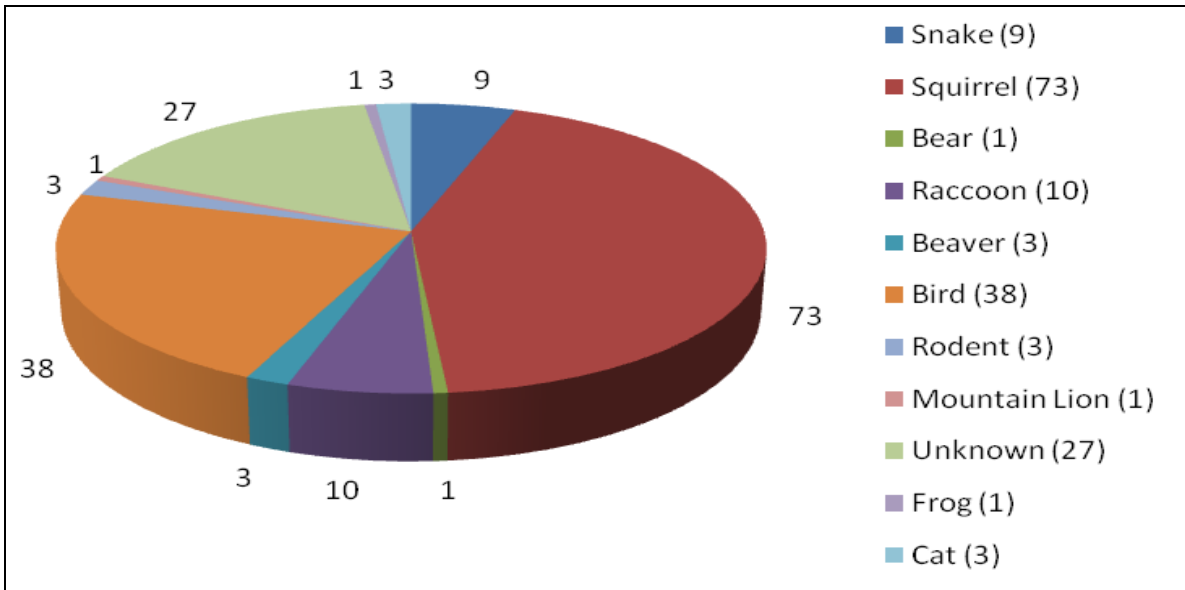
Notes: Number following animal type in the legend indicates number of reported outages caused by that animal. The bird category includes the following types: Crow, eagle, goose, hawk, osprey, raven, turkey and vulture.

Top states for outages caused by animals

2016 (169 total outages)	2014 (179 total outages)	2014 (150 total outages)	2013 (206 total outages)
1. Colorado (10)	1. Indiana (10)	1. California (13)	1. California (19)
1. Michigan (10)	2. California (9)	2. Texas (11)	2. Texas (14)
2. New York (9)	3. Washington (8)	3. Ohio (9)	2. Virginia (14)
2. Washington (9)	3. Michigan (8)	3. Oregon (9)	3. Ohio (11)
3. Montana (8)	4. Florida (7)	4. Michigan (9)	4. Tennessee (10)
4. Massachusetts (7)	4. Massachusetts (7)	5. Alaska (6)	5. Oregon (9)
4. Ohio (7)	4. Texas (7)	6. Missouri (5)	5. North Carolina (9)
4. Pennsylvania (7)	5. Iowa, New York, South Carolina, Tennessee, Virginia (6)	7. Wisconsin (5)	6. Michigan (7)
5. California Oklahoma (6)			7. Colorado, Indiana, Florida, Louisiana, South Carolina (6)

The early bird catches the worm — and causes the outage

In all fairness, it's not just the birds who are responsible for causing power outages. Although a flock of feathered friends did account for 38 of the 169 animal-related blackouts tracked by Eaton in 2016, other culprits included squirrels (the No.1 nemesis), snakes, raccoons, beavers, frogs, and even a lion and a bear.

Why do animals shoulder the blame for causing so many outages? When their bodies come in contact with a piece of energized equipment, it creates a short circuit. This diverts the path of electricity as it travels through the animal's body in search of a ground source. When the path is interrupted, special utility equipment senses this change and stops the flow of electricity, causing the blackout.

Power outage data by state

Reported power outages by region
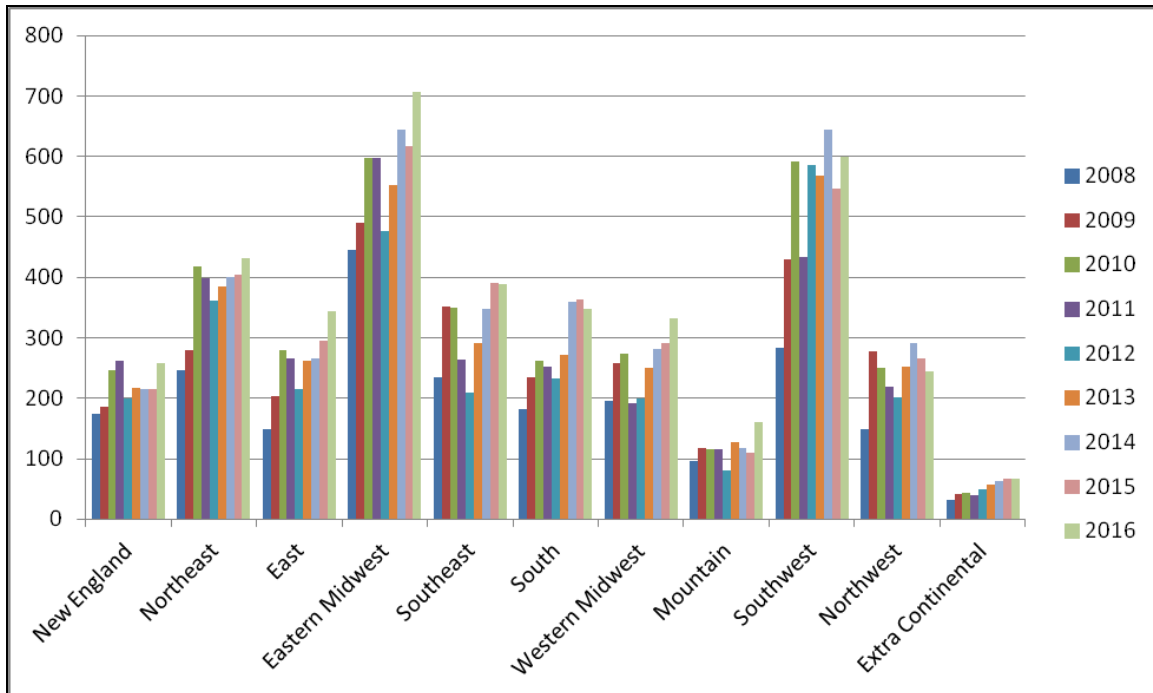
Regions:
New England: Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine
Northeast: New York, Pennsylvania, New Jersey
East: Virginia, North Carolina, Maryland (includes Washington DC), Delaware
Eastern Midwest: Wisconsin, Illinois, West Virginia, Ohio, Michigan, Kentucky, Indiana
Southeast: Tennessee, Georgia, Alabama, Mississippi, South Carolina, Florida
South: Texas, Louisiana, Arkansas, Oklahoma
Western Midwest: South Dakota, North Dakota, Nebraska, Minnesota, Missouri, Kansas, Iowa
Mountain: Colorado, Wyoming, Utah, New Mexico
Southwest: Nevada, California, Arizona
Northwest: Washington, Oregon, Idaho, Montana
Extra Continental: Alaska, Hawaii

State data overview

This section of the report provides an analysis of the power outages by state. There are four parts to each analysis.

1. The first part is an outage summary. The results are computed in the same manner as those in the outage summary found in the national power outage data in the previous part of this report. Only data pertaining to the particular state is used.
2. The second part of the analysis on each state is the outage fact. This is simply an interesting fact concerning a particular outage (or outages) in a state.
3. The third part of the analysis is a chart of the power outages by cause. This is the same type of chart that can be found in the national power outage data in the previous part of this report. Only data pertaining to the particular state is used.
4. The last part of each state section is the number of power outages by month. This is the same type of chart that can be found in the national power outage data in the previous part of this report. Only data pertaining to the particular state is used. From this chart it may be possible to determine particular times of the year when power outages are more common.
5. Data collection began February 16, 2008.

Alabama

Outage summary

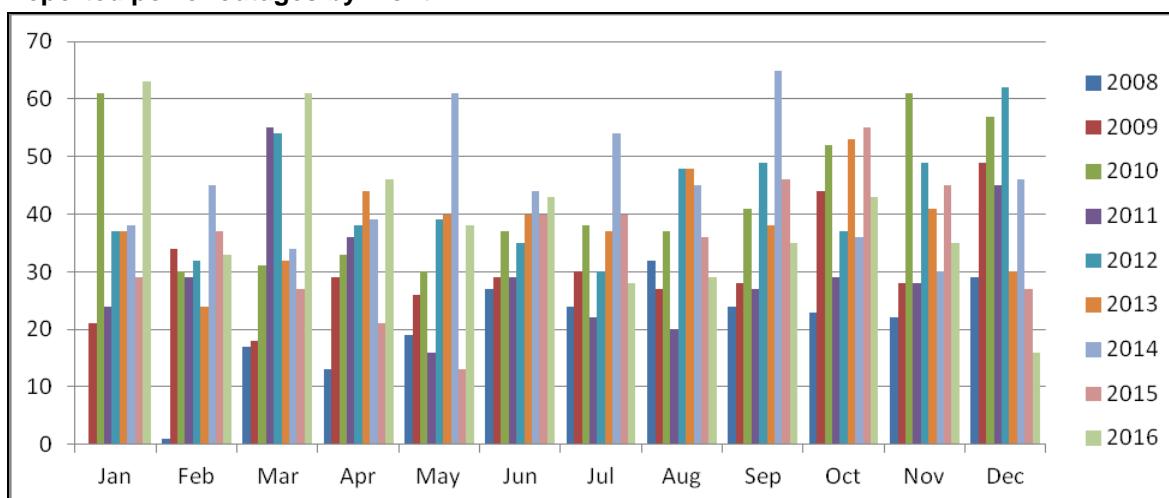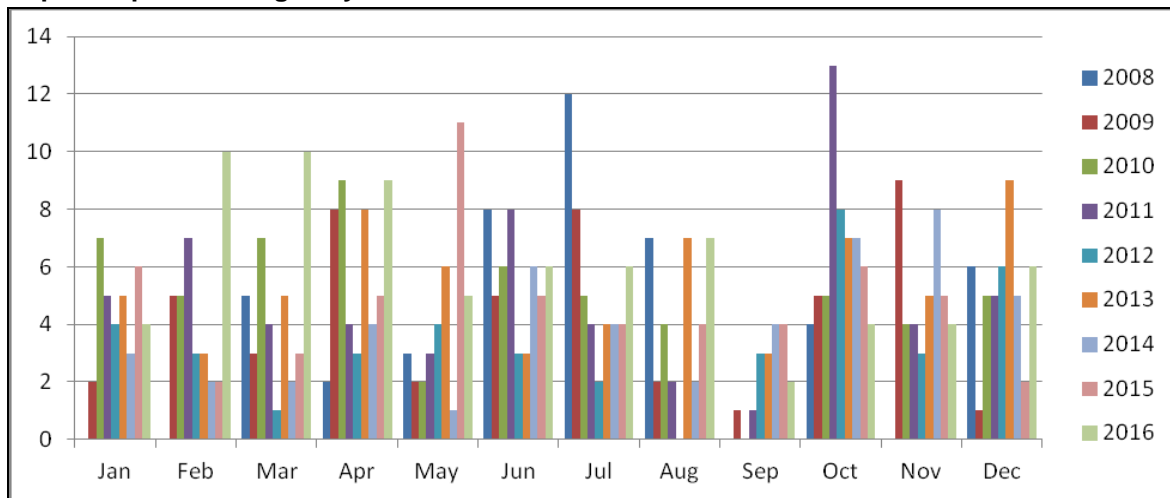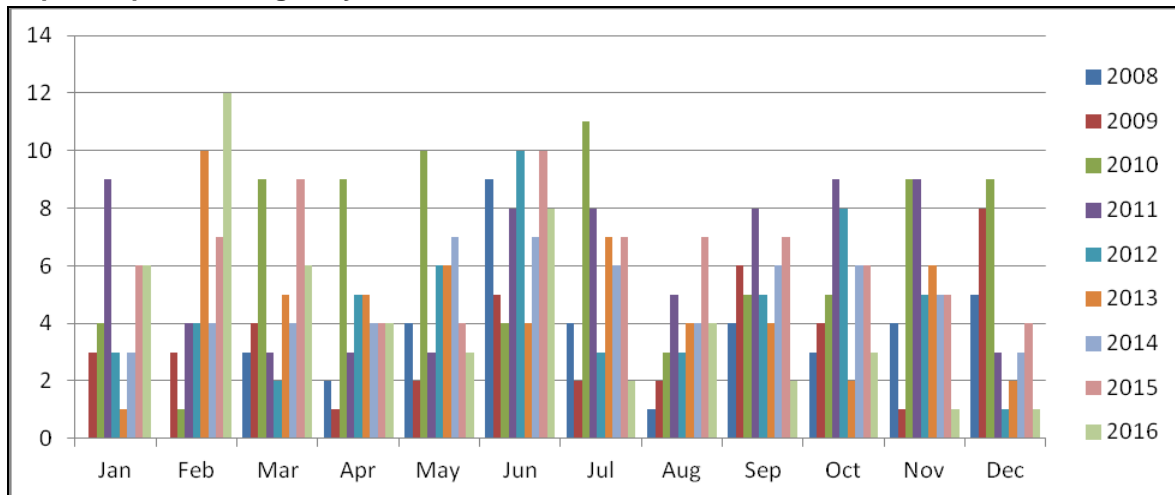|	
Total number of people affected by outages	312,420
Total duration of outages	545 minutes (9 hours)
Total number of outages	39
State ranking (number of outages)	29
Average number of people affected per outage	8,011
Average duration of outage	14 minutes

Note: Total number of people affected (and average) based on 16 (41%) of the total reported outages.
Total duration of outages (and average) based on 6 (15%) of the total reported outages.

Outage fact: On June 17, strong summer storms knocked out power to some 115,000 customers across the state.

Reported power outages by cause
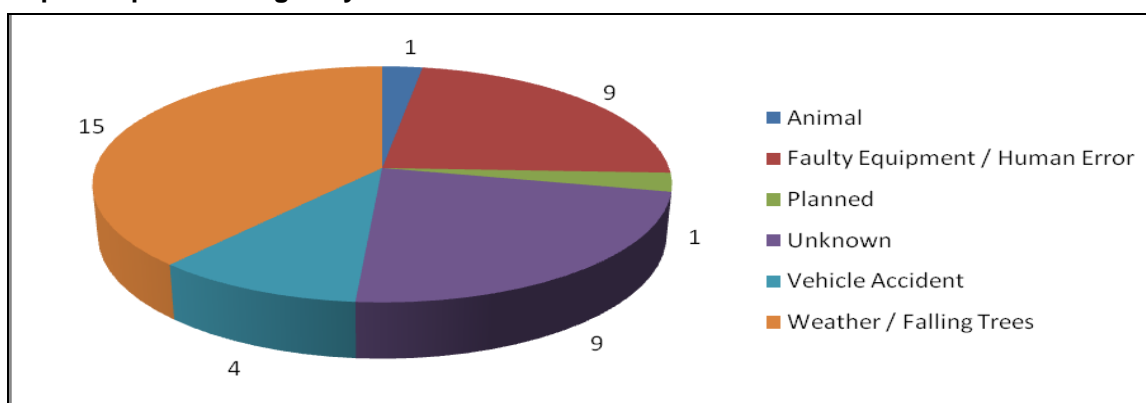
Reported power outages by month
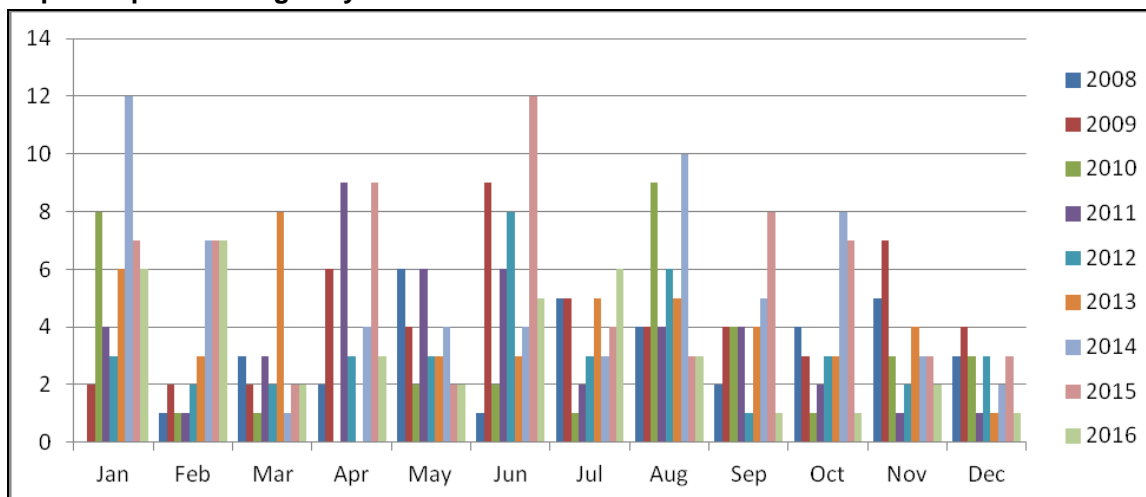
Alaska

Outage summary

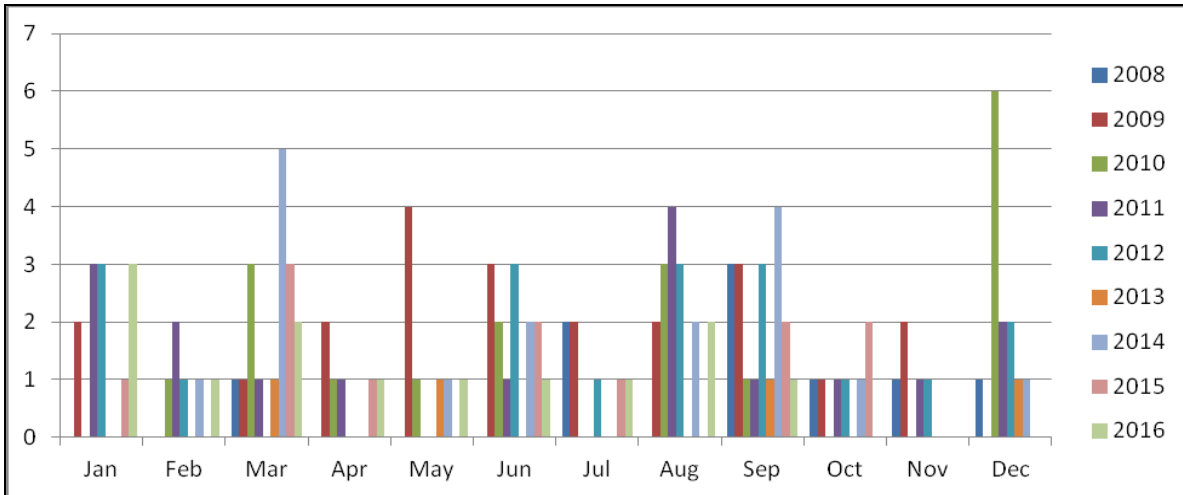|	
Total number of people affected by outages	85,326
Total duration of outages	1,487 minutes (nearly 25 hours)
Total number of outages	34
State ranking (number of outages)	34 (tie)
Average number of people affected per outage	2,819
Average duration of outage	44 minutes

Note: Total number of people affected (and average) based on 17 (50%) of the total reported outages.
Total duration of outages (and average) based on 11 (32%) of the total reported outages.

Outage fact: An eagle carrying a salmon hit a power line in Haines on August 19, killing power to 140 customers for half an hour.

Reported power outages by cause
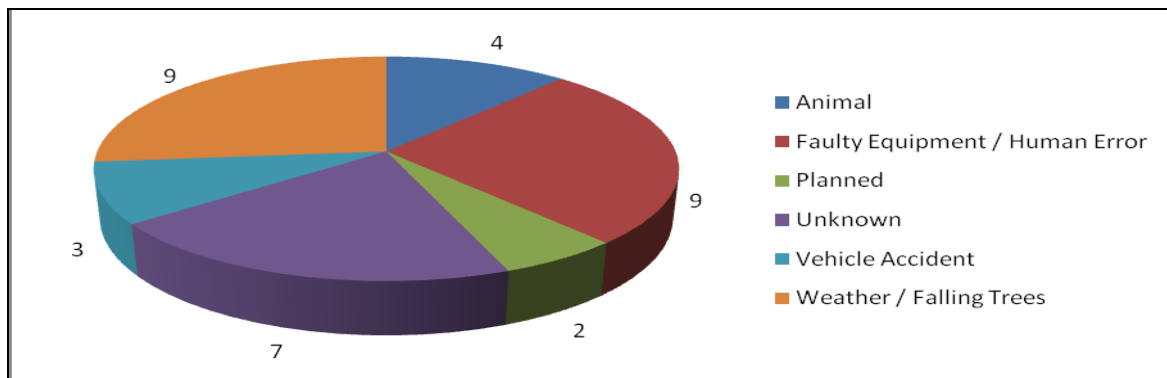
Reported power outages by month
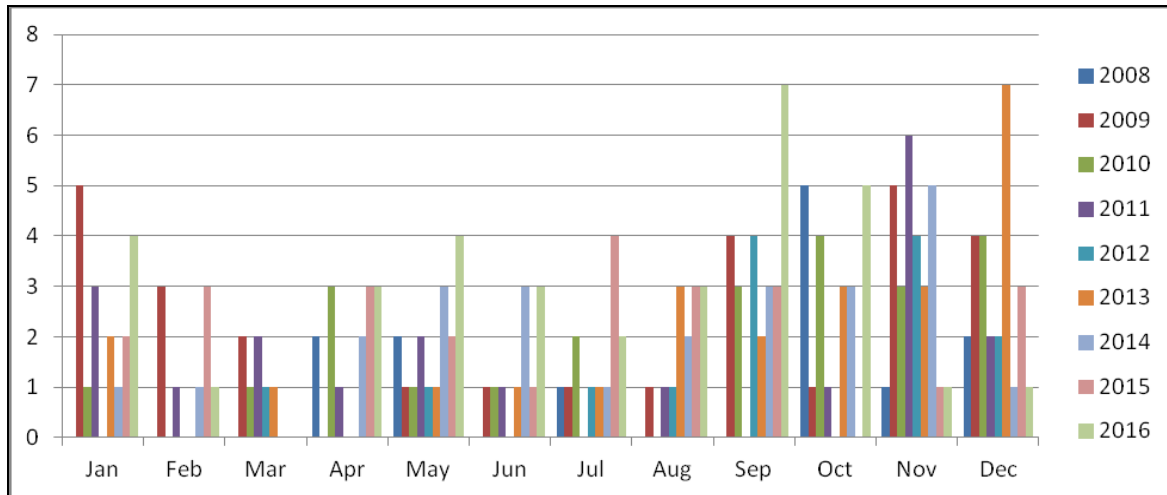
Arizona

Outage summary

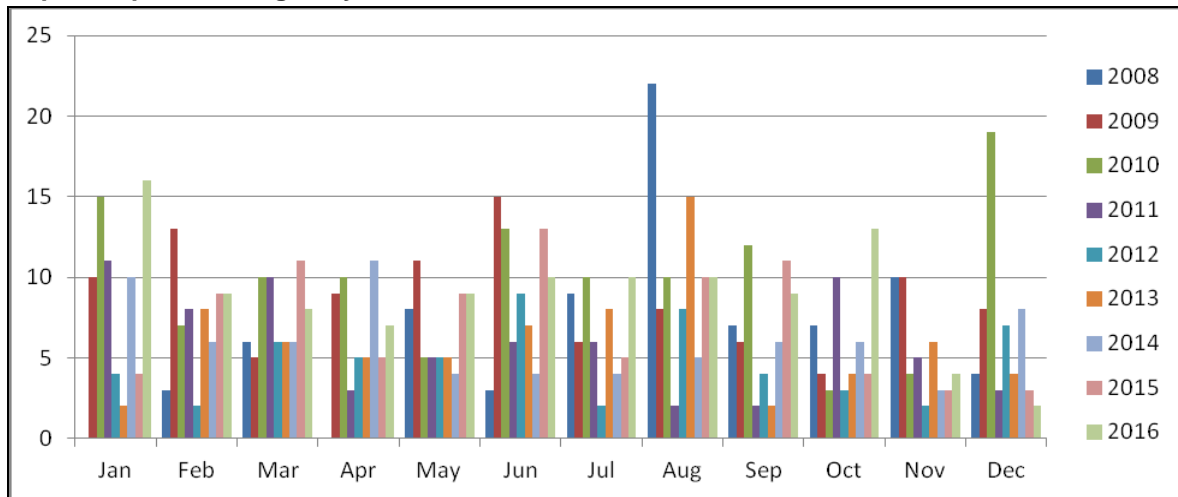|	
Total number of people affected by outages	259,228
Total duration of outages	6,115 minutes (4 ¼ days)
Total number of outages	62
State ranking (number of outages)	19
Average number of people affected per outage	4,181
Average duration of outage	99 minutes

Note: Total number of people affected (and average) based on 51 (82%) of the total reported outages.
Total duration of outages (and average) based on 13 (21%) of the total reported outages.

Outage fact: High winds blew an awning into a power line in Prescott Valley April 24, cutting electricity to 4,100 customers.

Reported power outages by cause
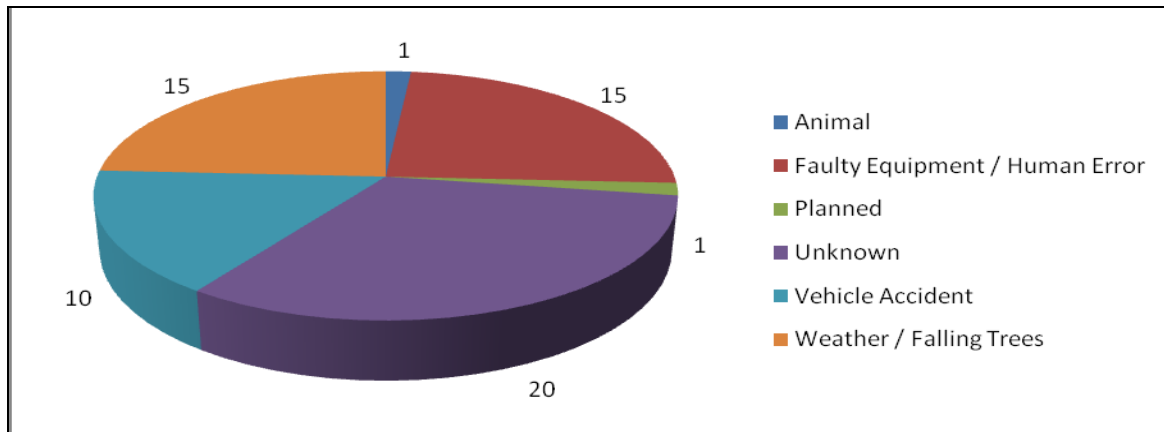
Reported power outages by month
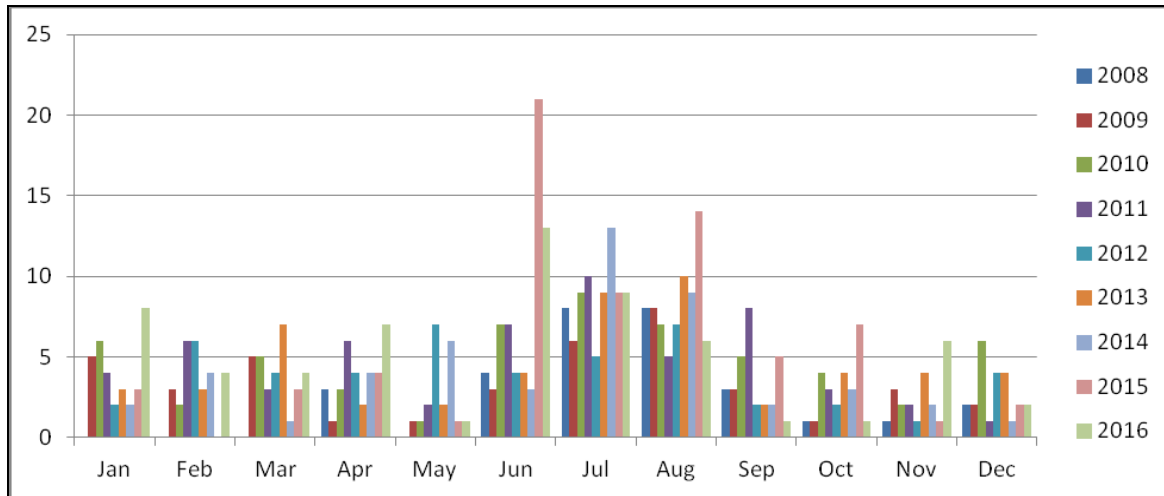
Arkansas

Outage summary

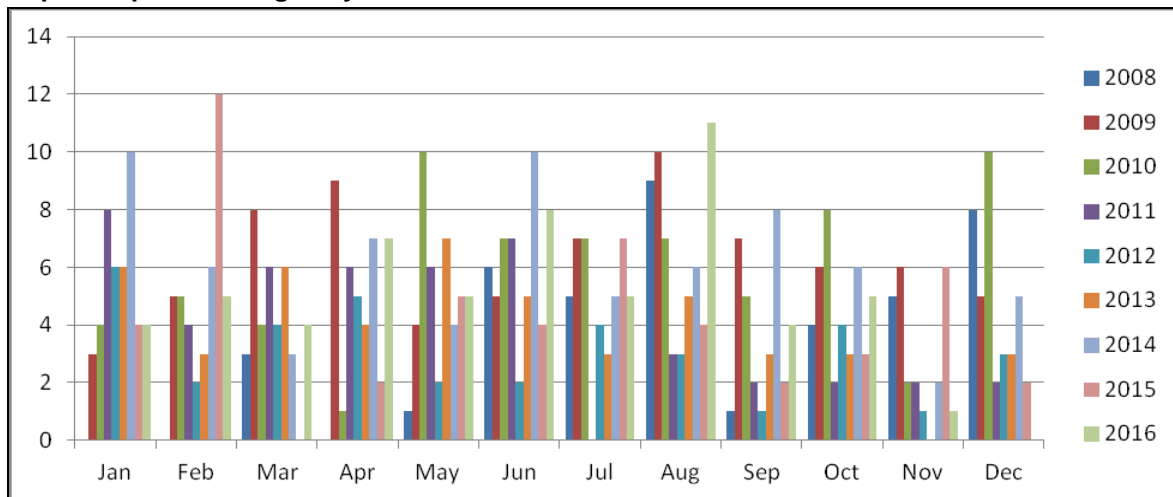|	
Total number of people affected by outages	347,141
Total duration of outages	1,185 minutes (nearly 20 hours)
Total number of outages	37
State ranking (number of outages)	31 (tie)
Average number of people affected per outage	9,382
Average duration of outage	32 minutes

Note: Total number of people affected (and average) based on 15 (40%) of the total reported outages.
Total duration of outages (and average) based on 11 (30%) of the total reported outages.

Outage fact: On Sept. 8, a beaver chewed through a large tree, causing it to fall near some electrical equipment. The resulting tripped breaker cut power to 400 Lynn homes.

Reported power outages by cause
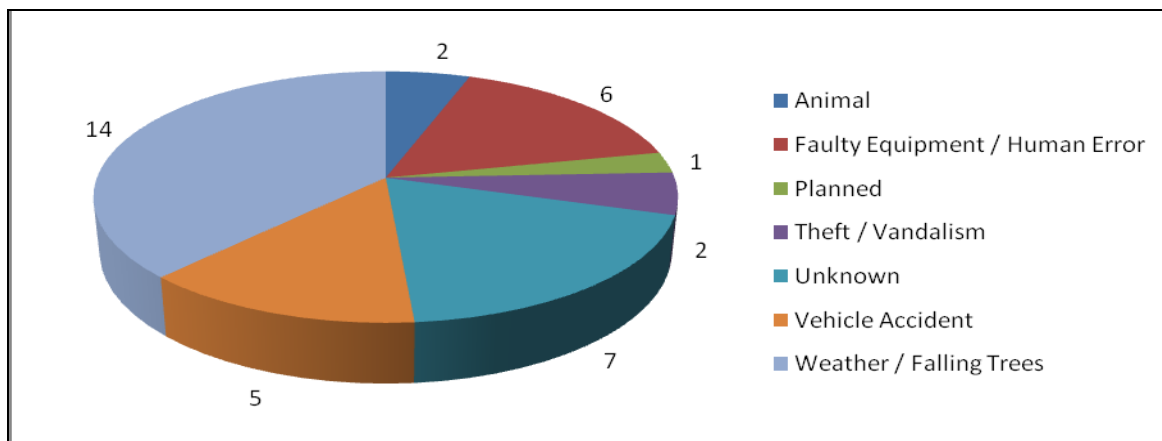
Reported power outages by month
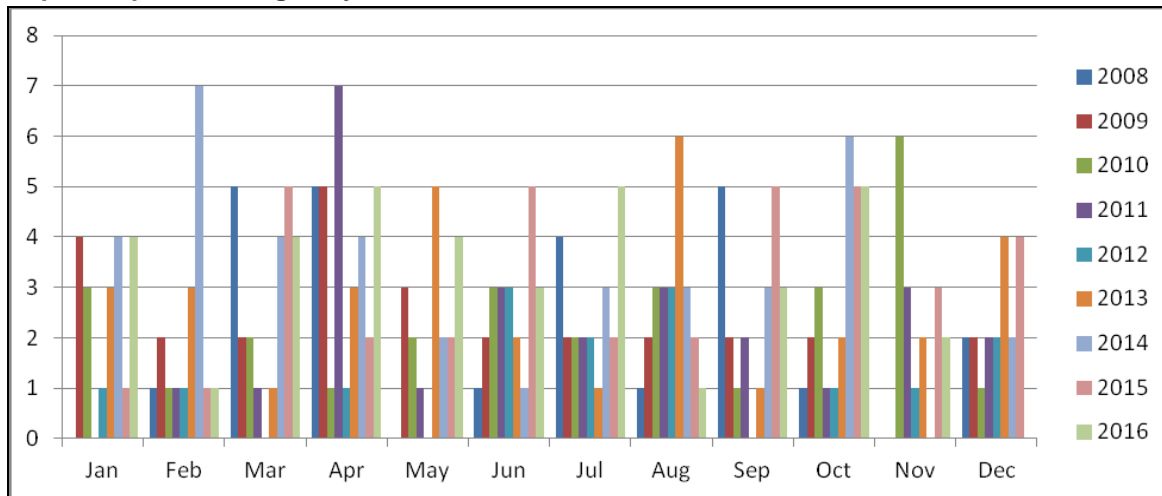
California

Outage summary

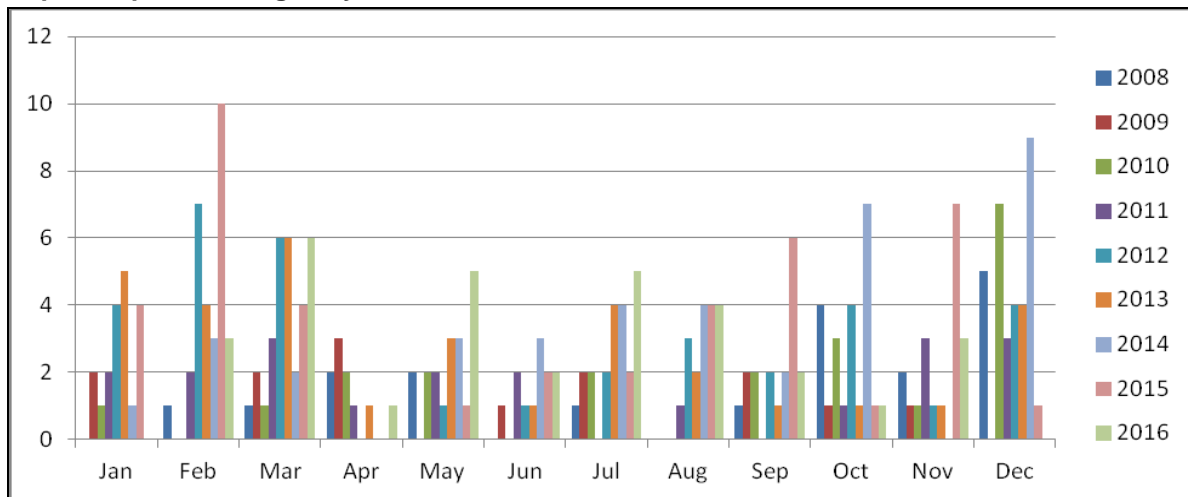|	
Total number of people affected by outages	1,949,879
Total duration of outages	41,131 minutes (more than 28 days)
Total number of outages	470
State ranking (number of outages)	1
Average number of people affected per outage	4,149
Average duration of outage	88 minutes

Note: Total number of people affected (and average) based on 380 (80%) of the total reported outages.
Total duration of outages (and average) based on 99 (21%) of the total reported outages.

Outage fact: A "wiring error" associated with an ongoing equipment-upgrade project caused an Oct. 10 outage In Torrance, in which 100,000 customers lost power. Local television footage showed large flames shooting from the PBF refinery plant, which was forced to flare off gases as units shut down.

Reported power outages by cause
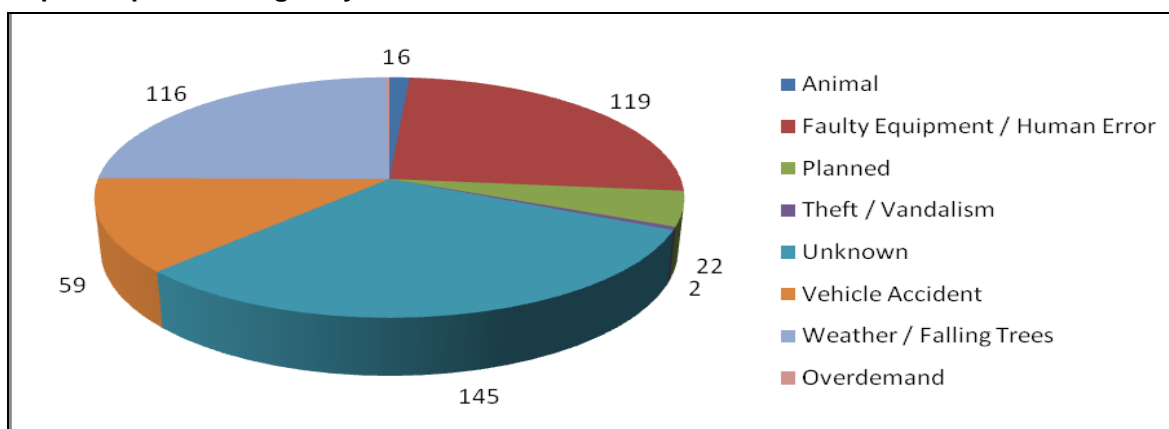
Reported power outages by month

Colorado

Outage summary

Total number of people affected by outages	288,057
Total duration of outages	4,831 minutes (3.3 days)
Total number of outages	73
State ranking (number of outages)	15 (tie)
Average number of people affected per outage	3,946
Average duration of outage	66 minutes

Note: Total number of people affected (and average) based on 43 (58%) of the total reported outages.
Total duration of outages (and average) based on 24 (33%) of the total reported outages.

Outage fact: On May 24, a goose was electrocuted on a line, causing a trip that cut power to 1,500 Fort Collins homes for almost 3 hours.

Reported power outages by cause
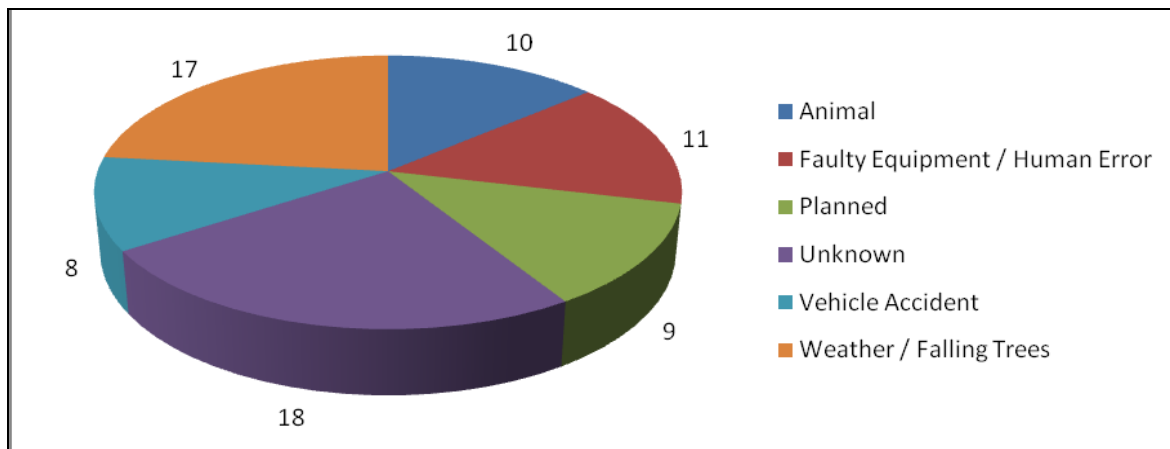
Reported power outages by month

Connecticut

Outage summary

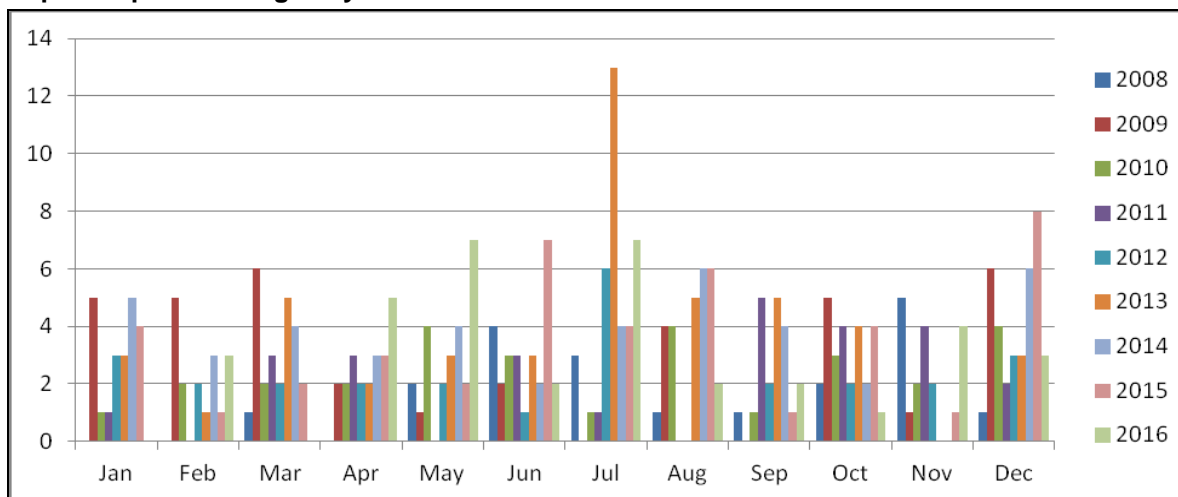|	
Total number of people affected by outages	320,943
Total duration of outages	1,380 minutes (23 hours)
Total number of outages	52
State ranking (number of outages)	24
Average number of people affected per outage	6,172
Average duration of outage	27 minutes

Note: Total number of people affected (and average) based on377 (71%) of the total reported outages.
Total duration of outages (and average) based on 6 (11%) of the total reported outages.

Outage fact: With winds gusting more than 75 miles-per-hour in some locations and torrential rain soaking a majority of Connecticut, a Feb. 24 storm caused extensive damage across the state, interrupting electric service to more than 89,500 customers.

Reported power outages by cause
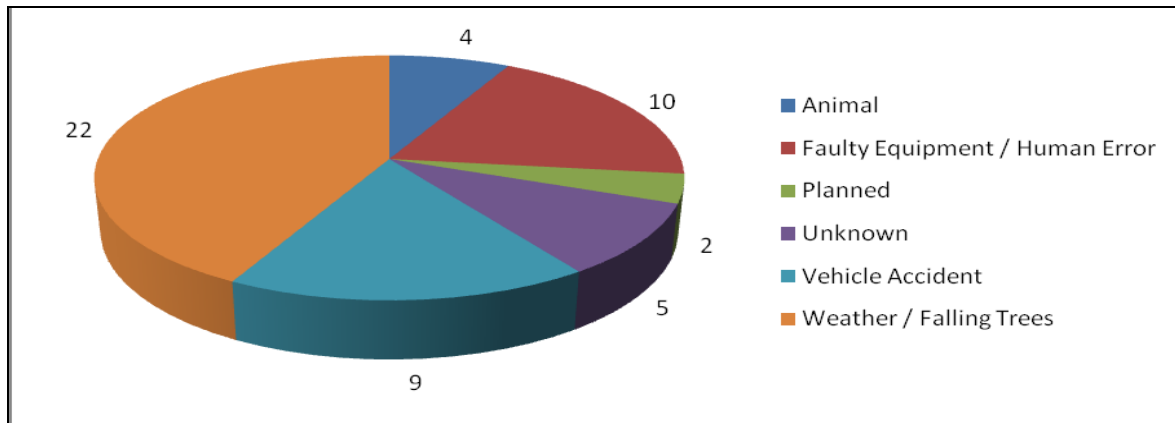
Reported power outages by month

Delaware

Outage summary

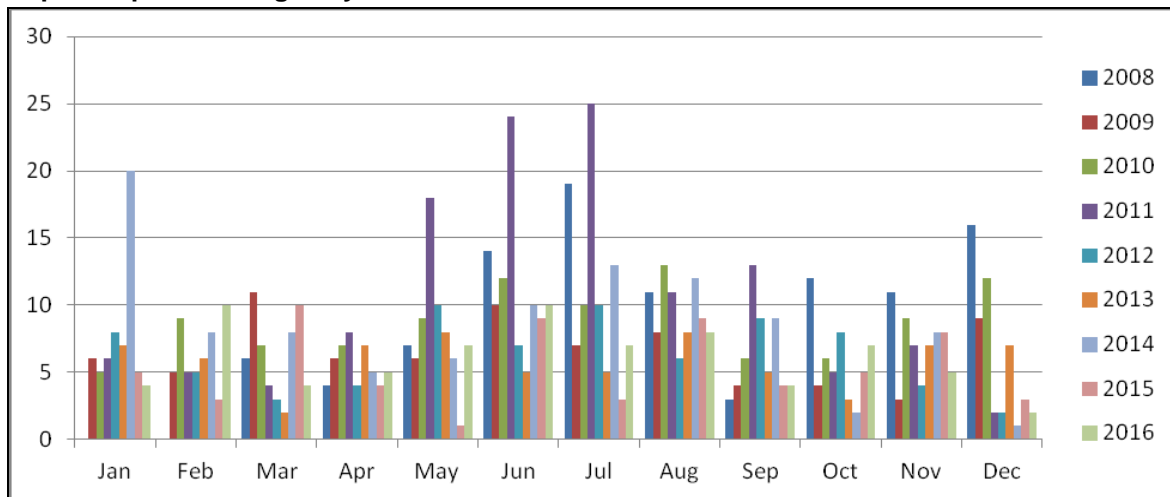| Total number of people affected by outages	5,887
Total duration of outages	660 minutes (11 hours)
Total number of outages	13
State ranking (number of outages)	40
Average number of people affected per outage	453
Average duration of outage	51 minutes

Note: Total number of people affected (and average) based on 6 (46%) of the total reported outages. Total duration of outages (and average) based on 3 (23%) of the total reported outages.

Outage fact: Sussex County couldn't escape the path of a historic blizzard Jan. 23, with the massive storm causing dozens of crashes and blacking out nearly 1,000 homes.

Reported power outages by cause
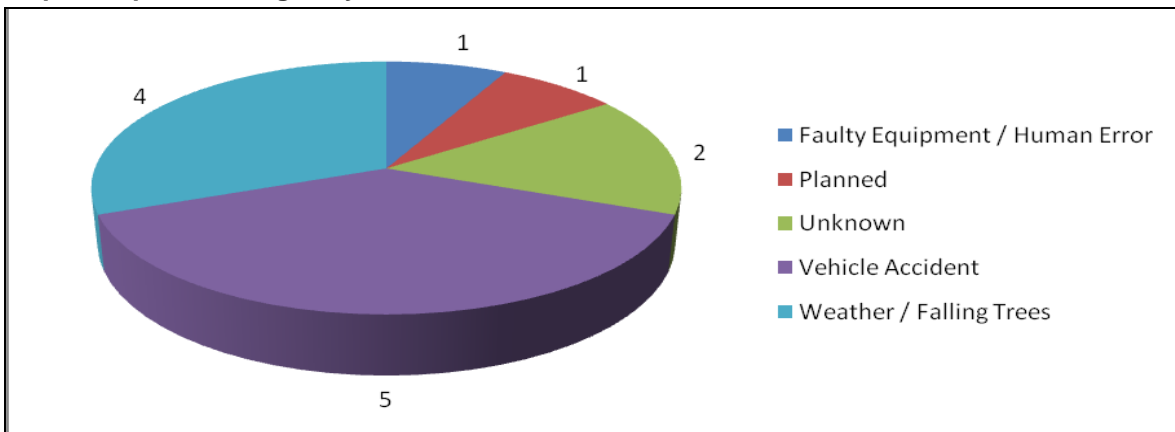
Reported power outages by month

Florida

Outage summary

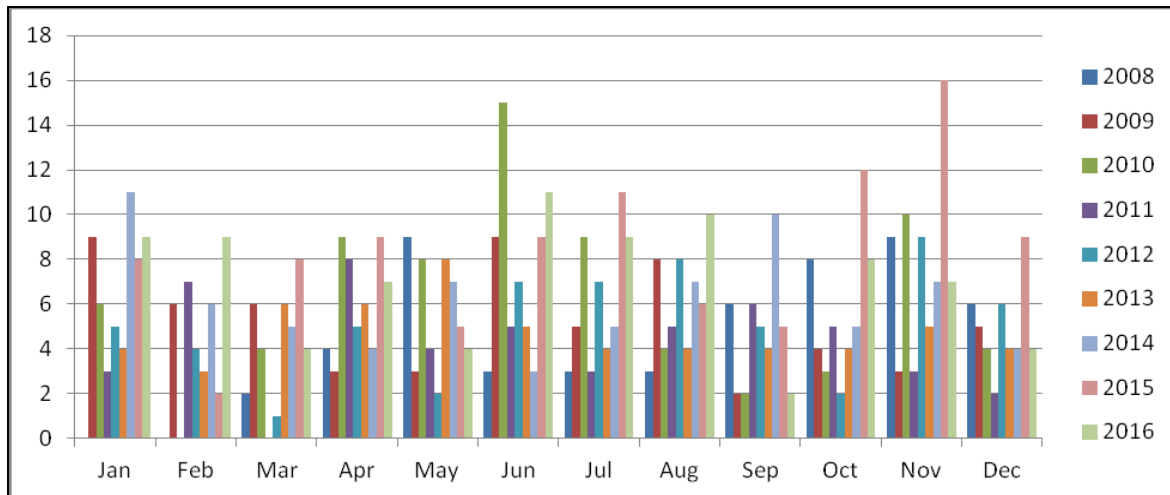|	
Total number of people affected by outages	977.675
Total duration of outages	3,165 minutes (more than 2 days)
Total number of outages	107
State ranking (number of outages)	8
Average number of people affected per outage	9,137
Average duration of outage	30 minutes

Note: Total number of people affected (and average) based on 69 (64%) of the total reported outages. Total duration of outages (and average) based on 17 (16%) of the total reported outages.

Outage fact: On Jan. 10, a vulture crashed into Kissimmee power lines, causing an outage for 1,000 customers that lasted 52 minutes.

Reported power outages by cause
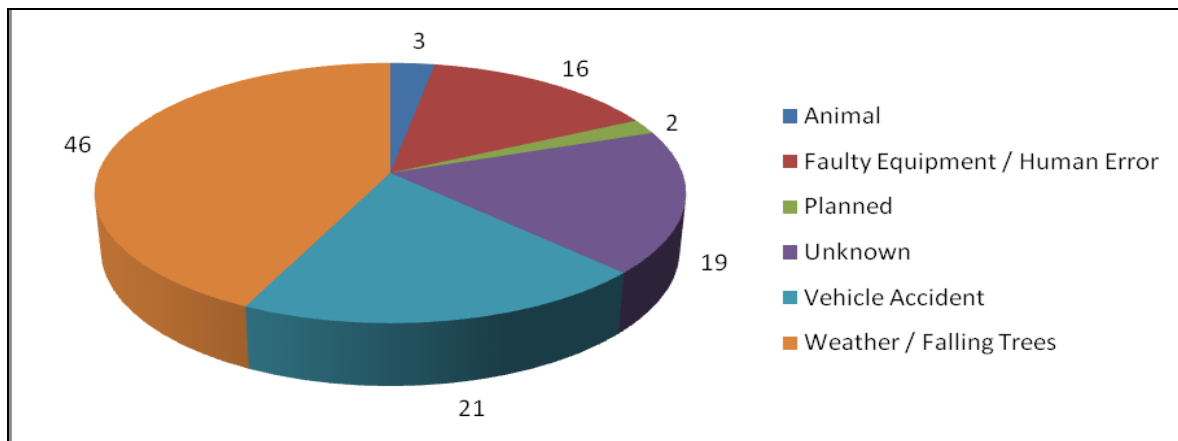
Reported power outages by month

Georgia

Outage summary

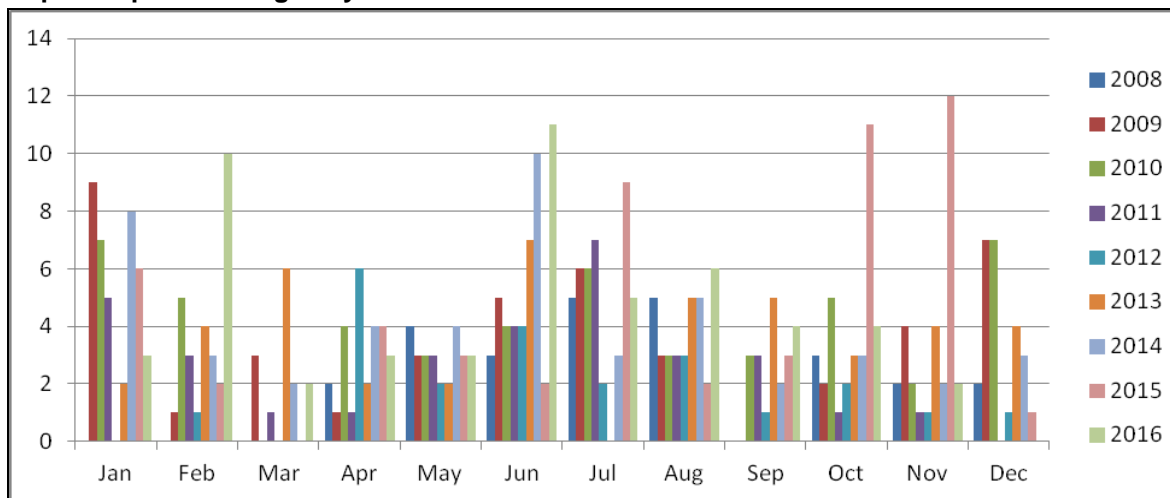|	
Total number of people affected by outages	686,485
Total duration of outages	1,360 minutes (nearly 23 hours)
Total number of outages	59
State ranking (number of outages)	20
Average number of people affected per outage	11,635
Average duration of outage	23 minutes

Note: Total number of people affected (and average) based on 31 (53%) of the total reported outages. Total duration of outages (and average) based on 7 (12%) of the total reported outages.

Outage fact: On August 3, a raccoon got into a breaker during the night at a Harris Station substation and created a 2½-hour power outage.

Reported power outages by cause
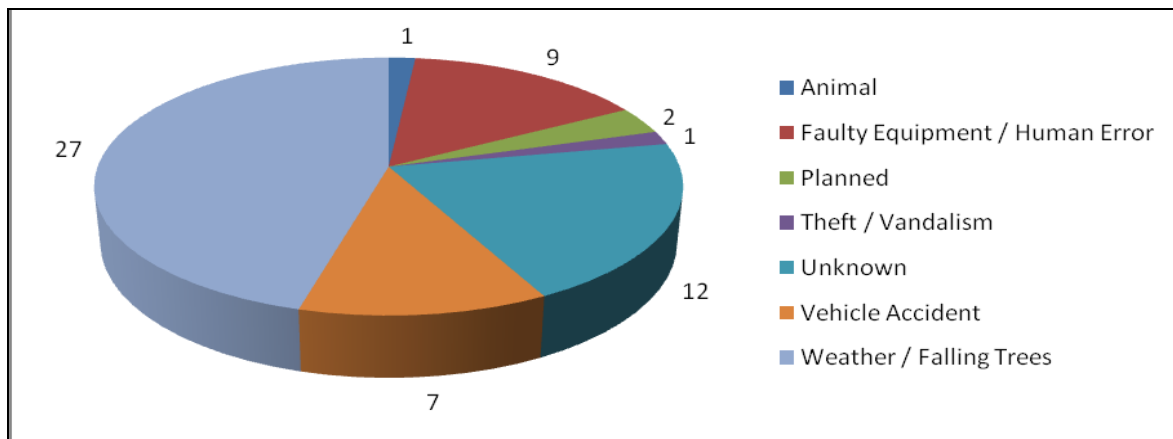
Reported power outages by month

Hawaii

Outage summary

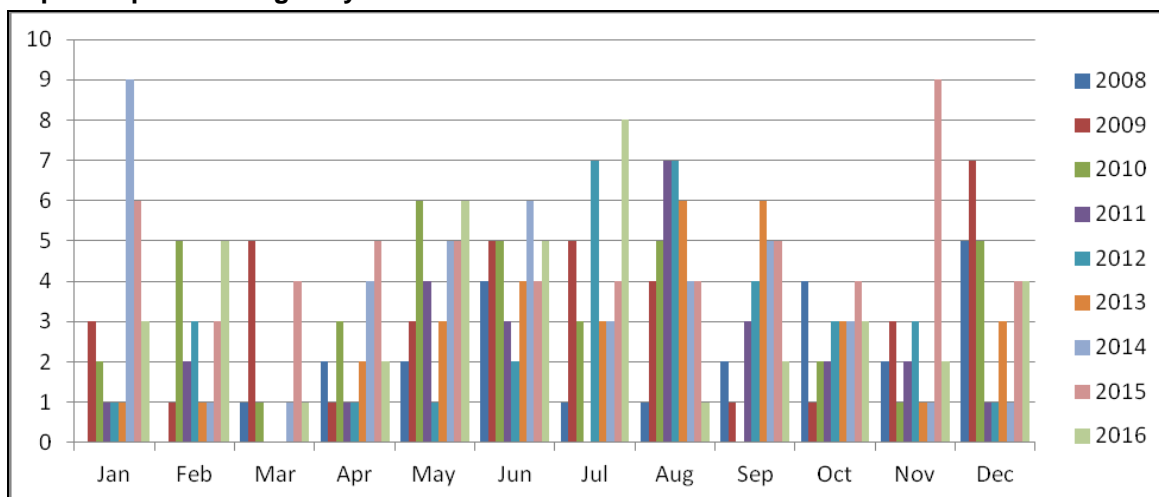|	
Total number of people affected by outages	151,560
Total duration of outages	2,856 minutes (nearly 2 days)
Total number of outages	32
State ranking (number of outages)	35
Average number of people affected per outage	4,736
Average duration of outage	89 minutes

Note: Total number of people affected (and average) based on 20 (63%) of the total reported outages. Total duration of outages (and average) based on 11 (34%) of the total reported outages.

Outage fact: A generation shortfall prompted an outage March 25 to 60,000 Oahu customers. Due to the loss of several generating units, the utility asked residents to conserve electricity use, especially during peak demand times.

Reported power outages by cause
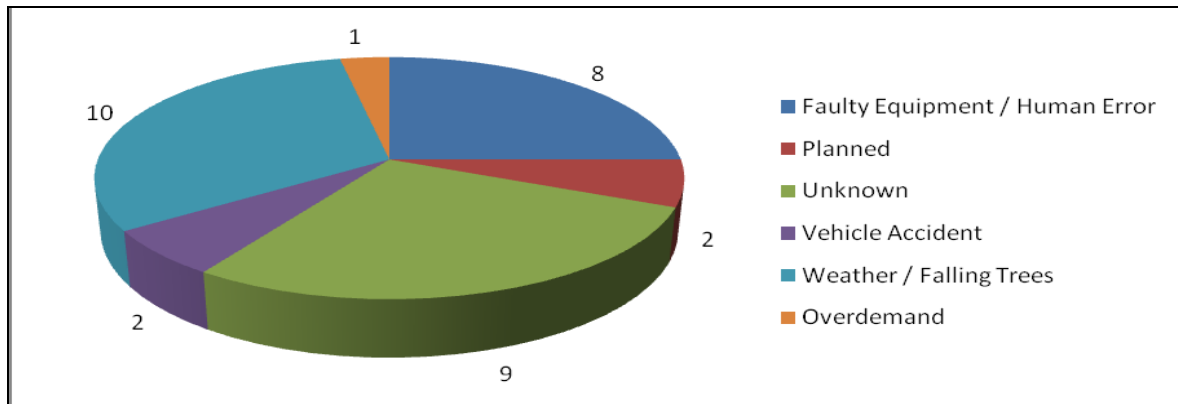
Reported power outages by month

Idaho

Outage summary

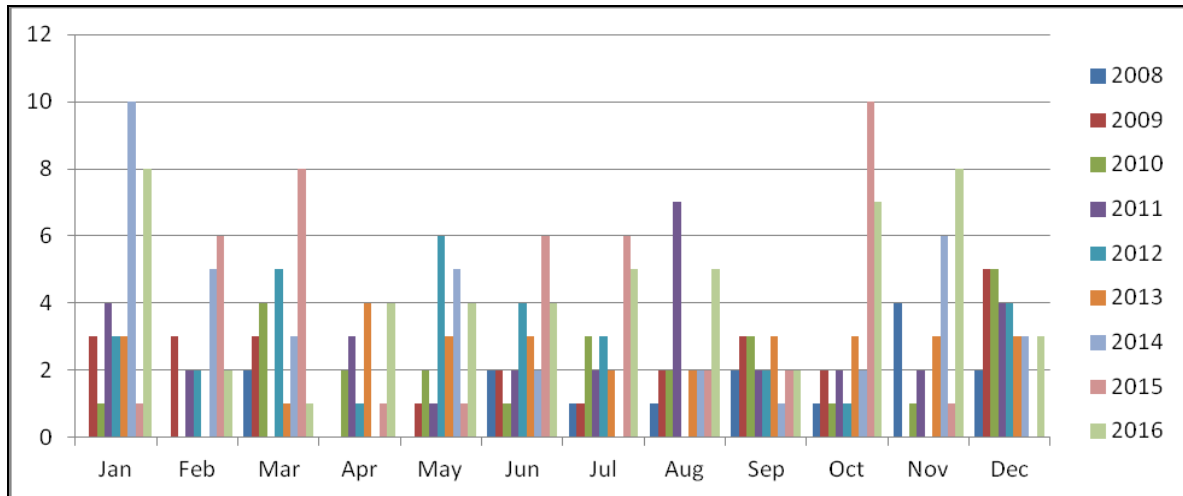|	
Total number of people affected by outages	161,214
Total duration of outages	1,870 minutes (more than 31 hours)
Total number of outages	36
State ranking (number of outages)	32
Average number of people affected per outage	4,478
Average duration of outage	52 minutes

Note: Total number of people affected (and average) based on 30 (83%) of the total reported outages. Total duration of outages (and average) based on 11 (30%) of the total reported outages.

Outage fact: On July 19, a huge outage stemmed from a capacitor bank that caught fire in Idaho Falls. The blackout affected 53,800 customers in parts of east Idaho, Wyoming and Montana.

Reported power outages by cause
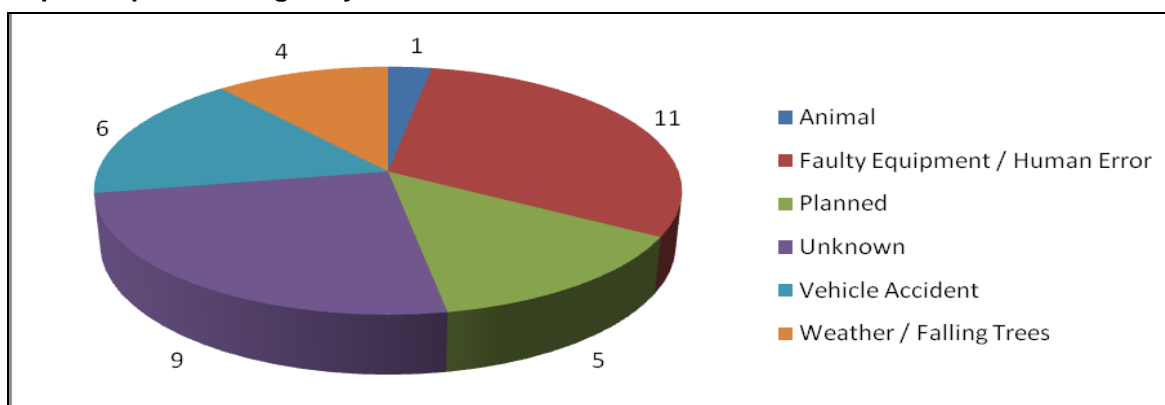
Reported power outages by month

Illinois

Outage summary

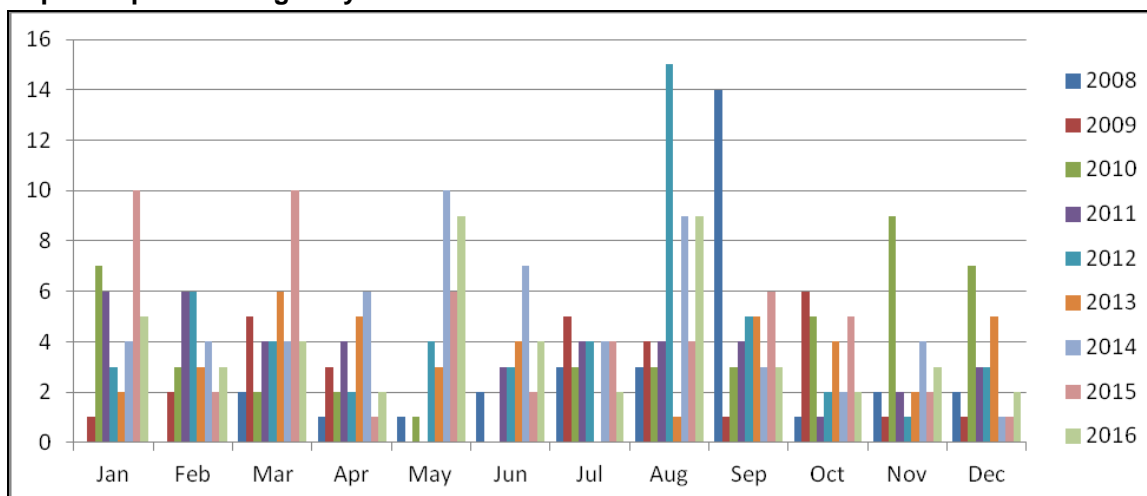|	
Total number of people affected by outages	235,381
Total duration of outages	2,625 minutes (nearly 2 days)
Total number of outages	73
State ranking (number of outages)	15 (tie)
Average number of people affected per outage	3,224
Average duration of outage	36 minutes

Note: Total number of people affected (and average) based on 48 (66%) of the total reported outages. Total duration of outages (and average) based on 16 (22%) of the total reported outages.

Outage fact: A train derailment resulted in an Oct. 26 outage to 450 Belleville customers. Eight cars of a coal train went off the tracks just past the Illinois state line, toppling over and taking down several power lines.

Reported power outages by cause
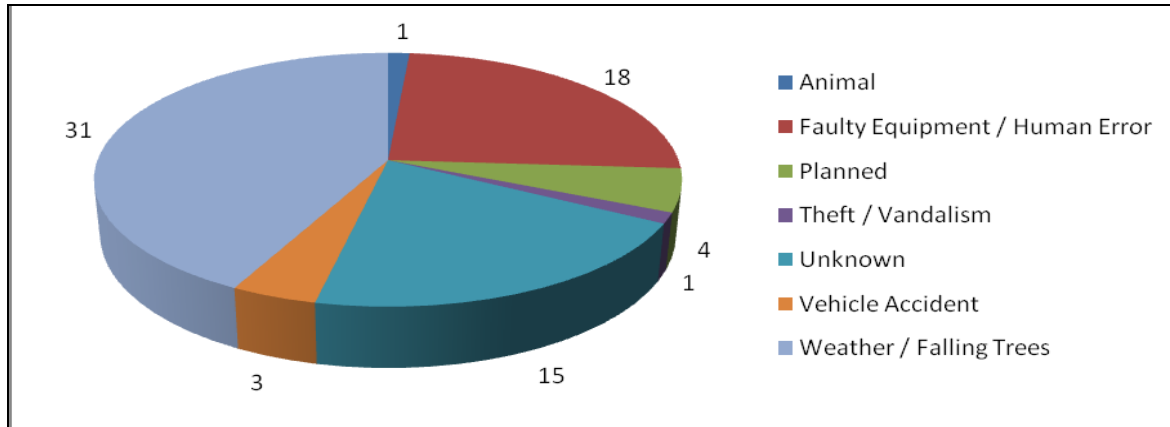
Reported power outages by month

Indiana

Outage summary

Total number of people affected by outages	329,753
Total duration of outages	4,001 minutes (nearly 3 days)
Total number of outages	84
State ranking (number of outages)	12
Average number of people affected per outage	3,926
Average duration of outage	48 minutes

Note: Total number of people affected (and average) based on 60 (71%) of the total reported outages. Total duration of outages (and average) based on 21 (25%) of the total reported outages.

Outage fact: On August 23, fierce winds from tornadoes were blamed for causing 30,000 outages in Kokomo. Three days later, 4,000 people were still without power.

Reported power outages by cause
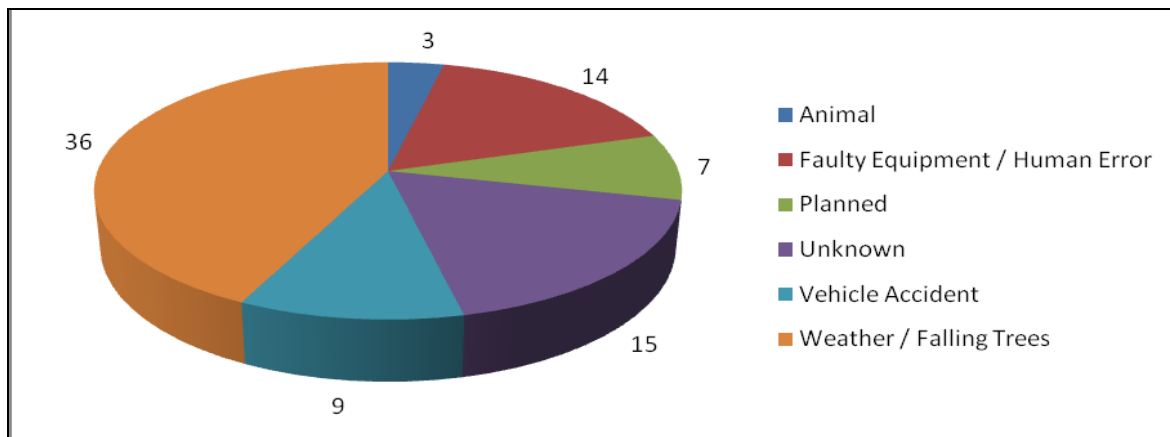
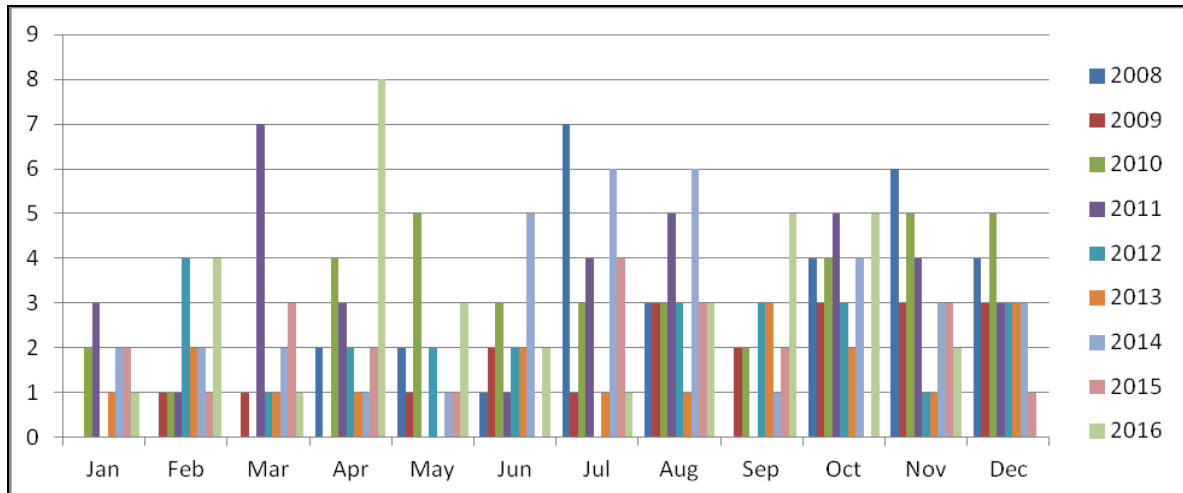**Reported power outages by month**

Iowa

Outage summary

Total number of people affected by outages	139,578
Total duration of outages	1,018 minutes (17 hours)
Total number of outages	53
State ranking (number of outages)	23 (tie)
Average number of people affected per outage	2,634
Average duration of outage	19 minutes

Note: Total number of people affected (and average) based on 42 (79%) of the total reported outages. Total duration of outages (and average) based on 8 (15%) of the total reported outages.

Outage fact: On June 17, strong winds and thunderstorms ripped apart trees, downed power lines and knocked out electricity to 10,000 residents and businesses in Sioux City and the surrounding area.

Reported power outages by cause
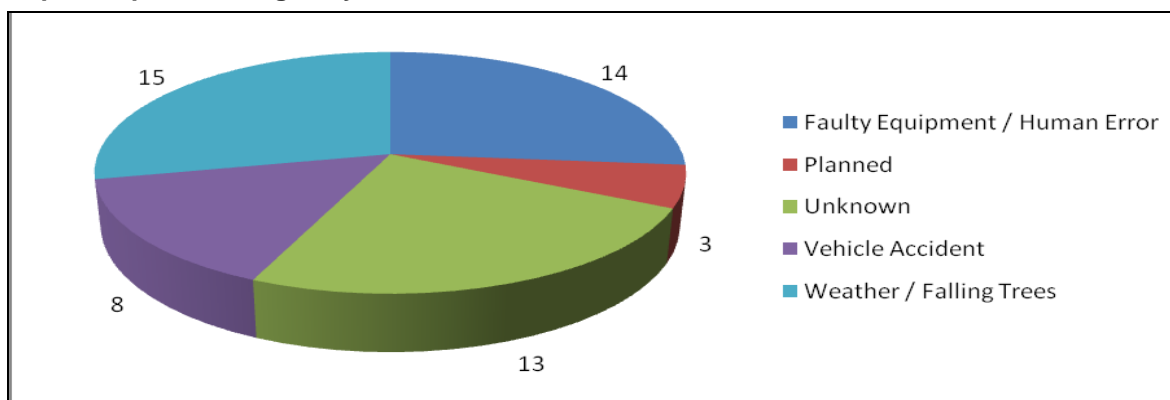
Reported power outages by month

Kansas

Outage summary

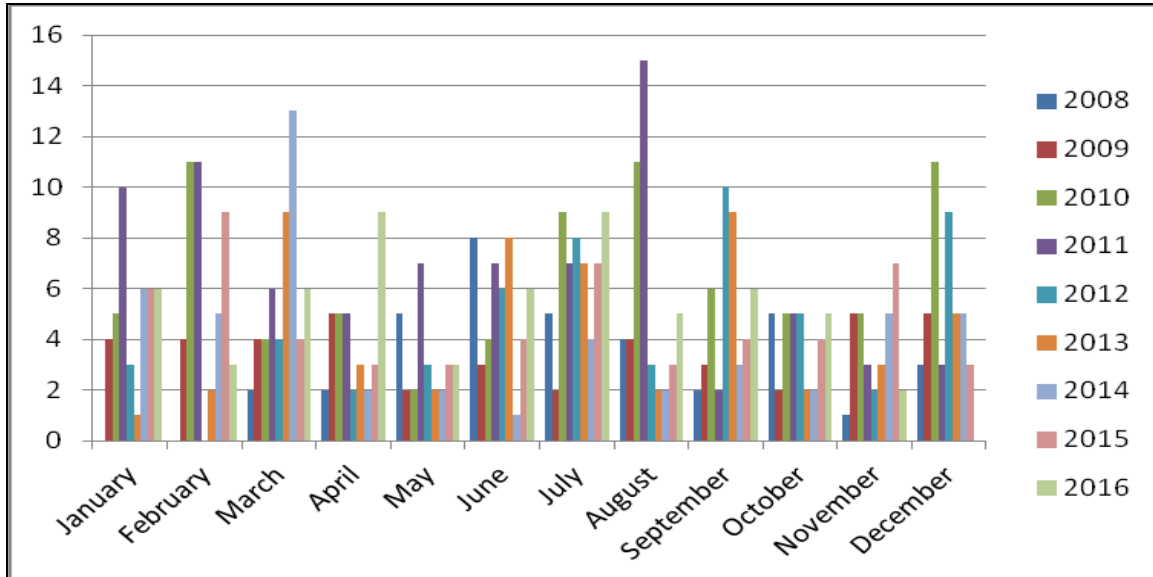|	
Total number of people affected by outages	86,661
Total duration of outages	1,230 minutes (20 ½ hours)
Total number of outages	42
State ranking (number of outages)	27
Average number of people affected per outage	2,063
Average duration of outage	29 minutes

Note: Total number of people affected (and average) based on 28 (67%) of the total reported outages. Total duration of outages (and average) based on 9 (21%) of the total reported outages.

Outage fact: On Feb. 19, a construction worker who was digging as part of site work struck an "unmarked" underground main electrical line, causing a power outage.

Reported power outages by cause
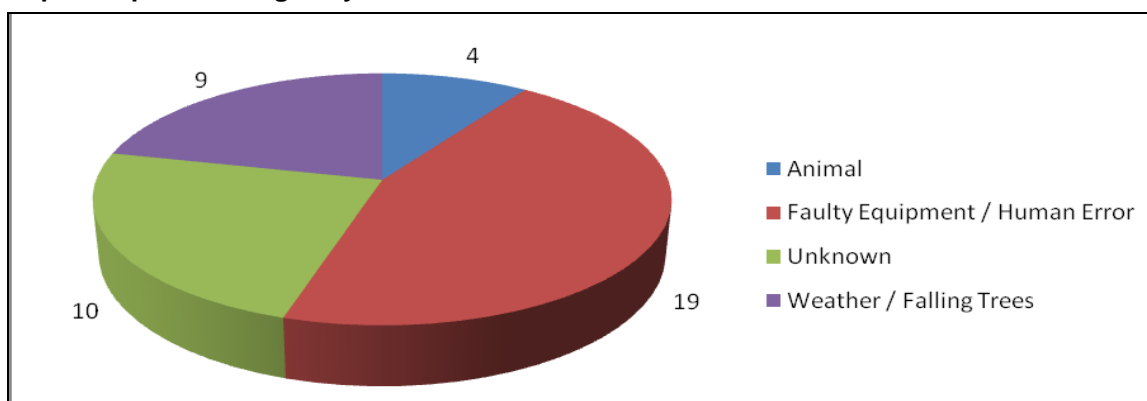
Reported power outages by month

Kentucky

Outage summary

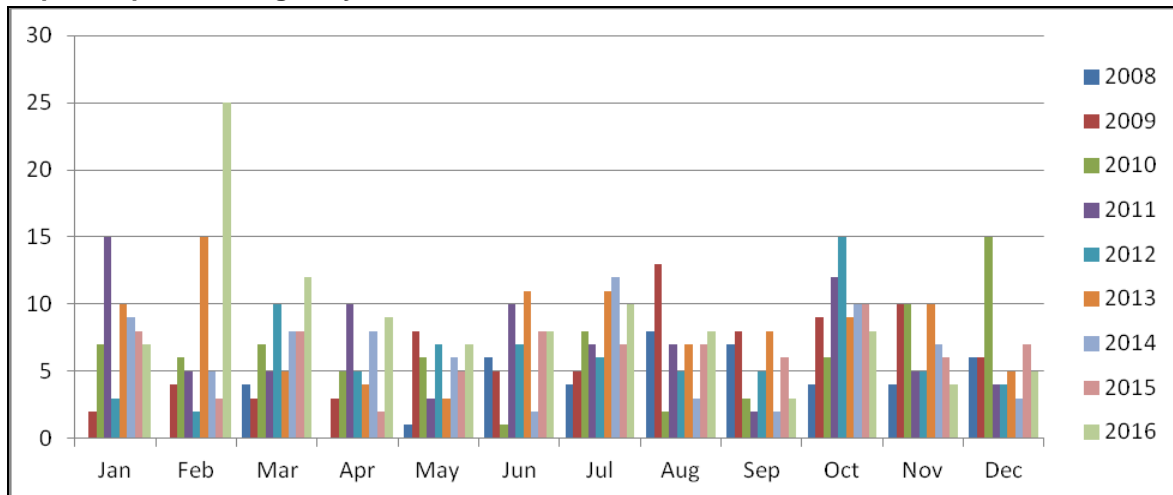|	
Total number of people affected by outages	92,825
Total duration of outages	1,235 minutes (20 ½ hours)
Total number of outages	53
State ranking (number of outages)	23 (tie)
Average number of people affected per outage	1,751
Average duration of outage	23 minutes

Note: Total number of people affected (and average) based on 33 (62%) of the total reported outages. Total duration of outages (and average) based on 9 (17%) of the total reported outages.

Outage fact: On Oct. 27, a TARC bus hit a utility pole and cut power to 1,400 in Louisville. Crews had to put up barricades and stop signs in the area because of malfunctioning stoplights.

Reported power outages by cause
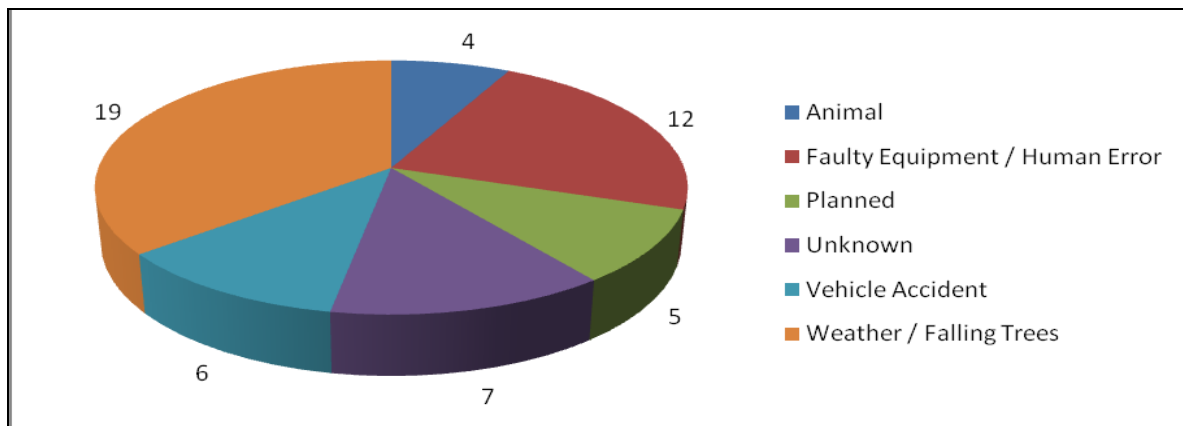
Reported power outages by month

Louisiana

Outage summary

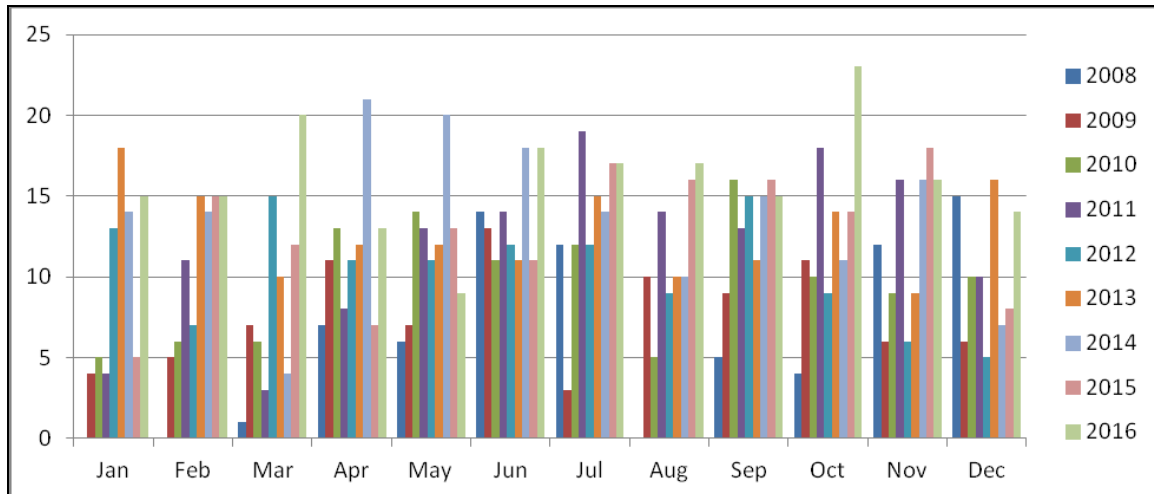| Total number of people affected by outages	267,332
Total duration of outages	1,785 minutes (30 hours)
Total number of outages	48
State ranking (number of outages)	25
Average number of people affected per outage	5,569
Average duration of outage	37 minutes

Note: Total number of people affected (and average) based on 37 (77%) of the total reported outages. Total duration of outages (and average) based on 9 (19%) of the total reported outages.

Outage fact: Snakes were blamed for a May 17 power outage that left 3,600 Dry Creek residents in the dark for three hours.

Reported power outages by cause
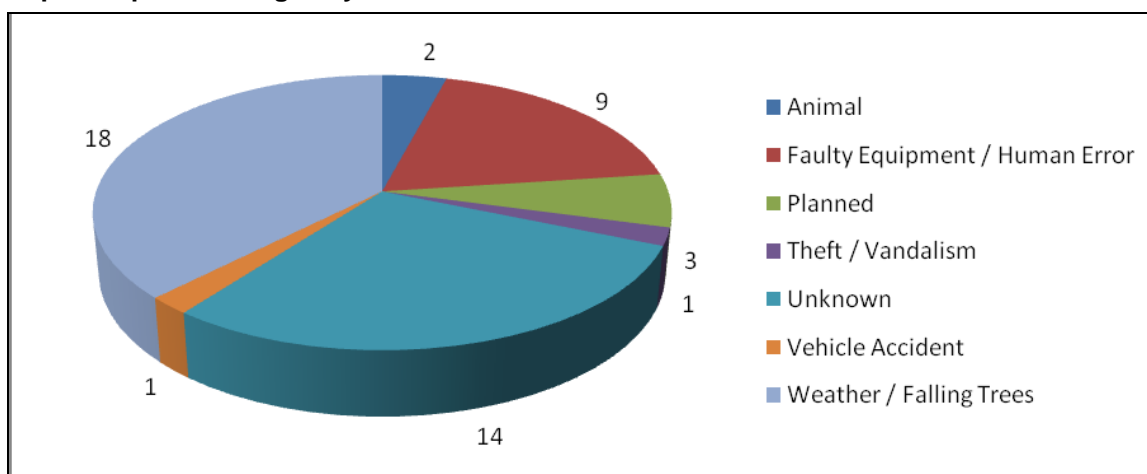
Reported power outages by month

Maine

Outage summary

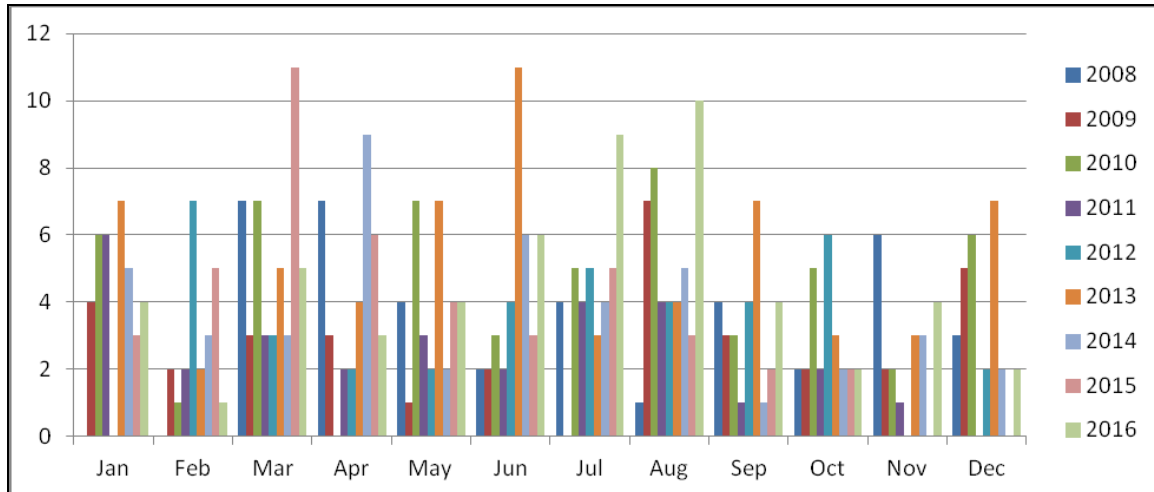| Total number of people affected by outages	96,367
Total duration of outages	1,495 minutes (25 hours)
Total number of outages	35
State ranking (number of outages)	33 (tie)
Average number of people affected per outage	2,753
Average duration of outage	43

Note: Total number of people affected (and average) based on 21 (60%) of the total reported outages. Total duration of outages (and average) based on 8 (23%) of the total reported outages.

Outage fact: A teen who fell asleep while driving was responsible for an August 9 outage in Belfast. The driver left the road and struck a guide wire to a power pole. It snapped the pole about 10 feet up and sent a ripple down the wires, causing a 5-hour cut.

Reported power outages by cause
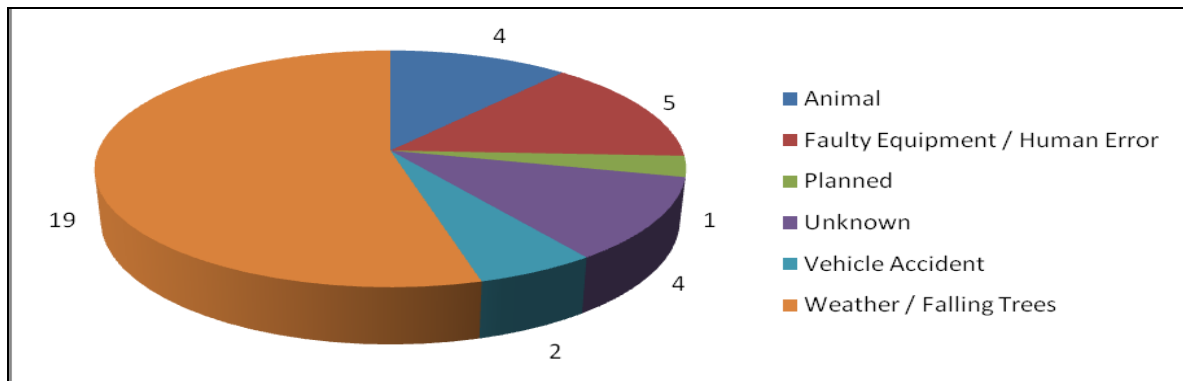
Reported power outages by month

Maryland / Washington, DC

Outage summary

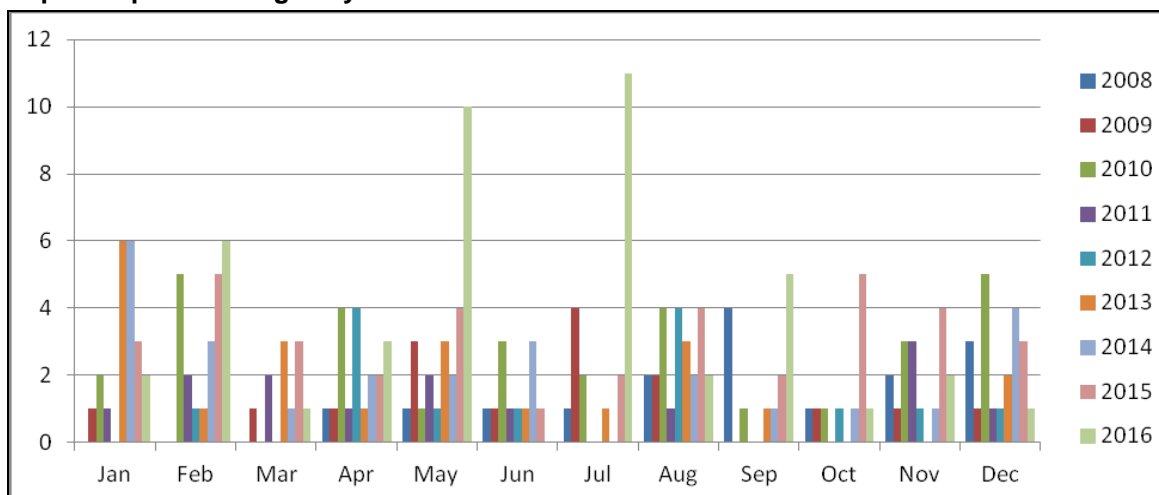|	
Total number of people affected by outages	231,811
Total duration of outages	939 minutes (nearly 16 hours)
Total number of outages	60
State ranking (number of outages)	31 (tie) and 38, respectively
Average number of people affected per outage	1,203
Average duration of outage	16 minutes

Note: Total number of people affected (and average) based on 42 (70%) of the total reported outages. Total duration of outages (and average) based on 10 (17%) of the total reported outages.

Outage fact: A raccoon took the blame for a July 5 blackout, in which 3,700 Hagerstown residents were left in the dark for more than 2 hours.

Reported power outages by cause
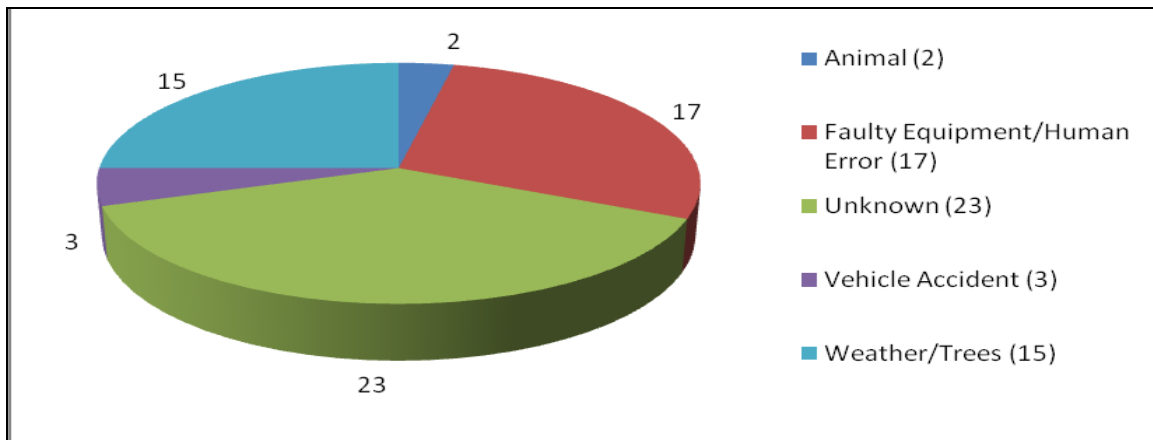
Reported power outages by month

Massachusetts

Outage summary

Total number of people affected by outages	285,941
Total duration of outages	2,282 minutes (38 hours)
Total number of outages	106
State ranking (number of outages)	9
Average number of people affected per outage	2,698
Average duration of outage	22 minutes

Note: Total number of people affected (and average) based on 68 (64%) of the total reported outages. Total duration of outages (and average) based on 16 (15%) of the total reported outages.

Outage fact: Ospreys dropping branches to build a nest atop a Hyannis utility pole cut power on April 12 to 2,200 customers. Some of the largest branches were only a couple of feet long, but the fall was enough to short out the power lines.

Reported power outages by cause
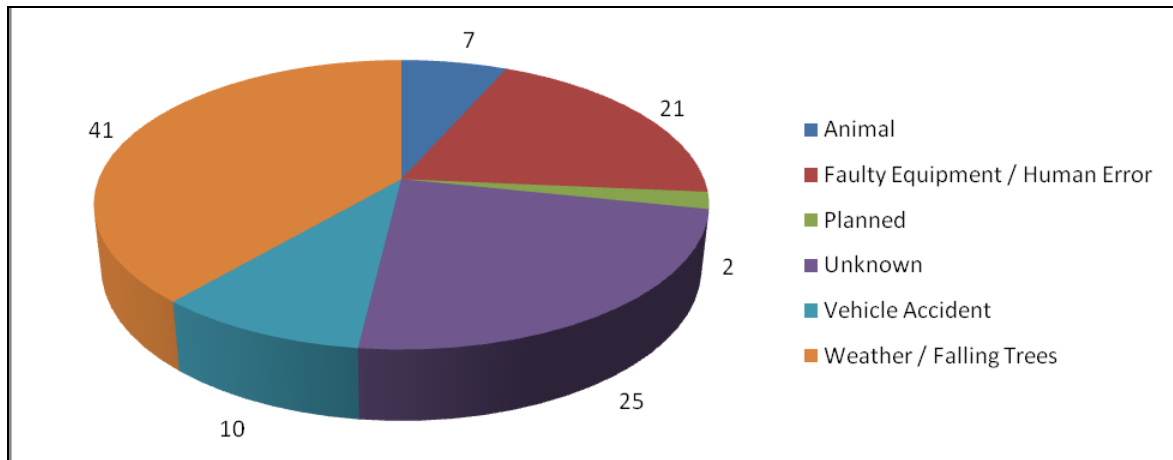
Reported power outages by month

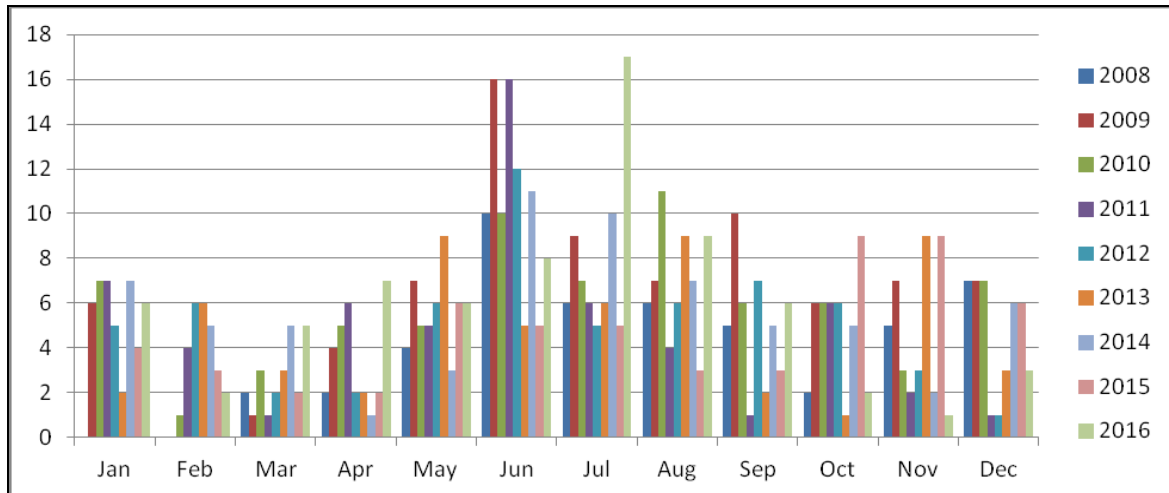# Michigan

Outage summary

Total number of people affected by outages	622,881
Total duration of outages	6,646 minutes (more than 4 ½ days)
Total number of outages	192
State ranking (number of outages)	3
Average number of people affected per outage	3,244
Average duration of outage	35 minutes

Note: Total number of people affected (and average) based on 136 (71%) of the total reported outages.
Total duration of outages (and average) based on 39 (20%) of the total reported outages.

Outage fact: On August 12, a tornado touched down and contributed to 30,000 power outages throughout Saugatuck Township.

Reported power outages by cause
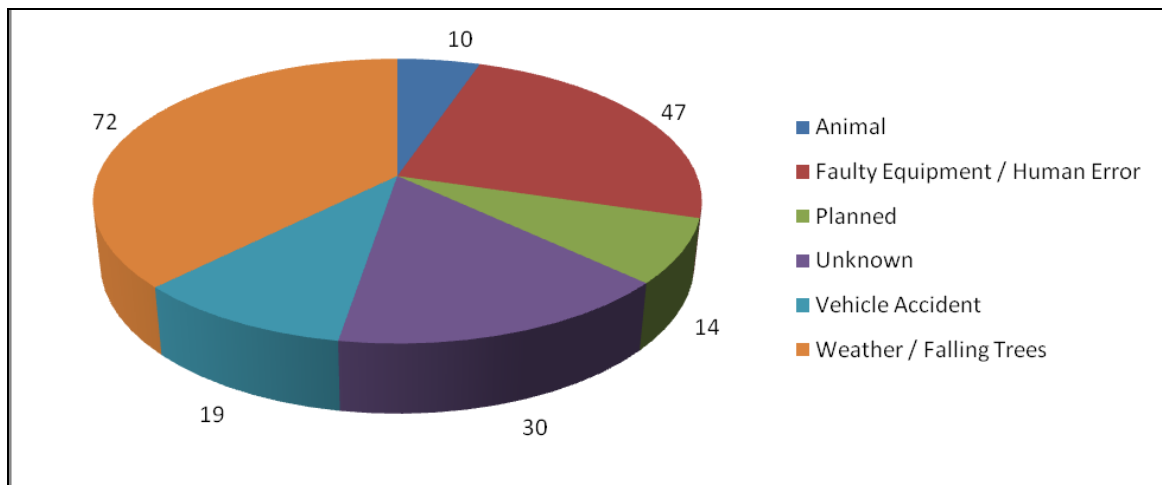
Reported power outages by month

Minnesota

Outage summary

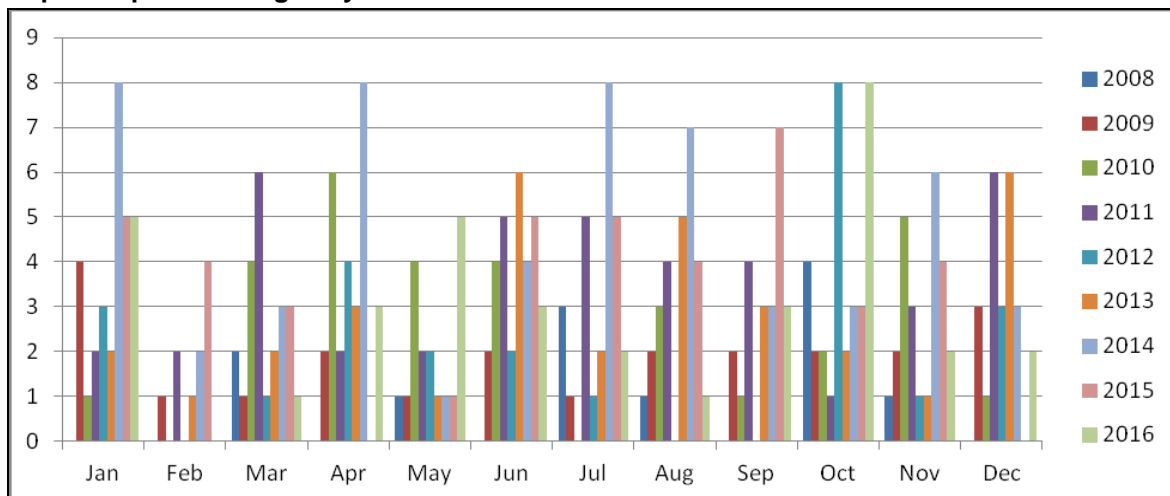|	
Total number of people affected by outages	296,042
Total duration of outages	1,548 minutes (nearly 26 hours)
Total number of outages	54
State ranking (number of outages)	22
Average number of people affected per outage	5,482
Average duration of outage	29 minutes

Note: Total number of people affected (and average) based on 38 (70%) of the total reported outages. Total duration of outages (and average) based on 13 (24%) of the total reported outages.

Outage fact: Vibrations from construction equipment caused an August 9 outage in St. Cloud. Sub crews broke open a breaker with the vibrations from the equipment, causing 1,600 customers in the downtown area to lose power.

Reported power outages by cause
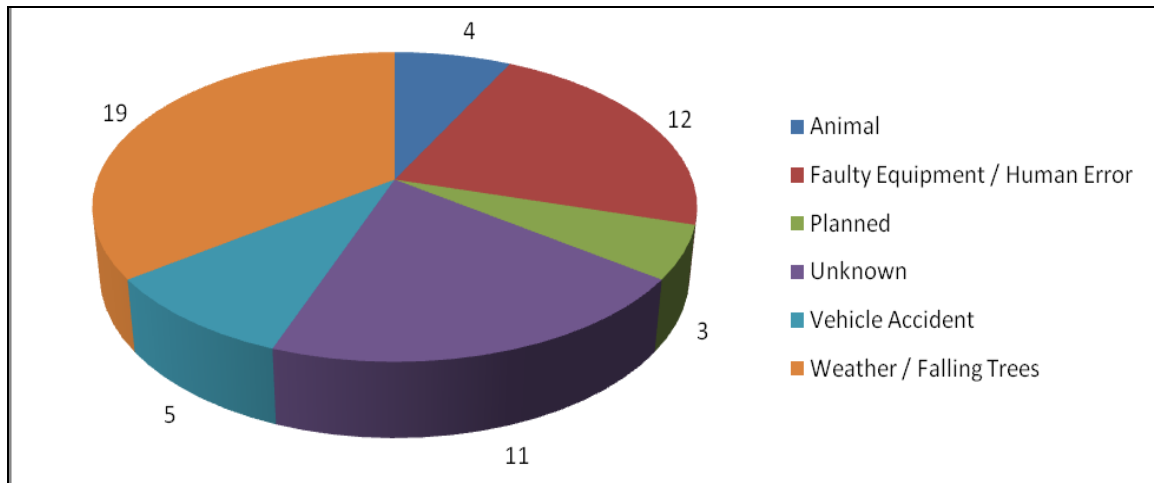
Reported power outages by month

Mississippi

Outage summary

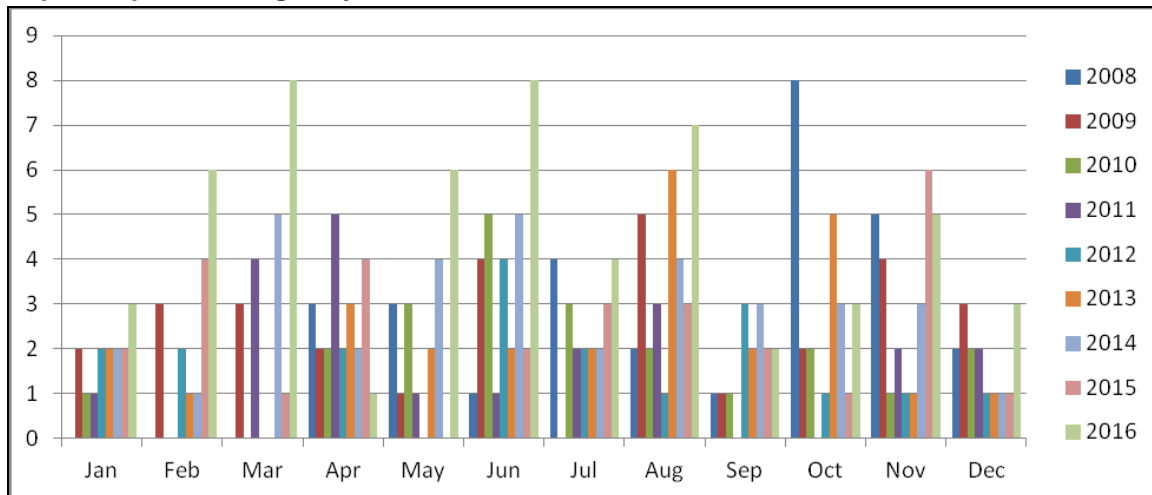| Total number of people affected by outages	94,517
Total duration of outages	4,625 minutes (more than 3 days)
Total number of outages	44
State ranking (number of outages)	26
Average number of people affected per outage	2,148
Average duration of outage	105 minutes

Note: Total number of people affected (and average) based on 22 (50%) of the total reported outages. Total duration of outages (and average) based on 12 (27%) of the total reported outages.

Outage fact: On May 29, a cat in a Hattiesburg substation sparked an outage. The utility had to deploy a mobile substation and call in more than 50 employees to get power restored as quickly as possible.

Reported power outages by cause
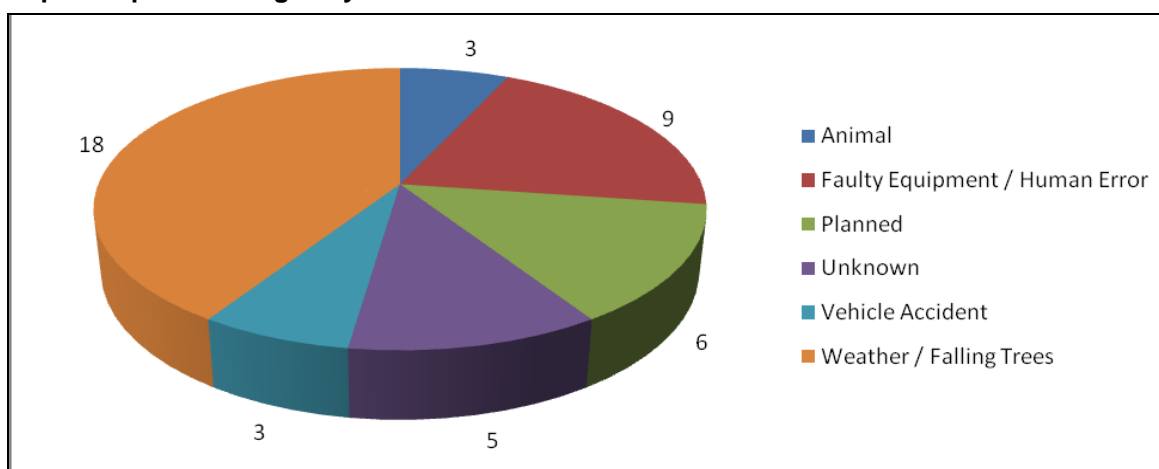
Reported power outages by month

Missouri
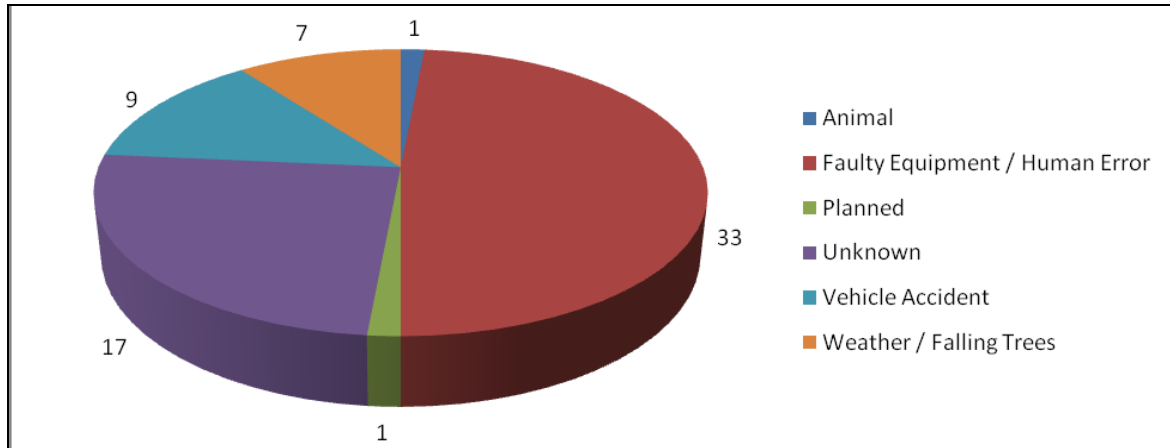
Outage summary

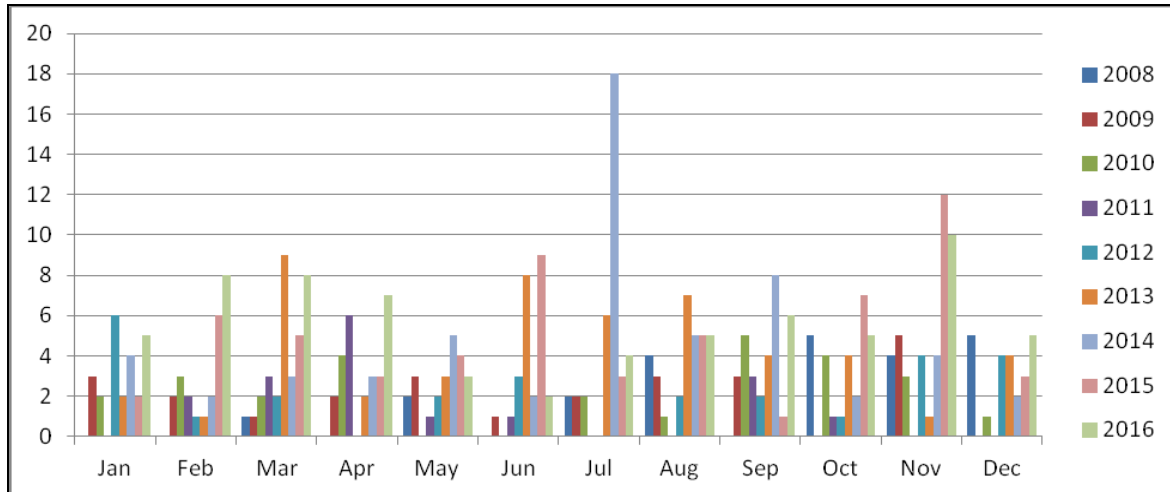|	
Total number of people affected by outages	384,115
Total duration of outages	4,427 minutes (more than 3 days)
Total number of outages	72
State ranking (number of outages)	16
Average number of people affected per outage	5,335
Average duration of outage	61 minutes

Note: Total number of people affected (and average) based on 46 (64%) of the total reported outages. Total duration of outages (and average) based on 16 (22%) of the total reported outages.

Outage fact: On Jan. 24, a tow truck hauling a Sheriff's patrol car crashed into a power pole, knocking out electricity to 600 Springfield customers for almost 8 hours. The patrol vehicle was being towed in for regular work.

Reported power outages by cause
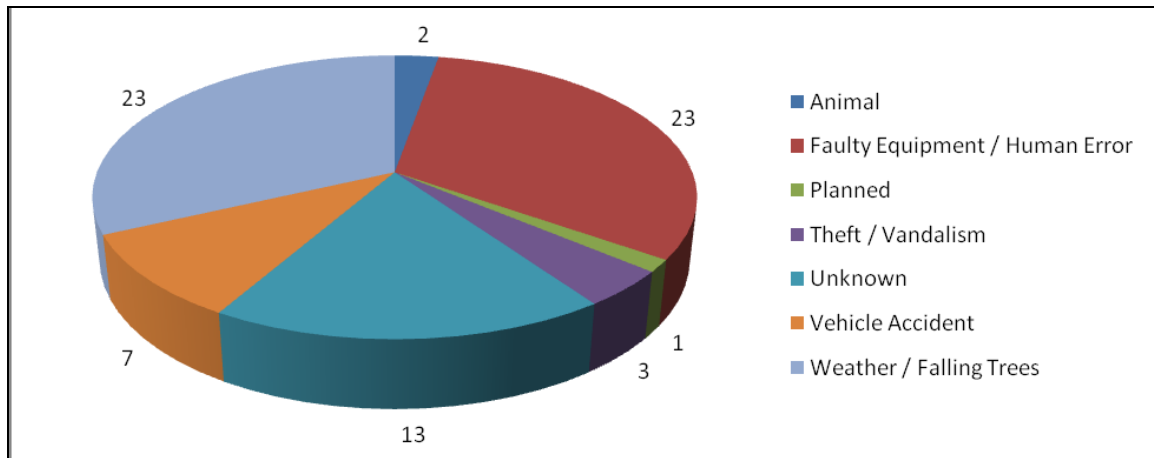
Reported power outages by month

Montana

Outage summary

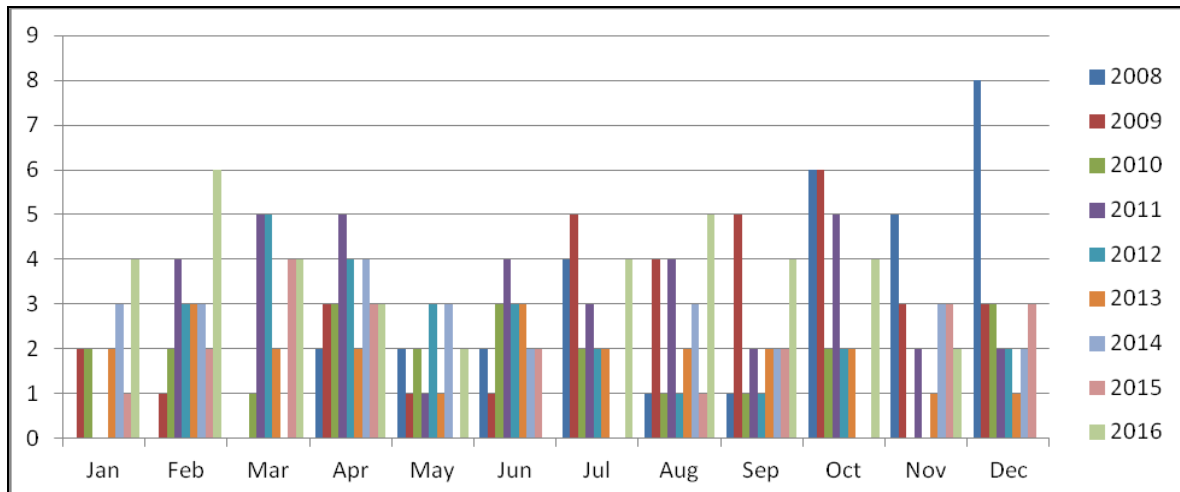|	
Total number of people affected by outages	74,895
Total duration of outages	1,705 minutes (more than 28 hours)
Total number of outages	35
State ranking (number of outages)	33 (tie)
Average number of people affected per outage	2,140
Average duration of outage	49 minutes

Note: Total number of people affected (and average) based on 21 (60%) of the total reported outages. Total duration of outages (and average) based on 11 (31%) of the total reported outages.

Outage fact: A significant spring storm struck Bozeman on May 10, leaving 27,000 power outages in its wake.

Reported power outages by cause
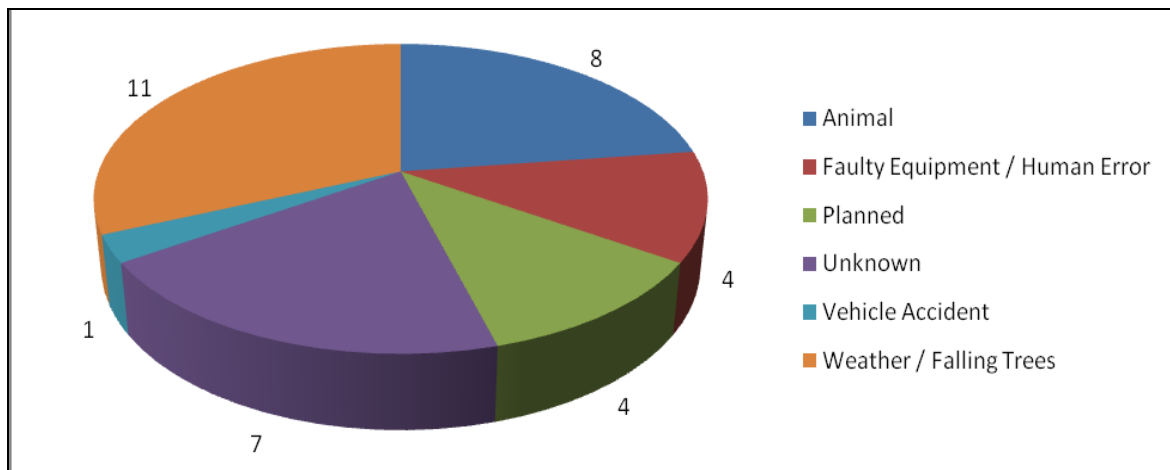
Reported power outages by month

Nebraska

Outage summary

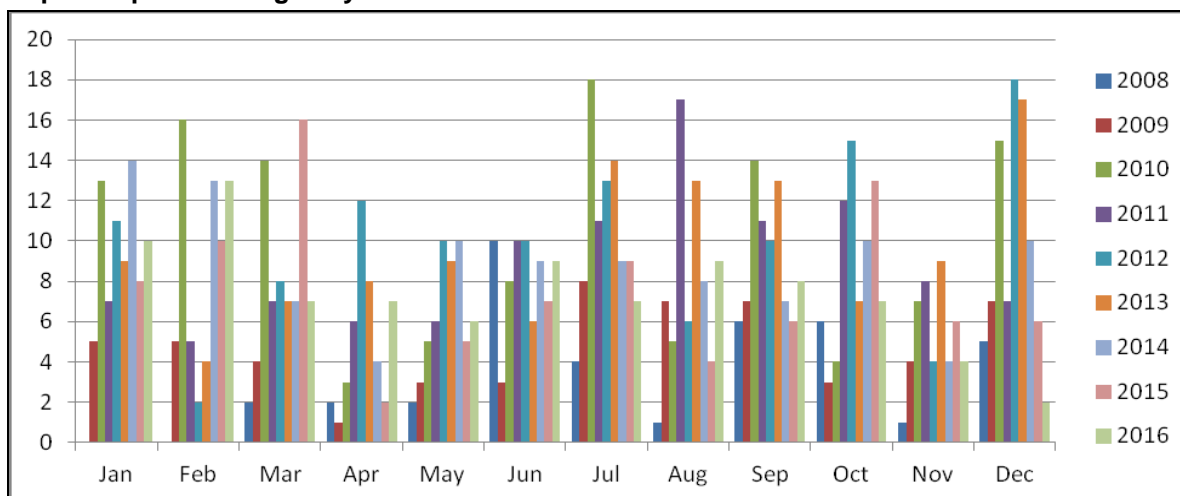|	
Total number of people affected by outages	95,834
Total duration of outages	12,551 minutes (more than 8 ½ days)
Total number of outages	56
State ranking (number of outages)	21
Average number of people affected per outage	1,711
Average duration of outage	224 minutes

Note: Total number of people affected (and average) based on 35 (63%) of the total reported outages. Total duration of outages (and average) based on 15 (27%) of the total reported outages.

Outage fact: Multiple lightning strikes on July 7 had 50 utility crews scrambling to restore power around Omaha's metro and rural areas, as the storm left 4,500 customers without electricity.

Reported power outages by cause
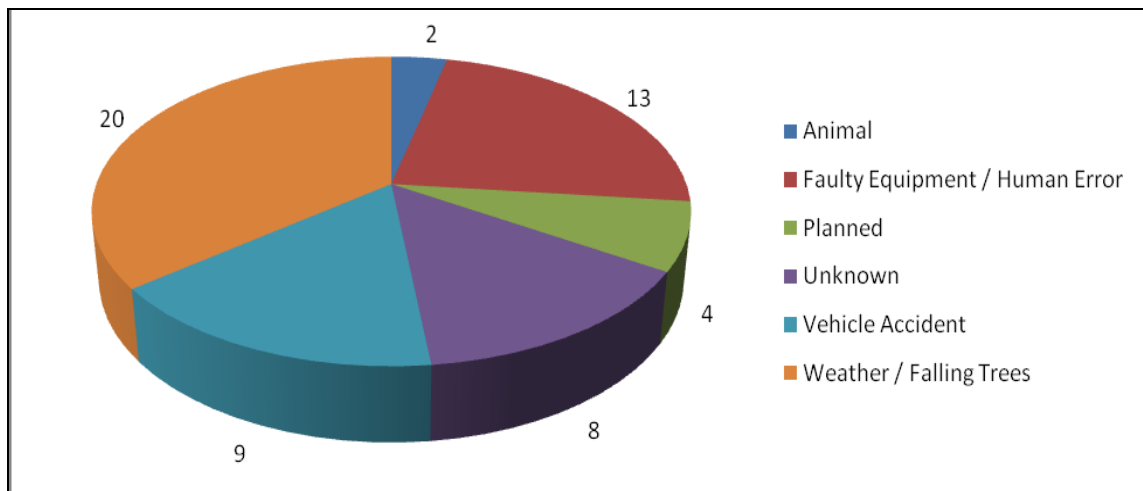
Reported power outages by month

Nevada

Outage summary

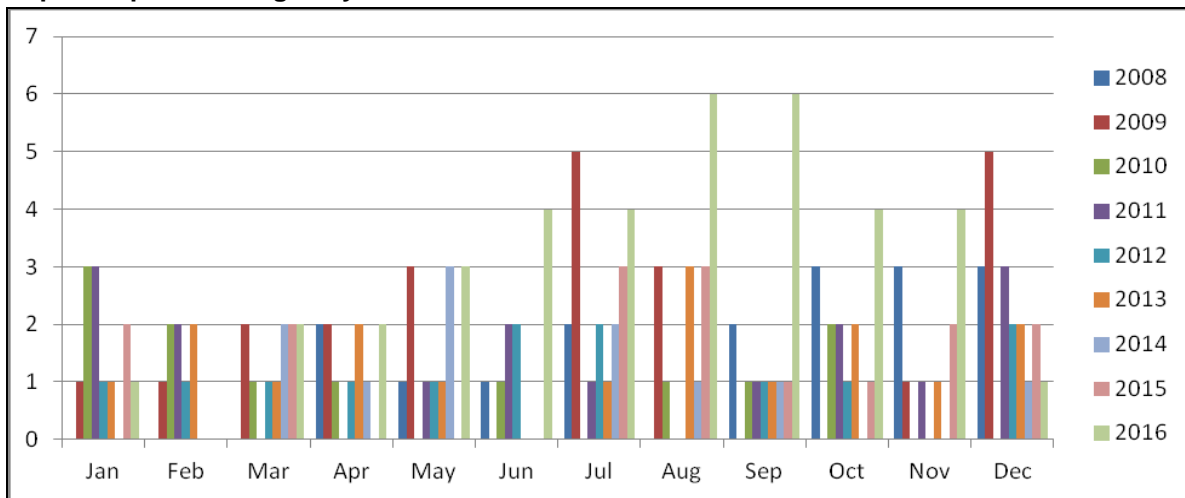| Total number of people affected by outages	225,089
Total duration of outages	4,924 minutes (more than 3 days)
Total number of outages	68
State ranking (number of outages)	17
Average number of people affected per outage	3,310
Average duration of outage	72 minutes

Note: Total number of people affected (and average) based on 47 (78%) of the total reported outages. Total duration of outages (and average) based on 5 (8%) of the total reported outages.

Outage fact: On March 1, a possible suicide attempt triggered an outage to 13,000 in Las Vegas. A man found laying on top of a transformer was in extremely critical condition in the hospital's burn unit.

Reported power outages by cause

Reported power outages by month

New Hampshire

Outage summary

Total number of people affected by outages	100,556
Total duration of outages	1,551 minutes (nearly 26 hours)
Total number of outages	38
State ranking (number of outages)	30
Average number of people affected per outage	2,646
Average duration of outage	41 minutes

Note: Total number of people affected (and average) based on 29 (76%) of the total reported outages. Total duration of outages (and average) based on 8 (21%) of the total reported outages.

Outage fact: On August 17, the driver of a large mower struck a utility pole on Route 9 in Hadley, knocking the line across the westbound lanes, sending sparks flying from live wires, and cutting power to 600 customers.

Reported power outages by cause
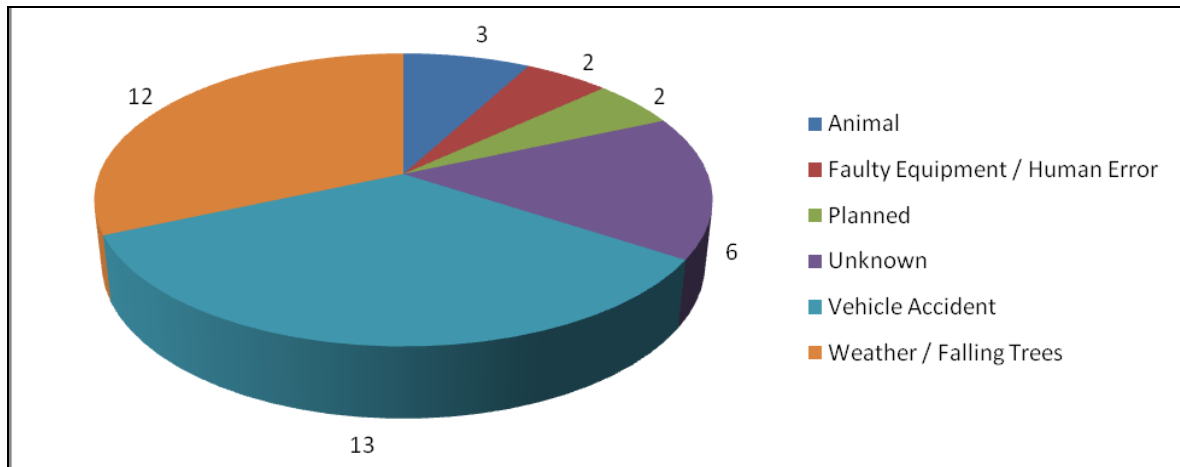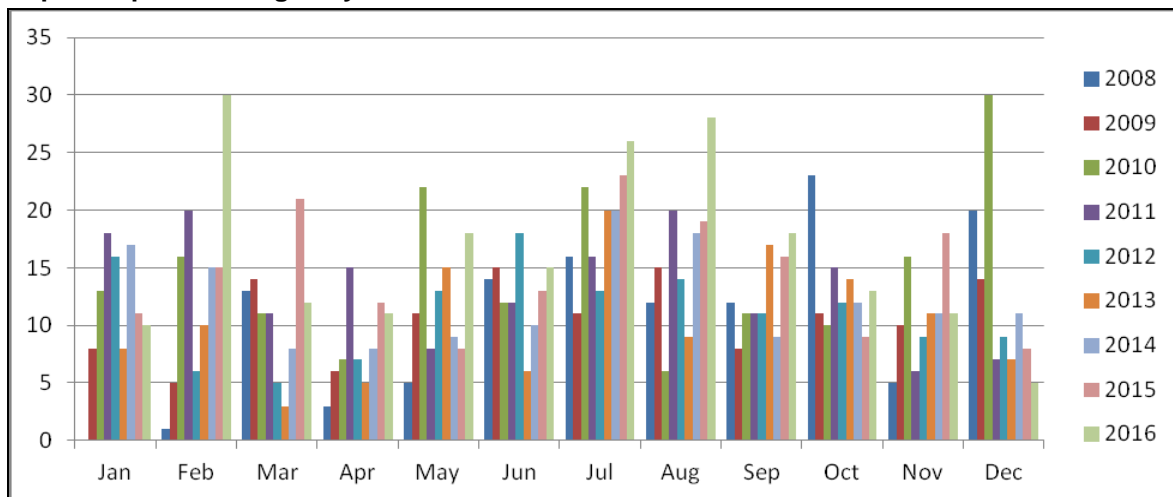

Reported power outages by month

New Jersey

Outage summary

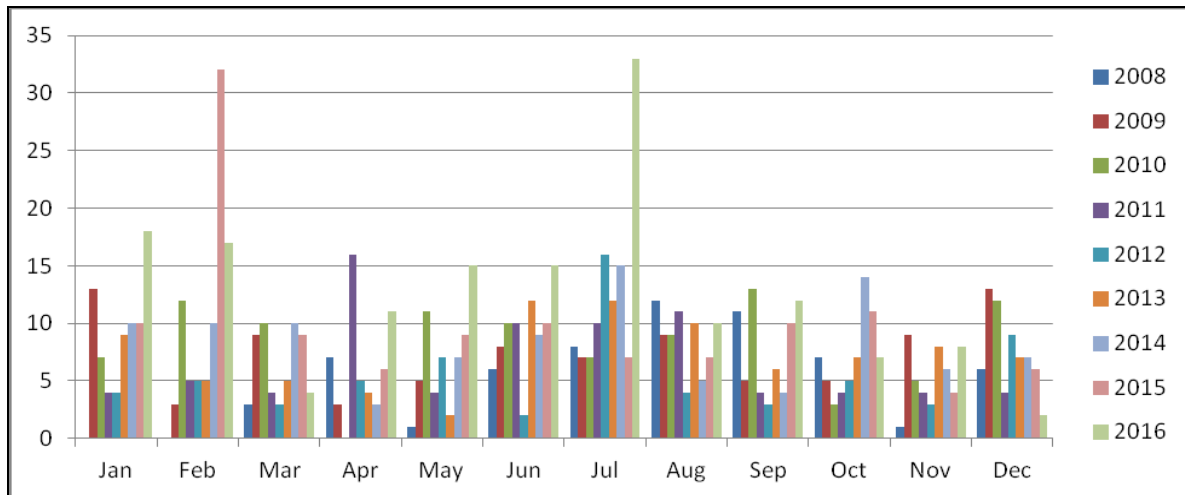|	
Total number of people affected by outages	390,056
Total duration of outages	3,290 minutes (more than 2 ¼ days)
Total number of outages	89
State ranking (number of outages)	11
Average number of people affected per outage	4,383
Average duration of outage	37 minutes

Note: Total number of people affected (and average) based on 51 (57%) of the total reported outages. Total duration of outages (and average) based on 21 (24%) of the total reported outages.

Outage fact: On Jan. 23, some 117,000 customers were left powerless after blizzard winds downed utility poles and wires, mostly in the southern part of the state.

Reported power outages by cause
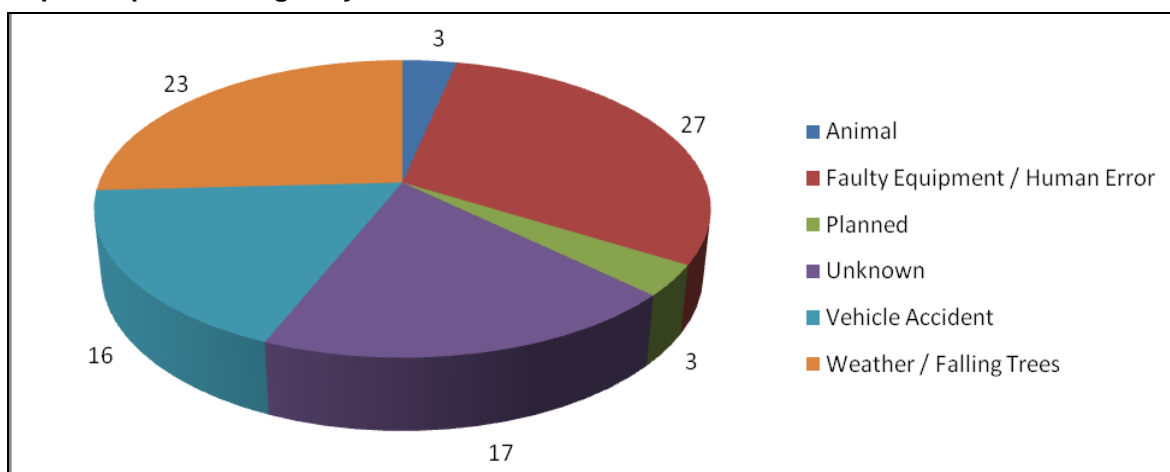
Reported power outages by month

New Mexico

Outage summary

Total number of people affected by outages	360,530
Total duration of outages	1,038 minutes (more than 17 hours)
Total number of outages	37
State ranking (number of outages)	31 (tie)
Average number of people affected per outage	9,744
Average duration of outage	28 minutes

Note: Total number of people affected (and average) based on 126(70%) of the total reported outages. Total duration of outages (and average) based on 9 (24%) of the total reported outages.

Outage fact: On Oct. 10, during day two of the Albuquerque International Balloon Fiesta, a pair of balloons hit power lines, with one causing a small explosion that cut power to 1,200 customers.

Reported power outages by cause
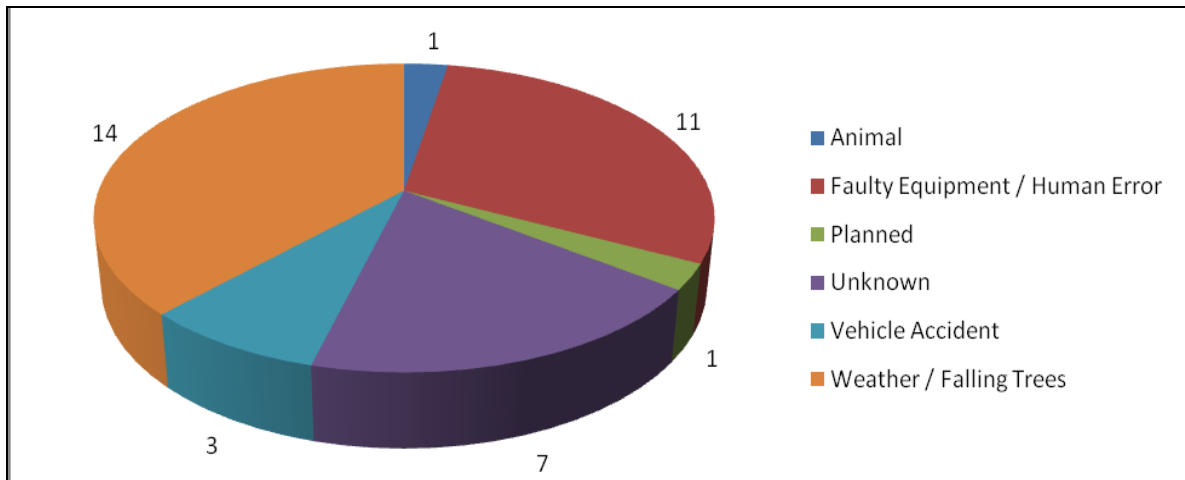
Reported power outages by month

New York

Outage summary

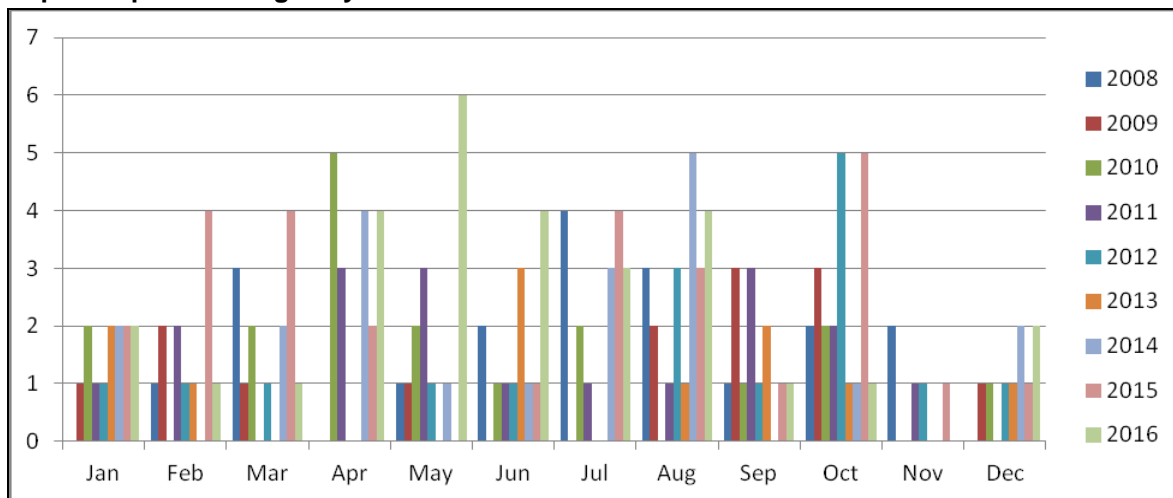| Total number of people affected by outages	638,879
Total duration of outages	12,628 minutes (8 ¾ days)
Total number of outages	197
State ranking (number of outages)	2 (tie)
Average number of people affected per outage	3,243
Average duration of outage	64 minutes

Note: Total number of people affected (and average) based on 133 (68%) of the total reported outages.
Total duration of outages (and average) based on 40 (20%) of the total reported outages.

Outage fact: On Oct. 27, the first snowstorm of the season was slightly heavier than forecast, disrupting the evening commute, causing dozens of accidents, and knocking out power to more than 25,000 customers across the state.

Reported power outages by cause
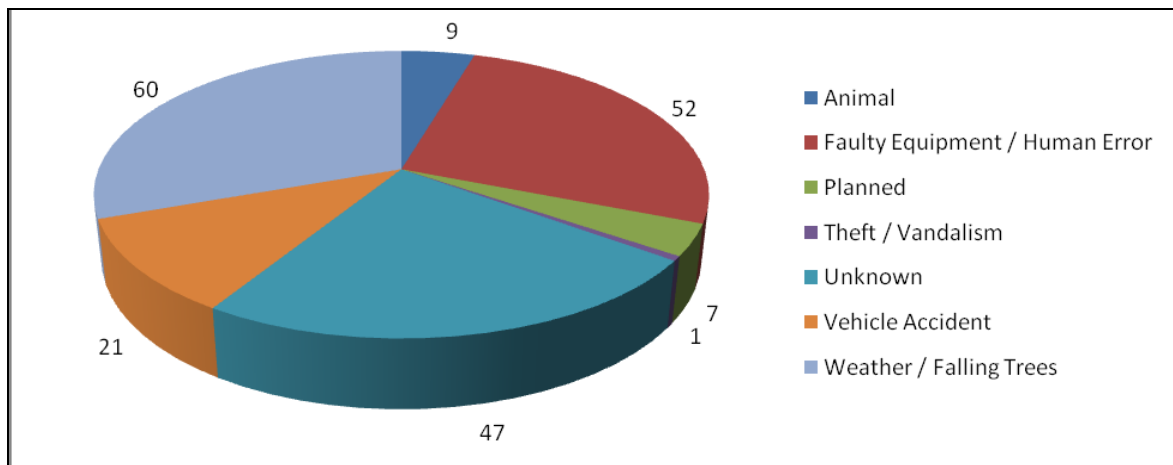
Reported power outages by month

North Carolina

Outage summary

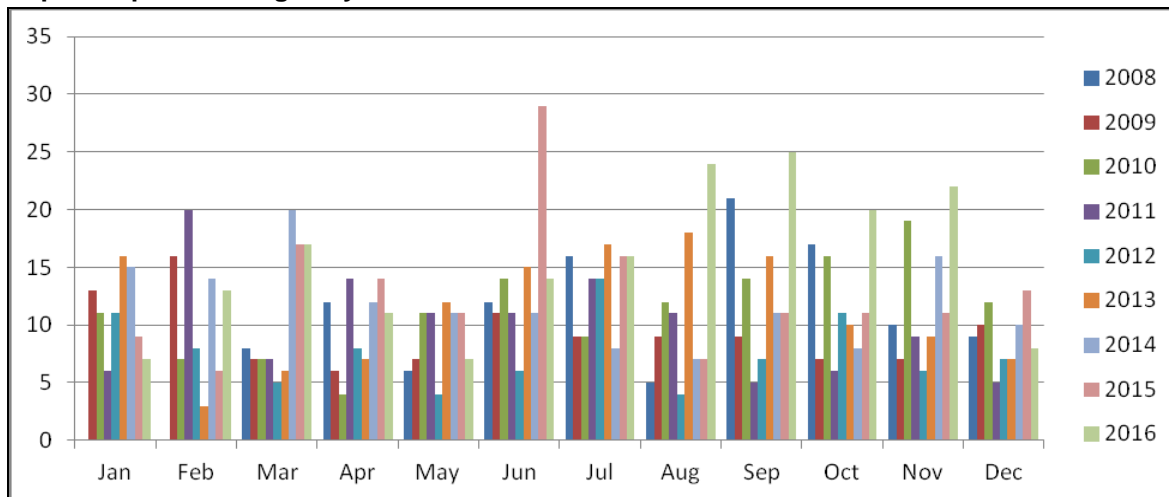|	
Total number of people affected by outages	1,154,935
Total duration of outages	5,954 minutes (3 1/4 days)
Total number of outages	152
State ranking (number of outages)	5
Average number of people affected per outage	7,598
Average duration of outage	39 minutes

Note: Total number of people affected (and average) based on 102 (67%) of the total reported outages.
Total duration of outages (and average) based on 28 (18%) of the total reported outages.

Outage fact: On July 28, a crow crashed into a Newton power pole that had two different circuits running to it. The bird touched both, prompting the entire substation to shut down and cutting power to the entire city.

Reported power outages by cause
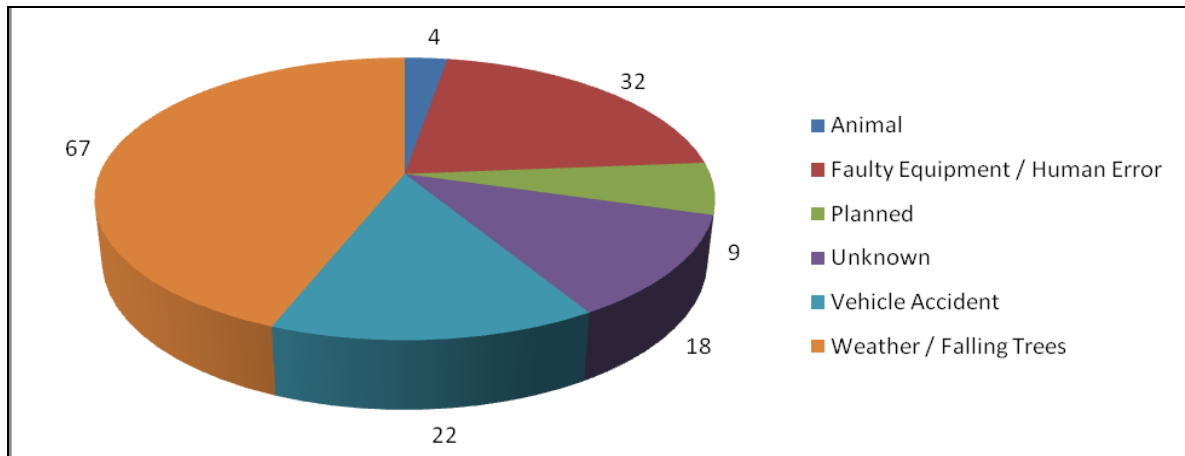
Reported power outages by month

North Dakota

Outage summary

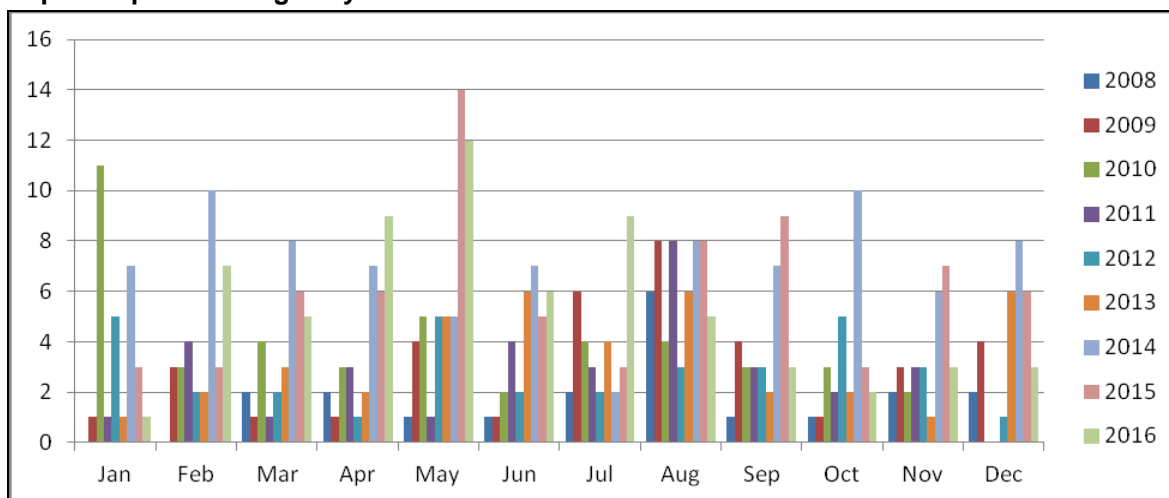| Total number of people affected by outages	49,101
Total duration of outages	890 minutes (nearly 15 hours)
Total number of outages	29
State ranking (number of outages)	36
Average number of people affected per outage	1,693
Average duration of outage	31 minutes

Note: Total number of people affected (and average) based on 24 (83%) of the total reported outages. Total duration of outages (and average) based on 8 (28%) of the total reported outages.

Outage fact: On Dec. 13, a man was trapped inside a pay loader after he knocked over two power lines and caused an outage to 2,000 customers near Downtown Fargo.

Reported power outages by cause
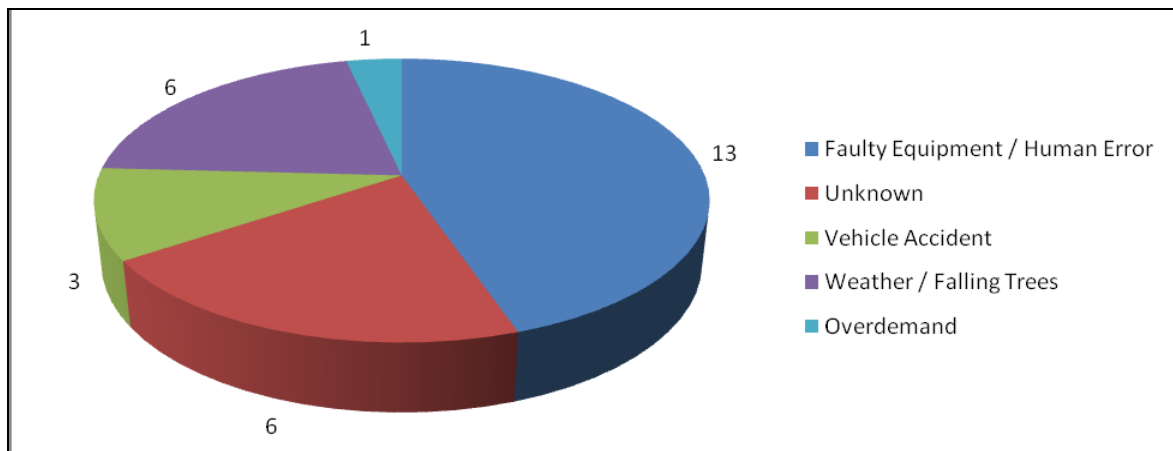
Reported power outages by month

Ohio

Outage summary

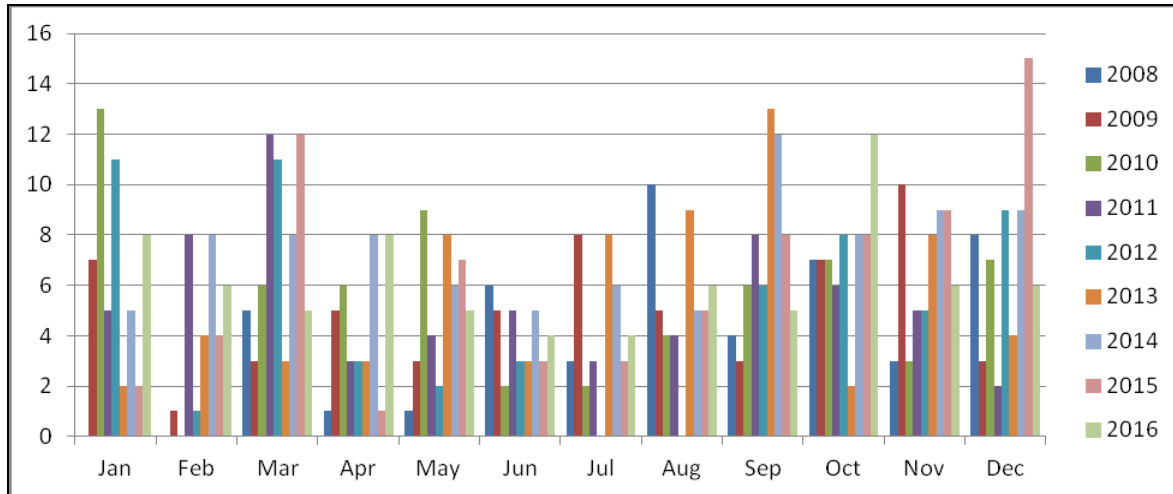| Total number of people affected by outages	518,849
Total duration of outages	6,907 minutes (nearly 5 days)
Total number of outages	184
State ranking (number of outages)	4
Average number of people affected per outage	2,820
Average duration of outage	38 minutes

Note: Total number of people affected (and average) based on 138 (75%) of the total reported outages.
Total duration of outages (and average) based on 32 (17%) of the total reported outages.

Outage fact: A tractor-trailer clipped a low-hanging electric wire in Zanesville on May 23, bringing down three power poles and causing a 3-plus–hour outage to 819 customers.

Reported power outages by cause
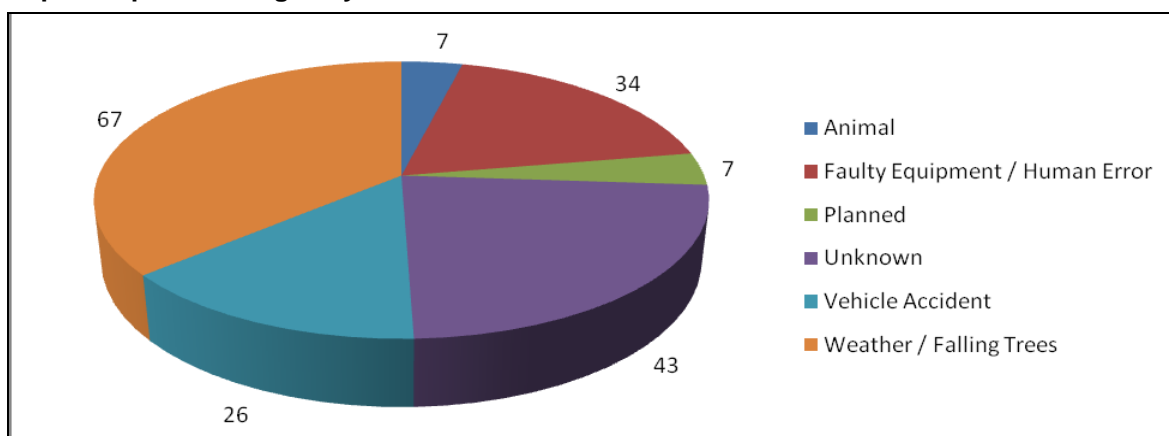
Reported power outages by month

Oklahoma

Outage summary

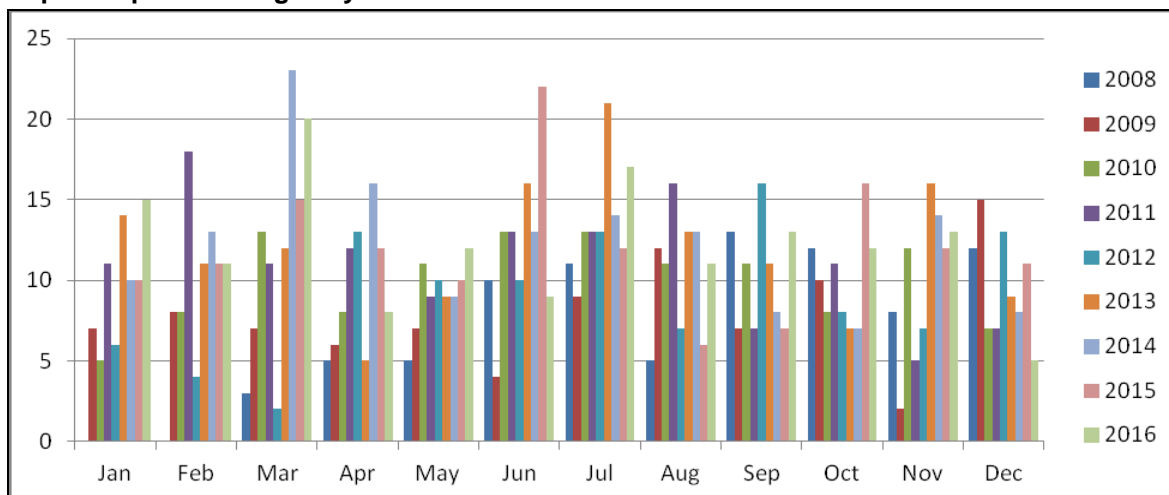|	
Total number of people affected by outages	253,543
Total duration of outages	1,210 minutes (20 hours)
Total number of outages	65
State ranking (number of outages)	18 (tie)
Average number of people affected per outage	3,901
Average duration of outage	19 minutes

Note: Total number of people affected (and average) based on 41 (63%) of the total reported outages. Total duration of outages (and average) based on 9 (14%) of the total reported outages.

Outage fact: A July 14 storm-induced blackout that affected 92,000 Tulsa customers was believed to be the second-most-widespread outage in Tulsa's history. Officials warned that power might not be restored for up to 5 days.

Reported power outages by cause
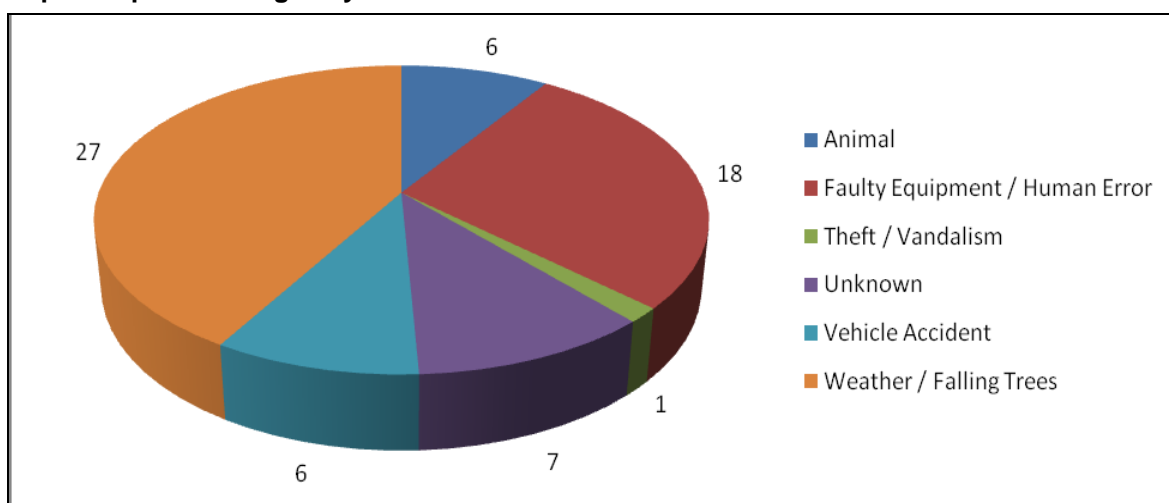
Reported power outages by month

Oregon

Outage summary

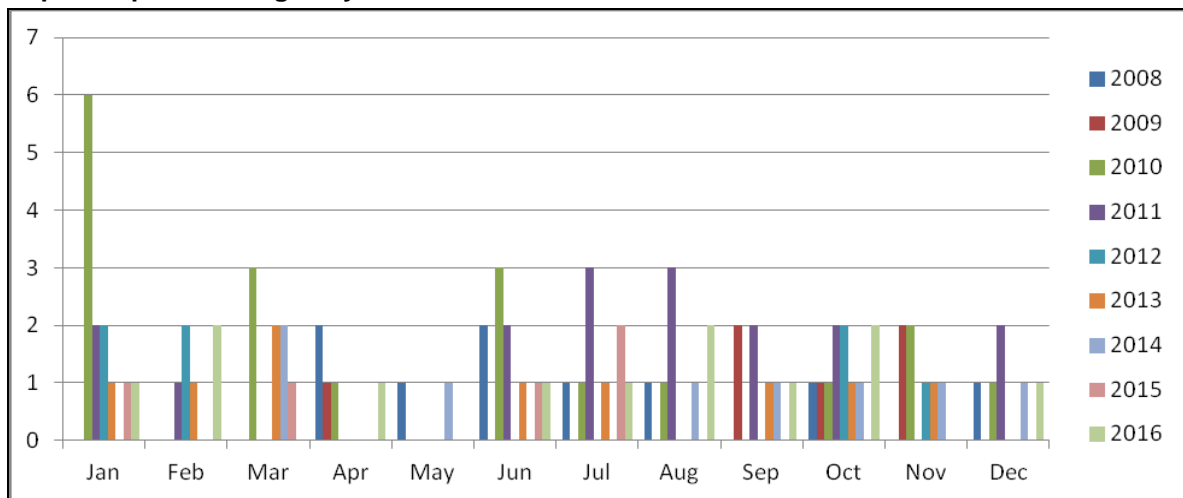|	
Total number of people affected by outages	335,810
Total duration of outages	3,555 minutes (nearly 2 ½ days)
Total number of outages	75
State ranking (number of outages)	14 (tie)
Average number of people affected per outage	4,477
Average duration of outage	47 minutes

Note: Total number of people affected (and average) based on 52 (69%) of the total reported outages. Total duration of outages (and average) based on 17 (23%) of the total reported outages.

Outage fact: An errant foil balloon was blamed for an April 5 outage in Eugene. The balloon landed on an energized circuit at a substation, cutting power to 2,400 customers for 4 hours.

Reported power outages by cause
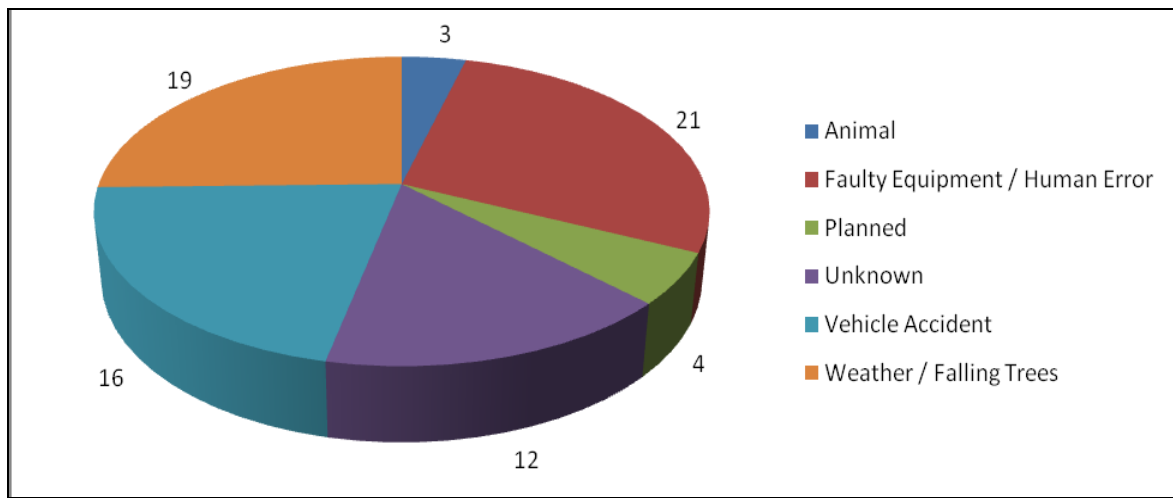
Reported power outages by month

Pennsylvania

Outage summary

Total number of people affected by outages	330,642
Total duration of outages	4,742 minutes (more than 3 days)
Total number of outages	146
State ranking (number of outages)	6
Average number of people affected per outage	2,265
Average duration of outage	32 minutes

Note: Total number of people affected (and average) based on 96 (66%) of the total reported outages. Total duration of outages (and average) based on 18 (12%) of the total reported outages.

Outage fact: A property owner cutting down trees in Meadville on July 8 caused an outage to 7,300 customers. One of the trees fell into a main feeder line carrying 34,500 volts of energy that provides power to a number of substations.

Reported power outages by cause
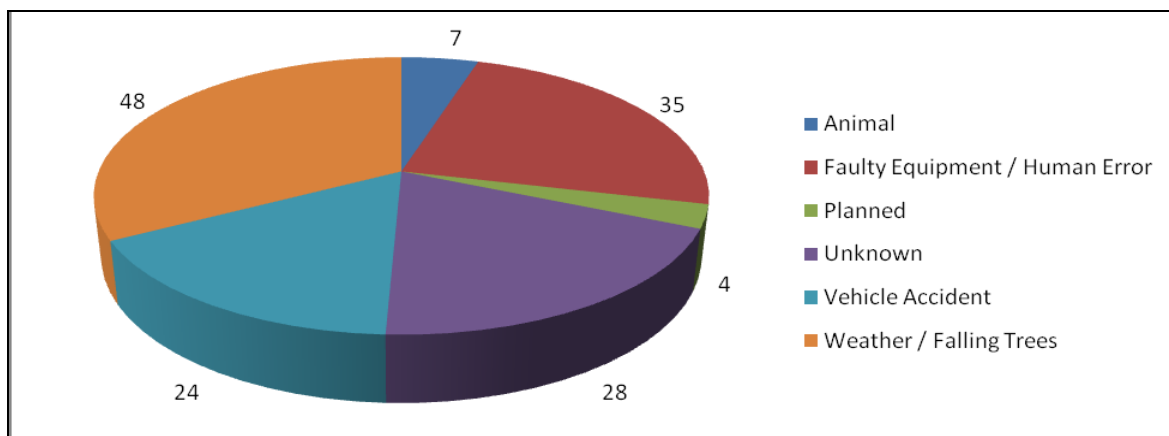
Reported power outages by month

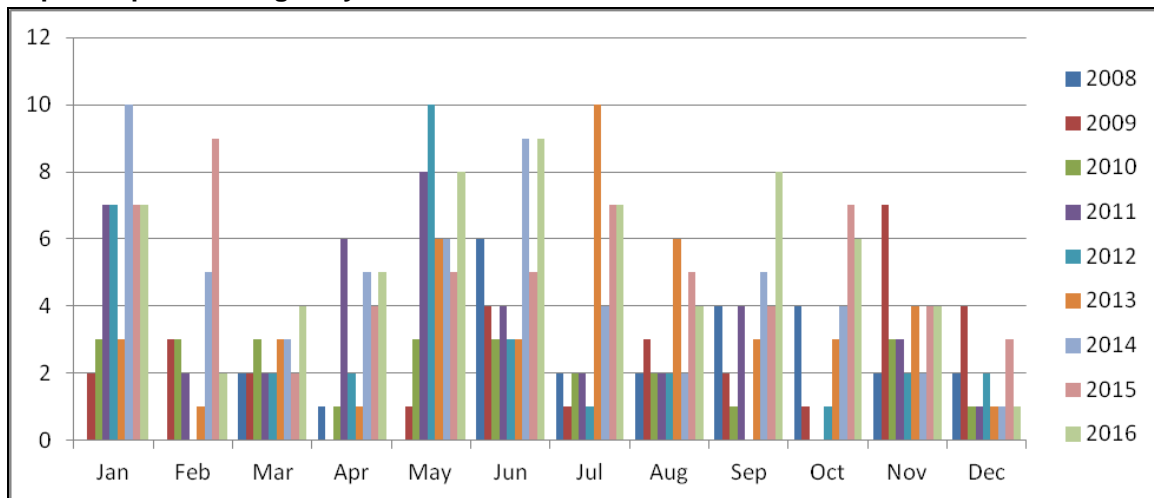# Rhode Island

Outage summary

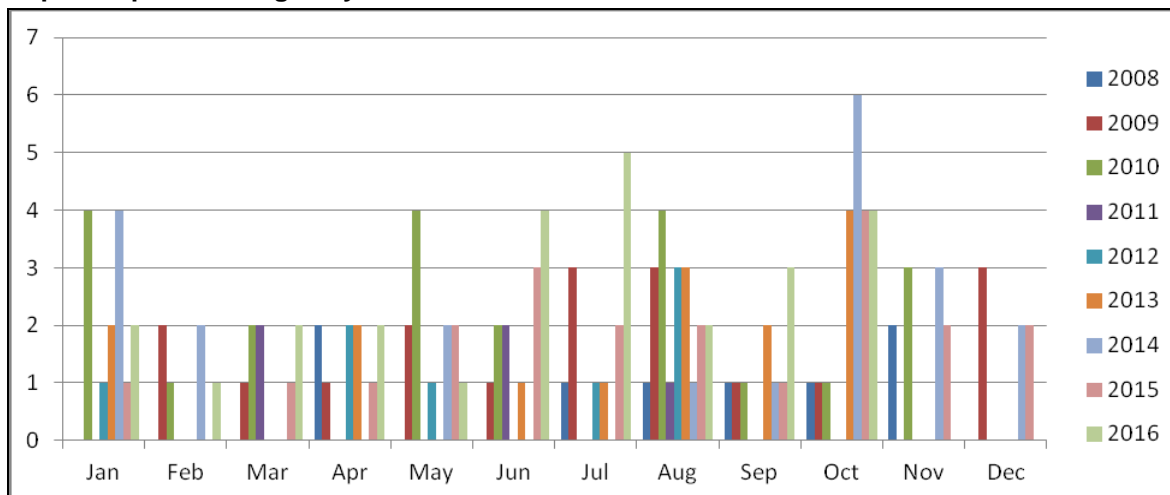|	
Total number of people affected by outages	115,907
Total duration of outages	335 minutes (more than 5 ½ hours)
Total number of outages	12
State ranking (number of outages)	41
Average number of people affected per outage	9,659
Average duration of outage	28 minutes

Note: Total number of people affected (and average) based on 10 (83%) of the total reported outages. Total duration of outages (and average) based on 2 (17%) of the total reported outages.

Outage fact: Lightning struck a transformer in Westerly August 11, knocking out power to 8,400 customers.

Reported power outages by cause
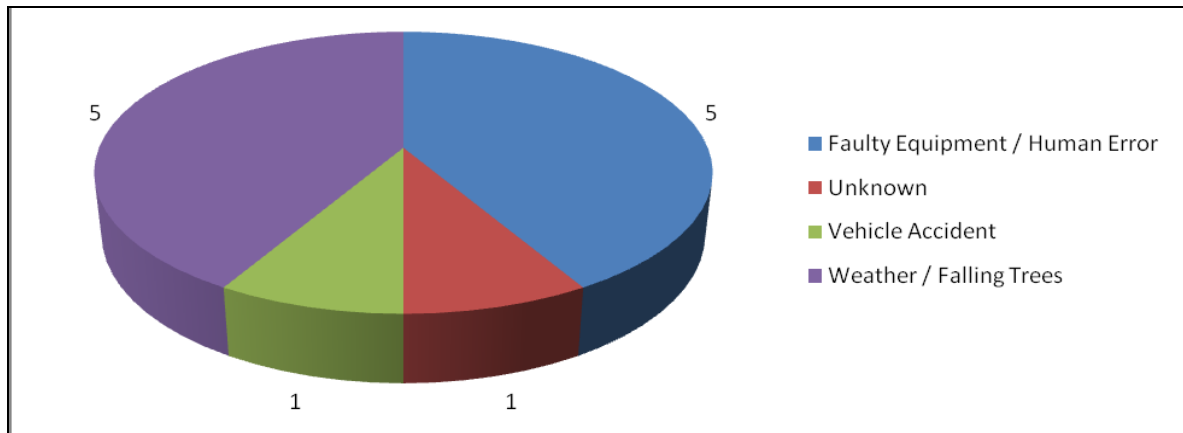
Reported power outages by month

South Carolina

Outage summary

Total number of people affected by outages	1,099,754
Total duration of outages	1,539 minutes (nearly 26 hours)
Total number of outages	65
State ranking (number of outages)	18 (tie)
Average number of people affected per outage	16,919
Average duration of outage	24 minutes

Note: Total number of people affected (and average) based on 48 (74%) of the total reported outages. Total duration of outages (and average) based on 10 (15%) of the total reported outages.

Outage fact: On May 13, not one but two serpents crawled into a transformer at a Rock Hill substation, cutting power to several businesses and homes. One of the snakes was electrocuted, while the other had to be contained by on-site workers.

Reported power outages by cause
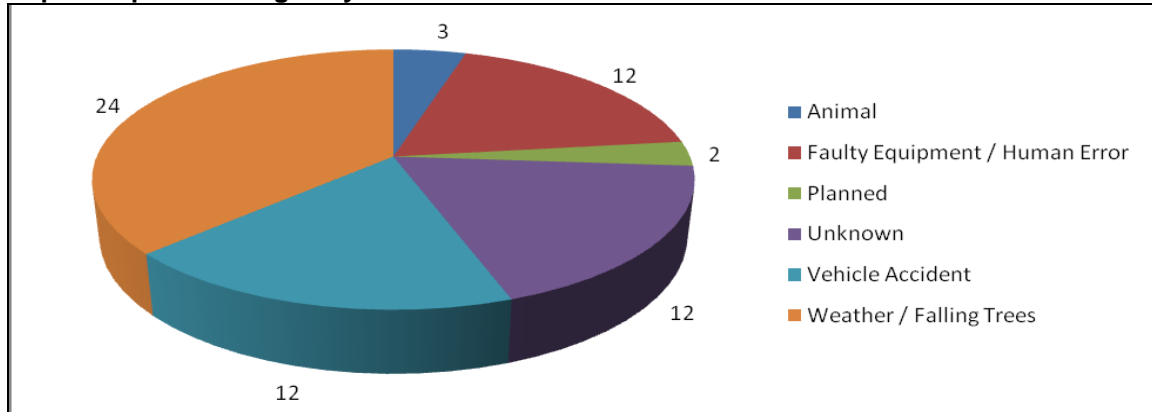
Reported power outages by month

South Dakota

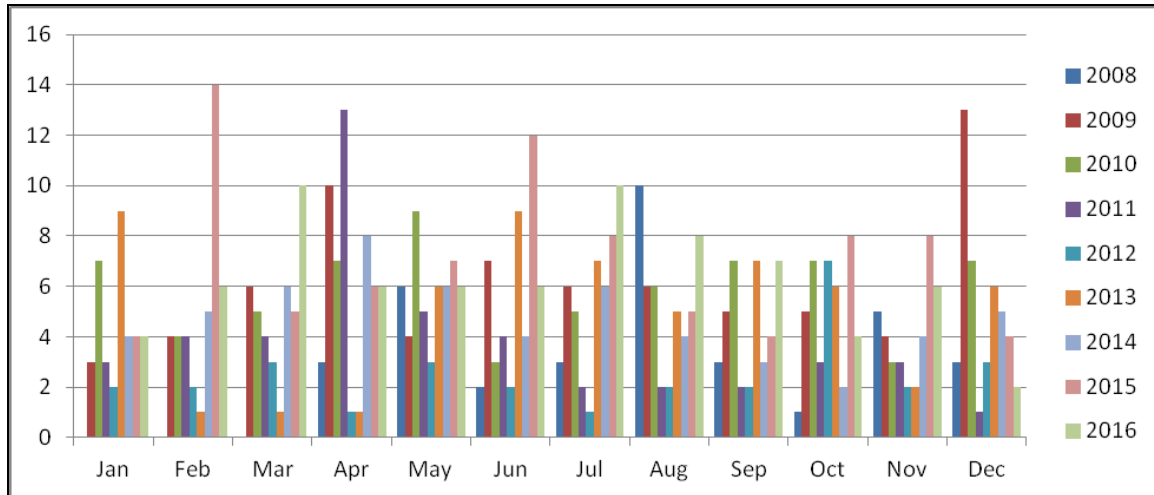**Outage summary**

Total number of people affected by outages	58,022
Total duration of outages	1,730 minutes (almost 29 hours)
Total number of outages	26
State ranking (number of outages)	37
Average number of people affected per outage	2,232
Average duration of outage	67 minutes

Note: Total number of people affected (and average) based on 17 (65%) of the total reported outages. Total duration of outages (and average) based on 9 (35%) of the total reported outages.

Outage fact: On Feb. 20, a squirrel that made its way onto a Sioux Falls power line knocked out service to 4,000 customers.

Reported power outages by cause
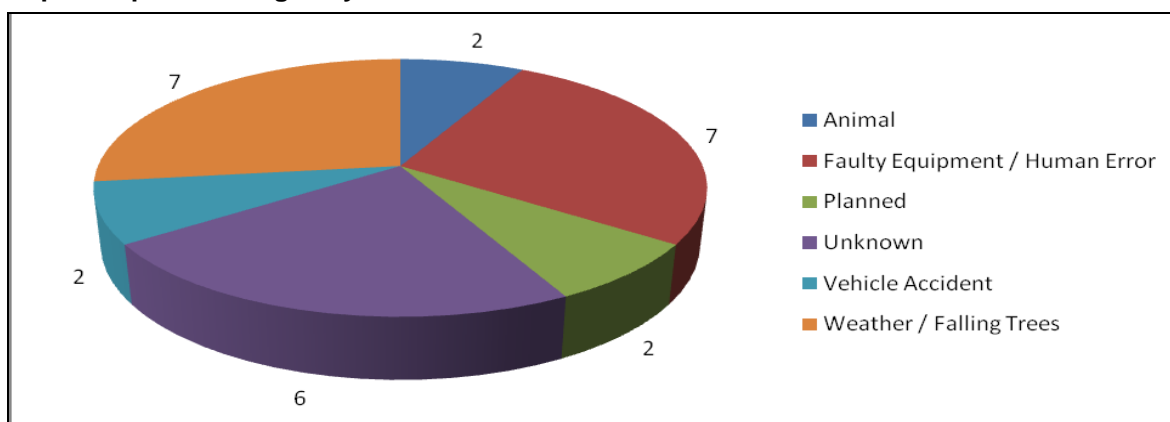
Reported power outages by month

Tennessee

Outage summary

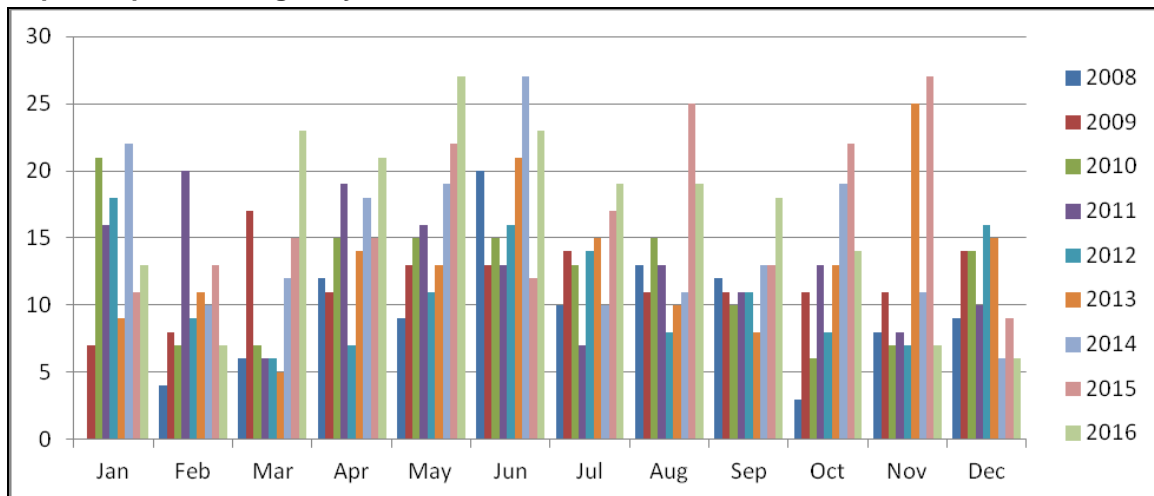|	
Total number of people affected by outages	157,281
Total duration of outages	2,476 minutes (1.7 days)
Total number of outages	75
State ranking (number of outages)	14 (tie)
Average number of people affected per outage	2,097
Average duration of outage	33 minutes

Note: Total number of people affected (and average) based on 45 (60%) of the total reported outages. Total duration of outages (and average) based on 13 (17%) of the total reported outages.

Outage fact: A half dozen lightning strikes and heavy rain were suspected of causing a blackout Sept. 10 to 17,000 Knoxville customers.

Reported power outages by cause
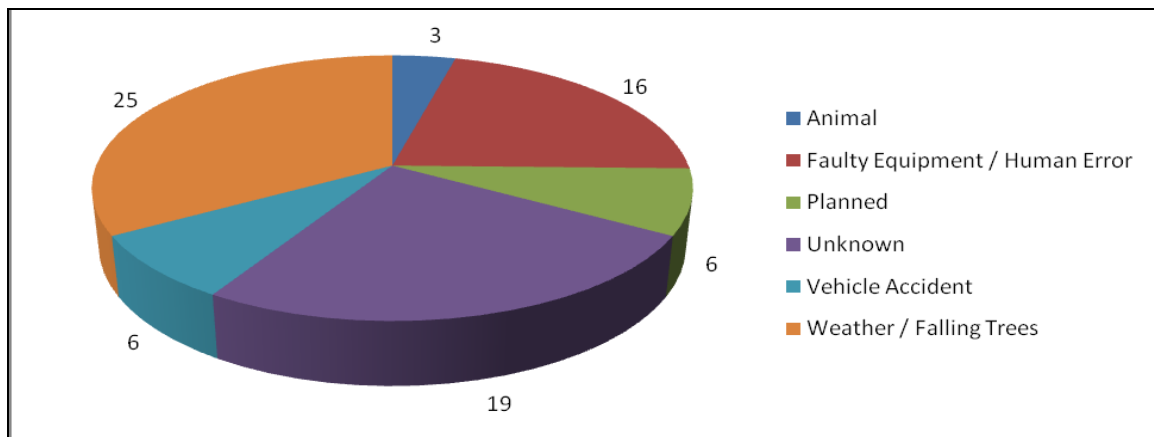
Reported power outages by month

Texas

Outage summary

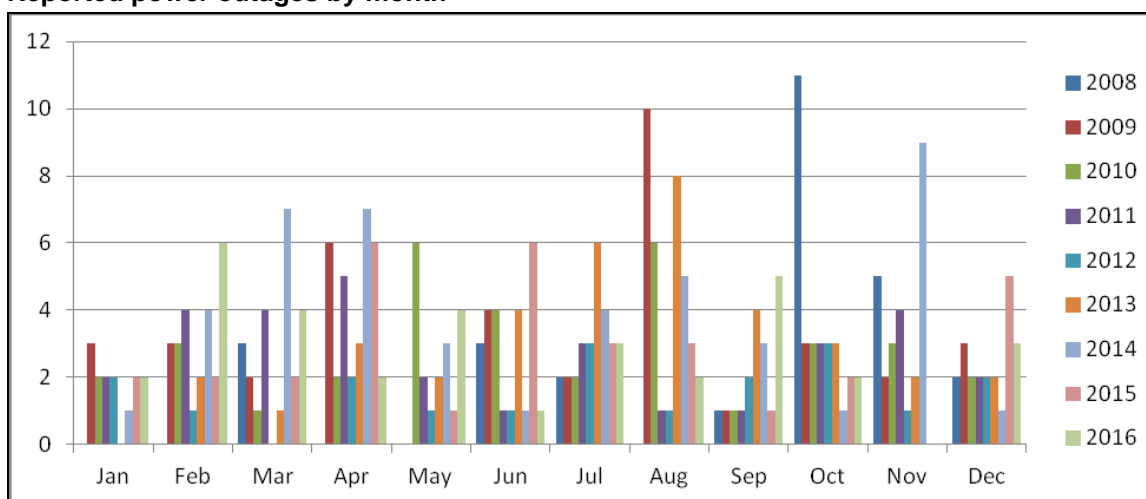|	
Total number of people affected by outages	858,919
Total duration of outages	5,165 minutes (3 ½ days)
Total number of outages	197
State ranking (number of outages)	2 (tie)
Average number of people affected per outage	4,360
Average duration of outage	26 minutes

Note: Total number of people affected (and average) based on 126 (64%) of the total reported outages.
Total duration of outages (and average) based on 27 (14%) of the total reported outages.

Outage fact: A transformer caught fire and caused a massive outage in Cypress August 23. Investigators said it was an internal failure at the substation that likely started the fire, which burned for several hours and affected 75,000 customers.

Reported power outages by cause
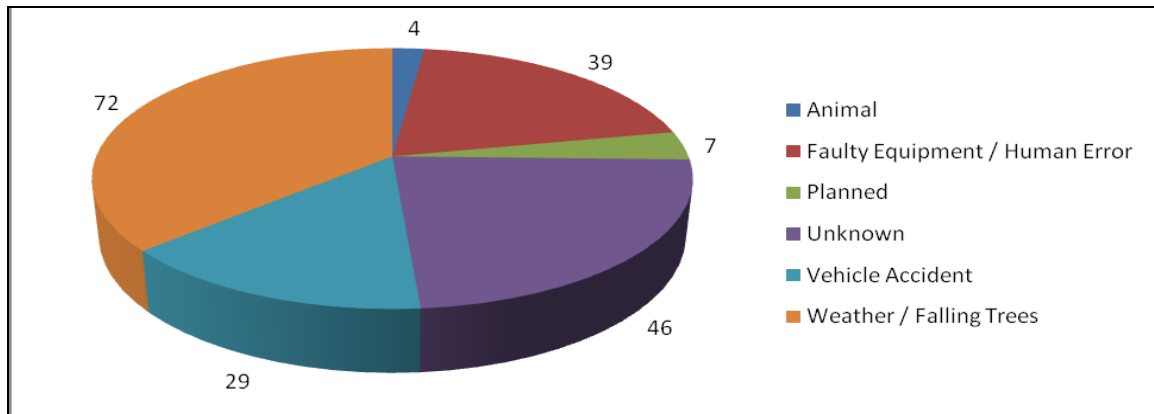
Reported power outages by month

Utah

Outage summary

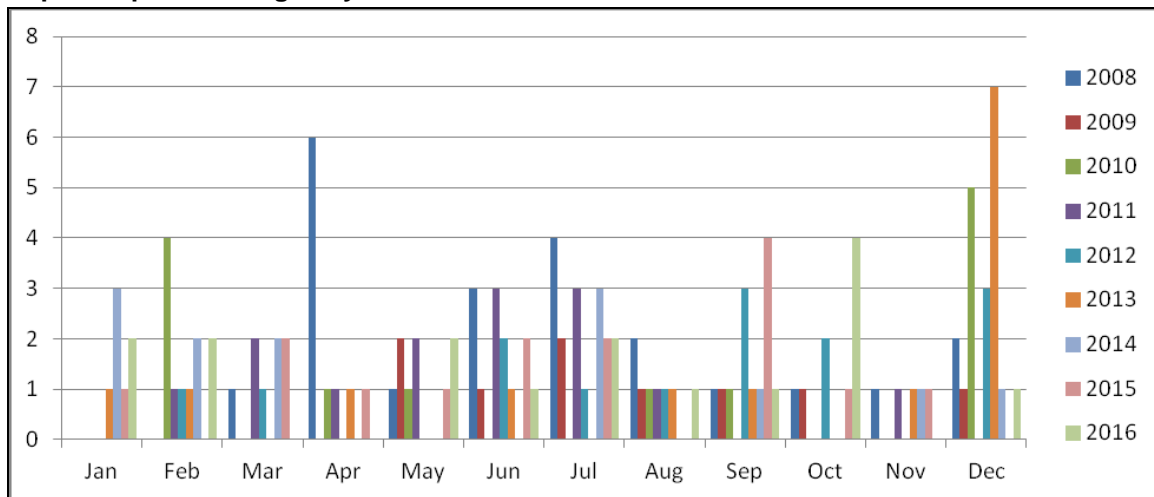|	
Total number of people affected by outages	247,084
Total duration of outages	1,395minutes (more than 23 hours)
Total number of outages	34
State ranking (number of outages)	34 (tie)
Average number of people affected per outage	7,267
Average duration of outage	41 minutes

Note: Total number of people affected (and average) based on 23 (68%) of the total reported outages. Total duration of outages (and average) based on 8 (24%) of the total reported outages.

Outage fact: On August 9, birds interfered with an electric pole's lightning arrester, which caused arcing that started a fire and left 2,000 Layton customers without power for an hour and a half.

Reported power outages by cause
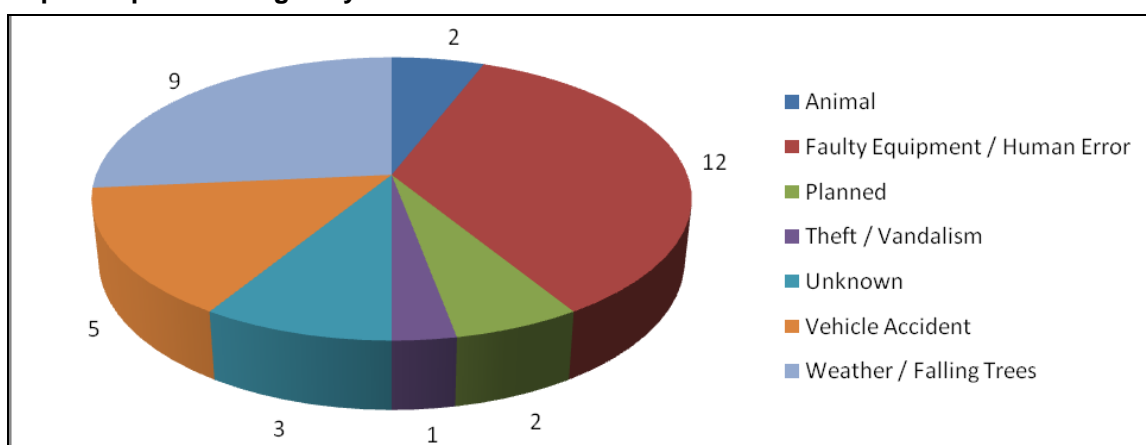
Reported power outages by month

Vermont

Outage summary

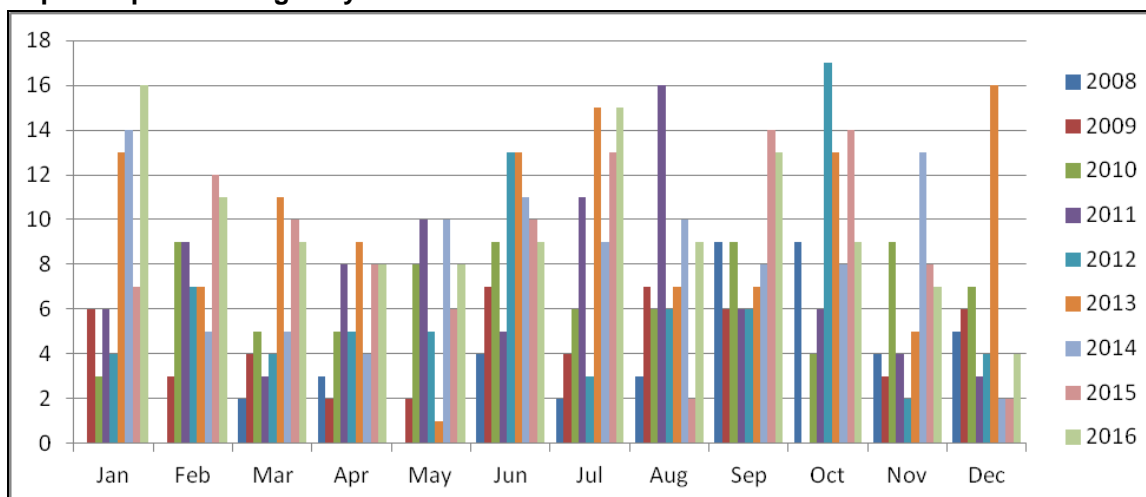|	
Total number of people affected by outages	69,542
Total duration of outages	149 minutes (21 hours)
Total number of outages	16
State ranking (number of outages)	39 (tie)
Average number of people affected per outage	4,346
Average duration of outage	9 minutes

Note: Total number of people affected (and average) based on 10 (63%) of the total reported outages. Total duration of outages (and average) based on 3 (19%) of the total reported outages.

Outage fact: Wet, heavy snow snapped power lines, leading to 20,000 outages in Windsor County on Oct. 27.

Reported power outages by cause
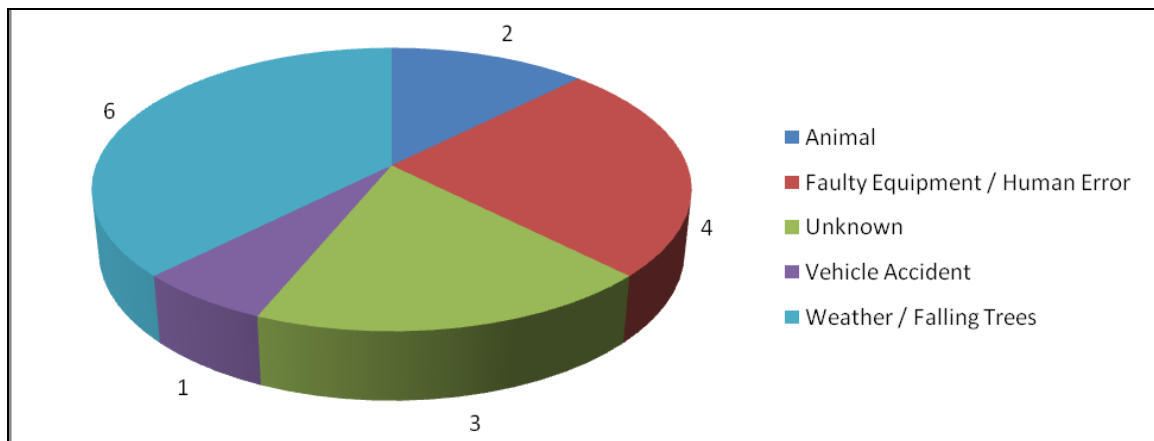
Reported power outages by month

Virginia

Outage summary

Total number of people affected by outages	1,012,762
Total duration of outages	1,967 minutes (nearly 33 hours)
Total number of outages	118
State ranking (number of outages)	7
Average number of people affected per outage	8,583
Average duration of outage	17 minutes

Note: Total number of people affected (and average) based on 90 (76%) of the total reported outages. Total duration of outages (and average) based on 13 (17%) of the total reported outages.

Outage fact: Norfolk utility crews responding to downed wires found two dead crows at the base of a utility pole. The Sept. 18 outage cut power to 2,000 and left the Norfolk Airport running on backup generators.

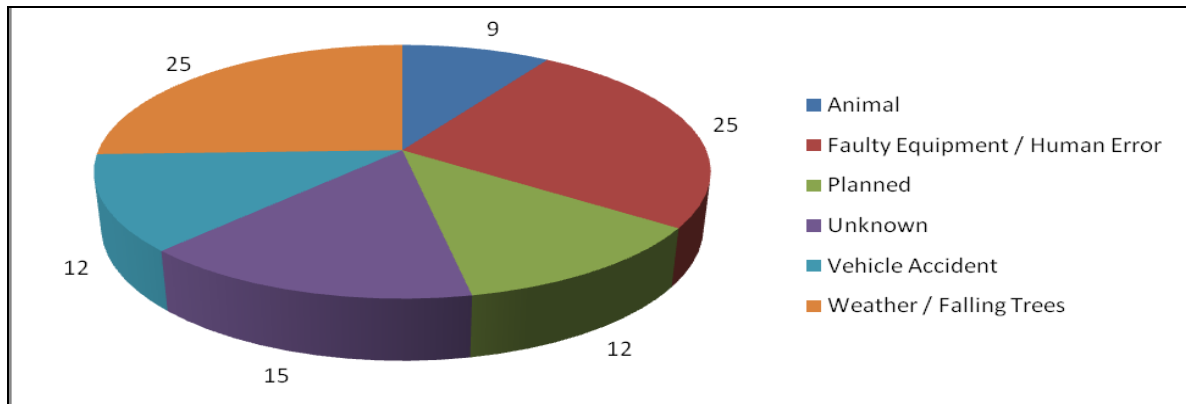**Reported power outages by cause**
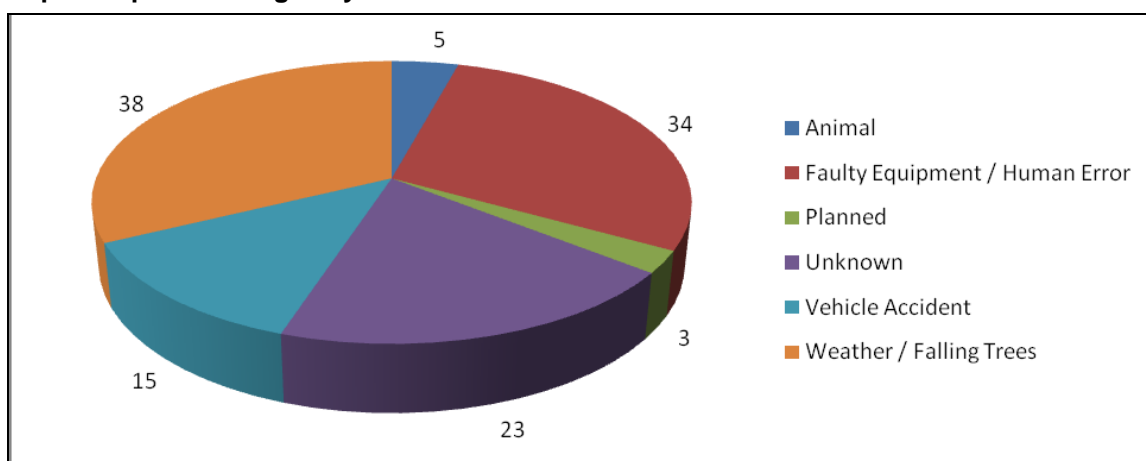
Reported power outages by month

Washington

Outage summary

Total number of people affected by outages	589,112
Total duration of outages	4,418 minutes (3 days)
Total number of outages	98
State ranking (number of outages)	10
Average number of people affected per outage	6,011
Average duration of outage	45 minutes

Note: Total number of people affected (and average) based on 66 (67%) of the total reported outages. Total duration of outages (and average) based on 27 (28%) of the total reported outages.

Outage fact: Residents in a portion of Ellensburg lost power in the early morning hours of Sept. 27 after a rat chewed through a transformer fuse. The transformer fuse was replaced and power was restored 45 minutes later.

Reported power outages by cause

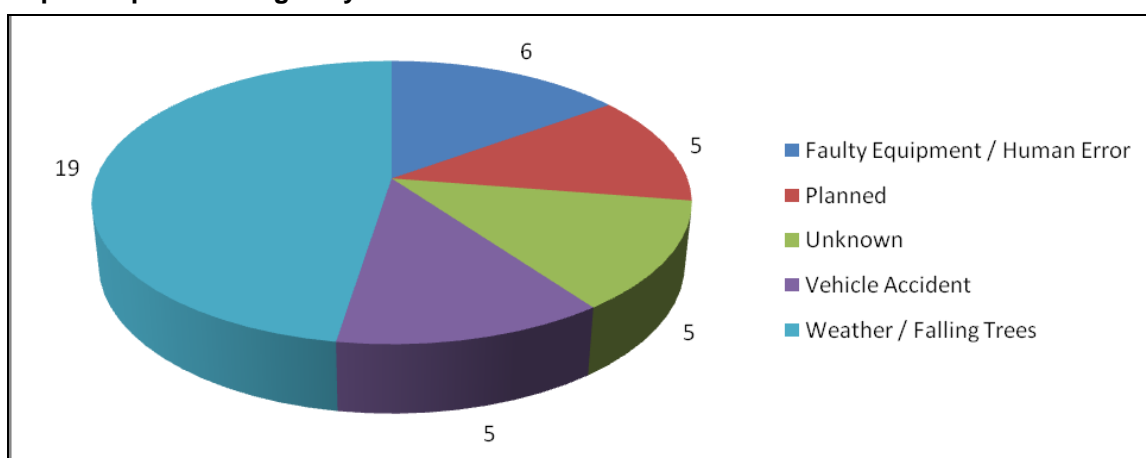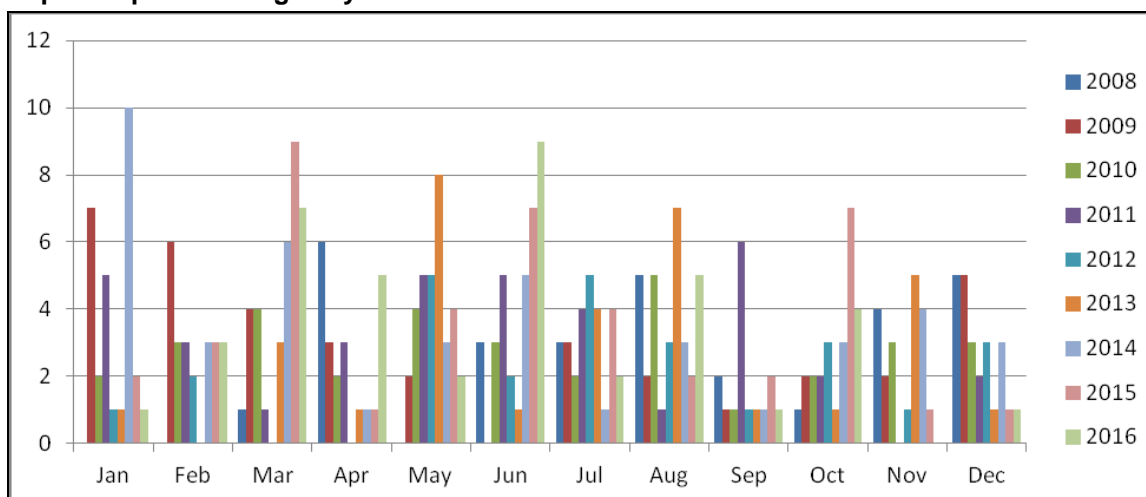**Reported power outages by month**
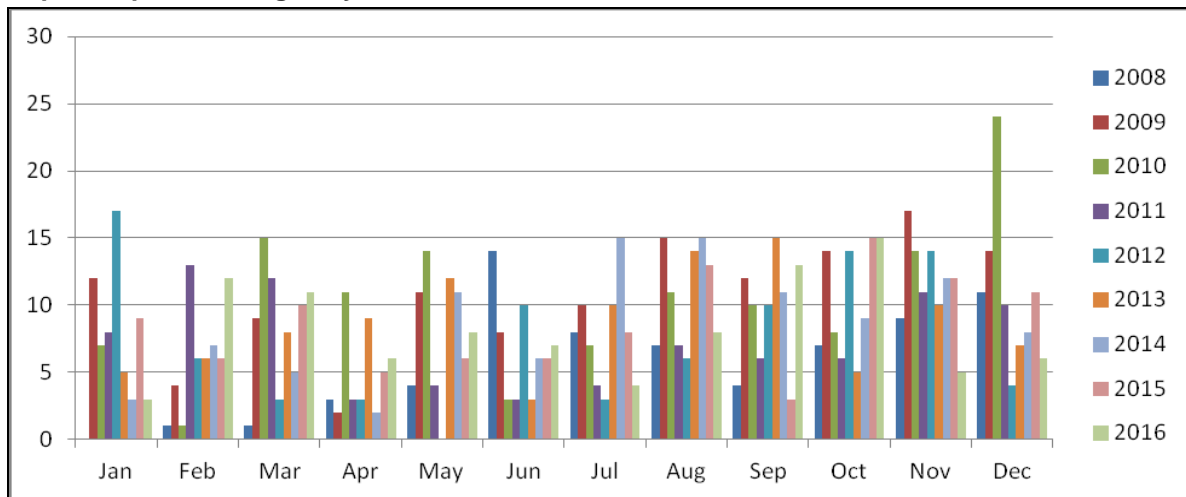
West Virginia

Outage summary

Total number of people affected by outages	168,787
Total duration of outages	3,075 minutes (more than 2 days)
Total number of outages	40
State ranking (number of outages)	28
Average number of people affected per outage	4,220
Average duration of outage	77 minutes

Note: Total number of people affected (and average) based on 30 (75%) of the total reported outages. Total duration of outages (and average) based on 10 (25%) of the total reported outages.

Outage fact: Mylar balloons got caught in power lines in Nitro on May 17, causing a circuit breaker to trip and leaving 155 customers in the dark.

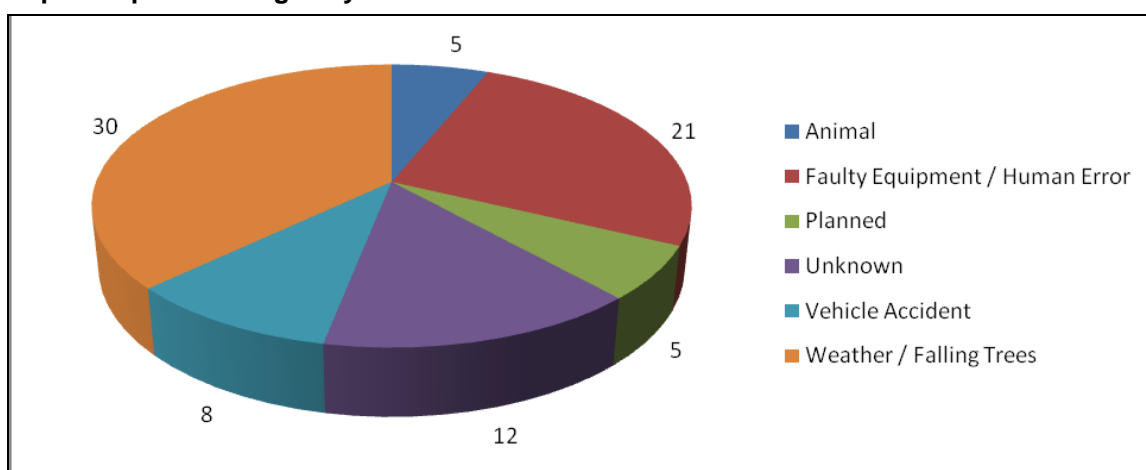**Reported power outages by cause**

Reported power outages by month

Wisconsin

Outage summary

Total number of people affected by outages	271,399
Total duration of outages	2,760 minutes (nearly 2 days)
Total number of outages	81
State ranking (number of outages)	13
Average number of people affected per outage	3,351
Average duration of outage	34 minutes

Note: Total number of people affected (and average) based on 61 (75%) of the total reported outages. Total duration of outages (and average) based on 19 (23%) of the total reported outages.

Outage fact: On Nov. 8, Election Day, a traffic crash sparked a power outage in Algoma. Voting continued at City Hall under generator power.

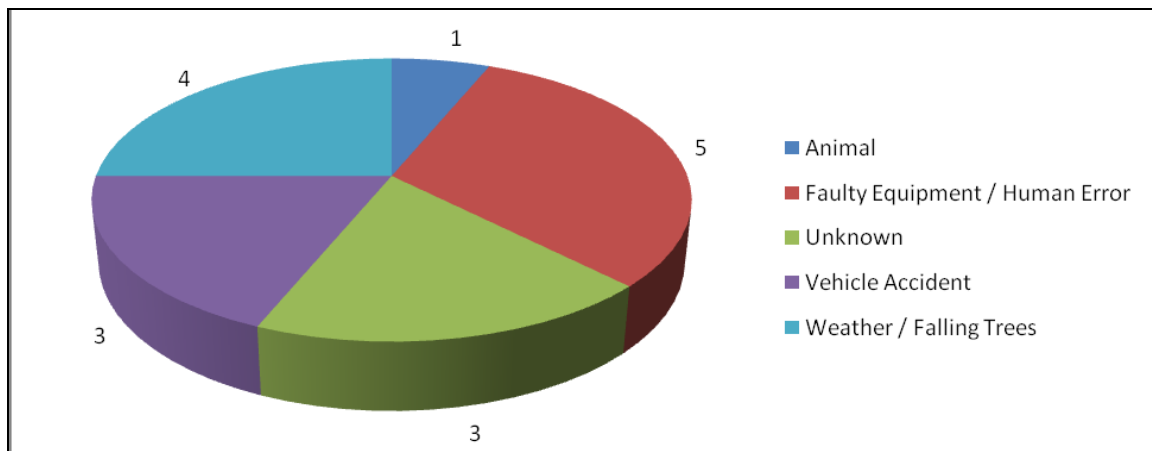**Reported power outages by cause**

Reported power outages by month
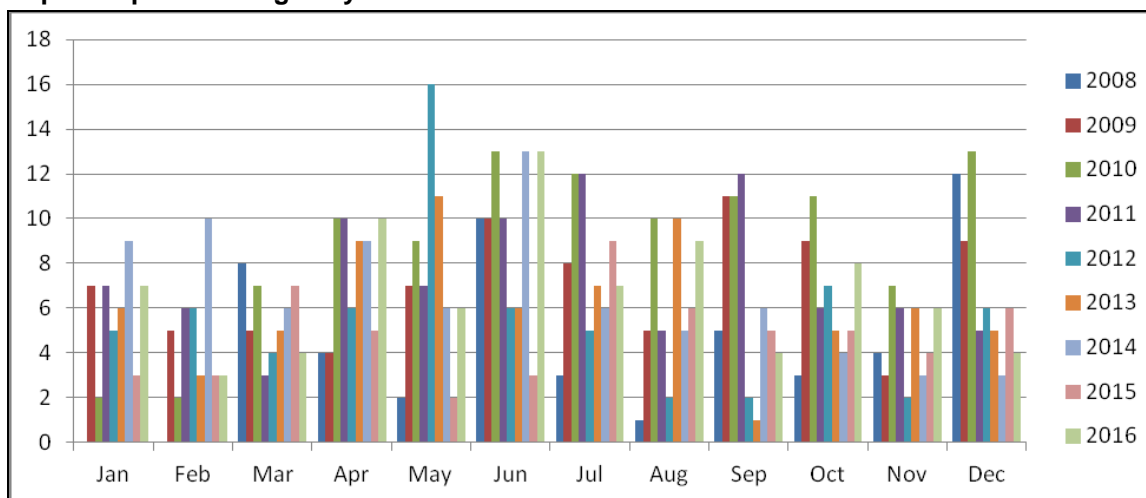
Wyoming

Outage summary

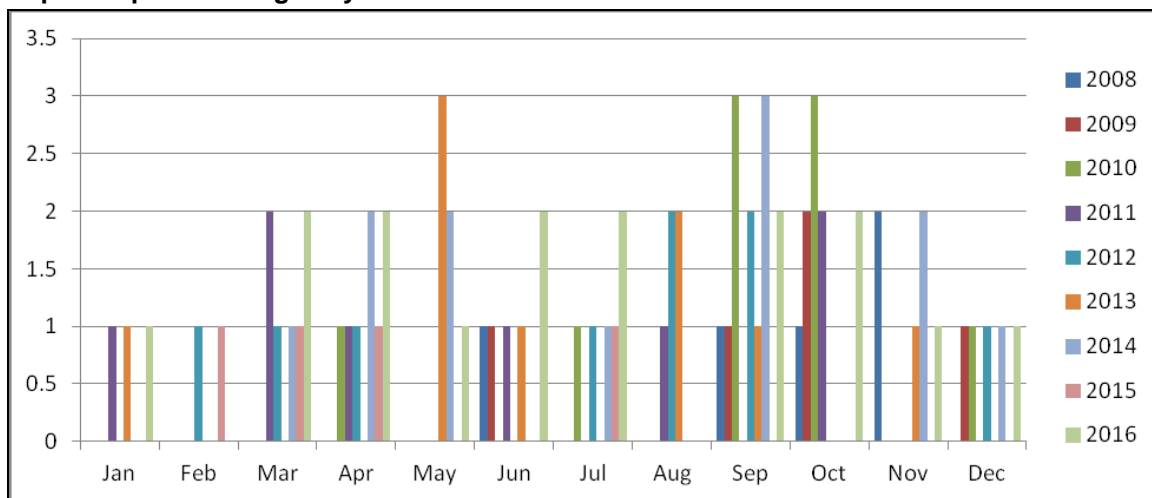|	
Total number of people affected by outages	18,107
Total duration of outages	465 minutes (nearly 8 hours)
Total number of outages	16
State ranking (number of outages)	39 (tie)
Average number of people affected per outage	1,132
Average duration of outage	29 minutes

Note: Total number of people affected (and average) based on 8 (50%) of the total reported outages. Total duration of outages (and average) based on 5 (31%) of the total reported outages.

Outage fact: On July 13, a construction crane struck a power line in Casper, leaving 2,500 customers without electricity.

Reported power outages by cause

Reported power outages by month