

The impacts of 2018 blackouts by industry

The costs and consequences of power outages are often difficult to calculate and can vary dramatically depending on the industry.

Losses generally represent a best-estimate of factors, including lost productivity, manufacturing disruptions, damaged inventory and lost sales, the majority of which are not recoverable. Potentially even more damaging is the impact of outages on customer confidence, which can also negatively impact an organization's future revenue.

A 2016 Ponemon Institute study estimated the cost of a U.S. data center outage has grown to \$8,851 per minute. The toll can scale even higher for healthcare organizations, which face an average cost of \$690,000 per outage, according to Ponemon. That price tag doesn't even factor in how the loss of power at hospitals can be life threatening. Manufacturers and financial service companies also tend to suffer significantly from blackouts, as do industries that deal with perishable products, from food to pharmaceuticals.

Disturbingly, S&C's 2018 State of Commercial & Industrial Power Reliability report found 18 percent of companies experienced a loss of more than \$100,000 as a result of their worst outage, while half of customers endured outages lasting more than one hour over the past year. The same survey revealed that 25 percent of companies reported experiencing at least one outage per month.

What follows is a snapshot of some of the most notable outages of the past year related to specific industries:

Data centers

Not even corporate giants are immune to power outages, a reality Amazon and Microsoft discovered firsthand in 2018. Amazon blamed human error for a March 2 outage that took down scores of large internet sites for several hours. The company said an employee who was debugging a billing system issue accidentally took more servers offline than intended. That misstep initiated a domino effect that knocked out other server subsystems, including those that are part of S3, Amazon's popular web hosting service. When the S3 servers went down, they disrupted web services for numerous Amazon clients, including Quora, Trello and IFTTT.

Another major fiasco occurred Sept. 4 when a Microsoft data center in Texas overheated, causing widespread outages that affected business users of the company's Azure services such as Office 365. Microsoft explained that after a lightning strike knocked out power at its data center complex, a cooling system malfunction led to a temperature spike, forcing the shutdown of equipment to prevent an even more catastrophic failure. One of 10 regions around the world that hosts Azure cloud services, the site's outages cascaded to some global customers due to cross-service dependencies. Full restoration of Azure services in the region took 21 hours.

Healthcare

Sometimes access to continuous, clean power is literally a matter of life and death. Numerous medical facilities across the nation were forced to evacuate patients throughout 2018 due to power outages. Thankfully, Fort Lauderdale, Fla.-based Kindred Hospital was able to transfer eight critically ill patients on ventilators to nearby Broward Health Medical Center after a May 11 blackout left the facility without power. Similarly, some patients at Tennessee's Lauderdale Community Hospital were forced to relocate following a Dec. 31 outage. The only hospital for miles, the facility had to run on a generator for hours after the power shut off. Metroplex Health System in Killeen, Texas also had to transfer all patients to other nearby medical facilities on Sept. 22 after electricity was cut at the hospital. Nearly 14 hours later, crews were still working to restore power. And it was

an overnight departure for residents of a nursing home in Lauderdale Lakes, Fla., after an iguana climbing on a power pole cut electricity to the facility on Sept. 29.

While evacuations aren't always necessary, unexpected closures at medical facilities remain extremely inconvenient and costly, requiring patient appointments to be rescheduled and disrupting a variety of services. Pennsylvania's Meritus Urgent Care, Meritus Medical Laboratory, Meritus Family Medicine and Meritus Pediatric and Adult Medicine all temporarily closed the morning of Sept. 9 due to a power outage in the Sylvania Center building. Furthermore, a May 3 power outage at the central tower of St. David's South Austin Medical Center in Texas prompted authorities to reschedule all non-emergency surgical cases.

Education

Affecting learning institutions from preschools through universities, the past year's blackouts made it clear the education sector lacks a lesson plan for escaping the impacts of power outages. Not even the nation's most prestigious campuses are immune from unexpected cuts, as Stanford University discovered on Oct. 24 when a cable failure knocked out power to about 50 buildings on the sprawling campus. The cut not only forced classes to be cancelled, but also posed an alarming safety risk. At the time, there were students working in labs with hazardous materials, all of whom were told to immediately stop their experiments and leave the building.

California State University, Sacramento was another higher ed victim, when aging infrastructure wreaked havoc with the power supply on Jan. 22. The unexpected campus-wide blackout—attributed to old switchgear failing—shut down buildings and prompted the cancellation of classes. And it was a curious squirrel that caused a Jan. 3 electrical outage at San Jose State University, leading officials to cancel classes, send all non-essential staff home, and close the student union and library.

Hundreds of K-12 institutions suffered similar consequences in 2018, as scores of power problems disrupted learning from coast to coast. In one instance, storm-induced blackouts led to closures across multiple districts in West Virginia on Sept. 28, including in Kanawha, Greenbrier, Wayne and Lincoln counties. Numerous other districts operated on delays.



Even the nation's Education Department was left in the dark on Sept. 25 after a construction accident cut power to part of the Washington D.C. headquarters' building. About 500 federal employees had to be sent home.

Airports

Electric reliability in airports was thrust into the spotlight following the 11-hour power outage at Hartsfield-Jackson Atlanta International Airport in December 2017, which canceled flights and cost Delta Airlines an estimated \$40 million. The incident intensified interest in airport microgrids, which run continuously to provide backup power when needed. San Diego International Airport is among the sites already supported by an operational microgrid, which officials credit for improving reliability and reducing energy costs. Meanwhile, multiple other airports are currently in various stages of researching or developing microgrid projects. In the future, it's possible the backup source will significantly reduce—or prevent altogether—airport blackouts such as those that occurred in 2018.

Among them was an outage at LaGuardia Airport, which was completely blacked out on Dec. 27 after an electrical fire at a power plant in Queens caused a transmission dip in the area. Inbound flights had to be held at their outbound airports when a ground stop was issued by the FAA.

A 90-minute power outage at Reagan International Airport on August 17 occurred after redundancy built into the power system failed. Two utility feeds that power the airport both went down, according to a spokesman. Travelers began tweeting around 9:30 p.m. that the airport had been plunged into darkness.

Flight cancellations and delays also plagued Philadelphia International Airport on Nov. 5 when an outage struck the FAA Tower shortly before 7 p.m. Although power was out for about 40 minutes, the system had to be rebooted, leaving a ground stop in effect for about two hours.

Travelers at McCarran International Airport in Las Vegas endured similar delays when a June 13 outage lasting more than an hour impacted ticketing and gate operations.

Government

Government shutdowns of a different kind halted services from coast to coast in 2018. At a polling site in Knoxville, Tenn., on Nov. 6, for instance, midterm election voters had to cast paper ballots when the location experienced a power outage. The site's generator failed, as well.

The city-county Government Center in Rochester, Minn., was another casualty when a Dec. 20 outage caused an early closure of the facility. A faulty circuit was responsible for cutting electricity to half the building, forcing its closure. As a result, the Olmsted County Adult Detention Center was also placed on lockdown.

And while Abraham Lincoln's likeness can be seen glowing from the end of Washington, D.C.'s National Mall on a nightly basis, on Dec. 16 the giant statue sat in blackness. A faulty underground cable was blamed for leaving the Lincoln Memorial—as well as Memorial Bridge, D.C. War Memorial and Korean War Veterans Memorial—in the dark.

Sporting events

The Los Angeles Dodgers and Arizona Diamondbacks were among the major league baseball teams that endured power outages last year—and we aren't referring to their batting slumps. On July 30, blackouts plagued both teams' stadiums, with the loss of electricity at Dodger Stadium attributed to a Mylar balloon making contact with overhead equipment. The incident caused a 23-minute delay of a game with the Milwaukee Brewers. Although an automated switch rerouted power to the stadium in two seconds, all equipment had to be reset and powered back on by stadium personnel. One state to the east, it was a major storm moving through the Phoenix metro area at around the same time that left more than 100,000 residents without power and knocked out lights at Chase Field during the Diamondbacks' 9-5 loss to the Rangers. The blackout was prominently featured on Twitter after ESPN reporter Pedro Gomez accidentally tweeted that a baboon caused the outage: "@Rangers and @Dbacks delayed in downtown Phoenix because a baboon went through town and overloaded the grid, knocking some lights out." The reporter actually meant to type "haboob," which is a type of intense dust storm.

And baseball wasn't the only sport plagued by power anomalies; March Madness took on another meaning when the Intrust Bank Arena in Wichita saw electricity cut during a March 14 NCAA game. The loss of power caused a 10-minute stoppage of play.

Entertainment venues

From halting rollercoasters in their tracks and freezing casino slot machines to postponing the concert of a popular country artist, power outages ripped the joy out of countless recreational attractions throughout 2018. Consider the August 11 blackout at Scottsdale's Talking Stick Resort and Casino. An estimated 200 people were playing on 844 slot machines when the venue had to be evacuated after a monsoon caused a major outage. Players who hadn't pulled their tickets from slot machines before the lights went out were forced to wait patiently for days until the casino and state's regulatory agency could verify claims.

Meanwhile, thrill seekers celebrating Memorial Day at Cedar Point amusement park in Sandusky, Ohio, got more than they bargained for when a car hit a utility pole near the park, cutting power to several rides. One of numerous theme park outages that occurred in 2018, the incident left riders stranded on rollercoasters and other rides for about two hours—including the 300-foot-tall Millennium Force rollercoaster. Park employees had to help passengers off.

Another high-altitude scare struck Colorado's Breckenridge Ski Resort on Dec. 29. When a power outage caused the Quicksilver SuperChair lift to stop moving, ski patrol had to use ropes to rescue skiers and snowboarders. There were no reports of injuries.

And Dierks Bentley fans had to walk the line in Cincinnati on May 31 after strong storms knocked out power to more than 45,000 residents, as well as the Riverbend Music Center. The blackout forced the cancellation of the country music star's concert.