

Your Reliable Guide for Power Solutions

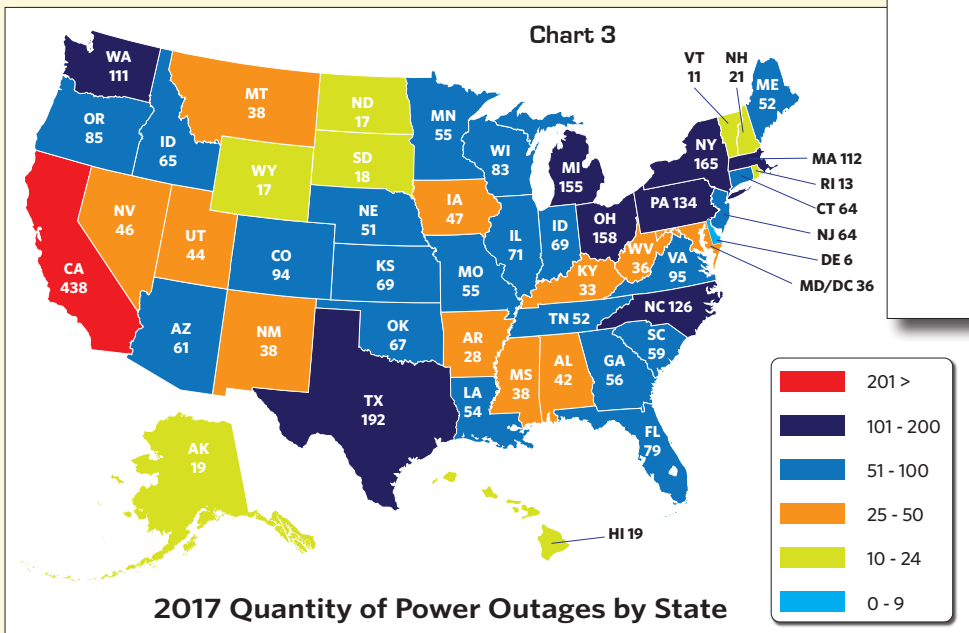
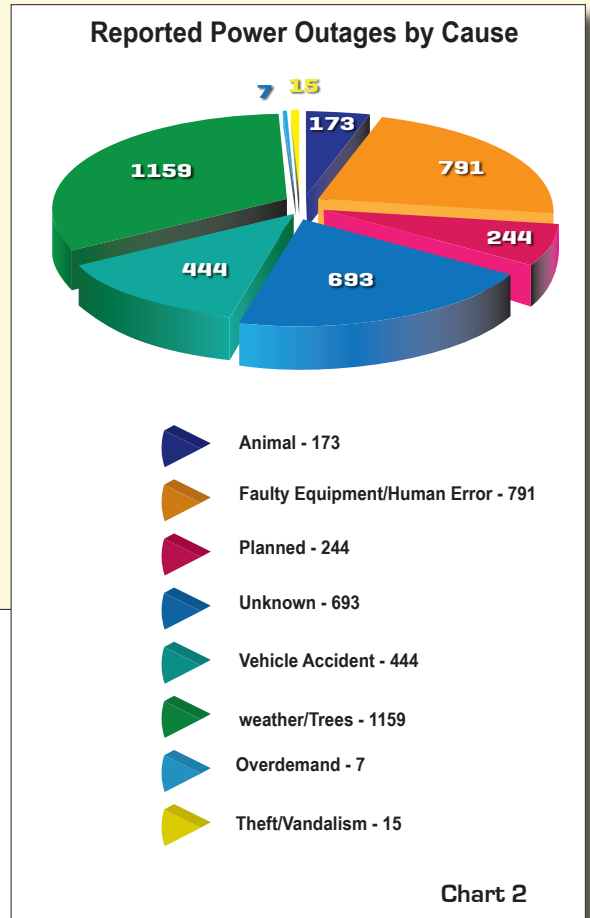
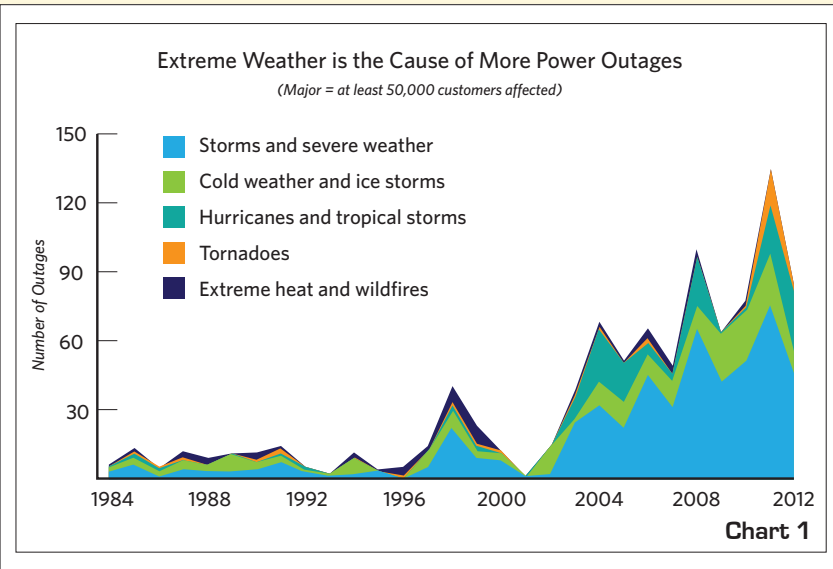
To fulfill our commitment to be the leading supplier in the power generation industry, the Total Energy Systems, LLC. team ensures they are always up-to-date with the current power industry standards as well as industry trends. As a service, our **Information Sheets** are circulated on a regular basis to existing and potential power customers to maintain their awareness of changes and developments in standards, codes and technology within the power industry.

US Power Outages and The Necessity for Standby Generators

1.0 Introduction:

The requirement for a generator system to provide backup power to the primary utility grid power is greater now than at any time before. Our twenty first century dependence on electrical powered equipment, is clashing with our reliance on an aging fragile grid system vulnerable to extreme weather events and an increasing power demand it struggles to keep up with.

This Information Sheet discusses the threats to our current grid system and the importance of installing a standby generator system when the primary utility grid power is off-line.



Source of Data
Data taken from the Eaton 2017 Blackout Tracker

The installation information provided in this information sheet is informational in nature only, and should not be considered the advice of a properly licensed and qualified electrician or used in place of a detailed review of the applicable National Electric Codes and local codes. Specific questions about how this information may affect any particular situation should be addressed to a licensed and qualified electrician.

2.0 Why are We Dependent on the Utility Grid?

When electricity distribution began in the late nineteenth century most users were connected to power generated by local power stations or they generated their own on-site power. As electricity took over as the main source of power for businesses and residences power plants expanded from a few hundred kilowatts to thousands of kilowatts. By the turn of the twentieth century major coal-fired power stations were built, many of which are now turning to gas, and in the first half of the twentieth century hydro-electric also emerged as a significant source of power. The second half of the twentieth century saw the emergence of nuclear power plants, another significant source.

As on-site power generation capacity expanded with the ability to power several cities and towns simultaneously, gradually local city power distribution were replaced by an extensive interconnected power distribution grid supplying several states. Today, in the first half of the twenty-first century, most electricity users receive their power through this extensive power distribution grid fed by numerous large power stations.

3.0 Why Do We Use Standby Generator Systems as Backup to the Utility Grid?

There are two principal drivers for users of electrical power to have emergency backup power supplies. (The majority of which are engine driven systems supplying power via an automatic transfer switch)

1. Increased intolerance for any interruption of power
2. Reliability of the utility grid - (See chart-3)
3. Regulations/best practice for facilities considered life/economic critical

3.1 Increased Intolerance for Any Interruption of Power:

In the digital age; commerce, social interaction, and security requires continuous connection with no interruption due to a lack of power. Today, it's not about losing HVAC and lighting, but losing the ability to function day-to-day.

3.2 Reliability of the Electrical Distribution (Grid) System:

The US grid system has sections that date back to the nineteenth century. Many infrastructure studies cite the lack of a modern interconnected smart-grid as a source of concern for increased productivity, security, and lack of reliability. In addition to failing due to lack of maintenance, poor design, and outside influences, the increase in electrical demand is overloading many sections of the existing grid network.

3.3 Regulations/Best Practice for Facilities Considered Life/Economic Critical:

Regulations and coding that govern health facilities, data centers, communication, transportation, and security specify a standby generator system is installed to provide power in the event of the main grid supply going off-line.

4.0 Quantity of Power Outages:

The grid system across the US fails frequently (See chart-3) and reasons for power outages are numerous, but even with our dependence on a reliable source of electrical power, power outages are not rare events. Chart-3 color codes the quantity of outages reported by each state. It's not a surprise that the highest density of outages occur in the most densely populated states and the ones that have some of the oldest grid systems.

5.0 Reasons for Power Outages:

There are many reasons users of the utility power suffer from power outages (See chart-2). However, many of the following reasons for outages would indicate we are relying on an electrical distribution grid that is exposed and set up to fail. One item not listed, but has been discussed frequently by security experts, is internet terrorism where somebody hacks into the electrical distribution controls with ill intent.

1. **Storms:** Wind, heat, ice, and snow are the most common causes of widespread power outages.
2. **Trees:** During high winds, or trimming by an untrained professional, limbs can come into contact with power lines and cause interruptions.
3. **Vehicles:** A vehicle collision with a utility pole can cause a power outage.
4. **Earthquakes:** Earthquakes of all sizes can damage electrical facilities and power lines.
5. **Animals:** Although we place barriers between wildlife and electricity equipment, squirrels, snakes and other small animals may still cause a short-circuit.
6. **Lightning:** When lightning strikes electrical equipment, transmission towers, wires and poles, outages can occur.
7. **Excavation digging:** Sometimes, underground cables are disturbed by digging. It's important to call 811 before any gardening or digging project.
8. **High Power Demand:** During heat waves and other times of unusually high power demand, overburdened electric cables, transformers, and other electrical equipment can melt and fail.

6.0 Reasons for Power Outages Due to Weather:

As indicated in chart-1 weather is the number one reason for a power outage. Chart-1 also demonstrates how extreme weather is a cause of power outages and how extreme weather is a factor in the rising rate of power outages since 1984. The trend upwards is not encouraging if your single source of power is the utility grid.

7.0 Solution for Reliable Power:

The utility grid for commercial, industrial, and residential users will continue to be the primary power source for electrical power. However, as tolerance for utility outages grows so will the requirement for standby power systems, and in some cases independent power through microgrid systems. Your power systems provider is here to serve all your independent power needs.



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