

NOVEMBER 2014

CONSULTING - SPECIFYING

engineer®

Evaluating energy codes

Codes and standards tackle high-performance
green buildings | page 25

Q&A on hospitals,
health care facilities | page 8

Building envelope
testing | page 30

Integrating fire protection,
HVAC systems | page 44

Comparing permanent and portable backup generators

Using portable generators and manual transfer switches can save business owners time, money, and aggravation.

By Dan Rafter,
ESL Power Systems Inc.,
Corona, Calif.

Now storms, high winds, and heavy rain can shut down restaurants, banks, gas stations, and grocery stores for prolonged periods of time (see Figure 1). When these businesses have to close their doors—even for a day—their owners can lose big, in both sales and reputation.

A survey conducted by the Electric Power Research Institute estimates the total cost of power outages from 985 industrial and digital economy firms to be between \$132 and \$209 billion.

With this in mind, many of today's business owners are opting to research and invest in their own backup power systems, doing all they can to keep their doors open when disaster strikes and grid power fails (see Figure 2).

When business owners decide to implement an emergency backup power system, they have some very important choices to make before determining what type of backup power solution they should select. Should they purchase and install a permanent generator and automatic

transfer switch (ATS), which automatically turns on when power goes out? Or should they rent a portable generator and connect it to a manual transfer switch (MTS) when an extended outage occurs or is imminent? Keith Daley, owner of Ad Hoc Energy in Norfolk, Mass., knows which solution he would choose: the MTS.

Why? An MTS solution can provide significant savings compared to an ATS, while protecting business owners from the consequences incurred by an outage. "Business owners can save so much money by going with a portable generator and MTS setup," Daley said. "It's not even

close, when you look at the actual cost. For many businesses, the MTS and portable generator is simply the better choice."

Cost benefit analysis of an MTS vs. ATS

The financial savings of an MTS backup power solution are significant. As Daley said, it's not cheap to purchase, install, and maintain a permanent generator, making renting one a more affordable choice. It can cost business owners \$25,000 to purchase a 100-kW permanent generator and another \$25,000 to install it. In addition, business owners would have to spend an additional \$7,000 to purchase a 400-A ATS, making the total installed cost of a typical permanently installed backup system roughly \$57,000.

This still doesn't include the cost of licenses, a fuel storage system, yearly maintenance, repair costs, and required periodic load-bank testing. Load-bank testing is a preemptive measure taken by critical operations facilities to ensure that their generators will perform at 100% when grid power goes out. It's a necessary and crucial process for any facility with an ATS and permanent generator. It helps avoid mechanical problems that may arise during an emergency. These additional annual costs can exceed \$10,000, depending on the frequency of load-bank testing and generator servicing.

Another factor to consider is the space that permanent generators require, along with fuel storage and handling. Many owners—especially those operating in crowded urban areas—might not have the available real estate required to house a permanent generator on-site.

In contrast, business owners wouldn't spend nearly as much to purchase an MTS and rent a 100-kW portable generator. The investment for

Figure 1: An MTS provides the means for a portable generator to deliver emergency backup power to a gas station if the utility fails. All graphics courtesy: ESL Power Systems Inc.



an MTS is typically around \$6,000, plus another \$10,000 for installation, bringing the total to around \$16,000. That's roughly 28% of the cost of the permanent generator/ATS solution.

The price of a 100-kW portable generator can range from \$25,000 to \$50,000. To mitigate initial costs, Daley said that business owners can rent this size of portable generator for about \$700 per week. While there may be other nominal fees incurred for delivery or running the equipment beyond the hours specified in the agreement, a worst-case scenario would be a weekly fee of \$1,400.

Some facilities, such as hospitals and data centers, can't afford to be without power for any period of time and therefore require a permanent generator and ATS. However, many businesses can afford to be without power for a short period.

"If you are a bank, a gas station, or a large box store, for example, you can afford to be down for 20 min, 30 min, or 1 hr," said Michael Hellmers, president of ESL Power Systems Inc. (see Figure 3). "You can modify your operations to work through the time it takes to wheel a portable generator in place or have one delivered to your site, hook it up, and do the actual transfer. Both an MTS and ATS have their applications. We contend that it makes financial sense for most businesses to choose an MTS and portable generator solution."

Selecting an MTS

After the cost benefit analysis has been performed and the determination has been made to install an MTS for backup power connection, there are several factors to consider. In facilities equipped with an MTS, it is more efficient for users to make their own connections to a portable generator because certified electricians are in high demand during times of prolonged outages and would likely be unavailable or would charge a premium for their services.

In lieu of paying steep fees for an electrician and to avoid the inconvenience of waiting for one to arrive following a power outage, an MTS equipped with color-coded, cam-style connectors can enable users to easily make these electrical connections in a quick and safe manner.

It is also very important for the MTS to be interlocked. There are several different types of interlocking options. However, Daley prefers

a lever system with circuit breakers, as it is fail-safe in preventing cross connections and the user does not have to hunt for fuses at an inconvenient time. This type of interlock also eliminates the chance of losing or duplicating keys. Beyond its ease of use and safety features, the factor that ensures an industry-tested MTS is good quality is UL certification.

Building inspectors typically require new equipment to be listed. When comparing various product listings disseminated by nationally recognized testing laboratories, it is important to know the appropriate category for the specific application. For example, UL 1008: Transfer Switch Equipment is set aside for transfer switch equipment and certifies that the complete assembly has passed a rigorous testing procedure, including short circuit, temperature, hi-pot, and structural, to ensure safety. In contrast, UL 50: Enclosures for Electrical Equipment, Non-Environmental Considerations only certifies that the actual box housing the equipment meets the minimum requirements for structural and environmental integrity.

Some facilities may require MTSs to be service-entrance rated (suitable for use as service equipment, or SUSE), which is an important consideration for equipment being installed at the building's utility service entrance.

Need for standby power increasing

While there are many things to consider when installing a backup power system, one thing is certain: businesses will definitely feel the impact when power is lost for an extended period of time. "The reliability of the electrical grid in the U.S. is being called into question more often," Hellm-

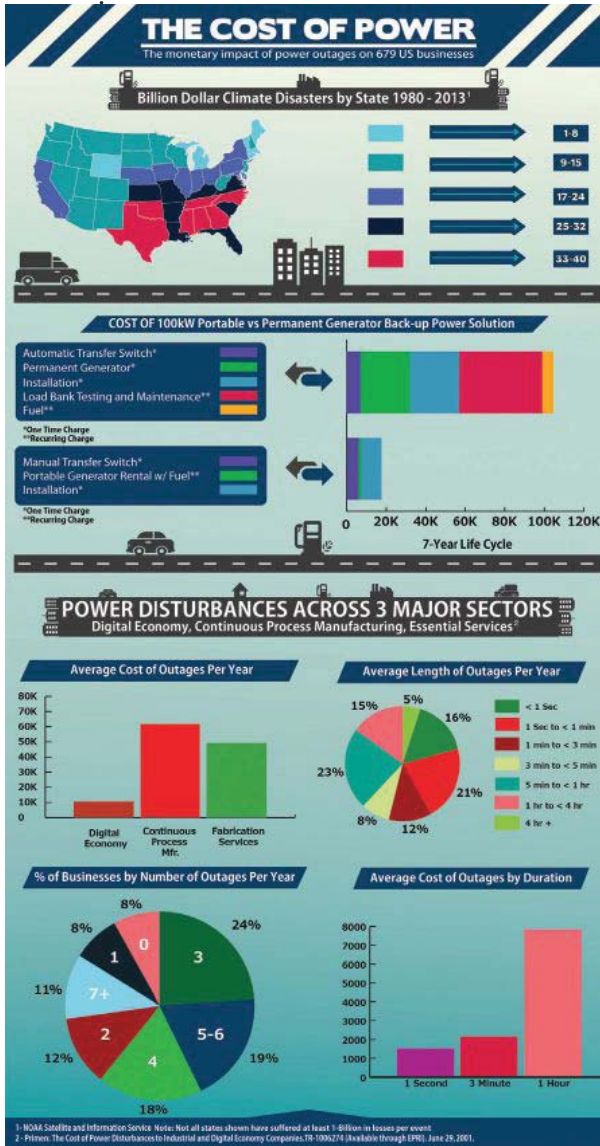


Figure 2: With the help of a portable generator, this MTS provides emergency backup power to a business.

Figure 3: A banking institution has emergency backup power protection via an MTS that connects to a portable generator.



Figure 4: This graphic displays the annual cost of power outages.



ers said. “Not enough money is being spent on major infrastructure repairs to the grid, plus we are seeing an increase in the number and severity of storms and weather-related emergencies. Whether we are talking about ice storms, wind storms, hurricanes, or significant heat,

we are finding that a lot more companies and municipalities are looking at emergency backup power more closely than they did 5 years ago.”

With an increasing demand for emergency backup power, owners must ask themselves, “How often should we expect to lose power in a given year?” A 2013 report published by the White House estimates a total of “679 wide-spread power outages occurred due to severe weather” from 2003

through 2012 (see Figure 4). Businesses can expect to lose power an average of 3.9 times per year. At this rate, it would take more than 364 weeks for a typical permanently installed generator to pay for itself, compared to the high-end rental charge of \$1,400 a week when a portable generator is needed. Not only is an MTS easy to operate, it is far less expensive, and a good business decision.

A study conducted by the Congressional Research Service estimated the cost of weather-related power outages to be between \$25 and \$70 billion annually (Campbell 2012). The costs associated with power outages can manifest in different forms, such as lost sales, lost productivity and wages, spoiled inventory, delayed production, and the inconvenience of getting things back up and running.

Annual costs can vary and are the highest they’ve been in years with major disasters such as Hurricane Ike in 2008 and Hurricane Sandy in 2012, each of which resulted in damages of more than \$50 billion dollars. Additionally, the occurrence of both major power outages and severe weather is increasing. The U.S. Energy Information Administration shows that weather-related power outages have increased considerably since 1992.

Since 1980, the U.S. has sustained more than 140 weather disasters whose costs have topped at least \$1 billion. The combined total of these events has exceeded \$1 trillion (U.S. Dept. of Commerce 2013). Even more sobering is the fact that 7 of the 10 most expensive storms in the country’s history have been within the last 10 years, having occurred between 2004 and 2012 (U.S. DOC 2012).

It’s clear that the need for standby power is not only to help avoid damages, but also to gain a strategic advantage over competitors. Businesses that are up and running through a power outage will gain the attention and respect of area consumers. And that can pay off significantly when it comes to your reputation.

“I do like to talk about production,” Daley said. “I can’t tell you how many outages I’ve responded to where there’s a wide area of two to three blocks without power. The one business that does have power? That business can’t keep the customers away. It almost becomes a Disneyland attraction.”

A bright future for MTSs

What is the overall cost impact when your business loses power during an emergency, disaster, or inclement weather? Could you continue to operate and be without power for 1 hr, 12 hr, 24 hr, or 3 days? How long would it take for an MTS to pay for itself? Take into account perishable goods, lost sales, wages, spoiled inventory, delayed production, and the headaches caused. Have you considered how your customer base might diminish if your competitor does have power in those critical times? Reputation goes a long way. Why not commit to preparing your business for the next power outage now? You just may find that an MTS provides you the safe and flexible connection that you can’t afford to be without.

Dan Rafter is a freelance writer who specializes in technical and industrial topics. He has more than 20 years of journalism experience and has written for many business and trade publications.