Weather or Not

Is your IT department ready for prolonged power outages?

Without adequate backup power — and the plans, procedures and associated gear to use it correctly — your company's data, mission-critical operations and IT gear are at risk.

Hurricanes, tornadoes, floods, heat waves, ice storms and other seasonal events often bring longer outages — hours, days, even weeks — than the seconds or minutes of uninterruptible power supply (UPS) backup that most IT has provisioned for. To cite an extreme case, 2005's Hurricane Katrina left many businesses without utility power for so long that they went out of business.

According to 2004 studies done by American Power Conversion (APC), Bell Labs and IBM, 90 percent of power outages are less than five minutes long — long enough, in most cases, for UPS systems to provide power to keep working through the outage, or give IT time to do an orderly shutdown. But the same surveys reported that 1 percent of outages lasted over an hour.

"New England gets 20 to 30 thunderstorm days per year," points out Randall P. Foltyniewicz, enterprise power specialist, CDW. "The southeastern United States and 'tornado alley' states like Oklahoma and Kansas can see an average of 70 major storm days annually. California may have only five or 10 thunderstorms a year, but they have 'rolling blackouts' because of the heavy power demands of summer air conditioning."

But even if your company isn't in a geographic area with weather-related power outages, that doesn't mean your utility power isn't at risk. The ripple effect of distant power problems can impact your local power. On August 14, 2003, one such problem led to hour-long power outages across the northeastern United States, as well as Toronto and Ottawa. Six weeks later, problems with a power line in Europe cascaded to a blackout over nearly all of Italy for nine to 18 hours, as well as a three-hour blackout in Geneva, Switzerland, affecting over 55 million people.

Local events can also interfere with the power coming into your IT center, whether it's a truck downing a power pole or an "operator error" involving the wrong switch. "One customer reported an outage due to a snake that got into their facility, crawled up into the UPS and ended up across the two critical-power paths," notes Peter Panfil, vice president of power engineering, Liebert brand products at Emerson Network Power.

According to APC, power problems are the single largest cause of data loss — 15 times more frequent than viruses. Ramesh Menon, senior product line manager, Eaton Powerware, notes that power outages cost the United States over $80 billion per year, with one-third due to outages lasting over five minutes.

Is Your Company Prepared?

"You have to ask, 'What would we do? What kinds of expectations do we have in place for continuity and backup at all times?'" advises David Slotten, director of product management, Tripp Lite. "I know of one company in a major city that keeps enough fuel on hand to last them two weeks, along with multiple redundant generators. But most people just don't think about it."

The only way an organization can be sure it is protected from the damage and downtime caused by power outages and other anomalies, according to information from Liebert brand products, is "to systematically identify critical systems and ensure the appropriate level of protection is provided for each system as close to the system as possible."

"When I do presentations on best practices, I ask if the audience knows what the impact cost to their business would be from a disruption in their critical applications. About half of the people in my audiences do," says Emerson's Panfil.

Once a company has identified its priorities for which systems need power, the next step is to do a PowerChain Audit, examining the critical power path and identifying key points of failures, says Eaton Powerware's Menon.

"Have a 'one-line' and keep it up-to-date," urges Emerson's Panfil. "A one-line is a simplified schematic of the power system in a facility, with detailed procedures and sequence of operations for problem conditions, that helps customers understand what to keep up or do an orderly shutdown on." However, he adds, "We often find that a one-line was generated when a facility was designed, built and commissioned, but the customer modified the facility, so the one-line may not always be up-to-date." »

The power industry has definitions of availability, ranked as tiers, Panfil notes. "Tier 4 is the highest level, usually with dual-buses, redundant UPS systems, generators and delivery paths. A high-availability center should strive for this."

Get the Right Gear

The reliability of power to your equipment is determined by the type of UPS you use, as well as what other power components and redundancy you include, according to Panfil. When utility power degrades, before failing completely, "A dual-conversion UPS will isolate you from fault conditions," he notes.

The cost of a dual-conversion UPS has decreased significantly in recent years, says Troy Turner, power specialist at CDW. "And with a dual-conversion UPS, you get 40 percent more battery life than a line-interactive UPS, and don't have to worry about switchover problems if you add a generator." But be sure you've maintained and tested the UPS, urges CDW's Foltyniewicz. "Check how old the batteries are, what shape they're in and if the current load is beyond what the UPS is intended for."

Furthermore, generators are strongly recommended. "A UPS can provide hours of backup time, depending on the equipment being served and the amount of batteries. A UPS may make sense for gear in an area difficult to support or retrofit with a generator. But in data center-scale requirements, you need to think about getting off batteries quickly and shift to a generator for your power supply," says Tripp Lite's Slotten.

You also need the generator to run your cooling and air conditioning, which can't run off the battery, he adds. "And you can't run without cooling for more than an hour — or even five minutes, if you've got blade servers or other dense racks — before you get hot spots that damage or bring down equipment."

A generator is also necessary if you want to use other electrical equipment when utility power fails. "You have to decide what your priorities are," says CDW's Turner. "How much of your phone system do you need? How much lighting? Can you live without air conditioning?"

If you already have a generator, check its health and your capacity, urges Tripp Lite's Slotten. Generator failure is one of the most commonly-reported blackout

4-step process

In a white paper on protecting critical systems during utility outages, Liebert brand product data recommends this four-step process for conducting a systematic audit of power protection systems:

✓ Are the right systems protected?

✓ Do systems have the right level of protection?

✓ How well did the systems that are in place perform before, during and after the event?

✓ Is a service strategy in place to ensure equipment is properly maintained?

problems. For example, the New York *Daily News* reported that during the August 2003 blackout, about half of New York City's 58 hospitals had generator problems.

If you don't yet have a generator, pencil it into your planning, advises CDW's Foltyniewicz. On average, he says, the time to add a generator is nine weeks, but could take up to eight months. "It depends on the size of the system. For an enterprise installation, you may need more permits and additional construction, such as drilling or roof mounts."

The price of nonportable generators ranges from under $10,000 to several hundred thousand dollars depending on the application, says Foltyniewicz. "And installation costs can range from half to twice that of the actual hardware. A site visit will help determine what's needed."

What if installing a generator isn't an option? "If you're in a situation where you lease the building or don't have that kind of access, your facility is in conflict with your business model," says CDW's Turner.

If you have a generator as well as a UPS, you'll need an automatic transfer switch (ATS) to shift between the utility and generator power, notes Emerson's Panfil. "Make sure your equipment handles this changeover seamlessly. If you currently use a line-interactive UPS, you may need to switch to dual-conversion."

Other solutions to consider include intelligent power distribution units (PDUs), which will let IT power equipment down or up on an outlet-by-outlet basis. Avocent and Raritan, for example, offer IP/KVM (Internet Protocol/Keyboard, Video, Mouse) and IP/server console switches that work with each vendor's power strips. "IP over KVM can also provide out-of-band access to servers in case the IP network is still down," points out Richard Dominach, senior product manager, Raritan. Intelligent power distribution units can also let devices be restarted in a specific order.

Plan and Test

Once you have your equipment in place, you have to test the process. "Know how your equipment works," Emerson's Panfil advises. "Practice the operation, and practice the maintenance procedures."

Some salient points to follow to keep your business up and running include:
- "Do a full system test at least once a year; I recommend once a quarter," says CDW's Foltyniewicz. "Make sure the UPS and generator work, and that you can switch over. Also check your breakers and PDUs regularly."
- Have emergency communications, such as walkie-talkies and even analog POTS ("plain old telephone service") lines, in case your PBX (private branch exchange) and cell phones are down.
- Determine how you'll get emergency fuel delivered in the event of a prolonged power outage.
- If something happens to the generator, make sure you have a plan for it to be repaired.
- "Label everything," says Emerson's Panfil.
- Don't forget about your desktop computers, reminds Jason Meyer, senior product manager, Belkin Corporation. "Make certain that they are plugged into a UPS. A 500 or 750VA UPS for each PC will allow your employees to finish what they were doing and shut down gracefully."
- Consider offsite data storage, archiving and hot standby facilities, says Tripp Lite's Slotten. "Can your people work remotely from their notebooks, and can you outfit them with mobile power if the office isn't available?" ◊

Types of UPSs

1 The simplest and most economical type is the **standby UPS**. These units wait in the background until a power problem arises, at which point the UPS battery takes over — but just temporarily — giving users enough time to save their work and shut down their PCs.

2 The **line-interactive UPS** constantly monitors the electricity flowing into computer equipment and boosts or levels out the voltage to adjust for spikes and sags. These UPSs are appropriate for servers, workgroups and telecom systems.

3 Technology from a true **online double-conversion UPS** provides the highest level of power protection currently available. The AC output is regenerated to and from DC power, which keeps it free from spikes and voltage variations, while various failsafe and self-diagnostic features provide additional defense.

Let CDW assist with project-based consulting.
Talk with your account manager today.