

Generators for the Next Electrical Power Outage?

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We once took for granted that when we flipped the light switch, lights would go on and systems would be powered, but this is no longer true.

There have been a number of blackouts both within the US and across the globe that have proven this to be a fallacy. Electricity is no longer a commodity we can take for granted.

A blackout can occur at any time and in any place, so we need to plan for this event. How do we go about getting prepared?

Determine What is Needed

The first step in preparing a Power Failure Response Plan is to identify and understand the electrical distribution system layout and design in the facility to be protected.

Most building or office electrical power distribution systems are quite complex. In order to properly understand them, wiring documentation will need to be reviewed and brought up to date.

If up-to-date documentation is not available when conducting the review, it needs to be developed as soon as possible and prior to developing the power failure response plan. An electrician can aid in this effort.

An up-to-date electrical system schematic or wiring diagram will clearly identify how the main components of the electrical system are connected.

This should include any special systems, such as uninterruptible power supplies or power protection devices.

Specifics regarding equipment voltage and current ratings should be identified and documented. It is also important to identify each major component with a unique name describing its location and important power ratings.

In addition to identifying the equipment on the drawings, it is equally important to physically match the system or component to the drawings by affixing a permanent label to the actual equipment for identification purposes. This, along with a flashlight, facilitates finding the equipment quickly in the case of an emergency.

Determine Mission Critical Requirements for Emergency Power

Critical electrical power requirements, or loads as they are often referred to, are usually identified as part of a Business Impact Analysis and Risk Assessment. However, if these assessments have not been developed as part of an on-going business continuity or disaster recovery program, then now, before a crisis, is a good time to identify the organization's critical need for electrical power.



Once the electrical power distribution system is documented and understood, the next step is to identify business critical loads that will require emergency power in the event of a power failure.

At this point it is important to note that uninterruptible power supplies and emergency generators may not normally provide for all of an operation's electrical needs. So, decisions need to be made as to what equipment absolutely needs to have power maintained during a power outage.

As I indicated earlier, this is usually done as part of an overall business impact analysis, where business critical systems and devices are identified. These are systems for which special considerations need to be made in case of any type of failure—of which power failures are one.

After critical systems are identified they need to be identified on the electrical drawings to make sure it is understood that they are critical to the operation (i.e., critical computing systems, LAN/WAN network devices, PBXs, production and/or security equipment).

If the electrical distribution system has been properly designed, all busi-

ness equipment should be connected to common circuits and separated from non-critical equipment.

This makes it much easier to isolate critical circuits and to properly connect them to emergency power sources during an emergency.

It is also important to keep the documentation up-to-date for the equipment contained on these circuits, so that the electrical load (current required to keep the equipment running) is properly identified and emergency equipment can be properly sized.

Determine What Type of Emergency Power to Use.

Typically if the power failure lasts less than an hour an uninterruptible power supply (UPS) may be able to sustain power – if properly sized and maintained.

However, if the power outage lasts longer than an hour, as was the case in the North-east US and again in Italy this year, emergency generators will be needed.

If it is absolutely critical to maintain power for an entire operation throughout a blackout, regardless of the length of that blackout, then consideration to possibly installing permanent emergency generators should be made.

It should be noted that this type of installation is quite expensive and complex to install, operate and maintain, and may not be viable due to building codes or environmental constraints.

If it is decided that the organization wants to install permanent electrical generation equipment, then an experienced professional's help should be solicited.

Portable electric generators can also be used. They are hooked-up after the power has failed and before the UPS's would shut down. If a portable generating unit is to be used, it is absolutely critical that the electrical load of each emergency circuit (measured in am-

peres) be known so that the generator(s) can be correctly sized (be large enough to supply the rated current of all devices to be powered during the power failure).

The wattage and voltage ratings for each generator should be defined prior to the outage and procedures documented, so that when acquiring them, the load does not have to be calculated under adverse conditions—which usually leads to error and further disaster.

If it is decided that the use of portable generation is the best alternative,

undertaken, be sure that the contract specifies delivery time and maintenance if a provided system/component fails to operate correctly.

It is also important to understand if your generators will be delivered first or in what priority they will be delivered during a widespread emergency outage.

However, even with this contracted agreement, there is no real guarantee that the pre-contracted generators will be available if the power outage is widespread.

It may be in the organization's best interest to acquire portable generators ahead of time and store them for when they are needed. If you choose this course, it is important to establish and implement proper maintenance procedures (e.g., running the generators periodically and changing the gas and oil as recommended by

the manufacturer) to make sure that the generator starts when needed.

During a crisis people react differently than when there is no stress, so the planning procedures should be clearly written, and readily accessible.

it may be prudent to arrange a pre-emergency contract to rent or lease the generators.

If a pre-rental or lease agreement is

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Typical Electrical Distribution Panel

Making the Generators Ready for Use

Before any power failure occurs is the time to plan how each generator will be connected during an emergency.

Here is where an electrician or experienced technician is critically important. Manual transfer switches can be placed near the emergency panels ahead of time so that switching to emergency power, once the generators are connected and started, is made easier.

All of the necessary connection equipment (e.g., cables and connectors, etc.) should be stored near the place where the generators will be used. In addition, adequate gas and oil supplies need to be planned for as generators will consume large supplies of gasoline and oil if they need to run for many hours.

Emergency generator procedures need to be well documented and attached to the generator or the transfer

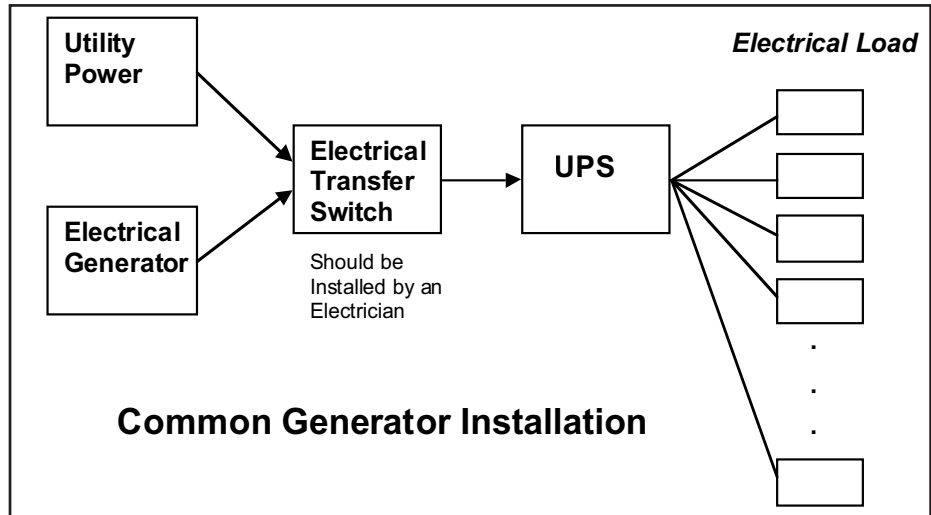
Ensure Readiness

To ensure that the emergency generation equipments (permanent or portable) are ready in case of an emergency, regular testing is essential.

Testing procedures should be established (and internal audits conducted to regularly review compliance) to ensure that the generators will work properly when called upon for service.

During a crisis, people react differently than when there is no stress, so the procedures should be clearly written. Using step-by-step check lists or flow-charts can make the procedures easier to follow.

Having these procedures available at each generator site to connect each portable generator will save a great



Typical Electrical Main Panel

switch.

This ensures that the generators will be connected properly and not damage wiring or critical equipment.

If the connection is very complex then part of the emergency response procedures should include an on-staff or contracted electrician or experienced technician to perform the connection of the generators.

The generators should be tested under actual circumstances, if possible, but if not, then an operational test will have to suffice. This operational test should include starting and running each generator for a minimum of thirty minutes—at least each month or minimally, once each quarter. Also make sure that each generator’s fuel tank is full upon completion of each test and that there are documented procedures to obtain fuel during an emergency (perhaps the local gas station may not be the best source).

Manufacturers typically recommend that fuel be replaced that is more than one year old.



Typical Portable Generator Installation

Formal Procedures Are Critical

Experiences of business continuity and disaster recovery professionals have shown that proper planning in advance makes response to an electrical power failure much more effective.

The group responsible for reacting during a blackout should make sure that well documented and easily understood procedures are developed and maintained.

deal of time during an actual crisis event.

It is also important to note that the procedures should include both how to connect the generator and how to disconnect the generator when power has been restored.

Running generator installation tests periodically can help make sure everyone is comfortable and prepared for the time when the drill may be replaced by reality. Ω