

**Electricity** is never more precious nor more scarce than after a disaster. Lights are out, telephones disabled, businesses shut down. People may need food, water, heat and medical attention. There can be no real recovery without power, yet no one can predict when utility service will come back.



# PLANNING FOR TEMPORARY POWER:

### A Critical Management Duty

Today, backup power plays a critical role in recovery from all manner of disasters. Rental generator sets of all sizes can help sustain facilities that safeguard public health, safety and welfare, even through extended utility outages. In addition, rental power can bring life back to schools, stores, offices and factories while rebuilding moves forward and the utility restores the grid.

Especially in the early stages, the speed of recovery depends on how well local authorities and private enterprises have planned for permanent or rental emergency power.

Emergency response experts advise against trying to plan for a specific event, such as a fire, flood or tornado. Instead, they recommend looking at the common results of any disaster. Significant among these is loss of electric power. Extended power failures have many causes, some natural and others man-made, some predictable and others difficult even to imagine.

Use this planner to prepare for emergency situations that could affect your day-to-day operations.

#### **GETTING STARTED**

#### A Three-Step Approach

Although critical, planning for power doesn't need to be difficult. Here are three simple steps that will help you secure and maintain the rental power necessary to carry your facility successfully through a scheduled or emergency shutdown:

#### 1. DETERMINE YOUR FACILITY'S ELECTRICAL LOAD

Before you rent temporary power, you have to know how much you need.

#### **FULL POWER**

If you have to keep your whole facility operating as it would with utility-supplied power, you need to determine your aggregate electrical load.

The quickest, easiest and most accurate way to do this is to take ammeter readings of your electrical distribution boxes. Take the reading when your company is normally operating at peak load. You may also be able to obtain peak demand readings from your utility bills.

Aggregate loads are also listed on panels of electrical distribution boxes.

#### **PRIORITY POWER**

At times, you may want to power only those electrical loads that serve critical functions at your facility. If so, you need to prioritize individual loads.

If you're not sure what your critical loads are, start by determining the lost profit or other problems that result if your company is without the equipment. Other than life-safety electrical loads powered by your standby generator sets as required by law, examples of critical loads include:

- Lights
- Heating, ventilating and air conditioning (HVAC)
- Computers
- Process Equipment
- Pumps

Prioritizing will help you decide which loads require power immediately during an emergency. This is important since it may take several hours or longer to secure all of the rental equipment you need onsite during a large scale emergency, such as a natural disaster.

In most buildings, a separate distribution box will feed critical loads. In this case, you may only need enough temporary power for the loads served by that set of circuit breakers.

You can also decide to power specific critical loads served by separate circuit breakers within a distribution box. To do so, take an ammeter reading of the distribution box during the off-hours at your facility with the equipment you don't need shut off and the critical loads on. The ammeter will tell you how much power you need to serve the critical loads since that is all the distribution box is feeding. However, it's important that the non-critical loads are shut off and kept off when rental power is hooked up.

If you want to power individual pieces of equipment that use motors, amperage and voltage information is listed on nameplates. You can list this information and all your power needs on the worksheet in this booklet.

An additional note: Rental power is often used to back up standby generator sets during scheduled and emergency outages. To find out how much temporary power you need for standby service, contact the company that supplied the standby generator, or a qualified rental generator set dealership.



Planning for temporary power may require the need to prioritize critical electrical loads.

#### 2. KNOW WHERE TO RENT GENERATOR SETS AND RELATED EQUIPMENT

Your rental generator sets are only as reliable as the supplier who backs them. In planning for temporary power, find a rental dealership (like Foley Power Solutions) that has the equipment you need, and a staff qualified to solve your problems and service the machines.

Visit the dealership to get to know the people you'll need to rely on during scheduled shutdowns and emergency power outages.

#### **Supplier Selection Criteria could include:**

#### **INVENTORY**

The supplier should have all necessary equipment in stock — generator sets and accessories — or be willing to commit to getting it on demand. Suppliers who do not have the equipment available in the region must have the capability to import it in an emergency.

#### **SERVICE AND SUPPORT**

The supplier should be willing to deliver the power generator sets and, in some cases, additional equipment including power cable, transformers and more. In addition, suppliers should train local techs and sales reps in the equipment operation or, if necessary, provide staff for operation, service and maintenance.

#### **LOCATION**

At a minimum, the supplier should be strategically located to serve major population centers. The ideal supplier will have multiple locations from which to deliver equipment and dispatch support staff.

#### **EXPERIENCE**

Longevity in business can be a good indicator of a supplier's reliability. Suppliers should be willing to discuss their track record in delivering and installing equipment under tight deadlines, as well as their experience in emergencies. Reputable suppliers will always provide references.

#### Here are basic questions to ask:

☐ What is the kilowatt (kW) range of your generator set rental fleet?	☐ What technical service/support do you offer?		
☐ Can you deliver immediately? If not, how long will it take?	☐ How do I know my rental units are reliable?		
☐ What if I need a generator set in the middle of the night, or during	☐ What happens if a generator set I rent goes down?		
a holiday?	☐ Do you have cables and other equipment I may need?		
☐ Who supplies the fuel?	☐ Can you train my staff to hook up and operate the equipment?		
☐ Have you ever rented generator sets to customers in my industry?	How long will it take?		
☐ What equipment/manpower do I need to provide?	☐ Can I obtain pre-approved credit so I can avoid delay during an emergency outage?		
	☐ Can you supply an operator?		

#### 3. ANSWER THE BASICS, SAVE TIME AND MONEY

#### Think about the following before the power goes off at your facility:

- How will the generator sets get from the dealership to the facility? Most dealerships like Foley Power Solutions deliver, but if you pick up the equipment yourself, you need to determine what size truck you will need. Most generator sets are towed on semi-trailers and pull trailers. Others are skid-mounted and require lifting equipment for loading and unloading.
- Where will you put the generator sets? The largest generator sets measure 8 feet wide by 40 feet long (2.5 meters wide by 12 meters long). If tight quarters are a consideration, two or more smaller units will perform just as efficiently.
- When it comes to accessory requirements, cable must be provided to connect the generator sets to the building's electrical system. Transformers, load banks, bus bars, distribution panels, feeder plants, fuses, outlets, load centers and other accessories may also be necessary.
- How will you get cable from the generator sets outside your building to electrical distribution boxes inside?
   Consider installing a weatherhead, or a cable access door in an outside wall of your facility that can be closed when not in use. Then, you won't need to route cable through windows and doors that should remain shut during offhours or inclement weather.
- Can you store enough fuel close to the area where you plan to keep the generator sets? During extended generator set runs, an auxiliary tank of fuel with capacity for at least 24 hours of run-time will reduce service calls from your fuel supplier.
- Do you have people on staff who can hook up the generator sets and check to ensure they will operate properly? If not, make sure your dealership or an electrical contractor can do the hookup, or have the dealership walk your staff through the procedure.

Foley Power Solutions has people on staff to help you plan out your fuel capacity, cabling needs and on-site support.

#### **FOR YOUR REFERENCE**

#### **USEFUL ELECTRICAL FORMULAS**

To check ampacity of cable types, see local regulations for proper cable sizing, which differ by region.

TO OBTAIN	SINGLE PHASE*	THREE PHASE*		
Kilowatts	V x 1 x pf	1.732 x V x 1 x pf		
Kilowatts	1000	1000		
kVA	V x 1	1.732 x V x 1		
KVA	1000	1000		
Horsepower required when generator kW unknown	kW	kW		
(if generator efficiency is known, use 0.93)	0.746 x Efficiency (Generator)	0.746 x Efficiency (Generator)		
kW input when motor hp known	hp x 0.746	hp x 0.746		
(if motor efficiency unknown, use 0.85 x hp)	Efficiency (Motor)	Efficiency (Motor)		
Amperes when motor hp known	hp x 0.746	hp x 0.746		
Amperes when motor up known	V x pf x Efficiency	1.732 x V x pf x Efficiency		
Amperes when kW known	kW x 1000	kW x 1000		
Amperes when kw known	V x pf	1.732 x V x pf		
Amperes when kVA known	kVA x 1000	kVA x 1000		
Amperes when kva known	V	1.732 x V		

<sup>\*</sup>Alternating Current

### **POWER OUTAGE WORKSHEET**

### **kVA/kW AMPERAGE CHART**

80% Power Factor

kVA	kW	208V	220V	240V	380V	400V	440V	450V	480V	600V	2400V	3300V	4160V
6.3	5.	17.5	16.5	15.2	9.6	9.1	8.3	8.1	7.6	6.1			
9.4	7.5	26.1	24.7	22.6	14.3	13.6	12.3	12.	11.3	9.1			
12.5	10.	34.7	33.	30.1	19.2	18.2	16.6	16.2	15.1	12.			
18.7	15.	52.	49.5	45.	28.8	27.3	24.9	24.4	22.5	18.			
25.	20.	69.5	66.	60.2	38.4	36.4	33.2	32.4	30.1	24.	6.	4.4	3.5
31.3	25.	87.	82.5	75.5	48.	45.5	41.5	40.5	37.8	30.	7.5	5.5	4.4
37.5	30.	104.	99.	90.3	57.6	54.6	49.8	48.7	45.2	36.	9.1	6.6	5.2
50.	40.	139.	132.	120.	77.	73.	66.5	65.	60.	48.	12.1	8.8	7.
62.5	50.	173.	165.	152.	96.	91.	83.	81.	76.	61.	15.1	10.9	8.7
75.	60.	208.	198.	181.	115.	109.	99.6	97.5	91.	72.	18.1	13.1	10.5
93.8	75.	261.	247.	226.	143.	136.	123.	120.	113.	90.	22.6	16.4	13.
100.	80.	278.	264.	240.	154.	146.	133.	130.	120.	96.	24.1	17.6	13.9
125.	100.	347.	330.	301.	192.	182.	166.	162.	150.	120.	30.	21.8	17.5
156.	125.	433.	413.	375.	240.	228.	208.	204.	188.	150.	38.	27.3	22.
187.	150.	520.	495.	450.	288.	273.	249.	244.	225.	180.	45.	33.	26.
219.	175.	608.	577.	527.	335.	318.	289.	283.	264.	211.	53.	38.	31.
250.	200.	694.	660.	601.	384.	364.	332.	324.	301.	241.	60.	44.	35.
312.	250.	866.	825.	751.	480.	455.	415.	405.	376.	300.	75.	55.	43.
375.	300.	1040.	990.	903.	576.	546.	498.	487.	451.	361.	90.	66.	52.
438	350.	1220.	1155.	1053.	672.	637.	581.	568.	527.	422.	105.	77.	61.
500.	400.	1390.	1320.	1203.	770.	730.	665.	650.	602.	481.	120.	88.	69.
625.	500.	1735.	1650.	1504.	960.	910.	830.	810.	752.	602.	150.	109.	87.
750.	600.	2080.	1980.	1803.	1150.	1090.	996.	975.	902.	721.	180.	131.	104.
875.	700.	2430.	2310.	2104.	1344.	1274.	1162.	1136.	1052.	842.	210.	153.	121.
1000.	800.	2780.	2640.	2405.	1540.	1460.	1330.	1300.	1203.	962.	241.	176.	139.
1125.	900.	3120.	2970.	2709.	1730.	1640.	1495.	1460.	1354.	1082.	271.	197.	156.
1250.	1000.	3470.	3300.	3009.	1920.	1820.	1620.	1620.	1504.	1202.	301.	218.	174.
1563.	1250.	4350.	4130.	3765.	2400.	2280.	2080.	2040.	1885.	1503.	376.	273.	218.
1875.	1500.	5205.	4950.	4520.	2880.	2730.	2490.	2440.	2260.	1805.	452.	327.	261.
2188.	1750.			5280.	3350.	3180.	2890.	2830.	2640.	2106.	528.	380.	304.
2500.	2000.			6020.	3840.	3640.	3320.	3240	3015.	2405.	602.	436.	348.
2812.	2250.			6780.	4320.	4095.	3735.	3645.	3400.	2710.	678.	491.	392.
3130.	2500.			7520.	4800.	4560.	4160.	4080.	3765.	3005.	752.	546.	435.
3750.	3000.			9040.	5760.	5460.	4980.	4880.	4525.	3610.	904.	654.	522.
4375.	3500.			10550.	6700.	6360.	5780.	5660.	5285.	4220.	1055.	760.	610.
5000.	4000.			12040.	7680.	7280.	6640.	6480.	6035.	4810.	1204.	872.	695.

# KEY GENERATOR SET FEATURES TO SPECIFY:

Foley Power Solutions has many kinds of rental power generator sets and features to choose from. Here are a few you should consider:

- Sound-attenuation: You'll need quiet generator sets, called sound-attenuated units, if your facility is close to homes or other businesses.
- Auto start/stop connections: This is a critical feature
  if you are using the rental generator sets to back
  up permanent standby units. Auto start/stop will
  automatically start a rental generator if a standby
  unit goes down.
- Distribution panel labeling: This helps inexperienced operators safely identify output voltages.
- Radiator, exhaust discharge: Some generator sets feature vertical radiator and exhaust systems to direct heat and exhaust gases up and away from people and buildings. These features are important in populated or high traffic areas.
- Electronic governors: Specify these if you have critical loads that cannot tolerate fluctuations in electrical frequency. Examples include computers, motor-driven equipment and other machines backed up by Uninterruptible Power Supply (UPS) systems.
- Output bus bars: Bus bars should be spaced to allow for multiple output cable hookup.
   This lets you run several pieces of equipment off one rental generator set.

- Fuel capacity: Check the fuel capacity and consumption rate to determine how many tanks of fuel will get you through your rental period.
   Generator sets should operate at least eight hours without refueling.
- Fuel priming pump: This ensures easier starts after transport.
- Charging alternator: This ensures batteries are charging when units are operating. Note: An outside power source is required for standby generator sets if the unit is equipped with battery chargers and/or space heaters and jacket water heaters.
- Sight gauges: Properly positioned sight gauges for fuel and other critical fluids speed up spot-checking, letting your staff spend more time on other matters.
- Security: Generator sets should be virtually tamperproof. Look for lockable doors, oil/water drains mounted inside enclosure and hidden exterior fuel drains. All connections, such as output bus bars, should be covered.





# PLANNING IN CONTEXT

Arranging for equipment is only the first step in emergency power planning. The true test of a plan is how well it functions in practice. A power outage alone can create major logistical challenges as public agencies and businesses rush to provide temporary power.

For example, an outage affecting a large area can require the shipment of hundreds or even thousands of rental generator sets within days. The challenges multiply after a natural disaster, as delivery of power must coordinate with the distribution of many necessities such as medical supplies, food, clothing, household goods and building materials.

An effective plan assigns priorities to all major goods and services and their delivery. In a world that increasingly depends on electricity, a strong argument can be made for giving top priority to rental power. The sooner power is installed, the more efficiently all other materials and services can be delivered. Emergency planners must ensure that power for all purposes — public and private — arrives where it is needed as quickly as possible.

Not all barriers are physical. For international shipments, slowdowns in customs can significantly delay delivery of power. Planners should consider proposing special legislation to allow generator sets to be imported in emergencies. Provisions allowing temporary, duty-free imports of equipment can greatly expedite delivery. Contracts established with freight companies during the planning phase may increase the availability of ships or air transport when a disaster occurs.

Finances are another stumbling block to be avoided. As part of planning, emergency management agencies should agree on payment terms with rental power suppliers. This may include issuing a letter of credit from a financial institution or budgeting the necessary funds.

## **EMERGENCY POWER PLANNER:**

#### **Your PRACTICAL GUIDE to restoring electric power and protecting your business during utility outages.**

When the power goes down, you want it back—fast. Preparation for power failure is a must, and a contingency plan is an essential tool. With a solid contingency plan in place, you'll know what to do and whom to call to restore your power as soon as possible, to keep your business functioning and your revenue stream flowing.

This Emergency Power Planner will guide you and your team through the basic steps of building a contingency plan. The checklist format will help you cover the key elements quickly and easily. To fill in the details, consult with an established supplier of rental power generating equipment, supplies and service.

Sooner or later power outages affect everyone. Don't wait for the inevitable to happen. The time to plan is now. And your local Cat® Rental Power dealer is ready to assist you.

#### **Foley Power Solutions**

5701 E. 87th Street Kansas City, MO 64132 816.753.5300 www.foleyeq.com



Step	facility and equipment, or for critica	l loads o	nly. You	ır em	outage, you can provide power for your ergency standby generator powers only e which loads are critical and which are	life-safety
	Production machinery		kW		Pumps	kW
	Computers and servers		kW		Other	kW
	Process controls		kW			kW
	Plant and office lighting		kW			kW
	Heating, ventilating, air conditioning		kW			
	Compressed air systems		kW		TOTAL _	kW

Step 2: PLAN FOR THE LOGISTICS OF DELIVERY AND OF deliver and park the generator set, so that it is ear fueling. Planning considerations must include:	<b>PERATION</b> . Your equipment supplier must be able to asily accessible for connecting, operating, servicing and
<ul> <li>Environmentally sound location away from drains, work areas and residences</li> </ul>	<ul><li>☐ Identification of connection points</li><li>☐ Designated access route for delivery</li></ul>
☐ Location with adequate surrounding open space	$\square$ Opening for cable access to the building
☐ Location away from traffic, trees and obstructions	Planned route for cable inside the building
☐ Level, paved area for parking	☐ Security fencing

Olop t	SELECT APPROPRIATE GENERATOR SET FEATURE specific requirements, including:	<b>S.</b> Choose from a variety of features to suit your site's					
	specific requirements, including.						
	Sound attenuation. Ask for ratings below 92 db(A) at full load. Ratings as low as 70-72 db(A) are available.						
	Auto start-stop capability. Automatically starts a re	, •					
	Vertical radiator and exhaust discharge. Directs di Important in populated or high-traffic areas.	scharges up and away from buildings and people.					
	Electronic governor. Necessary for critical loads t motor-driven equipment, machines backed by UPS	nat cannot tolerate frequency fluctuation (computers, ).					
	Charging alternator. Ensures that batteries are cha	rging when the unit is operating.					
	Sight gauges. Simplify monitoring of fuel and critic	al fluid levels.					
	Security features. Lockable doors, interior-mounte prevent tampering.	d oil/water drains, and hidden exterior fuel drains help					
	Distribution panel labeling. Helps inexperienced op	erators safely identify output voltages.					
	Output bus bars. Spacing of bus bars for multiple of several loads.	utput cable hookups allows one generator set to run					
	Fuel priming pump. Facilitates startups after transp	ort.					
	EPA and local emissions certifications. Ensures co	mpliance with emissions regulations.					
Step 4	of accessory equipment. Consider whether you ne	<b>D ACCESSORIES</b> . Your installation may require a variety ed any of the items listed below. If so, determine the					
Step 4							
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Step 4	of accessory equipment. Consider whether you ne required quantities.  Cable Switchgear Controls	ed any of the items listed below. If so, determine the  ☐ Fuses ☐ Outlets ☐ Spider boxes ☐ Use any of the items listed below. If so, determine the					
Step 4	of accessory equipment. Consider whether you ne required quantities.  Cable Switchgear Controls Circuit breakers  ———————————————————————————————————	ed any of the items listed below. If so, determine the    Fuses					
Step 4	of accessory equipment. Consider whether you ne required quantities.  Cable Switchgear Controls Circuit breakers Transformers  ———————————————————————————————————	ed any of the items listed below. If so, determine the    Fuses					
Step 4	of accessory equipment. Consider whether you ne required quantities.  Cable Switchgear Controls Circuit breakers Transformers Quad boxes  Consider whether you need to be accessed as a consider whether you need to be a considered as	ed any of the items listed below. If so, determine the    Fuses					

	OSE YOUR RENTAL GENERATOR SET SUPPLIER. ership that offers the following qualifications and		
	Well maintained and pre-tested equipment.		Staff qualified to deliver turnkey service and
	requirements.  Modern, emissions-compliant equipment designed for rental use.  Complete ancillary equipment in stock.  Ability to deliver to meet your time constraints.  Quick, efficient delivery and pickup.		technical support.  Experience in your industry.  Capability to train your staff.
			Flexible financial options that include weekly and monthly rental contracts; Rental Purchase Options.  Pre-approved credit arrangements.  24-hour response including weekends and
	Spare parts inventory in stock.		holidays.
for funece	VIDE FOR FUELING. A reliable fuel supply is essent service in advance, ideally through your rental essary. Considerations include:  Tank capacity. Determine the fuel consumption rate operate for at least eight hours between refuel Auxiliary fuel. Having an auxiliary fuel tank enable Delivery access. Make sure you can provide a cledelivery vehicles.  Spill containment. Regulations typically require concedit approval. Prior credit approval from the fue operations on track.	l equinte oings es lo ear a	f the generator set. The unit should be able  nger runs between refuelings.  nd easily navigable access route for fuel  inment equal to the tank capacity.
mus supp	IDUCT A DRY RUN. Practice makes perfect. If yo t practice its execution beforehand. Stage a drill polier run through the plan step by step, just as if a Make sure that each person fully understands his outage.  Estimate how long it takes from the time the power line.  Verify the voltage from the transformer breakdow breakdown is essential to the safety of people are provider to fit the generator with the right size co	in win em s or h er fa ound	nich your team and, ideally, your equipment ergency were really happening.  There role in the event of an actual power els until your emergency power supply is on the owing the voltage from the transformer the generator and will allow the service

	Step 8: DESIGNATE EMERGENCY PERSONNEL. Make a list of the key emergency contacts who will be in charge during outages. Make this list accessible to your team members and keep it up-to-date. Be sure to include a primary contact and alternate for each of the following job functions:								
	<ul><li>☐ In-house operations and maintenance</li><li>☐ IT, security, data recovery</li></ul>		ty representative oment representative et hookup	☐ Generator set operation☐ Electrical engineer or contractor☐ Fuel supplier					
NAME 8	& FUNCTION	E-MAIL	OFFICE PHONE	MOBILE PHONE	HOME PHONE				

**A FINAL WORD.** We are a supplier of complete generation systems for emergency power. Our engineers and field technicians are experienced in applications of every size, in every sector. We are prepared to answer your questions about electric power contingency planning and to be your business partner in the next power emergency. For more information, contact us.

Foley Power Solutions 5701 E. 87th Street Kansas City, MO 64132 816.753.5300 www.foleyeq.com



# 15 Convenient Locations to Serve You

#### **KANSAS**

Chanute

501 W. 35th Pkwy. · Chanute, KS 66720 · (620) 431-3600

Colby

205 E. Horton Ave. · Colby, KS 67701 · (785) 462-3913

Concordia

1805 Lincoln St. · Concordia, KS 66901 · (785) 243-1960

Dodge City

1600 E. Wyatt Earp Blvd. · Dodge City, KS 67801 · (620) 225-4121

**Great Bend** 

701 E. Tenth St. · Great Bend, KS 67530 · (620) 792-5246

Liberal

1701 E. 5th St. · Liberal, KS 67901 · (620) 626-6555

Manhattan

5104 Skyway Dr. · Manhattan, KS 66503 · (785) 537-2101

Olathe

15854 S. 169 Hwy · Olathe, KS 66062 · (913) 393-0303

**Park City** 

1601 East 77th St. North Park City, KS 67147 (316) 943-4211

Salina

2225 N. Ohio St. · Salina, KS 67401 · (785) 825-4661

**Topeka** 

1737 SW 42nd St. · Topeka, KS 66609 · (785) 266-5770

Wichita

1550 S. West St. · Wichita, KS 67213 · (316) 943-4211

#### **MISSOURI**

**Kansas City** 

5701 E. 87th Street · Kansas City, MO 64132 · (816) 753-5300

Sedalia

1040 Sedalia Road · Sedalia, MO 65301 · (660) 829-7400

St. Joseph

3619 Pear Street · St. Joseph, MO 64503 · (816) 233-2516





FoleyPowerSolutions.com

