

# **CONTINGENCY PLANNING FOR DISRUPTED ELECTRIC POWER:**

*The Case for Partnering with a Strong Rental Power Supplier*



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Wisdom is like electricity. There is no permanently wise man, but men capable of wisdom, who, being put into certain company, or other favorable conditions, become wise for a short time, as glasses rubbed acquire electric power for a while.

- **Ralph Waldo Emerson**

## **Introduction**

In today's global economy, every second of business time is crucial and can represent millions of dollars in revenue. A company's ability to recover from, or adjust easily to, planned or unexpected electric power disruption can be a vital element of its financial success and competitiveness. Power disruption comes in all forms and durations, and is not always predictable or preventable. Power generation suppliers are in business to alleviate operation downtime losses by minimizing a company's risk of being stuck without power.

By planning ahead for potential power failure, and developing a contingency plan that includes a rental power option, a company can reduce future headaches from power disruption. An effective contingency plan requires simply understanding a business facility's needs, and knowing both how to react quickly and who to call when the power goes out. Rental power is designed to keep a business functioning and on schedule when local power sources are unavailable or inadequate.

"Whether it's a scheduled shutdown or an emergency outage, facility managers and plant engineers can save time and money by planning ahead to secure portable rental generator sets to meet their temporary electric power needs." [Smith 1] Stand-by generators can continuously monitor a business's power consumption, and are able to automatically start up if power is interrupted and shut off when primary utility service is returned. This continuous power helps a company maintain operation, avoid revenue loss, and ultimately, protect the bottom line; providing the advantage of reliability when competitors go down.



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This paper will address three key issues:

1. The value of understanding a company's power needs before a power disruption
2. The key benefits of tapping into the expertise of rental power suppliers
3. The necessary requirements to expect with a rental power company

## **Before Power Disruption: How to Plan Ahead**

Only when faced with a power loss, does the extent to which a company's dependence on electric power, become apparent. Every company is vulnerable to an accident that can interrupt business. Without power, operations are paralyzed, business stops, and a company can be left incurring huge losses in revenue and production time.

Power disruption can result from: natural causes, such as weather; technological failures involving equipment or wiring malfunctions; and human error.

These issues create a myriad of problems for a company, including:

- Loss of critical data
- Dropped sales or service calls
- Damage to manufacturing equipment
- Loss of product or a batch of materials
- Environmental safety risks
- Legal liabilities resulting from service lapses

A company unprepared for power failure is exposed to potentially crippling losses that could have been easily avoided by planning ahead. With a crisis plan in place, a company establishes a quick response strategy to call upon in a power emergency. "While some amount of downtime is unavoidable, manufacturers can take a pro-active approach by assessing their company's down-time needs by priority and learning strategies to help decrease the risk of downtime to levels that are more acceptable."<sup>1</sup>

[Rockery and Myer]

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<sup>1</sup>"Downtime can create serious problems. One automotive plant recently experienced a \$700,000 loss in just 72 minutes due to lost time and required rework." "Acceptable Downtime" by Pat Rockery and Jack Myer, [www.genesis-systems.com/downloads/acceptabledowntime.pdf](http://www.genesis-systems.com/downloads/acceptabledowntime.pdf)



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## **Time Is Everything in an Emergency**

When a company is unprepared for power disruption, valuable time is wasted determining the problem and finding a solution. The following examples are common reasons that will delay a company's quick response to a loss in power.

- No knowledge of how a system responds to power disruption.
- No knowledge of a system's load requirements or what size generator or type of ancillary equipment is needed to fix the problem.
- Contact information for vendors and suppliers is not readily available.
- No established credit with power suppliers, fuel vendors, or trucking companies - or credit is established with only one supplier, vendor, or trucking company and what you need is not available. That is, you *have put all your eggs in one basket*.
- Rental suppliers and/or fuel vendors who do not provide delivery during the night or on the holidays.
- No knowledge of how to properly place the generator set and ancillary equipment, so that it meets health, government, and environmental codes.
- No knowledge of how to install or operate power generation equipment.

The above examples are all questions that a company not only must, but also can, ask before they are faced with power disruption.

Money and time will be saved by planning ahead and knowing who to turn to when power is disrupted. Even if a company has invested in a standby power system, a continuity plan should also include rental power in case of unexpected outage/failure.

## **Determining Your Power Needs**

Properly determining your business facility's power needs is essential to setting up a fast response and cost-effective system that will ensure that you find the right rental supplier. Planning for your temporary power needs involves understanding the following issues:



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## Defining Your Facility Power Needs

### *Sizing and Equipment:*

*What needs power?* First, it is important to know how much power is needed. To do this, it is important to determine the maximum amount of time that can be allowed for downtime: “Quantify this by calculating the impact from the loss of production per second, minute, hour or day.”[Smith 1-2] Key to this assessment is determining where the entire facility needs power or just certain critical loads. [Smith 2]

*What size rental generator is needed to power the load?* Most rental generator sets fit just about any application and can function all the time – supplementing utility power during normal operation, or before it has been permanently established and providing backup during outages caused by utility grid failure or natural disasters. An amperage chart, like the one included on page 9, will help determine the appropriately sized generator unit to meet any amperage needs and utility configuration.

*What other equipment and services are needed and is the unit adequately equipped with plug-ins for running accessory equipment?* A generator may require certain ancillary equipment and features to meet a facility’s needs effectively, such as cables, transformers, ramps, distribution panels, spider boxes, etc. Generator sets are also available that can simultaneously handle a combination of 120-volt and 240-volt for accessory equipment plug-ins. In order to determine the right ancillary equipment and services, it is important to understand the mechanical and logistical requirements of setting up rental power at the facility.



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## Basic Rental Needs

### *Mechanical Requirements:*

*Is the generator portable?* For maximum mobility, most rental generators are skid-mounted on fuel tank bases or trailer/van-mounted depending on their size – commonly ranging from 10kW to 2MW. [See the Amperage Chart on page 9.]

*Where should the generator be placed?* Units are placed outside and cannot be situated too close to building air intakes, loading docks, or areas with poor access or ventilation. Attention must also be paid to how a fuel truck will access the unit for refueling.

*Is a sound-attenuated generator needed?* It is also important to be aware of the neighboring businesses and/or residences, and whether there's a need a generator sound-attenuated for low noise operations. If so, a rental generator should have a sound-attenuation rating below 92db(A) at full load or better.

*How will cable be routed?* Attention must be paid to where and how power cables will be connecting the generator to the electrical distribution boxes (or equipment) to avoid security, fire safety, or environmental problems. Cable ramps allow multiple cables to be safely and compactly routed around a work site. Spider boxes serve as a base for multiple plug-ins.

*Will an auto-start/stop connection be needed?* This is a critical feature if the rental generator will be backing up a permanent standby unit. This feature will automatically start and stop the rental generator if your standby unit goes down. [Smith 2]



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### ***Logistical Requirements:***

*What does the rental supplier have available and how quickly can it be supplied?* A good power rental supplier will offer a full range of power generators that come with everything necessary to make the unit run efficiently. “The supply of necessary accessories and engineering support is an important facet of the rental sector.” [Hull 1]

*Will the rental supplier deliver the generator and related equipment?* If yes, the company should find out if the supplier offers deliveries around the clock or on holidays. If a company wishes to handle its own freight, then its truck must be able to handle the weight load of the equipment and be able to safely offload.

*Who will be responsible for setting up and maintaining the equipment? What technical service/support does the unit require during operation?* Hooking up and maintaining the generator is a critical responsibility that must be handled by a qualified technician. Certain services (e.g. oil) must be performed with frequency depending on the rate of operation and length of time the unit is needed. Maintenance highlights an important reason why even if a company has invested in a standby generator it is important to have a rental backup plan. Standby generators stand idle for most of the time and require thorough maintenance upkeep (checking batteries, fuel levels, leaks, etc.). If a company doesn’t perform regular maintenance on their standby unit, it is not guaranteed to cover their facility in an outage.<sup>2</sup>

*Will there be enough fuel; if not, who will handle fueling?* It is important to be aware of how much fuel the rental generator can hold, so that the necessary fuel schedule can be established. “Check the fuel capacity and consumption rate to determine how many tanks of fuel you will need through your rental period. Generator sets should run for at least eight hours without the need to refuel.” [Smith 4] If the unit is expected to run for an extended period of time, an auxiliary fuel tank will help decrease fuel service costs, and provide extra support during additional emergencies.

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<sup>2</sup> Preventative maintenance on company-owned standby units can be outsourced, and is the topic of my upcoming paper on Power Protection Planning.



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### ***Logistical Requirements Continued:***

*What security is required?* The rental generator unit should be designed with lockable doors, oil and water drains located inside the unit, and hidden exterior fuel drains to maintain security. The supplier should offer remote monitoring capabilities that will provide 24-hour basic monitoring and control of the unit.

*What happens if the rental generator goes down?* Utilizing rental power grants the freedom of not worrying about a budget for maintenance upkeep or the day-to-day cost of owning a generator set. However, it is important to highlight that a rental generator is only as reliable as the supplier who backs it. Power rental suppliers should provide quality rental-grade generators. “Quality is the keyword. It is quality that will give you days or weeks of trouble-free operation.” [Hull 4] Some rental suppliers offer contingency-power rental agreements, which allot that adequate rental power will be delivered to your site within a certain window of time depending on conditions made.

### **What to Look for in a Power Rental Supplier**

Knowing the facility’s power requirements will help in finding the right power rental company that can supply the best equipment to meet the needs. It is also crucial that the power rental company has reliable, qualified staff that will assist with all questions and concerns.

Here are features to look for when researching power rental suppliers:

**Network** - The more extensive a rental power supplier’s network and parts distribution, the more it can be relied on to provide a complete power solution. An extensive inventory allows power needs to be met exactly as they arise, whether temporary or emergency. A large fleet means availability; multiple branches mean power support for various locations – should a company have multiple facilities. A reliable supplier is affiliated with a manufacturer, industrial company, financial institution, and other resources.



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**State-of-the-Art Equipment** – A rental supplier should provide modern equipment built exclusively for rental (e.g. sound attenuated and packaged as both trailer- and skid-mounted units for maximum mobility) and designed to deliver low operation cost, serviceability, reliability, and minimized installation time. The benefits: there is no need to worry about the cost and time associated with the upkeep of owned equipment or keeping up with advancements in equipment technology, or changes in environmental regulations.

**Flexibility** – Power solutions that can be customized with a wide range of attachments, components, and performance options to fit specific needs and applications are best. A good power rental supplier will offer equipment and capabilities, like: Uninterrupted Power Supply (UPS), distribution switchgear, redundant generator sets, resistive and reactive load banks, and fuel tanks.

**Industry Expertise** – A good supplier should have a reputation for durability, reliability and economy, and be able to supply references to support their claim. Most importantly, the best supplier will be a consistent performer in the industry of interest – e.g. healthcare, manufacturing, pharmaceutical, commercial, construction, mining, residential, and telecommunication – and have knowledgeable service technicians trained to service every aspect of electric power generation (setup, connection, maintenance, refueling, etc.)

**Established Partnership with Key Suppliers of Ancillary Equipment** - Connections with reliable suppliers of distribution equipment, clean diesel fuel, etc., to ensure the quality of power solutions is critical.

**Turnkey Service 24 hours a day, 7 days a week** - Around the clock expert consultation for all needs, questions, and concerns is also important.

**Freight** – The rental power supplier should also offer quick, efficient delivery and pick up of generators and ancillary equipment.

**Test** – By regularly taking time to check systems functionality, safety features, batteries, warning lights, etc., it is less likely that a company will experience failure.



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**Logistics** – It makes sense to map out the area where the emergency generator unit and equipment should be placed. Contact phone numbers (including after hour contacts) and a list of all equipment, cable, transformers, etc., should be located in a visible spot -- to know immediately who to call and what is required.

## **Conclusion**

By tapping into the experience and expertise of power generation rental suppliers, a business is granted the flexibility of options. These suppliers know the ins and outs of generation equipment and logistics and are committed to helping a business stay online.

Outsourcing rental power helps to minimize the financial loss and downtime of power failure. By standing free from the utility power grid, portable generators in a sense prevent disruption by being able to provide continuous power when the utility grid fails, allowing a company to remain functional. This ability is not “in the fact that it lasts forever but that it is always available.” [Hull 3] Any business will benefit by establishing a support network to rely upon -- that is a “contingency-plan scenario, whereby a business is preparing for the unscheduled need before its occurs. Planning like this is an insurance policy to prevent any major economic impacts to the business should power fail.” [Hull 2] When it comes to your company, planning ahead can mean the difference between failure and success. [Smith 4]

Whether facing an emergency, or planning for downtime a year in advance, rental power ensures quick response and uninterrupted power. Planning ahead is simple; dealing with the disastrous effects of power disruption is not.



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## kVA / kW Amperage Chart – 80% Power Factor

### Amperage Chart

kV-A/kW Amperage Chart --- 80% Power Factor

kV-A	kW	208V	220V	240V	380V	400V	440V	450V	480V	600V	2400V	3300V	4160V
8.3	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	8.9	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
600	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	1660	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	-	-	10560	6700	6360	5780	5660	5285	4220	1055	760	610
5000	4000	-	-	12040	7680	7280	6640	6480	6035	4810	1204	872	695



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**RENTAL POWER CHECKLIST:**

**Equipment Needs:**

Critical load requirement (voltage/amperage):

Priority loads:

Designated loads to be isolated from main breaker:

Size of generator unit(s):

Power cable(s), # and lengths:

Fuel capacity need at full load:

Fuel consumption rate at full load:

Ancillary equipment needed (auto-start/stop connect, ramps, transformers, panels, etc.):

Additional service needed (installation, start up, operation, maintenance checks, etc.):



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### **Equipment Considerations:**

Does the unit meet local requirements for engine emissions?

Do I need a sound-attenuated generator?

Do I need a portable unit?

Does the generator support dual-voltage?

Does the unit have adequate fuel capacity for the intended use?

If the unit is trailer-mounted, what are the overall dimensions? Weight?

### **Logistics:**

Physical location to place generator(s): [Attaching schematic drawings and electrical diagrams is useful.]

In-house operation/Maintenance staff contacts:

Turnkey Service contact:

Power Rental Supplier contacts:

Fuel Vendor contacts:

Trucking service contacts:

Delivery time estimated from initial call:

Does the power rental supplier offer a contingency rental agreement? If yes, do we have one and what does it ensure?

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