

Classification Upon Completion: \_\_\_\_\_

# Resilient Power Assessment Worksheet

March 2024

Site Name: \_\_\_\_\_

Site Owner: \_\_\_\_\_

Point of Contact: \_\_\_\_\_

Date Completed: \_\_\_\_\_

This worksheet is intended to help critical infrastructure owners and operators (excluding electrical and natural gas utility companies) collect the necessary data to better analyze their facility's or site's resilient power per their risk management plan. It covers long and short-term power outages and helps meet the goals in [CISA's 2023-2025 Strategic Plan](#) to reduce risk and improve resilience and collaboration. The development of the worksheet was supported by the [Resilient Power Working Group | CISA](#) with member expertise across several critical infrastructure sectors.

In the below, RBPB is the acronym for the [Resilient Power Best Practices for Critical Sites and Facilities](#) document, which is used for the basis of this worksheet. The National Fire Protection Association (NFPA) 110 standard is also an excellent reference. Note that this is an assessment worksheet for use by critical infrastructure owners and operators and will not be collected by CISA (unless agreed upon by the recipient).

There are five (5) tables below: (1) *Risk Management Requirements*, (2) *Equipment*, (3) *System Load, Fuel Storage, and Fuel Supply*, (4) *Operations and Maintenance (O&M)*, and (5) *Security*. The Risk Management Requirements in Table 1 below should be available in your facility's or site's risk management plan. These risk management factors should then drive your operational requirements.

**Table 1. Risk Management Requirements**

Category	Parameter	Value/Comment
<b>Risk Management Requirements</b>  (Ref. RBPB Sections 2.1 and 2.2)	Long-term backup power timeframe per your risk management plan? (See RBPB Section 1.4 for suggested timeframes.)	_____ days
	After a primary power supply failure, what is the acceptable outage time until the backup power system restores power to the loads?	<input type="checkbox"/> No Downtime <input type="checkbox"/> 10 Seconds <input type="checkbox"/> 60 Seconds <input type="checkbox"/> Other, specify: _____
	Required short-term emergency backup runtime (e.g., to evacuate building)?	_____ hours
	Do you follow either a standard or best practices/guidelines to help determine your backup power requirements?	<input type="checkbox"/> Yes, specify: _____ _____ <input type="checkbox"/> No

*Table 2. Equipment* below covers your facility's/site's generation system, its battery energy storage system and the load that will need power. Most of the generator information should be on the generator with the remaining parameters in the purchase order or user manual. If there are more than two generators, replicate the Generator 2 Category below.

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**Table 2. Equipment**

Category	Parameter	Value/Comment
<b>Generator 1</b>  (Ref. RPBP Sections 5.1 and 5.2)	Manufacturer?	
	Model Number?	
	Serial Number?	
	Type of Fuel/Energy Used?	<input type="checkbox"/> Diesel <input type="checkbox"/> Natural Gas <input type="checkbox"/> Other, specify: _____
	Rated output power?	_____ kW/MW
	Maximum output power?	_____ kW/MW
	Minimum output power to prevent wetstacking?	_____ kW/MW <input type="checkbox"/> Not Applicable
	What is the annual operational run-time rating of the generator? (See RPBP Table 11 or ISO 8528.)	<input type="checkbox"/> Emergency Standby Power (200 hours) <input type="checkbox"/> Limited Running Power (500 hours) <input type="checkbox"/> Prime Running Power <input type="checkbox"/> Continuous Operating Power <input type="checkbox"/> Not Applicable (e.g., renewable)
	Maximum continuous operation time before offline maintenance (e.g., change oil) is required during continuity operations?	_____ hours/days
	Year manufactured?	
<b>Generator 2 (Duplicate for additional generators 3 – N)</b>  (Ref. RPBP Sections 5.1 and 5.2)	Is there a second generator?	<input type="checkbox"/> Yes <input type="checkbox"/> No <b>If "Yes", complete below for Generator 2.</b>
	Manufacturer?	
	Model Number?	
	Serial Number?	
	Type of Fuel/Energy Used?	<input type="checkbox"/> Diesel <input type="checkbox"/> Natural Gas <input type="checkbox"/> Other, specify: _____
	Rated output power?	_____ kW/MW
	Peak output power?	_____ kW/MW
	Minimum output power to prevent wetstacking?	_____ kW/MW <input type="checkbox"/> Not Applicable
	If renewable, minimum daily energy production?	_____ kWh

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Category	Parameter	Value/Comment
	What is the annual operational run-time rating of the generator? (See RPBP Table 11 or ISO 8528.)	<input type="checkbox"/> Emergency Standby Power (200 hours) <input type="checkbox"/> Limited Running Power (500 hours) <input type="checkbox"/> Prime Running Power <input type="checkbox"/> Continuous Operating Power <input type="checkbox"/> Not Applicable (e.g., renewable)
	Maximum continuous operation time before offline maintenance is required (e.g., change oil) during continuity operations?	_____ hours/days
	Year manufactured?	
<b>Power Transfer System</b>  (Ref. RPBP Section 6.1)	Does the backup power system automatically start when grid power is lost (typically starting with a battery storage system then a generator)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	If there is more than one independent generator, can backup power automatically be switched between the two generators without losing power to the load (perhaps with support from the battery system)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Applicable (N/A) (only one generator exists)
	Do essential generator systems share circuit breakers with other non-essential systems and are they properly labeled?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Energy Storage System (ESS)</b>  (Ref. RPBP Chapter 7)	ESS maximum output?	_____ kW
	ESS storage capacity?	_____ kWh
	Do you have a facility-wide ESS backup system?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Table 3. System Load, Fuel Storage, and Fuel Supply first focuses on diesel fuel storage, usage, maintenance, and delivery. The table then covers onsite backup fuels to natural gas (e.g., propane).

**Table 3. System Load, Fuel Storage, and Fuel Supply**

Category	Parameter	Value/Comment
<b>System Load</b>  (Ref. RPBP Sections 2.4 and 6.2)	When was the last time a facility audit or continuity exercise was conducted to ensure all critical systems are connected to the backup generator system?	<input type="checkbox"/> < 1 year ago <input type="checkbox"/> 1-5 years ago <input type="checkbox"/> > 5 years ago, specify: _____
	When was the last time you estimated or measured the facility load during expected peak demand periods (e.g., extreme heat or cold with peak occupancy levels)? This should include both short-term and long-term outages via either a bottoms-up analysis or during a continuity exercise or test cycle.	<input type="checkbox"/> < 1 year ago <input type="checkbox"/> 1-5 years ago <input type="checkbox"/> > 5 years ago, specify: _____

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Category	Parameter	Value/Comment
	Expected average backup power system load during a long-term outage covered in your risk management plan?	_____ kW
	Expected maximum load over a very short period of time (milliseconds up to several seconds) during an outage?	_____ kW
	Expected maximum load (including air conditioning and heating) over a period of minutes up to hours during an outage?	_____ kW
<b>Diesel Fuel Storage and Usage</b>  (Ref. RPB Section 5.3)	On-site fuel storage capacity?	_____ gallons
	Minimum amount of fuel on hand (excludes during and immediately after a grid outage)?	_____ gallons
	Fuel capacity needed to maintain power during a long-term outage per your resilient power plan (includes implementation of load segmentation plan)?	_____ gallons
<b>Diesel Fuel Delivery Contract</b>  (Ref. RPB Section 5.4)	Is there a fuel supply contract in place?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Who is your fuel supplier?	Primary: _____ Secondary: _____
	Have you had a conversation with your fuel supplier to understand their plans and your fuel delivery priority relative to other customers?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	What is the timeframe in the primary fuel-supplier contract for fuel delivery once requested? (If applicable)	_____ hours/days
	Are there any preventable single points of failure with the primary fuel supplier (e.g., can the fuel be delivered even if local supplies are depleted)?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, list: _____ _____
<b>Natural Gas / Propane</b>  (Ref. RPB Sections 5.1, 5.3, and 5.4)	Is there a natural/propane gas generator with fuel stored onsite for backup power purposes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <b>Complete below only if "Yes."</b>
	What type of fuel(s) can be used for backup power purposes if the natural gas supply is offline or cannot be used?	<input type="checkbox"/> Propane <input type="checkbox"/> Other, specify: _____
	How much stored fuel is expected to be used per day during a long-term outage?	_____ gallons (liquid) _____ BTUs (gas)
	What is the fuel capacity needed to maintain power during a long-term outage per the facility's/site's required resilience?	_____ gallons (liquid) _____ BTUs (gas)
	Is there a fuel supply contract in place?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	How long does it take for the backup fuel to be delivered after a material amount is used?	

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Table 4 below covers the Operations and Maintenance (O&M) Plan as well as its execution. It includes generator testing, fuel testing and maintenance, and requests information about the proper personnel being available to help ensure that power is maintained during a power outage.

**Table 4. Operations and Maintenance (O&M)**

Category	Parameter	Value/Comment
<b>O&amp;M Plan and Maintenance</b> (Ref. RBPB Section 2.4)	Does an O&M Plan exist and address backup power and threats?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial
	Does your facility/site implement a Continuity of Operations Plan (COOP) (see Glossary) and does it include the backup power system?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial
	Is your facility equipped to perform the periodic maintenance necessary (see Glossary) to operate when the grid is not operational per your risk management plan?	<input type="checkbox"/> Onsite <input type="checkbox"/> Contracted
<b>Off-Grid Exercise</b>	When was the last “pull the plug” off-grid generator exercise conducted?	<input type="checkbox"/> Less than 2 years ago <input type="checkbox"/> 2-4 years ago <input type="checkbox"/> 4-7 years ago <input type="checkbox"/> More than 7 years ago or N/A
<b>Generator Testing</b> (Ref. RBPB Section 5.3)	How often is the generation system tested or run under a resistive load unit?	<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Annually <input type="checkbox"/> Other, specify: _____ <input type="checkbox"/> N/A (tests are under facility load)
	How often is the generation system tested or run under the facility load (could be combined with a resistive load)?	<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Annually <input type="checkbox"/> Other; specify: _____
	Is generator testing conducted per National Fire Protection Association 110 (NFPA 110)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Are all the generators, the backup battery systems, and the power transfer system(s) tested during the above tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No If no, specify differences: _____ _____
<b>Diesel Fuel Testing and Maintenance</b> (Ref. RBPB Section 5.3)	How often is fuel testing performed (unless at least 2/3rds of the fuel has been used and replaced within the past six months)?	<input type="checkbox"/> Semi-Annually <input type="checkbox"/> Annually <input type="checkbox"/> Other, specify: _____
	How often is fuel maintenance performed?	<input type="checkbox"/> Annually <input type="checkbox"/> Dependent upon test results <input type="checkbox"/> Other, specify: _____
	What fuel maintenance procedures are followed?	<input type="checkbox"/> RBPB <input type="checkbox"/> NFPA 110 <input type="checkbox"/> Other, specify: _____

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Category	Parameter	Value/Comment
<b>O&amp;M Personnel</b> (Ref. RPBP Section 2.4)	Who conducts the backup generation system maintenance? (Check all that apply.)	<input type="checkbox"/> On-site employee(s) <input type="checkbox"/> On-site contractor(s) <input type="checkbox"/> Off-site contractor(s) <input type="checkbox"/> Other, specify: _____
	Is there an onsite or available <b>backup</b> for each key personnel to perform the necessary maintenance during an outage?	<input type="checkbox"/> Yes <input type="checkbox"/> No

**Table 5. Security**

Category	Parameter	Value/Comment
<b>Telecommunications</b> (Ref. RPBP Section 2.5)	Does your facility/site implement telecommunications best practices?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Cybersecurity</b> (Ref. RPBP Section 3.1)	Does your cybersecurity plan cover the backup power control system?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Physical Security</b> (Ref. RPBP Section 3.2)	Does your physical security plan cover your backup power generation system and fuel?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Electromagnetic Security (EM)</b> (Ref. RPBP Section 4)	Is EM pulse (EMP) and EM interference (EMI) security, including mitigation strategies (e.g., EMP/EMI surge protection), incorporated into your power system?	<input type="checkbox"/> Yes <input type="checkbox"/> No

## Next Steps

The next step is for you to analyze your *Resilient Power Assessment Worksheet* results to ensure that they meet your resilient power requirements. If your facility/site does not have adequate capacity and resilience-related power requirements, the [Resilient Power Best Practices for Critical Facilities and Sites](#) can help you define backup and emergency power requirements based upon your organization’s risk management plan.

The gap between your worksheet results and your resilient power requirements can then be used to drive improvements to your resilient power system. The *Resilient Power Best Practices* document can also help you develop the best and most cost-effective solutions to implement these improvements.

## Glossary

**Average** – In the above material, the average is found by adding all data points and dividing by the number of data points.

**Continuity of Operations Plan (COOP)** – The COOP applies to the functions, operations, and resources necessary to ensure the continuation of the facility’s/site’s Essential Functions. See the *Continuity Guidance Circular* | [FEMA.gov](#) for more details.

**Continuous Operating Power** – Unlimited number of operating hours per year.

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**Energy Storage System (ESS)** – A system used to store electrical energy to be used at a later time. The most common storage system is a battery ESS (BESS).

**Key Personnel** – Employees or contractors that have essential responsibilities to ensure the operation of the backup power system (e.g., order more fuel, change the generator oil).

**Maintenance** – For generators, maintenance should include oil and filter changes, battery system checks, and other tasks as discussed under NFPA 110. Storing sufficient stocks of the most essential and most commonly deployed spare parts (filters, lubricants, fuses, hose clamps, etc.) is recommended.

**Minimum Output Power** – The minimum average load on a generator over a period of time specified by the manufacturer (typically several hours).

**Peak Output Power** – This is the maximum power that can be provided by the generator for a very short period of time that can cover equipment startup power demands.

**Prime Running Power Generator** – This unit is intended to be run for a long period of time and may be run even when the public grid is operable (i.e., as a primary source of power) but its average power output over 24 hours should not exceed 70% of rated output power.

**Standby Generator** – Supplies power for a limited duration during a power outage. There is no overload capability built into the units and they are only allowed to be run when backup power is needed.

**Rated Output Power** – The power that a generator can continuously provide.