Continuous Power Without Continuous Diesel Operation

A grid outage can leave a site dependent on temporary or backup power for days, months, or indefinitely. Communications, water systems, monitoring equipment, temporary facilities, and other essential operations may still require electricity 24 hours a day.

Load	**5.7 kW, 24 hours a day**
Sun	**5.2 peak-sun hours a day, annual average**
System	**123-SG-7S82-40, solar and battery platform with a standalone 40 kW diesel**
Engine runtime	**24 h a day on the generator alone, 5.8 h a day as one system**
Basis	**A representative application, calculated for these conditions**

A diesel generator can carry the load, but a generator-only solution may require the engine to run continuously—24 hours a day and 8,760 hours a year.

Some sites cannot accept that much engine operation. Fuel deliveries may be difficult, service visits may be expensive, or noise and exhaust may make continuous generator use impractical.

123eSolar provides another approach: combine solar generation, battery storage, intelligent controls, and diesel backup into one coordinated off-grid power system.

Keep the Power. Reduce the Engine Hours.

A properly configured 123eSolar system uses solar and stored energy to carry the load for much of the day. The diesel generator operates when necessary to replace the energy the solar array cannot provide.

The generator remains available for continuity, but its engine does not need to run around the clock.

Consider a steady 5.7 kW load operating 24 hours a day at a site receiving an annual average of 5.2 peak-sun hours per day.

For those conditions, the **123-SG-7S82-40** is calculated to reduce diesel-engine runtime from 24 hours a day to 5.8 hours a day.

That represents:

- A 76% reduction in diesel-engine runtime
- Approximately 6,645 fewer engine hours per year
- About 18 hours each day without a running engine

These results apply to the stated load, available sunlight, and system configuration. Every site must be evaluated using its own operating requirements.

One System, Three Energy Sources

The **123-SG-7S82-40** pairs a mobile solar-and-battery platform with a standalone 40 kW diesel generator.

The solar platform includes 16 panels, 7.36 kW of solar capacity, 30.4 kWh of battery storage, and 12 kW of continuous inverter output.

Each part has a defined role.

Solar produces energy when sunlight is available. The battery stores and delivers energy between solar production and generator operation. Intelligent controls coordinate the available sources. The diesel generator supplies the remaining requirement when solar and stored energy are insufficient.

The objective is not to eliminate diesel from an application that requires dependable backup. It is to prevent the diesel engine from operating unnecessarily.

Fewer Operating Demands at the Site

In this representative application, annual diesel-engine operation falls from 8,760 hours to approximately 2,115 hours.

Fewer engine hours slow the accumulation toward inspections, oil changes, and other hour-based service intervals. Exact maintenance savings depend on the selected generator, its service schedule, and local service costs. The reduction in operating hours, however, is direct and measurable.

Under the same modeled conditions, the combined system uses approximately 3,300 fewer gallons of diesel per year than the 40 kW generator operating alone.

It also requires about 25 fewer refueling trips per year. The calculated interval between refueling increases from approximately 7.9 days to 17.1 days.

Fewer fuel deliveries and service visits reduce the effort required to keep essential equipment operating, particularly at remote or difficult-to-access locations.

Built for Field Service

The diesel generator is mounted on its own trailer, separate from the solar-and-battery platform. It can be serviced or exchanged without disturbing the solar side of the system.

This modular arrangement keeps the generator available for the work it does best while allowing the solar and storage equipment to remain an independent, serviceable unit.

Configure Power for Your Site

A grid outage is only one reason dependable utility power may be unavailable. Delayed utility connections, temporary infrastructure, remote operations, and emergency response can create the same requirement: maintain a continuous load without operating a diesel engine continuously.

Every result depends on the load, operating schedule, location, available sunlight, and continuity requirement.

Start with what must remain powered. Use the 123eSolar sizing tool to model your site, then request an engineering sheet for a solar, storage, and backup configuration designed around your requirements.

123eSOLAR · INTEGRATED MOBILE POWER

123-SG-7S82-40

Solar Generator, modular pairing

123esolar.com/123-SG-7S82-40

12 kW as two units: sixteen panels backed by a standalone 40 kW diesel.



Two units, one system: sixteen panels opened wide beside the standalone 40 kW diesel.

OVERVIEW

A new cell site is often ready to go on air before utility power reaches it, and until it does, a temporary diesel generator runs it around the clock. 123-SG-7S82-40 puts that site on air as two units working as one system: a sixteen-panel solar and battery trailer that carries the site, and a standalone 40 kW diesel generator that steps in only when the sun and the battery cannot.

The solar trailer is rated for 12 kW continuous, with surges to 24 kW for motor and compressor starts. Its 7.36 kW array brings in 31.6 kWh on an average day to a 30.4 kWh lithium iron phosphate bank. Below 1.32 kW the site runs on sun and battery alone, indefinitely, with the engine off.

Above that, the 40 kW generator does two jobs at once: it carries the load and recharges the bank at the inverter's full charge rate, then shuts down. At a steady 6 kW that is about 6.2 engine hours a day and 15.91 days between refuels of its 140-gallon tank, against 7.92 days for the same generator carrying the load alone — 8.36 gallons a day instead of 16.8. At 4 kW the tank lasts 27.62 days and at 2 kW 107.9, while the generator alone still refuels every 7.92. Both engines are read by the same fuel rule: their own published figures, held at the lowest one below it. At a remote site every refuel is a truck, a driver and a day on the road, so the days between refuels are what make this the cost-effective way to keep the site on air.

Because the generator travels on its own trailer, either unit can be serviced or replaced without taking the other offline, and the solar trailer can work alone where an engine is not allowed. Output is 120/240 V or 120/208 V at 50/60 Hz, with a 5 ms transfer.

Every 123eSolar system is SMART enabled: cloud IoT monitoring and control from your phone or desktop, so the site is watched and managed without a trip to it.

FEATURES AND BENEFITS

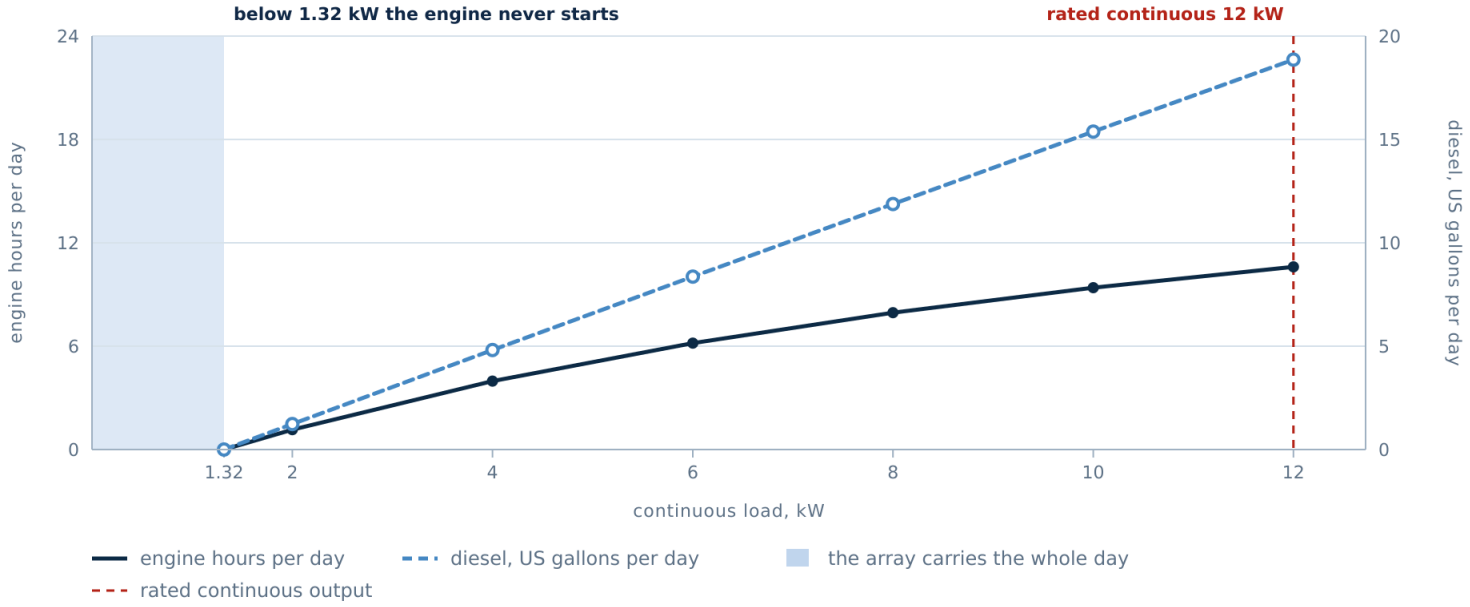
- **Sixteen 460 W panels, 7.36 kW** — Loads around a kilowatt run with the engine off.
- **Standalone 40 kW diesel, 140-gallon tank** — 15.9 days between refuels at 6 kW.
- **30.4 kWh lithium iron phosphate bank** — Quiet nights on sites with neighbours or noise limits.
- **A solar trailer and a generator trailer** — One site, two independent machines, and no single point of downtime for maintenance.
- **SMART cloud IoT monitoring and control** — The site is watched and managed without a trip to it.

KEY SPECIFICATIONS

POWER	
Rated continuous output	**12 kW**
Peak output	**12 kW**
Surge	**24 kW**
Surge, 30 minutes	**13 kW**
Output voltage and phase	**120/240 V or 120/208 V**
Output frequency	**50 / 60 Hz**
Transfer time	**5 ms**
ENERGY STORAGE	
Battery technology	**Lithium iron phosphate (LFP)**
Arrays installed	**8**
Total stored energy	**30.4 kWh**
Usable stored energy at 50%	**15.2 kWh**
Silent runtime at 6 kW	**2.4 hours**
SOLAR	
Array rated power	**7.36 kW**
Solar panels	**16 x 460 W**
Daily solar production	**31.6 kWh/day**
Load covered by solar alone	**1.32 kW**
DIESEL BACKUP	
Generator output	**40 kW**
Fuel capacity	**140 US gallons**
Days between refuels at 6 kW	**15.9 days**
Engine starts and stops at	**30% and 80% state of charge**
Engine runs at 6 kW	**5 a day, 1.2 h each**
MECHANICAL AND SITE	
Ambient operating range	**-4 to 140 °F (-20 to 60 °C)**

PERFORMANCE ACROSS THE LOAD RANGE

What the engine does at each load. Below 1.32 kW the array carries the whole day and the engine never starts. Above it, the engine runs only to put back what the sun did not: at 12 kW, 10.6 hours a day on 18.9 US gallons.



LOAD, CONTINUOUS	BATTERY ONLY	DAILY DRAW	AFTER SOLAR	GENERATOR	ENGINE RUNS	DIESEL	DAYS ON A TANK
1.32 kW · solar break-even	**11.12 h**	**31.6 kWh**	**covered**	**0 h/day**	**none**	**0 gal/day**	**—**
2 kW	7.33 h	48 kWh	16.4 kWh	1.15 h/day	0.9 × 1.2 h	1.2 gal/day	107.9 days
4 kW	3.67 h	96 kWh	64.4 kWh	3.98 h/day	3.2 × 1.2 h	4.8 gal/day	27.6 days
6 kW	2.44 h	144 kWh	112.4 kWh	6.18 h/day	5 × 1.2 h	8.4 gal/day	15.9 days
8 kW	1.83 h	192 kWh	160.4 kWh	7.94 h/day	6.4 × 1.2 h	11.9 gal/day	11.2 days
10 kW	1.47 h	240 kWh	208.4 kWh	9.39 h/day	7.5 × 1.2 h	15.4 gal/day	8.6 days
12 kW	1.22 h	288 kWh	256.4 kWh	10.6 h/day	8.5 × 1.2 h	18.9 gal/day	7.1 days

Every load runs continuously and the day is 24 hours: daily draw is the load × 24 h. Solar is a daily energy offset, not an instantaneous power match. The engine starts at 30% state of charge (a 70% depth of discharge) and stops at 80%, putting 15.2 kWh back into the bank on each run while it carries the load.

AGAINST THE 40 KW GENERATOR RUNNING ALONE

LOAD, CONTINUOUS	40 KW ALONE	DAYS ON A TANK	THIS SYSTEM, ENGINE	THIS SYSTEM, DIESEL	DAYS ON A TANK	ENGINE HOURS SAVED	DIESEL SAVED
2 kW	16.8 gal/day	7.9 days	1.2 h/day	1.2 gal/day	107.9 days	**95%**	**93%**
4 kW	16.8 gal/day	7.9 days	4 h/day	4.8 gal/day	27.6 days	**83%**	**71%**
6 kW	16.8 gal/day	7.9 days	6.2 h/day	8.4 gal/day	15.9 days	**74%**	**50%**
8 kW	16.8 gal/day	7.9 days	7.9 h/day	11.9 gal/day	11.2 days	**67%**	**29%**
10 kW	16.8 gal/day	7.9 days	9.4 h/day	15.4 gal/day	8.6 days	**61%**	**8%**
12 kW	20.2 gal/day	6.6 days	10.6 h/day	18.9 gal/day	7.1 days	**56%**	**7%**

The 40 kW generator telecom sites use for temporary power carries the load alone, 24 h a day with no sun and no battery, on its own 140-gallon tank (133 usable). Both engines are read by the same rule: their own published fuel figures, a straight line between them, and below the lowest published point that point's burn.