123-STG-42S51

Solar Tri-Brid™ Generator

123esolar.com/123-STG-42S51

10 kW Tri-Brid™: sun first, battery second, diesel only when both run short.

Solar, lithium storage and a 10.8 kW diesel on one trailer, stowed for the road.

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-STG-42S51 is the all-in-one Tri-Brid™ for that job: solar, lithium storage and a diesel generator built into one trailer, so a single tow puts a complete power plant on the site with no second unit to coordinate.

It is rated for 10 kW continuous — the inverter sets that limit — with surges to 24 kW for motor starts. The 4.6 kW array produces 19.8 kWh on an average day into a 19 kWh lithium iron phosphate bank, and below 0.82 kW the sun and the battery carry the site on their own.

When the load runs higher, the controller starts the 10.8 kW diesel, runs it at full output — carrying the load and recharging the bank together — and shuts it down again once the bank is charged. At a steady 5 kW that is about 9.7 engine hours a day where the 40 kW generator telecom sites use for temporary power would run all 24, and 10.89 gallons of diesel a day instead of 16.8. The 89-gallon tank lasts 7.76 days between refuels, against 7.92 for the 40 kW alone on its larger tank; at 3.33 kW it lasts 12.76 days. 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. The engine is certified to EPA Tier 4 Final.

Output is 120/240 V or 120/208 V at 50/60 Hz with a 5 ms transfer, rated for operation from -4 to 140 °F (-20 to 60 °C).

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

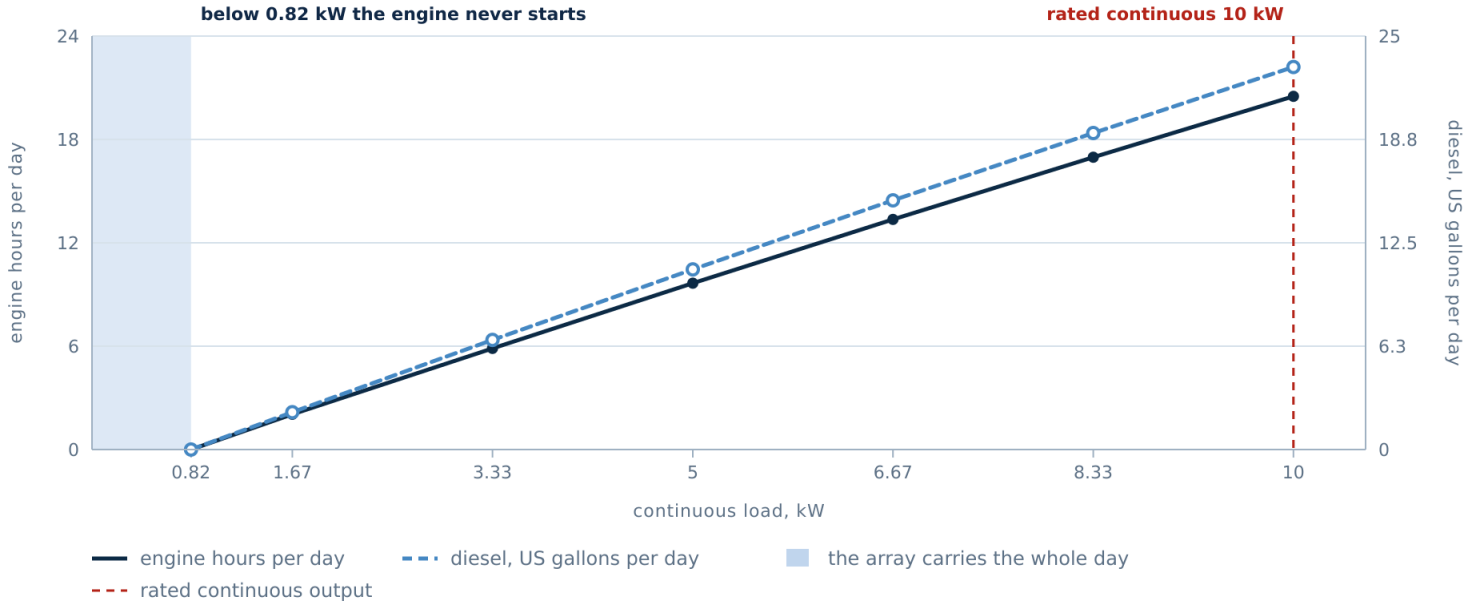
- **Solar, lithium and a 10.8 kW diesel in one trailer** — One machine to transport, place and service.
- **Ten 460 W panels, 4.6 kW** — Light loads run silent and burn no fuel.
- **89-gallon tank, EPA Tier 4 Final engine** — 7.8 days between refuels at 5 kW.
- **24 kW surge** — Start-up spikes are covered without oversizing the engine.
- **SMART cloud IoT monitoring and control** — The site is watched and managed without a trip to it.

KEY SPECIFICATIONS

POWER	
Rated continuous output	**10 kW**
Peak output	**10 kW**
Surge	**24 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	**5**
Total stored energy	**19 kWh**
Usable stored energy at 50%	**9.5 kWh**
Silent runtime at 5 kW	**1.9 hours**
SOLAR	
Array rated power	**4.6 kW**
Solar panels	**10 x 460 W**
Daily solar production	**19.8 kWh/day**
Load covered by solar alone	**0.82 kW**
DIESEL BACKUP	
Generator output	**10.8 kWe**
Fuel capacity	**89 US gallons**
Days between refuels at 5 kW	**7.8 days**
Engine starts and stops at	**30% and 80% state of charge**
Engine runs at 5 kW	**5.5 a day, 1.8 h each**
Emissions	**EPA Tier 4 Final**
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 0.82 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 10 kW, 20.5 hours a day on 23.1 US gallons.



LOAD, CONTINUOUS	BATTERY ONLY	DAILY DRAW	AFTER SOLAR	GENERATOR	ENGINE RUNS	DIESEL	DAYS ON A TANK
0.82 kW · solar break-even	**11.25 h**	**19.8 kWh**	**covered**	**0 h/day**	**none**	**0 gal/day**	**—**
1.67 kW	5.56 h	40 kWh	20.2 kWh	2.04 h/day	1.8 × 1.2 h	2.3 gal/day	37.4 days
3.33 kW	2.78 h	80 kWh	60.2 kWh	5.87 h/day	4.3 × 1.4 h	6.6 gal/day	12.8 days
5 kW	1.85 h	120 kWh	100.2 kWh	9.66 h/day	5.5 × 1.8 h	10.9 gal/day	7.8 days
6.67 kW	1.39 h	160 kWh	140.2 kWh	13.36 h/day	5.4 × 2.5 h	15.1 gal/day	5.6 days
8.33 kW	1.11 h	200 kWh	180.2 kWh	16.97 h/day	4.1 × 4.2 h	19.1 gal/day	4.4 days
10 kW	0.93 h	240 kWh	220.2 kWh	20.5 h/day	1.6 × 12.8 h	23.1 gal/day	3.7 days

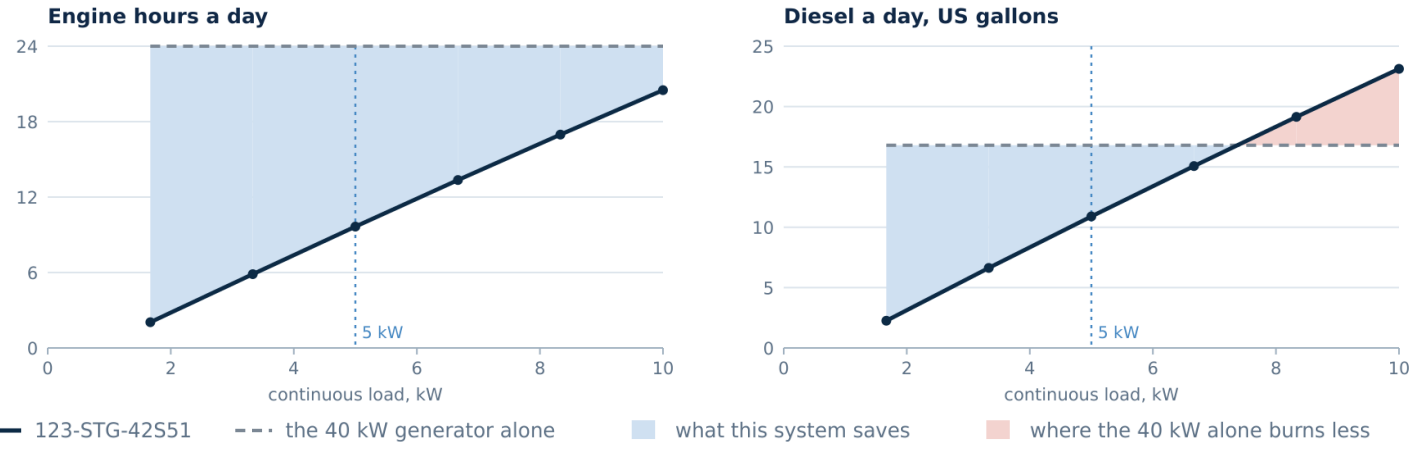
Every load runs continuously and the day is 24 hours: daily draw is the load × 24 h. Solar is a daily energy offset, not an instantaneous power match. The engine starts at 30% state of charge (a 70% depth of discharge) and stops at 80%, putting 9.5 kWh back into the bank on each run while it carries the load.

CASE STUDY: AGAINST THE 40 KW GENERATOR RUNNING ALONE

At 5 kW around the clock, the 40 kW generator telecom sites use for temporary power would carry the site alone at 13% of its rating, 24 hours a day. 123-STG-42S51 runs its engine **9.7 hours a day — 60% fewer engine hours** — and burns **35% less diesel**: 10.9 US gallons a day against 16.8 US gallons, and 7.8 days between refuels against 7.9 days.

The 40 kW generator alone
Engine 24 h a day at 13% of its rating · 16.8 gal a day

123-STG-42S51
Engine 9.7 h a day, the sun and the battery the rest · 10.9 gal a day



LOAD, CONTINUOUS	40 KW ALONE	DAYS ON A TANK	THIS SYSTEM, ENGINE	THIS SYSTEM, DIESEL	DAYS ON A TANK	ENGINE HOURS SAVED	DIESEL SAVED
1.67 kW	16.8 gal/day	7.9 days	2 h/day	2.3 gal/day	37.4 days	**91%**	**87%**
3.33 kW	16.8 gal/day	7.9 days	5.9 h/day	6.6 gal/day	12.8 days	**76%**	**61%**
5 kW	**16.8 gal/day**	**7.9 days**	**9.7 h/day**	**10.9 gal/day**	**7.8 days**	**60%**	**35%**
6.67 kW	16.8 gal/day	7.9 days	13.4 h/day	15.1 gal/day	5.6 days	**44%**	**10%**
8.33 kW	16.8 gal/day	7.9 days	17 h/day	19.1 gal/day	4.4 days	**29%**	14% more
10 kW	16.8 gal/day	7.9 days	20.5 h/day	23.1 gal/day	3.7 days	**15%**	38% more

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.