



GREEN
POWER

HYBRID POWER GENERATORS FOR CONSTRUCTION, INFRASTRUCTURE AND PLANT HIRE



www.fireflysolar.net

POWERING INDUSTRY

Around half of all the UK's carbon emissions are accounted for by the construction and related industries. Under UK government targets, both a 50% reduction in emissions and a 33% reduction in costs to deliver projects need to be achieved by 2025.

Hybrid Power Generators can do both.



Firefly

Since 2007, Firefly has been the expert in design and manufacture of Hybrid Power Generators. Firefly has provided renewable power across the world for a variety of sectors. Our proven specialist expertise has delivered cost and emissions savings across the construction and related industries.

Firefly offer:

Solutions:

- ▶ Hybrid Power Generators
- ▶ Hybrid Power Tower Lights
- ▶ Biodiesel Generators
- ▶ Stand-Alone Solar Power
- ▶ Portable Hybrid Battery Packs

Services:

- ▶ Specification Support
- ▶ Dry Hire Services
- ▶ Equipment training
- ▶ Renewable Power Consultancy
- ▶ Real time remote monitoring

Remote Communications Software



Track, control and manage assets anywhere in the world with ease from your mobile device. Real time reporting of your fuel and emissions savings is available using Firefly's Remote Communications Software.

The Challenges of powering sites

- ▶ Grid connection time
- ▶ Noise from generators
- ▶ Fumes from generators
- ▶ Increasing fuel costs
- ▶ Carbon emission reduction targets
- ▶ Transformers and extension leads causing trip hazards
- ▶ Limited access to power points for large groups of trades on-site

The Plant Hire, Construction and Infrastructure industries have a unique opportunity to contribute to carbon emission reduction and integrate Hybrid Power technology. By integrating renewable energy sources into a site infrastructure, Firefly's Hybrid Power Generators can reduce diesel fuel dependency, cut noise and air pollution as well as greenhouse gas emissions.

Traditional Usage of Diesel Generators for sites

Inefficient generator use is common on construction sites in the UK. Traditionally the same generator that supplies high daytime loads is also left running to provide lower overnight loads. Generators run less efficiently at very low loads, as engines are unable to produce the same number of kWh of energy per litre of fuel when delivering power outputs of less than 25% of their generating capacity. This burns litres of fuel unnecessarily. Generators consume a baseline of fuel, even if they are delivering no power. Running at very low loads can cause damage and reduce the life of the generator.

With an ever increasingly volatile energy market, continuous fuel cost rises and conscious efforts to lower damaging diesel emissions into the environment, Firefly renewable and efficient power systems provide the ideal solution.

Power Type	Carbon Emissions	NOx Emissions
Diesel	▶ 2.67Kg per litre	▶ 2.0 g / kWh
Mains Electricity	▶ 0.54Kg kWh	
Wind and Solar	▶ Zero Rated	

HYBRID POWER GENERATORS

Cygnus Hybrid Power Generator (HPG) 6kVA - 24kVA

Hybrid Power Generators for Diesel Fuel Management / UPS and/or Stand-Alone Power

The HPG provides stand-alone power for variable load requirements and also has the benefit of connecting to any conventional diesel generator to manage variable load requirements (which reduces diesel fuel consumption). The HPG also acts as a back-up source of power in the eventuality of a diesel generator breakdown.

Similar to hybrid car technology, our HPG has an intelligent computer management system, which manages variable loads. The HPG automatically manages lower loads and in the event that a higher load is needed, it switches from sourcing power from its own internal battery storage, to providing power from the diesel generator. Likewise, the computer management system of the HPG can also detect when a lower load is needed and switches off the diesel generator. Hence for a project, site managers can be far less dependent on diesel fuel, significantly reducing diesel fuel costs, noise, fumes and maintenance. An HPG provides power with zero carbon emissions when running on internal batteries, which significantly reduces the overall carbon footprint of a project.

Unlike a diesel generator, our HPG is the most efficient system for managing and supplying variable load power requirements, both day and night. A diesel generator runs regardless of the power drawn from it, whereas our Hybrid Power Generator provides power on demand without needing to run (burn fuel) in case power is required.

Additionally our HPG units are capable of using a range of renewable technologies, such as Solar, Wind, Battery and Biodiesel* either in combination with a diesel generator or as the stand alone power source. The HPG is capable of adapting to a huge range of energy demands, either through combining renewable and traditional fuel sources or by powering operations end to end - totally carbon neutral.

** Firefly use Waste Vegetable Oil (WVO) as virgin biodiesel has many damaging impacts. Biodiesel is non-toxic and considered zero carbon, as the carbon emitted when burnt has been pre-absorbed by the growth of the plant*



Benefits of Hybrid Power Generators

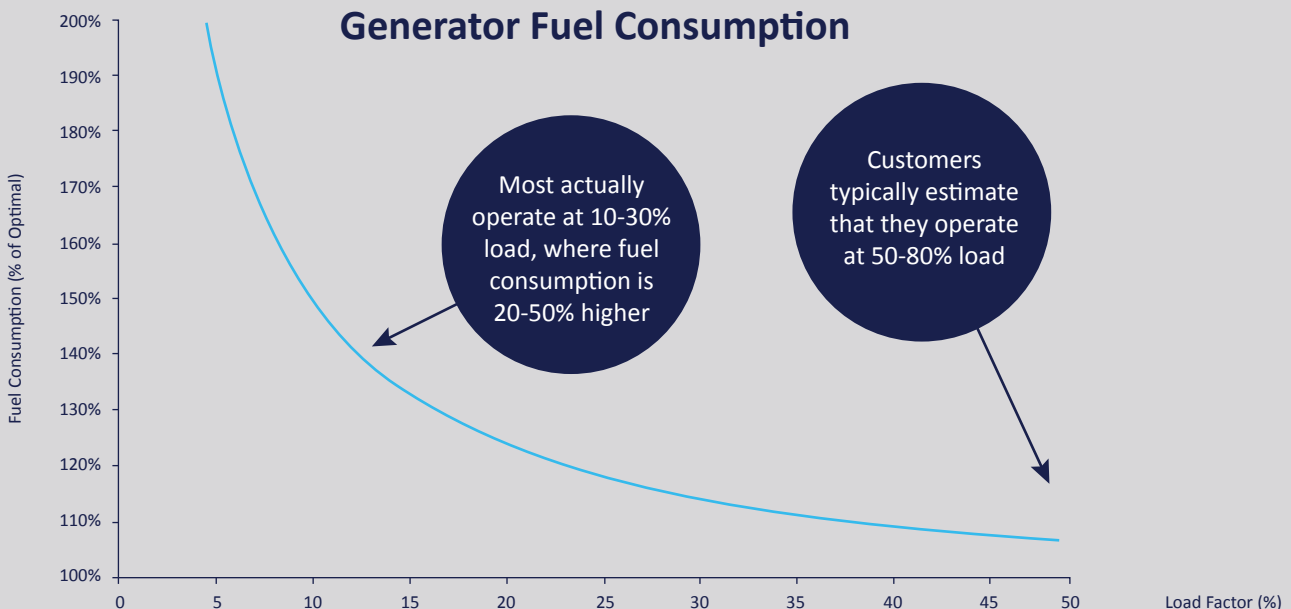
Stand-Alone Power

- ▶ Zero carbon emissions
- ▶ Zero noise – Truly silent - 0dB
- ▶ Zero fuel required

In conjunction with a diesel generator

- ▶ Reduces diesel fuel consumption by up to 50%
- ▶ Reduces diesel carbon emissions by up to 50%
- ▶ Reduces maintenance time & costs of diesel generator by up to 50%

How are fuel savings achieved?



HYBRID POWER SOLUTIONS

Stand-Alone Solar Power

Stand-alone solar power consists of photovoltaic cells mounted on panels (Solar Fold-Arrays™) connected to a HPG. Sunlight is converted into electricity and energy produced is stored within the batteries of the generator. The inverter within the HPG is used to step up the voltage, so that the generator can supply standard mains voltage equipment. When equipment is used, energy is drawn from the battery storage and these batteries are then simultaneously recharged by the solar panels during the day.

Benefits

- ▶ Zero carbon emissions
- ▶ Zero fuel required
- ▶ Extremely efficient
- ▶ Visible demonstration of your commitment to low carbon energy
- ▶ Zero noise – Truly silent - 0dB
- ▶ Connects to all Firefly renewable power systems



Case Study: Building Contractor - Peterborough

The Challenge

Firefly supported a team of building contractors in this ambitious project to rebuild a children's play centre in Ravensthorpe, Peterborough, which was closed as part of Peterborough City Council cuts.

The challenge was to run the lights with solar power rather than diesel generators on the construction site. This was a sizeable achievement considering the team of tradesmen and contractors were tasked with creating a building worth £1 million in only 10 days. With little time and a large site, they needed round the clock power and plenty of lights.

Solution

Two Pictor Tower Lights and a Pyxis Power Pack with Battery Extender Modules, combined with portable Solar Fold-Arrays™ from Firefly.

Benefits

The project saved 600 kg of CO₂ over the duration of the 10 day build that would have normally been produced, if they had used traditional diesel generators.

- ▶ Saved £2,000 in total generator savings
- ▶ Saved 600 kg of CO₂
- ▶ Silent source of power and light, both day and night



Portable Hybrid Battery Packs



NO FUEL. NO NOISE. NO FUMES. NO FUSS!

The Pyxis Power Pack™ available in 110V and 230V models, provides portable battery power. The ideal alternative to a diesel or petrol generator. No fuel, fumes or noise, it is ideal for confined spaces.

British manufactured by the experts in power storage technology, the high build quality of the Pyxis Power Pack™ provides a solution for portable power up to 750W.

The Pyxis Power Pack™ is the ideal cost-effective alternative to running a noisy generator, with no expensive refuelling. Unlike a generator, it is safe to use in confined spaces. IP44 rated, it is also suitable for outdoor use.

With Pure Sine Wave technology, the Pyxis Power Pack™ can provide power for low-power sensitive IT equipment such as laptops, mobile phones, tablets and televisions.

Presented in a robust and durable case with easy lift handles, the Pyxis Power Pack™ has a flexible output which can be scaled up with additional optional Battery Extender Modules, all of which are housed in stackable cases.

Benefits

- ▶ Completely portable by hand
- ▶ Ideal for confined spaces
- ▶ Zero noise – Truly silent - 0dB
- ▶ Reduces cable trip hazards
- ▶ Zero carbon emissions
- ▶ Battery Extender Modules for extra capacity

[View the Pyxis Power Pack™ Video:](#)



Total generator savings based on fuel costs, servicing costs and hire cost

CONSTRUCTION

Our innovative Hybrid Power Generators are the solution for significantly reducing diesel fuel costs and carbon emissions for contractors.

The reliable performance and engineering excellence of the Firefly hybrid fleet, provides savings in excess of 40,000 litres of diesel a year. The Cygnus HPG is the ideal complimentary asset to existing diesel generator fleets for both Plant Hirers and Contractors.



Case Study: Infrastructure Contractor - Ware, Hertfordshire

Site requirements

- ▶ 24 hour CCTV equipment
- ▶ Security welfare (including lighting and heating)

The Challenge

The challenge was to reduce the fuel consumption of the site whilst ensuring that more than enough power was still available round the clock for all their needs. This included cabins for security and welfare, which required lighting and heating, as well as CCTV for the site.

Normally the site would be powered by a 60kVA diesel generator, 24 hours a day.

The site was located in a residential area. It was essential to eliminate overnight noise and minimise disruption to the local community.

Solution

A silent running 24kVA/48kWH Cygnus HPG (Hybrid Power Generator) was installed on site, to work in conjunction with the existing diesel generator.

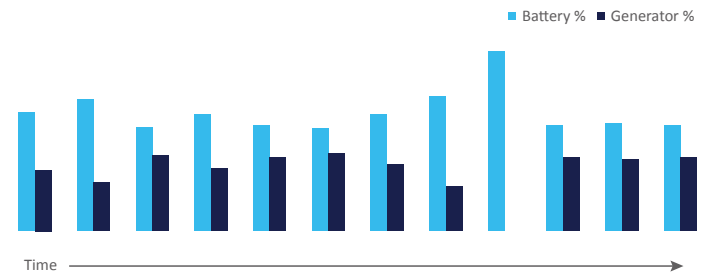
Benefits

In one month alone, the Cygnus HPG achieved a 65% reduction in fuel consumption for the client, whilst local residents benefited from a safe, secure site that was silent overnight.

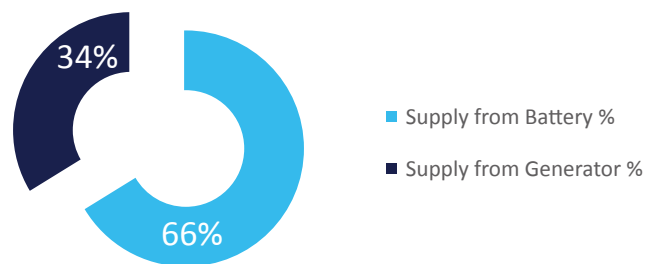
- ▶ Saved 2,375 litres of diesel over the month¹
- ▶ Saved £2,137 in diesel fuel (£0.90p per litre)¹
- ▶ Saved 6.24 tonnes of CO₂ emissions¹
- ▶ Provided silent power without disruption

In addition to the above savings, the diesel generator benefitted from a reduction in runtime to 34%. This will improve the lifespan of the diesel generator and reduce maintenance and service costs.

One month battery vs generator use (daily)



One month battery vs generator use (average)



Savings



¹ Based on 3/4 load in working hours and 1/4 load in overnight and weekend hours



INFRASTRUCTURE



Refurbishment and upgrade work often results in restrictions of where and how work can be undertaken. Rail projects often involve working overnight and at the weekend, within the vicinity of residential areas.

Running a diesel generator during these times can be disruptive. Other projects, such as those in rural areas, may require operating away from mains grid. Providing power on site 24hrs a day is a significant cost, therefore reducing diesel generator runtimes can deliver a dramatic reduction in operation costs.

Case Study: Electrical Rail Contractor - Coulsdon, South London

Site requirements

- ▶ 24 hour CCTV equipment
- ▶ Security welfare (including lighting and heating)

The Challenge

The challenge was to provide Southern Rail and Network Rail with power for their waiting room facilities whilst they were operating rail replacement services. The objective was to reduce their fuel consumption while still providing reliable 24 hour power supply. Usually this would have been obtained from one diesel generator and one backup generator.

The site was located in a residential area. Reducing noise and exhaust fumes was essential for local residents and commuters.

Solution

A silent running 24kVA/48kWH Cygnus HPG (Hybrid Power Generator) unit was installed on site, alongside a 20kVA diesel generator.



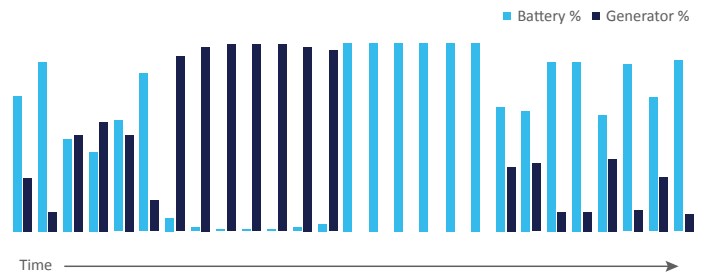
Benefits

In one month, the Cygnus HPG achieved a 50% reduction in fuel consumption for the client.

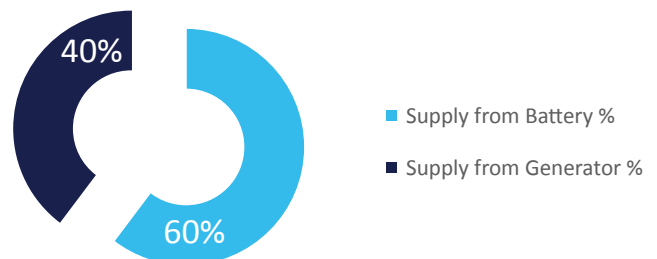
- ▶ Saved 648 litres of diesel over the month¹
- ▶ Saved £583 in diesel fuel (£0.90p per litre)¹
- ▶ Saved 1.5 tonnes of CO₂ emissions¹
- ▶ Provided silent power without disruption

In addition the diesel generator benefitted from a reduction in runtime to 40%. This will improve the lifespan of the diesel generator and reduce maintenance and servicing costs.

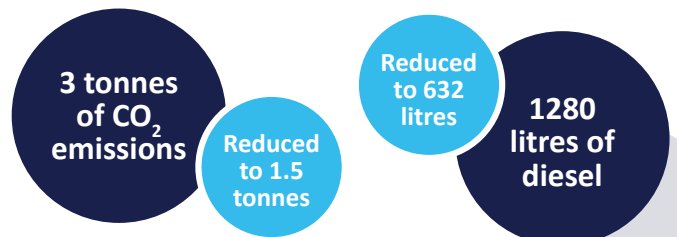
One month battery vs generator use (daily)



One month battery vs generator use (average)



Savings



¹ Based on 3/4 load in working hours and 1/4 load in overnight and weekend hours

PLANT HIRE



The ideal addition for plant hirers to complement your existing diesel generator hire fleet offering

Generate cash savings, cut carbon emissions on construction sites and achieve a rapid return on your sustainable Hybrid Power Generator hire investment. Reduce your customers costs and support their goals to reduce CO2 emissions.

Use of diesel generators for over-night power is highly inefficient, intrusive to residents, produces a high output of carbon emissions and a costly 24hr operation. The Cygnus™ Hybrid Power Generator works with all standard 20kVA-100kVA diesel generator fleets with no modifications required.

Sector use:

- ▶ Construction
- ▶ Network Rail
- ▶ Utilities
- ▶ Roads & Highways
- ▶ Events
- ▶ Broadcast

Construction Application Example:

The Cygnus™ HPG is ideal for over-night low level power requirements:

- ▶ Drying rooms
- ▶ Welfare & security cabins
- ▶ Perimeter or aviation lighting
- ▶ Suitable for sensitive IT equipment
- ▶ CCTV monitoring
- ▶ Power tool and radio recharging

This complimentary revenue stream in addition to the existing hire of a diesel generator, generates a return on investment within just 23 weeks. Hire and lease options are also available.

**PROVEN SUSTAINABLE POWER
YOUR CUSTOMERS CAN RELY ON**

Hire example

Hiring the Cygnus™ 24kVA HPG additionally with a 100kVA diesel generator can:

- ▶ Reduce fuel consumption by up to 50%
- ▶ Reduce maintenance time and costs by up to 50%
- ▶ Reduce CO² output by up to 50%
- ▶ Save 40,000+ litres¹ in diesel fuel per year
- ▶ Save £35,000+² per year in fuel costs
- ▶ Reduce cabling on site (portable and stand-alone)

Operation:

With an intelligent computer management unit, the monitoring system of the Cygnus™ HPG efficiently delivers optimal variable power according to load. Greater peak loads are delivered by passing through power directly from the diesel generator. Proprietary firmware ensures optimised power availability, without operator intervention. The power management system will detect low loads and shut down the diesel generator. The Cygnus™ HPG performs recharging from the diesel generator.

Support:

- ▶ Training Programme
- ▶ Specification & Technical Support
- ▶ Servicing & Maintenance
- ▶ 5 Year Product Warranty as standard

Additional wind and solar package options also available to plant hire.

¹Based on 100kVA diesel generator reduced from 24hrs to 12hrs run time, 365 days a year.

²Based on 89p per litre.



Hybrid Power Generators
for Construction,
Infrastructure and
Plant Hire



Flexible,
intelligent,
powerful.

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