

PS System General Information and Application Notes

Which Generator and Which Fuel?

If you are off-grid and need to generate your own power you may be offered generators which run on different fuels. The choice is usually between diesel and LPG.

Virtually all of the generator sets we sell for "Prime Power" applications are powered by diesel fuel. "Prime Power" is a more conservative rating applied when the generator is the main source of power as opposed to "Standby Power" where the generator only has to start if the mains supply fails.

We also supply generators powered by LPG or natural gas usually for standby applications. We have supplied a few gas powered generators for prime power but that is because there is usually a compelling reason. For example we supplied an LPG powered set for a boathouse because the local authorities ruled out oil because of the proximity of the Lake.

A 12kVA gas powered set is about 30% cheaper to buy than a diesel. This is because most gas powered sets are converted petrol engines and operate at twice the speed, 3000 RPM instead of 1500 RPM. This makes the engines and alternators smaller and cheaper. The faster speed means there is more wear and tear resulting in a reliable working life that can be less than a quarter of the slow running diesel.

LPG has a calorific value that is about 20% less than red diesel. This means that even before we look at the efficiency of the sets we are bound to consume 20% more LPG than diesel for the same power.

The engine on a gas powered set is at least 30% less efficient and the alternator is at least 10% less efficient than the equivalent PS System diesel set.

This results in the LPG powered generator having a significantly higher fuel consumption and a shorter working life than the PS System diesel equivalent.

In terms of economy, efficiency, reliability,

operating life and cost of ownership the PS System diesel generators are by far the best choice.

Choosing a System

If you are building a new property or doing a refurbishment on an existing property the PS System and generator can be fully utilised increasing efficiency and reducing costs.

The PS System will extract the maximum amount of electrical power for every drop of fuel consumed reducing costs and pollution.

The PS System is fully automatic, fully integrated, efficient and reliable.

The PS System used with a generator is the complete answer to off-grid electrical power.

However the system efficiency can be improved dramatically by adding the CHP (Combined Heat and Power) option.

A modern building whether new or refurbished will be well insulated and in most applications where the PS System is used the generator can provide all of the hot water and space heating required.

If the building is large and cannot be refurbished to the latest insulation standards or is heavily used during the day then a supplementary boiler may be required. Even so the PS System Generator will provide the bulk of the requirement.

CHP (Combined Heat and Power)

How does the PS System provide hot water and space heating?

You have purchased the PS System and generator to provide your electricity and will be paying for the fuel to power it.

For every 1kW a typical diesel generator provides in electricity it wastes 2kW in heat. We can recover up to 85% of this heat and use it to provide you with hot water and space heating.

We call this CHP.

CHP makes the system very efficient cutting the cost of 1kW of electricity to well below the price you would be paying for grid connected power.

If you can you should make use of the CHP facility because the medium term savings in fuel use can easily pay you back.

Cooking

Some of our customers use gas for cooking, usually LPG. That's OK but it does mean that you have to install a tank and purchase and store another fuel.

We think it is better to use electricity for cooking because the generator has to run part of every day to recharge the batteries and it may as well be when the cooker is being used.

We have just tested an induction hob on a PS System for one of our customers and it worked very efficiently.

Supplementary Heating

Even though the house is centrally heated some people like to have a focal point to sit round on a cold evening.

If a solution is required that is instant with no regular maintenance we would suggest a small power electric fire probably less than 1kW.

Or an oil fired solution using the same fuel as the generator.

Alternatively if manual operation is not a problem an open or closed fire burning wood or other biomass fuel could be installed.

Reliability

One of the reasons behind some of our customers using different fuels is because they feel that if the PS System or generator is not working they can at least keep warm. Unfortunately that is often not the case because gas often needs electricity to control it. The PS System is very reliable - more reliable in many areas than the national electricity grid.

If reliability is a paramount issue then it is probably better to have another small cheap standby generator with a manual changeover

rather than install a tank and purchase and store LPG.

Alternative Heaters

Some of our customers want to install a ground source heat pump with the PS System.

Firstly this would be a more expensive and less efficient solution than the PS System CHP option. Secondly it is not a good idea because a typical heat pump will use a relatively large motor rated between 3.5kW and 7.5kW. This would keep the generator running longer using more fuel.

Investment

The PS System and generator represent a significant investment and adding the CHP option increases that amount. There are four main ways that the investment is repaid.

1. Reduced consumption of fuel.
2. Increased life of the generator.
3. Reduced maintenance.
4. The convenience and time saved by fully automatic operation.

If the location is off-grid and a generator is running most of the day to provide electricity the cost in fuel and wear and tear is high. When a PS System is installed to control the generator the costs are immediately and significantly reduced. The PS System can easily pay for itself in less than three years in saved fuel alone as well as give fully automatic operation.

If the CHP option is installed then the PS System and generator become even more efficient.

If you generate your own power you need a PS System.