

Are you still running that generator? Cut down on fuel costs with PV

The talk lately about high fuel prices is focused on cars and planes, which makes sense since transportation is so important to our daily lives. However, in our world of remote-site industrial power we also have a fuel price concern. Fossil-fueled generators in remote locations typically use diesel or propane and diesel in particular has been hit extremely hard by the recent surge in fuel prices. Engine-generator sites that may have been running economically are now getting much more expensive to operate, especially at sites where the engine is refueled frequently.

Photovoltaics (PV), or solar electricity, consumes no fuel to operate. Sunlight is the only required "fuel" and is free for the life of the system. How can we use PV as a means to combat the high cost of fuel at a site running an engine-generator?

1. Replace your fossil-fueled generator with a PV generator:

If your load is 300 watts of continuous demand or less, a stand alone PV system may be a cost-effective means of powering your equipment. That 300 watts is a continuous, 24/7 load figure (300 watts x 24 hours/day = 7,200 watt-hours/day),

which means the PV system can power intermittent loads greater than 300 watts.

If your load runs off a DC voltage, a PV system is even more cost-effective. PV is a DC technology, and can direct-drive a DC load with no additional power conditioning required. Since an engine-generator produces an AC voltage, it must be rectified down to the DC voltage needed by the load.

A PV system operates at little-to-no maintenance and has zero fuel costs. While PV may be more expensive to purchase and install relative to a generator set, it costs virtually nothing to operate. Therefore, the cost of ownership over the life of the load equipment may be significantly less, especially with sharply escalating fuel costs.

2. Add PV to your existing generator:

If your continuous load is between 300 watts and 2000 watts, you can add PV to your engine generator to create an active PV/engine hybrid system. In a hybrid system each generation source contributes regularly to the load over the course of the year. Often the contribution "mix" is close to 50% each. In areas of high solar radiation, and where the load is

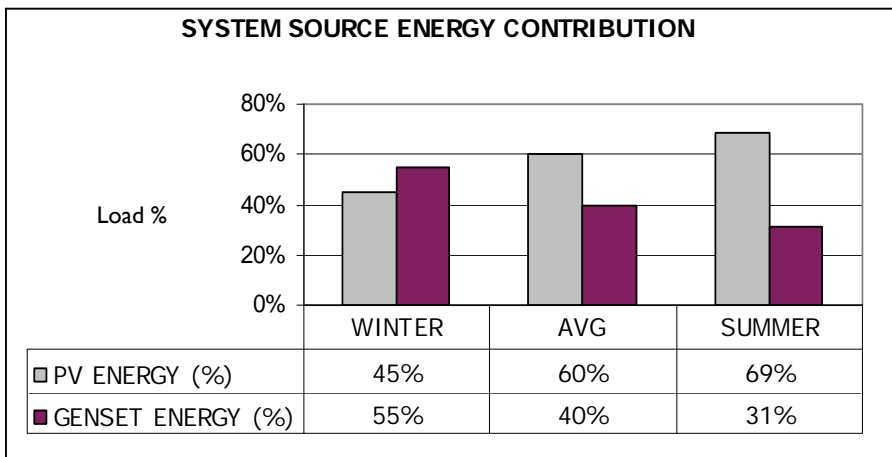


An 1800 watt PV/engine hybrid systems for a US Border Patrol Surveillance site.

close to the 300-watt lower limit, the PV will likely contribute the majority of the annual energy. Refer to chart below left.

Operating a PV/engine hybrid offers distinct advantages over operating either PV or an engine on a stand alone basis:

- A hybrid system architecture "decouples" the engine from the load by using the engine to recharge a battery bank. The result is an optimally loaded engine that runs at peak fuel efficiency with minimized intervals between maintenance visits.
- Since an engine's output is typically several times greater than the output of a PV array, you can gain a significant annual energy contribution from the engine while running it for a minimal amount of time. For example, an engine might easily contribute 50% of the annual energy while running less than 10% of the time, or well less than 1,000 operating hours per year.
- A stand alone PV system must be sized for worst-case solar radiation over a



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12-month operating period. At all other times of the year the PV array generates excess energy that cannot be utilized beyond the limited amount used daily to recharge the battery bank. In a hybrid configuration the array is not sized to fully support the load during worst-case insolation months. So, all the output of the solar array is used as energy to power the load or recharge the battery bank.

A well-designed PV/engine hybrid might start the engine one to three times a week, run it for 10-12 hours with each operating cycle, and consume just a few hundred of gallons of fuel per year (refer to chart at right). The intelligent control system not only dictates when the engine starts as a function of battery state-of-charge, but it can also override that logic and "force" the engine to operate only during certain times of the day. This feature is valuable if the noise from the engine is an issue during certain times of the day or night.

As the escalating price of fossil fuel drives the cost of operating a remote-site engine generator, consider how the replacement of the engine with a PV generator, or the addition of PV creating a hybrid system, can help defray those high costs and save you money over the life of the system.

Call SunWize today for more information!

