

## The sunless, windless, waterless alternative energy system

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Well, heck. Just what is "alternative energy"? Most folks seem to feel it ought to have something to do with an electrical system powered by the sun, wind, or falling water. But there are also those who supply their own electricity with a generator.

The burning of fossil fuels to create electrical power may appear primitive or even obscene in the midst of technology which uses only renewable resources, but the actual application of that technology has its drawbacks. Photovoltaic hardware, for example, is very expensive and you need a lot of it to produce **enough** electricity to satisfy your needs.

And what if you live in one of the many parts of our planet where the sun lurks behind clouds a good many months of the year? What if you live where the wind doesn't blow hard enough all year to operate a wind generator? And what if you don't have on your property a stream with sufficient drop to operate a viable hydroelectric system? Your only choice for self-sufficient power may be a generator.

A generator doesn't have to be obscene. A generator, as a matter of fact, can be a very efficient alternative energy source. The trick is to make it part of a system instead of a source.

### The don'ts

Regarding generators, there are several basic no-no's that, when violated, do indeed make their use primitive and obscene. Here is a list of some of them:

- 1. Never run a generator for any length of time for the sole purpose

of operating equipment that requires far less power than the generator delivers. Not only do you waste a whole lot of fuel and cause unnecessary noise pollution, but it's harmful to the generator because they are meant to operate under a reasonable load. For example, don't spend the evening watching a 30-watt TV that's being powered by a 3000-watt generator. (Don't laugh. We had a neighbor who did just that almost every night of the week.)

- 2. **Never** use a 3600 RPM gasoline-powered generator for anything but short-term applications: emergencies or intermittent power tool use.
- 3. **NEVER** operate a generator in such a way that your neighbors can hear it.

### Use it with a battery pack

The key to the efficient use of a generator for permanent homestead power is the storage of electricity. Operate the generator **only** when lots of power is required, as on the days of the week you do your laundry, vacuum the house, pump irrigation water, or other

heavy use. Then while the generator is running anyway, it can also operate an industrial-strength battery charger. The charger will charge the batteries that run the lighter loads of the house, even when the generator is not running. (The low-voltage direct current supplied by the batteries is changed to regular 110 AC by an inverter.)

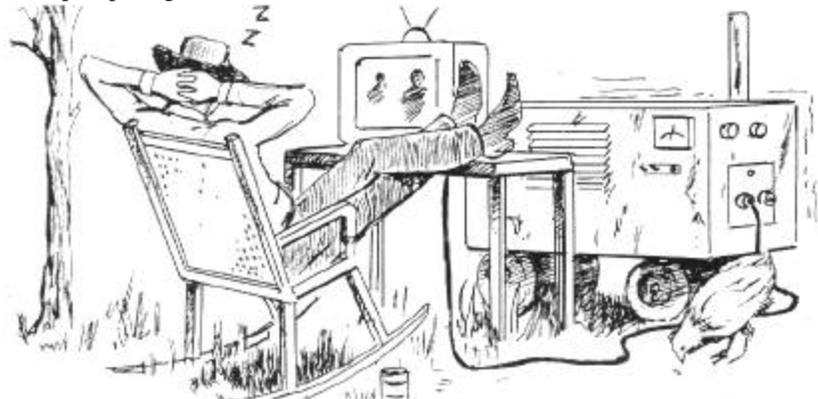
### The cardinal rule of generator shopping is: do not even consider a gasoline-powered unit that runs at 3600 RPM.

We ran our homestead on a system like this for 10 years, and our home had all of the electrical gadgets found in any home in the city, plus an office and a shop full of power tools. And we never ran the generator in the evening or on weekends.

### The 3600 RPM no-no

So how do you choose a generator? The cardinal rule of generator shopping is: do not even consider a gasoline-powered unit that runs at 3600 RPM. For several good reasons: Almost all of these machines are built for intermittent use only. Almost all of them will self-destruct quickly when used for prolonged periods at even modest loads. Almost all are very optimistically rated.

For example, we borrowed a popular-brand Japanese generator to use while our good old industrial machine was down-for its first repair in seven years of service. The old generator was rated at 3500 watts and would easily start any power tool in the shop



even when the air-compressor was running. The borrowed unit, resplendent in chrome razzle-dazzle and complete with automotive-style operating panel (even an ignition key!) was rated at 5500 watts-but it would not even start the compressor. It just huffed and puffed, lugged down, and popped its circuit-breaker.

Another reason is noise. 3600 RPM generators, running- under load, are, incredibly noisy. Someone called me a few days ago and asked if I had ever heard one of the new Honda generators run. He said that the dealer fired one up inside the showroom and it fairly whispered. What the dealer **did not** do was plug something into the machine which would have brought it up to its normal operating speed. Many of the bigger high-speed gas generators have an idle feature which allows the engine to slow way down when there is no load on the generator. Then the instant the generator senses a load, the machine comes up to its full-scream speed. Buyer beware.

Enough of the **don'ts**. Let's take a look at some **dos**.

A "generator" is actually composed of two major components: the generator, which produces the electricity, and the engine, which drives the generator. It is important that each of these major components is carefully selected to do its required job.

Generators that are serious contenders for permanent installation will operate at a maximum speed of 1800 RPM. (Be careful not to confuse "running" speed with "idle" speed. Some consumer-type generators run at 3600 RPM have an idle speed of 1800 RPM.)

## Miller

One of the best industrial-quality gasoline-powered generators available has the bonus of also being an electric welder. A good-quality arc welder can be a real asset on the homestead. Even if you don't know the first thing about welding, having the machine available makes it easy for someone who does know how to use it to do any repairs that require a welder.

Check your yellow pages for a welding-supplies dealer who handles Miller products and ask to see the lineup of welder-generators. They come in various outputs and all have excellent engines designed for continuous operation at full-rated output. These machines run at 1800 RPM in "generator" mode and at 3600 RPM in "welder" mode. (The machine mentioned earlier which ran our home and shop for seven years was a Miller welder/generator. Its engine just loafed along producing its full-rated power for years.)

## Onan/Kohler

Another excellent source for industrial-quality, low-speed generators is your nearest dealer in RV supplies. Any generator with the name Kohler or Onan can be counted on for a long and trouble-free life. Be careful though to make sure that you are getting an 1800 RPM machine. Some of the smaller units run at 3600 RPM. (If you get an RV generator, do not remove any of the sheet-metal shrouding. These machines are designed to be installed in the small spaces available in RVs and the shrouding is necessary to insure the proper flow of cooling air.)

Onan and/or Kohler generators are also available as free-standing machines and these are actually better suited to permanent installation.

## Diesel generators

The most efficient and maintenance free engines of all are diesels. Diesels have no ignition system, carburetor, or spark plugs. (The only problem we ever had with the Kohler engine on our Miller generator was with the ignition magneto.) They are simple in design and extremely durable. They burn less fuel per horsepower/hour than do gasoline engines, and their exhaust is devoid of many of the toxic emissions of gas engines.

The catch is that it is difficult to find diesel-powered generators in the small sizes required by the average homestead. Remember, it is not efficient to operate a generator which produces,

or is capable of producing, power far in excess of that required.

One application of a larger diesel generator that might work well in some circumstances is an installation which would serve several neighbors. Each neighbor's house would have its own battery bank and inverter. The generator would come on line for a predetermined duration each day, supplying each home with large amounts of power and charging the batteries to carry the load for the balance of the day. The cost of the machine and the maintenance chores would be shared by the neighbors.

## China Diesel

The six to eleven-KW generators driven by small diesel engines made in China (as supplied by China Diesel Imports of Jamul, California) are excellent alternative-system power sources. These little engines burn only a 1/2 pint of fuel per horsepower/hour, and the generators supplied with them are state-of-the-art.

In conclusion, a generator used as either a sole source of power or as a backup for other sources does not need to be an environmental disaster.

The generator should be operated in a controlled and orderly fashion and only when required for high-load applications. Some of its power should be diverted into storage batteries for use when the generator is not on-line. A system like this can supply a home with uninterrupted 110-volt power 24 hours a day even if the generator is not started for several days at a time.

Stay away from any "consumer" generators, regardless of buzz-words like "heavy-duty." The generators on most of the 3600 RPM machines available through hardware outlets are fine for their intended uses: power tools, pumps, and emergencies. Most will fail quickly if subjected to sustained operation at anywhere near their maximum output, let alone their rated output. The engines on these machines (mostly Briggs & Stratton) are well suited to their intended use, which is intermittent—not sustained periods of full-throttle operation.

Almost any generator designed to operate at 1800 RPM is also designed to run quietly and dependably for years while producing its rated output. Commercial/industrial equipment is the best way to go. If you live on a homestead or farm, do consider the welder/generator combination. Again, be careful. There are welder/generators on the market that run at 3600 RPM, and even though they are designed for industrial use, they will not last as long as their slower-running cousins, and you will have to endure the excessive noise for the duration, even if it is shorter than you'd hoped. Diesel engines outlast gasoline engines by a wide margin and require no maintenance other than regular oil changes.

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If you happen to come across a good, used, military-surplus or other industrial type of machine and you are not intimate with the electrical workings of generators, have someone knowledgeable check it over for you. Older generators will often have very complex and possibly malfunctioning voltage-regulating hardware that can cost more to straighten out than the machine is worth.

**Change the oil!!**

As with all mechanical equipment, follow the manufacturer's service recommendations. The importance of timely oil changes cannot be overstressed. Save money on oil, not by the use of Brand-X oil, but by buying a major-name-brand product of the proper viscosity in case lots when it comes on sale. With diesel engines, use only oil that is specifically rated for diesel use. (It will say so on the container.) Diesel engines operate at much higher combustion pressures than gasoline engines, and regular automotive motor oil is not suitable.

Never operate your generator without a properly installed and serviced air cleaner. It doesn't take much abrasive dust to dramatically shorten the life of an engine.

**Clean, ventilted shed**

Install your generator in a clean, well-ventilated shed, out of the weather and out of the paths of dust and moisture. (See Backwoods Home Magazine's issue No. 8 "How to construct a soundproof generator shed.")

**Don't start it under load**

Starting your generator with an electrical load on it is hard on the generator and the equipment plugged into it. Be sure that the generator has come up to full speed before applying any load. It is also good practice to allow the machine to run at no load for a few minutes before shutting it down, especially after it has been working hard.

With intelligent and conservative use, a well-chosen and properly maintained generator can become the heart of a dependable and cost-effective alternative energy system.

(Skip Thomsen is the author of "More Power to You!," a step-by-step manual describing the China Diesel generator-based electrical system. The book is available from Oregon Wordworks, P.O. Box D, Manzanita, Oregon 97130 for \$9.95 plus \$2 S&H.) Δ

*If you would not be forgotten,  
As soon as you are dead and rotten,  
Either write things worthy  
reading,  
Or do things worth the writing.*

Benjamin Franklin, May 1738

*For my daughter's hand I  
choose the likely man over the  
rich man; I want a man without  
money rather than money  
without a man.*

from Plutarch's Lives,  
Themistocles (c. 528 - c. 462 B.C.)



*A quiet creek by a wilderness home.*