Generator power for the homestead

By Doug Montgomery
As told to Lance Bisaccia

If you're living "off the grid," and you want electricity in your life, you have a range of choices to consider, including solar, wind, hydro, and generator power. Each of these choices has its advantages and disadvantages, and each of them except generator power depends on conditions at your site—on whether there is enough sun, wind, or flowing water to generate the power you need. Any of those first three choices is likely to require a hefty investment of money and/or learning time and/or weeks of work, since you need to buy and install the necessary generating equipment, battery bank, electronic control devices, and wiring systems. By contrast, you can get a generator and start using electricity the day it arrives. And you can generate 110-volt current (or 220) directly, without an expensive inverter to convert DC to AC.

Of course it costs money to buy and run a generator, too, but you can set up a generator-based system that will power a "normal" house more quickly, easily, and affordably than you can set up one of the other types of power systems. That's especially true if you can find a good *used* generator and if you're willing to live without batteries, as I do. Right now, I'm keeping my system running all the time, but for years I just started it up when I got home and needed power.

There are other "costs," too: you need to keep your generator supplied with fuel, you need to start it up when you want power, and it will make noise and exhaust. However, you can set up your system so that these problems are pretty small ones. For example, you can have a large fuel tank that gets filled at long intervals. And you can run your generator in a soundproof shed.

Another point to consider is this: if you do want to power your homestead with solar, hydro, or wind power, but you can't afford to *start* that way, you can start with an affordable generator. As your finances permit, you can add batteries, so you'll always have power on demand, and you'll only have to run the generator periodically. Then later, if you wish, you can create a solar, wind, or hydro system, and you'll already have your battery bank and *backup* generator. Having a backup generator is very helpful (sometimes essential), and many people who *do* start out with solar, wind, or hydro include one in their system. (The Backwoods Home offices are powered by a good solar power system, and they are sometimes very glad they also have a backup generator.)

If you do go with a generator, either as a stand-alone system or as a backup, I strongly recommend that you get a generator that is *diesel-powered* (not gasoline or butane), that runs at *low RPM*, and that is *air cooled*. And I'll tell you why:

Diesel power

I recommend diesel over gasoline generators because they're cheaper to run, they're more reliable, and they last longer.

One reason they're cheaper to run is that fuel costs are lower: they use less fuel per hour of operation, and the fuel is cheaper per gallon. As I said, I keep my system running all the time these days. (I do that for personal reasons; most people wouldn't need to.) Running constantly, my system uses about 200 gallons of diesel a month, which I buy for 70¢ a gallon, so it costs me about $140 a month. That's a little *less* than I paid for electricity from "the grid" when I lived in San Diego. When I used to run the system only at need, it cost me about *half* that. This is a 4000 watt (4 KW) system, running a "normal American house"—and my power tools—on 110-volt power (except my well pump, which uses 220). I have a two-cylinder Lister diesel driving a Lima brushless alternator.

As I said, diesel power plants are also more reliable and last longer than gasoline engines. That's partly because they're heavier-built and partly because they run at lower RPM, which brings me to my next point.

Low RPM

A typical diesel runs at about 1800 RPM. A typical gasoline engine spins *twice* that fast. The result is just what common sense would suggest: the gas engine uses more fuel, it's less reliable, and it just wears out faster. It's the same situation as if you had two cars driving along the freeway, one of them going 50 MPH and the other racing along at 100 MPH. The one that's going so fast is going to use more fuel per mile, have more mechanical problems, and wear out sooner.

Air-cooled

Why do I prefer an air-cooled power plant over water-cooled? Simple: no radiator to maintain, no coolant to check, leak, or freeze, no antifreeze to test, replace, or worry about. Most cars and trucks are water-cooled because those engines are subject to wide variations in load, RPM, and airflow for cooling. A stationary diesel power plant runs at a constant speed and load—and pretty constant cooling conditions—so air cooling works fine. Mine runs well at temperatures from 20 below to 110.

My Lister ran with no repairs for four years in all seasons, then it needed a rod bolt tightened, and it's been

running faultlessly again since then (lately, for 24 hours a day).

Buying a generator

To run a "normal American house," you'll probably want a 4- or 5-KW system, so I'll discuss prices for a 4 KW generator. Naturally, many people are well satisfied with a lifestyle that doesn't require nearly so much electricity, and they will be able to generate what they need for much less money. For a 4-KW generator, you're likely to spend about $2300 for a new single-cylinder model and $3200 for a two-cylinder. (By contrast, a neighbor of mine has over $20,000 invested in her solar power system.) Two of the brands that I consider excellent are Lister-Petter and Dutz, both of which have air-cooled models.

And of course, you can buy a *used* generator, sometimes for as little as $200. My wife Maxine and I were lucky: we got our excellent system in trade for $200 worth of welding work. (And luckier still, Maxine is the one who did the work!) Sometimes you can find good military or construction surplus equipment at good prices. Sometimes you can find equipment at an auction. Take an able mechanic along with you when you look and buy. Ask lots of questions of the seller, concerning the performance and maintenance history of the system. Be aware that a used system will sometimes need some work. If you buy a used generator from a dealer, chances are you'll get a decent—possibly rebuilt—system (if not the lowest price), and a dealer will usually give you some kind of a warranty period, such as 30 days. One good way to find new and used generators is to look in the yellow pages of the phone book.

Doug Montgomery is a master mechanic. He's been a mechanic since he was 13 years old, and that's been quite a while. He's repaired and rebuilt about every kind of engine there is, including cars, heavy equipment, aircraft, and submarines. He and Maxine are also good neighbors, right down the road from our Backwoods Home offices. Δ