

## **Emergency Power and Generators**

**By Dr. Kenneth S. Cheng**

A loss of electricity is a likely scenario at the time of our “big one.” The electrical grid that supplies all of California and much of the western US is a system that is dated and fragile, and can easily be disrupted at the slightest of issues. You may recall that much of south Orange County (including all of Nellie Gail Ranch), nearly all of San Diego County, parts of northern Mexico and parts western Arizona suffered from a major blackout in September of 2011. This blackout (the largest in California history), affecting an estimated 7 million people and causing millions of dollars of economic damage, occurred because one electrical company employee erroneously removed a piece of monitoring equipment at a Yuma, AZ switching station. This blackout lasted 7 to 24 hours depending on the areas affected and served as a mini test of how well prepared we were for a major disaster. If one individual over 200 miles away can cause so much havoc, imagine what a 7.8 magnitude earthquake just 40 miles away will do to this area. Keep in mind that all we lost was electricity; imagine losing electricity, water and gas, and not for 7 to 24 hours but for 2-6 weeks.

As you prepared for a power outage....

- Do you know exactly where your flashlights are located and do they work?
- How about your matches and candles?
- Do you know how to shut off the gas main if you discover a gas leak?
- How would you prepare your meals?
- Do you know how to disconnect your electric garage door opener and open your garage door manually?
- Do you have at least a half a tank of gas in your car in case you need to leave the area?
- Do you have a home telephone that doesn't require electricity? Remember that cordless phones won't work in a power outage.
- How will you charge your cellular phone during a power outage?
- Do you have a plan for communicating with others if the cell towers are over-loaded?
- During a power outage, how would you go about contacting help for a medical emergency?
- Do you have life-supporting medical equipment that requires electricity and how would you keep it running during an outage?
- Do you know that some gas appliances with electronic ignition will not allow gas to flow when there is an electrical outage?
- How will you keep your refrigerated and frozen food cold?
- Do you know who is your Block Captain?

### **Generators**

Generators for residential use can provide the power needed to operate the necessities in your home. Prices for generators can range from several hundred

dollars for smaller, portable units, up to ten's of thousands of dollars for permanent units that could supply your entire street. Before purchasing a generator, you will need to do some homework. Things to consider include power needs, use, portability, fuel, cost, maintenance and how the generator is attached to your home.

Power needs. Generators are rated based on the number of watts that can be provided. Be sure to understand that the advertised wattage may be a "maximum" power and not a "rated power." Maximum power is the maximum wattage the generator can provide to start up motors (refrigerator, pumps, furnace fans, air conditioners, etc.) Generators cannot run on maximum power for longer than 20-30 minutes. Rated power is the wattage that can be provided for prolonged periods; this is the true rating. Many generator manufacturers have interactive wattage calculators on their websites that can help you determine the proper size generator for your needs. Keep in mind that an Energy Star refrigerator may only use 100-200 watts of electricity to run but starting the refrigerator can increase the wattage need 3-5x the running wattage.

Use. Although most of us would be running basic home appliances with an emergency generator, certain sensitive electrical appliances may require inverter technology to function properly. This might include computers, fluorescent lighting, televisions, etc. If you plan on operating any of these appliances during an emergency, consider getting a generator that contains the inverter technology.

Portability. Generators are either permanently installed or portable, the smallest weighing only 40+ lbs. Each type has its advantages and disadvantages. Keep in mind, however, that "portable" generators can still be well over 100 lbs. and difficult to maneuver. Fortunately, all portable generators have accessory wheel kits (for an additional cost) that make moving these generators easier.

Fuel. Most generators run on gasoline. Although this is convenient, gasoline must be stored properly and gasoline, especially the ethanol/gasoline mixtures sold in California, is unstable and has a shelf life of only 3-6 months. Gasoline stabilizers, such as Stabil, are available but they only extend the shelf life up to 12 months. The best practice for users of gasoline generators is to rotate their properly stored gasoline by pouring the fuel into their cars and refilling the storage containers with fresh fuel every 6 months. Other fuels available for generators include diesel fuel (usually found with permanent generators,) propane and natural gas. The latter two can be utilized by converting a gasoline generator to use propane/natural gas, or by purchasing a "dual fuel" generator. There are many advantages to using a propane/natural gas generator (dual fuel option if natural gas is available, indefinite shelf life of properly stored propane, no need to "rotate" fuel, less expensive fuel cost, etc.) The process of conversion is inexpensive and can be done with a "do-it-yourself" kit but the conversion is beyond the scope of this article. Generators that operate on dual fuel are becoming more commonplace and readily available at most hardware and "big box" stores.

Cost. As stated earlier, generators can cost as little as a few hundred dollars to many thousands of dollars. Cost is often related to the amount of power (watts) produced, but other factors that raise the cost include inverter technology, noise reduction, starting mechanisms, etc. Some of the least expensive generators (<\$1000) may provide 4000 watts of power but do not include inverter technology and are generally very loud. These generators are best used by contractors at construction sites who are not operating sensitive electronic equipment. Better home generators can cost \$2000-\$3000 but include an inverter, noise reduction and electric start. That being said, Honda Power Equipment ([powerequipment.honda.com](http://powerequipment.honda.com)) makes a relatively quiet 2000-watt home generator with an inverter for approximately \$1100. This would be the minimum size recommended for home use and would run one refrigerator and a few additional appliances and lights.

Maintenance. Generators are engines no different than car engines; proper care and maintenance will allow them to function problem-free for years. Maintenance includes:

- running the generator at least once every 3 months (at partial load) to keep the engine parts lubricated,
- maintaining recommended oil levels,
- changing the oil as recommended by the manufacturer,
- never storing fuel in the fuel tank,
- keeping electric start batteries fully charged,
- storing the generator indoors and away from the elements.

Connecting the generator to your home. Generators produce the power but need to be connected to your appliance(s) to be useful. The least expensive way is to connect your appliance directly into the generator. This will require a long extension cord, and probably multiple cords to attach each appliance. A better way is to have a licensed electrician install a transfer switch to your electrical panel. This allows you to plug your generator directly into your house circuit to supply all needed appliances. However, unless you have installed a very high watt-producing generator, you probably will not be able to operate all electrical appliances in your home. To prevent overloading your generator in this situation, you may consider unplugging unneeded appliances and taping light switches in the off position.

## **Solar Power**

For many reasons, solar power has become more popular and its use more prevalent. Much of the power in your home can be supplied through solar power, as evidenced by lower reliance (and lower electric bills) to the utility-supplied power. However, the great majority of installed solar systems **will not** power your home during an electrical outage. The reason is that most solar systems are tied to the electrical grid (utilities) and a safety feature prevents power from being produced in residential solar systems when the power grid is down. This safety feature allows utility workers to work on electrical lines without fear of being electrocuted by solar-fed electrical lines. The two exceptions to this are systems that are completely

off-grid (and thus completely independent of utilities); and an on-grid systems with the battery back-up. However, most systems installed do not include the very expensive battery back up system, and nearly all systems are tied to the local utilities. Unless you are completely off-grid or have this battery back-up system, do not expect any electricity from your solar electrical system.

The purpose of this article was to provide you an overview of electrical power options during a power outage. A complete evaluation cannot possibly be done on the few pages of this article. As such, the Nellie Gail Emergency Preparedness Committee strongly encourages you to do your own research as to your power needs and options. As always, please feel free to contact us if you have any questions or comments regarding this or other topics. You can email us at [emergencypreparedness@nelliegailranch.org](mailto:emergencypreparedness@nelliegailranch.org).