National Fuel

Building on 100 Years

Energy Advisor

How to Shop for a Residential Home Emergency Generator

If you've lost power for any length of time, you can understand the importance of backup power generation. The increasing demands of home offices, security systems, food refrigeration, HVAC systems, sump pumps, etc. have moved backup power to the forefront of many homeowners' minds. The consequences of a power outage can be significant! Portable and standby generators have become more common today in residential locations because of these demands.

Selection
According to the online resource Electric Generators Direct, the key to picking the perfect emergency portable generator is to pick the right style first, then pick the right wattage. The most popular choice for homeowners is an appropriately-sized emergency portable generator. The downside of smaller units is that they can only power a few appliances, and their small gas tanks need to be refilled every few hours. The larger commercial generators are costly and can create storage issues when they are not in use.

Another consideration involves the end user's capability to refuel the generator after the tank runs out. Most users do not want to keep a second tank on hand, but there are other options. Some manufacturers offerTri-Fuel generators that can be powered by gasoline, liquid propane (LP), or natural gas, though the more common choice for a portable generator is gasoline.

Those customers that are planning on being in their homes for many years may also want to consider a standby generator. This is a permanent installation that uses LP or natural gas to eliminate the refueling issue. Generally more expensive than portable emergency generators, an end user may be able to justify the investment if there are frequent outages in areas that are exposed to sustained weather problems (ice storms, blizzards, flooding, hurricanes, tornados, earthquakes, etc). When the power goes out, an automatic transfer switch and generator combination can quickly restore electricity to selected circuits, as long as the propane tank or natural gas line have not been disrupted. This type of setup is attractive to many customers who do not want the inconvenience of frequent power outages.

Size
If an emergency portable generator is selected, it can be purchased in medium (3 to 6 kW), large (7 to 9 kW) and extra-large sizes (10 kW and up). The medium unit will typically power multiple survival appliances, including a refrigerator, sump pump, furnace fan, and several other appliances. A large portable generator can restore power to multiple rooms in a home (minus a central air conditioner). If the end user is looking for more power, the extra-large portable generator can supply enough electricity to restore power to most small homes, including some central air conditioners.

The issue with air conditioners is that most generators do not have adequate surge capacity to start a 4- or 5-ton central air conditioner. If the homeowner really needs air conditioning, it may make sense to buy a very large generator with sufficient starting amperage capability, or perhaps to purchase a cheap window air conditioner to run only during power outages.

The following is a generator sizing chart from Gen-Tran for residential use.

Typical Number of Circuits*	6	6	10	12	12
Max amps (@ 240V)	30 amps @ 125V only	20 amps	30 amps	50 amps	60 amps
Max Generator size (watts)	3,750	5,000	7,500	12,500	15,000
Breakers	3-15amp 1-pole 3-20amp 1-pole	2-15amp 1-pole 2-20amp 1-pole 1-20amp 2-pole	3-15amp 1-pole 3-20amp 1-pole 1-20amp 2-pole 1-30amp 2-pole	3-15amp 1-pole 3-20amp 1-pole 1-20amp 2-pole 1-30amp 2-pole 1-50amp 2-pole	3-15amp 1-pole 3-20amp 1-pole 1-20amp 2-pole 1-30amp 2-pole 1-50amp 2-pole
Required Main Breaker in Load Center	60amp 2-pole	60amp 2-pole	60amp 2-pole	100amp 2-pole	100amp 2-pole
Power up these Essential Loads	Furnace Fan Refrig/Freezer Microwave Lights TV/Radio	Furnace Fan Refrig/Freezer Microwave Well/Sump pump Lights TV/Radio	All items to left **plus** Water Heater Garage Door Opener Security System Home Office	All items to left **plus** Dishwasher Electric Range	All items to left **plus** Air Conditioner (varies)

Source: Sizing chart courtesy of Gen-Tran.

**Note that Gen-Tran offers a maximum of 16 circuits as an upgrade for the various generator sizes.*

Prioritize your needs. Use the lowest wattage light bulbs that provide a safe level of light, reserving power for additional lighting elsewhere or a small appliance. Remember that the greater the load on a generator, the more fuel it will use.

Transfer Switch
The purpose of a transfer switch is to reduce the need for multiple extension cords running from the generator to an individual appliance. Ideally, the transfer switch is installed beside the main electrical panel, and then connected to the individual circuits targeted to run during a blackout. The transfer switch prevents utility workers from getting hurt by dangerous backfeeding from unsafe generator installations. Because of this potential situation, all generators providing backup power to any home are now required by National Electrical Code (NEC) Article 702.6 to have a generator transfer switch.

There are both automatic and manual transfer switches. Manual transfer switches are less expensive, and require an individual on site to operate. They also can include built-in wattage meters, which keep track of what is being powered. Without them, the system can be overloaded, potentially damaging the generator and appliances. Automatic transfer switches sense when utility power shuts off, trigger a permanently installed generator to start, and once the generator reaches a nominal output level, the selected household circuits are transferred to the generator load according to the priority assigned at installation.

Transfer switches can be provided by Gen-Tran, Electric Generators Direct, and other generator suppliers. There are also prewired electrical boxes that combine service entry equipment and manual transfer equipment into one cabinet, thereby eliminating the need for separate equipment and extra wiring.

Safety
Be familiar with the safe operation of a portable or standby generator, including the following tips:

- Before starting your generator, carefully read and follow all of the manufacturer's instructions.
- Be sure that the total electric load on your generator will not exceed the manufacturer's rating.
- Install a generator transfer switch in accordance with NEC Article 702.6.
- Always locate your generator where its exhaust will vent safely.
- Exercise caution when refueling gasoline-powered generators. Let the generator cool down before adding additional fuel; spilled gasoline on a hot manifold can ignite into flame. Keep the generator in a well-ventilated area outside.
