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EMERGENCY GENERATORS

Purpose

An emergency generator can limit the interruption of your electrical service caused by an outage. Please consider the following guidelines when installing your generator.

Consider the following when purchasing and installing a generator.

- Type and size of generator.
- How will you move the generator?
- Where will you store it when you don't need it for an outage?
- How and where will you store the fuel needed to operate the generator?
- How will you connect the generator to meet your electrical needs during an outage?
- What are your electric needs during an outage?
 - * Heat
 - * Medical Equipment
 - * Septic System
 - * Well
 - * Cooking
 - * Hot Water
 - * Refrigerator
 - * Freezer
 - * Lights
 - * Computer
 - * Phone
 - * Garage Door Opener
 - * TV
- Who will operate the generator when needed?
- How will you make sure that the generator operates safely for you, your family, and utility workers fixing the power outage?

Consider purchasing a standby generator if:

- △ You want the safety and security of knowing you will not have to be without power during a power outage.
- △ You have a home business that requires power (Internet, phone connection).
- △ You have a sump pump, well or septic system.
- △ You have medical needs that require power (medication that requires refrigeration, respirator, oxygen).
- △ You live in a remote area where power outages are more common.
- △ You are building a new home or business.

Whatever the reason, whenever there is an extended power outage, some customers would like to fire-up that portable generator to get electricity flowing to certain appliances. If not used or installed properly, this can pose a severe hazard to line workers, your neighbors, and the generator itself can be damaged.

This information is intended to identify common questions surrounding the safe installation and operation of emergency generators.

1. How do I select an emergency generator?

The first step in purchasing a generator is to identify the things you absolutely cannot live without during a power outage. Usually high on the list will be the refrigerator and the freezer, a well pump, the furnace fan if you have natural gas or oil heat, or maybe some lighting. Consider your list carefully, because the bigger the generator, the more expensive it will be.

Once you have your list, calculate how much electricity those items need. Look at the wattage of each item on the equipment nameplate or in the owner's manual and add it all up. Then keep in mind that your generator should not run continuously at more than 80 percent of its rated capacity and take into account that appliances that operate with a motor (like a refrigerator and freezer) can require two to ten times their listed wattage in order to start.

Once you factor in those conditions you can determine the size of the generator you'll need.

2. What can happen if I don't use the generator properly?

The most common problem is something called back feed. This occurs when a generator is connected to the home's wiring system.

The problem typically occurs during a power outage when a homeowner with a forced-air natural gas or oil-fired furnace tries to operate the furnace fan by plugging the generator into an electrical outlet and feeding power into the home's electric system. That's when back feed happens.

*The electricity from the generator will flow through the home's wiring, out of the house through the electric meter, the voltage will increase to about 12,500 volts as the current passes through the transformer outside (yes, it works in reverse), and then it will flow into the City's electric system—**posing a potentially fatal shock hazard to anyone working on the power line or coming in contact with a line that might be sagging or on the ground.***

Common Wattages

- △ **Furnace Fan**
500—2,350 starting watts, depending on its size
- △ **Refrigerator or Freezer**
About 2,200 starting watts
- △ **Well Pump**
1,400—2,100 starting watts
- △ **Sump Pump**
1,300—2,150 starting watts
- △ **Garage Door Opener**
1,100—1,400 starting watts
- △ **Electric Fry Pan**
1,300 watts
- △ **Coffee Maker**
1,750 watts
- △ **Microwave Oven**
625—1,000 watts

3. Can this also damage my generator?

Yes, it can. When your utility workers work on a power line, they routinely use a grounding system to protect themselves. If a generator is back feeding to that ground, the generator could be severely damaged. Also, when power is restored to a home that has a generator connected to the wiring, the sudden flow of utility power into the generator could burn out the machine.

4. How can I prevent back feed?

There are two ways. The easiest solution is to simply plug items you want powered by the generator (for example, your freezer) directly into the generator. But that doesn't solve the problem of getting electricity to something that is hard-wired into the house, like the furnace fan.

If powering the furnace fan is your objective, you'll need to use something called a transfer switch, which disconnects the home's wiring system from the City's wiring system and also allows the homeowner to direct the flow of electricity from the generator to any circuit in the house, such as the one powering the furnace fan.

A transfer switch should only be installed by a licensed electrician and requires an electrical permit and an electrical inspection. Most electricians or dealers that sell generators can arrange to get one installed in your home.

5. Can't I accomplish the same thing by throwing the main breaker?

Not safely. Simple circuit breakers do not make a positive disconnection between the home electric system and the City system. What's more, they've been known to fail. The consequences are pretty high if it does fail.

The only safe way to create a positive disconnection between the home's electric system and the City's electric system is through the use of a transfer switch.

6. Are there other safety tips that I should keep in mind?

Yes. Make sure extension cords are adequately sized to handle the electricity. If you're not certain, ask the dealer who sold you your generator or check with an electrician. Also, the generator itself should always be placed outside in a well-ventilated area and you should never refuel it when the engine is hot. Let it cool for at least 15 minutes to minimize the danger of fire.

Instructions on how to properly use a generator are included in most operating manuals. You should read them carefully.



Permanently Installed Generator



Portable Generator



Manual Transfer Switch

Do

- **Do** make sure your generator is rated to produce the amount of power necessary for the appliances or fixtures selected.
- **Do** operate your generator in a well-ventilated outdoor area. Be sure to place the generator where exhaust fumes will not enter the house.
- **Do** consider the fuel capacity of the generator if you want to keep a refrigerator running during the day while you are away from home.
- **Do** make sure electrical cords are rated for the electrical load and for outdoor use.
- **Do** make sure you have a fire extinguisher located near the generator.
- **Do** install generator in compliance with manufacturers instructions.
- **Do** store liquid fuel in proper containers.
- **Do** keep your generator dry. Operating the generator in snow or rain, or near water, can lead to death or serious injury.
- **Do** have your generator serviced regularly in accordance with the manufacture's instructions.

Don't

- **Don't connect the generator to the wiring system in your home without an approved and inspected permanently installed, transfer switch.** The transfer switch keeps your generator from sending power back through the utility grid and endangering the lives of electrical workers repairing power lines or citizens who may accidentally contact fallen lines. Also, the transfer switch protects your generator from damage when power is restored. Consult a licensed contractor for assistance.
- **Don't refuel a hot engine** if your generator burns gasoline or diesel. Spilled fuel on a hot muffler can be disastrous. Let the generator cool while not operating for at least 15 minutes to minimize the danger of fire.
- **Don't use an undersized extension cord with a generator.** An extension cord that is not heavy enough can damage the equipment you are operating and cause a fire hazard. Both the length and diameter of wire affect its ability to carry an electrical load. The longer the extension cord and the larger the electrical load, the larger the diameter of the wire must be. If you have any questions, get help from a licensed electrician or qualified supplier who can size the cord to match the equipment you want to operate.