



BACKUP POWER OPTIONS

In the event of PG&E Public Safety Power Shutoffs (PSPS) or during an emergency such as a wildfire or earthquake, the power grid may be unavailable for an extended period-of-time. You may need partial- or whole-house backup power during this time for:



HEAT - Furnaces, even gas-powered, require power to operate. Infants, sick, and the elderly will struggle if a disaster hits in the winter when temperatures are low.



SAFETY - Lighting is needed at night, and candles can be a fire hazard. Alarm systems, security cameras and other safety devices may have backup batteries, but these rarely last for more than a few days.



REFRIGERATION - Food, including milk for children, and many medicines require being kept cold. Bags of ice may only last a few days.

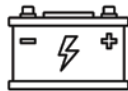


WORKING FROM HOME - Many people work from a home office, and being unable to work for several days can become a financial burden.

OPTIONS There are 3 common partial- or whole-house alternative power sources:



gasoline/natural gas generators



large storage batteries



solar panels with large storage batteries

CALCULATE POWER NEEDS - To determine which of the above options is best for you, and what size system you require, you need to calculate your power demand:

First, it's useful to understand power and energy. Electric power is the rate of doing "work." Common units of power are the watt and kilowatt (1,000 watts). Energy is power used over a time period. A common unit of energy is the kilowatt-hour (kWh), or 1,000 watts delivered for 1 hour.

For example, running a 10 watt LED light bulb for 100 hours would consume 1 kWh (10 * 100) of energy.



Note that generators and solar panels are sized by power (watts), which they produce as long as they operate. Batteries are sized by stored energy, as they produce power only for a certain time until they run out.

Then, list every device and appliance that you want to operate at the same time during an outage, and note how much power each one uses. An electricity monitor like the "Kill-A-Watt" can measure how many watts each draws, or refer to the device label or owner's manual. **This is a good time to make sure that all your light bulbs are LEDs.** LED bulbs use far less energy than incandescent bulbs, and even less than compact fluorescent, and they last much longer.

Add these figures up, multiply by 1.5 (safety factor) and that's your rough power need. Typically, 6,000 to 10,000 watts is sufficient for partial-house backup, but you can get by with less if you don't run high-load appliances such as a furnace and a refrigerator at the same time.

OPTION 1 - GASOLINE/NATURAL GAS GENERATOR

The cheapest and most-common source of backup power is a gas-powered generator

PROS

- + Cost is typically less than \$3,000 for 6,000 watts (6 kW) of power output
- + Replenishable fuel (you can siphon gasoline from a vehicle in an emergency)
- + Durability - brand names will last for many years if properly maintained
- + Flexibility - generators can be fueled by gasoline, natural gas and/or propane



CONS

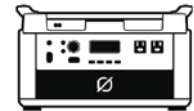
- Some models can be quite loud (Honda has a reputation for being quieter)
- Supplies power regardless of demand, although some models have an Eco mode
- Must be run outside using electrical cords or a transfer switch to connect to inside devices
- They pollute (especially gasoline fueled) and fuel storage may be a safety issue
- For additional information refer to the OCP&R Guide #21 – Emergency Generators

OPTION 2 - LARGE STORAGE BATTERY

A new entrant to the field is a large storage battery with AC outlets. This is charged while the grid is operational and can power devices during outages. Goal Zero is an example of this type of battery.

PROS

- + No maintenance
- + Only supplies power when it is demanded



CONS

- Higher cost (currently \$1,000 for a 1.2 kWh battery) and efficiency degrades over time
- New type of product, minimal track record, unknown durability

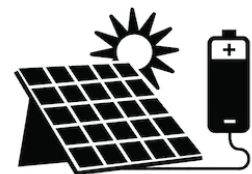
Note - if you have an electric vehicle, you can connect a “pure sine wave” inverter to the 12v battery and draw 500 to 1000 watts of emergency AC power, enough to power lights or a small appliance. The vehicle must be on and in Park to keep the 12v battery charged, so make sure it’s secure and well-monitored. Leave enough in reserve to drive the vehicle to a charging station.

OPTION 3 - SOLAR PANELS & LARGE STORAGE BATTERIES

The best long-term solution that provides immediate, clean power during an outage

PROS

- + A properly sized system can power an entire house indefinitely during a power outage, as long as enough solar energy is available
- + Little maintenance required over the life of the system
- + >40% cheaper than PG&E energy over a 20-year time-frame



CONS

- Highest upfront cost (\$15,000 to \$30,000 or more based on size and features)
- Power production can be impacted by rain, clouds and shade over the solar panels

OCP&R is a program of the Oakland Firesafe Council.

Contact OCP&R for more information and assistance regarding backup power options.

Thanking Vivek Bhatia, Doug Mosher and various on-line sources for their contribution to this content. Version 1.2 7/21/20

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