

Home Backup Power Sizing Worksheet

Work out what you actually need to keep running when the grid goes down

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Contents

1. Start with the outage you are planning for
2. Step 1 — List your critical loads
3. Step 2 — Size the system
4. Step 3 — Pick the approach
5. Step 4 — Questions for the installer

General information for planning purposes. It is not engineering, legal, or financial advice; confirm final decisions with a licensed professional in your area.

Start with the outage you are planning for

The right backup system depends on how long you need to run and what must stay on. Answer these three questions first; everything else follows.

Longest outage you want to cover (hours or days)	
Season it is most likely to happen	
Must-run loads (medical, heat, cooling, refrigeration, well pump, work)	
Nice-to-have loads	

Step 1 — List your critical loads

Look at the nameplate on each appliance or use a plug-in energy meter for a week. Running watts is what it draws continuously; starting watts is the surge when a motor starts.

Load	Running watts	Starting watts	Hours per day	Watt-hours per day
Refrigerator / freezer				
Furnace fan or heat pump				
Well pump or sump pump				
Lighting (LED, whole home)				
Internet router + modem				
Medical equipment				
Phones, laptops				
Microwave / cooking				
Other				
TOTAL				

Watt-hours per day = running watts x hours per day. Add the column to get your daily energy need. The single largest starting-watts figure sets the peak your system must handle.

Step 2 — Size the system

Two numbers decide the equipment: peak power (kW) and stored energy (kWh).

- Peak power needed = sum of running watts of everything that could be on at once, plus the largest single starting surge. Divide by 1,000 for kW.
- Energy needed = daily watt-hours x days of outage. Divide by 1,000 for kWh.
- For batteries, plan to use about 80–90% of rated capacity; check the manufacturer's usable-capacity figure, not the gross figure.
- For generators, choose a unit whose continuous rating is above your peak, and remember fuel: a portable unit may burn several gallons per day at moderate load.

Peak power required (kW)	
Energy required (kWh)	
Battery usable kWh needed (energy ÷ 0.85)	
Generator continuous rating needed (kW)	

Step 3 — Pick the approach

Each option trades cost, noise, fuel, and permitting differently.

Option	Good for	Watch out for
Portable generator + transfer switch	Short outages, tight budget	Manual start, fuel storage, carbon-monoxide risk — never run indoors or near windows
Standby generator (natural gas / propane)	Long outages, whole-home	Permits, gas line capacity, annual service
Battery storage (with or without solar)	Silent, automatic, short-to-medium outages	Limited kWh without solar recharge; cost scales with capacity
Solar + battery	Multi-day outages, daily bill savings	Winter production drops; needs an islanding-capable inverter
Hybrid (battery + small generator)	Resilience with lower fuel use	Two systems to maintain; integration must be designed

Step 4 — Questions for the installer

Bring this page to every quote.

	What is the usable capacity and continuous / peak output of the proposed system?
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☐	Which circuits will be backed up, and is a critical-loads panel included?
☐	How does the system switch over — automatic, and how fast?
☐	What permits, inspections, and utility interconnection steps are included in the price?
☐	What is the warranty on the battery / generator and on the installation?
☐	How is the system monitored, and who gets the alert when something fails?

This worksheet is general guidance, not an engineering design. Final sizing should be confirmed by a licensed electrician or installer familiar with your local code.

Next step

Tesla Powerwall Buyer's Guide — gridwisetechnology.com/tesla-powerwall-buyers-guide/