

Solar Panel, Battery & Inverter Sizing Worksheet

Free printable worksheet for preliminary home solar and backup sizing

1. Quick Formulas

What to size	Formula
Daily energy	Daily Wh = Watts x Quantity x Hours/day
Battery	Nominal battery Wh = Backup load x Backup hours / DoD
Inverter	Recommended inverter W = Peak simultaneous load x 1.20-1.25
Solar array	Solar W = Daily Wh / (Peak sun hours x System efficiency)

2. Appliance & Energy Worksheet

Appliance / Load	Watts	Qty	Hours/day	Daily Wh	Peak?
TOTAL					

3. Sizing Assumptions

Peak simultaneous load	_____ W	Backup load	_____ W
Desired backup time	_____ h	Battery voltage	12 / 24 / 48 / ____ V
Battery DoD	_____ %	Inverter margin	20 / 25 / ____ %
Peak sun hours	_____ h/day	System efficiency	_____ %
Panel wattage	_____ W	Panel count	calculated / rounded up

4. Your Results

Daily energy use	_____ Wh/day	_____ kWh/day
Nominal battery size	_____ Wh	_____ kWh
Battery capacity	_____ Ah	at _____ V
Recommended inverter	_____ W	Surge check: _____
Recommended solar array	_____ W	_____ panels

Remember: Watts size the inverter; watt-hours/kWh size energy storage. Always check motor/compressor surge loads and equipment compatibility before final selection.

Worked Example

A simple example showing how the worksheet formulas connect

Load	Watts	Qty	Hours/day	Daily Wh
Refrigerator	180	1	8	1,440
LED lights	100	1	5	500
Internet/router	20	1	24	480
Laptop	65	1	4	260
TOTAL				2,680 Wh/day

Battery example

Assume a 600 W critical backup load, 6 hours of desired backup, 85% depth of discharge, and a 48 V battery bank.

Usable energy = $600 \text{ W} \times 6 \text{ h} = 3,600 \text{ Wh}$

Nominal battery = $3,600 / 0.85 = 4,235 \text{ Wh} = 4.24 \text{ kWh}$

Battery capacity = $4,235 / 48 = 88.2 \text{ Ah}$

Inverter example

Assume the appliances that may run together total 1,600 W. Use a 25% planning margin.

Recommended inverter = $1,600 \times 1.25 = 2,000 \text{ W}$

Solar array example

For 2,680 Wh/day, 5 peak sun hours, and 80% overall system efficiency:

Solar array = $2,680 / (5 \times 0.80) = 670 \text{ W}$

At 450 W per panel: $670 / 450 = 1.49$, so round up to at least 2 panels before project-specific margin.

Important: This worksheet is for preliminary sizing only. Final design should also account for local solar resource, temperature, wiring, inverter surge capacity, battery/inverter communication and compatibility, PV voltage/current limits, manufacturer specifications, and applicable electrical codes.

Use the online calculator on the Avepower guide for faster estimates, then print or save this worksheet for project planning.