

Solar Battery Size Calculator

Estimates solar-backup battery capacity in kWh, Wh, and Ah from daily energy, autonomy, usable depth of discharge, efficiency, reserve, and system voltage.

Generated October 10, 2026

<https://www.elecatrix.com/solar-backup-power/solar-battery-size-calculator/>

Inputs		
Input	Value	Unit
Daily energy use	12	kWh/day
Autonomy period	2	days
Battery system voltage	48	V
Usable depth of discharge	80	%
Round-trip efficiency	90	%
Reserve adder	10	%
Results		
Result	Value	Unit
Autonomy load energy	24	kWh
Usable factor	0.72	x
Base battery capacity	33.3333	kWh
Required battery capacity	36.6667	kWh
Required battery capacity	36666.6667	Wh
Required battery capacity	763.8889	Ah
Calculation details		
Detail	Value	Unit
Calculation basis	Required battery capacity is daily energy times autonomy days, divided by usable depth-of-discharge and round-trip efficiency, then adjusted by the entered reserve.	

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Selection boundary

Solar battery estimate only; verify battery chemistry, BMS, inverter, charge rate, temperature, listing, fire-safety, and manufacturer requirements.

Formulas

Autonomy load energy (kWh) = Daily energy (kWh/day) x Autonomy (days)

Usable factor = (Depth of discharge (%)/100) x (Round-trip efficiency (%)/100)

Base battery capacity (kWh) = (Autonomy load energy/Usable factor)

Required battery capacity (kWh) = Base battery capacity x (1+(Reserve (%)/100))

Required battery capacity (Ah) = $\frac{\text{Required battery capacity (kWh)} \times 1,000}{\text{System voltage (V)}}$

Warnings and limitations

This solar battery size estimate is a planning calculation. It does not choose battery chemistry, BMS, inverter, charge controller, enclosure, fire-safety system, utility interconnection, or code compliance.