

Battery Runtime Calculator

Estimate battery runtime by converting nominal amp-hour capacity to usable watt-hours and dividing by load power. Battery chemistry, discharge behavior, temperature, BMS limits, and inverter performance require separate review.

Generated October 10, 2026

<https://www.elecatrrix.com/solar-backup-power/battery-runtime-calculator/>

Inputs

Input	Value	Unit
Battery capacity	200	Ah
Battery system voltage	24	V
Load	500	W
Usable depth of discharge	80	%
System efficiency	90	%

Results

Result	Value	Unit
Nominal battery energy	4800	Wh
Usable battery energy	3456	Wh
Runtime estimate	6.912	h
Usable factor	0.72	x

Calculation details

Detail	Value	Unit
Calculation basis	Runtime divides usable battery energy by load watts. Usable energy applies depth of discharge and efficiency.	
Selection boundary	Runtime estimate only; no battery chemistry, discharge curve, temperature, inverter overload, BMS, listing, fire, utility, or code-compliance result is made.	

Formulas

C_battery=nominal battery capacity in Ah,quad V_system=nominal system voltage,quad P_load=load power

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DoD=usable depth of discharge percent,quad eta=system efficiency percent

$E_{\text{nominal}} = C_{\text{battery}} \times V_{\text{system}}$

$E_{\text{usable}} = E_{\text{nominal}} \times (\text{DoD}/100) \times (\text{eta}/100)$

$t_{\text{runtime}} = \frac{E_{\text{usable}}}{P_{\text{load}}}$

Warnings and limitations

This battery runtime estimate uses entered battery and load assumptions only. It does not approve battery chemistry, inverter, BMS, protection, fire-safety, utility, or code compliance.