

Residential EV Daily Energy and Charger Power Calculator

Convert daily driving, vehicle efficiency, charging efficiency, and available home-charging time into an average EV charging-power requirement.

Generated October 10, 2026

<https://www.elecatrix.com/solar-backup-power/residential-ev-daily-energy-charger-power-calculator/>

Inputs

Input	Value	Unit
Daily driving distance	40	mi/day
Vehicle efficiency	3	mi/kWh
Available home charging window	10	h
Charging efficiency	90	%
Entered charging supply voltage	240	V
Optional charger power cap	9.6	kW

Results

Result	Value	Unit
Battery driving energy needed	13.3333	kWh
Estimated wall energy needed	14.8148	kWh
Average required charger power	1.4815	kW
Estimated current at entered voltage	6.1728	A
Charger power margin	8.1185	kW
Miles replaced per charging hour	4	mi/h

Calculation details

Detail	Value	Unit
Charger cap comparison	Entered charger cap is at or above the average daily-energy requirement.	

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Calculation basis	Daily driving energy is converted to wall energy using the entered vehicle efficiency and charging efficiency. Average power divides wall energy by the available home charging window.
Installation boundary	Daily-energy estimate only; no EVSE circuit, breaker, conductor, service, load-management, vehicle approval, or code-compliance result is made.

Formulas

$$E_{\text{drive}} = (\text{daily miles} / \text{vehicle efficiency})$$

$$E_{\text{wall}} = \text{frac} E_{\text{drive}} \eta_{\text{charging}}$$

$$P_{\text{avg}} = \text{frac} E_{\text{wall}} t_{\text{charge}}$$

$$I = \text{frac} P_{\text{avg}} \times 1000V$$

$$P_{\text{margin}} = P_{\text{charger cap}} - P_{\text{avg}}$$

Warnings and limitations

This is a daily-energy planning estimate. Vehicle consumption, charging taper, temperature, HVAC use, behavior, EVSE settings, load management, circuit capacity, and adopted code requirements require separate review.