

ELECTRIC VEHICLES & SOLAR

Customizing your solar power system for electric vehicle charging



Electric vehicles are a great way to reduce your reliance on fossil fuels, but have you ever wanted to take it a step further and charge with solar energy?

The most important place to start is to make sure your solar PV system is the proper size.

Information Needed

- Range of EV
- Battery Capacity of EV (kWh)
- Daily Commute Distance
- Hours of Ideal Sunlight *

Example: Tesla Model 3

- Range: **358 miles**
- Battery Capacity: **73.5 kWh**
- Daily Commute Distance: **50 miles**
- Hours of Ideal Sunlight: **5 Hours**

* Most southern states including Florida and Alabama receive about 5 hours of ideal sunlight each day.

STEP 1 - Determine kWh per Mile

How much energy are you consuming per mile?

Battery Capacity ÷ Range

$$73.5 \text{ kWh} \div 358 \text{ miles} = \mathbf{0.2053 \text{ kWh/mile}}$$

STEP 2 - Determine Total kWh per Day

What is your daily consumption for EV travel?

Commute x Total kWh per Mile

$$50 \text{ miles} \times 0.2053 \text{ kWh/mile} = \mathbf{10.31 \text{ kWh/day}}$$

STEP 3 - Determine Solar PV Size

How much solar do you need to power your EV?

Formula: kWh per Day ÷ Hours of Sunlight

$$10.3 \text{ kWh/day} \div 5 \text{ Hours} = \mathbf{2.1 \text{ kW}}$$

Keep in mind that some energy loss occurs during a power conversion depending on a variety of factors including system design, equipment, and shading.

Increase your calculated system size by about 20% to account for these losses.

In this example, the 2.1 kW system should be closer to 2.5 kW.