PSCenergy

A Comprehensive Guide

How Much Solar (and Battery) Do You Need to Charge an EV in Australia?

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Introduction

If you're thinking about getting solar to power your home and your electric vehicle, you're probably wondering: **How much solar and battery storage do I actually need to charge my car at home?**

It's a fair question. And once you add up home usage, night-time charging, and maybe even a second EV in the future, it's easy to feel overwhelmed.

At PSC, we give you real numbers so you can make the best decision for your unique energy needs and goals. You'll get some in this article, along with how you can pair an EV with solar.

In this article, you'll learn about the following:

How Much Energy Does an EV Actually Use?

What If You Charge Your EV at Night?

How Much Does It Cost to Charge an EV?

EV Charging and Solar Sizing Guide

How Big Does Your Solar System Need to Be to Charge an EV?

Real Example: Charging from Solar on the Weekend

By the end, you'll understand exactly what to plan for and how to make the most of solar power to drive your EV further, cheaper, and smarter.

How Much Energy Does an EV Actually Use?

Let's start with the car. In this case, the example used is a Tesla Model S Performance. It has a 100kWh battery and gets about 500 km on a full charge in real-world conditions. We're also going to use this example because the math is easy.

Forget the brochure range of 600 km. Real-life driving, whether it's highway or city, averages out to around 500 km per charge. That means this car uses about **20kWh for every 100 km of driving.**

This number is key. The ratio between kilowatt hours and kilometres scales up or down to your needs.

It lets you determine how much energy your EV will use based on your driving habits. Drive 50 km a day? You'll need about 10kWh. Drive 100 km? You'll need about 20kWh.

If you're interested in learning a bit more about the Tesla Wall Connector, you might want to check out the following article titled, Tesla Car Charger Review: Is It Right for You?

How Much Does It Cost to Charge an EV?

If you charge your EV from the grid at full retail price (around $0.38 per kWh in 2025), a full charge of 100kWh will cost you about **$38.**

That gets you 500 km of range. Compare that to a petrol car that might cost double or triple to go the same distance. Even if you pay full retail for the electricity, **EVs are still much cheaper.**

But if you charge using solar, that cost can drop near zero.

If you're interested in learning a bit more about public charging stations, you might want to check out the following article titled, Electric Vehicle (EV) Charging Guide 2024.

How Big Does Your Solar System Need to Be to Charge an EV?

To charge your EV at home using solar, you need to size your system based on two things:

How much energy your ***home*** uses.

How much energy your ***car*** needs.

If you already have a solar system sized for your home – let's say **11.5kW** – you'll need to add **another 5 to 6kW** just to cover your EV's needs. That means your total solar system should be somewhere between **16 and 20kW.**

Here's how that works:

A 20kW solar system in Australia can produce around **78kWh per day** (based on 3.9 average peak sun hours).

That gives you enough energy to power your home ***and*** deliver the 20kWh or more your EV might need for daily driving.

This setup works best if you charge during the day while the sun is out. But what if you can't?

If you're interested in learning about other EV charger options, you might want to check out the following article titled, Zappi Charger Review: Is It the Right Choice for You?

What If You Charge Your EV at Night?

Many people drive to work and come home after sunset. If you want to charge your EV at night, you'll need a battery to store that solar energy during the day.

Let's say you need **20kWh to charge your EV overnight**. Then you'll need **at least 20kWh of battery storage**. And that's just for the car.

You'll need more storage if you also want your home to run on solar at night. Two **Tesla Powerwall 3s** (with 27kWh capacity total) would give you the breathing room you need.

This setup lets you charge your EV after hours, run your home on solar at night, and avoid expensive peak-time grid rates.

If you're interested in learning a bit more about bidirectional EV charging, you might want to check out the following article titled, Bidirectional EV Charging in Australia Explained: Your Guide to V2G, V2H, and V2L.

Real Example:

Charging from Solar on the Weekend

At a home in Kurmond, NSW, one EV owner had a 30kW solar system and Tesla Powerwalls. His daily commute was about 25 km, so he didn't need to charge during the week. Instead, he topped up the car on weekends.

Here's how he made it work:

- He set the charger to start at 8:00 a.m. and run all day.
- He reduced the charge rate to 10kW so the solar could run the house and fill the batteries.
- He avoided drawing power from the grid and kept battery cycling low.

This system lets him add 60kWh to the car in a day, while also keeping the house powered and the Powerwalls topped up.

Real Example – Continued

When a second EV came into the picture, they had to repeat the process on Sunday. They used both weekend days to charge their cars while carefully managing solar production.

Multi-EV homes have higher energy demands. It's not just double the kWh – you also need more flexibility and smarter planning.

Some families, like the one in the Kurmond example, planned weekend charging routines. Others may need to invest in bigger solar systems (25–30kW) and multiple batteries to handle the load.

Workplace charging can also help ease the pressure.

Some employers are starting to offer free EV charging during the day. For example:

- **Westmead Children's Hospital** has installed 70 EV chargers for staff.
- **PSC Energy** allows staff to charge EVs for free using their solar-powered system.

If you can charge your EV at work using solar, you can reduce the size of your home solar system and may not need as much battery storage.

If you're interested in learning a bit more about the importance of a good installer for your solar (the most important component of any system, seriously), you might want to check out the following article titled, In-house Installers vs. Subcontractors: Which is Better?

EV Charging and Solar Sizing Guide

Okay. We have a lot of great information about EVs, the storage needed to charge it, and the solar needed on the home to charge the solar battery. It's a lot of math.

If you want to digest the math, we've included a step-by-step example below with tables and equations explaining it.

These handy charts will explain things for you, along with the statistics from the manufacturer about each electric vehicle.

The first chart listed here will be an example that we return to throughout the rest of the charts. This one will help you determine what size solar system and battery storage you need before you factor in an EV.

Please Note: This daily usage assumes that 40% of energy **(excluding car charging)** is used during the day.

EV Charging and Solar Sizing Guide

Consumption /24 hours	5kWh	10kWh	15kWh	20kWh	25kWh	30kWh	35kWh	40kWh	45kWh	50kWh
Solar needed	1.28kW	2.56kW	3.85kW	5.12kW	6.41kW	7.7kW	8.98kW	10.24kW	11.54kW	12.82kW
Battery needed if 60% night time with no allowance for backup reserve	3kWh	6 kWh	9 kWh	12 kWh	15 kWh	18 kWh	21 kWh	24 kWh	27 kWh	30 kWh
If adding 20% backup reserve capacity	0.6kWh	1.2 kWh	1.8 kWh	2.4 kWh	3 kWh	3.6 kWh	4.2 kWh	4.8 kWh	5.4 kWh	6 kWh
Total battery capacity including reserve	3.6kWh	7.2 kWh	10.8 kWh	14.4 kWh	18 kWh	21.6 kWh	25.2 kWh	28.8 kWh	32.4 kWh	36 kWh

We'll be referring back to the above table as we do calculations for each electric vehicle. It's an excellent resource that gives insight into how to size a battery to your solar system size.

For the purposes of this article, we'll assume the EV will commute **100 kilometres per day**. We've included other options and posted them in the enclosed tables.

We'll also assume **35kWh per day of energy used by the home**.

Let's use the Tesla Model Y as an example, so you'll know where we got our figures for the entire chart.

Tesla Model Y

Given by the manufacturer:

- AC Charging Power – 11kW
- AC Charging Time – 8 hours
- DC Charging Power – 250kW at a Tesla Supercharger station
- DC Charging Time – 27 minutes
- EV Battery Capacity – 78.1kWh
- Distance per Charge – 514km

Figures calculated in the following tables:

- Ave kms/kWh – **?**
- Solar System Size – **?**
- Solar Battery Size – **?**

Pick how many kilometres you are likely to commute every day.

This first table only accounts for EV kilometres and kilowatt hours for the electric vehicle. This does not include home loads. The table above does that.

Kilometre per day	50	100	150	200	250
kWh/day	7.6 kWh	15.2 kWh	22.8 kWh	30.4 kWh	38 kWh
Battery size if completely charging after sun hours from solar battery.	7.6kWh	15.2 kWh	22.8 kWh	30.4 kWh	38 kWh
Solar needed to charge from home battery during peak sun hours (PSH).	2kW	3.9kW	5.8kW	7.8kW	9.7kW

To fill out the above chart, you need to know the average kilometres per kilowatt hour (km/kWh). If you drive 50 km per day, you will divide distance per charge for a Tesla Model Y by EV battery capacity.

514km per kWh / 78.1 kWh = 6.58 km/kWh is the average kilometres per kilowatt hour of driving distance.

Then you take the kilometres per day you drive, we'll say it's 100. Divide it by the average km/kWh.

100 km / 6.58 km/kWh = 15.2 kWh used by the EV to travel 100 km per day

Next, we need to determine how much solar is required in order to charge the EV for 15.2kWh. This is done by dividing 15.2 by 3.9 peak sun hours. Peak sun hours are the hours in a day when sunlight is strong enough to produce 1,000 watts of solar energy per square metre.

15.2 kWh / 3.9 PSH = 3.9 kW extra is needed to charge your EV from solar.

Next up, we need to look at how much combined storage and solar is needed to run your home and your EV.

Total daily kms	100kms
Total storage needed	15.2kWh
Total solar needed to charge car only	3.9kW
Total kWh used by home only	35kWh
Total storage needed for the home only	25.2kWh
Total solar needed for home only	8.98kW
COMBINED STORAGE NEEDED FOR CAR AND HOME	(15.2kWh + 25.2kWh) = 40.4kWh
COMBINED SOLAR NEEDED FOR CAR AND HOME	(3.9kW + 8.98kW) = 12.88kW

Here are the statistics for a Tesla Model Y again, now that the math done:

Tesla Model Y

- AC Charging Power – 11kW
- AC Charging Time – 8 hours 15 minutes
- DC Charging Power – 250kW at a Tesla Supercharger station
- DC Charging Time – 27 minutes
- EV Battery Capacity – 78.1kWh
- Distance per Charge – 514km
- Ave kms/kWh – **6.58 kms/kWh**
- Solar System Size – **12.88kW**
- Solar Battery Size – **40.4kWh**

BYD Atto 3

- AC Charging Power –7.4kW
- AC Charging Time – 9 hours
- DC Charging Power – 88kW
- DC Charging Time – 40 minutes
- EV Battery Capacity – 60.5kWh
- Distance per Charge – 480km
- Average kilometres per kilowatt hour – 7.9 km/kWh
- Solar System Size – 12.28kW
- Solar Battery Size – 37.9kWh

Tesla Model 3

- AC Charging Power – 11kW
- AC Charging Time – 6 hours 15 minutes
- DC Charging Power – 250kW at a Tesla Supercharger station
- DC Charging Time –25-30 minutes
- EV Battery Capacity – Up to 75kWh
- Distance per Charge – 629km
- Average kilometres per kilowatt hour – 8.4 km/kWh
- Solar System Size – 12.8kW
- Solar Battery Size – 37.1kWh

Kia EV6

- AC Charging Power – 11kW
- AC Charging Time – 7 hours 20 minutes
- DC Charging Power – 233kW
- DC Charging Time – 18 minutes
- EV Battery Capacity – 82.5 kWh
- Distance per Charge – 528 km
- Average kilometres per kilowatt hour – 6.4 km/kWh
- Solar System Size – 12.1kW
- Solar Battery Size – 40.8kWh

Hyundai Ioniq 5

- AC Charging Power – 11kW
- AC Charging Time – 9 hours
- DC Charging Power – 233kW
- DC Charging Time – 18 minutes
- EV Battery Capacity – Up to 84 kWh
- Distance per Charge – Up to 570km
- Average kilometres per kilowatt hour – 6.8 km/kWh
- Solar System Size – 12.8kW
- Solar Battery Size – 39.9kWh

Polestar 2

- AC Charging Power – 11kW
- AC Charging Time – 8 hours
- DC Charging Power – 205kW
- DC Charging Time – 34 minutes
- EV Battery Capacity – Up to 75kWh
- Distance per Charge – Up to 659 km
- Average kilometres per kilowatt hour – 8.8 km/kWh
- Solar System Size – 11.9kW
- Solar Battery Size – 36.6kWh

MG 4

- AC Charging Power – 11kW
- AC Charging Time – 7.5 hours
- DC Charging Power – 135kW
- DC Charging Time – 35 minutes
- EV Battery Capacity – Up to 77kWh
- Distance per Charge – Up to 530km
- Average kilometres per kilowatt hour – 6.9 km/kWh
- Solar System Size – 12.7kW
- Solar Battery Size – 39.7kWh

Volvo EX30

- AC Charging Power – 11kW
- AC Charging Time – 8 hours
- DC Charging Power – 150kW
- DC Charging Time – 30 minutes
- EV Battery Capacity – 69kWh
- Distance per Charge – 462km
- Average kilometres per kilowatt hour – 6.7 km/kWh
- Solar System Size – 12.8kW
- Solar Battery Size – 40.1kWh

BMW i4

- AC Charging Power – 11kW
- AC Charging Time – 8 hours 15 minutes
- DC Charging Power – 205kW
- DC Charging Time – 31 minutes
- EV Battery Capacity – 84kWh
- Distance per Charge – Up to 520km
- Average kilometres per kilowatt hour – 6.2 km/kWh
- Solar System Size – 13.1kW
- Solar Battery Size – 41.3kWh

Kia EV9

- AC Charging Power – 11kW
- AC Charging Time – 8 hours
- DC Charging Power – 210kW
- DC Charging Time – 27 minutes
- EV Battery Capacity – 99.8kWh
- Distance per Charge – Up to 512km
- Average kilometres per kilowatt hour – 5.1 km/kWh
- Solar System Size – 14kW
- Solar Battery Size – 44.8kWh

Hyundai Kona Electric

- AC Charging Power – 11kW
- AC Charging Time – 9 hours
- DC Charging Power – 77kW
- DC Charging Time – 45 minutes
- EV Battery Capacity – 65.4kWh
- Distance per Charge – Up to 514km
- Average kilometres per kilowatt hour – 7.9 km/kWh
- Solar System Size – 12.3kW
- Solar Battery Size – 37.9kWh

Cupra Born

- AC Charging Power – 11kW
- AC Charging Time – 7 hours 30 minutes
- DC Charging Power – 125kW
- DC Charging Time – 25 minutes
- EV Battery Capacity – 77kWh
- Distance per Charge – 550km
- Average kilometres per kilowatt hour – 7.1 km/kWh
- Solar System Size – 12.6kW
- Solar Battery Size – 39.3kWh

MG ZS EV

- AC Charging Power – 7kW
- AC Charging Time – 7 hours
- DC Charging Power – 50kW
- DC Charging Time – 40 minutes
- EV Battery Capacity – Up to 72.6kWh
- Distance per Charge – Up to 440km
- Average kilometres per kilowatt hour – 6.1 km/kWh
- Solar System Size – 13.2kW
- Solar Battery Size – 41.6kWh

Mercedes-Benz EQB

- AC Charging Power – 11kW
- AC Charging Time – 7 hours 15 minutes
- DC Charging Power – 100kW
- DC Charging Time – 35 minutes
- EV Battery Capacity – 66.5kWh
- Distance per Charge – 371km
- Average kilometres per kilowatt hour – 5.6 km/kWh
- Solar System Size – 13.6kW
- Solar Battery Size – 43.1kWh

Audi Q8 e-tron

- AC Charging Power – 11kW
- AC Charging Time – 11 hours 30 minutes
- DC Charging Power – 170kW
- DC Charging Time – 31 minutes
- EV Battery Capacity – 114kWh
- Distance per Charge – 454km
- Average kilometres per kilowatt hour – 4 km/kWh
- Solar System Size – 15.4kW
- Solar Battery Size – 50.2kWh

Ford Mustang Mach-E

- AC Charging Power – 10.5kW
- AC Charging Time – 11 hours
- DC Charging Power – 150kW
- DC Charging Time – 32 minutes
- EV Battery Capacity – Up to 91kWh
- Distance per Charge – Up to 600km
- Average kilometres per kilowatt hour – 6.6 km/kWh
- Solar System Size – 12.9kW
- Solar Battery Size – 40.4kWh

Volvo C40 Recharge

- AC Charging Power – 11kW
- AC Charging Time – 8 hours
- DC Charging Power – 150kW
- DC Charging Time – 32 minutes
- EV Battery Capacity – Up to 78kWh
- Distance per Charge – Up to 476km
- Average kilometres per kilowatt hour – 6.1 km/kWh
- Solar System Size – 13.2kW
- Solar Battery Size – 41.6kWh

Nissan Leaf e+

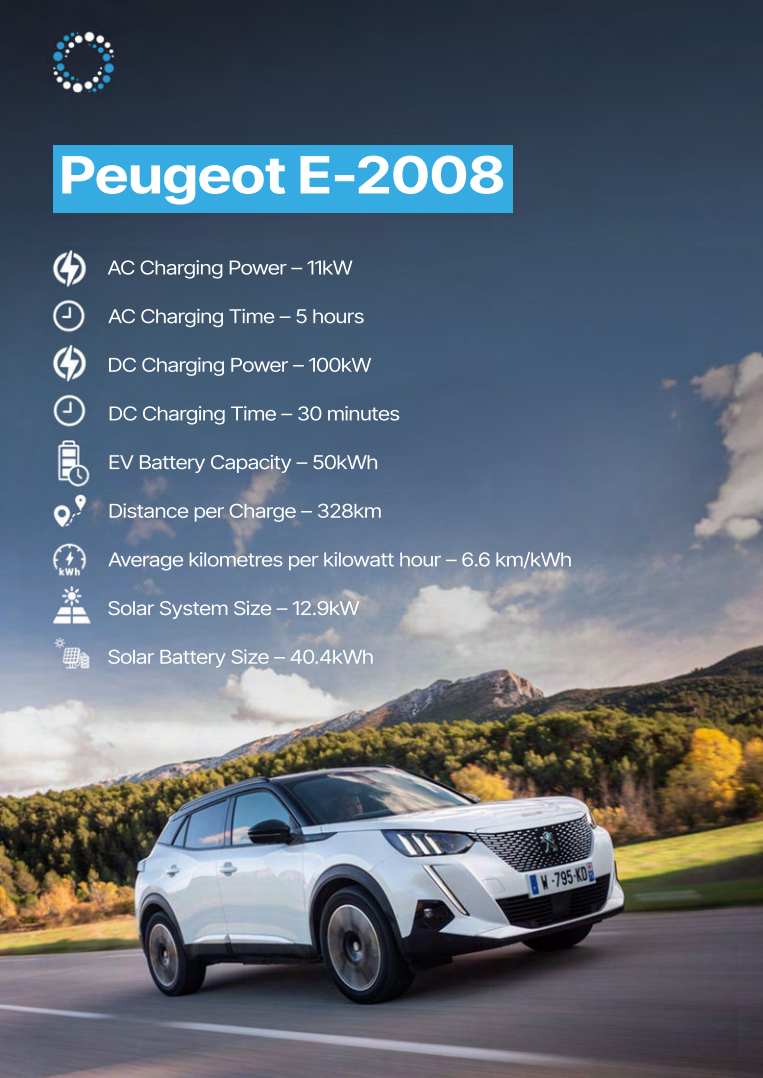
- AC Charging Power – 7kW
- AC Charging Time – 7.5 hours
- DC Charging Power – 50kW
- DC Charging Time – 70 minutes
- EV Battery Capacity – Up to 59kWh
- Distance per Charge – Up to 385km
- Average kilometres per kilowatt hour – 6.5 km/kWh
- Solar System Size – 12.9kW
- Solar Battery Size – 40.6kWh

Subaru Solterra

- AC Charging Power – 11kW
- AC Charging Time – 8 hours
- DC Charging Power – 150kW
- DC Charging Time – 30 minutes
- EV Battery Capacity – 71.4kWh
- Distance per Charge – 485km
- Average kilometres per kilowatt hour – 6.8 km/kWh
- Solar System Size – 12.8kW
- Solar Battery Size – 39.9kWh

Peugeot E-2008

- AC Charging Power – 11kW
- AC Charging Time – 5 hours
- DC Charging Power – 100kW
- DC Charging Time – 30 minutes
- EV Battery Capacity – 50kWh
- Distance per Charge – 328km
- Average kilometres per kilowatt hour – 6.6 km/kWh
- Solar System Size – 12.9kW
- Solar Battery Size – 40.4kWh



Final Thoughts

Charging your EV at home with solar makes sense. It's cheaper, more sustainable, and gives you complete control over your energy. But it takes proper planning.

To get it right, you need to:

- Know how much energy your EV uses
- Add the right amount of solar on top of your home's needs
- Store that energy in batteries if you charge at night

At PSC, we know that with the right system, you can power your car and home from the sun. The goal is Net Zero by 2025, so we can all leave the petrol station behind for good.

If you're interested in learning a bit more about solar batteries, you might want to start with the following article titled,
Adding a Battery to a Solar System.

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