How do I know how much solar power I need?

If you're going off grid and asking yourself "How do I know how much solar power I need," this article is for you. We'll show you how to calculate how much solar power you need, so you can choose the right off grid solar power kit.

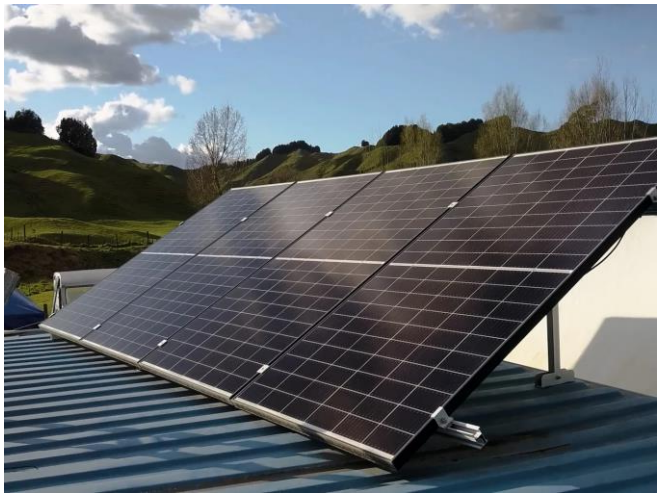
If you're asking yourself "How do I know how much solar power I need?," this article is for you. Calculating your off grid solar power needs requires only a little bit of simple math, but there's a few steps to get you to the right number.

This article will show you how to calculate how much solar power you need to help you choose the right kit.

List your appliances and their wattage.

You first need to establish what appliances and electrical equipment you need to run, and what wattage it is. You may find it helpful to check out some of our examples of common items in the "What can this kit run?" section. You can find the wattage of an item in a few places: the specifications listed on the item itself or in the manual, through use of plug-in wattage meter, or on the energy star rating data.

Small appliances like this toaster will likely have a number like 1800W right on the bottom sticker, and appliances you



are yet to buy will have specs online or an energy star rating you can use. If you have old appliances with no manuals, stickers, or online listings, you can measure it with a meter.

Keep in mind there are a few items that aren't recommended to be run on solar, such as electric ovens, heaters, and hot water cylinders.

Note down how long your appliances will run.

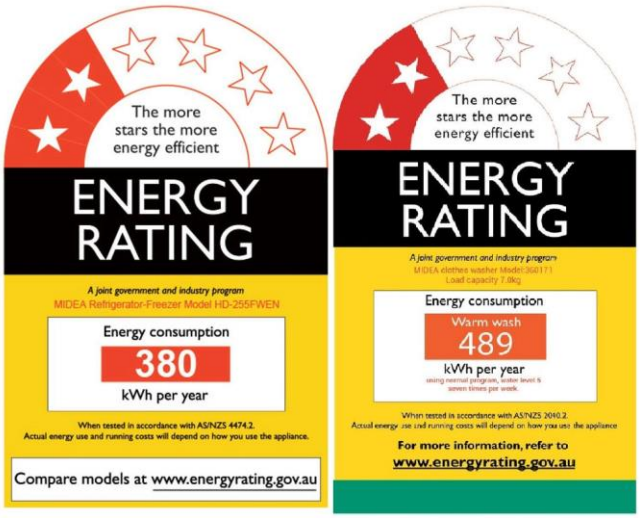
This is the first step of how to calculate how much solar power you need - working out how long each of these things will be running for each day in hours. This will vary from a few minutes to 24 hours a day.

To convert minutes into hours, simply divide them by 60. E.g., 17 minutes / 60 = 0.28 hours, and 137 minutes / 60 = 2.28 hours. Make sure you consider the total run time in a 24-hour period – the kettle might only run for 5 minutes at a time, but you might run it 5 times a day for a total of 25 minutes.

How to calculate how much solar you need: Calculating individual power usage.

With these two numbers you can calculate how much power each item uses during its total running time, which is measured in Watt hours (Wh). Simply multiply the wattage by the hours. For example, an 1800W kettle running for 0.4 hours (25 minutes) each day is 1800 x 0.4 = 750Wh.

Not all appliances are this simple however - for example, a fridge is plugged in 24/7 but typically only uses noticeable power for a few hours a day. Looking at this item's energy star rating you can find a yearly consumption figure (380kWh), and you can simply divide this by 365 (380,000/365 = 1041Wh) to find the daily usage.



Whiteware like washing machines and dishwashers can also be tricky, as they run very different cycles – you can typically find the power usage for each cycle in the manual or online specs, or the energy star rating will provide a yearly figure for a specific wash cycle that is run a set number of times a week.

Pay special attention to things like lights and chargers – are you just running one, or multiple? Make sure you count all of them.

How do I know how much solar power I need? Calculating your daily totals

From here all you need to do is add all these numbers together to calculate your specific daily usage.

Here's a quick example of what a small family living in a fairly energy efficient tiny house might run in a day:

- 2000W Coffee Maker for 10 minutes (300wh)
- 25W Phone Charger for 12 hours a day (300wh)
- 50W Fan for 4 hours a day (200wh)
- Efficient Fridge/Freezer for 24 hours a day (1000wh)
- 1800W Kettle for 10 minutes (300wh)
- 60W Laptop for 12 hours a day (720wh)
- 2000W Microwave for 20 minutes (600wh)
- 600W Water Pump for 2 hours a day (1200wh)
- 20W Wireless Router for 24 hours a day (480wh)
- 100W Television for 4 hours a day (400wh)
- 2000W 4 Slice Toaster for 12 minutes (200wh)
- 500W Cold Washing Machine for 4x a week avg (125wh)
- 250W Lighting (5x 50W Lights) for 6 hours a day (1440wh)
- 375L Chest Freezer for 24 hours a day (460wh)
- 60W Cordless Tool Charger for 12 hours a day (720wh)

This totals 8,445Wh per day.

So how do you know how much solar power you need using that number? It's pretty simple with our kits – the total power generation for each kit is listed, so you just need to make sure that your total usage is below that.

For example, our Freedom Kit is estimated to generate 9,000Wh of power each day, provided you get 3 hours of clear sunlight over the whole day, which is the winter average.

We usually recommend your usage being under the generation figure by about 20%. Why? Charge controllers and inverters (especially the hybrid inverter) have a standby draw that will use some of your generated power.

The 20% gap also accounts for any inaccuracies in calculations, and the eventual drop in efficiency of the system as it ages (plus a little wiggle room for when there's below average weather, or brief increases to your power usage). This gap means you won't have to worry about these little things for 90% of the year.

The above usage is about 93% of the total generation of the Freedom Kit on an average winter day, so you'd need to expand or upgrade to comfortably support it. But this list includes a few items that you might choose to ditch or use less over this season, like the microwave, coffee maker, TV, and cordless tool charger. Reducing their usage could easily take you down to 7,125Wh, or 79%.

That means you could happily run all the remaining appliances over the course of the day with the Freedom Kit, while still having wiggle room for the standby draw and any inefficiencies.

If your usage is over that figure and you can't cut back, you can either ask about expanding the Freedom Kit or opting for the larger Lifestyle Kit. And if you're way under, you can look at the smaller kits instead!

How do I know how much solar power I need – what's reasonable?

This is also a time to consider how much you are willing to compromise – what does a regular "worst case" day of power usage look like, and is that reasonable? Just like with the above example, it means taking stock of where you can reasonably cut back your usage for short periods.

Calculating how much solar power you need is about making sure reasonable usage is covered for 80-90% of the year. You'll have plenty of power in high resource times like summer, so you just need to manage your usage over the darkest periods of the year – this could mean reducing usage or having backup power like a generator.

Understanding this will allow you to get a more cost-effective solar solution. The price difference between sizing for 'a little compromise', and sizing for 'never having to worry' can easily be thousands of dollars!

--

By following this calculation guide, you should have a pretty clear idea of which of our solar kits will support your power usage. If you're in between two, or you're unsure, feel free to get in touch and we can have a chat about the best options for you!

--

Learn More:

To learn more about off-gridding, especially solar, make sure you check out our knowledge base at: https://gridfree.store/blogs/how-to-articles/

Check out solar power options, from individual components to complete kits, on our website: https://gridfree.store/collections/complete-off-the-grid-solar-kits