# SOLAR POWER – IMPORTANT INFO

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## What you need to camp with solar power

A self-sufficient solar setup requires camping solar panels for compactness and portability, a solar regulator, a deep-cycle auxiliary battery and an inverter if you're planning to charge 240v appliances such as a laptop or television. The way these products fit together is simple: solar panels gather power from the sun, which then flows into the battery via the solar regulator. Also known as a charge controller, solar regulators are important because they prevent damage to your battery from fluctuating charge or overcharging.

## Storing your solar power

Deep-cycle batteries are the obvious choice for storing solar power, as they can be regularly and deeply discharged without harming the battery's capacity to charge and store power. Keep in mind it's ideal to limit your deep cycle battery's discharge to around 70-50% of its capacity at a time to extend its lifespan, while discharging below 20% capacity will have a negative effect on its lifespan. Meanwhile, using power inverters for camping is a must for those who want to power their 240v AC appliances with the solar power they gather. Inverters change 12v DC (battery) power to 240v AC (household) power. When buying a power inverter for camping, ensure the one you are looking to purchase produces enough power to adequately support the appliances you're using.

## Calculating your solar power requirements

Calculating your equipment's power usage is key to creating a solar power system that's tailored to you. Without a basic understanding of how much power your equipment is using, you could end up purchasing the incorrect battery, solar regulator or wrong-sized solar panel. If any one of these products is too small you could end up with a flat battery earlier than expected, or worse, a damaged solar regulator or battery. To calculate your usage, keep in mind most devices will have its power draw on the label that's on the product, after which you need to work out how long per day you will operate the equipment to calculate it's overall power draw.

Here’s an example of a basic setup: to run a medium-sized fridge that draws 4amps and some LED camping lights that draw 0.25amps each, a 120W folding solar panel kit coupled with a 100amp deep cycle battery and solar regulator would cover your needs and then some. To find out what products you require to fit your needs, check out Redarc's Solar Calculator.

## How much power do solar panels gather?

Sunlight hours, location and a slight loss in output performance above an ambient temp of 25 degrees Celsius make it impossible to accurately calculate how much power your panels will reap. For these reasons, it always makes sense to overestimate your solar panel size when purchasing, which will account for unexpected or extreme weather, as well as when you’re staying in areas that have limited or interrupted sunlight.

Allowing for these factors though in general terms it’s safe to estimate that an 80W panel can supply between 4 and 5 Amps on a sunny day for most of the sunlight hours of the day (with an average of 8 sunlight hours in a day); for a 120W panel, this rises to between 6 to 7.5 Amps.

Mathematically, this would mean that a 120W panel system could supply 2.75 Amps continuously day and night running at no loss. In real world terms, this means that a 120W system linked to a 100Ah battery could supply power to a 50L fridge 24/7 and some camp lights for 6 hours a night for almost 5 days without any other form of charge. However, taking your battery’s need to keep a certain level of charge (to avoid damage to it), this number would settle at around 4 days off the grid when all is said and done.

## Understanding solar power terminology

The relationship between Watts, Volts and Amps can be confusing when misunderstood, though basically:

Watts (Power) = Volts x Amps

Watts, volts and amps form the basis of most solar power jargon, though on their own or even in a formula probably won't make much sense to most campers. To get a better understanding of what these terms mean and how they fit into your understanding of solar power, we can relate them to one another through a simple solar power analogy:

## A Basic Solar Power Analogy

A basic way to understand solar power is to liken a solar setup to a rainwater system. The roof of a house that gathers the water is the solar panel, and the water tank is the battery. The greater the size of the roof, or the more watts a solar panel has, the more water that can be gathered. The water tank is pressurised and connected to a hose, with the water pressure representing voltage and the flow of water (or the water flowing) in the pipe attached to the tank representing amps.

**Watts** - the amount of power the solar panel is producing, with the total wattage of the panel only able to be achieved in perfect conditions, for example the solar panel at the ideal temperature and aligned with perfect sunlight.

**Volts** - the pressure of electricity being produced by the solar panel, similar to the height of water stored in a water tank: the higher the water tank from the ground, the more voltage and so more force for the water to flow.

**Amps** - the actual amount of electricity flowing in the solar panel and cables. We call this flow current, which can be compared to the amount of water flowing into and out of a water tank. The flow of electricity will vary depending on the amount of sun on our solar panel or if the battery is full or empty, large or small.

**Amp-Hour (Ah)** - the steady flow of 1 Amp for one hour, 5 Amp-hour (5Ah) is a flow of 5 amps for one hour.

Here's an example of how Amps relate to Amp-Hours: a battery with a 1 amp-hour capacity should be able to supply a flow of 1 amp of current for one hour, 2 amps for half an hour and so on. A typical camping or auxiliary battery size is 100 Amp-Hour, and if our camping light has a rating of 1 amp we would expect our light to stay on for 100 hours.