

## Episode 6 | How to make solar work for you

In my opinion the only way of recharging your battery system that makes sure you can stay Offgrid for good. If you get this part right the only time you need to get into civilization is when you run out of food or water.

The trick here is oversizing as much as possible. Solar panels are rated to their maximum power output under ideal laboratory like conditions where a certain amount of light energy hits the panel, and the panel is 25 degrees Celsius. Both values are often very different out in the field and with different conditions the power output of the panel might change a lot.

Field testing has shown that oversizing your mobile solar system by a factor of 2 will cover you for most scenarios. If you need a 150W solar panel in an ideal world choose a 300W solar panel to overcome limiting factors in the field.

### **Fixed Panels - Roof Mounted**

Roof mounted panels in mobile setups are great if you park in the sun. When you choose your roof solar setup this should be your first thought: **Will I be parking in the shade most of the time?** If the answer is yes, then choose a small roof solar system which will be enough to keep accessories running that are usually on all the time even if the vehicle or trailer is parked up without being used or while you are away from your setup for a few days. For example: You might be parked at a harbor to go on a fishing trip while you still want your fridge running. Or your fridge is always on even while you are in town without driving a lot. A flat mounted roof solar panel is ideal for these scenarios.

In large caravans, campers, or motorhomes roof solar is great because you will have the option of shade or not depending on your energy needs. If done right, you can generate enough solar energy to run your aircon and stay cool even while parked in the sun and recharging your batteries at the same time. To get the most out of a large roof solar system make sure to run high voltage, multi segmented panels or run standard automotive panels in series and create multiple parallel strings to have a better partial shading tolerance. See example for MPPT regulators in how to charge your deep cycle battery.

### **Mobile Panels**

This is your option if you usually park in the shade or if you want to extend your solar system past the available roof space. Your setup can have an external solar panel plug in point, plug in an extension cable and set up your panels in the sun while camping in the shade. You have got the option in between foldable solar panels with an aluminium frame or solar blankets / mats. Both work well and it will depend on the money you want to spend and the space available which one will be the right choice for you.

Foldable solar panels are bulky and heavy. They are hard to store because of their size. On the plus side they are a lot cheaper than solar blankets and their aluminium frame protects the panel well.

Solar blankets are relatively lightweight and fold up small which makes them easy to store. It is important to check the product quality before buying. The quality of the fabric which is being used to hold the panel together needs to be very heavy duty to stand the test of time and the harsh

conditions in the field. The downside is that solar blankets are very expensive compared to foldable solar panels.

### **Panel Orientation**

In theory it is best to set the angle of the panel in way that it is perpendicular to the sun. That will give you without a doubt the best performance of your panel.

In the field this is not so easy to achieve. If you have a fixed roof mounted panel and set it on an angle you must make sure you park your vehicle facing north. If you don't you lose production compared to a flat mounted roof panel. The problem is that a lot of times we are not able to park our vehicle facing north may it be because of the terrain, the view, wind direction or space available at camp. To make sure you do not have to worry about making sure you face north it is best to mount the panel flat on the roof which will also give you the best protection for the panel while driving.

Mobile foldable solar panels often come with inbuilt frames to angle them towards the sun. If you use these panels and stand them up, make sure you face them north or move them with the sun during the day otherwise you will lose production. For solar blankets it is the easiest to just lay them flat on the ground. If it is windy, they can be pegged down in the corners.

Never hang your panel of the side of your vehicle or awning or other things. This will reduce production a lot. Always try to have the panel as perpendicular to the sun as possible / practical.

### **Heat**

Solar panels generally work better if they are cooler. If you mount a fixed panel, make sure you allow for ventilation under the panel. If you use a mobile panel do not put it on a hot bonnet or any other surface that will heat up during the day.