

UNDERSTANDING SOLAR & ENERGY USE – The Tent Stake™

The Power Audit

When determining what size system you want to have, it's important to determine the amount of power you require for the 'wants' of your family. First thing, we are going to be talking in watts, because watts are how energy is measured; i.e.: lightbulbs, microwaves, blow driers, charge cords, etc. After you have found the wattage of the items you want to use, approximate the time they will be used in a day. Like a radio is 50watts x 5hrs of usage = 250watts. At this point, add up all the loads you have calculated. This will give you the battery capacity for your families total calculated load usage. Now, take that number & double. I like to do this because of cloudy days & if there is more usage than anticipated or is normal.

Batteries – AKA: The Tank

Ok, now, your camper most likely came with a standard lead acid battery, & you're probably not happy on how long it lasts while rustic camping. These batteries are rated in Amp Hours, or AH, meaning how many amps can they supply in one hour. So, we said we do everything in watts. This is the formula for converting AH into watts. $12.7\text{volts} \times 200\text{ah} = 2540\text{WH}$ or 2540watts for an hour. The fact is, lead acid batteries only have half the rated output. A 110ah battery has 55ah, that's 660wh, or 660watts for 1 hour. That's it. And it weighs 75 lbs.!

➤ Other disadvantages:

- Lead acid (LA) is slow to charge.
- The life span is pretty short.
- Maintenance for LA is adding water a few times a year.
- Not good for interior mounting, because it gives off flammable hydrogen gas.

I only recommend LIFEPO4 (Lithium Iron Phosphate) batteries. More expensive to start, but will last for many more years!

➤ Other added bonuses:

- Much lighter! My 200ah 2500wh weighs 47lbs.
- 100% usable rated capacity. That's twice the usable power of LA.
- Charges 5 times faster than LA.
- Can be mounted inside.

Replacing your stock battery with a 200ah LIFEPO4 will have a noticeable difference.

You can start with one and add another, in parallel, later. (That's Pos to Pos and Neg to Neg)

Now you have your batteries figured out!

Solar Panels – AKA: The Power Producer

This is where there may be some skewed expectations. The salesman said, "It is solar ready for boondocking!" with one 100-watt panel. Or the "It's solar ready!" That's a good one. When someone asks me how much solar they need, I say really, as much as you can fit on the roof, but 600watts is a good start. With the 200ah/2540wh battery, that's a little over 4 hours to charge in full sun. Remember, the battery is the "tank" and the solar panels are how we "fill the tank." The more wattage in panels the faster the battery is charged. There are the suitcase type panels that sit on the ground. Those can be nice to have for an extra boost, if needed, on a cloudy day, but the roof mounted panels will be more desirable. Residential panels can bring some big wattage to the game, for sure, but be careful of the weight.

Solar Charge Controllers – AKA: The Converter

The solar panels make DC power, but we can't just hook them to the batteries, as is. The voltage from the panels can be anywhere from 18-52 volts. We need 12. So, we use a charge controller to handle the magic of getting it to the 12-volt range. There are many brands to choose from, but for me there is only one, Victron Energy! They are currently (no pun intended!) the top of the game for the industry. Also, the MPPT type is what you will want. They are most efficient. Depending on the number of panels and how big they are, will determine whether you need more than one charge controller.

This raises a lot of questions, I know! It can feel overwhelming at first. This is a brief overview of getting some solar for your rig and what considerations you should be thinking about when determining cost. Not ready to go with panels on the roof yet? See our section on Power Stations/Solar Generators. But remember, the Watt Hour rating, Wh, when sizing.