How to calculate what system you will need

To start designing a system you need to know your requirements first. Ideally you do NOT start with the question what products do I want to install but rather with these questions:

- How much energy do I use per day?
- How long will I be stationary for max? Use the worst-case scenario.
- How long will I drive in between stops min? Use worst case scenario.

How much energy do I use per day?

This is only an estimate because your energy consumption relies on a lot of external factors that will vary with almost every trip away. For example, a fridge will use more energy in summer than in winter and it will also use more energy when a lot of warm drinks need to be cooled down rather than just keeping something cold. Here are some energy consumption examples :

!!! IMPORTANT all these numbers and the following calculations are based on a 12V system !!!

- Small to medium fridge 25 – 35 Ah/day + 10Ah/day for freezer
- Medium to large fridge 35 – 45 Ah/day + 20Ah/day for freezer
- Induction cooking dinner and breakfast 150Ah/day
- Travel Buddy 12Ah/hour
- 6 ltr hot water system on 12 Volt 15 – 25 Ah/charge
- 10 ltr hot water system on 12 Volt 25 – 35Ah/charge
- Small camping lights 10Ah/night
- Coffee machine through inverter 4Ah/cup
- Small inverter in idle 10Ah/day
- Large inverter in idle 20Ah/day
- Phone and small light charging 10Ah/day
- CelFi Go 10Ah/day
- Ice machine through inverter 8Ah/hour
- Waterpump 5Ah/day
- Kettle through inverter 15 – 20 Ah/litre

How long will I be stationary for?

For this we need the maximum time that the vehicle will not move. This will determine how big the battery bank and the solar system will be because we will not have any charging from the alternator during this time.

How long will the vehicle be driven in between stops?

This will be the minimum driving time during camping stays. This time will determine how much charge current your alternator charging system needs to supply to recharge your battery bank in between stays.

Practical Example

Consumers:

•	Medium fridge (always running)	35Ah
•	Phone and light charging	10Ah
•	Camplights	10Ah
•	Water pump	5Ah
•	Travel Buddy (2hrs)	24Ah
•	Hot water system 6ltr (1charge per day)	25Ah
•	Total	109Ah

Maximum time stationary:

Overnight stays mainly but a few times a year stationary for 7 days.

This makes our maximum stationary time 7 days.

Minimum driving time:

The drives in between longer stays will be a minimum of 4 hours.

Conclusion:

We need to make sure that we have roughly 100Ah of energy available for 24 hours of being off grid. We use 48hrs as the time that you want to be able to be stationary without the need to charge. This way we make sure that even during rainy days you do not run out of power straight away when there is no solar charging available (which is the main energy source we use in Australia when stationary). We will need 200Ah of useable battery capacity for a 48 hour period.

To make sure we can stay off grid for a whole week we need solar panels. A 300W solar blanket will give you roughly 100Ah into a 12V battery per day. A bit less in winter a bit more in summer.

In 4 hours of driving, we need to be able to charge a 200Ah battery. We will need a 50A charger to do that.

In the next episode we will learn how to pick the right batteries and chargers your system and in the episode after that we get deeper into how to design your solar system.