Calculating Solar Panel Requirements

Article · January 2019

CITATIONS
0

READS
275

1 author:

Sooraj Surendran
Ostrich Mobility Instruments
5 PUBLICATIONS **3** CITATIONS

SEE PROFILE

Calculating Solar Panel Requirements

Author : Sooraj Surendran , Senior Engineer Electronics, Ostrich Mobility Instruments

Important things to choose while selecting Solar Panels are :

1, Amount of Energy Battery can store.
2, Amount of energy appliances use over an period of time.
3, Energy Solar panel can create over a period of time.

Detailed Calculation :

Amount of energy battery can store is calculated by :

Battery capacity is measured in Amp Hours (e.g. 24 AH). Need to convert this to Watt Hours by multiplying the AH figure by the battery voltage (e.g. 12V). this is just the simple calculation below :

- X (Battery size in AH) x Y (Battery Voltage) = Z (Power available in watt hours
- For a 24AH, 12V battery the Watt Hours figure is 24(X) x 12(Y) = 288 WH (Z)

This means the battery could supply 288W for 1 hour.

However you are never really able to take all the power from a battery as once the voltage drops below your equipment's requirements it will no longer be able to power it.

- Lead acid battery's will give you around 50% of their rated power. (i.e. a 10Ah battery has 5Ah of usable power)
- Li-ion battery's will give you around 80% of their rated power. (i.e. a 10Ah battery has 8Ah of usable power), Normal Battery is not suitable for solar applications, there are specially designed deep cycle batteries for Solar Applications.

Energy Appliances Use for a Period of Time :

The power consumption of appliances is generally given in Watts (e.g. A small portable TV is around 20 W this information can be found on the data sticker that most electrical items have). To calculate the energy you will use over time, just multiply the power consumption by the hours of intended use.

The 20 W TV in this example, on for 2 hours, will take 20 x 2 = 40 WH from the battery.
Repeat this for all the appliances you wish to use, then add the results to establish total consumption like below.

An easy way to lower your power usage is to swap out halogen lights for LED lights. LED lights generally use 80% less energy for a similar light level.

Energy Solar Panel Generating Over a Period of Time :

To calculate the energy it can supply to the battery, you multiply Watts (of the solar panel) by the hours exposed to sunshine.

Using the above calculation takes into consideration any losses in the system from the regulator, cables and battery you may be using.