

Solar Panel Basics

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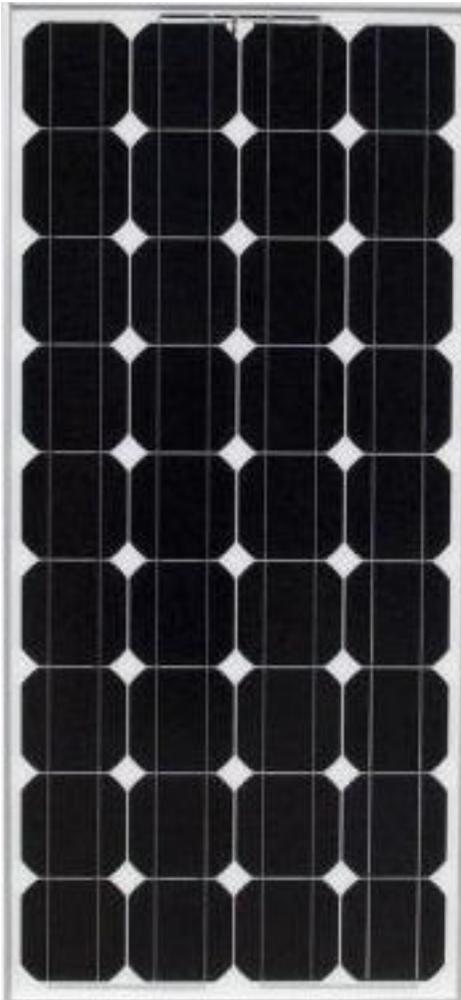
First off, the panels need to be mounted in a good spot for sun and out from under trees etc. they should be at a 30 degree angle pointed south.

A. Solar panel output

1. The panels are a sun only source of energy.
2. Generally speaking from ramping up to 10 AM until 2 PM ramping down.
3. The more panels, the more energy captured.
4. A blocking diode is needed for darkness to prevent battery discharge through the panels.

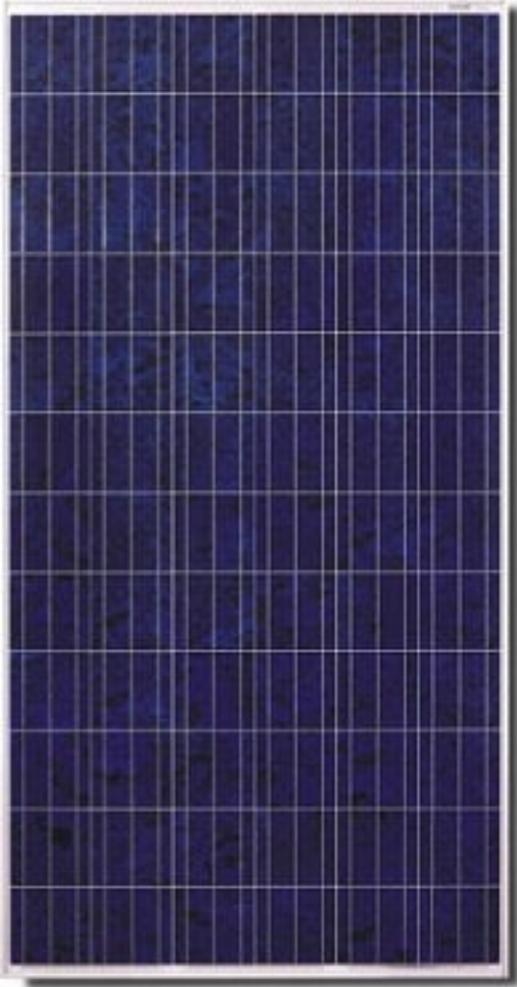
B. The three types of solar panels are Monocrystalline, Polycrystalline, and Amorphous.

C. The monocrystalline



1. The mono is at the top of the list for output to surface area.
2. In fact the mono panel will out perform the amorphous 4 to 1.
3. The mono panel can be noticed by the squared off corners of the cells.
4. The cells are made from a solid rod of silicon of high purity and cells are sliced from this rod. The higher efficiency comes from the high quality.

D. The Polycrystalline panel is close to the mono but not as efficient.



1. The poly is the most common panel used for home owner installations.
2. The poly panel can be quickly recognized by it's little square segments that have a distinct blue flakey look.
3. The poly is made from pouring molten silicon into a mold form.

E. The Amorphous panel is at the bottom of the barrel as far as solar panels.



1. This type panel is usually found at Harbor Freight and made in China.
2. This panel out performs both of the other two in lower light levels.
3. These panels are sold in a kit of 3-15 watt panels combined = 45 watts.
4. The cost is rather high for what you wind up with.
5. These are made by spraying a thin film of silicon on a plastic sheet.

F. The battery: Heart of the solar system and an important consideration.

1. The every day car battery will do in a pinch but because it is made of thin plate material, and will soon fail under a deeper discharge than normally seen in the average vehicle. It can only be discharged to 80%.
2. The lead acid battery gasses when charged above 14.25 volts and that gas is explosive hydrogen produced and needs proper ventilation, and not something that you want in your closet.
3. The better lead acid battery is the common golf cart or deep cycle marine battery with thick plates letting it discharge to near 50% of charge. These also create hydrogen gas if over charged and not a household item.
4. The cats meow of batteries is the Absorbed Glass Matt battery commonly known as an AGM battery. These will do a 50% discharge and keep on ticking, and with proper care can last past ten years of use. They are sealed and are much safer to keep in your garage. They are quite pricey and some times can be found at the scrap yard for pennies on the dollar, de-sulfated and used for a while more.

G. The charge controller: an important part of the solar charging system.

1. The charge controller is vital to maintaining a battery or battery bank.
2. The charge controller keeps the battery from becoming overcharged. It automatically blocks the batteries from drain down overnight.
3. It stops the solar charging when the battery is fully charged.
4. There are many prices and amperage models for the solar system.
5. I have found a 20 amp controller on eBay for \$6.00, made in China.

H. The last item needed is the inverter, and there are two types of inverters.

1. The composite wave is the most common type sold in stores.
 - a. The composite wave is cheap and works in most cases bit creates a buzz on fans, can overheat wall wart transformers, and terrible TVI.

b. This type is sold in automotive stores and work with drills saws, etc

2. The pure sign wave inverter is the Cadillac of inverters and low noise.
3. These are quite a bit more expensive than the composite wave but better suited for running a refrigerator or other motorized appliances.
4. Inverter sizing is directly proportionate to your load needs. A 750 watt refrigerator on start up requires three times the running load. So a 750 watt refrigerator compressor that will draw right at 6.2 amps at 120 volts at 60 cycles. Therefore, a load of 6.2 amps will be momentarily 18.6 amps and require 2,230 watts. A three thousand watt inverter would be a safe margin.

I. Summary.

Your home generator will last just so long, the mono or poly panels will give you energy well past 30 years and every day at that. Sadly the Amorphous panel will expire long before that. About 20 years in the sun, if your lucky and that's a stretch.

..... W2BTC over and out