

Solar Power

There are three basic types of PV module.

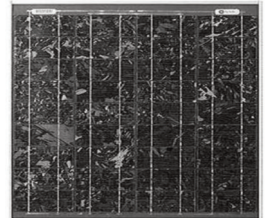
RESOURCE
RENEWABLE ENERGY



Monocrystalline is the most efficient and therefore the most expensive. It is thin slices of a grown silicon crystal and has very high efficiencies in direct sunlight. They are usually a pure black or dark blue colour in separate squares.

Polycrystalline uses the leftover bits of mono and so is less expensive but also less efficient.

However a point to consider with poly is that the shards of crystal are multi-directional and so although the power generation is less it will absorb sunlight from all directions. They are usually grey/blue colour in one sheet or squares and have a crystalline appearance.

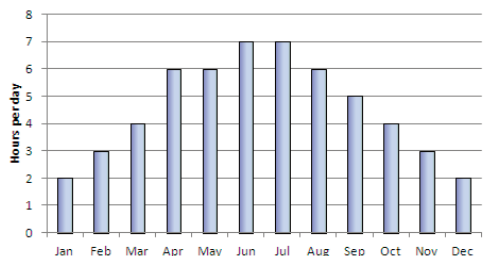


Amorphous silicon cells look like plastic and now come as bendy sheets. They need more area for the same peak output but they are better light absorbers. This means they will work better on cloudy days and do not need direct sunlight. They are usually a blue/purple colour and in one big sheet. Thin film cells are available that do not use silicon but are less common, usually a dark blue or brown colour in thin strips and not very efficient.

System sizing

For off grid systems it is a compromise between generating enough to meet your needs and the capability of fully charging your battery bank in an appropriate timescale. Systems can be sized using peak sun hours, which are the average number of hours per day that PV panels should generate peak output. The average peak sun hours by month have been calculated by the Met Office in the UK, based on averaged data from 2000 to 2010, and are shown above. Use the table below to work out how many amp hours (Ah) per day a particular solar panel will generate as batteries are rated in Ah.

Peak sun hours in UK



Panel Peak power output

(a) W

Battery Voltage

(b) V

Peak sun hours

(c) h/day

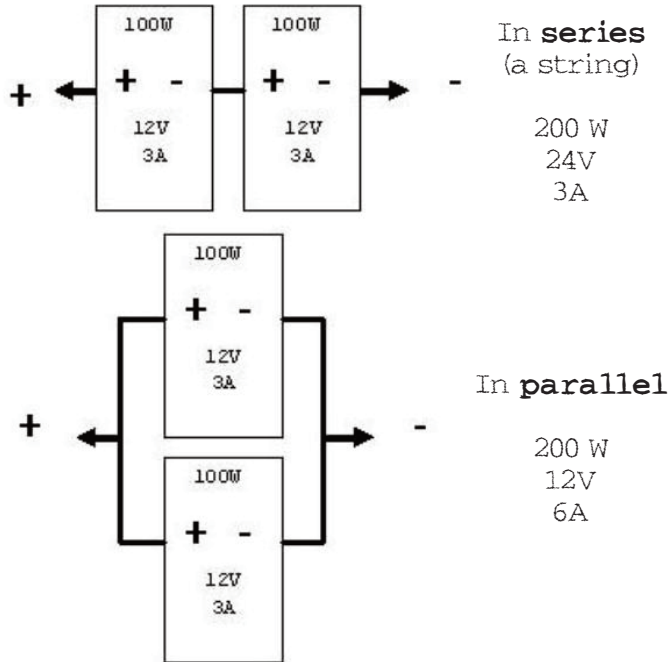
Multiply (a) by (c)

(d) Wh/day

Divide (d) by (b)

(e) Ah/day

Solar PV panels can be wired up to increase voltage or amps to suit the needs of individual systems and control gear. The advantage to increasing the PV voltage is higher efficiency and thinner transmission cables. The advantage to increasing the amps is a higher charge rate. Just remember that Watts stay constant. The decision is usually determined by other components in the system and cost.



To run an efficient off grid solar system you will need batteries and a charge controller. To run household appliances on AC power you will need an inverter. It is also important to correctly size all cable and fuses. REsource have produced flyers on all of these subjects.

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