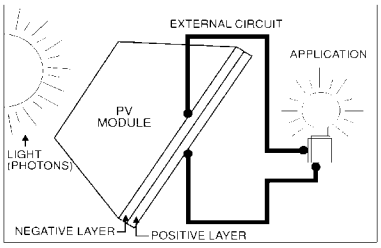
Solar Power Explained

Welcome to solar power from Marlec, a reliable, portable, non-polluting technology that produces electricity direct from sunlight!

Harnessing the power of the sun can provide you with energy for lighting, tv, pumps, navigation equipment, laptop computers, mobile phone battery chargers, electronic devices and many other electrical appliances. You can have the convenience of all this equipment at your home, boat, caravan or remote site supplied through a 12V battery. Read on to find out how.

HOW DOES IT WORK? A photovoltaic (pv) panel consists of a number of silicon cells (usually 36) connected internally in series. When light reaches these cells electrons are caused to drift which produces an electric current. This current varies with the size of individual cells and the light intensity.



WHAT CAN IT SUPPLY? PV panels are usually used to charge 12v batteries for a wide variety of uses from telecommunications and navigation systems, remote third world villages to caravans, holiday cottages and boats. Single panels are available in sizes from 5 Watts to 170 Watts and can be connected in parallel to give higher currents or in series to produce higher voltages. (Note: when connected in series panels must be of equal current rating).

WHAT POWER OUTPUT CAN I EXPECT? Whenever exposed to daylight PV panels will produce a more or less constant output voltage. This means that even in temperate zones in winter a useful charging current can be produced. This output current however does vary with light intensity. The rated output of all panels are measured by a standard illumination of 1kw/m (1 sun) at a temperature of 25°c. All BP Solar and SunWare PV panels are tested individually!

For example you could expect the following average daily amp/hrs from modules mounted at their optimum tilt angle facing south.

Location	Module (watts)	Summer Ah per Day	Winter Ah per Day
London	10	3.51	0.41
	30	10.4	1.14
	60	20.9	2.29
Edinburgh	10	3.21	0.22
	30	9.55	0.67
	60	19.1	1.32

HOW ARE SOLAR PANELS INSTALLED? PV panels are easy to install, having no moving parts and are virtually maintenance free except periodical cleaning. They are usually mounted on brackets from a pole, wall or a roof and should be south facing (in the Northern Hemisphere). They should be inclined at an angle (from horizontal) relative to the latitude of location (between 65° & 75° for British Isles). They can be mounted flat such as on a caravan roof or boat deck which can mean better performance on overcast days. If panels are mounted at less than 15° they should be cleaned more often as flatter angles do not take full advantage of the cleansing effect of rainfall. A steeper angle in winter and a flatter angle in summer will improve output and a system where the angle can be manually altered seasonally will generate more power overall. Careful siting is important to ensure maximum exposure to sunlight for the longest possible time. If panels are shaded output will be reduced.

HYBRID SYSTEMS! PV panels are ideal for use in a combined system with Windchargers, they can even be mounted on the same pole. Hybrid systems provide a more consistent seasonal power supply - higher winds in winter and more intense, longer hours of sunshine in summer. The balance between wind and solar power obviously depends on the location.

GETTING STARTED – YOUR QUESTIONS ANSWERED!

Q. What size of solar panel should I use to recharge my leisure battery?

A. As a rule of thumb we recommend that a 10W solar panel will replace the natural discharge of a 100Ah leisure battery over the UK wintertime and a 20W for 200Ah, etc. To achieve more power select a higher rated panel or speak to Marlec for further advice.

Q. I need a guaranteed amount of power to be generated per day, how do I find out which panel I can achieve this with?

A. At Marlec we will find out exactly what your power requirements are and using our solar sizing programme we will advise you of the number and size of solar modules needed for the intended location. Call to speak to one our technical advisors on +44 (0)1536 201588

Q. Do I need to fit a diode?

A. Fit a diode in the case where you are working to the above minimum panel:battery ratio recommendations. In these circumstances the solar panel is unlikely to ever overcharge the battery in UK weather conditions. The diode will prevent the battery from discharging back into the solar panel at night time. Diodes may also be required when installing multiple solar panels in parallel or series.

Q. Do I need to fit a regulator?

A. Yes we recommend a regulator if working over our recommended minimums above. If a regulator is fitted to a single solar panel a diode is no longer needed.

Q. How do I calculate the Amp rating of the regulator needed?

A. Employ the physics equation of Amps x Volts = Watts AxV=W. Therefore an 80W solar panel charging a 12V battery should be regulated using a solar regulator rated 6.7A or more.

Q. Can I connect more than one solar panel to my regulator and battery?

A. Yes but each parallel connected panel should have it's own diode fitted to prevent power leaking from one panel to another in the event of one becoming shaded.

Q. Can I charge more than one battery?

A. Yes. Batteries connected in parallel (12V) are effectively one battery bank and equally batteries connected in series (24V) are also one battery. In the case of charging two separate batteries from the solar panel a "charge splitter" is required. Marlec offer a hybrid controller – the HRDX Controller for both wind & solar input and output to 2 separate batteries.

Got more questions?

Then speak to the technical sales team here at Marlec. We have been official UK Distributors for BP Solar (formerly Solarex) since 1989. We have a vast experience of designing systems for leisure users and professionals working on applications where reliability is critical. We select solar manufacturers whose product specifications we know can be relied on, we test products at our factory in Corby and provide valuable feedback on product applications. Finally, you can be sure of the best value too as all the photovoltaic panels that we offer are supplied directly from the manufacturers to us as UK agents.

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