Solar PV Panels

With the introduction of Feed In Tariffs (FITs) in April 2010, generating renewable electricity has become more financially attractive. Solar photovoltaic (PV) arrays benefit from being mounted in areas with no shading. With an abundance of roof space in wide open areas, solar electricity presents a clear opportunity to the rural community. This fact sheet will guide you through how to establish if solar PV is suitable for you.

With the inclusion of FIT's, solar PV offers the chance to make returns on investment of over 10%. Categories of micro, small and medium scale arrays are applicable to individual operators and businesses.

Solar PV modules are made of semi-conducting materials that covert solar irradiance into electricity. The amount of electricity generated by the array is dependent on the amount of solar irradiance it is exposed to. Even under cloud cover the array will generate electricity, although not at its optimum rate. The electricity will need to be converted from DC to AC by the inverter system so that it can be used onsite or sold to the grid. An indoor area is also required to house the array inverter system. The larger the array, the larger the indoor area that will be required to house the system.

The inverter system will also track the maximum power point of the array. The maximum power point will alter in line with change in irradiance levels. The maximum power drawn from the array is also dependant on the uniformity of the system. The inverter can only draw the lowest string voltage and string current from the array, therefore making it vital that there is minimum shading losses to maximize electricity production.

The following table above shows the specification for solar PV arrays, estimated production and system costs. Although FIT rates will are liable to change subject to government consultation.

Size	Power (kW)	Annual Electricity Production (kWh)	FIT (£/kWh)	Total Size (m^2)	Annual Income + Savings (£1,000's)	Total Installation Cost (£ 1,000's)
Domestic Retrofit	Up to 4	Up to 4,000	0.21	Up to 30	Up to 2	1-10
Domestic New Build	Up to 4	Up to 4,000	0.21	Up to 30	Up to 1.8	1-10
Small	4-10	Up to 8,500	0.168	Up to 75	Up to 4	10-40
Medium	10-50	Up to 42,500	0.152	Up to 325	Up to 17.5	40-200
Medium-Large	50-250	Up to 85,000	0.129	Up to 750	Up to 35	200-750

The Enterprise Delivery Hub is supported by:

Northwest Regional Development Agency

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The European Agricultural Fund for Rural Development: Europe investing in rural areas

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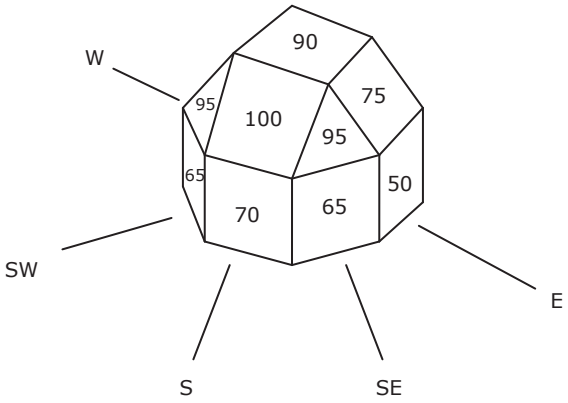
Although expected payback periods are longer for solar PV than other renewable technologies, typically 11-15 years, FIT's are guaranteed for 25 years. This is 5 years longer than any other technology and therefore makes rates of return of over 10% possible. (Calculations on rates of return and pay-back periods are based on electricity generated mainly being used on site rather than exported to the grid).



The optimum orientation for a solar array is to be facing due south, at an incline angle of 35-45°.

Solar arrays at differing angles/orientations will be exposed to less sunlight and therefore generate less electricity. The key point to note is that even a solar array facing due east/west can still receive 75 % of the optimum level as shown in the figure to the right.

Daytime electricity can cost up to 12 p/kWh and exporting electricity to the grid will only generate 3p/kWh. It is therefore financially beneficial to use as much as the electricity generated onsite as possible.

The Energy Saving Trust *cash back calculator* will allow you to asses the income available from solar generation. *www.energysavingtrust.org.uk*

Numerous different materials are used for solar cells, with differing efficiencies and cost. The most common and proven material used is Silicon, which are known as monocrystalline, multicrystalline and ribbon solar cells. Other novel thin film technologies exist that can achieve greater efficiencies, however they come at a greater cost and risk. Your MCS installer will be able to advise you on the appropriate solar system to suit your needs.

Key points to consider:

- **Unshaded area- shading will reduce electricity production.**
- **The installer must be MCS accredited to ensure eligibility for FIT's.**
- **There must be daytime electricity requirement to utilize generation during daylight hours**

If you decide that a solar PV system is feasible, get in contact with a variety of MCS installers to obtain several quotes. Your installer will give you detailed assessment of how much electricity you can potentially generate. If your system is not installed by a MCS approved installer you will not be eligible for the FITs. *www.microgenerationcertification.org*

Please contact us on 01270 613 195, email hub@reaseheath.ac.uk or visit our website for more details.

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