

Photovoltaic panels—generating your own electricity



What are Photovoltaic panels and how do they work?

Photovoltaic (PV) panels work by capturing the sun's energy using photovoltaic (PV) cells. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting.

Solar PV panels (arrays of photovoltaic cells) generate renewable electricity from the sun by converting sunlight using what is called the 'photoelectric effect'. As energy is produced from daylight, not only from direct sunlight, panels generate electricity on overcast or sunny days.

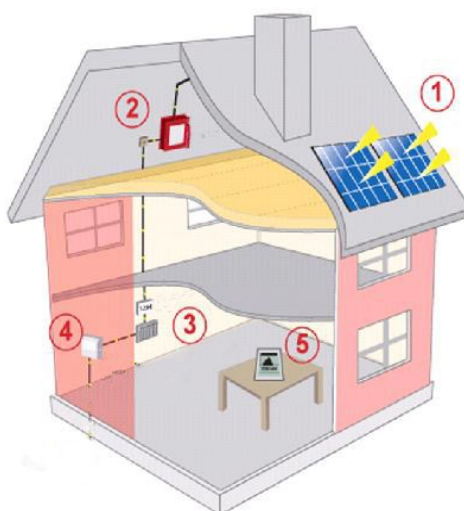
Solar panels can supply a substantial proportion of the electricity needs of a typical household. Apart from reducing your electricity bill, any surplus electricity is sold directly back to the grid.

Solar panels provide clean, green electricity. They have no moving parts, require little maintenance and are designed to last for many years.



Photovoltaic panels are mounted onto your roof using a discrete framing system. The number of panels will depend on the size of your roof, how much electricity you want to generate, and how much you wish to invest in terms of installation costs.

The layout of the panels is also flexible and they can either be laid out in a portrait or a landscape configuration.



A typical installation as shown in the diagram above consists of the following:

1. PV panels are securely mounted onto your roof.
2. The PV panels are connected to an inverter, which is normally positioned in your loft space. The inverter converts the direct current (DC) generated by the panels to alternating current (AC) that is needed to power your lights and appliances.
3. A generation meter records how much electricity you are producing.
4. The electricity flows into your existing consumer unit, where it is either used to power your lights and appliances, or exported to the national electricity grid.
5. A real time display unit means that you can constantly keep up to date with the status of your system and enjoy the thrill of seeing your savings and income mount up.

Is my house suitable for a PV system?

Before installing a PV system, you might want to consider points.

Sunlight—The yield from the solar panels depends on the intensity and duration of light they receive, not necessarily direct sunlight. Therefore, even if it is overcast, solar PV panels produce electricity. However, shading from tall trees, buildings or chimneys can reduce the yield from the PV system.

Planning permission—You will need to check the local planning rules, although in most cases, installing a PV system is considered a permitted development and therefore planning permissions will not be required. However, if for example the home is in a conservation area, World Heritage Site or if it is a listed building, it will be necessary to consult your local authority.

Roof—Is your roof large enough? To ensure a good return on your investment, a roof size of at least 12 m² is recommended. You will also need to consider the orientation of your roof. The best performance is achieved if your roof faces West, South-West, South, South-East or East.

The roof must be strong enough to take the increase in weight from PV panels. This is usually not a problem with the average roof structure.

Electrical upgrading—PV systems should be installed by qualified electricians who will be able to identify any work that may need to be carried out prior to installation. Older fuse boxes may need to be replaced. In the majority of homes, only very minor upgrades are required and these can be carried out at the same time as the system is installed.

Access—Is the roof easily accessible? Is there sufficient space to erect scaffolding if needed?

What are feed-in-tariffs and how do they work?

The UK feed-in-tariffs (also known as the Clean Energy Cash Back) are a government-backed policy that has been introduced to encourage householders to generate their own electricity from renewable or low carbon sources.

The feed-in-tariffs reward you for the amount of energy your PV system generates regardless of whether you consume the electricity or not. It also pays you for the electricity you export to grid.

Benefits of feed-in-tariffs

You will be paid 43.3p for every single kWh of electricity that is generated by your solar PV system. Even if you use the generated electricity to power the appliances in your own home. By using the generated electricity in your home, you will also save around 13p for each kWh since you will not have to buy this electricity from your energy supplier, so in effect the total benefit is around 56p.

Any electricity that is not used in the home will be exported to the grid for which you will receive an additional 3.1p/kWh.

The feed-in-tariffs (both generation and export tariff) are guaranteed for 25 years and each year they will increase by the Retail Price Index (RPI). Any income generated will be completely tax free.

It is important to remember that the feed-in-tariffs are only guaranteed if you install your solar PV system before April 2012.

For systems installed after April 2012, they will be reduced by 8.5% for each year that you delay. So there is a real incentive to install a solar PV system sooner rather than later.

Feed-in-tariffs in a nutshell

Generation Tariff—A fixed price for each unit of electricity generated by the system, whether used in the home or exported. This price is guaranteed for 25 years and will rise with the rate of inflation each year.

Export Tariff—A fixed price for each unit of electricity generated by the system that is exported to the National Electricity Grid. This price is guaranteed for 25 years and will rise with the rate of inflation each year.

Avoided Costs—The savings you make from reducing the electricity you need to buy from your supplier because you use your own generated electricity.

Costs and earnings

Prices will vary depending on the size of the system you choose, but they start from around £7500. Likewise, your earnings will depend on the size of the PV system. As an example, a typical installation produces approximately 2,000 kWh of electricity per year. If we assume that an average householder uses 50% of the generated electricity the system produces and sells the other 50% to the national electricity grid, they can expect to earn:

£866 from the Generation Tariff

£31 from the Export Tariff

£130 from electricity bill

The total annual income would be **£1027**, while the total potential profit* over 25 years would be **£27,146**

*This is the total income and savings over the minimum lifetime of the system, less the original system cost.



Useful websites

www.sunswitch.co.uk

For more info on the feed-in-tariffs visit:
www.energysavingtrust.org.uk/Generate-your-own-energy/Sell-your-own-energy

Prices quoted in this factsheet are correct as of April 2011.

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