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## Solar PV Panels

### What are solar panels?

Solar panels are groups of photovoltaic (PV) cells that turn sunlight into electricity. Solar is a plentiful, renewable source of energy – and solar energy even works well in the grey old UK, because solar panels don't need direct sunlight to function. Thankfully for us!

Whilst PV is the most common type of solar panel, there are also other types of solar power. For example, solar thermal panels use sunlight to heat water flowing through the panels, which can then be used to heat your home.

### How do solar panels (PV) cells work?

A solar panel's photovoltaic cells are sandwiched layers of semi-conducting materials, usually made of silicon. Each layer has different electronic properties, which energise when hit by photons from sunlight, to create an electric field. This is known as the photoelectric effect, and this creates the current needed to produce electricity.



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One solar panel typically consists of around 30 cells (those familiar-looking blue squares you often see in a solar panel). It can generate around 300W of power in full sunlight, depending on brightness, size of panel and other things like temperature. The panels generate a direct current of electricity, which then passes through an inverter to convert it into an alternating current. This charge can then be funnelled into the National Grid, or used by any home or business with solar panels.

### **The benefits of solar power**

The brilliant thing about solar is that it can create a lot of cheap power close to where it's being used.

Solar panels are also easy to install, making them suitable for all sorts of locations. From rooftop panels in city centres to large countryside solar farms, they're highly scalable and adaptable.

From an environmental point of view, solar's amazing because it releases no harmful carbon – and it just goes on and on. In fact, a typical home solar PV system could save around 1.3 to 1.6 tonnes of carbon per year (depending where you live in the UK).

Once they've been installed, solar panels need little to no maintenance – just occasional cleaning to keep them clear of dirt and debris. Solar panels also don't create any noise pollution while they're generating electricity. And because they're made of silicon, they're super-safe and non-toxic too.

### **How much do solar panels cost?**

There's no denying that solar panels are a long-term investment – so the initial costs can seem somewhat high. But with the price of solar being 70% cheaper today than in previous years, it's much more affordable lately. Plus, given that electricity and gas bills could go up over time, a solar panel system will help to insulate you from those rising costs. Not to mention that it potentially adds value to the price of your home!

While there are less Government incentives, the price of a solar system is continuing to fall. These days, an average solar set-up will cost somewhere between £2,500 and £8,000 (including installation<sup>4</sup>), depending on the number of panels and the size of your roof.

### **Are solar panels right for me?**

Most UK homes are suitable – but the best are ones with south-facing roofs with a pitch of 30-40 degrees. We wouldn't suggest putting panels on a north-facing roof, but you might find an east or west-facing roof still works well (although you'll probably generate around 25% less energy).

Your roof also needs to be strong enough for the panels – and you'll need space in your loft to house the inverter. Most homes don't need planning permission, but if you have a flat roof, or live in a conservation area, check with your local council before going ahead.

### **How much will solar panels save me?**

The exact amount you could save depends on several things, including the size of your solar installation and the way you use the energy you generate.

Assume that the average UK home has a 3.5kW installation on its roof. This will cost around £5500. We estimate that a 3.5kW panel in Southern England will return about £250 to your pocket in the first year, and deliver an approximate 5% rate of return over the 25 year lifetime.



The amount you save will depend on where you live in the UK (i.e. the amount of sun your home gets), how much generated electricity your home uses, and how much you pay for electricity. Many suppliers offer calculators to help you do the maths. Just remember, solar panels last for 25 to 30 years, so they're a great investment!

Typically, the more electricity the system can generate, the more it costs – but the more it could also save. Larger systems are usually more cost-effective than smaller systems, generating up to 4kWp (enough to meet the energy needs of a family of 3 to 4).

### **How to make money from solar energy**

While the Government's previous Feed-in Tariff is no longer available, you can still make money from any unused electricity by selling it back to the National Grid.

There are 2 ways to do that, via a battery, which will store the unused electricity and helps you to run off-grid, depending on the amount you collect and use.

The second is the Government's 'Smart Export Guarantee', which means that energy suppliers will compete to give households the best price for their excess electricity. Homeowners will still see a long-term payment and faster return on their investments: <https://www.ofgem.gov.uk/environmental-programmes/smart-export-guarantee-seg/about-smart-export-guarantee-seg>

### **Are solar panels worth it?**

The solar subsidy may have fallen – but so has the cost of the technology. And with an average system generating around 3,700 kWh a year, that works out at about 92,500 kWh of electricity generated by solar over its lifetime.

Add to that the many environmental benefits to be gained – from helping to lower emissions and tackle air pollution, to reducing your home's carbon footprint – and it's clear that solar is a smart, sustainable choice.

### **How to install solar panels**

As with any big investment, it pays to get several quotes from different providers before making any decisions. We recommend that you check the company you choose is a certified installer here: <https://mcscertified.com/find-an-installer/>

## **Solar Panel Installation Process**

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The most common location for the installation of solar PV panels is the roof. Most roofs typically have the desired specifications for the installation, so that panels get the maximum sunlight. Nevertheless, if installation on the roof is not applicable or desired, the solar panels could also be mounted on the ground. You just need to make sure that there are no objects blocking access to the sun. *[The following steps explain solar panel installation on a roof:](#)*



## 1. Set Up Scaffolding

Firstly, you have to erect scaffolding to ensure safety during the whole installation process when being on the roof.

## 2. Install Solar Panel Mounts

Then, the solar panel mounting system has to be set up. This will support the base of the solar panels. The whole mounting structure must be tilted and have an angle between 18 to 36 degrees to have maximum sunlight exposure.

## 3. Install the Solar Panels

When the mounts are set up, the solar panel itself has to be installed on the mounting structure. Make sure to tighten up all the bolts and nuts so that it stays stable.

## 4. Wire the Solar Panels

The next step in the installation process is to install the electrical wiring. In most cases, MC4 connectors are used because they are suited for all types of solar panels. Make sure to shut off the household's electricity supply during the wiring installation.

## 5. Install Solar Inverter

After that, the solar inverter must be connected to the system. It is typically installed near the main panel and it could be both indoors and outdoors. Inverters are more efficient if kept in a cooler place. If the inverter is outdoors, it should be kept out from the afternoon sun. If it is installed indoors, the garage or utility room are usually the best places, since they stay cool for most of the year and have ventilation.

## 6. Bond Solar Inverter and Solar Battery

Thereafter, the solar inverter has to be connected to the solar battery. The solar battery storage can save you from worrying about the lack of usable energy during cloudy times, it can also lower the solar battery storage system costs during installation.

## 7. Connect the Inverter to the Consumer Unit

The inverter should be connected to the consumer unit to generate electricity. A generation meter should also be connected to monitor the amount of electricity the solar panels actually produce. You can use your computer or other device to check your solar system's performance. For example, you can check how much electricity you generate at different times and decide what time is suitable for using your washing machine or other utilities.

## 8. Start and Test Solar Panels

The final step is to switch the power on and test the newly installed solar panel system. After that, the solar panel installation process is complete.

To find out if you qualify for a grant, contact us:

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