



# How does solar energy work

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Yes, solar power is a renewable and infinite energy source that creates no harmful greenhouse gas emissions- as long as the sun continues to shine, energy will be released.

The carbon footprint of solar panels is already quite small, as they last for over 25 years. Plus, the materials used in the panels are increasingly recycled, so the carbon footprint will continue to shrink.

Solar energy was used by humans as early as the 7th century B.C. when humans used sunlight to light fires by reflecting the sun's rays onto shiny objects. Later, in 3rd century B.C., the Greeks and Romans harnessed solar power with mirrors to light torches for religious ceremonies.

In 1839 and at the age of just 19, French physicist Edmond Becquerel discovered the photovoltaic (PV) effect while experimenting with a cell made of metal electrodes in a conducting solution. He noted that the cell produced more electricity when it was exposed to light - it was a photovoltaic cell.

In 1954 PV technology was born when Daryl Chapin, Calvin Fuller and Gerald Pearson developed the silicon PV cell at Bell Labs in 1954 - the first solar cell capable of absorbing and converting enough of the sun's energy into power to run everyday electrical equipment.

Solar panels are usually made from silicon, or another semiconductor material installed in a metal panel frame with a glass casing. When this material is exposed to photons of sunlight (very small packets of energy) it releases electrons and produces an electric charge.

This PV charge creates an electric current (specifically, direct current or DC), which is captured by the wiring in solar panels. This DC electricity is then converted to alternating current (AC) by an inverter. AC is the type of electrical current used when you plug appliances into normal wall sockets.

Solar PV panels generate electricity, as described above, while solar thermal panels generate heat. While the energy source is the same - the sun - the technology in each system is different.

Solar PV is based on the photovoltaic effect, by which a photon (the basic unit of light) impacts a semi-conductor surface like silicon and generates the release of an electron. Solar thermal is less sophisticated and simply the direct heating of water (or other fluids) by sunlight. For domestic use, solar thermal panels are also installed on a roof facing the sun, heating water stored in a hot water cylinder and so providing hot water and heating. On a larger scale, solar thermal can also be used in power stations.

Solar farms, also known as solar parks or solar fields, are large areas of land containing interconnected solar panels positioned together over many acres, to harvest large amounts of solar energy at the same time. Solar



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farms are designed for large-scale solar energy generation that feed directly into the grid, as opposed to individual solar panels that usually power a single home or building.

Yes, it can - solar power only requires some level of daylight in order to harness the sun's energy. That said, the rate at which solar panels generate electricity does vary depending on the amount of direct sunlight and the quality, size, number and location of panels in use.

Both the UK and US governments are aiming to decarbonise their electricity systems by 2035, in which renewable energy sources like solar power are set to play a major part.

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