centre for sustainable energy

# Solar water heating

## Turning sunshine into free hot water ...

**Using the abundant and free energy from the sun to heat the hot water in your home means that you will save money on your fuel bills.**

Solar water heating, often referred to as **'solar thermal'**, involves using solar panels to absorb the heat of the sun and transfer it to the water you use in the home. On warm summer days a solar thermal system could provide all of your hot water. During the winter the output will be considerably less.

### How does it work?

Solar thermal technology works alongside conventional water heating systems. Heat absorbed by the panels is used to pre-heat water that is either fed into a hot water storage cylinder or directly into a combination boiler. This reduces the amount of fuel needed to bring the hot water up to a useable temperature, saving money on heating bills and reducing carbon emissions.

In a **'direct'** or 'open-loop' system the water heated in the solar panels goes directly into the domestic hot water cylinder. These systems are very rarely used in the UK because of the risk of both freezing and overheating.

So most solar systems are **'indirect'** – that is, the liquid in the panels is not the same as what comes out of the taps. Instead, it is a mixture of water and antifreeze, and the heat it absorbs from the sun is transferred to the water in the hot water cylindar by way of a copper coil.

### Likely savings

A well-installed and properly used solar hot water system can save a household £160 a year when replacing gas heated hot water tanks, or £275a year when replacing electric immersion heating.

(Figures taken from Energy Saving Trust and use October 2022 energy prices.)

Flat-plate collectors. This is an ideal roof for solar panels, with no shading or obstruction

Evacuated tube panels

There are two main types of solar collector. **Flat plate collectors** are dark, box like structures (top photo) which contain a series of pipes running horizontally and vertically inside them. **Evacuated tube** systems are a series of glass tubes (above). The vacuum created within the tubes minimises heat loss from the solar collector, particularly in colder conditions. No liquid passes through the tubes themselves, rather the heat is transferred through a heat exchanger which is fixed to the top of the tubes. Evacuated tube systems tend to be more efficient but are also more expensive.

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Solar panels will provide lots of hot water for both kitchen and bathroom

## Is your home suitable?

Here are four practical things you will need to consider before investing in a solar water heating system.

1) The space where you are putting your panels should face predominantly south. Due-south is ideal but anywhere between south-east and south-west is also likely to be suitable.

2) You'll need between 2 and 5m$^2$ of roof space. The available roof space needs to have as little shading as possible from buildings, chimneys or trees. Any shading will reduce the output of the solar panels. Panels can also be fitted on a frame on a flat roof.

3) If you have a hot water storage cylinder, you are likely to be able to have a solar thermal system installed.

4) Combination or 'combi' boilers do not have separate hot water cylinders and therefore need to be compatible with accepting pre-heated water directly into the boiler. If your combi boiler is not compatible with pre-heated water, you will need to install a separate hot water cylinder as part of your solar thermal system.

In terms of planning permission solar panels are usually classed as a permitted development, but some restrictions still apply so it is best to check before proceeding.

## What about costs?

Most domestic solar water heating systems cost somewhere between £3,000-£5,000 depending on the size, type and number of panels, and whether it is a direct or indirect system. Installers will offer different systems, so it's worth doing the research and getting quotes from at least three suppliers. Make sure that both system and installer are registered with the **Microgeneration Certification Scheme** and ideally use an installer who has signed up to the **Renewable Energy Consumer Code**.

Maintenance costs on solar hot water systems are minimal and you should expect a 5-10 year warranty. You can perform a yearly check yourself on the condition of the panels and arrange for a professional installer to check the system thoroughly every three to five years. An installer should leave you a written list of maintenance checks you can do yourself (such as topping up antifreeze), and ome installers also offer an annual service.

## More information

Microgeneration Certification Scheme
**www.microgenerationcertification.org**

Renewable Energy Consumer Code
**www.recc.org.uk**

Heating and Hot Water Industry Council
**www.centralheating.co.uk**

Solar Trade Association
**www.solar-trade.org.uk**

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