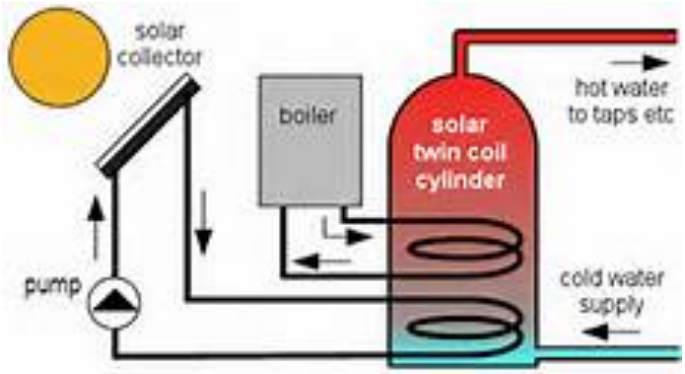
SOLAR THERMAL HOT WATER

This advice guide is part of a series of guides produced by the Association of Plumbing & Heating Contractors Ltd. to provide essential basic information that a homeowner may consider having carried out in their home. This guide is about Solar Thermal Hot Water Systems.

Introduction

A typical home will produce hot water as part of its central heating system, either using a combination boiler to directly heat the water as needed or heating a store of water in a hot water cylinder. Alternatively we can heat water using electricity at the point of use, for example of electric shower or using an emersion heater inside a hot water cylinder.



Solar water heating systems use the energy from the sun to heat hot water using a store of water in a hot water cylinder. Often a boiler or electric immersion heater will still be used to heat the stored water further ready for use. Using solar energy from the sun to 'pre-heat' stored water means that we use less gas, oil or electricity, saving money and reducing the amount of carbon we produce.

In the United Kingdom a Solar Thermal Hot Water System will work all year round, although as you would expect, more heat is generated in summer months with clear sunny days, often meeting the full hot water heating demand without further topping up. In autumn or winter months when it is overcast or cloudy the system will rely more on a boiler or electrical supply to top-up the temperature of the water. As energy from the sun is 'free', once the installation costs have been met, a solar thermal hot water system can reduce fuel bills and in addition, using less gas or oil will reduce your carbon footprint.

The solar thermal system

All solar thermal hot water systems use solar panels, mounted on the roof of a property. These panels are also called collectors and 'collect' the heat energy from the sun. We generally use two types of collector, the evaporated tube or the flat plate panel. The flat plate collector is around 30% efficient, however, the evacuated tube collector is around 40-60% efficient but can be more expensive to install.

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How do solar water heating systems work?

Solar water heating systems use solar panels, called collectors, fitted to a roof. A fluid, which is a mix of glycol and water travelling through tubes within the collector absorbs the heat from the sun, warming the fluid up.

The fluid is then sent through a coil in a hot water cylinder, warming its contents ready for you to use, in a similar way as a boiler would warm up the water in a cylinder. The temperature of the hot water in cylinder can be topped up from the boiler or an electric immersion heater.

There are two main configurations of the system within the UK, the first being the Drainback System, the second being a Fully Filled System. As the names suggest, a drain back system pumps the heat transfer fluid from a reservoir through the solar collector then through the coil in the cylinder. Once the fluid stops pumping around the system the water from the solar collector drains back down into the reservoir, leaving the solar collector empty of fluid. The Fully Filled System, as the name suggests, simply gets filled with heat transfer fluid at the testing and commissioning stage, then remains fully filled for the duration of its operation or routine servicing.

Costs, savings and earnings

It is suggested that an average Solar Thermal Hot Water System costs around £3,000 - £5,000, of course, this will change significantly depending on the type of property, existing system installed and the heating demands. Savings are moderate, around £60 - £120 a year. This cost saving depends on the type of fuel used previously to heat hot water. With a Solar Thermal Hot Water System it may be that the system provides all hot water demands during the summer months but a lot less during winter.

Considerations

Is there a suitable space for the solar collector?

The solar collector should ideally be positioned on a roof that faces east to west and gets a lot of sun all day. An alternative to mounting the solar collector on the roof is to fit them to a frame and have them fixed to a south-facing wall.

Is the existing plumbing system compatible with the Solar Thermal Hot Water System?

You will need to consider if there is room for an increased size cylinder. In addition the boiler will have to be checked to see if it is compatible with the system. Combination boilers do not provide hot water to a cylinder and so the boiler may have to be changed and a compatible cylinder installed.

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