

Harnessing Heat from Sunlight

How Solar Water Heating Works

Heat from the sun can be used to heat the water you use at home for baths, showers, washing up etc. Solar energy is free, so it can reduce your energy bills in addition to reducing the carbon dioxide (CO₂) emissions that contribute to climate change. Installing a solar water heating system may also increase the value of your home.

System Description

A solar water heating system consists of three main components: a collector panel which absorbs the sun's rays; a cylinder to store the hot water; and water pipes connecting the two. There are two main types of collector panels: flat plate and vacuum



Vacuum Tube Solar Panel

tube. In both kinds, water circulates through the panels

and gets heated by the sun. Vacuum tube collector panels are more efficient than flat plate collector panels because they don't allow heat to escape once it has been absorbed. They are also more expensive. Ideally, collector panels should be south facing, tilted at around 45 degrees, and not shaded by trees or other buildings. This maximises the amount of direct sunlight falling on the panels. Hot water can be generated with indirect sunlight, but at reduced efficiency. In Richmond upon Thames you may not need planning permission if, in the view of the planning department, the panels do not project significantly beyond the roof space - check with the Council before installing collector panels. The cylinder is similar to that in an ordinary house - indeed, when solar water heating is installed; the existing cylinder can sometimes be reused. The water pipes connecting the collector panels to the storage cylinder should be copper not plastic, due to the high temperatures the system generates. They are insulated (lagged) to prevent heat escaping, and there is also a small electric pump to keep the water circulating. In some systems, the pump is powered from a small photovoltaic panel cutting the energy use

further. Because the collector panels can produce hot water only when the sun is shining; another means of heating water is still needed. This is usually in the form of a connection to the central heating boiler, or an electric immersion heater. It should be noted that most types of combi-boiler cannot work with solar water heating systems.

Energy savings

Water heating accounts for about a third of energy use in a house. Solar water heating can provide almost all of a house's hot water needs in the summer, and about half the year-round hot water needs. Exact energy savings will depend on how much hot water you use, and which energy source is being displaced by the solar water heating system. For example, a family of four living in a house with gas water heating will save about £85 per year (rising as energy costs do) by installing solar water heating. This will also reduce carbon dioxide emissions by about 330kg per year, equivalent to driving a car about 1,400 miles. For houses with electric water heating, cost savings and emissions reductions will be about twice as much.



Flat solar panel

Costs

The typical installation cost for a domestic system is £3,200 - £4,500. This includes all components and installation costs. You can install a system yourself, and this may cost less, but it won't be eligible for grants. Grants are available through the Department for Business, Enterprise & Regulatory Reform for up to £400 or 30% of installation costs. In order to be eligible for the grant, an effort must have been made to make the house more energy efficient, for example by applying loft insulation and installing low energy light bulbs. Grants are available only for accredited products installed by accredited installers. See below for information on grants. Because solar water heating is a fairly simple technology, it requires very little maintenance, and systems will last 30 or more years.

Conclusions

Solar water heating is an effective way of reducing CO₂ emissions and tackling climate change. Although it will take a long time for the initial cost to be recouped, you will see a significant reduction in your energy bills. As energy prices

continue to rise, solar water heating will seem more attractive in terms of cost savings. If you're interested in solar water heating for your home, your next steps should be to consult your local planning authority and get quotes from reputable installers. If the initial cost of solar water heating is off-putting, there are a lot of other things you can do to reduce household energy use, including loft insulation, low energy light bulbs and remembering to switch off anything electrical when you're not using it.

Accredited installers

A full list of accredited products and installers can be found on the website of the Low Carbon Buildings Programme (see below). Here are a few local installers of solar hot water systems:

Capital Solar Ltd.
Weybridge
www.capitalsolaruk.co.uk

Green Systems UK
Chertsey
www.greensystemsuk.com

Rayotec
Sunbury
www.rayotec.com

Solar4us
Croydon
www.solar4us.com

Solar Century
London SE1
www.solarcentury.com

Further Contacts

Energy Saving Trust:
Advice on energy conservation and renewable technologies
www.est.org.uk/myhome/generators/types/solarwater/

Low Carbon Buildings Programme:
Information about grants and installation Grants:
www.lowcarbonbuildings.org.uk/how/householders/
Accredited installers:
www.lowcarbonbuildings.org.uk/info/installers/find/installerfind

Solar Trade Association
Represents designers, installers and manufacturers of solar water heating equipment
www.greenenergy.org.uk/sta/

Richmond upon Thames planning department
www.richmond.gov.uk/planning

All recommendations within this leaflet are offered in good faith, with the benefit of related experience and knowledge. However, if you choose to carry any of them out, you do so entirely at your own risk. REN are unable to accept any responsibility for the loss or damage resulting from such action.

Richmond Environment Network

Linking, supporting, developing & promoting local environmental and sustainability activities.

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