

Resilient Building Toolkit Adaptation Measures Factsheet

Name and description of measure: Solar hot water systems

Solar thermal or solar hot water systems work by absorbing energy from the sun and transferring it, using heat exchangers, to heat water. It can be used to provide hot water at temperatures of between 55 and 65°C.

There are three main types of solar heating collector that are suitable for mounting on buildings. These are:

- **Flat-plate collectors;** a sheet of black metal that absorbs the sun's energy encases the collector system. Water is fed through the system in pipes which conduct the heat to the water.
- **Evacuated tubes;** a series of parallel glass heat tubes grouped together. Each tube contains an absorber tube. Sunlight passing through the outer glass tube heats the absorber tube contained within it, and in doing so, the heat is transferred to water flowing through the tube.
- **Solar matting;** a range of extruded hollow sections of flexible black material that can be used for solar collection. Water passes through the hollow tubes, absorbing the heat from the sun.

Cost of measure (high, medium or low):

Medium with pay back periods between 5-10 years. Solar hot water heating is only truly economically viable in a business where there is a sufficiently high level of demand for hot water, such as in a canteen. Generally, solar hot water is more economical in larger systems.

Pros and Cons:

Pros

A solar thermal system could be integrated into an existing gas-boiler system.

Planning permission is not usually required for small-scale solar water heating systems.

The system works all year round, though you'll need to heat the water further with a boiler during the winter months.

May be able to claim the Government Renewable Heat Incentive (RHI).

Cons

Retrofitting is a more costly option due to the complex nature of installation.

Systems should be roof-mounted and oriented to face between south-east and south-west.

It is also advantageous to be able to locate equipment (such as the heat exchangers) in the roof space close to the collectors.

Effectiveness of measure (high, medium or low):

Medium. An efficient solar water heating system can meet up to 60% of a building's hot water needs.

Photos:



Product review site:

Energy Saving Trust: <http://www.energysavingtrust.org.uk/Publications2/Generating-energy/Buyers-guides/A-buyer-s-guide-to-solar-water-heating>

Energy Saving Trust: <http://www.energysavingtrust.org.uk/Publications2/Housing-professionals/Microgeneration-Renewables/Solar-water-heating-systems-guidance-for-professionals-conventional-indirect-models-2006-edition>

Carbon Trust: [http://www.carbontrust.com/media/7379/ctv010 - renewable energy sources.pdf](http://www.carbontrust.com/media/7379/ctv010_-_renewable_energy_sources.pdf)

Case study contact:

University of Portsmouth have installed solar hot water systems. Contact Ian McCormack, Energy and Environmental Manager.