

Unit 301: Understand the fundamental principles and requirements of environmental technology systems

Worksheet 1: Solar thermal (hot water) (Tutor)

Using your notes and the internet (refer to Resource 1, 'Micro-renewable energies') answer the following questions:

1. Describe the principle of operation of a solar thermal (hot water) system.

Solar thermal (hot water) is a renewable energy system for generating domestic hot water using solar panels (known as 'collectors') fitted at an optimal angle on a south-facing roof or other suitable surface.

Roof-mounted solar collectors capture energy from incident solar irradiation, passing the heat into a transfer fluid – usually a pre-prepared mixture of 60% water and 40% glycol to prevent freezing during periods of low outdoor air temperatures.

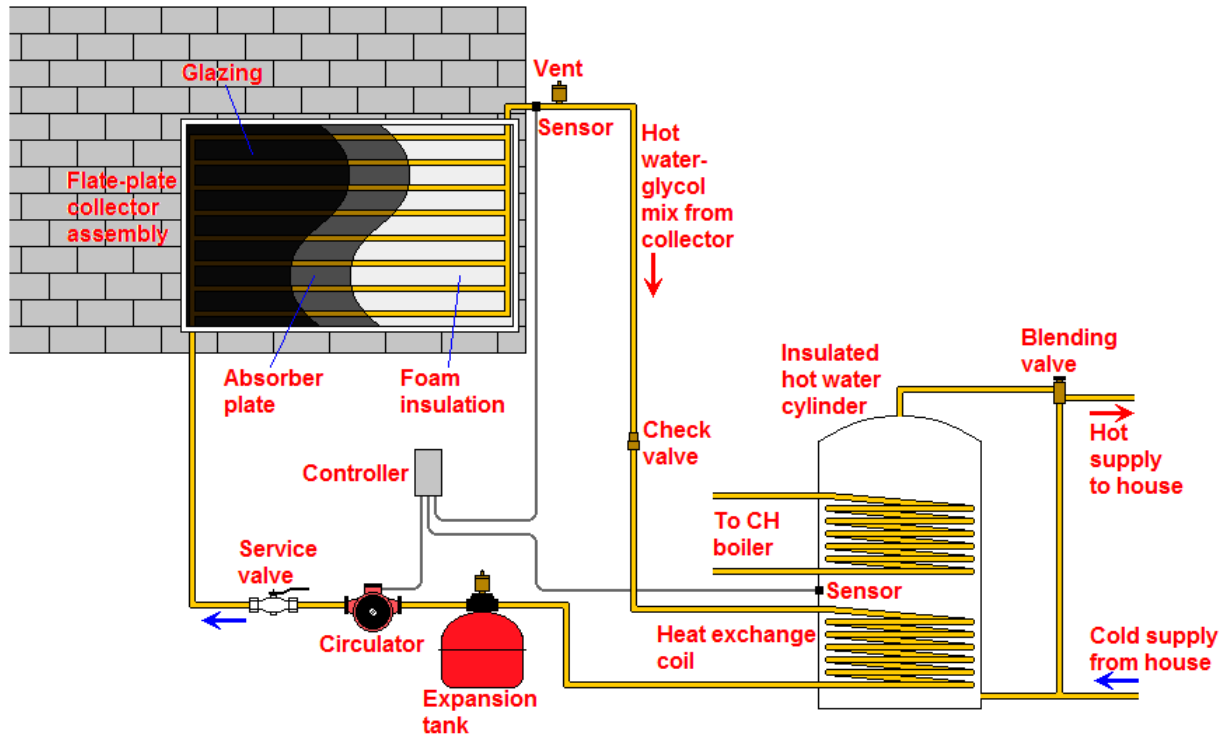
The heat transfer fluid is usually pumped through a coil located in the lower section of an unvented indirect cylinder and, in so doing, heats the stored water that would normally be used for domestic hot water.

2. In small groups, discuss what is meant by the term 'permitted development' and write down your findings below.

They are granted in the form of General Development Planning Orders (GDPOs) which apply separately to England, Wales, Scotland and Northern Ireland, and, in effect, they give implied planning consent to carry out certain classes of development.

In order to carry out work under PD the work must strictly conform to the current criteria, so it does make sense to either check with your local authority before carrying out the works or have a qualified surveyor confirm that they are in order.

3. Label the diagram below.



4. List **three** advantages of solar thermal (hot water).

- **Cut carbon footprint**
- **Cut bills**
- **Hot water all year round**

5. List **five** disadvantages of solar thermal (hot water).

- **Only available during daytime.**
- **Subject to the effects of climatic changes.**
- **Dependant on geographical location.**
- **Energy conversion rates or efficiencies are low compared to other energy sources.**
- **High capital cost.**