

# SOLAR THERMAL TRANSFER FREQUENTLY ASKED QUESTIONS

## 1. What is solar thermal transfer?

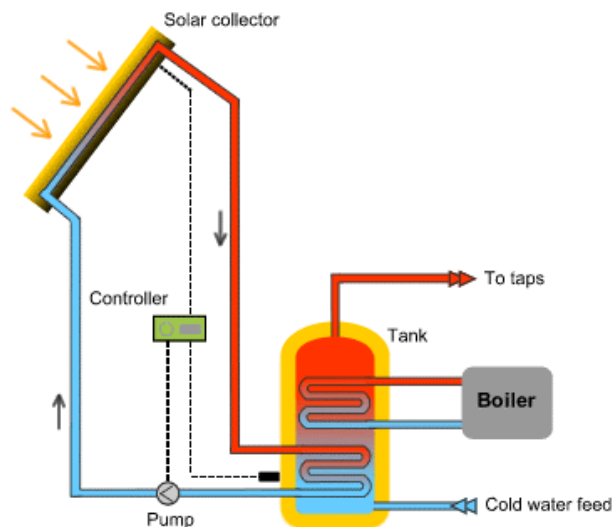
Solar technology can be divided into two areas: solar thermal transfer and photovoltaics. Solar thermal transfer involves the use of collectors to convert sunlight into heat for hot water supplies or auxiliary space heating. It is a specialist term for heat (it also covers cooling) produced using solar energy.

## 2. What does a solar thermal system consist of?

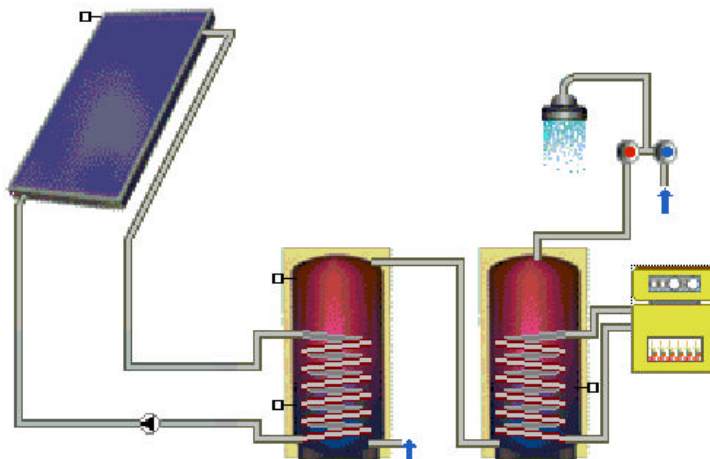
Solar thermal transfer systems are made of at least one collector, heat storage unit, solar circuit, and control unit with pump.

### Diagram of typical systems:

#### a) Direct System:



#### b) Pre-Heating System:



### **3. What types of collector are there?**

The most common is the flat plate collector. It consists of a metal absorber in a sealed housing, insulated on the back. The side facing the sun has a transparent glass cover. There are also vacuum tube collectors, they are slightly more efficient but also more expensive. Their absorber consists of a flat or curved strip of metal fitted in an evacuated glass tube. A vacuum tube collector is made of a number of tubes whose ends are connected to a common header. (See picture of both systems P4)

### **4. When is a house suitable for a solar thermal transfer system?**

Solar radiation is sufficiently intense in the U.K. to operate a solar thermal transfer system effectively. Ideally you require a roof surface that faces south, is free from shading and has a pitch between 20° to 60°. 1 to 1.5m<sup>2</sup> of collector area is required for supplying hot water. The storage tank requires an approximate footprint of 1m<sup>2</sup> although larger tanks mean more stored hot water especially through the summer.

It is possible to get the same energy yield from west or east orientated collectors with a slightly larger surface area. Flat roofs and facades are also suitable for mounting collectors.

### **5. When should a solar thermal transfer system be installed?**

Installation at the time of construction is about 20% cheaper than retrofitting. Where future retrofitting is planned, the correct pipe work and a suitable hot water storage tank should be fitted to minimise subsequent costs.

### **6. What proportion of my hot water requirements can I cover with a solar thermal transfer system?**

A solar thermal transfer system for hot water supply in an average semi-detached or detached house is designed to cover up to 100% of the energy demand during the summer months of May to September. The boiler can be switched off during this period. At our latitudes, a well-designed system can cover 60% of the hot water requirements over the year.

### **7. What contribution does a solar thermal transfer system make to the environment?**

A solar energy system replaces fuels such as oil, gas, coal and uranium, and therefore reduces the impact of CO<sub>2</sub> emissions on the environment. Each kilowatt-hour produced with solar energy system cuts pollution. In addition, account should be taken of the emissions arise throughout the raw material supply chain, not just when the fuel is burnt in the consumer's boiler. These upstream sources of emissions include:

- Crude oil tankers
- Oil refineries
- Road tankers transporting the fuel oil the consumer
- Emissions involved in the production of materials used to manufacture the individual conversion systems

**£400 grant available from the low carbon building program!**

## **8. What are the advantages of a solar thermal transfer system?**

- Protection of the environment
- Conservation of primary energy reserves
- Direct use on site
- Advanced technology
- Solar energy is unlimited
- Reduction of carbon dioxide emissions
- Lower costs
- The energy required to manufacture a solar energy system is saved after just two years

## **9. What are the applications of a solar thermal transfer system?**

These can be divided into three main categories:

- Solar energy systems for hot water supplies
- Solar energy systems for hot water supplies and auxiliary space heating
- Solar energy systems for heating swimming pools

## **10. How much energy can really be saved?**

The energy payback time of solar energy systems is the period a system must be in operation to produce the amount of energy that was required for its manufacture. Construction of the solar energy system becomes ecologically viable as soon as it can produce more energy than necessary in the form of energy from fossil fuels to manufacture it. On average, a solar system (5m<sup>2</sup> flat plate collector, 300 litre storage tank) saves approximately 2300kwh per year compared with a conventional heating system. The energy payback time of the solar energy system is therefore less than two years. Over its 20-year plus life span, the system supplies at least thirteen times the energy as was needed to manufacture it.

## **11. How can install a solar thermal transfer system on the building?**

The following installation options are available:

- Integrated roof
- Roof mounted
- Flat roof
- Complete roof
- Canopy
- Façade

## **12. How much does it cost to operate and maintain the system?**

Solar energy systems require a small amount of power to run the pump and controller. They should have a basic check every year by the homeowner and a service every few years from a qualified plumber, although this could be combined with the annual boiler service. The collectors are cleaned sufficiently by rain and snow to maintain their efficiency.

## **13. How long will a solar thermal transfer system last?**

Solar thermal transfer systems have a life in excess of 20 years.

## **14. Does the installation of a solar thermal transfer system have to be approved?**

The relevant authority must be informed prior to installation but they are encouraged to approve renewable energy installations, especially integrated roof systems.

**PHOTOS OF SOME BOWLLER SOLAR ENERGY INSTALLATIONS:**

**A- FLAT PLATE COLLECTOR**



Manufacturer\_Type: Schuco\_Premium



Manufacturer\_Type: Velux\_U12



Manufacturer\_Type: Velux\_SO6

**B – VACUUM TUBE COLLECTOR**



Manufacturer\_Type: Sonnenkraft\_VTC10



Manufacturer\_Type: Thermomax\_DF100