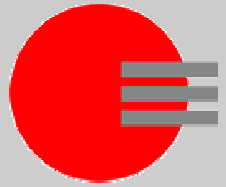


Solar Thermal Systems

Jeremy Rawlings

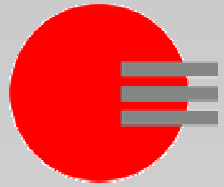
Consultant in Building Integrated Renewables





Solar Systems

- Two types of system:
 - Solar thermal – absorbs energy from the sun to heat water.
 - Solar-Photo-voltaic (PV) – absorbs sunlight to generate electricity.

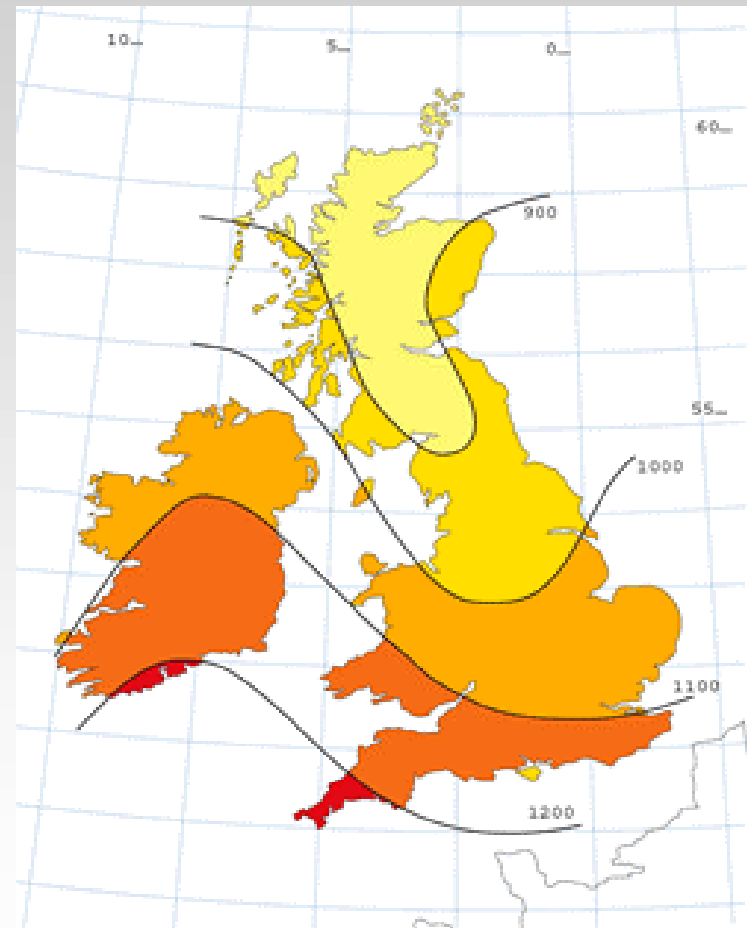


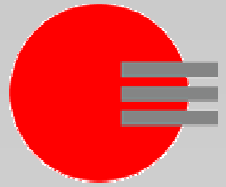
Domestic Solar Thermal System

- Provides up to 40-70% of domestic hot water supply in UK.
- Saving 1,500 kWh to 2,000 kWh/yr.
- Saves around 0.3t to 0.6t/yr of CO₂ depending on demand and fuel replaced.
- 20+ year lifespan.



- UK solar irradiation in kWh/m² at a 30° inclination
- Average house requires 3,000 kWh/yr to heat its hot water

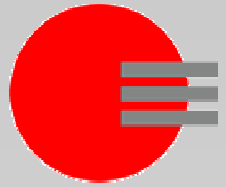




Site Requirements

- South-west to south-east facing location, un-shaded most of the time
- Typical panel size 2 to 4 m²
- Hot water store
- Another heat source in the winter months





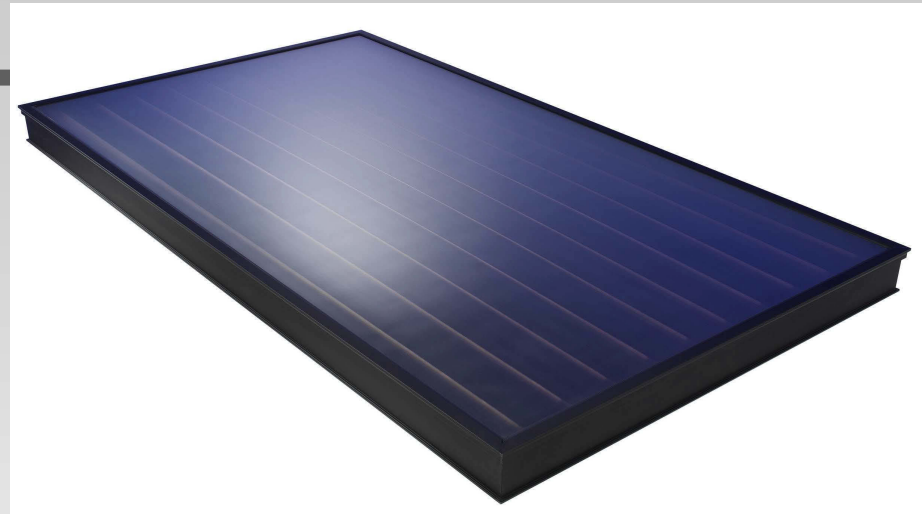
Collector Types

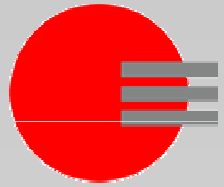
- Three Main Types of Collector:
 - Unglazed
 - Flat Plate Collector
 - Evacuated Tube



Flat Plate Collector

- Good efficiencies at lower temperature differences
- Can integrate into roof (more acceptable in AONBs).
- Lower cost
- Typical house of four requires $3-4\text{m}^2$

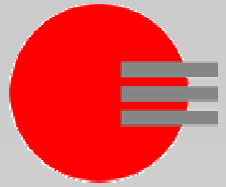




Evacuated Tube

- Very good at reaching high temperature
- Can't integrate into roof
- Higher cost
- Typical house of four requires 3m^2

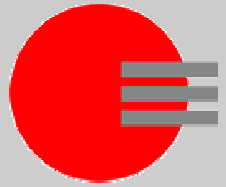




Installation

- New build or retrofit
- Likely to take 2-3 days
- Usually placed on the roof, but could be on the ground
- Twin-coil hot water store in place of existing cylinder (or two or more separate stores) – likely to need 150 to 200 litres.

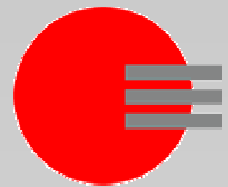




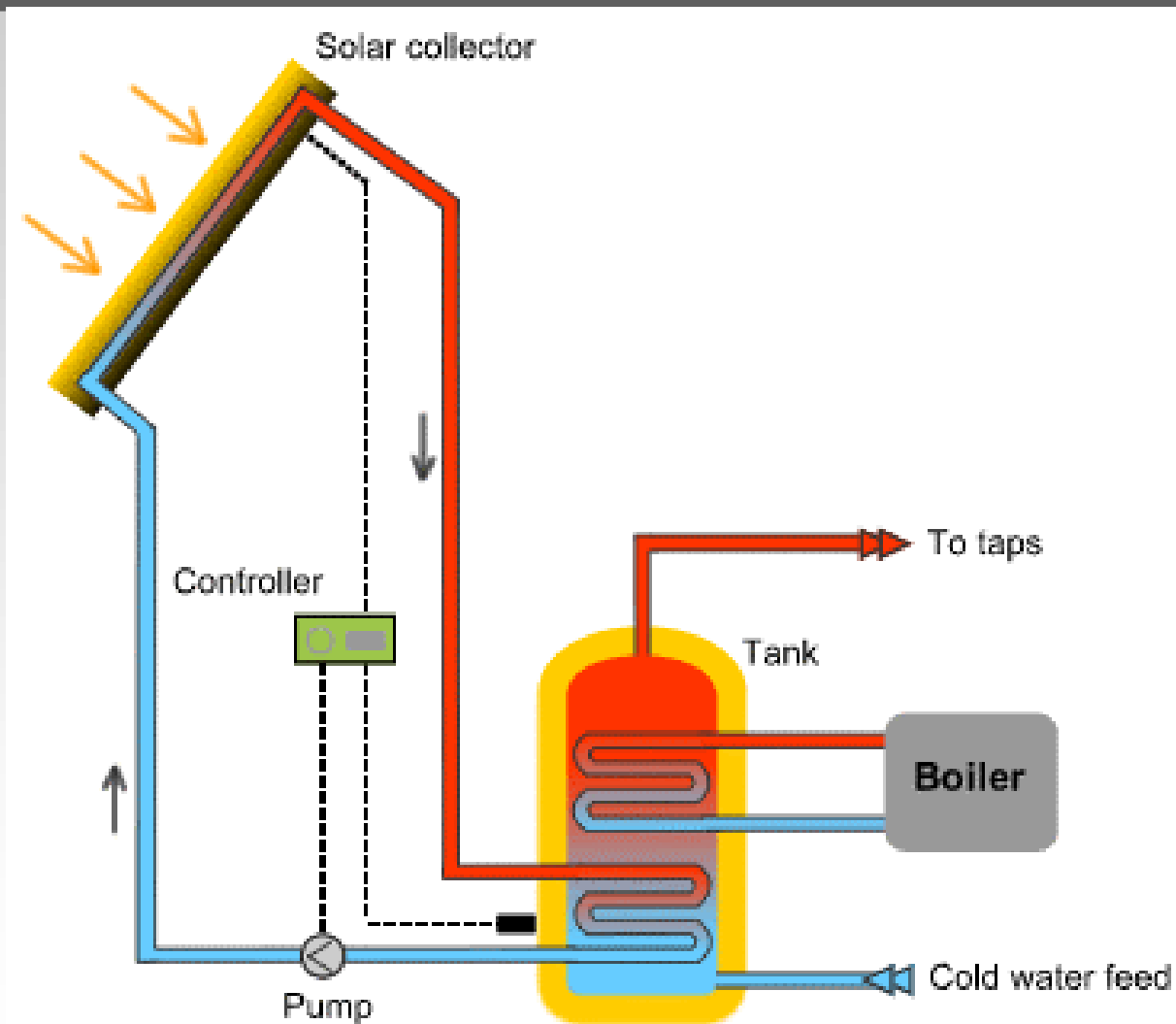
System types

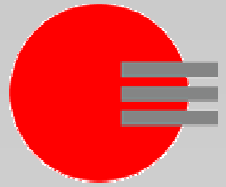
- Direct: heats the water in the collector which will be used at the taps.
- Indirect: heats a fluid that warms the water in the HW cylinder.





Typical System Layout - Indirect

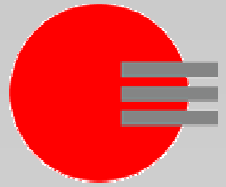




System Protection

- Need to protect system from:
 - Overheating
 - Freezing
 - Hard Water
 - Legionella

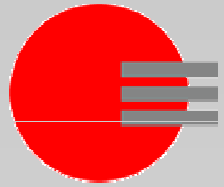




Choosing a System

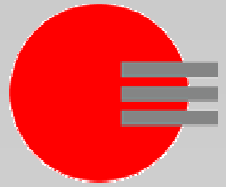
- Choose an installer who is a member of the Solar Trade Association:
www.solartradeassociation.org.uk
- If eligible for a grant, also choose a system and installer registered under the grant programme





Indicators for SWHT

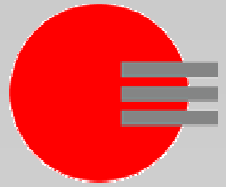
- Ensure all primary energy efficiency measures have been undertaken
- High hot water use – i.e. lots of baths
- Expensive water heating – LPG or electric
- Stay around during summer
- Building house, changing roof or heating system.



Cost and Payback

- £2,500 to £4,000 including installation (STAG).
- Typical house: may save £70 - £150/yr.
- Provides a sure source of hot water.
- Lifestyle choice.





Conclusion

- Solar resource largest in summer.
- SWH produces 50-70% of hot water.
- A number of different systems on the market.
- Fast growing market in the UK, but still a huge potential for growth.

