

# Solar Energy

## What is solar energy?

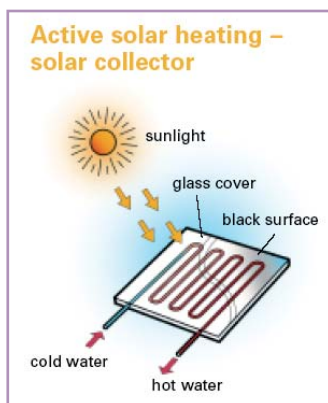
## How can we use solar energy?

Solar energy is energy from the sun. The sun is incredibly powerful. Each minute of each day, it gives the Earth enough energy to meet global energy demand for a WHOLE year!

### How does solar energy work?

**There are two main ways that solar energy can be captured and used:**

1. **Solar Panels** – this uses the sun's heat to provide hot water for homes. Can provide around 40 - 50% of hot water needs. Water is pumped through pipes in the solar panels on the roof. The panels are designed to be effective. The panels are black – to absorb heat, they are also insulated – to avoid heat loss. The heated water in the solar panels, is pumped through a **heat exchanger** to heat water for use in the home. Best location is on a south-facing roof.



Source: dti

### 2. Photovoltaic Cells (PV Cells)

– convert energy from the sun into electricity.

PV cells are arranged in panels and can be fitted to anything, from your roof to your backpack! They were developed in the 1950s by NASA for use on US Space satellites. They are made up of **silicon** (type of melted sand). Solar cells produce electricity from chemicals when light falls on them. It's all to do with tiny particles called **electrons**.

For the PV cells to work, there only needs to be daylight – there does not need to be strong sun. The electrical energy can be used directly in devices like calculators or it can be stored in batteries to use later, e.g. garden lights collect energy all day and use it at night. For a home, PV cells can provide around 25 - 33% of electricity needs.



Shannaghmore Outdoor Education Centre, The Ballagh, Killeel Road, Newcastle



**Advantages**

- No waste, CO2 emissions or pollution produced
- Once constructed, running costs are very low
- Solar energy can be generated in remote places
- Solar energy can be used small-scale, e.g., energy for a road sign or large-scale, energy for a house or school
- Energy is normally generated at or near to where it is used, reducing costs

**Disadvantages**

- Doesn't work at night
- Stronger sun, solar panels are more effective – in Northern Ireland during the winter the sun is often weak
- Photovoltaic (PV) cells are very expensive
- For a home using solar panel, using the energy during the day when it is generated is the best

**Case Study 1****Where?**

A home in Irvinestown, Co. Fermanagh

**What?**

Solar Panel Heating System – 20 solar tubes on roof

**How much electricity?**

1455kWh per year

**CO2 savings?**

884kg CO2/yr

**Case Study 2****Where?**

Creggan Healthy Living & Learning Centre, Derry

**What?**

Solar Water Heating System – 10 flat plates

**How much electricity?**

25 – 27,000kWh per year. It provides hot water for the showers, health suites and healthy eating café in the building.

**CO2 savings?**

Between 15,200 – 16,416kg CO2/yr

