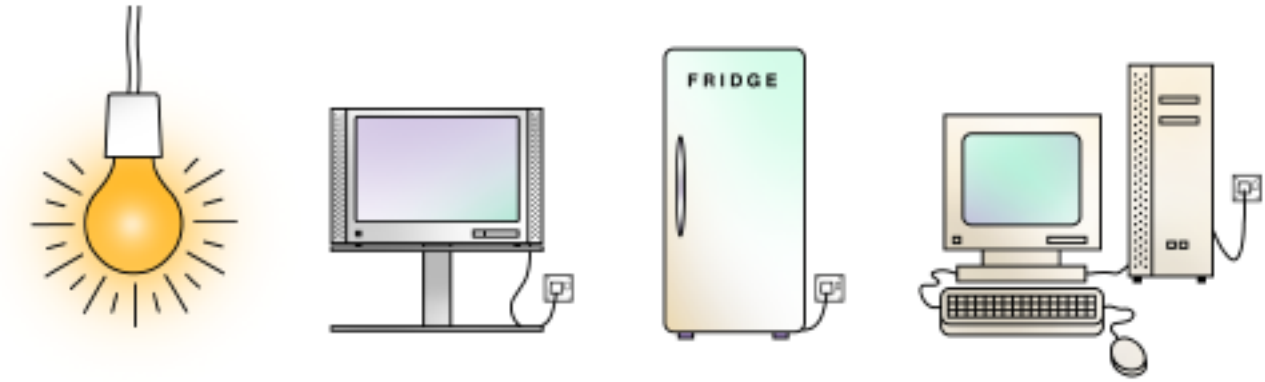
Fossil fuels (non-renewable energy)

Electricity

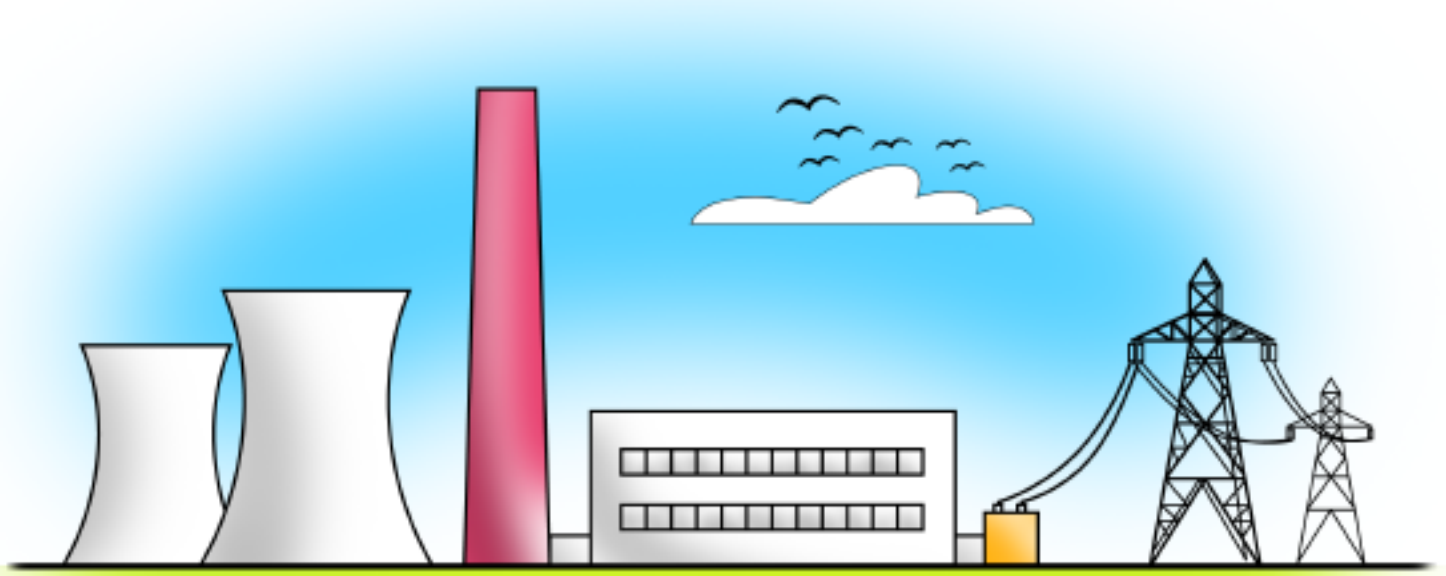
We need electricity to make lots of things work.



How is electricity made?

Most electricity is made in big buildings called **power stations**. The electricity travels to homes, schools and other places along thick wires called **cables** or **power lines**.

Look for the cables in this picture of a power station.



What fuels are used inside a power station?

Most power stations in the UK make electricity by burning **fuel**.

The fuels they burn are **coal**, **gas** or **oil**.

How is electricity made?

Courtesy of Sunflower / Brian Litzenberger

- The fuel is burned to make **steam**.
- The steam turns a machine called a **generator**, like the one in this picture.
- The generator makes **electricity** when it turns very quickly.

Problems with power stations

Courtesy of Sunflower / Brian Litzenberger

- Power stations cause pollution. They make the air dirty. Pollution is bad for our planet. It can kill plants and animals. It can also make people sick.
- But power stations are cleaner than they used to be, and there are ways to make them cleaner still.
- Gas and oil are running out, and coal will run out in about 200 years! We need to find different ways to make electricity.

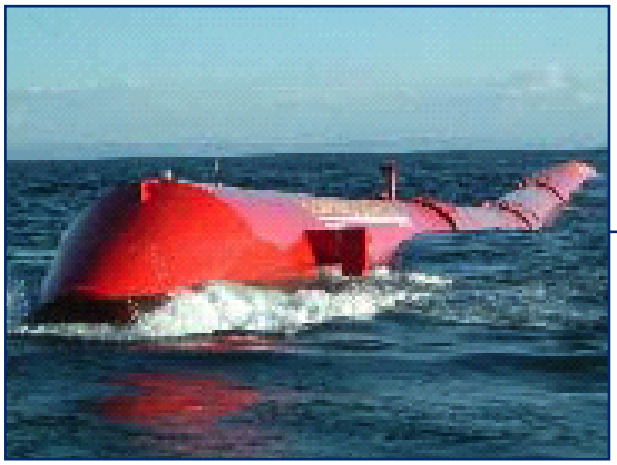
Renewable energy

Ways to make electricity

We can make electricity using **non-renewable energy**. Coal, gas and oil are three kinds of non-renewable energy.

We can also make electricity using **renewable energy** – such as the energy in the sun, wind or sea. They can never be used up and they don't make pollution. Here are four types of renewable energy.

Wave energy



Courtesy of Ocean Power Delivery

- This is the **Pelamis wave machine.** It makes electricity from the waves at sea.
- Each wave moves a part of the machine. This movement works a generator inside.
- The Pelamis is longer than a football pitch!

Tidal energy

- This machine can use the power of the **tides** to make electricity.
- When the tide goes in or out, the water pushes the blades round and round.
- When the blades turn, they work a generator, which makes electricity.

Courtesy of Marine Current Turbines Ltd

Hydroelectric energy

Courtesy of US Army Corps of Engineers

- This picture shows a reservoir and a dam. A **dam** is a huge concrete wall that holds the water back.
- There are gates in the dam to let the water through. When the gates are open, the water rushes through.
- The water turns machines that make electricity.

Biomass energy

Courtesy of NRE Slide Library / DTI

- The farmer planted the trees in this picture to make **fuel**.
- First the farmer cuts the young trees to make small wood chips. We can burn the dry wood chips to make steam, which can be used to make electricity.
- As soon as the trees are cut down, the farmer plants new ones, so the fuel never runs out.

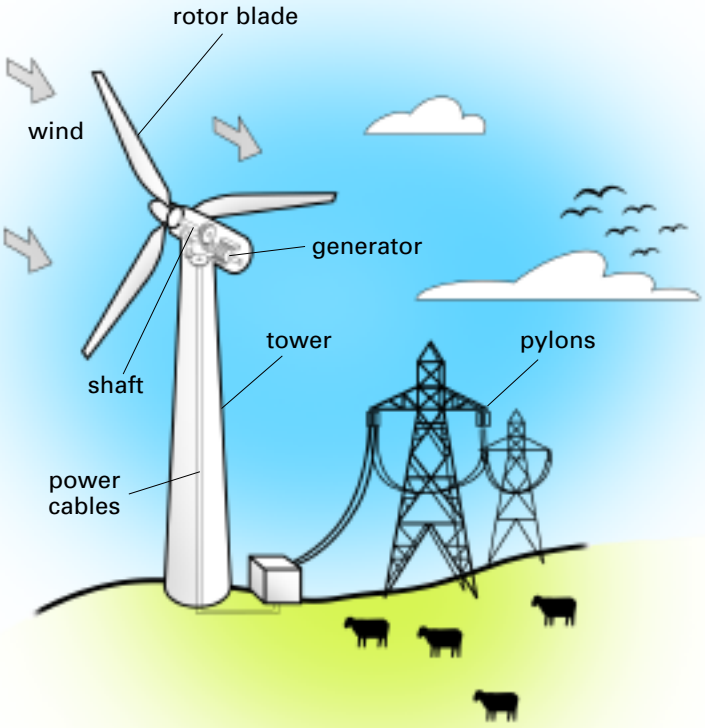
Wind energy

What is wind energy?

The wind can make things move. This power is called **wind energy**. A long time ago, people used windmills to make flour. Today, big wind turbines work in the same way, but they use wind to generate electricity.

How a wind turbine works

- The wind spins the **rotor blades**.
- When the rotor blades spin, they turn a machine inside the top of the turbine, called a **generator**.
- As the generator spins, it makes **electricity**.
- The electricity runs along **power cables** to homes and other buildings.



Why is wind energy good?

Courtesy of npower renewables

- We will never run out of wind! It is renewable.
- Wind turbines do not cause pollution. They don't make the air dirty.
- Wind energy is very safe.
- The UK has some very windy places, so we can make lots of electricity.

Wind farms

When lots of wind turbines are in one place, it is called a **wind farm**. We are building many new wind farms in this country. They make electricity that is used for lights, cooking, heating, TVs, computer games and lots of other things.

Courtesy of npower renewables

Wind farms can be built on land where there is a lot of wind. They are often built in hilly places away from towns. A big wind farm can make enough electricity for over 1000 homes.

Wind farms can also be built out at sea. There is often more wind at sea than on land. The wind turbines are fixed to the sea bed.

Courtesy of npower renewables

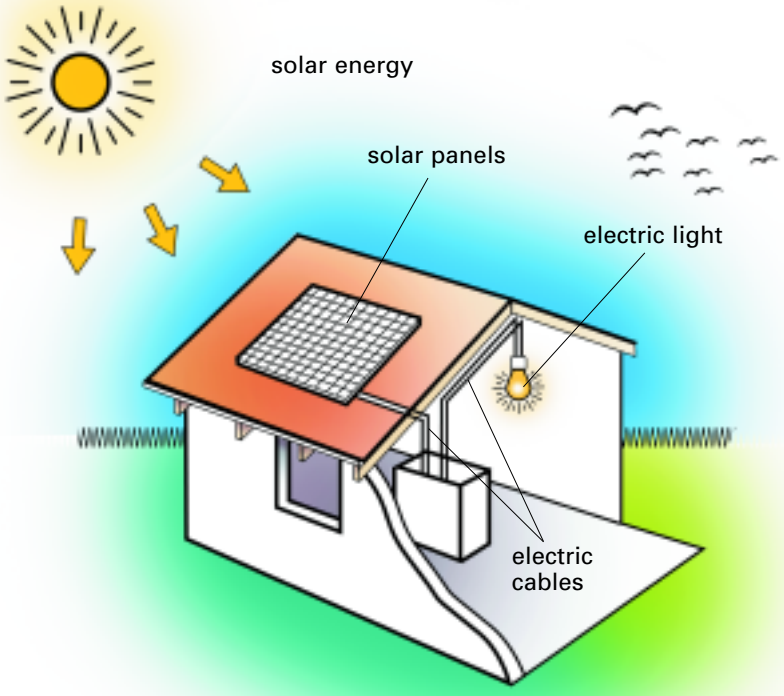
Solar energy

What is solar energy?

Solar energy means energy from the **sun**. The sun gives us light and heat.

The heat can be used to make hot water, and the light can help to make electricity for homes, schools and offices.

How solar panels work



- This house has **solar panels** on the roof.
- When the sun's light shines on the panels, they turn the light into electricity.
- The electricity runs along cables and we can use it to power lights, computers and TVs.

Why is solar energy good?

- The sun gives out light and heat for free!
- The sun's energy will not run out. It is renewable.
- Solar panels do not cause pollution.
- Solar energy is very safe and it is quiet.

Courtesy of www.pdphoto.org

Using solar power

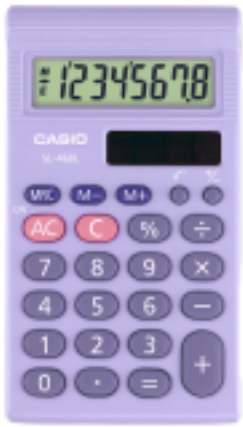
Solar panels work best in places where the sun shines a lot. But they still work on cloudy days.

Courtesy of DTI

A solar truck

This supermarket lorry has solar panels on the roof. They make electricity to keep the food inside the trailer cool.

Courtesy of DTI



Courtesy of Casio

A solar calculator

Calculators with small solar cells can use solar energy instead of batteries to work.

Courtesy of www.iea-pvps.org / Dennis Gilbert

A solar office

This new office is covered in solar panels and big windows. The windows give light and warmth when the sun shines. The solar panels make electricity for all the offices in the building.