Renewable and Non-Renewable Energy

Renewable Energy

What is renewable energy?

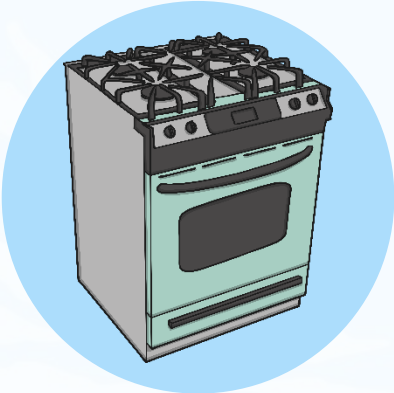
Renewable energy comes from natural resources that are naturally replenished, such as sunlight, wind and waves.

Non-Renewable Energy

What is non-renewable energy?

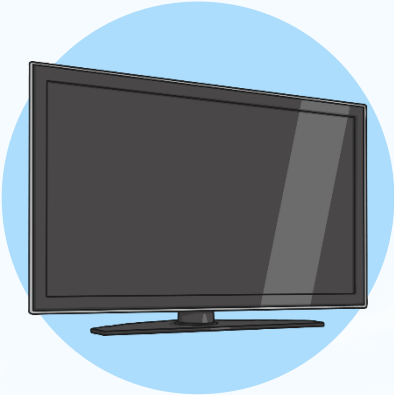
Non-renewable energy comes from natural resources that are not naturally replenished, such as oil and coal.

What Do We Use Energy For?



Gas is used to heat our homes, water and to cook our food.

We need energy to power our cars. We use diesel, petrol or electricity for fuel.



We use electricity to power lots of things, such as lights, televisions and computers.

Why Don't We Use Renewable Energy All the Time?

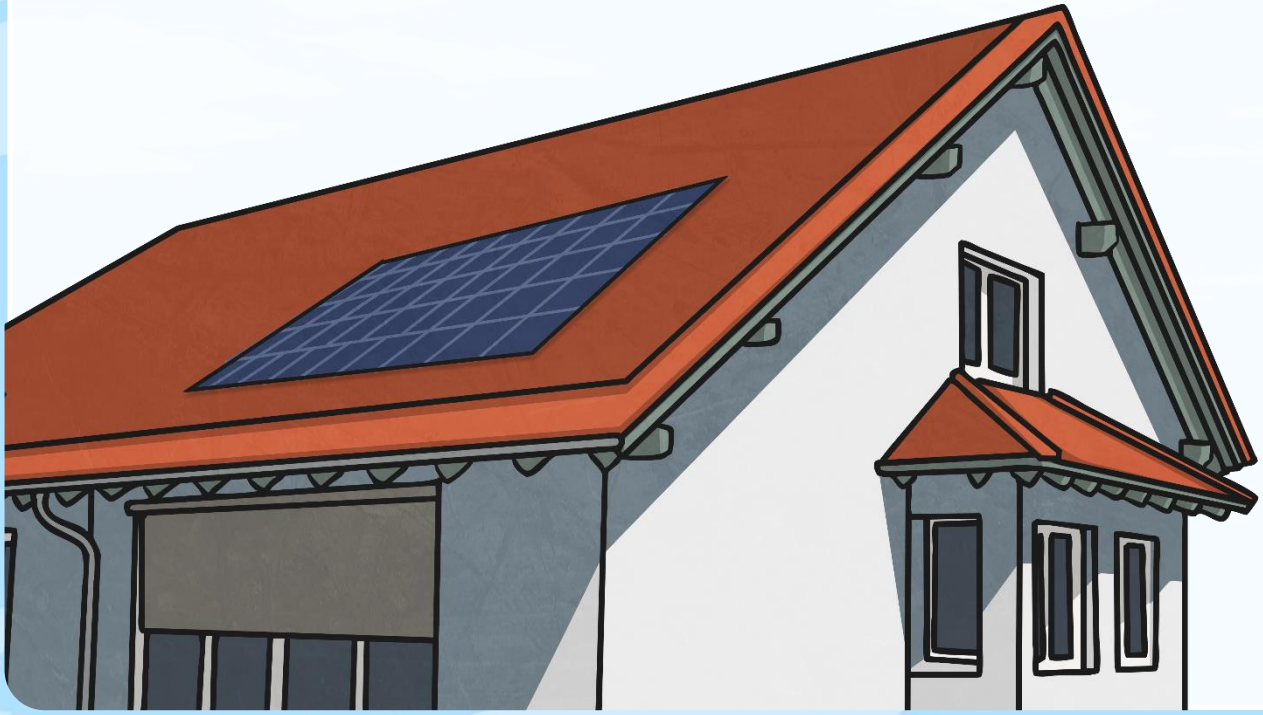
- Renewable energy, such as wind or sunshine, can't be stored to be used whenever we need it.
- If the wind doesn't blow, or if it isn't very sunny, then there may not be enough power for everyone.
- Non-renewable resources, such as oil or coal, can be stored and used when they are needed.
- Non-renewable energy is usually cheaper than renewable energy, which means not everyone can afford to use renewable energy.

Solar Energy

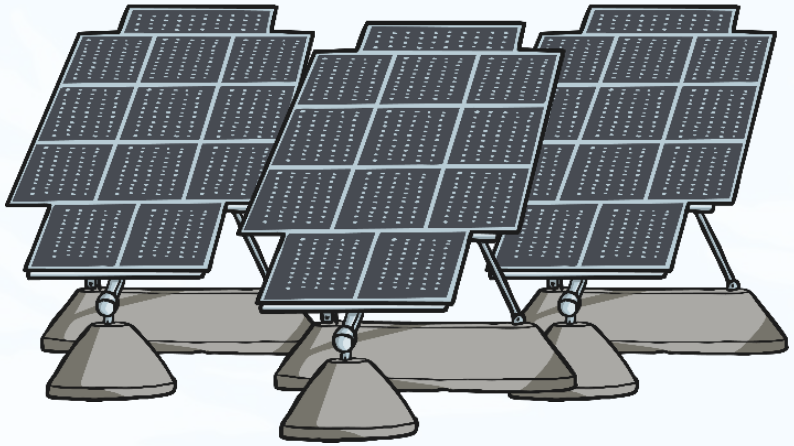
Solar energy comes from the sun.

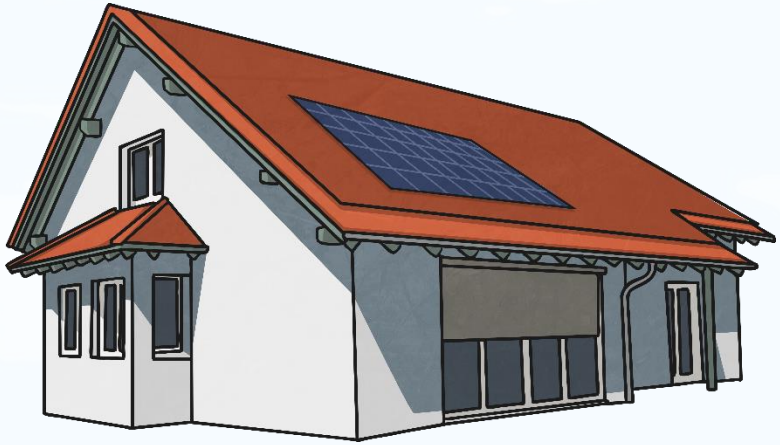
The Sun can be used to give us heat energy.

Solar panels are used to convert sunlight into electricity.



Solar Power





1. The Sun shines on solar panels, usually located on the roof of a building or in a field.
2. Photovoltaic cells (PV cells) inside the panels convert the Sun's energy into electrical energy.
3. The electricity can either be used or carried along power lines to the National Grid.

1. Some solar panels are used to provide heating.
2. The Sun shines on solar panels, usually located on the roof of a building.
3. Water inside the panels is heated.
4. The water is pumped around the heating system in the building.

Solar Power

Advantages	Disadvantages
• Solar energy is renewable and the Sun's heat and light are free. • Solar energy can be used to generate electricity in remote places where other electricity supplies are hard to come by. • It does not produce any CO_2. • Energy is usually generated at or near to the location it will be used, reducing transmission costs.	• PV cells do not work so well when it is cloudy and do not work at night. • The UK is not a very sunny country! Solar power works better in hot places, so its use is therefore limited.

Renewable.

There are increasing numbers of solar farms in the UK.

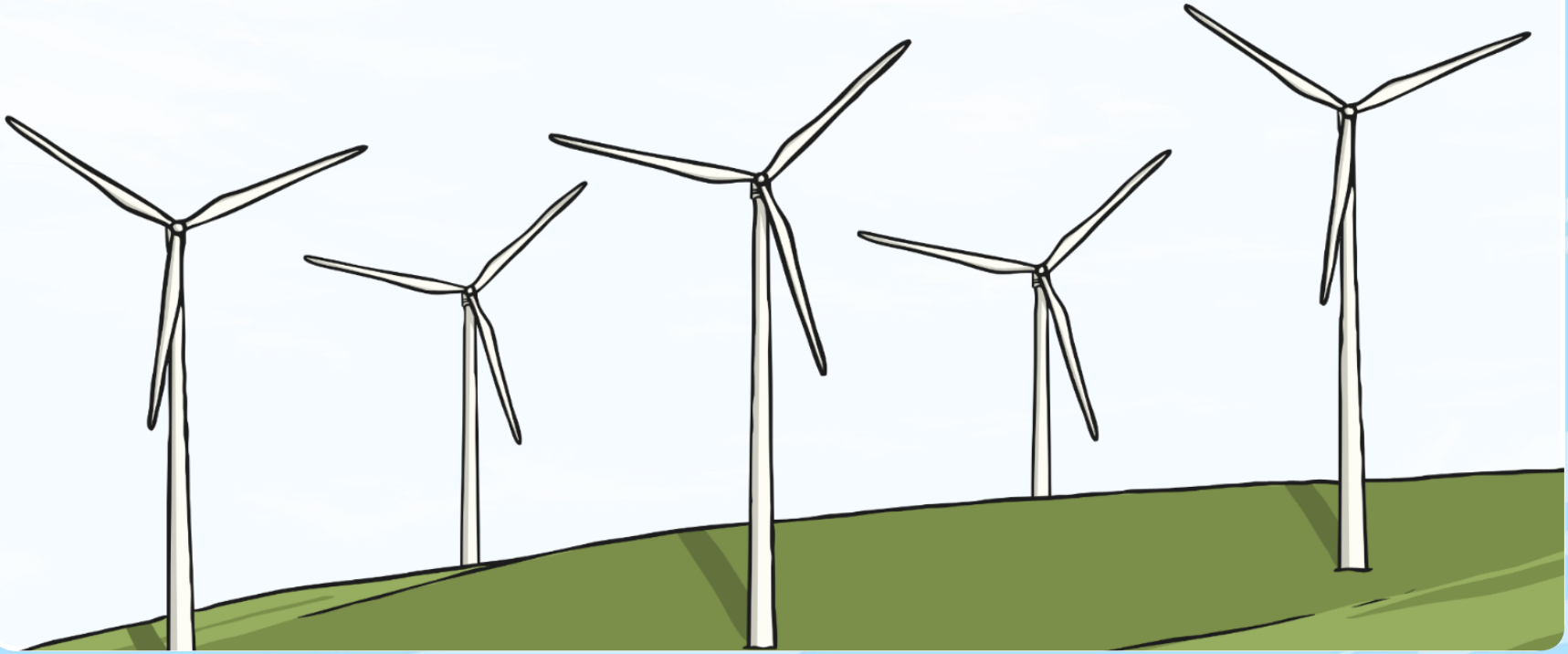
Many buildings are now fitted with solar PV cells.

Wind Energy

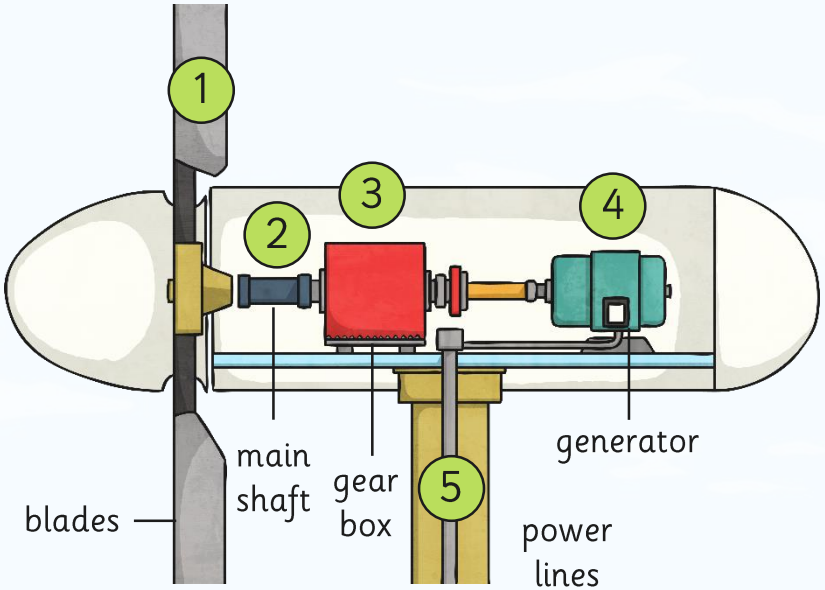
Wind turbines are used to convert wind energy to electricity.

The wind blows the blades around and this movement is converted into electricity.

A group of wind turbines is called a wind farm.



Wind Power



1. When the wind blows, the blades turn.
2. The blades turn the main shaft which connects to the gear box.
3. The gear box increases the speed of rotation to around 1500 rpm (revolutions per minute).
4. The shaft turns a generator which generates electricity.
5. The electricity is carried along power lines in the tower.

Wind Power

Advantages	Disadvantages
• Once the wind turbine is built, running costs are very low. • It does not produce any CO_2. • The land occupied by a wind farm can still be used for farming. • Wind is a renewable source so it will not run out. • Wind farms are safe and easy to build.	• Wind turbines must be shut down in very strong or very weak winds. • They can only be built in certain areas. • Not everyone likes the appearance of wind farms.

Renewable.

There are many wind farms in the UK.

Wind farms vary from a single turbine to fields of over 200!

Did you Know…?

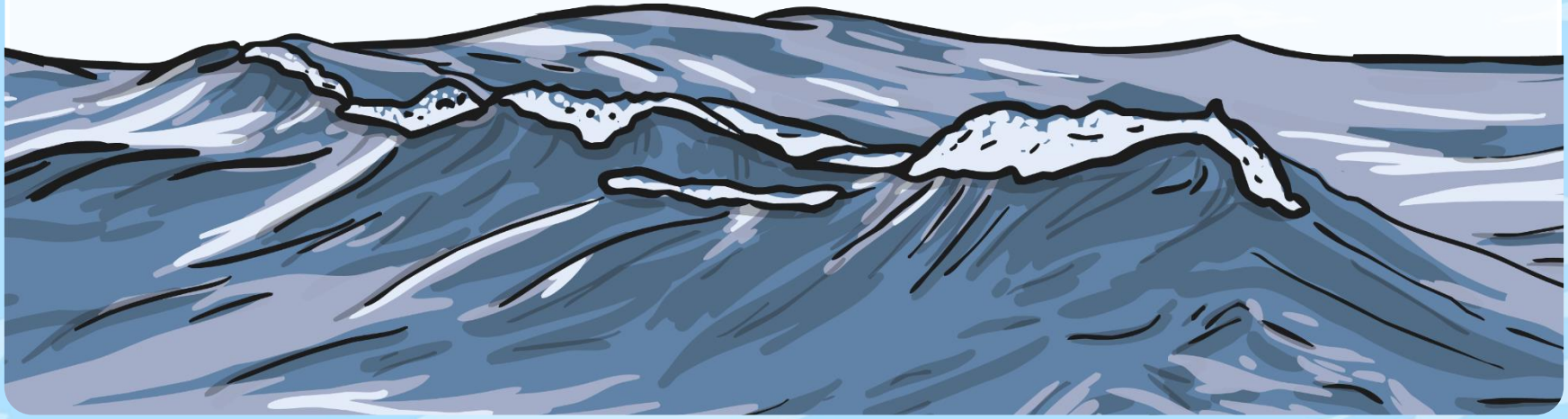
Other parts of the mechanism allow the turbine to be turned to face into the wind. In high winds, the pitch of the blades can be changed to stop the turbine turning at all and prevent damage.

Hydropower Energy

Hydropower is energy that comes from moving water.

Water that flows down fast-flowing rivers is used to spin turbines that generate electricity.

The movement of big waves at sea can also be used to generate energy.



Geothermal Energy

Geothermal energy is thermal energy generated and stored in the Earth.

It is always very warm underground, even if it is very cold on the surface.

We can collect heat from underground and use it to heat our houses.

The lava from volcanoes shows us how hot it is underground.

Biomass

Whole Class

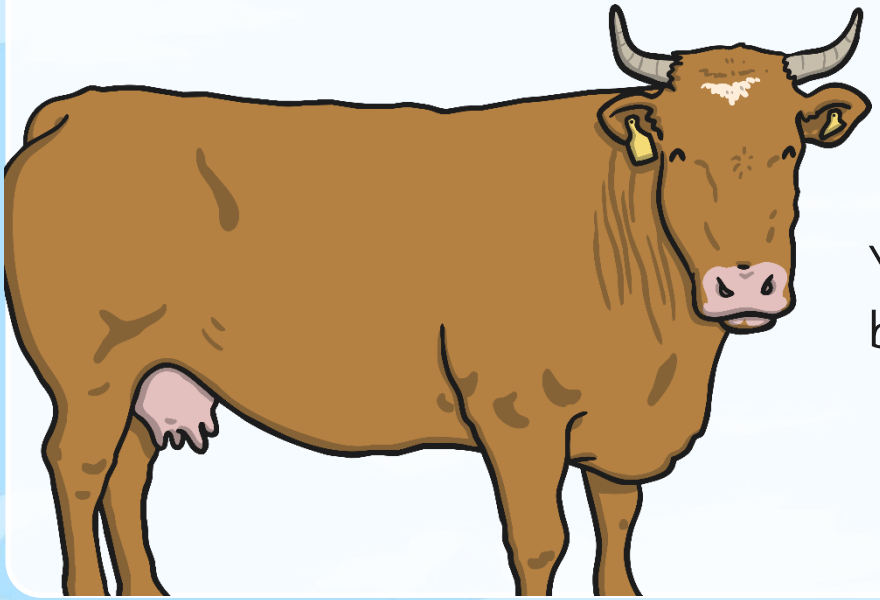
Watch this video.

Is this a renewable source?

How is this method similar to non-renewable methods?

Biomass Energy

Biomass means ‘natural material’. Energy can be obtained by burning natural waste materials such as scrap pieces of wood, dead trees and unused parts of crops.



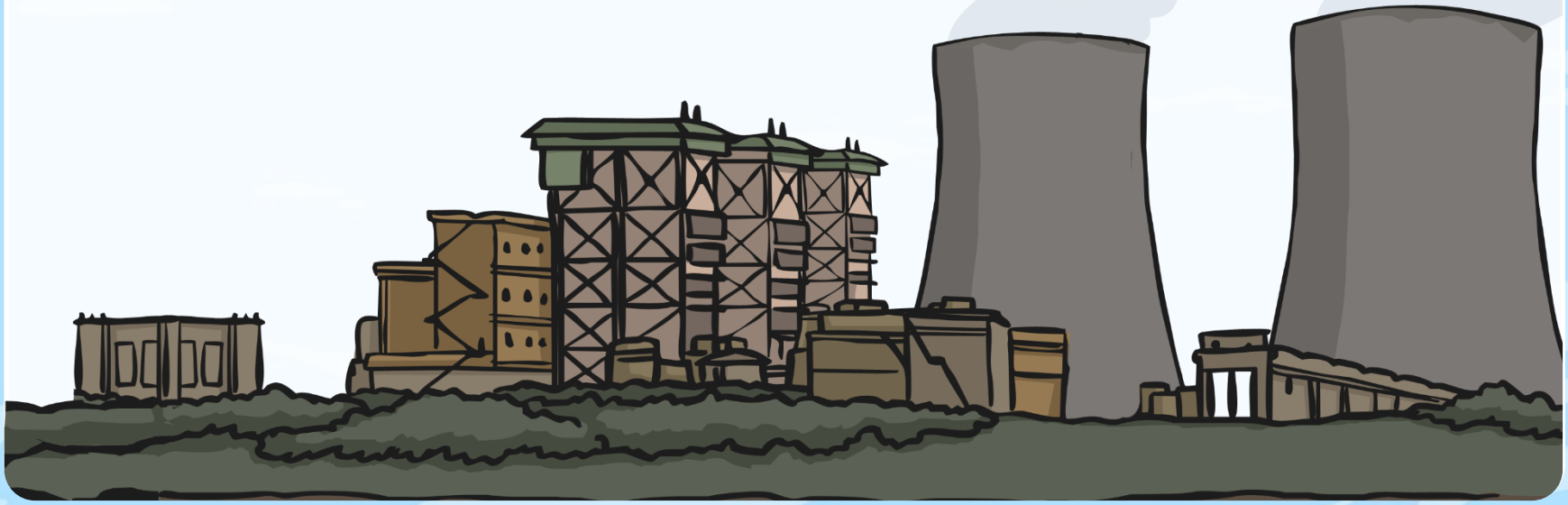
You can even burn the gas produced by cow manure to make energy.

Coal Energy

Coal is mined from under the ground and burned in large power stations to produce electricity.

The coal that we use cannot be replaced so one day there will be no coal left.

Burning coal is bad for the environment because lots of carbon dioxide gets released into the atmosphere.



Oil Energy

Oil is found deep underground and pumped up to the surface for us to use.

Oil is burned at some power stations to make electricity and is also used to make fuel which we use in our cars.

If we keep using oil there will eventually be none left.

Nuclear Energy

Nuclear power stations use uranium as fuel to make electricity. Uranium is a natural resource taken from the ground so it is not renewable.

Nuclear power doesn't produce much waste so it is a very clean way of generating energy.

Gas Energy

Natural gas is found deep underground and is pumped into our homes.
We use it to cook and burn it in a boiler to heat our water.

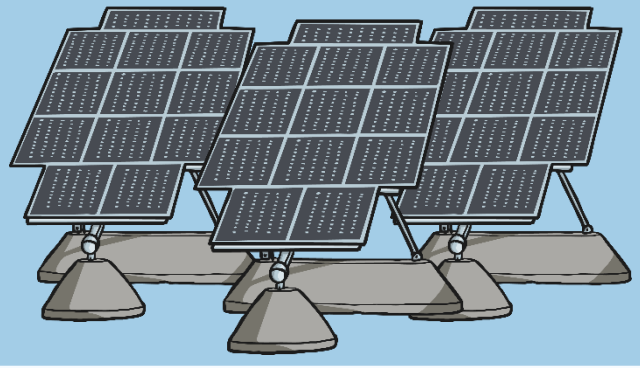
The gas that we pump from underground will one day run out and there won't be any left to use.

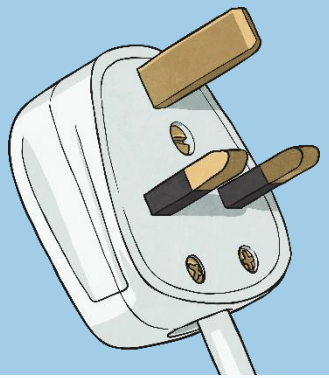
Making Comparisons

Whole Class

Look at the real-time generation data here.

How much electricity is being generated from renewables today?





On Target?

Whole Class

In 2014, renewables supplied 7% of the UK's electricity.

The European Union target is for the UK to source 15% of its electricity from renewables by 2020.

‘Passive’ Homes

‘Passive’ homes are energy efficient houses.

They have no central heating and very low energy bills.

Schiestlhaus, Austria – the first ‘passive’ mountain hut to be built in the Alps.

Cool air from the outside is drawn in and is heated using energy from within the house.

Lots of large windows allow heat and light from the sun in to the house.

The house is draught-free. There is no letterbox.

Solar panels heat the water.

A log burner is used to heat the home during winter.