GEOGRAPHY KNOWLEDGE ORGANISER: WHAT POWERS OUR WORLD? (1)

Key learning

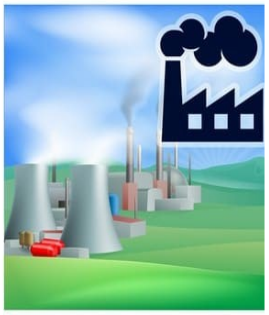
Electricity is an **energy**. This energy can be used to power electrical items such as toasters, kettles, cookers, televisions and computer tablets. Electricity is transported from **power stations** to our homes, schools and places of work through a **national grid** of substations, wires and cables. Electricity can also be stored in batteries (also called cells).

How is electricity made?

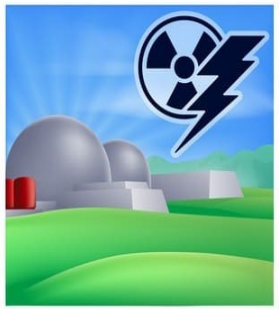
Large machines called **turbines** are turned very quickly – this requires a lot of **energy**, such as heat, wind or moving water. The spinning turbines cause large magnets to turn within copper wire coils - these are the **generators**. The moving magnets within the coil of wire cause electrons (charged particles) to move within the wire – this is electricity.

The environmental cost of supplying the world's energy is huge. Without drastic changes, our planet is at risk from catastrophic extinction events, linked to global warming, within our own lifetimes. Energy is produced in different ways:

Solar Energy is radiant light/heat from the Sun that is harnessed in different ways, eg solar panels.



A **fossil fuel power station** burns a fossil fuel, such as coal, oil, or natural gas, to produce heat to drive turbines.



A **nuclear power station** uses a nuclear reaction to heat the steam to drive a turbine to generate elecricity

A **hydro-electric power station** uses running or falling water to drive turbines to generate electricity

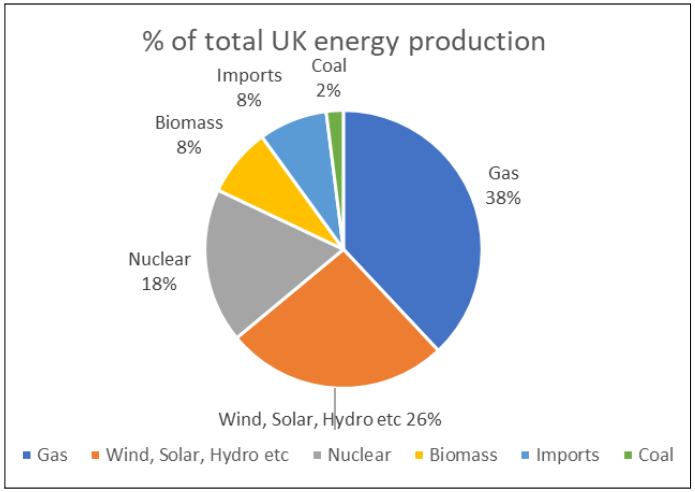
Wind energy is the use of wind to drive turbines to make electricity . Wind turbines have their own generators.

Renewable & Non-Renewable Energy

Renewable Energy
Energy from a source that is not depleted when used, eg solar, wind, wave, biomass

Non-Renewable Energy
Energy from a source that is depleted when used, eg coal, natural gas, oil

UK Power Production 2020



The National Grid

The **National Grid** network is made of power stations, storage facilities, substations, power lines and gas pipelines which enable the **distribution** of electricity to all areas of Great Britain. Within the network, there are many **electricity companies** who send electricity from the grid to your home.

GEOGRAPHY KNOWLEDGE ORGANISER: WHAT POWERS OUR WORLD? (2)

Global Warming

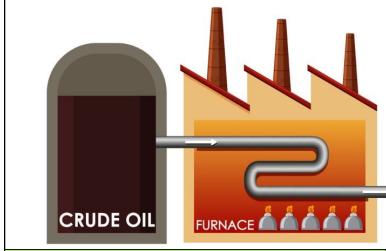
The **greenhouse effect** is a process that occurs when gases in Earth's **atmosphere** trap the Sun's heat. This process makes Earth much warmer than it would be without an atmosphere. The greenhouse effect is one of the things that makes Earth a comfortable place to live.

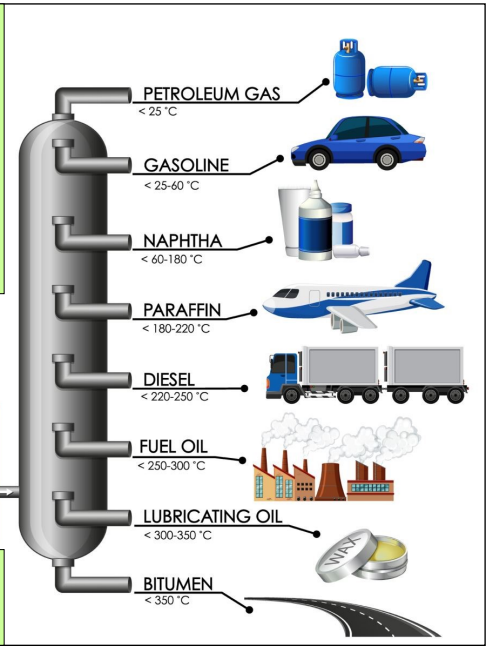
Human activities are changing Earth's natural greenhouse effect. Burning **fossil fuels** like **coal** and **oil** puts more **carbon dioxide** into our atmosphere.

NASA has observed increases in the amount of carbon dioxide and some other **greenhouse gases** in our atmosphere. Too much of these greenhouse gases can cause Earth's atmosphere to trap more and more heat. This causes Earth to warm up.

Scientists believe **climate change** is likely to have a huge impact on life on earth, with extreme weather, dramatic changes to food and farming, and threats to the planet's plants and wildlife.

Petroleum is a yellowy black liquid found beneath the Earth's surface. It has become crucial to humans as it can be turned into a range of substances when it is heated and treated.





Naphtha is a key ingredient in the making of plastics.

Fossil Fuels

Coal, **petroleum (crude oil)**, and **natural gas** are all considered **fossil fuels** because they were formed from the fossilized, buried remains of plants and animals that lived millions of years ago. Because of their origins, fossil fuels have a high **carbon** content.

It is believed 80% of the world's power is generated using **fossil fuels** which are responsible for high **emissions** of **carbon dioxide**. Countries which produce these fuels, and the companies that manage mining and supply, can become very rich and powerful. **Petroleum** derivatives such as plastics also have a huge environmental impact.

What do you think?

The future of Energy Production

In December 2015, 195 countries including the UK, signed up to the Paris Agreement to act on climate change. This agreement aimed to reduce the amount of greenhouse gas emissions each country was producing by moving to renewable energy sources.

These are just some of the issues that the Paris Agreement is trying to resolve:

Should we spend money on new technologies to replace fossil fuels with renewable energy sources?

How can we transport people locally and globally in an environmentally friendly way?

What will climate change do to our food supplies? How do we deal with this?

How will we achieve 'net zero'? (Producing less carbon than we take out of the atmosphere)

How can we support people, animals and nature that are affected by climate change?

The recent COP26 talks (Nov 2021) brought together world leaders & private companies with the aim of keeping global warming below 1.5% and enforcing the Paris Agreement.

Talk with your family and try to familiarise yourself with as many of these terms as you can, which we will be using throughout this study: **Atmosphere, greenhouse effect, fossil fuels, coal, oil, natural gas, carbon, carbon dioxide, climate change, solar/ hydro-electric/nuclear power, emissions, petroleum, electricity, energy, power station, renewable, non-renewable.**