

Yr 8 Geography – What is energy?

Why am I learning this? As the world's population continues to grow, so does our demand for energy. We use energy to cook, and heat and light our homes, and to drive the machinery we all depend upon. Currently 84% of the world's electricity is produced by burning fossil fuels. However, fossil fuels pollute the atmosphere and speed up global warming – and they will run out one day. This unit will make you think about how we can generate our electricity in a more sustainable way by switching to cleaner sources of energy

Key Word	Definition
Energy	"The ability to do work". Energy is what is needed to make things change and move.
Fuel	Any material which has stored energy.
Fossil fuel	Coal, oil or natural gas that are formed from the remains of dead organisms, known as fossils. This process happens over millions of years.
Non-Renewable energy	Sources of energy that cannot be replaced and so they will eventually run out.
Renewable energy	Sources of energy that we can use and they can be replaced quickly.
Turbine	A machine that when turned by water, wind or steam produces electricity.
Wind power	Electricity produced by the wind turning a turbine produced by
Solar Power	Energy is transferred from the sun to generate electricity in solar cells. It can also warm water in solar panels.
Global warming	Thermal (heat) energy is trapped by the atmosphere, causing the planet to become warmer than it would be naturally.
Greenhouse gases	Gases in the atmosphere, that trap escaping thermal energy
Climate change	The change in the average conditions – such as temperature and rainfall
Acid rain	Any form of precipitation with high levels of nitric and sulphuric acids. It can be caused by burning fossil fuels.
Sustainability	To use the world's resources in such a way that ensures there will be enough resources left for future generations
Carbon footprint	The amount of carbon dioxide released into the Earth's atmosphere as a result of human activities

What are fossil fuels?

Fossil fuels are stores of energy. When fuel is burnt it **releases its stored energy.** Where does this stored energy come from? The answer is - **the Sun**

There are **three** types of **fossil fuels**:

- Petrol** – comes from oil. Oil is produced from decayed plants and animals that died millions of years ago. **These plants took in and stored the sun's energy when they were alive.**
- Gas** – from the remains of tiny sea animals and plants that died millions of years ago sunk to the seabed or ocean floor where they decomposed. **These tiny sea animals and plants also took in and stored the sun's energy when they were alive.**
- Coal** – comes from plants on land that died millions of years ago. **These plants took in and stored the sun's energy when they were alive.**

Advantages of fossil fuels:

- Can be found in many parts of the world
- Oil and gas can be transported easily through pipes.

Disadvantages of fossil fuels:

- They are **non-renewable**
- Burning fossil fuels **releases greenhouse gases** (Carbon Dioxide) into the atmosphere. This leads to global warming which results in climate change

The difference between **renewable** and **non-renewable** sources of energy

Renewable energy = sources of energy that we can use and they are **can be replaced quickly.**

- Wind power, Solar power, Hydroelectric power, Geothermal Energy, Wood

Non-renewable energy = sources of energy that cannot be replaced and so they **will eventually run out.**

- Coal, Oil, Gas



What is 'climate change'?

Climate change refers to changes in the Earth's average temperature.

These changes occur naturally over time, but most scientists think that human behaviour is **increasing the amount of greenhouse gases** in the atmosphere, which is causing more rapid changes to the climate.

Humans are increasing the concentration of greenhouse gases, such as **carbon dioxide** and **methane**, within the atmosphere. These gases act as a blanket around the planet, trapping the sun's heat

Greenhouse gases can be released by human activity, such as:

- burning of fossil fuels**, which releases carbon dioxide into the atmosphere.
- deforestation**, as trees absorb carbon dioxide and store carbon.

Scientists suggest that the impacts of higher temperatures could include: making it difficult for some countries to grow food. Also, melting of the ice caps will raise sea levels causing flooding of coastal and low-lying communities.



Case study: The Athabasca Oil Sands

In an attempt to improve its energy security, Canada is extracting oil and bitumen from a massive area called the 'Athabasca Oil Sands'.

Advantages of developing the Athabasca Oil Sands

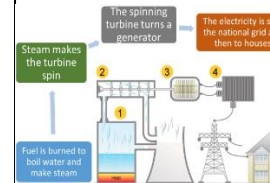
- Provides Canada with a secure source of energy (oil)
- Has produced thousands of jobs

Disadvantages of developing the Athabasca Oil Sands

- 200,000 tonnes of water used daily to treat bitumen – polluting local water supplies.
- There has been mass deforestation since 1963 to make way for the extraction equipment.



How do we produce electricity?



What is your Carbon Footprint?

A carbon footprint **is the total amount of carbon dioxide (CO2) emissions caused by one individual or organisation.** What can we do to reduce our carbon footprint? **Use fewer fossil fuels:**

Cycle instead of using the car, turn off lights and appliances when not needed. Use renewable energies.

