

What is Electricity?

Electricity is a form of energy resulting from the flow of electric charge. Electrical energy is one of the most convenient forms of energy to use as it can be transferred by cables to where we need it. We use electricity everyday for heat, powering devices and light.

Did you know electricity travels at the speed of light at approx. 186,000 miles per second?

How is Electricity generated?

Electricity is generated by transforming an existing energy resource into electrical energy, as efficiently as possible. Energy resources include the sun, fossil fuels, nuclear fission, wind, water, biomass and heat from the ground.

To ensure we have a constant supply of electricity, we need to use different energy resources and technologies so there is not a reliance on one type of electrical power generation. Central to the design of many power stations is the use of a turbine and generator. The turbine blades rotate due to the flow of steam produced by heat from fuel combustion, or alternatively wind for a wind turbine. The resultant rotation in the generator produces electrical energy that can be transferred via the National Grid to be used by homes and businesses

Electricity Generation Methods



Burning Fossil Fuels

Fossil fuels are hydrocarbons, primarily coal, oil or natural gas, formed from the remains of dead plants and animals.

When fossil fuels are burned to make electricity, they release carbon dioxide and other greenhouse gases. These gases trap heat in our atmosphere, making them the primary contributors to global warming and climate change.

Coal, oil and gas are natural resources that are being used up faster than they can be made by nature. This makes them a non-renewable resource of electricity.



Nuclear Energy

About 450 nuclear reactors provide about 11 percent of the world's electricity. In nuclear power plants, a process called fission is used to generate electricity.

Nuclear power plants do not emit any of the greenhouse gases that contribute to global warming, however they produce radioactive waste that needs to be contained and stored for hundreds, sometimes thousands of years.

Severe nuclear accidents such as Chernobyl (1986) and the nuclear disaster at Fukushima Daiichi nuclear plant (2011) have led some people to campaign against nuclear energy.

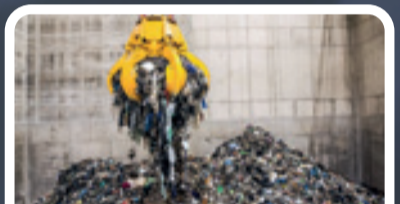


Renewable Energy

A renewable energy source means that it is sustainable - something that can't run out, or is endless like the sun.

Sources of renewable energy include solar, wind, hydro power, tidal, biomass and geothermal. Renewable energy sources don't emit carbon dioxide and other greenhouse gases that contribute to global warming.

In 2016, global renewable energy capacity grew by a record amount while its costs fell considerably. This improvement was largely due to a drop in the cost of both solar and wind energy.



Energy from Waste

Energy from Waste is a sustainable source of generating electricity. Non-recyclable waste is burned at high temperatures to produce steam which is used to drive a turbine connected to a generator.

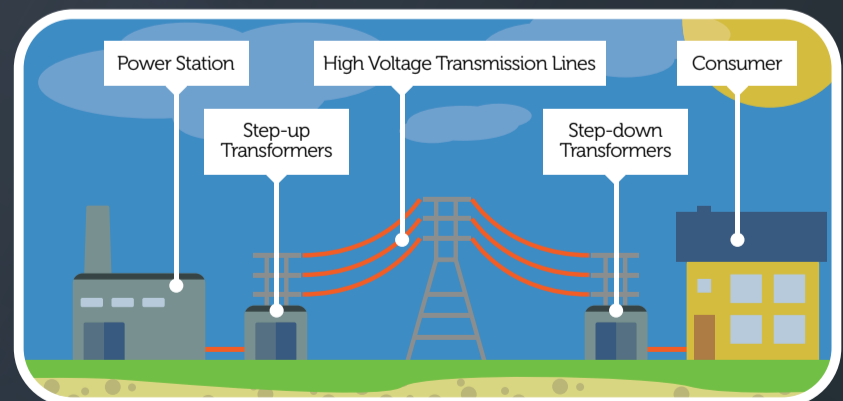
When waste is burned, carbon dioxide, water and ash are produced. Any material that won't burn, like glass, metals or stones, collects at the bottom of the chamber. Energy from Waste facilities also create small amounts of gases, such as nitrous oxides and fine particles. The emissions from incinerators are carefully controlled. The air is cleaned by a sophisticated air-pollution control (APC) system before it is released into the atmosphere.

What we do with it?

Electricity is generated in power stations and transported across the UK via the National Grid.

To move power around the National Grid:

- Before electrical power leaves a power station - it is transferred at high voltages by using 'Step-Up' transformers to increase the voltage to around 275,000V
- Before electrical power enters homes and factories - the voltages are decreased by 'Step-Down' transformers to 230V.



The transfer of electrical energy via the grid is very efficient. When currents in a cable are higher, more energy is dissipated to the surroundings through heating. As high currents waste more energy than low currents, electrical power is transported around the grid at a high voltage and low current.