

## How energy is generated and stored

### Renewable and non-renewable energy sources

There are two types of energy sources – **renewable** and **non-renewable**.

- Renewable energy sources include wind, solar, tidal, geothermal, biomass and hydro-electric.
- Non-renewable energy sources include coal, oil, gas and nuclear.

**Renewable** energy sources are often referred to as 'clean' or 'green' energy sources, because they come from a natural supply that is continuously replaced.

**Non-renewable** energy sources are often called 'dirty' and 'fossil fuels'. Coal, oil and gas are available in different parts of the world, but in limited amounts. Non-renewable energy sources often need to be extracted from the earth and sometimes processed, which can give off pollution and be very damaging. We currently depend highly on non-renewable energy sources, so a shift to 'greener' sources is underway and developing more and more.



Wind farms use turbines.



Coal fired power stations create lots of pollution.

### Advantages and disadvantages of renewable energy

**Wind** power has relatively little impact on the environment, although some people consider turbines to be unsightly, or 'visual pollution'. They are expensive to install, and reliable when there is wind. Turbines can affect wildlife, particularly birds.

**Solar** energy is expensive to set up, and is very dependent on sunny weather conditions to be at its most productive, although some electricity will be generated on cloudy days. Home owners fitting solar panels to their roofs can find them space-consuming too. Storing solar energy can also be difficult and expensive.

**Tidal** systems are expensive to set up and can damage ecological coastlines and harm marine life. Tidal power generates power for around 10 hours per day. It is around 80% efficient, better than solar or wind-based systems.

**Geothermal** energy uses 'hot spots' where molten rock close to the earth's crust generates hot water. In some locations, geothermal systems involve drilling into the earth's surface to reach deeper geothermal resources, allowing broader access to geothermal energy. This is a very high-cost resource and also risks triggering earthquakes.

### Manufacturing using renewable energy

Industrial and commercial manufacturing plants and factories around the world are implementing alternative methods of power generation from renewable energy sources, in order to increase production and reduce their energy usage.

Currently, about 66% of the energy used by the industry and manufacturing sector is fossil fuels, with a small percentage of renewable energy and biofuels.

### Government targets

The UK government has made a commitment for the UK to be net zero emissions by 2050.

This includes increasing clean wind energy, slashing carbon emissions and increasing offshore wind capacity.

### Fossil fuel powered road vehicles

By 2030, the UK will ban the production of petrol- and diesel-powered cars. Some hybrid vehicles that use both electricity and petrol or diesel will still be allowed to be produced until 2035.

In addition to some cities having congestion charges to help reduce congestion and pollution, electric vehicles and hybrids are becoming a more popular choice for motorists. There is often reduced or no road tax, as these vehicles are very clean and some produce zero emissions. Lots of car manufacturers are now producing fully electric cars, however battery technology and charging facilities remain problematic.