**What is renewable energy?**

**Renewable definition**: A resource that is not depleted by use.

Renewable energy sources are those that are not finite, and will not run out.

Finite sources of energy include coal, oil and gas, which are used up when they are burned directly as fuel, or to generate electricity, and these will eventually run out. Although coal, gas and oil are produced naturally by the processes of the planet, this takes millions of years, and humans are using these energy sources much more rapidly than they can be generated.

**What is environmental sustainability?**

**Environmental sustainability definition**: A state in which the demands placed on the environment can be met without reducing its capacity to allow all people to live well, now and in the future.

Sustainable energy sources are those that can be used without reducing the ability of future generations to live well. This could mean avoiding the depletion of energy sources, but could also mean not harming the environment to a point where it becomes harmful to people or nature. Whether an energy source is sustainable or not takes into account the environmental impact, together with whether the energy source is renewable.

**Is it renewable/sustainable?**

Whether an energy source is renewable or not can be quite clear cut, so pupils may feel comfortable saying whether a given energy source is renewable or not.

Whether an energy source is sustainable is harder to determine. Generally non-renewable energy sources are also non-sustainable, as their use depletes the supply, meaning that they are not available to future generations. Most energy sources tend to sit somewhere along a spectrum of sustainability, rather than being sustainable or non-sustainable. Sustainability is something that can be improved in all energy production. This means that pupils may struggle to decide if an energy source is sustainable or not. The important aspect of the activity is to debate the issues surrounding that source, rather than reach a definitive conclusion.

# Example 1. Coal

Non-renewable: It is a finite resource that will be depleted by use.

Non-sustainable: Once coal is depleted, it will reduce the ability of future generations to generate energy.

Summary: Coal is widely considered to be non-renewable and non-sustainable.

# Example 2. Wind power

Renewable: Using wind to generate energy does not use it up, wind will continue to be available for power generation indefinitely.

Sustainable: Wind power will continue to provide energy for future generations. Wind power does not generate greenhouse gases, and so does not contribute to climate change. Wind farms built on land or in the sea can lead to special protection put in place for that land, which can preserve habitats.

Non-sustainable: Building wind farms on land or in the sea can lead to habitat destruction and be hazardous for wildlife such as migrating birds. The manufacture of wind turbines uses energy, and the source of the energy used in manufacture of the turbines may not be sustainable.

Summary: Wind power is widely considered to be renewable, but its sustainability is debated. Many people see it as a more sustainable alternative to fossil fuels.

# Example 3. Biogas

Renewable: Feedstock can be produced at a rate that keeps up with fuel demands, for example, food waste or commercial forestry.

Sustainable: If the feedstock can be produced as a by-product of human activity, such as food waste, then the feedstock itself has little environmental footprint. Biogas can make use of potential greenhouse gas emissions, such as methane, and burn this gas as a fuel. Growing biogas feedstock can provide an alternative income to communities with suitable land.

Non-sustainable: Feedstock grown commercially can have environmental impact in terms of habitat loss in the conversion of land to commercial forestry, or agriculture to grow feedstock. Commercial feedstock may be grown on one continent and transported to another for use, which has an environmental cost. Growing biogas feedstock instead of food crops can reduce the availability of food in some parts of the world. Biogas provides a fuel or energy source for the generation of electricity by burning the gas. Burning biogas produces greenhouse gas emissions, which leads to climate change.

Summary: Biogas is widely considered renewable, but its sustainability is debated. The sustainability of biogas can be improved or reduced, depending on how it is produced.