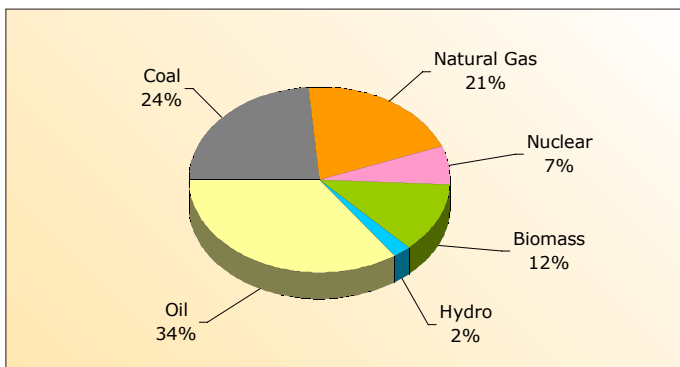


# RENEWABLE ENERGY

A large amount of the energy we buy today comes from fossil fuel and nuclear power stations. During the burning of these fossil fuels, emissions are released into the atmosphere which have a negative impact upon our environment. These include carbon and sulfur dioxides which contribute to environmental climate change and acid rain. Both fossil and nuclear fuels depend on limited resources, and there are serious doubts surrounding the safety of nuclear technology, and how to dispose of the radioactive waste products. Renewable sources of energy, such as the wind and the sun, do not contribute to climate change and will not run out, offering a more sustainable option for future energy supply.

## The need for energy...

Humankind needs an extremely large amount of energy to sustain its activities, in our homes, businesses, industry, and for transport. At present nearly three quarters of our energy comes from the fossil fuels: coal, oil and gas, the rest coming from nuclear, hydro, and biomass. This high dependence on fossil fuels is worrying for a number of reasons.



Above: World energy consumption by source of energy 1992

## What's wrong with fossil fuels?

Fossil fuels are limited resources -they will run out. At present energy consumption rates oil has been predicted to run out in around 100 years, gas in around 65 years, and coal in around 200 years. These are of course just predictions, and it is likely that improved technology and emphasis on energy efficiency will mean they last longer than predicted. The bottom line, however, is that they will inevitably run out with continued use. Fossil fuels are also known to have a negative impact on the environment in a number of ways. When they are burned they release harmful emissions into the atmosphere such as Carbon Dioxide (CO<sub>2</sub>), the most significant 'greenhouse gas'. It is called a greenhouse gas because excessive amounts of it in our atmosphere stops some solar energy radi-

ating back out to space, capturing more and more of it in our atmosphere where it gradually warms up the planet -Global Warming or **Climate Change**. The effects of climate change will mean polar ice caps melting, massive flooding from rising sea levels, and a dramatic increase in extreme weather conditions. This will effect whole ecosystems with changes in temperature, flora, and fauna, threatening the extinction of some species. Another side-effect of the burning of fossil fuels is acid rain. Gases such as sulfur dioxide and nitrogen oxides combine with water in the atmosphere to form sulfuric acid and nitric acid, and the resulting rain is slightly acidic. Acid rain causes damage to plant life, in some cases seriously affecting the growth of whole forests, and can also erode buildings and corrode metal objects. As well as these major threats there are other negative effects associated with the use of fossil fuels, most notably oil spills.

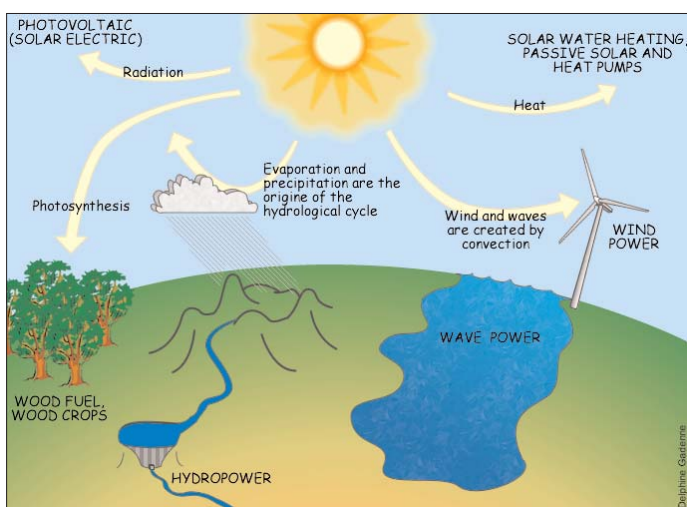
## Why not nuclear?

Nuclear power is seen by some as a major energy resource of the future. It does not emit the gases that contribute to climate change or acid rain, but it has its own problems which cast doubt over its use. There are questions over the safety of nuclear power plants, where a single accident can cause significant radioactive pollution contaminating land and causing long-term, and often terminal, harm to the health of affected people. Another big issue is the safe disposal of radioactive materials, which can remain radioactive for tens of thousands of years.

## A renewable alternative...

Fossil fuels cannot be considered 'sustainable', meaning that to use them all now means not only

will future generations not have those resources, but we will also be seriously damaging their future environment. The increased use of renewable sources for energy supply offers a cleaner alternative which will never run out, and will not contribute to climate change or create acid rain.



Above: The sun is the real source of most renewable resources.

**Solar Power:** The use of passive solar design is possibly the simplest form of solar energy. Many buildings today are designed to utilise the energy of the sun as efficiently as possible, reducing but not eliminating the need for space heating using another fuel source. The most common direct use of solar power is for solar water heating (SWH). A typical roof-mounted SWH panel system will provide 40-70% of hot water needs over the year. Solar energy can also be converted into electricity using special photovoltaic (PV) cells. PV cells are used in simple applications e.g. calculators and watches, but can also be used for larger applications such as integrating them into buildings to provide all or some of the electricity requirement.

**Wind Energy:** People have used the power of the wind for many years to produce mechanical power for milling grain and pumping water. In recent times wind turbine technology has enabled us to harness wind to generate electricity. This renewable source of energy has great potential, the UK

has the largest wind resource in the whole of Europe. There are currently around 60 wind farms on land in the UK and more offshore wind farms are being planned.

**Biomass Energy:** Fast-growing trees like willow and poplar can be used as commercial energy crops to meet local heating needs, or used in power stations to generate electricity. Wastes from agricultural and forestry operations can also be used in this way.

**Water power:** The use of water can be categorised into three main areas: Hydroelectricity, Tidal and Wave. Hydroelectricity schemes currently produce 20% of electricity worldwide, but can have a significant negative environmental impact. Tidal power is used to some extent worldwide, but is very expensive, and Wave power is still at the experimental stage.

**Geothermal:** The heat of the Earth can be tapped into to produce electricity in power plants, and we can also use its warm water in industry, agriculture, bathing and cleansing. Geothermal energy is widely used but still offers a lot of potential for further development.

**Green electricity:** It is increasingly possible for consumers to invest in renewable energy by purchasing "green electricity". This has been made possible by the deregulation of the electricity industry. Now consumers can choose to buy electricity from a range of suppliers, many of which now offer a 'green tariff'.

### A future sustainable energy strategy?

At present in the UK only 2% of electricity produced comes from a renewable source. Governments worldwide are committed to increase the use of renewable sources, the UK has a target of 5% by 2005 and 10% by 2010. Various predictions suggest we will achieve 50% by 2050, a date that many feel will already be too late to avoid significant impacts of climate change.

**Sponsors:** The National Energy Foundation, The Department of the Environment Transport and the Regions, Student Force, PowerGen

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