

Global Issues 1

Energy Use

Contents

Facing global issues 4

What's the issue? Energy for the future 5

Energy issues around the globe 6

ISSUE 1

High energy demand 8

ISSUE 2

Limited oil supplies 12

ISSUE 3

Pollution from burning coal 16

ISSUE 4

Running out of wood 20

ISSUE 5

Problems with energy alternatives 24

What can you do? Save energy 28

Towards a sustainable future 30

Websites 30

Glossary 31

Index 32

ISSUES

To read the second part of each issue, click on the page number to go to the next page.

Glossary words

When a word is printed in **bold**, click on it to find its meaning.



Facing global issues



Hi there! This is Earth speaking. Will you spare a moment to listen to me? I have some very important things to discuss.

We must face up to some urgent environmental problems! All living things depend on my environment, but the way you humans are living at the moment, I will not be able to keep looking after you.

The issues I am worried about are:

- the huge number of people on Earth
- the supply of clean air and water
- wasting resources
- energy supplies for the future
- protecting all living things
- **global warming and climate change.**

My global challenge to you is to find a **sustainable** way of living. Read on to find out what people around the world are doing to try to help.

Fast fact

In 2005, the United Nations Environment Program Report, written by experts from 95 countries, concluded that 60 per cent of the Earth's resources are being degraded or used unsustainably.

What's the issue? Energy for the future

Across the world today, oil, coal and gas are the main sources of energy for industry, transport and the home. Oil, coal and gas are **fossil fuels**. Developing energy sources as alternatives to these fuels is an urgent environmental issue.

The need for energy

Everything that happens needs an energy source. Human bodies use food for energy, plants use the energy of sunlight to grow. Since the 1850s, people have come to rely more and more on fossil fuels as their main energy sources, and most modern machines still use oil or coal.

Problems with fossil fuels

There are two main problems with relying on fossil fuels:

- fossil fuels are **non-renewable** energy sources, and they will run out
- using fossil fuels causes environmental problems, including pollution and global warming.

Overcoming these problems requires the development of a range of alternative fuel sources.

Most of the energy used by people today comes from fossil fuels.

Fast fact

Until the mid-1800s, the main fuel source used by people was wood.



Energy issues around the globe

The most urgent energy supply issues around the globe include:

- the high demand for energy (see issue 1)
- supplies of non-renewable fossil fuels rapidly running out (see issue 2)
- pollution and global warming caused by burning fossil fuel (see issue 3)
- running out of **renewable** fuels such as wood (see issue 4)
- problems with new alternative fuel (see issue 5).

Fast fact
Fossil fuels form under the ground from the remains of plants and animals that lived millions of years ago.



ISSUE 5
France
Turning to the nuclear energy alternative. See pages 24–27.



ISSUE 3
China
Air pollution due to high use of coal. See pages 16–19.



ISSUE 1
USA
The highest energy user. See pages 8–11.



ISSUE 2
Saudi Arabia
Even the largest oil reserves have a limit. See pages 12–15.



ISSUE 4
Africa
Problems with wood as a source of energy. See pages 20–23.



High energy demand

Modern **developed countries** have very high energy demands. They need huge amounts of energy every day to run machines in manufacturing, in offices and homes, for communications and for transport.

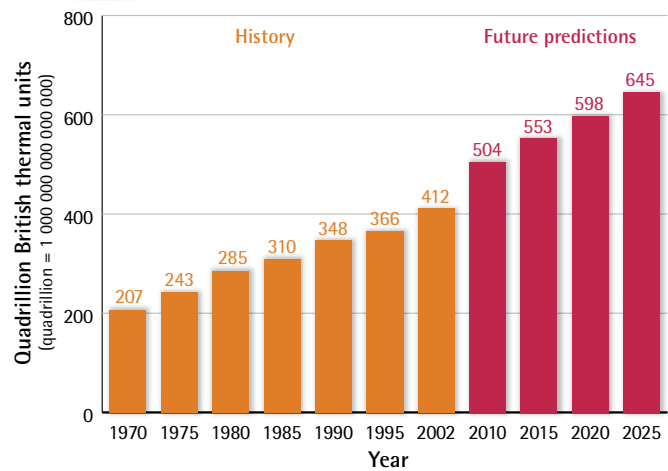
World energy demand

The world population is rapidly increasing and more and more people across the globe are using more and more energy each year. Since the 1850s, industrial development has depended on fossil fuels for energy. Oil, coal and gas are still the main energy sources used today.

Fuel consumption today

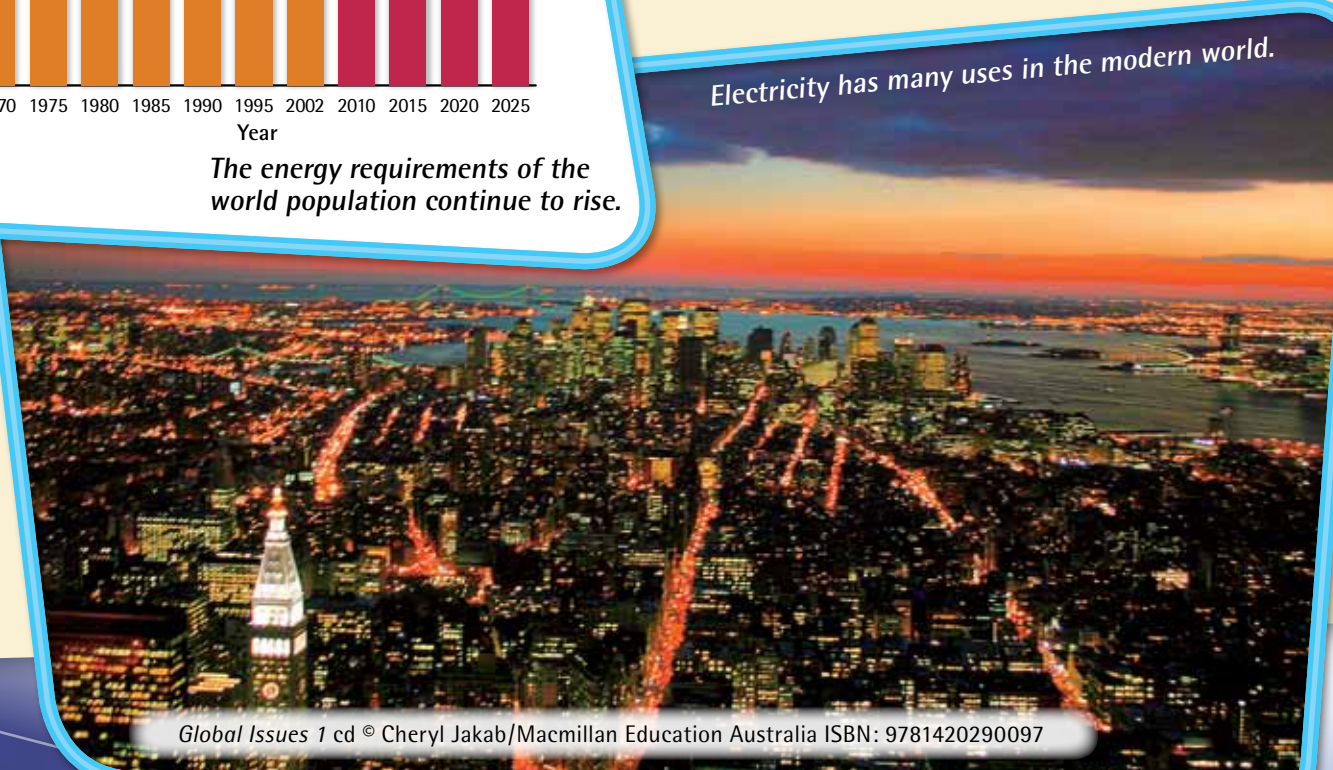
Fuel consumption worldwide is increasing fast. Nations with well developed industry are continuing to demand more and more energy to run more and more devices. Many people in **developing countries**, particularly in Asia, Africa and South America, are moving from a rural lifestyle to an industrial lifestyle with a high energy demand.

Fast fact
In 2000, world consumption of fossil fuels was about 30 times greater than it was in 1900.



The energy requirements of the world population continue to rise.

Electricity has many uses in the modern world.



The US is rich in fossil fuel resources such as oil.

Fast fact
In worldwide fossil fuel reserves, the USA has more coal than any other country. It has the sixth largest natural gas reserves, and the eleventh largest oil reserves in the world.

CASE STUDY

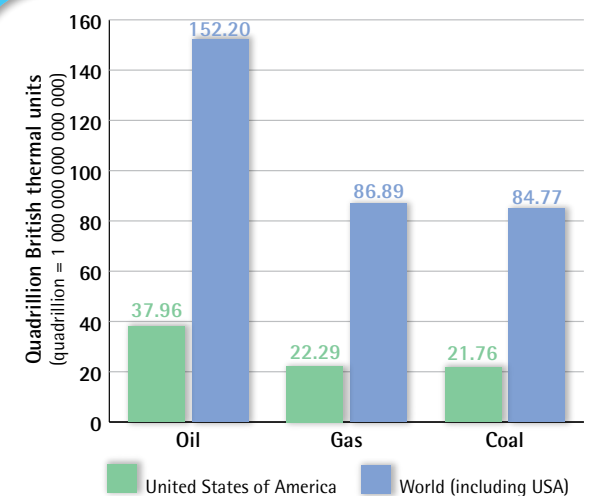
The US - world's largest energy consumer

Of all the countries in the world, the United States of America consumes by far the most energy. The US is the world's largest energy producer, consumer and importer.

It is predicted energy consumption in the US will increase by 25 per cent by the year 2025. Transport will account for most of this growth in demand for oil through to 2020.

Cars in the US

Cars account for a large part of the huge demand for oil in the US. About 80 per cent of total travel each year is by private car. Airline travel is the second most popular way to travel. Very little travel is by public transport such as buses and trains. Passenger vehicles in the early 2000s use about 40 per cent of all the petroleum consumed in the US.



The US has about 5 per cent of the world population and consumes about 25 per cent of the energy.

Towards a sustainable future: Reducing consumption

In the early 2000s, about 20 per cent of the world's population in developed countries consumed about 80 per cent of the world's resources, including energy. Reducing energy consumption can save large amounts of energy resources so they will last longer.

Energy efficiency

Energy efficiency is the quickest and cheapest way to extend the world's energy supplies. Efficient devices use less energy to do the same job. Energy-efficient light globes, cars, washing machines and refrigerators all help save energy supplies by reducing the energy needed to do a job.

Switch off and save

Switching off appliances when they are not in use decreases energy demand and saves money. Electric lights left on, electrical appliances on stand-by and using cars to take short trips instead of walking all waste energy.

Energy-efficient appliances help reduce energy consumption.



Fast fact

It is estimated that using energy-efficient household appliances and improved technologies can result in a 50 per cent saving in electricity.



When tilted down, these window coverings stop direct heat from the Sun. When tilted up, they act as light scoops to reflect light into the living area.

CASE STUDY

Passive solar building design

Buildings can be designed to use the Sun for heating or cooling, rather than using airconditioners and heaters. This use of the Sun's energy is called 'passive solar energy'. Buildings can also be designed to make the most of natural lighting from the Sun during the day.

Passive solar features

Passive solar designs include:

- windows that collect extra heat in winter and less heat in summer
- air channels to direct heat into the house in winter and keep heat out in summer
- thick walls that prevent swings in temperature by absorbing heat in winter and insulating in summer.

Advantages of passive solar design

Designing buildings to better use passive solar energy can make huge energy savings. Passive solar design can dramatically reduce the amount of energy used and therefore saves money on energy bills.

Limited oil supplies

Today oil is used about four times as fast as new supplies of oil are found. At this rate, the known oil reserves could be used up in as little as 45 years.

What is oil?

Crude oil or petroleum is a naturally occurring oily liquid which forms from long-dead plants and animals. Most oil formed below the oceans from the remains of tiny animals.

Crude oil is the main fuel for transport. Oil is also used in medicines, fertilisers, foods, plastics, building materials, paints, cloth and to generate electricity. **Lubricants** made from petroleum are used in just about every machine.

Reserves of crude oil

Oil is not distributed evenly through the Earth's crust. Nearly 70 per cent of the world's known oil reserves are in the Middle East, in Saudi Arabia, Iraq, Iran, the United Arab Emirates and Kuwait. About half of the crude oil taken from these reserves is refined for use as petrol in cars and trucks.

Offshore wells are the source of about a quarter of the world's annual production of oil.



Oil is transported in supertankers.

CASE STUDY

Oil in Saudi Arabia

Saudi Arabia produces about one-eighth of the world's oil each year. Production was estimated in 2001 to be over 3 billion (3 000 000 000) barrels.

Saudi Arabia's oil reserve is not accurately known, although it is estimated at more than 250 billion (250 000 000 000) barrels. It is difficult to know exactly, but at current rates of production, oil in Saudi Arabia may last for 80 years at the most.

Oil production and export

Most oil produced by Saudi Arabia is exported through ports in the Persian Gulf. The Trans-Arabian Pipeline, completed in 1950, carries oil to Lebanon. Another pipeline completed in the 1980s links the eastern oilfields with the Red Sea.

Oil pollution

Saudi Arabian **habitats** experience a number of problems from oil production. Oil wells, pipelines and ships create oil spills on land and in the sea, causing extensive pollution problems.

Fast fact
One barrel contains about 159 litres of oil.

Towards a sustainable future: Ensuring future energy supplies

Oil is a non-renewable resource and will not be the main fuel used for very far into the future. The future of energy supplies can be ensured by:

- using oil reserves carefully and wisely
- finding alternatives to oil.

Using reserves wisely

Remaining oil reserves need to be conserved now to make sure supplies last as long as possible. Experts agree that new discoveries and inventions can extend the availability of cheap oil for only a few decades. New technologies may also allow more oil to be taken from known deposits.

Wind turbines, which spin in the wind and make electricity, are being developed as a renewable energy source.

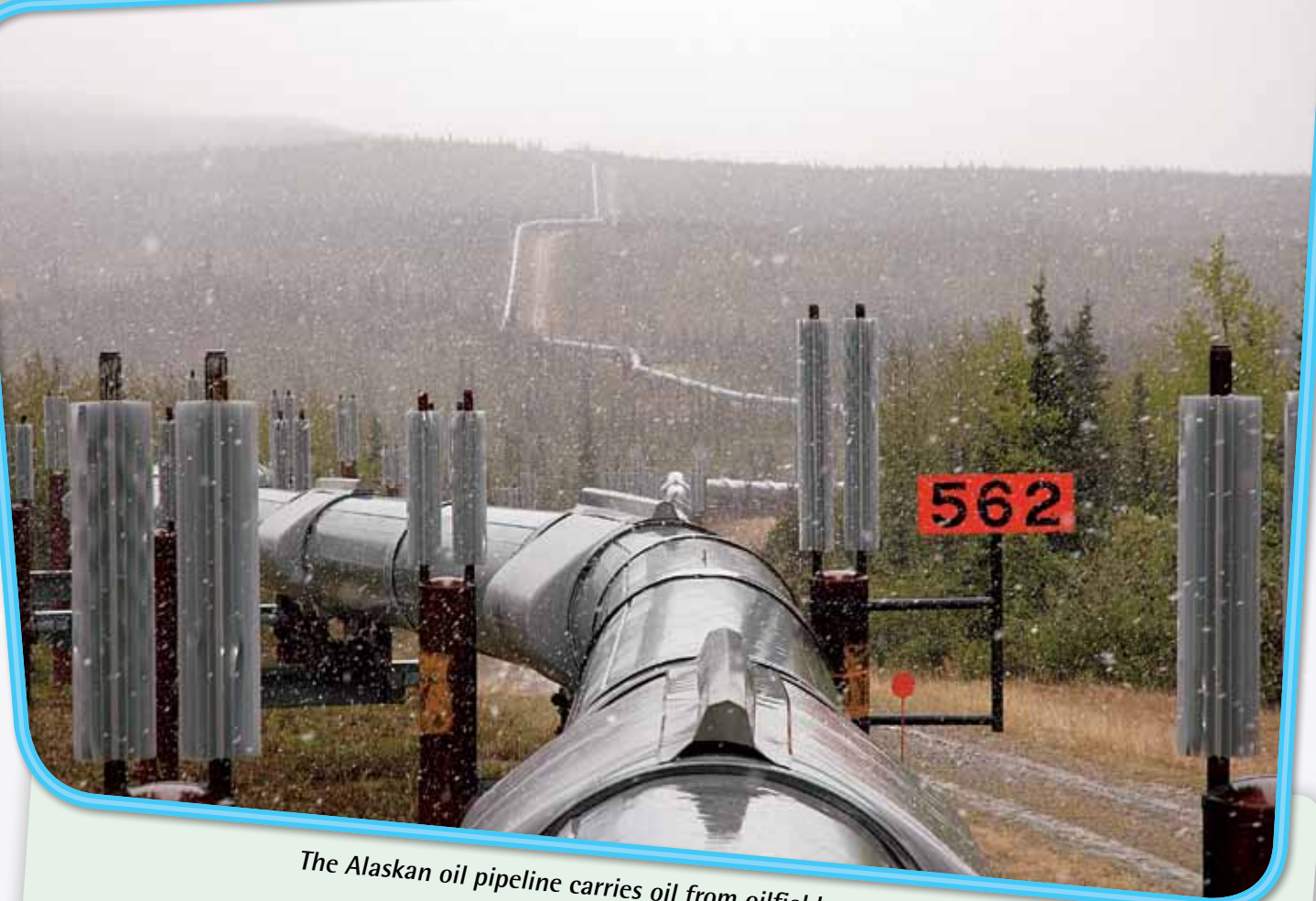
Finding alternatives

Renewable alternative energy sources include wood, wind, the Sun, energy from ocean waves and **hydro-electricity**. The best alternative sources to use are ones that:

- cause little environmental damage
- give a continuous supply that will not run out.

Fast fact

In October 1994, an estimated 60 000 to 80 000 tonnes of oil was spilled from a fractured pipeline near Usinsk, just south of the Arctic Circle.



The Alaskan oil pipeline carries oil from oilfields on the Arctic coast to tanker ships.

CASE STUDY

New oil deposits

The search continues for new oil deposits to help keep up the supply. Additional discoveries of new oilfields will be made, however there are limits.

Oil in Alaska

The Prudhoe Bay oilfield on the North Slope of Alaska is the largest oilfield ever discovered in the Americas. The crude oil in this field is estimated to be about 10 billion (10 000 000 000) barrels.

The Alaskan oil pipeline brings crude oil from the Prudhoe Bay oilfield to tanker ships docked in southern Alaska. Crossing 1270 kilometres of Alaskan wilderness, the pipeline carries up to 2 million barrels of oil per day from the Arctic coast to the Gulf of Alaska.

At current rates of oil use, Prudhoe Bay will only produce enough oil to supply the United States for less than two years. Prudhoe Bay is the only oilfield of this size discovered in the area in more than 100 years of exploration.

Fast fact

It is estimated the remaining oil reserves in the United States will last for less than 10 years at the current rate of production.

Pollution from burning coal

Coal is a major energy source, used particularly for heating and generating electricity in power stations. A major disadvantage of coal, and to a less extent other fossil fuels, is the release of large amounts of pollution into the air when it burns.

What is coal?

Fast fact

When coal is burnt, carbon combines with oxygen to release energy, and carbon dioxide is given off as a waste product.

Coal is a solid fossil fuel formed from plant material. It consists mainly of carbon, a material found in living things. Most known coal reserves formed between 345 and 280 million years ago.

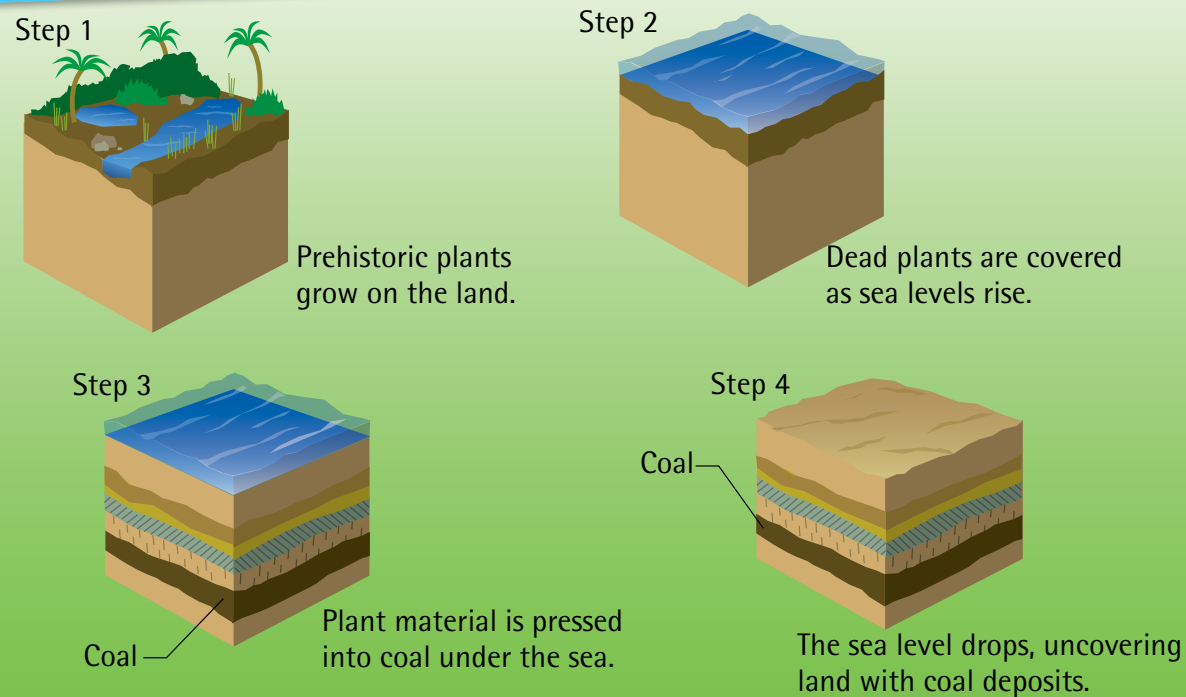
Coal is a rich energy source, but not as rich as oil. It is also not as easy to get from the ground or transport as oil.

Pollution from coal

Use of coal and other fossil fuels for energy is thought to be the main cause of global warming being experienced today. Burning coal releases:

- carbon dioxide that adds to global warming
- sulfur dioxide, which causes acid rain
- fine particles of air pollutants causing serious health problems.

Coal forms under the ground over millions of years.



Burning coal is the major source of air pollution in China.

CASE STUDY

Coal use in China

Coal is the leading industrial and domestic fuel in China. Coal is used to generate most of China's electricity and is causing enormous pollution problems. China's coal-mining industry is the world's largest.

Coal reserves in China

China has more than 40 per cent of the world's known reserves of coal. Chinese coalfields are among the largest in the world, with over 10 trillion (10 000 000 000 000) tonnes of coal, mostly in north China, around Dongbei. There are also many smaller coal mines throughout the country.

Air quality and coal

Using its huge coal reserves has helped China to develop rapidly as an industrial nation. Like many similar places around the world, the air quality of industrial areas in China suffers greatly from air pollution.

Fast fact

Coal provides about three-quarters of China's energy. China also generates a significant amount of electricity by flowing water or hydro-electric power.

Towards a sustainable future: Finding new fuels

Coal is limited in supply, and reserves of coal should last about another 200 years if used at the 1998 levels of production. However, the biggest problem with coal is the pollution it causes when it burns. Alternative renewable fuel sources are needed to replace non-renewable, polluting fossil fuels.

Alternative energy sources

Renewable energy sources such as wind, wave and solar energy, are being developed to replace coal for generating electricity. Non-renewable alternatives in use include geothermal energy and nuclear energy.

Clean coal technologies

New technologies for using coal are also being investigated to try to reduce pollution. These 'clean coal technologies' reduce pollution given off by burning coal, and also get more useable energy from the coal.

Clean coal technologies include:

- improved methods of cleaning coal before use
- removing pollutants from wastes instead of releasing them into the air
- using wastes as a fuel source
- carbon sequestration, which is burying waste carbon dioxide deep underground.

Fast fact

In 2000 as much electricity was produced from nuclear energy as from all other sources worldwide in 1961.

In Scotland, wave-powered electricity generators are being trialled.



Solar panels can be fitted to individual buildings.

CASE STUDY

Solar energy

A major alternative to coal as a source of electricity is solar energy. Solar energy is used in large-scale power plants and on a small scale in individual homes.

The world's largest solar power station

An area outside Leipzig, Germany, has one of the world's largest solar-powered electricity generators. A field of 33 500 solar panels directly captures the Sun's heat and converts it to electricity. The station is connected to the area's power grid and now generates enough electricity to power 1800 homes.

A solar house

Individuals can also set up their own solar energy system. This involves having solar collectors connected to a system of batteries that store the energy collected when the Sun is shining. These systems are becoming very popular. For example, more than 20 000 small-scale solar-power generator systems are purchased each year in Kenya.

Fast fact

Setting up solar energy systems still costs more than using electricity generated by fossil fuels.

Running out of wood

Since earliest times, humans have used wood as fuel. Burning traditional fuels, such as wood, is still a major source of energy in developing countries, particularly in Africa. Today, however, traditional fuels are not being replaced as fast as they are being used, causing major problems, particularly in developing countries.

Fast fact

In Africa, biomass is about 66 per cent of total energy use, compared to about 3 per cent in Europe.

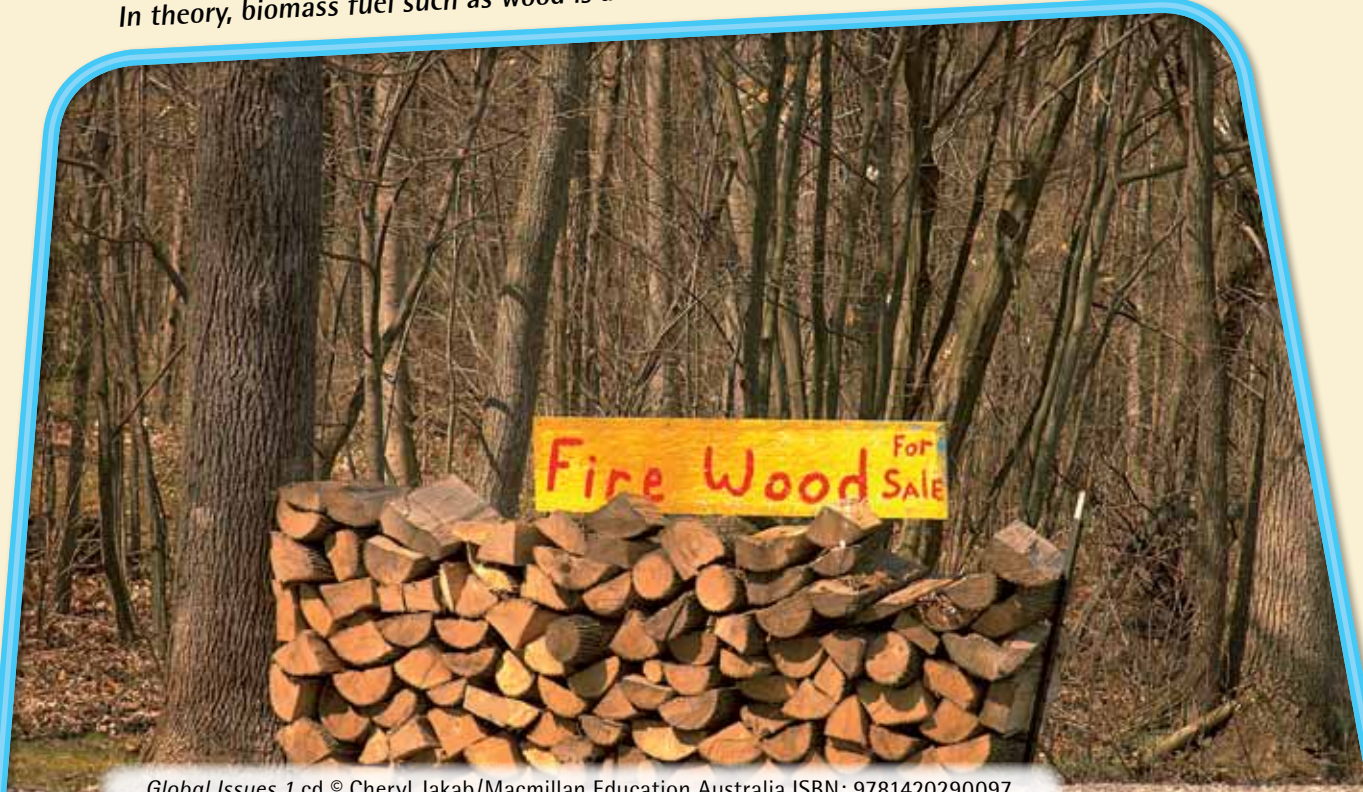
Renewable biomass fuels

Biomass fuel comes from living things, such as plants. Biomass is a renewable energy source because it can be grown to provide continuous supplies. Wastes from food crops can be used as biomass fuels.

Limits to grown fuel

Traditional biomass fuel, such as wood, is only likely to play a very small role in energy supplies in industrial countries. However, biomass is an important energy source that people living in rural areas with no other fuels can provide for themselves. Traditional firewood collection is considered unsustainable or non-renewable if used too intensively.

In theory, biomass fuel such as wood is a renewable source of energy.



The collection of firewood in Africa consumes huge amounts of time and human energy.

CASE STUDY

Firewood in Africa

The main fuels used in Africa include wood, animal dung, leaves and grasses. Firewood collection along with **deforestation** by logging is removing large amounts of plant cover in Africa.

Fuel of the poor

Many Africans, particularly rural woman, spend hours each day searching for enough fuel to be able to cook their evening meal. African families living in cities may spend half of their whole income on fuel for cooking. For poorer African nations, trees often supply 70 to 90 per cent of energy.

Environmental damage

Collecting firewood faster than it grows strips the land of vegetation. Firewood collection in much of Africa is at least one-third higher than replacement by regrowth. Removing plant cover then leads to **desertification** of the land, destroying what was useful land. This degrading of land is particularly bad in arid areas when there is high growth in population.

Fast fact

Africa has very low levels of electricity consumption per person. Most Africans use 60 to 200 times less energy than most Europeans.

Towards a sustainable future: New biomass fuels

A sustainable future involves developing a range of renewable fuel sources, which can include biomass fuels. Currently, much biomass fuel use is not sustainable, but alternative approaches are being developed. Growing timber and other biomass fuels is becoming increasingly important to ongoing fuel supplies.

Modern biomass technologies

Modern biomass technologies are developing fuels that are as easy to use as oil, but are grown by plants. They should also have the advantage of burning more cleanly and not producing the pollution associated with fossil fuels.

In a few places, biomass fuels are a major source of energy. In Brazil, sugarcane is made into a fuel called ethanol. Ethanol provides about half the fuel for transport in Brazil. In China, gas for fuel is being made from animal dung.

Recycled waste

Organic waste and water plants can also be used to produce **methane** or 'biogas'. Research is continuing to find ways to generate biomass energy using wastes.

Ethanol is as easy to use for fuel as petrol.



CASE STUDY

Oil from this crop of rapeseed will be made into biomass fuel.

Biomass fuel farms

Research is being done to find plants that can be grown to produce biomass fuel for transport.

Land for biomass fuels

One major limit to biomass energy is the land needed to grow it. One estimate suggests that to grow fuel for all the cars in the world would mean doubling the amount of land in use today for farming. Research is being done on developing biomass fuel farms in areas that are unable to grow food crops. Switchgrass, for example, is a North American desert plant that survives where little else can grow.

Algae biomass fuel

Research is progressing into growing microscopic **algae** in plastic tubes to provide biomass fuel. Some green algae produce **hydrogen** as a waste product when they are in sunlight. If this hydrogen could be collected it may be useful in hydrogen-powered cars. Algae hydrogen farms could provide a rich source of fuel in the future.

A number of problems still exist in this 'hydrogen farming' technology. Researchers hope to develop technology to provide hydrogen fuel as a renewable clean fuel in the near future.

Problems with energy alternatives

Each of the energy alternatives that have been developed have strengths and weaknesses. The disadvantages of non-renewables, such as nuclear and geothermal energy, are well known. However, renewable alternatives, including wind and solar power, also have disadvantages.

Disadvantages of non-renewable alternatives

Nuclear energy

- Mining uranium can cause pollution.
- Nuclear waste is very dangerous and must be sealed up and buried for many years.
- Accidents at nuclear power plants can be major disasters.

Geothermal energy

- Not many places are suitable for geothermal power stations.
- Poisonous gases and minerals may come up from underground.
- Sometimes a geothermal site may 'run out of steam'.

Disadvantages of renewable alternatives

Wind energy

- Huge wind turbines create visual and noise problems and can also kill birds.
- Energy needs to be able to be stored for use when the wind is not blowing.
- It is not a good alternative for transport.

Solar energy

- It can be costly to set up.
- Energy needs to be able to be stored for use when the Sun is not shining.
- At present, it is not a good alternative for transport.

Sun and wind energy is stored in large rechargeable batteries.



Nuclear power plants do not release greenhouse gases, but there are other problems with wastes.

CASE STUDY

Nuclear power as an alternative fuel source

In 2006, there were about 440 nuclear reactors across the globe, producing about 16 per cent of the world's electricity. Several hundred more reactors are due to be built by 2030. Nuclear power already provides most of the electricity in France.

The advantages of nuclear power

Nuclear power plants produce huge amounts of energy for electricity. **Radioactive** material produces much more energy than the same amount of fossil fuel.

Nuclear power plants do not release carbon dioxide or add to global warming. Well-constructed power plants do not release radioactivity into the **atmosphere**.

The disadvantages of nuclear power

Mining uranium is environmentally damaging, and supplies will run out in about 50 years.

Safety is a major problem, and an accident at a nuclear power plant can cause major health and environmental problems.

Radioactive waste from the power plants is toxic to living things for 710 000 years and there is no safe way to store or dispose of it.

Fast fact

Construction of nuclear power plants declined due to safety fears following the 1979 Three Mile Island accident in the United States, and the 1986 disaster at Chernobyl, in Ukraine.

Towards a sustainable future: Clean, plentiful energy

For a sustainable future, clean, non-polluting and renewable energy sources are urgently needed.

Choosing between alternatives

It is important that people understand the strengths and weaknesses of each alternative energy source being developed. These need to be considered when choosing which energy sources to use. Just as fossil fuels have created environmental problems including air pollution and global warming, alternative fuels can also create damage to the environment.

Using a range of fuels

In the future, most areas will be supplied by a combination of energy sources. Alternatives such as wind, solar and biomass energy are being used in addition to traditional sources of energy in different areas. It is predicted, for instance, the use of natural gas to generate electricity will increase worldwide from 18 per cent in 2002 to 24 per cent in 2025.

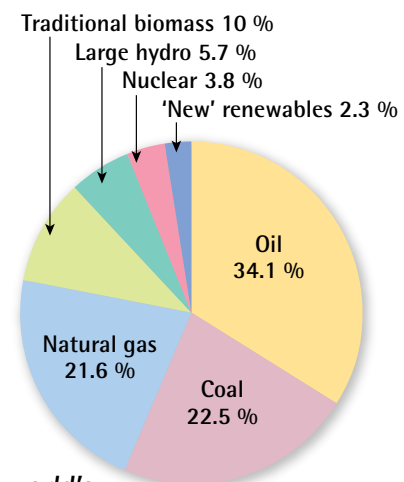
Fast fact

Zero-energy buildings produce as much or more energy than they use by combining energy-saving construction and appliances with solar and wind technologies.

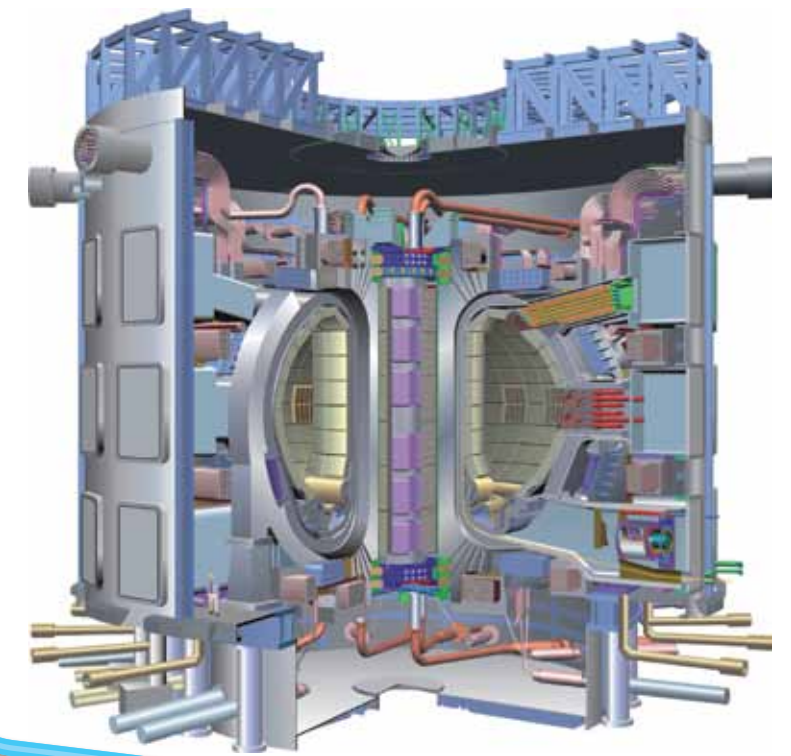


This zero-energy home in the United States uses passive solar design to reduce energy requirements for heating to a small fraction of the requirements of an average home.

World energy resources 2001



In 2001, about 78 per cent of the world's energy was from fossil fuels.



A fusion power design

CASE STUDY

Fusion - the wonder energy source

One completely untapped source of energy being investigated is fusion power. In the future, fusion research may provide a widely available, unlimited energy source with low environmental impacts.

What is fusion power?

Fusion is the energy source in the Sun. Fusion power is produced when two atoms fuse into a larger atom. This happens at very high temperatures when hydrogen turns into a special type of gas, called plasma.

The machine used to capture the energy of fusion is called a Tokamak. Spherical Tokamaks or STs are being tested in laboratories including the ROTAMAK ST in South Australia, SPHERA in Italy and MAST and START in the United Kingdom.

Project ITER

In June 2005, a 40-hectare site in France was selected for the first experimental large-scale fusion power station, called Project ITER. A number of countries are working together on the project. Project ITER will test the theory that fusion can be used on Earth. The power station is expected to begin operation in 2016.

Fast fact

ITER is pronounced as in the word 'fitter' and means 'the way' in Latin.

What can you do?

Save energy

You may think that just one person cannot do much, but everyone can help. If every person is careful, the little differences can add up.

Use less energy at home

You can help save energy by reducing your energy consumption. You could conduct a home energy audit to find how you might save on energy. An energy audit locates wasteful energy use, including heating and cooling, lighting and electrical appliances.

Here's what to look for:

- Check for air leaks and draughts such as gaps along the edges of flooring, walls, doors, windows and ceilings.
- Check the light bulbs in your house. Do you have low-energy light globes? You may have brighter bulbs where lower energy ones would do. Keep a record of when you use lights to see if they are switched off when not needed.
- Check whether any electrical appliances use energy in a standby mode when not in use. Switch them off at the powerpoint when not in use.

Fast fact

A 20-watt compact fluorescent will save about 650 kilograms of greenhouse gas over five years, compared with using standard incandescent 100-watt globes.



It takes less energy to light up your home with compact fluorescent lights than with traditional incandescent lighting.

Use energy-efficient lighting

Lighting consumes about 15 per cent of a household's electricity use. Energy-efficient lighting technologies can reduce the amount of energy used to light homes. Fluorescent lights, including compact fluorescents, generate one-fifth of the greenhouse gases that ordinary globes produce.

Incandescent lighting

Traditional incandescent electric lighting is the most common type of lighting used in homes. Incandescent lamps have a low efficiency and a short operating life of about 750 to 2500 hours. Incandescent lamps are less expensive to buy. However, because they use more power and have short life spans, they are more expensive to operate.

Low-energy lights

Low-energy lights such as compact fluorescent lights give out more light for the energy they use and less heat than incandescent lamps. They can save 75 to 90 per cent of lighting energy when they replace incandescent lights.

Towards a sustainable future



Well, I hope you now see that if you take up my challenge your world will be a better place. There are many ways to work towards a sustainable future. Imagine it... a world with:

- a stable climate
- clean air and water
- non-polluting, renewable fuel supplies
- plenty of food
- resources for everyone
- healthy natural environments.

This is what you can achieve if you work together with my natural systems.

You must work together to live sustainably. That will mean a better environment and a better life for all living things on Earth, now and in the future.

Websites

For further information on energy, visit these websites:

- World Energy Council <http://www.worldenergy.org>
- Fusion power <http://www.iter.org>

Glossary

acid rain

rain containing acids which falls from polluted skies

algae

living things that are found in water and make food using the energy from the Sun

atmosphere

the layer of gases surrounding the Earth

carbon dioxide

a colourless, odourless gas in the atmosphere

climate change

changes to the usual weather patterns in an area

deforestation

removal or clearing of forest cover

degraded

run down or reduced to a lower quality

desertification

turning an area into desert, with low plant cover and a high risk of erosion

developed countries

countries with industrial development, a strong economy and a high standard of living

developing countries

countries with less developed industry, a poor economy and a lower standard of living

fossil fuels

fuels such as oil, coal and gas, which formed under the Earth from the remains of animals and plants that lived millions of years ago

geothermal

heat from inside the Earth

global warming

an increase in the average temperature on Earth

greenhouse gases

gases that help trap the Sun's heat in the atmosphere

habitats

areas used by living things to provide their needs

hydro-electricity

power generated by moving water in rivers and dams

hydrogen

a gas that can be burned as fuel and which produces only water

incandescent

giving out light at a high temperature

lubricants

substances used to decrease rubbing or friction between moving surfaces

methane

a gas that is given off from burning fossil fuels and decomposing vegetation (including the digestion of plants by animals)

non-renewable

a resource that is limited in supply and which cannot be replaced once it runs out

power grid

system of wires to carry electricity

radioactive

material that produces waves of energy, called radiation

renewable

a resource that can be constantly supplied and which does not run out

sustainable

a way of living that does not use up natural resources

United Nations Environment Program

a program, which is part of the United Nations, set up to encourage nations to care for the environment

Index

- A**
Africa 7, 20, 21
Alaskan oilfields 15
algae biomass fuel 23
- B**
biogas 22
biomass fuel farming 23
biomass fuels 20–23, 26
- C**
carbon dioxide 16, 18, 25
carbon sequestration 18
cars 9, 12, 23
China 7, 17
clean coal technology 18
coal 7, 9, 16–17, 18
- D**
deforestation 21
- E**
energy efficiency 10, 28–29
ethanol 22
- F**
fossil fuels 5, 6–7, 8, 9, 12–15, 16
France 6–7, 25, 27
fuel consumption 8–11, 15, 21
fuel shortages 6–7, 20–21
fusion power 27
- G**
geothermal energy 24
global warming 5, 6, 16, 25
- H**
hydro-electricity 14, 17
hydrogen power 23
- M**
methane 22
Middle East 12, 13
- N**
natural gas 5, 9, 26
non-renewable energy 5, 6–7, 14, 18, 24, 25
nuclear energy 6–7, 24, 25
- O**
oil 6–7, 9, 12–15, 16
oil spills 12, 13, 14
- P**
passive solar buildings 11
pollution 5, 6–7, 13, 16, 17, 18, 24
- R**
renewable energy 6–7, 14, 18, 19, 20–23, 24, 26
- S**
Saudi Arabia 6, 12, 13
saving energy 10, 26, 28
solar energy 11, 19, 24, 26
sustainable living 4, 11, 26, 28–9, 30
- T**
Tokamaks 27
transport 9, 12, 22, 23, 24
- U**
United Nations 4
United States of America 6, 9, 15
- W**
wind energy 14, 24, 26
wood 5, 6–7, 20–21
- Z**
zero-energy homes 26