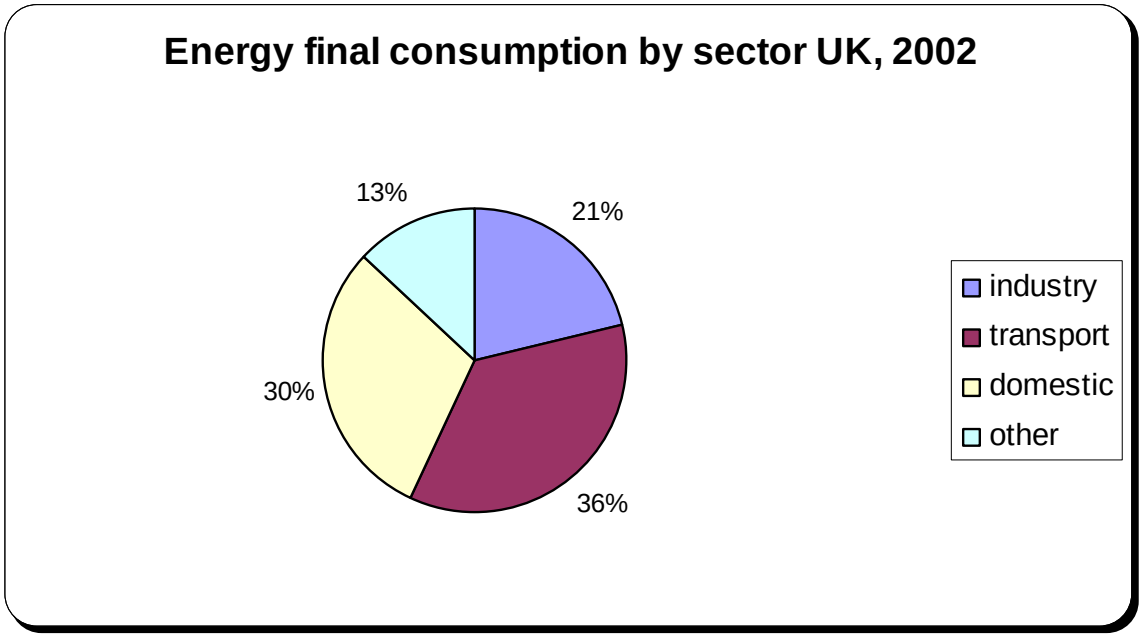
The energy problem – information sheet

In the UK, as in the rest of the industrialised world, we use an enormous amount of energy as we go about our everyday lives. Energy, and in particular electricity, is now an essential part of society, we take it for granted that we can light up a room or heat our homes with a flick of a switch or can communicate worldwide via the internet. We also use large a amount of energy that comes from other sources, gas is widely used to heat homes and cook food; while our entire transportation system is heavily reliant on oil. Please see figure 1 below for a breakdown of energy consumption in the UK. The way we currently produce our energy is leading to enormous and possibly irreversible environmental damage.

Energy use has increased significantly since the start of the industrial revolution. This is due to increases in the human population, increased production of consumer goods, and increasing use of energy intensive appliances such as washing machines, televisions and cars.

Figure 1



Source: Department of Trade and Industry[1]

Our current modes of energy production mean that our energy demands are leading to huge emissions of carbon dioxide (CO_2) into the atmosphere which is a direct cause of the enhanced greenhouse effect that is responsible for global climate change.

[1]DTI Energy White Paper "Our energy future – creating a low carbon economy" pp13

http://www.dti.gov.uk/energy/whitepaper/chap1.pdf

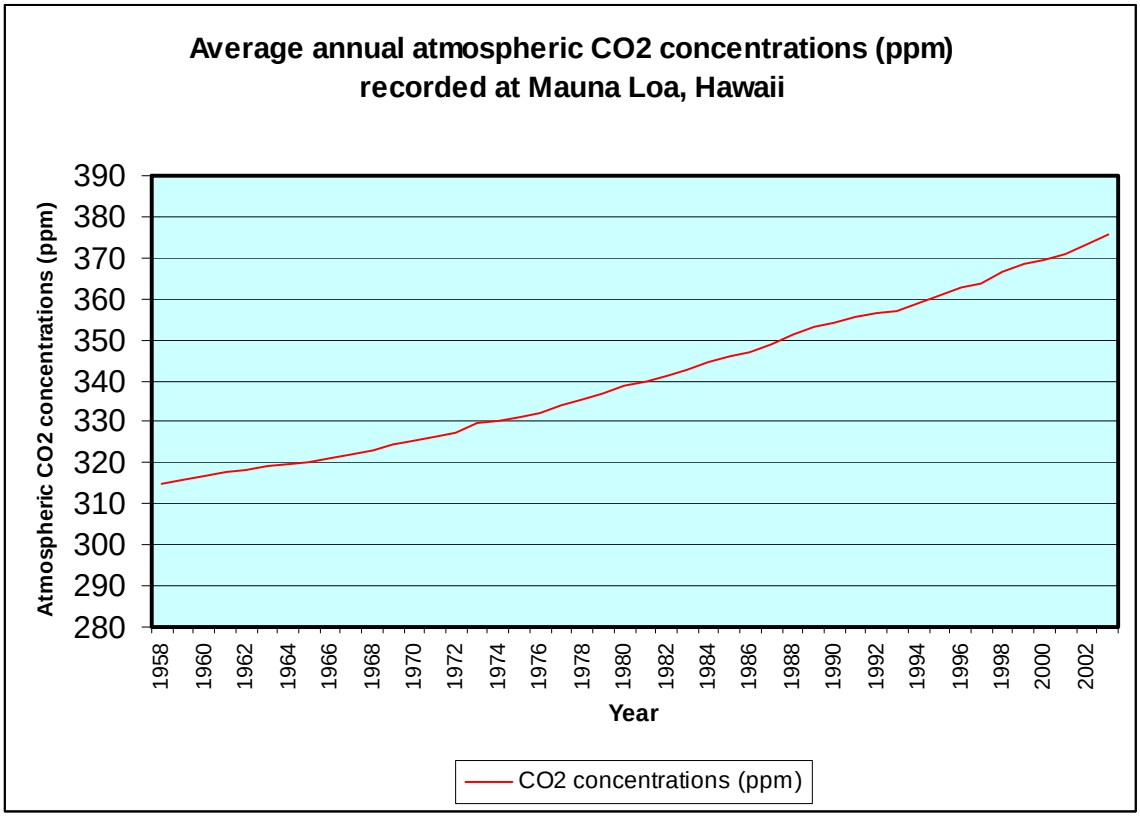
What is the enhanced greenhouse effect, and why is it changing the climate?

The greenhouse effect is actually a good thing. Put simply, it prevents incoming heat from the Sun from escaping straight back into space and keeps the global mean surface temperature at around 15 degrees Celsius. Without the greenhouse effect, the Earth would be too cold for life to survive. The problem we face is the enhanced greenhouse effect. Concentrations of greenhouse gases are building up in the atmosphere and this is preventing more heat from escaping, leading to an increase in the Earths temperature. The increase in the Earth's temperature is affecting ecosystems either directly, by melting ice in the arctic regions, which leads to loss of habitat for wildlife; or indirectly by changing weather patterns, which can disrupt ecosystems which are used to certain climatic conditions. Climate change is affecting some parts of the world more than others. Areas in temperate zones, such as the UK will see significant changes such as sea level rise, more extreme weather events, and the spread of diseases such as malaria from the tropics.

Carbon dioxide is not the only greenhouse gas responsible for the enhanced greenhouse effect, nor is it the most potent, but it is by far the most common, and this is why it is focused on more than other greenhouse gases.

Before the industrial revolution, atmospheric CO_2 concentrations were around 280 parts per million (ppm)[2]. Now, as a result of human activities they have increased to around 375 ppm. Figure 2 below is a record of concentrations of atmospheric CO_2 taken from the worlds longest running atmospheric CO_2 monitoring programme at Mauna Loa in Hawaii, which has been gathering data since 1958.

Figure 2



Source: Mauna Loa Research Centre[3]

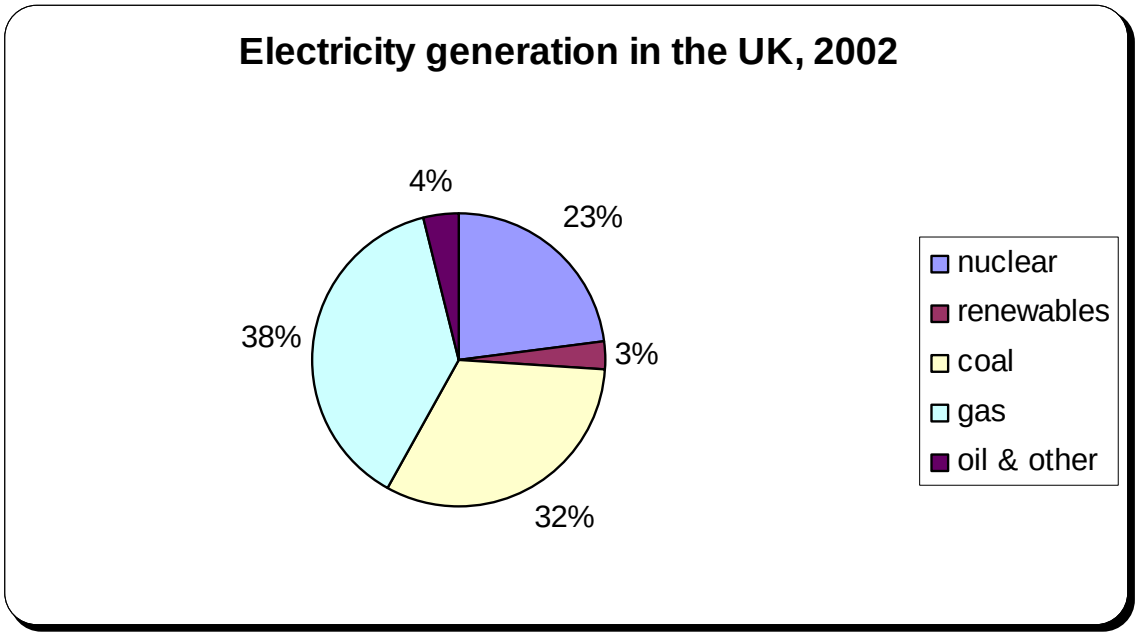
[2] http://www.climateark.org/vital/07.htm Climateark.org climate change information website.

[3] http://cdiac.esd.ornl.gov/trends/co2/sio-mlo.htm Mauna Loa Research Centre

The Kyoto Protocol

The Kyoto Protocol is an international agreement that requires a drastic reduction of greenhouse gas emissions in order to reduce the effects of climate change. Over 10 years ago, global climate change was identified as a serious problem and most of the worlds countries joined an international treaty known as the United Nations Framework Convention on Climate Change (UNFCCC). At the first Conference of the Parties (COP1), which was held in Berlin in March/April 1995, the members decided that stronger and more detailed commitments were needed to tackle climate change. This was known as the Berlin Mandate, and was the foundation for the Kyoto Protocol. The Kyoto Protocol was adopted At COP 3 two and a half years later on 11 December 1997 in Kyoto, Japan. Over 84 countries had initially indicated that they would ratify the Protocol, however, the Protocol is only a voluntary agreement and some key countries have refused to sign up. By ratifying the Kyoto Protocol, the UK has made a commitment to reduce its greenhouse gas emissions by 12.5% of 1990 levels over the period 2008-2012. Unfortunately, The USA, China, and India, the three countries that will be the biggest source CO_2 emissions for the foreseeable future are not bound by the Treaty[4], but Kyoto is still regarded by many observers as a step in the right direction. For more information on the Kyoto Protocol please see the links at the bottom of this sheet.

Figure 3



Source: Department of Trade and Industry[5]

There are various methods of energy production available to us, figure 3 above shows a breakdown of sources used in the UK. Some methods of energy production have more of an impact on the environment than others. The important thing to note is that there is no panacea, no form of energy production is without its drawbacks, and by simply switching from one energy source to another we will still be impacting on the environment. What is needed is a reduction in the amount of energy we consume coupled with a switch from fossil fuels to renewable energy production. Outlined below are several types of energy production, each with their own advantages and disadvantages.

[4] The USA have refused to ratify the treaty, while India and China are classed as Annex II countries.

[5] DTI Energy White Paper "Our energy future – creating a low carbon economy" pp10

http://www.dti.gov.uk/energy/whitepaper/chap1.pdf

Non-renewable energy:

Non-renewable energy sources are sources that are finite and that will deplete as they are used, eventually running out altogether. Below, a few examples of non-renewable energy are briefly outlined.

Fossil fuel:

This type of fuel exploits the energy stored within the buried remains of biomass that existed millions of years ago, hence the name “fossil”. This category consists of oil, coal, and natural gas. Fossil fuels are our primary source for energy, supplying over two thirds of energy demand (see pie chart above).Fossil fuels are very versatile, and are used for generating heat, electricity, and for powering vehicles. In a fossil fuel fired power station, the fuel is burned to produce steam from water. The steam is then used to drive turbines, which then turn generators to produce electricity. Petrol and diesel are produced from oil, and are widely used for transportation.

Advantages: The advantages of using fossil fuels to generate energy are that it is convenient and low-cost relative to other sources. We have been burning fossil fuels to generate energy since the middle of the nineteenth century, and have established efficient methods of extracting, transporting, and harnessing the energy contained in fossil fuels.

Disadvantages: The problems associated with fossil fuel use are that the extraction of fossil fuels causes local environmental problems including noise, dust, and groundwater pollution; while the burning of fossil fuels releases greenhouse gases and other harmful particulates into the atmosphere causing wider environmental problems such the enhanced greenhouse effect and acid rain. Fossil fuels are a finite energy source that will eventually run out. As fossil fuel reserves run low, the cost of retrieving them will increase significantly, making this form of energy production more expensive than others.

Nuclear:

Nuclear power is generated from the fission of uranium, plutonium or thorium, or by the fusion of hydrogen into helium. The most common method is via the fission of uranium. The nuclear fission generates heat, which is used to heat water to produce steam. The steam drives turbines which turn generators to produce electricity.

Advantages: There are very low greenhouse gas emissions associated nuclear power, the energy generated is very low-cost compared to other sources, and the process is generally clean in relation to fossil fuel use.

Disadvantages: An accident at a nuclear power station could result in the release of vast amounts of highly radioactive material into the atmosphere. Whilst the chances of an accident are low the impacts can be very high. The accident at Chernobyl in 1986 is a stark reminder of what can happen when things go wrong (please see links at the bottom of this sheet for further information). In addition, nuclear waste can stay dangerously radioactive for thousands of years, and there is still no solution for dealing with it safely. There is also a risk of proliferation of nuclear material. Nuclear waste can be used to make nuclear weapons, and nuclear power stations would be prime targets for terrorists.

Energy from waste:

The term “energy from waste” refers to the range of combustion processes that exploit the calorific value in waste material in order to generate heat, electricity, or both. There are various techniques that are used to produce energy from waste, these are combustion, gasification, pyrolysis, and biological processes, including anaerobic digestion and extraction of landfill gas. Incineration technology is the most common form of extracting energy from waste. Prior to incineration, the materials that can be either composted or recycled are removed, leaving only residual waste. The residual waste is then burned in a furnace to heat water and produce steam. The steam then turns turbines which then generate electricity. Incineration plants can also burn industrial and clinical waste, but may have to operate at higher temperatures or use additional filters in the chimneys. In other energy from waste process, the residual waste is made into pellets, which are fed into furnaces at a refuse derived fuel (RDF) plant.

Advantages: Energy from waste saves resources by generating energy from waste materials that would otherwise be sent to landfill. This saves landfill space and reduces the need for electricity generation via fossil fuels or nuclear.

Disadvantages: There is widespread concern over emissions from energy from waste plants. Despite the vast improvements in flue cleaning technology and the implementation of stricter regulations over recent years, the public at large is still unconvinced that emissions from energy from waste plants are safe.

Renewable energy:

Renewable energy is, as its name suggests, energy that is constantly renewed and will never run out. Most sources of renewable energy come either directly or indirectly from the Sun, although there are other sources such as the Earths' internal heat source or gravitational energy.

Advantages: The main advantage associated with using renewable energy is the lack of greenhouse gas emissions and other airborne pollutants. Once renewable energy plants are built the electricity generated is free.

Disadvantages: The main problem with renewable energy sources is that they cannot generally be relied upon as a continuous source of energy, for example tidal and solar energy are only available at certain times.

Below, several forms of renewable energy are briefly outlined:

Wind power:

Winds are driven by the heat of the Sun. The potential for exploiting the energy stored in the winds was recognised hundreds of years ago. Windmills have been used for centuries for grinding grain or for pumping water. Nowadays, energy from the wind is harnessed via wind turbines. Wind turbines are made up of a rotor, which usually has three blades, and this is mounted on top of a high tower in order to catch the faster wind. The energy that actually turns the blades is greater than the force of the wind against the blades. This is because a pocket of low pressure air forms on the downwind side of the blade causing the blade to move towards it. This force is called lift. The force of the wind on the front of the blades is called drag, and it is these forces combined that turn the rotor and generate electricity. A large number of wind turbines are usually built together to create wind farms.

Advantages: It is claimed that a wind turbine used for electricity generation will repay the energy used in its manufacture within 6-9 months of its operation. The UK has the larges wind resource in the whole of Europe[6].

Disadvantages: Opponents of wind farms claim the turbines are noisy, unsightly, and a danger to wildlife. It is claimed that to provide the UK with a significant proportion of its energy requirements, large areas of the countryside would need to be covered by wind farms. It is unfortunate that the best sites for wind farms are also areas that are highly valued for their tranquillity and natural beauty. A solution to the wind farm problem would be to locate them offshore.

Solar power:

There are several methods of capturing energy directly from the Sun. These are known as passive solar, solar thermal energy, and photovoltaics (solar electricity).

Photovoltaic cells:

Photovoltaics (pv's) are the most common type of solar energy generation. These are the solar panels we see on wristwatches, calculators, and on the roofs of buildings. Milton Keynes has parking meters that are powered by pv cells. The pv's convert sunlight directly into electricity. When energy from the sun hits a photovoltaic cell, electrons become dislodged and create an electrical current. The DC current produced depends on the type of material used and the amount of sunlight reaching the photovoltaic cell. A number of photovoltaic cells side by side in a rectangle shape are called a "module", and a number of modules together are known as an "array". The single crystal silicon cell is the most common cell used today as it is more efficient than the cheaper

[6] The National Energy Foundation. Accessed on 10/05/05. http://www.nef.org.uk/greenenergy/wind.htm

polycrystalline cells. Gallium arsenide cells have emerged as more efficient, and have other advantages, but are not widely used as they are currently too expensive. There is currently research into producing cells using thin films. The films are made from amorphous silicon, and use much less material than existing photovoltaic cells; the cells can be built to any required size which will allow them to be incorporated into buildings at the point of construction.

Passive solar:

This system uses the Suns light for lighting, and its warmth for heating. It does this without the use of any mechanical devices such as switches or pumps. These passive solar devices save energy by lessening the need for conventional forms of light and heating. There are four types of passive solar power for buildings:

Direct gain:

The sunlight reaches floors which are tiled or concreted, and is stored as heat. Later the stored heat radiates back into the room, reducing the need for other forms of heating.

Mass Wall:

This passive solar system uses a wall of water filled containers, or brick or concrete set behind south facing walls. The wall absorbs the Suns energy during the day and then lets it out in the evening, reducing the need for heating.

Daylighting:

This passive solar system allows sunlight into building without its heat. Daylighting is usually used in large buildings such as schools or office buildings, and reduces the need for conventional lighting.

Sunspaces:

This passive solar system traps the heat from the Sun in much the same way as a greenhouse. Sunspaces are usually used with mass wall and direct gain systems.

Solar Thermal:

This uses the heat from the Sun to heat water. The heated water can be used for cooking, bathing, heating, or even for generating electricity. Solar Thermal uses mechanical devices such as pumps or fans to distribute the energy where it is required, and it is this that distinguishes it from passive solar systems. There are three main types of Solar Thermal systems, and they operate at differing temperatures:

Low temperature:

These systems are used when temperature requirements are low, such as in swimming pools. The water is pumped from the swimming pool through tubes which are covered in black plastic, and then back into the pool. The black plastic absorbs the heat from the Sun, which is in turn absorbed by the water before it returns to the pool.

Medium temperature:

The most common example of a medium temperature Solar Thermal system is a domestic hot water system, although medium temperature systems are also used to heat air. These systems always have a conventional back-up system as the temperature has to stay at a certain level regardless of whether or not the Sun is able to heat it. The water, or air, is heated as it passes through flat boxes that are black inside with a glass lid. The heat builds up in the boxes, which are known as plates, because the black absorbs the heat and the glass lid traps the heat inside.

High temperature:

These systems are also called concentrating solar collectors, as they concentrate the incoming solar radiation onto a small area in order to reach high temperatures. These systems are used to generate electricity, but unlike photovoltaics, which use the Suns light, they use the Suns heat. There are three types of high temperature Solar Thermal systems in use; these are the parabolic trough, central receivers, and dish/steam engines, and they are all used to generate electricity.

Advantages: It is simple and can be very cheap to introduce, especially passive systems. Most systems make no noise at all.

Disadvantages: Solar power has limited use in regions at higher latitudes such as the UK, and can also be affected by factors such as cloud cover or seasonal variation in solar radiation.

Tidal:

Tidal energy works using the power from changing tides, and the changing tides are driven by the gravitational pull of the Earth, Moon, and Sun combined with the revolution of the Earth. A huge dam (barrage) is built across a bay or an estuary where there is a large difference in water levels between high and low tides. The high tide will bring a vast amount of water into the bay, before gates are closed when the water level is at its highest to prevent the water from leaving when the tide goes back out. The water stored behind the dam is then released through holes at the bottom of the dam at high speed. The rushing water drives turbines, which generate electricity. The process is repeated again and again with every change in tide.

Advantages: There is an enormous amount of energy contained in the tides, dams would protect large areas of the coast from high storm tides, and that tides are totally predictable.

Disadvantages: Tidal energy dams would have enormous impacts on ecosystems as currents and water levels change. Tidal energy systems are also very expensive to build.

Biomass:

Biomass is a collective term for all material derived from plants or animals, different forms of biomass can be burned in order to produce energy; it is extremely versatile and can be used to produce heat directly, or to generate electricity, or both. Examples of biomass that can be burned to produce energy include straw, wood, poultry litter, and food waste. Fast growing wood crops, or grass types such as miscanthus and switchgrass can be harvested to provide biomass for energy production. Biomass electricity production plants burn the material to heat water and make steam. The steam produced is them used to turn turbines which turn generators to produce electricity. Biomass can also be used to produce natural fuels such as methanol, natural gas, and oil via a process know as bioconversion. Although burning biomass releases carbon dioxide, the most common greenhouse gas, into the atmosphere, the amount released never exceeds the amount that is initially absorbed from the atmosphere by the material.

Advantages: There are many natural waste by-products produced by our lifestyles, and it makes sense to use them whenever possible. Biomass fuel is carbon neutral, and has a tendency to be very low-cost compared to other fuels. Using biomass lessens the demand for the Earths' resources.

Disadvantages: Greenhouse gases and particulates are released through burning, and some materials are not available all year round. In addition, collecting biomass materials in sufficient quantities may prove difficult.

Hydroelectric:

Hydroelectricity gets its name from the Greek work "hydro" meaning water. Hydroelectric power stations exploit the huge gravitational (potential) energy that is contained in rivers in mountainous regions. A dam is constructed to trap water in a river valley and allow a huge increase in water level. At the bottom of the dam there are holes containing turbines for the water to flow through. Dams are built very high, which generates high water pressure and therefore more potential for energy production. When the water flows through the pipes at high pressure, it turns the turbines, which generate electricity. The water is then free to flow downstream and eventually return to the sea.

Advantages: The energy source is constant, making it more reliable than other renewables. Water can be stored up when energy demand is low and used when demands increase. Hydroelectric plants can also reach peak output faster than other power stations.

Disadvantages: Suitable sites for dams are few and far between and hydroelectric plants are very expensive to build. The construction of hydroelectric plants leads to the displacement of many riparian communities, and causes devastating effects on ecosystems either side of the dam.

Geo Thermal:

The name “geothermal” is derived from the Greek words “geo” meaning “Earth” and “thermal” meaning “heat”. The centre of the Earth is extremely hot, around 6000 degrees Celsius. This heat drives the movement of the Earths tectonic plates which causes earthquakes and volcanic eruptions. The temperature can reach over 250 degrees Celsius even a few kilometres below the surface. It is generally believed that the temperature increases by one degree Celsius for every 36 metres descended. This renewable energy source exploits the energy stored in the rocks under the Earths surface. The underground rocks are hot enough to form steam from water, so holes are drilled down to the hot rocks in order to release the steam. Sometimes there is an abundant source of groundwater available to produce the steam, but more commonly the power station feeds cold water down to the rocks to provide a source of water or to support a low supply. The steam is used to drive turbines, which turn generators and produce electricity. There are hot rocks beneath the city of Southampton, and the Local Council are introducing a district heating scheme to exploit the resource. For further information please see the useful contacts at the bottom of this sheet.

Advantages: A distinct advantage offered by geothermal energy production is that there is very little visual impact on the environment.

Disadvantages: Suitable sites for geothermal schemes are hard to come by, for example the rocks need to be drilled through easily, and the hot rocks also need to be close enough to the surface to be easily reached. Also, some hazardous gases may come up from the rocks, and their handling and disposal may be a problem, and some geothermal site have been known to “run out of steam” for long periods.

Hydrogen fuel cells:

Hydrogen is the most abundant element in the universe, and hydrogen fuel cells are seen by some experts as the solution to our future energy needs. In a hydrogen fuel cell, gaseous hydrogen and air are fed in. The hydrogen gas atoms then get split into protons and electrons by a catalyst, and the protons travel through a membrane which prevents the electrons from getting through. This forces the electrons to find another way of getting back to the protons, and this is via a wire. When the electrons travel through the wire they produce an electric current which can be used to power vehicles or to run household appliances. The electrons and protons pair up again on the other side of the membrane in the presence of air. The hydrogen atoms bond with the oxygen atoms in the air to form water pure enough to drink. During the whole process the only emissions are water and heat. Unfortunately, hydrogen is not naturally found in its gaseous state, and has to be “made”. Sources of hydrogen are methane (natural gas), petroleum, biomass, and coal. Gaseous hydrogen can also be made when it is separated from the oxygen atoms in water using electricity via a process called electrolysis.

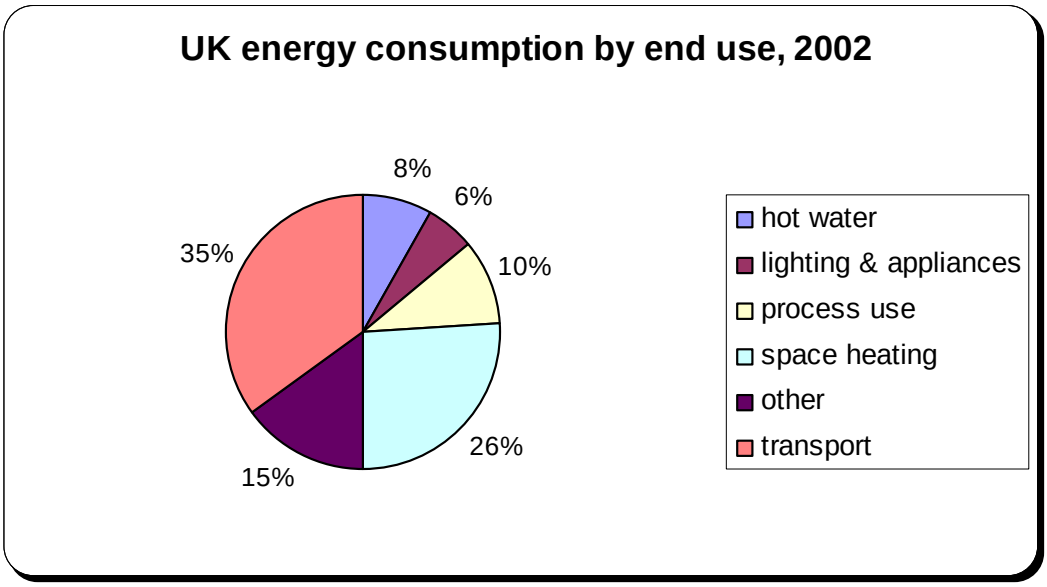
Advantages: We will never run out of hydrogen, and gaseous hydrogen can be produced wherever there is a source of electricity.

Disadvantages: The separation of hydrogen atoms from water via electrolysis requires an input of more electricity than is actually received from the gaseous hydrogen (a solution to this is to use renewable sources to supply the electricity). A long term problem is that there is doubt as to whether there is enough copper in the world to manufacture enough electric motors that are going to be required for fuel cells. Also, many types of fuel cells currently have problems operating in very cold weather, which may prove to be a major problem if it cannot be overcome.

What you can do

There are disadvantages associated with any method of energy production, and so it is clear that just switching to renewables and hydrogen fuel cells will not combat the problems associated with the ever increasing energy demands of the world. Figure 4 shows how energy is used in the UK.

Figure 4



Source: Department of Trade and Industry[7]

If we wish to reduce the impacts from energy production, then we will need to reduce demand for energy. Figure 4 above shows a breakdown of how the energy sources are being used in the UK, and below is a list of simple measures that can be taken to reduce energy demand.

Make use of your local recycling facilities

Manufacturing using recycled materials saves energy when compared to using virgin materials. For example making aluminium cans from recycled aluminium saves 95% of the energy required to make it from bauxite, and by recycling glass 315kg of CO_2 is saved per tonne of glass melted[8]. It is important that if you use a car to transport your recyclables you do not make special trips to recycle, instead try to combine it with a shopping trip or with a journey you were taking anyway.

Buy energy efficient equipment

When purchasing new appliances such as fridges, freezers or washing machines, look for the energy rating of the product before you buy. Appliances rated A or B are the most energy efficient. You may be able to obtain a Government grant for energy efficiency improvements for your home. Please see Powergen under useful contacts at the bottom of the page for more details.

Avoid using standby mode

Try to avoid using standby mode on appliances such as televisions and computer monitors, as this wastes energy.

Don't leave fridge doors open for longer than is necessary

For every minute that the fridge door is open, it will take 3 minutes for it to regain its temperature9

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[7] DTI Energy White Paper "Our energy future – creating a low carbon economy" pp13

http://www.dti.gov.uk/energy/whitepaper/chap1.pdf

[8] Wasteonline glass and metals information sheets.

[9] Anglia West Energy Efficiency Advice Centrehttp://pect.peterborough.gov.uk/Press%20Releases/NewYear%27s%20Resolutions_energy.html

Fit energy efficient light bulbs

Replace tungsten bulbs with energy efficient, compact fluorescent lamps and slimline tubes. They typically make immediate savings of 50% and last up to ten times longer. Also, switch lights off when they are not needed. It is always more efficient to switch them off rather than leave them on for any length of time[10].

Don't over heat your hot water, and use the plug

Of course your hot water needs to be hot, but you aren't going to make tea with it are you? 60°C/140°F is usually adequate for bathing and washing.

Ensure your home or office is well insulated

Lofts, cavity walls, doors and windows can be insulated to retain heat. Also, fitting a hot water cylinder jacket will save energy and you can reduce your annual fuel bills by up to £20[11].

Turn down your central heating thermostat

By turning your thermostat down by just one degree Celsius you will be saving energy and can reduce your fuel bills by up to 10%[12].

Keep your fridge or freezer maintained

Regularly defrost your freezer and keep the grille at the back clean to ensure your fridge or freezer is at its most efficient.

Keep your car well maintained

Road transport is responsible for 26% of CO_2 emissions in the UK. Service your car regularly to keep it at its most fuel-efficient, and make sure the tyres are inflated to their correct pressure. A car with under inflated tyres will require more energy to drive, which means more CO_2 emissions and higher fuel costs[13].

Sensible driving saves energy

By driving sensibly you will prolong the life of your car and save energy. For example driving too fast leads to harsh braking which wears down brake shoes and basically uses your fuel to heat the atmosphere around your brakes.

Try other forms of transport for short journeys

Up to 24,000 people die prematurely each year as a result of poor air quality. Why not leave the car at home when taking short journeys. You could try walking, cycling or public transport. You will save energy and reduce air pollution[14].

Useful links and further information

The ElectricityInfo website. This independent website allows consumers to compare the fuel mix, emissions and waste information for their electricity suppliers with those of other electricity suppliers: http://www.electricityinfo.org/index.html

Green Electricity Marketplace. This website is useful if you want to find out about the options available to you when choosing a green energy supplier: http://www.greenelectricity.org/

DTI Energy White Paper: http://www.dti.gov.uk/energy/whitepaper/chap1.pdf

UK Atomic Energy Authority: http://www.ukaea.org.uk/

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[10] Peterborough Environment City Trust, advice and tips: http://www.pect.net/

[11] Anglia West Energy Efficiency Advice Centre

[12] Anglia West Energy Efficiency Advice Centre

[13] Energy Saving Trust http://www.est.org.uk/myhome/whatcan/simpletips/

[14] Energy Saving Trust http://www.est.org.uk/myhome/whatcan/simpletips/

The international communications platform on the long-term consequences of the Chernobyl disaster: http://www.chernobyl.info/

British Nuclear Fuels Ltd: http://www.bnfl.com/index.aspx?page=150

Details of the Geothermal energy scheme in Southampton: http://www.southampton.gov.uk/environment/energy/

Defra energy labels guide: http://www.defra.gov.uk/environment/consumerprod/energylabels/

The National Energy Foundation: http://www.nef.org.uk/powered/factsheets.htm

Energy Saving Trust – Grant finder: http://www.est.org.uk/myhome/gid/

Powergen - energy efficiency and grant advice: http://www.powergen.co.uk/pub/DOM/A/ui/homepage/homepage.aspx

United Nations Framework Convention on Climate Change (UNFCCC) - provides detailed information on the Kyoto Protocol: http://unfccc.int/2860.php

Mauna Loa Research Centre: http://cdiac.esd.ornl.gov/trends/co2/sio-mlo.htm

Climate Ark climate change information website: http://www.climateark.org

Updated: May - 05

www.wasteonline.org.uk

www.wastewatch.org.uk

Due to changes in funding, we are no longer able to offer a public information service. Should you have further questions on waste and recycling, please contact one of these groups:

Householders and students should call the Recycle Now helpline on 0845 331 31 31 for further waste based information, and where to find your local recycling facilities.

Small to medium businesses should visit the Envirowise website, or call 0800 585 794, for further information on waste issues. Larger businesses should visit www.businesslink.gov.uk.

For industry based questions, please use the WRAP technical helpline on 0808 100 2040 for advice on markets and recycling company development, or visit www.letsrecycle.com for listings of recyclers and reprocessors.

If you find a mistake on this page, or have a technical question regarding the wasteonline website, please email info@wastewatch.org.uk.

Thank you, and apologies for any inconvenience.