



Energy Factsheet

Energy and the Environment

The Facts

The 'greenhouse effect' of gases like carbon dioxide (CO2) and methane occurs because these gases allow the shortwave radiation from the sun to pass through them. However when this radiation is reflected back from the earth's surface as long wave radiation these gases reflect it back towards the surface thus trapping the heat energy from the sun.

This natural greenhouse effect keeps the surface of the earth around 33°C warmer than it would be in the absence of greenhouse gases. Therefore these gases in normal concentrations play a vital role in keeping the earth at a habitable temperature.

Since the industrial revolution began human activities, particularly burning of fossil fuels and large scale deforestation, have increased concentration of CO2 and other greenhouse gases in the atmosphere. This increased concentration has caused a thickening of the greenhouse blanket.

The world has been warming in recent decades and the stratosphere has been cooling (The layer above the main blanket)

Source; *The Climate change challenge: Carbon Trust*

Current effects of climate change

Changes in weather over recent years have caused devastation globally such as;

- Abnormally high temperatures in Europe in the summer of 2003 were associated with at least 27,000 deaths
- Approximately 600,000 deaths occurred world-wide as a result of weather-related natural disasters in the 1990s; and some 95% of these were in poor countries
- Globally, 1998 was the warmest year and the 1990s was the warmest decade on record

Source; *World Health Organisation*

The Future

Across the globe there may be severe problems for regions where people are particularly vulnerable to changes in the weather. Flooding, droughts, food shortages and the spread of disease are commonly predicted. The social, environmental and economic costs of climate change could be huge.

The predicted impacts are particularly severe for the poorest communities, who have contributed least to greenhouse gas emissions. Today the world has over 6 billion people and in the next 35 years, it is estimated that this will grow by another 2.5 billion. This is putting extra demand on the world's resources and fossil fuels which cannot be exploited indefinitely.

Source; *World Bank*

How much energy do we use in the UK?

- Of the £58 billion spent annually on energy in the UK, approximately £5 billion of this is wasted.
- The fuel mix has changed significantly since 1970 as natural gas consumption has replaced coal.
- Electricity consumption has increased by 74% over the period 1970-2001.¹
- There has been a significant rise in energy consumption from 1980-2005 by 67% for the transport sector, 18% for the domestic sector and 8% for the service sector, and Industry has fallen by 31%²
- Annual energy costs for the further and higher education sector in the UK total more than £200 million resulting in the release of at least 3 million tonnes of carbon dioxide!³

How much energy do we use at Anglia Ruskin University?

We spend in excess of £1 million on energy at our University and consumed 10,888,821 kWh of electricity, 11,084,188 kWh of gas and 1,919,501 kWh of oil from 1 August 2005 to 31 July 2006. (Figures include University student accommodation)

This has released 7265 tonnes of carbon dioxide into the atmosphere which is equivalent to 4036 hot air balloons!⁴

Market volatility has caused energy prices to soar on the back of ever increasing demand for fossil fuels and the University has been affected by price increases of 65% for electricity and 85% for gas.

Source; ¹ *Energy consumption in the UK: Dti*, ² *UK energy in brief, July 2006: Dti*, ³ *Energy consumption guide 54: Carbon Trust 8*, ⁴ *The Carbon Community Carbon Reduction Programme*

Climate change is a moral issue

Climate change is a moral issue which cannot be ignored and by making small adjustments we can all make a significant difference.

We can all save energy by being energy efficient which will also reduce costs and make our working environment more comfortable.

Switch off today and keep climate change at bay!

- Reduce our demand on fossil fuels
- Reduce our carbon dioxide emissions
- Reduce our impact on the environment
- Reduce our costs

Further information

www.anglia.ac.uk/energy

Carbon Trust - www.carbontrust.co.uk
Department of Trade and Industry - www.dti.gov.uk/energy
World Health Organisation - www.who.int
World Bank - www.worldbank.org

Energy at Home

The facts

- Just over a quarter of the UK's annual carbon emissions come from the energy used to heat our homes.
- It is estimated that over 10 million houses in the UK have insufficient insulation, which means that the heat disappears through the walls or roof.¹
- Domestic energy use has increased by 32% since 1970
- 82% of energy used in households is for space or water heating²

Source; ¹ *The Sustainable energy challenge, Malcolm Wicks: Dti*, ² *Energy Consumption in the UK: Department of Trade and Industry*

Myth; When an appliance is left on standby, it's off in reality.

Reality; Many people presume electrical products are off when they are in standby but they continue to consume power in this mode.

Telltale signs of items left on standby;

- A red, orange or green LED light
- Equipment with a remote control which could be waiting to receive the 'on' signal from the remote control

Source; CTG001, *Creating an awareness campaign: Carbon Trust*

Did you know?

- 95% of the energy used by mobile phone chargers in the UK is wasted energy.
- Only 5% is actually used to charge the phones and the rest is used when the charger is left plugged into the wall but not switched off at the socket.

Source: *Green Energy UK*

How to reduce energy at home

There are lots of ways you can reduce energy at home and save on your energy bills such as;

- Insulate pipes and lofts (Grants are available)
- Switch off lights and appliances after use (rather than use standby)
- Fit Low energy light bulbs
- Try not to overheat your home (1°C increases costs by 10%)
- Do not overfill the kettle
- Defrost your freezer regularly
- Purchase energy efficient appliances and use half load and energy saving features
- Invest in solar energy (Grants are available)
- Use timers (i.e. to heat hot water)

Wise up with water!

There are many ways you can also save water such as;

- Purchase water saving devices (i.e. toilet and tap devices)
- Use a water butt to collect rainwater for watering the garden
- Purchase energy efficient appliances such as washing machines and dishwashers
- Fix leaking taps
- Turn tap off while cleaning teeth
- Pour any left over glasses of water onto your houseplants
- Fill the kettle with only as much as you need, not to the brim.

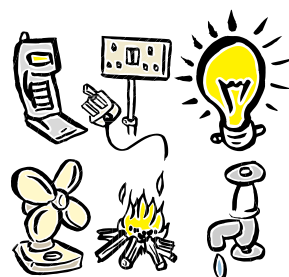
Did you know?

Energy saving light bulbs last up to 12 times longer than a standard light bulb and use less energy. This will give you savings on your electricity bill.

Source; *Energy Savings Trust*

Waiting for the tap to run cold can waste more than 10 litres a day! Put a bottle of tap water in the fridge so you can have cold fresh water whenever you want it.

Source; *Waterwise*



Further information

For further information, refer to the lighting and heating fact sheets and the following websites;

www.anglia.ac.uk/energy

Department of Trade and Industry;
www.dti.gov.uk/energy

Carbon Trust;
www.carbontrust.co.uk

Green Energy UK;
www.greenenergy.uk

Energy Savings Trust;
www.est.org.uk

Waterwise;
www.waterwise.org.uk

Office & electrical equipment

The Facts

Office equipment is the second major user of electricity in offices after heating and consumes around £300 million of energy nationally each year.

There can be associated costs through ventilation and air conditioning to overcome additional heat this equipment produces, which can also increase energy consumption.¹

Office equipment is the fastest growing energy user in the business world, consuming 15% of the total electricity used in offices. It is expected to rise to 30% by 2020.

Energy and carbon dioxide emissions can be reduced by adopting simple energy efficiency measures.²

Source; ¹ *Good practice Guide 118, managing energy use: Carbon Trust*, ² *CTV005, Office equipment, introducing energy saving opportunities for business: Carbon Trust*

How much energy does office equipment use?

Equipment	Average (W) Consump'n	Standby (W) Consump'n	Typical Use in a day
PC Monitor	80	10-15	4 hours
PC Hard drive	40	20-30	4 hours
Photocopier	120-1000	130-170	1-2 hours
Fax machines	30-40	10	20-30 mins
Printers	40-80	20-30	1-2 hours
Vending mach's	350-700	300	8-10 hours

Source; *Good practice Guide 118, managing energy use: Carbon Trust*

Myth; When an appliance is left on standby, it's off in reality.

Reality; Many people presume electrical products are off when they are in standby but they continue to consume power in this mode.

Telltale signs of items left on standby

- A red, orange or green LED light
- Equipment with a remote control which could be waiting to receive the 'on' signal from the remote control

Source: *CTG001, Creating an awareness campaign: Carbon Trust*

Myth; Turning a computer on and off several times a day uses more power and damages the hard drive.

Reality; Modern hard drives are not significantly affected by shut-downs when their use is no longer required.

Source; CTG001, Creating an awareness campaign: Carbon Trust

Did you know?

- 95% of the energy used by mobile phone charges in the UK is wasted energy.
- Only 5% is actually used to charge the phones and the rest is used when the charger is left plugged into the wall but not switched off at the socket.

Source; Green Energy UK

- A photocopier left on overnight uses enough energy to produce over 1500 copies.
- A photocopier is typically used for 20% of the day but they often get left on 24 hours a day, 7 days a week using energy!

Source; CTG001, Creating an awareness campaign: Carbon Trust

- Monitors can account for almost two thirds of a computer's energy use

Source; Good practice Guide 118, managing energy use: Carbon Trust

Say goodbye to standby!

By adopting measures such as the following, you can reduce energy consumption and carbon dioxide emissions;

- Use energy saving features on equipment
- Switch off appliances after use rather than leave on standby
- Use timers on equipment where appropriate
- Purchase energy efficient items
- Print wisely - unnecessary printing wastes paper and energy
- It may be possible to switch off your fax overnight if it has a buffer
- Emails are cheaper and save more energy than sending a fax

Further information

www.anglia.ac.uk/energy

Carbon Trust – www.carbontrust.co.uk

Green Energy - www.greenenergy.uk

Heating and Cooling

An uncomfortably hot fact!

Heating can typically account for 60% of the energy bill and simple measures such as reducing the temperature by 1°C can achieve 8-10% cost savings.¹

Unlike lighting which is instantly available, the temperature of a building takes a considerable time to build up and cool down. It is also affected by heat gains from the following;

- The sun
- Internal sources of heat, such as computers, lights and electrical equipment
- People (We generate heat at a rate of around 100w per person!)²

Source; ¹ Heating Factsheet: Carbon Trust, ² Fuel efficiency booklet 21, Simple measurements for energy use and water efficiency in buildings: Carbon Trust

Did you know?

- Electricity is the most expensive form of energy as it has to be generated from another source of energy (i.e. gas, nuclear or coal)¹
- Electricity emits more carbon dioxide into the atmosphere for each unit used (See CO₂ emissions from fuels)²

Source; 1 Nifes Consulting Group, 2 Carbon Trust

Carbon dioxide (CO₂) emissions from fuels

The calculation of CO₂ emissions is energy consumption (kWh) x conversion rate to produce total kg CO₂.

Fuel Type	Units	Conversion rate (to kg CO ₂ per unit)
Oil	kWh	0.271
Gas	kWh	0.194
Grid Electricity	kWh	0.422
Coal	kWh	0.293

Source; Part L Building Regulations

Why not calculate how much CO₂ you emit at home using an online calculator;

Go to www.nef.org.uk/energyadvice/co2calculator

Myth; Turning up the thermostat to well above the temperature required will heat a room up quicker.

Reality; Setting thermostats to a higher temperature than is required will only affect the final temperature and does not increase the speed at which the building temperature rises.

Source; CTG001, Creating an awareness campaign: Carbon Trust

Myth: Heat rises

Reality; Hot air rises. So don't block radiators with furniture or other items – This prevents air circulating and could also be a fire hazard

Source; CTG001, Creating an awareness campaign: Carbon Trust

Top tips

We can all reduce energy consumption, CO₂ emissions and make our working environment more comfortable by adopting some simple housekeeping measures such as;

- Use power down facilities on photocopiers, faxes, printers
- Switch off lighting when there is sufficient daylight
- Switch off equipment after use
- Don't heat unused space
- Don't use heating and cooling at the same time!
- Switch off lights after use and at the end of the day
- If you have opened a window for ventilation, don't forget to close it

Did you know?

A typical window left open overnight in winter will waste enough energy to drive a small car over 35 miles so remember to close the window after use.

Source; CTG001, Creating an awareness campaign: Carbon Trust

Further information

www.anglia.ac.uk/energy

Carbon Trust; www.carbontrust.co.uk

The National Energy Foundation;
www.nef.org.uk

Water

The facts

- The UK has less available water per person than most other European countries.
- The South East of England has less water available per person than the Sudan and Syria
- Water is scarce in parts of Scotland, Wales and Northern Ireland as well as in England - large scale drought is already occurring in the UK, with the lowest rainfall, groundwater and reservoir levels for decades.
- Each person in the UK currently uses about 150 litres of fresh water every day. This consumption level is not sustainable in the long-term.

The UK will face increased pressures on our water supply in the future with population increases and climate change.

Source; *Waterwise*

Did you know?

To produce 3000 calories of food a day for a year for each of the world's 6.7 billion people, would require enough water to fill a canal one kilometre wide, as deep as Big Ben is tall, and long enough to circle the Earth twice.

It would take the Thames over 3500 years to fill such a canal. Yet this canal would only hold enough water to grow one year's worth of food.

Source; *A Waterwise Briefing, February 2007: Waterwise*

Wise up with Water

It is important that we do not take this precious resource for granted and that we use water wisely.

- Turn off taps, and cooling systems after use
- Use a sink plug where available
- Avoid leaving taps on when washing hands
- Use the energy saving and half load facility on appliances
- Don't overfill the kettle, only use the amount of water you need
- See the home fact sheet for tips on saving water at home

Further information

www.anglia.ac.uk/energy

Waterwise; www.waterwise.org.uk

Lighting - See the light!

Lighting is an important use of energy - not only does it enable us to do the myriad of visual tasks but it can also affect our health, mood and mental stimulation. It can affect our life and productivity.¹

The amount of energy used in lighting is determined by the lighting equipment, i.e. the lamps and the light fittings. It is also determined by the lighting requirement for the particular application and the length of time the lighting is switched on.²

The energy used by lighting can end up as heat, so by controlling lighting the building will become more comfortable to work in.³

Source; ¹ *Good Practice Guide 272, Lighting for people, energy efficiency & architecture: Carbon Trust*, ² *GIR 092, Energy efficiency in lighting- an overview: Carbon Trust*, ³ *Carbon Trust*

Watts up with leaving the lights on?

Lighting is a major consumer of electrical power in buildings and can be a major source of waste. In the UK, 20% of the electricity generated is used for lighting. This amounts to approximately 58,500 million kwh or units of electricity and 34m tonnes of carbon dioxide (CO2) each year. Of this, 58% is used in the service sector (offices, shops and warehouses) and 29% in the domestic sector.

Source; *Good Practice Guide 272, Lighting for people, energy efficiency and architecture: Carbon Trust*

Technical information

There are two main types of electric lamp;

Incandescent lamps- Light is emitted through heating a tungsten filament until it glows. Incandescent lighting is most commonly seen in homes and small spaces.

Discharge lamps – An electric gas is discharged such as florescent, low and high pressure discharge lamps.

Source; *GIR 092, Energy efficiency in lighting- an overview: Carbon Trust*

Did you know?

Only around 6% of the electricity of a 'traditional light bulb' is converted to light. The rest is lost as unwanted heat.

Source; *Carbon Trust*

Measuring the efficiency of a lamp

The amount of light emitted in lumens when the lamp has reached full light output with respect to the amount of electricity consumed in Watts is called Efficacy.

The unit of efficacy is lumens per Watt and the higher the value the better the lamp's energy efficiency performance.

Efficacy levels

Type	Efficacy (Lumen/Watt)	Average Life (hrs)
Incandescent:		
Tungsten Filament	8-12	1000
Incandescent:		
tungsten halogen	12-24	2000-4000
Compact Fluorescent	50-85	5000-15000

Source; *GIR 092, Energy efficiency in lighting- an overview: Carbon Trust, Energy saving fact sheet: Carbon Trust*

Occupancy sensors

Some areas of our University have occupancy sensors which detect when someone is in the room and the lights automatically turn on and off.

Sensors are located in the following buildings;

- Sawyers
- Michael Ashcroft Building (Exclud' Corporate Suite)
- Tindal

Switch off!

Choosing the most efficient type of lamp can make huge reductions in energy consumption.

We can also reduce our energy consumption and CO2 emissions by acting on the following observations;

- Is it bright enough without having the lights on – can you use sunlight?
- Is an empty room being lit up?
- Is there faulty lighting? - A Flickering tube uses more electricity
- Are sensors working properly?
- Report faulty lights to facilities helpdesk on 6464

Myth; It's better to leave fluorescent lights on as starting them up wastes more energy than if they remain permanently switched on.

Reality; Fluorescent tubes use only a few seconds worth of power in start up

Source; *CTG001, Creating an awareness campaign: Carbon Trust*

Did you know?

Lighting an office overnight wastes enough energy to heat water for 1000 cups of tea!

Source; *CTG001, Creating an awareness campaign: Carbon Trust*

Further information

www.anglia.ac.uk/energy

Carbon Trust; www.carbontrust.co.uk