

Strategy for a changing climate

A **climate change Guide** for Lewes District

August 2009



Lewes District Council
www.lewes.gov.uk

foreword

“Local Authorities have a pivotal and indispensable role in climate security”.
Local Government Association, How authorities can meet the challenge of climate change,



Climate change – above and beyond that which can be explained by natural variation – is happening, and it poses a significant danger to our world and our future. No continent and no country is ‘safe’.

It is very tempting, in the current financial crisis with consequential cuts in public spending, rising unemployment and business bankruptcy, to regard concern for the environment as a luxury we cannot afford. However, we have only one world and even a cursory glance at the international reviews of the state of the environment will show there is no time to lose in addressing the serious damage we continue to inflict upon it.

It is time to use some of the creativity that has made us wealthy to come up with solutions to the problems that wealth has produced. Pollution, loss of wildlife habitat, and the excessive demand for scarce natural resources, for example water, leave millions of people in dire poverty as well as contributing to climate change.

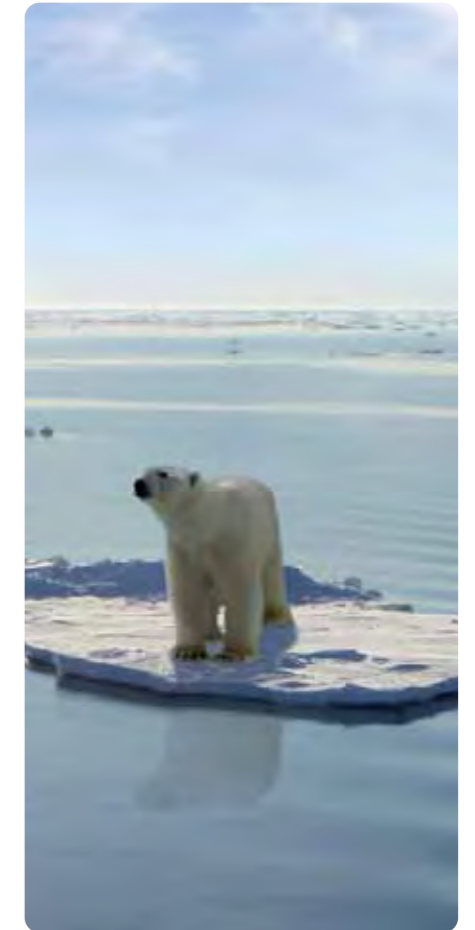
Even with the undoubted creativity we possess to find solutions to our current problems and challenges, we still need to have the will to take the necessary action. So the new National Indicators, which reflect the Government’s priorities for local government, are very welcome. These indicators now include some important environmental targets under the broad heading of ‘Environmental Sustainability’.

Although many issues require international action, what will matter for the future is what each one of us will do now – are we willing to help tackle the big issue or just allow it to get worse?

Councillor Eddie Collicot

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This Guide contains some specialist words and phrases which may not be familiar. These are explained in the glossary which follows, which can be read as an introduction or referred to as you read.

1 glossary

Adaptation

Adaptation is the action taken to minimise the adverse impacts of climate change, and take advantage of any opportunities that are presented.

Carbon capture & storage (CCS)

The process of capturing the carbon dioxide that is emitted when fossil fuels are burned. It involves capturing the carbon before or after combustion and storing it under-ground in depleted oil and gas fields, coal seams or deep saline aquifers. Because it avoids the release of carbon dioxide into the atmosphere, CCS is being developed as a way to help limit climate change.

Carbon dioxide

Carbon dioxide (CO₂) is one of the naturally occurring gases in our atmosphere, but it is also released by burning any type of carbon compound. As a result of the world's increasing use of carbon-rich fossil fuels by cars, aircraft, power plants and domestic heating systems, the amount of carbon dioxide in the atmosphere has increased significantly over the last century. Trees (as well as other plants and oceans) absorb carbon dioxide from the atmosphere. Felling trees stops them absorbing carbon dioxide, and burning them releases it, so deforestation is also adding to atmospheric carbon dioxide levels.

Carbon Footprint

A carbon footprint is a measure of the total amount of carbon dioxide emissions that are directly and indirectly caused by human activity

Climate change

Climate change covers the changes in global weather patterns over an extended period of time (usually 30 years or longer) and the effects they produce. Weather occurs over a much shorter period of time, and does not necessarily reflect the trends associated with climate change. Climate change can be natural or man-made (anthropogenic). From the onset of the industrial

revolution in the 18th century observers have noticed variations in local climates which seem to have been caused by human activities. The fourth assessment of the Intergovernmental Panel on Climate Change stated that most of the global warming over the last 50 years is 'attributable to human activities'.

EMAS

The Eco Management and Audit Scheme (EMAS) is a European regulation which sets high standards for environmental management. To meet the requirements of EMAS, an organisation must continuously improve its environmental performance above and beyond legislative requirements.

Fossil fuels

The term 'fossil fuel' covers carbon-rich materials like oil, natural gas and coal. These were formed hundred of millions of years ago from fossilised plant and animal remains, locking up carbon and energy. Burning such fuels releases the energy, but it also unlocks the carbon and releases it as carbon dioxide. Since the carbon was originally absorbed so long ago, releasing it effectively adds carbon dioxide to the atmosphere. The process of forming these fuels also takes millions of years, so once we have exhausted them they will not be replaced. Stocks are rapidly dwindling, and it is becoming increasingly difficult to guarantee security of supply. This is one of the reasons for increasing fuel prices.

Greenhouse effect

Gases such as carbon dioxide and methane in the atmosphere allow solar radiation to warm the earth, but stop some of the resulting warmth escaping back into space. In this they act rather like the glass of a greenhouse, so they are known as greenhouse gases. Without them the planet would freeze and life would be impossible. However, the greenhouse effect is increasing, making the earth warmer, and this is changing the global environment.

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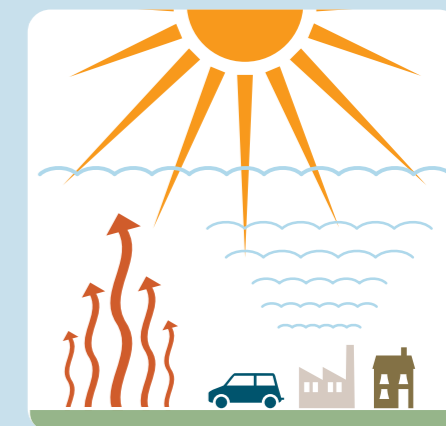


Illustration: JacksonBone

Greenhouse gases

Common greenhouse gases in the atmosphere include water vapour, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons. The effect of each gas is affected by its abundance and characteristics. For example, methane by character is much stronger than carbon dioxide, but it is present in much smaller concentrations so its total contribution is smaller.

Local Agenda 21

The Earth Summit in 1992 called on communities around the world to prepare and implement a local strategy for sustainable development. This is called Local Agenda 21 (LA21). The aim of LA21 is to improve the quality of life for local people now, and for future generations.

Methane

Methane (CH₄), is a greenhouse gas released by the anaerobic decay of organic matter. Large amounts are generated by decay in waterlogged swamps and peat bogs, livestock, and by the burial of waste in airless landfill sites. Although there is less methane than carbon dioxide in the atmosphere, it is 20 times more potent as a greenhouse gas.

Mitigation

This refers to the action that is taken to reduce greenhouse gas emissions and tackle climate change, thereby limiting the most severe impacts.

Nottingham Declaration

The Nottingham Declaration on Climate Change requires local authorities to work with the community to tackle climate change at local level. By signing the declaration, local authorities commit themselves to implementing a climate change strategy and action plan. This involves cutting carbon emissions and instigating measures that help others to do the same. The declaration is the most widely recognised policy statement on the subject. Lewes District Council is a signatory.

Ozone layer

The ozone layer is a thin layer of ozone gas (O₃) in the stratosphere that absorbs damaging ultraviolet radiation from the sun. Some of the chlorofluorocarbons (CFCs) that are used in industry and domestic appliances (especially refrigerators) are capable of destroying ozone if they are released into the atmosphere. In itself, thinning of the ozone layer has no direct impact on the greenhouse effect, but it may increase the effects of harmful radiation on plants that absorb carbon dioxide. It will also increase the incidence of skin cancers. The ozone-destroying CFCs also act as greenhouse gases.

Sustainable development

Sustainable development, or sustainability, is about making sure that we use resources such as fuels, metals, timber and fisheries in such a way that future generations will have enough for their needs. It's like a deposit account at the bank: if we save money, we are more likely to have a secure future. Living sustainably will help mitigate climate change, and it will help us adapt to the changes that occur.

Weather

Weather is the state of the atmosphere at any one place at any time. It is constantly changing, especially in countries like Britain. One way of remembering the difference between climate and weather is that 'climate' is what you expect (cold winters), and 'weather' is what you get (a blizzard).

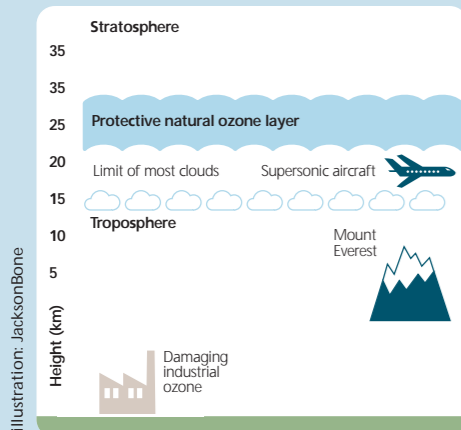


illustration: JacksonBone



istockphoto.com



“Warming of the climate system is unequivocal...”
Intergovernmental panel on Climate Change, 2007

“Climate change poses clear, catastrophic threats. We may not agree on the extent, but we certainly can't afford the risk of inaction.”
Rupert Murdoch



2 introduction

Climate change is seen by many people as the single most important issue facing the world today, with impacts that may affect every single facet of our daily lives. It is one of the key issues facing world leaders.

This Climate Change Guide is designed to be used in conjunction with the stand alone leaflets (see Action in a Changing Climate). Together they form Lewes District Council's **Climate Change Strategy**. The purpose of this Guide is to give you the facts about climate change, to show you how this is impacting on our daily lives, and to explain how we at Lewes District Council are addressing climate change on a local and regional level. Through our own initiatives and strategic partnerships we are empowering individuals and organisations to act now to **reduce** long-term damage caused by climate change and to **adapt** to the changes that will inevitably occur.

The Council has already shown its commitment to tackling climate change by:

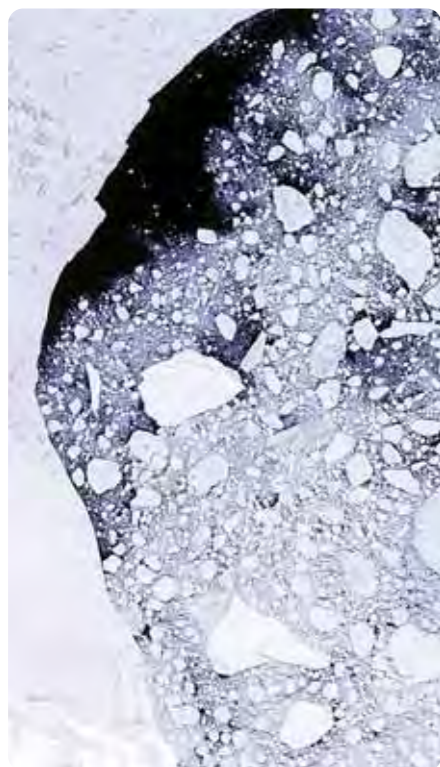
- Signing the Nottingham Declaration on Climate Change (right)
- Developing a Sustainable Energy Policy
- Developing a Sustainability Strategy
- Joining Climate South East
- Applying the Eco Management and Audit Scheme (EMAS) across all of its services
- Developing a Sustainable Waste Management Strategy
- Developing a Travel Plan

For further information check out the LDC website, www.lewes.gov.uk



3 the problem of climate change

"It's important to listen to what scientists have to say, even when it's inconvenient, especially when it's inconvenient" President Barak Obama, 2009



Climates have been changing throughout the history of the earth, but these changes have always been linked to natural causes and long-term astronomical cycles. However, the vast majority of scientists now agree that we are experiencing an unprecedented rate of climate change, and that this is primarily due to an increase in the volume of carbon dioxide and other 'greenhouse gases' in the atmosphere. Most of these gases are released by burning fossil fuels such as coal and oil, to provide the energy that underpins our way of life.

Carbon dioxide levels have risen by over 30 per cent since the beginning of the Industrial Revolution in the late 19th century. Global average temperatures rose by 0.6°C during the 20th century. Most of this temperature rise has occurred since the 1970s. A rise of 0.6°C may not seem much, but small rises can have dramatic effects. An average global rise of just 4°C could melt the Antarctic ice sheet. (See also the diagram opposite.)

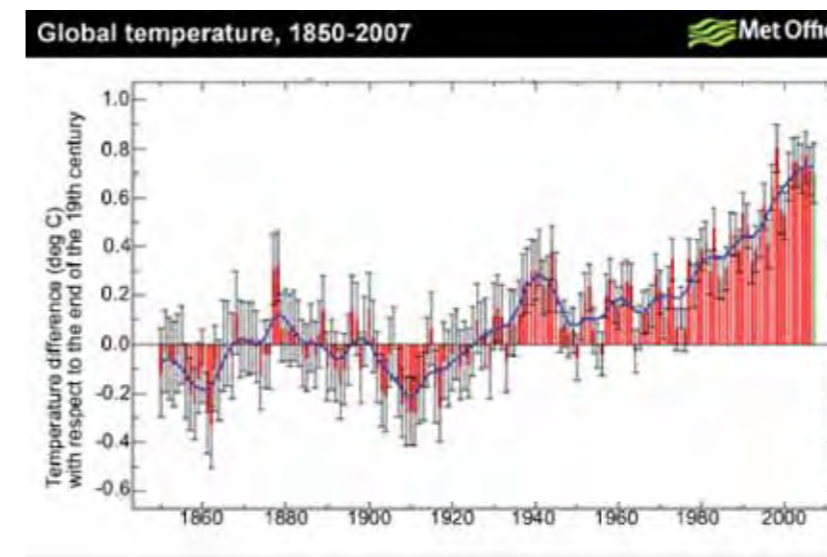
If everyone stopped using oil, gas and coal today, climate change would still take place. This is because greenhouse gases stay in the atmosphere for about 100 years after they are released. The Government introduced targets for green house gas emission reductions through action in the UK and abroad of at least 80% by 2050, and reductions in carbon dioxide emissions of at least 26% by 2020, against a 1990 baseline. If we cut carbon dioxide emissions by 70% immediately, the world would continue to heat up for several more decades, and the sea would rise for several more centuries. (Forecasting the Future, EST, 2005).

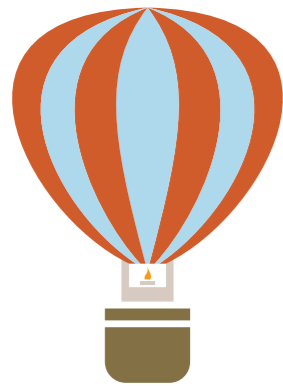
Over the past century the average global temperature has risen by 0.6°C. This may not seem much, but the world has warmed by only 7–8°C in the 12,000 years since the last ice age ended, so an increase of over half a degree in 100 years is a lot. In England the average temperature has risen by 0.7°C since 1659. Of that, 0.5°C of the rise has occurred in the 20th century. Further rises of between 2°C and 4.5°C are expected by 2080. (UK Climate Impacts Programme)

"If we don't act quickly and determinedly to address climate change the world will face billions of climate refugees." Sir David King, Former Government Chief Scientific Officer

If we act now, we can reduce the more extreme impacts of climate change, and find ways to adapt the changes that will inevitably occur.

The rise in global surface temperature has averaged more than 0.15 °C per decade since the mid-1970s. Warming has been unprecedented in at least the last 50 years, and the 17 warmest years have all occurred in the last 20 years.





Throughout this document, tonnes of carbon dioxide are represented by the number of hot-air balloons they would fill. An average-sized hot-air balloon approximately 15 metres in diameter has a volume of 2250 cubic metres, and would contain about 4.5 tonnes of carbon dioxide at the earth's surface.

What is Carbon Dioxide?

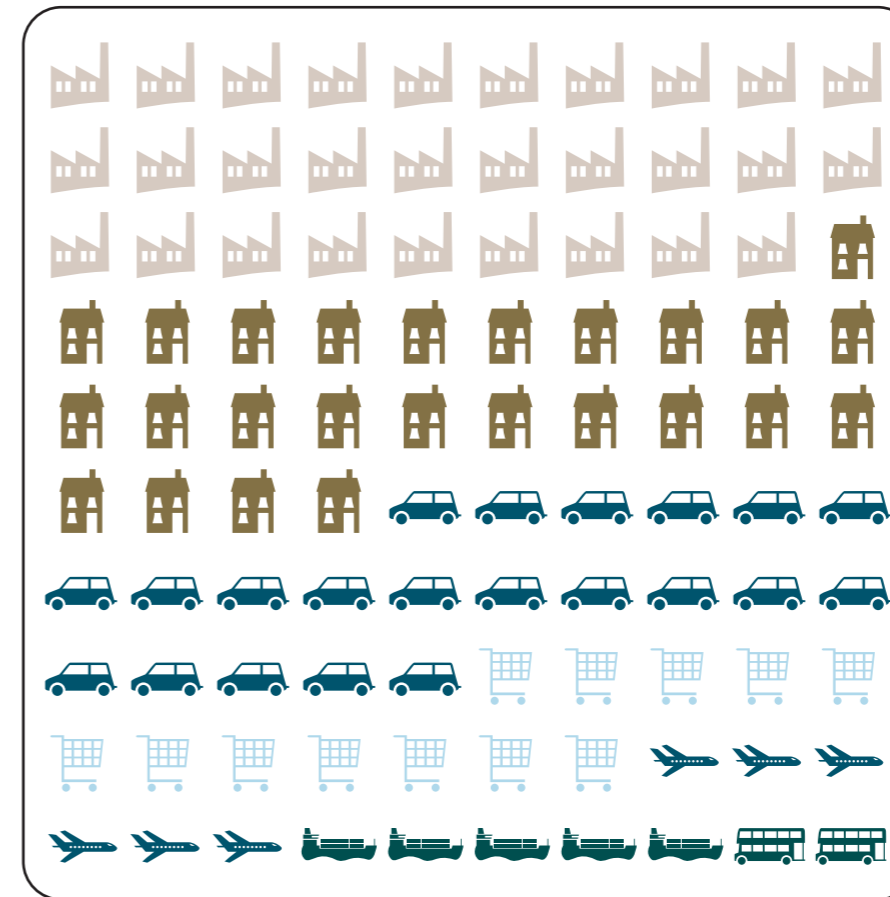
Carbon dioxide is a natural product of living organisms. It is released into the atmosphere by respiration (the conversion of food into energy) and the oxidation of dead organic material by decay and burning. In general, the amount of carbon dioxide entering the atmosphere is balanced by the amount that is absorbed by growing plants. But if these plants are fossilised in the form of coal and oil, the carbon is locked up underground for millions of years. Burning these fossil fuels oxidises the carbon and releases it back into the atmosphere as carbon dioxide – but so many years after it was absorbed that it is like adding extra carbon dioxide to the system. This is why levels of atmospheric carbon dioxide are increasing.

The concentration of carbon dioxide in the atmosphere is measured in parts per million, or ppm. Current levels stand at about 388 ppm, between 1970 and 2000 this figure rose at a rate of approximately 1.5 ppm per year. From 2001 to 2007 the average rise was over 2 ppm.

If carbon dioxide levels reach the 400 ppm they are likely to cause an average global temperature rise of 2°C. The Intergovernmental Panel on Climate Change (IPCC) states that such a rise is a safe limit, but that above this level climate change may increase unchecked, causing serious damage to ecosystems. Despite this, the EU has recommended 550 ppm as a suitable safe limit. Many experts believe that this target is set too high, and that such a level could cause an global temperature rise of well above 2°C, with catastrophic consequences.

“In the short time between 4th and 13th August 2003 more than 2000 people died in the UK because of heat.” Environment Agency, 2003

Where does the Carbon Dioxide come from?



Human produced carbon emissions in different sectors

- Industry 29%
- Household 25%
- Road transport 21%
- Commercial (shops) 12%
- Aviation 6%
- Shipping 5%
- Public transport 2%

Carbon dioxide is emitted from three main sources. **Industry** releases a lot, both by burning fuel for heat and by using powered equipment. A great deal is emitted through the use of **domestic** gas, oil and electricity for heating, cooking, lighting and electrical appliances. The other main source is **transport**, which either uses engines powered by fossil fuels, or runs on electricity that is largely generated by burning fossil fuels.

Transport emissions are rising dramatically. Emissions from air travel are rapidly increasing, and here the availability of cheap short-haul flights is the main culprit. More energy is used per person on short-haul flights, because proportionately more fuel is used during take-off and landing than during the flight. On the road, the increasing use of heavy, big-engined vehicles for short journeys is having a similar effect.

How the earth is warming up how greenhouse gases can change the climate

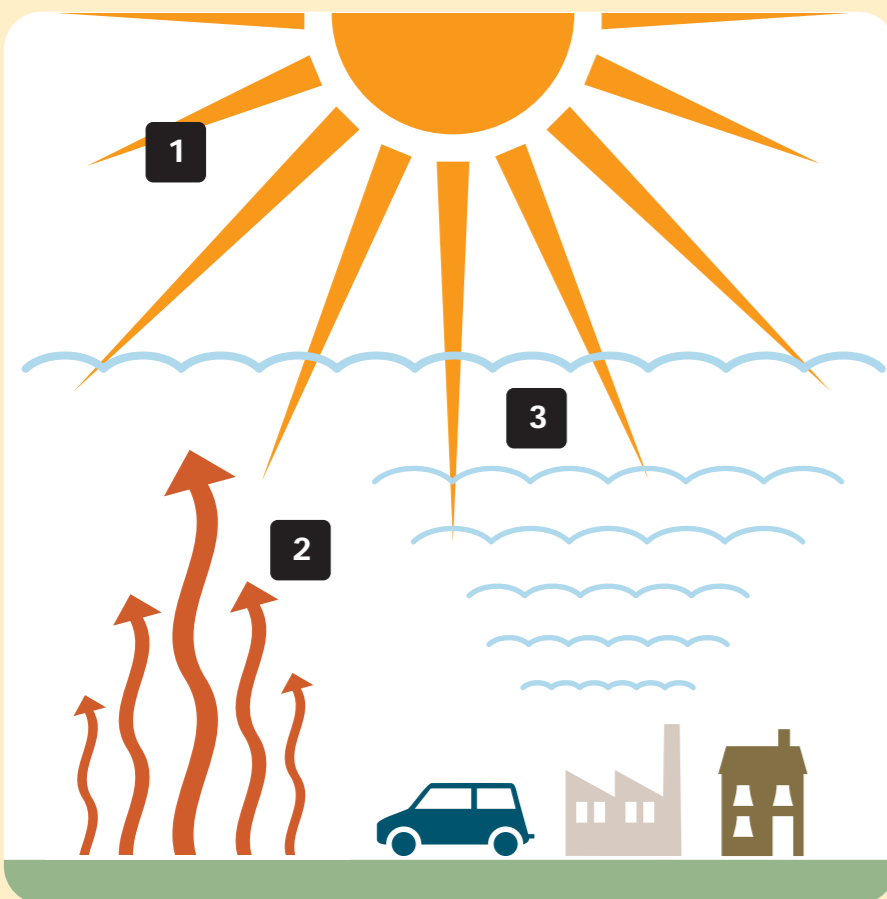


illustration: JacksonBone

Some of the sun's heat energy (1, 2) is absorbed by the earth, and some of it is needed to keep us warm. Now the excess heat is being prevented from escaping back to the atmosphere by an increase in man-made pollution (3) (carbon dioxide, methane, nitrous oxide – so-called 'greenhouse gasses') so the earth is warming up like a greenhouse.

Carbon dioxide, one of the main greenhouse gasses, is released naturally by respiration. But it is also released by the burning of fossil fuels where it has been locked up for millions of years. Such fuels are coal, gas and oil, which we use to provide energy for heating, lighting, powered appliances and transport. (4)

Increased volumes of greenhouse gases are being released as the world becomes more reliant on energy. This is increasing the greenhouse effect, and raising average global temperatures.

Warning signs

The effects of climate change are already being felt. The frequency and severity of severe weather events such as storms, floods, droughts and heatwaves have increased, and are set to increase more dramatically within our lifetime, and those of our children. Sea levels are rising, ocean temperatures are increasing and polar ice is melting. Wildlife is suffering, and many species are suffering local extinctions. The natural environment that we take for granted may soon undergo changes that cannot be predicted or reversed.

Across the world events are taking place which indicate that we may have already reached crisis point.

In western Siberia an area of permafrost the size of France and Germany combined is melting for the first time since it formed more than 11,000 years ago. What is most worrying is not the degree of melting, but the release of methane that it could involve. Methane is a greenhouse gas, 20 times more potent than carbon dioxide. The frozen tundra is the world's largest peat bog, which stores of a quarter of the world's methane. If it thaws out, the peat could release enough methane to increase global warming by as much 25 per cent.

Glaciers around the world have been retreating at an alarming rate over the last 150 years, and some have melted away completely. The number of glaciers in Spain has dropped from 27 to 13 since 1980, and over the last 100 years there has been a 50 per cent reduction in the amount of glacial ice in the European Alps and the Caucasus mountains.

Melting Antarctica

In 2008, the Wilkins Ice Sheet on the Antarctic Peninsula lost more than 400 square kilometres (160 square miles) to a sudden collapse. In April 2009 an ice bridge connecting the Wilkins Ice Shelf on the Antarctic Peninsula to Charcot Island disintegrated continuing the break up of the ice shelf. West Antarctica and the Antarctic Peninsula lost nearly 200 billion tonnes of ice in 2006 alone, which is 75 per cent more than losses in 1996

"For the past four years the loss of summer sea ice in the Arctic has been equivalent to an area of 500,000 square miles – roughly the size of Texas or Iraq" Independent, 29 September 2005

Global dimming

The impact of global warming may be worse than we thought. For years industrial countries have suffered from air pollution caused by fine particles such as soot. This has led to a ten per cent reduction in the amount of sunlight reaching the ground in the UK. This has kept us a little cooler. Since the Clean Air Act of 1956, this type of air pollution has begun to decrease. This is good for our lungs, but scientists now suspect that it could have hidden the real impact of global warming. As more particles are removed from the air by cleaner technology, more sunlight will reach the ground. It could get much warmer than predicted, and it could happen much more quickly.

Some recent climatic events

- 2000** Floods inundated the centre of Lewes.
- 2003** Summer temperatures reached an all-time high of 38.1°C in Gravesend.
- 2003** Across Europe, 36,000 people died from problems related to high temperatures.
- 2003** Snow completely disappeared from the Scottish mountains for only the fourth time in history.
- 2004** Globally 2004 was the fourth warmest year ever recorded. The ten warmest years ever recorded worldwide have all occurred in the last 14 years.
- 2004** Economic losses attributed to extreme climate events were estimated at over 90 billion US dollars.
- 2004** Mudslides destroyed the centre of Boscastle, Cornwall.
- 2005** A 130mph tornado hit Birmingham, causing £25 million of damage.
- 2005** The hurricane season started early in the Caribbean, and Hurricane Katrina destroyed New Orleans.
- 2006** The warmest year on record, seeing the two hottest months for at least three centuries and an increase in deaths and cases of heatstroke.
- 2006** Drought order powers granted to three Southern Water Companies to limit non-essential uses of water.
- 2006** Globally the number of floods and related disasters was 43% greater than the 2000-2004 average.
- 2007** The wettest May-July on record with severe flooding causing £3 billion of damage. 13 people were killed and around 350,000 people in Gloucestershire were left for more than two weeks without clean water.
- 2008** At the beginning of the year floods in northern England and Wales forced the closure of key road and rail routes and the end of the year saw extensive flash flooding hit the south and south-west of England.
- 2009** February saw the snowiest period for two decades, virtually all of London's travel network was down, over 5000 schools closed and there were shortages of road salt to keep the roads clear.
- 2009** Following extreme weather with a week of maximum daily temperatures in excess of 45 degrees Celsius wildfires in the southern Australian state of Victoria wiped out entire towns, destroyed more than 1,800 houses and left more than 200 people dead and 7,000 people homeless.

How can we in the Lewes area adapt to the predicted changes in climate?

How best should we try to reduce the impacts?

Are our houses designed to withstand flooding or the effects of longer, hotter summers?

Are we ready to deal with these changes?

That's the global picture – but what about here in South East England? Many of these events were almost certainly linked to global warming. Since the South East is likely to warm up more rapidly than any other part of the UK, extreme weather events will become more likely in the region.

In the next section we focus on the likely impacts of change in our area.

How will our coastline look after repeated storm surges and erosion?

What can we expect the countryside to look like in 20 years time?

Are we ready to deal with diseases such as malaria that are more commonly linked to hotter climates?

These are some of the questions that are occupying experts, and which this Climate Change Guide and Action Leaflets will help you to explore in relation to your own actions and lifestyle.





images © sussex express

“Climate change is an important issue for us at Lewes District Council. As the area worst affected by the floods of autumn 2000, we have experienced first hand how devastating extreme climate problems can be”.
Ian Kedge, Environmental Health, LDC

4 the future impacts of climate change on Lewes district and the South East

Lewes has first-hand experience of the extreme weather events that are characteristic of global warming. The District was badly affected by the great storm of October 1987, the drought of 1995 and more recently by severe flooding in October 2000. In spring 2006 we had another drought.

Lewes was the area worst hit by these floods, so we know how devastating extreme weather events can be. Some 836 properties were affected. Businesses and public buildings represented about 27 per cent of the total, while the remainder were residential properties. The cost of the damage was estimated at £88 million. A flood report is available on the Lewes District Council website.

Sea levels are rising, and in the South East this is compounded by the fact that the land is sinking as a result of geological forces and groundwater extraction. As a consequence our coastal erosion rates are among the highest in Europe. The cliff falls at Beachy Head and Birling Gap are constant reminders of our vulnerable coastline. The combination of rising sea levels and the greater frequency and severity of storm surges will significantly increase the risk of coastal flooding.

> Further information

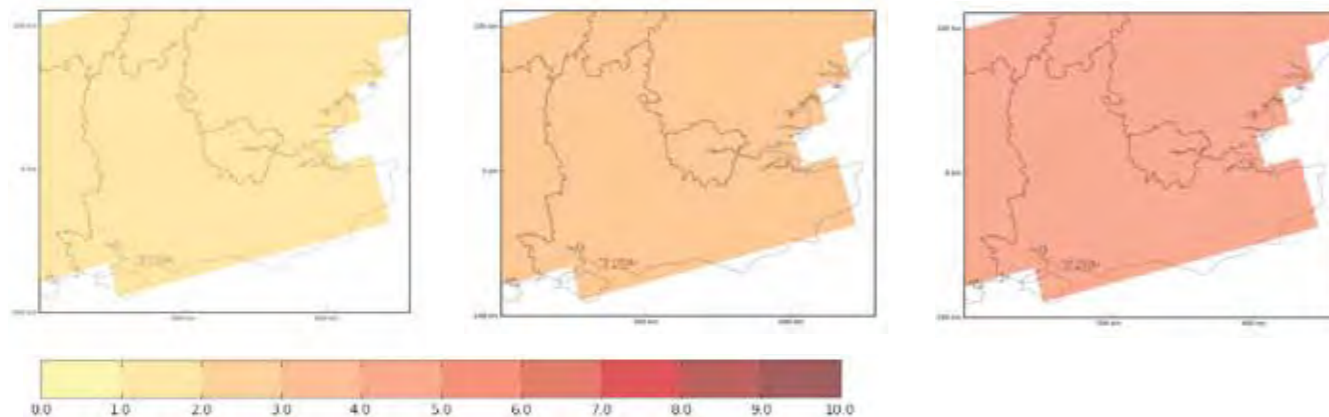
A report on the October 2000 floods is available on the Lewes District Council website, www.lewes.gov.uk and from www.defra.gov.uk

UKCP09 scenarios

The UK climate programme (UKCIP) has produced a range of climate predictions for the South East. These are known as UKCP09 scenarios. Using the medium emissions scenarios, we might expect to experience the following by 2080s:

- Under medium emissions, the central estimate of increase in winter mean temperature is 3°C; it is very unlikely to be less than 1.6°C and is very unlikely to be more than 4.7°C.
- Under medium emissions, the central estimate of increase in summer mean temperature is 3.9°C; it is very unlikely to be less than 2°C and is very unlikely to be more than 6.4°C.
- Under medium emissions, the central estimate of change in winter mean precipitation is 22%; it is very unlikely to be less than 4% and is very unlikely to be more than 50%.
- Under medium emissions, the central estimate of change in summer mean precipitation is -22%; it is very unlikely to be less than -47% and is very unlikely to be more than 7%

Medium emissions scenario 2020s, 2050s, 2080s – 50% probability



Change in annual mean temperature (°C)

The RSPB has been surprised by the appearance of a young family of song thrushes in the middle of winter in Brighton, Sussex. Birds are sensitive natural indicators of the state of our climate, and various indicators show that spring is arriving about two weeks earlier than it did 30 years ago. RSPB South East, 2004.

5 how will climate change affect our everyday lives?

As we have seen, the climate of the South East is changing and will continue to do so. As temperatures rise and rainfall patterns shift, so the biodiversity of the South East will change and the familiar landscape will alter more quickly than before. The plants and animals that we associate with East Sussex may be replaced by other species more suited to higher temperatures. Flooding and sea level rise will have enormous consequences for vulnerable coastal areas. The effects will be felt beyond the natural world and will impact on every facet of our daily lives, affecting the way in which we work, play and live.

Below is a summary of the impacts that we can expect.

1 Health

Higher temperatures could have mixed effects on health. Some benefits may be felt, such as reduced winter mortality (currently around 40,000 people die from winter-related illnesses), but new diseases, against which we have no immunity, may spread.

Possible impacts:

- Increased risk of physical and psychological injuries associated with extreme weather events such as flooding.
- Increase in water-related health problems.
- More heat-related deaths, possibly offset by fewer cold-related deaths in winter.
- Increase in respiratory problems due to air pollution and dust in drier summers.



- Increased pressure on health services caused by the influx of refugees from nations affected by more severe consequences of climate change.
- Introduction of tropical diseases such as malaria.
- Increased risk of skin cancer and sunburn as people indulge in more outdoor pursuits in hotter summers.
- More cases of food poisoning as higher temperatures increase food decay rates.
- Disruption to health services and infrastructure by flooding and storms.

“Despite torrential flooding in Carlisle and Northern England, the South has experienced abnormally low levels of rainfall over the winter.... In the three winter months from November to January only half the amount of normal rainfall was recorded.” Southern Water, March 2005.



2 Water

Water is a major issue, especially for the South East where there are severe pressures from population, industry and leisure. The South East has the highest demand for water per head in the UK. This high demand is related to the generally warmer, drier conditions in the South East combined with greater affluence, and higher demand for housing in the South East will increase pressure on water supplies. Drier summers might lead to extended restrictions on water use, and water may need to be brought in from other regions. East Sussex has already faced hosepipe bans and most recently a drought order. This could become the norm if efficiency measures are not implemented and consumption reduced. Rainfall in heavier bursts will have an impact on drainage with more surface runoff leading to localised flooding.

Possible impacts:

- Lower water quality, with greater risk of salination.
- Increased evaporation from soils.
- Water demand may be difficult to meet if peak demands occur during low rainfall periods or droughts.
- Hosepipe bans and water rationing.
- Increased damp problems in homes in winter because of increased rainfall.

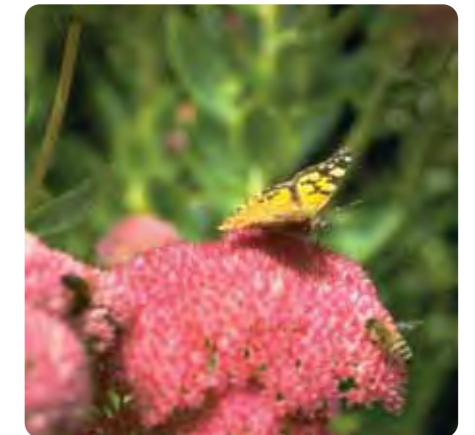
3 Wildlife

Changes have already started occurring in habitats across the UK. Several plants usually associated with warmer climates are pushing northwards, and some birds are wintering here rather than migrating to more southerly regions. Warmer waters are drawing exotic fish and other marine organisms north, displacing native species and disrupting the marine food chain. This in turn is causing catastrophic breeding failures among seabirds. Spring starts two to three weeks earlier for insects and one week earlier for plants than it did a century ago. The effects on native biodiversity – the variety of species – could be profound. Rising sea levels will ‘squeeze’ intertidal habitats with impacts for birds and marine life.

“Warmer winter temperatures will put daffodils and crocuses at risk, while other climate change impacts will affect snowdrops, rhododendrons and primulas.” UK Climate Impacts Programme, 2005

Possible impacts:

- Changes in wildlife populations as a result of changes in habitats and food stocks, possibly leading to local extinctions.
- Loss of wetland habitats and species associated with them.
- Loss of land area through coastal erosion and ‘coastal squeeze’.
- Problems for migratory species caused by increased frequency and severity of storms.
- Drying up of ponds and rivers.
- Loss of native species through competition with invading species that are more suited to the changed conditions.
- Increased risk of heath fires.



“Since 2000, we have experienced record low groundwater levels, some of the hottest and wettest months and years on record, and snow in April.”

Southern Water 2009



4 Agriculture

Agriculture in the South East will be conspicuously affected by climate change, although some of these effects may be positive. The growing season for plants, for example, has lengthened by one month since 1900.

Possible impacts:

- Increased temperatures may extend the growing season even further, but summer droughts may offset any benefits to farmers.
- Possible increase in autumn and winter rainfall may offset summer droughts, but only if the water can be contained.
- Many traditional crops may disappear, but there may be increased opportunities to grow warm-climate crops such as maize and soya.
- New livestock and crop pests may become prevalent.
- Soil erosion, diffuse pollution and deteriorating water quality will affect what can be grown.
- Loss of grazing and forage yields, reduced milk production, animal welfare issues and changing breed viability could adversely affect farming practices.



5 Woods and trees

Predicted summer droughts will make trees more vulnerable to pests and diseases such as Dutch elm disease, as well as simply starving them of water. We may experience full-scale forest fires like those that occur in other countries such as Portugal and Indonesia.

Possible impacts

- Loss of mature trees in hedgerows and town streets caused by drought. Some species will suffer an increase in crown dieback, resulting in bare, dead upper limbs.
- Trees will suffer from drier conditions on the chalk downs, leading to the loss of shallow-rooted species such as beech.
- Increased risk of forest and heath fires in summer.
- Increased frequency and severity of winter storms will damage and destroy more trees.
- Possible adverse effects on soil properties.
- Increased carbon dioxide levels in the atmosphere are already leading to more rapid growth of trees; this may affect timber quality in the future (Forestry Commission Bulletin 125).

“There is no doubt that many of the climate change scenarios are extremely challenging to our flood defence role. Southern Region is dominated by its coastline. Climate change will make it extremely difficult to maintain standards of defence against both flooding and erosion”.

Gary Lane, Regional Water Manager, Environment Agency, Southern Region

6 Flood and coastal defence

Flooding is already a problem and is set to increase in the future. The Lewes floods of 2000 caused huge damage and psychological trauma. Severe storms and rising seas coupled with erosion are slowly eating away our coastlines. Rivers are breaking their banks more frequently, and flash floods are becoming more common.

Possible impacts:

- More frequent and more severe flooding owing to rising sea levels and an increase in winter rainfall. Significant areas of Lewes District are at risk from flooding by major rivers and from inundation by the sea.
- More frequent breaches in sea defences.
- Increasing coastal erosion. The extremely wet weather of winter 2000/2001 led to a number of cliff falls. These areas will also be at risk from increased weathering during the predicted higher winter rainfalls.



Flood risk areas in Lewes district

In an article in The Independent, scientists estimated flooding in Britain to cost about £29bn a year.

7 Tourism

The prediction of warmer, drier summers in the South East is likely to increase the demand for outdoor and water-related leisure activities. This will have knock-on effects on transport infrastructure, water demand and electricity demand, for example. It could increase the need for expanded water storage facilities, leading to the loss of more land to reservoirs.



Possible impacts

- Increased numbers of people engaged in outdoor pursuits could be detrimental to wildlife habitats already under pressure from climate change, and increase soil and beach erosion.
- A shift to outdoor leisure activities could reduce the long-term viability of indoor sports facilities, judging by statistics relating sporting activity to weather derived from attendance at Lewes District Council leisure centres.
- If tourism increases owing to better summer weather, jobs will be created but more resources may be used for building, consumption and waste production.
- Extreme weather such as flooding may cause travel disruption.
- Decreased aesthetic appeal of the natural environment may deter visitors.
- Heritage sites may need increased shading for protection.

8 Insurance

In 2003 the UK experienced its hottest summer temperatures on record, leaving insurers with close to £400 million in subsidence claims alone.

Possible impacts

- Insurance may be more difficult to obtain for buildings on floodplains, and near cliffs subject to erosion.
- Subsidence claims will increase as warmer, drier summers result in ground shrinkage.
- Resulting rising costs of insurance (two or three times higher) may lead to under-insurance, especially among people on low incomes.
- Health insurance may be harder to obtain for new health threats.
- Travel, transport, liability and construction insurance may also increase.

“Weather risks are already increasing by 2 to 4 per cent per year on the household and property accounts due to changing weather. Claims for storm and flood damages in the UK have doubled to over £6 billion over the period 1998–2003, compared to the previous five years, with the prospect of a further tripling by 2050.” Association of British Insurers

9 Buildings and infrastructure

Drier summer conditions and increased winter rainfall could have serious impacts on the structural integrity of buildings and roads. Issues related to building design and subsidence are likely to become increasingly important.

Possible impacts

- Increased risk of subsidence to buildings in summer, and higher risk of flooding in winter, especially on floodplains or in coastal regions.
- Wetter winters could increase the risk of damp problems. Building integrity may also be weakened by increasing wind strength.
- Uncomfortable conditions in buildings not designed for higher temperatures.
- Road surfaces may melt and railway tracks may buckle in extreme summer heat.

10 Air quality

Climate change will inevitably alter the weather pattern, and this will have knock-on effects on the quality of the air we breathe.

Possible impacts

- More frequent high levels of ozone pollution
- Stronger and more frequent wind speed
- Higher incidence of extreme events such as Tornadoes
- More coastal damage caused by storm surges
- Drier conditions producing a risk of dust storms
- Increased damage to property and wildlife resulting from high winds, associated fanning of heath and forest fires.





11 Transport

Transport may be affected in several ways, but to some degree this will depend on technological advances in vehicle design.

Possible impacts

- Roads may suffer from increased subsidence, flooding and cracking.
- Coastal rail services and roads may be vulnerable to storm surges and coastal flooding.
- Landslips on road and rail embankments may occur.
- Ferry services may be disrupted more often by storm conditions.
- Overheating of vehicles may occur more often.
- Increased tourism may increase motorway congestion.
- Cold-weather disruption to road and rail networks in winter may decrease.



12 Waste

Waste and waste disposal may be affected.

Possible impacts

- Increased rate of degradation and leaching from landfill sites.
- Increased incidence of pests and vermin.
- Increased mobilisation of toxic wastes.
- Higher disposal costs associated with reducing greenhouse gas emissions.
- Higher costs associated with more frequent waste collections.
- Periodic weather-related disruption of collection and transfer of waste.

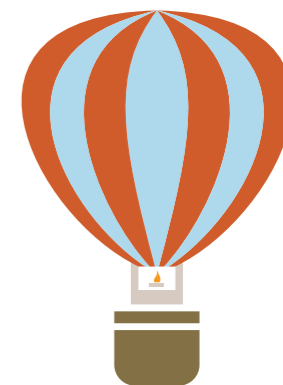
“There is still time to avoid the worst impacts of climate change, if we take strong action now.” Stern Review, October 2006

6 global to local: tackling climate change

Climate change is a global problem, we need to meet the challenge at every level, right down to the individual. If we all take responsibility for our own contribution to the problem, we stand a chance of defeating it.

Global action

The world energy supply is currently dominated by the use of carbon-rich fossil fuels, namely oil, gas and coal. The international community is becoming increasingly alarmed at both the dwindling supplies of these finite resources and the associated problems of global warming. The United Nations Earth Summit in Rio de Janeiro in 1992 set the principle of a global action plan to promote sustainability, and this in turn has led to global objectives on energy, such as the Kyoto Protocol. The EU has responded to these Kyoto objectives by recognising that energy efficiency or energy saving is the most cost-effective way of meeting these objectives.



10 million balloons
represents the
Kyoto target

National action

In response to the Kyoto objectives, the UK Government has passed legislation which introduces the world's first long term legally binding framework to tackle the dangers of climate change, the Climate Change Act 2008. This act sets a target to reduce carbon dioxide & other greenhouse gas emissions by 80 per cent by 2050.

More information on National and International climate change policy and action can be found on the DEFRA website
<http://www.defra.gov.uk/environment/climatechange/index.htm>

Regional action

The South East Plan sets out the long term planning framework over the next twenty years. The Plan is a key tool to help achieve more sustainable development, protect the environment and combat climate change. These include the regional economic and housing strategies as well as strategies and programmes that address air quality, biodiversity, climate change, education, energy, community safety, environment, transport, health and sustainable development. <http://www.gos.gov.uk/gose/planning/regionalPlanning/815640/>



Local action

Lewes District Council has been very active in promoting environmental management, sustainability and renewable technologies.

In December 2004 Lewes District Council signed the Nottingham Declaration on Climate Change.

The declaration committed the Council to:

- Work with central government to deliver the UK Climate change programme.
- Prepare a plan with the community to address the causes and effects of climate change.
- Reduce greenhouse gas emissions from the council's own services.
- Encourage all sectors in the community to reduce their own greenhouse gas emissions.
- Work with key organisations on identifying ways of dealing with climate change.
- Develop renewable energy generation.
- Monitor the progress of our plan against the actions needed.

Following the introduction of new National Indicators Lewes District Council is working with other Councils in the County to reduce carbon dioxide emissions and to work together on the adaptation and mitigation of the affects of climate change.



Partnership action

While Lewes District Council is working strategically to address climate change issues, we are also working with a range of local organisations on grass-roots community projects that educate, raise awareness and suggest practical ways of implementing sustainable lifestyles. The Local Sustainability Team regularly attends events, schools and other organisations to inform the community about climate change, and suggest ways in which individuals or groups can 'do their bit' in the fight to reduce global warming.

We are members of Climate South East, and partners in a number of projects that implement best practice in tackling climate change. These projects involve partners such as the South East England Development Agency (SEEDA), International Council for Local Environmental Initiatives (ICLEI), Sussex Enterprise, universities and other councils.

As a Council we have made sustainability and energy-awareness central to all our actions. This involves sustainability training for all staff, adopting an Environmental Management System (EMAS), Environmental Steering Group and Energy Working Group. Initiatives such as energy audits for all our buildings, a green travel plan, sustainable procurement and eco-monitors have all been set in place through these mechanisms.



Individual responsibility

We all share responsibility for climate change so to a greater or lesser extent our individual actions contribute to the problem. Climate Change is happening so we need to increase our awareness of the impact we have on the planet. Therefore we need to reduce the amount of greenhouse gases we produce and adapt to our changing climate. The effect on the global climate is becoming more and more evident. We can all take small steps to help reduce our impact on the environment.

Individual action

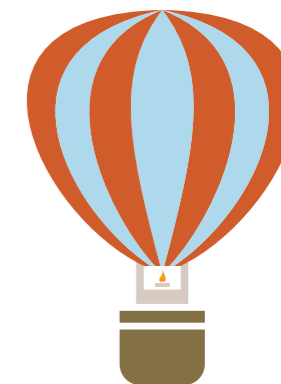
Climate Change is a huge global problem, but that does not mean that there is nothing we can do about it. In the UK domestic lighting alone produces about seven million tonnes of carbon dioxide each year. By simply changing to energy-saving light bulbs we could dramatically reduce this figure. Televisions and DVD players left on standby can use up to 60 per cent of the full running power. If we turned off all our standby switches we could save power equivalent to nearly half the annual output of a typical power station. (Forecasting the Elements, EST, 2005).



How much carbon dioxide does each of us use per year?

The average British person produces a total of 23.6 tonnes of carbon dioxide in a year, which is ten times that of the average person in India.

(Source: International Energy Agency)



5.25 balloons represents individual use

- 3.3 tonnes lighting and electrical equipment
- 4.6 tonnes flying to holiday destinations
- 4.7 tonnes heating the home and water
- 6 tonnes food production
- 5 tonnes car travel (average of 10,000 miles per year)



istockphoto.com

“If everyone in the world moderated their transport use, made small changes to their home energy and paid attention to the foods they ate, then we would achieve the Kyoto Protocol targets six times over”.

Dave Reay, University of Edinburgh, 2005.

7 action in a changing climate – your action leaflets

The good news is that we can reduce our energy consumption by making choices that do not impact greatly on our lifestyles. Small changes in individual behaviour, such as storing rainwater for the garden, switching to energy-saving appliances and shopping for local produce, can have major impacts when undertaken by the whole population.

The series of leaflets that accompanies this Guide outlines some of the most common measures that we can take to reduce carbon dioxide emissions. Many of these measures are simple and inexpensive. The leaflets includes suggestions for individuals and organisations, and provides clear, effective advice that can help people achieve sustainable solutions.

The leaflets cover the areas listed below

- Activities
- Consumption
- Energy Efficiency
- Food
- Renewable Electricity
- Travel
- Water
- Waste

Together this Guide and the Action Leaflets form Lewes District Council's Strategy for Climate Change Action.



“As individuals we are no more than grains of sand in the path of the climate change glacier, together we can radically change its path”.

Dave Reay, Climate Change: a two-way street, 2005

Links and resources

There are many sources of information on climate change and we have listed some of the most relevant below. For targeted information on climate change for different sectors of the community we have included a comprehensive list of contacts in each of our **Action Leaflets**. Please contact the sustainability team for these.

Lewes District Council

www.lewes.gov.uk/environment/8260.asp
Local Sustainability Team, telephone: 01273 474968 or 01273 486423, email: sustainability@lewes.gov.uk

United Kingdom Climate Impacts Programme (UKCIP)

Comprehensive and clear information on potential climate impacts. www.ukcip.org.uk

The Carbon Trust

Practical information and advice on climate change for organisations. www.carbontrust.org.uk

The Energy Saving Trust

Practical information and advice on climate change for individuals. www.energysavingtrust.org.uk

Act On CO₂

Carbon Footprint calculator and campaign to help people save money, save energy and reduce their carbon dioxide emissions. <http://actonco2.direct.gov.uk/index.html>

The Tyndall Centre

Respected research centre with latest work carried out on a variety of climate change issues. www.tyndall.ac.uk

Intergovernmental Panel on Climate Change

Major source of global information and research. www.ipcc.ch

Climate South East

Research and project information on climate change issues and impacts specific to the South East Region. www.climatesoutheast.org.uk