

Climate Change

The UK Programme

Department of the Environment,
Transport and the Regions
Scottish Executive
The National Assembly for Wales
Department of the Environment
(in Northern Ireland)



Climate Change

The UK Programme

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by Command of Her Majesty:

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Foreword by the Deputy Prime Minister



The developed world's economic prosperity has been built on the use of fossil fuels. Coal, oil and gas have powered our industrial and commercial development; provided light and heat for our homes and places of work; and fuelled the transport system which supports our economy and gives us highly valued mobility.

But we now have to face up to the consequences. Man-made emissions of carbon dioxide and other greenhouse gases are accumulating in the atmosphere and starting to change our climate. We must not underestimate the impact this could have. The devastating floods, droughts and storms we have seen in the UK and across the world in recent years show all too clearly how vulnerable we are to climate extremes and how high the economic, human and environmental cost can be, particularly in developing countries.

Scientists warn that things will get worse. We have to take practical action to deal with flooding and severe weather. But we can avoid the worst effects of climate change with a concerted global effort. Patterns of economic development will need to continue to change, with a technological revolution leading the way to a less resource intensive, low carbon economy. Making this transformation will not be easy, nor will it happen overnight. But it opens up new opportunities for business, and being less wasteful can improve our standards of living. We need to stimulate innovation and encourage investment in cleaner technology now in order to move development on to a sustainable path.

The international community has started to tackle climate change, with the UK playing a leading role. The Kyoto Protocol provides a framework for action, setting binding emission reduction targets for developed countries. All countries will eventually need to be part of the solution. But we cannot expect the developing world to do more unless developed countries show leadership by taking domestic action to reduce emissions. Deeper cuts will be

needed in the longer term, but the immediate priority must be to turn the commitments made at Kyoto into real emission reductions.

The UK is fully committed to playing its part. We have already honoured our Rio commitment to bring the UK's greenhouse gas emissions back to 1990 levels by the year 2000. This programme now sets out our strategy for delivering further cuts so that we achieve, and move beyond, our Kyoto target. However, emissions have continued to rise in many other developed countries and we look to them to implement equally challenging programmes of action.

The sixth Conference of the Parties to the Climate Change Convention in The Hague in November 2000 is a crucial stage in the international effort on climate change. We need an outcome which sets all the industrialised countries on the path to meeting their Kyoto commitments, with a strong emphasis on reducing emissions at home.

This programme sets out the Government's and devolved administrations' strategic approach to tackling climate change. It focuses on practical action to reduce emissions over the next decade. But it also starts to put in place measures that will allow us to reduce our dependence on fossil fuels and make a radical shift to more sustainable patterns of energy generation and consumption. The programme looks at how climate change will affect the UK and the action we have already taken to prepare for this. A strong and effective partnership between the public and private sectors, working closely with local communities, is critical if we are to respond to this challenge.

Climate change will affect us all – and we can all be part of the solution. We have a responsibility to take action, but it is also in our own interests to do so. Measures to reduce greenhouse gas emissions can be good for the economy, for businesses and for our communities. Wasting less energy, better insulated homes, cleaner engines and a good public transport system all help to reduce emissions and improve our standard of living. We want to make sure that the UK makes the most of these opportunities – making a strong contribution to the global fight against climate change, while improving the quality of life we have now, and that of future generations.

A handwritten signature in black ink that reads "John Prescott". The signature is written in a cursive, flowing style.

John Prescott

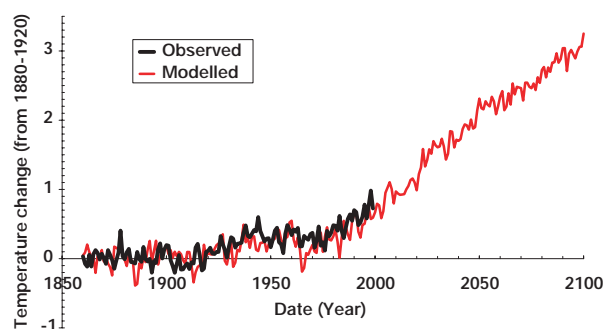
Introduction

- 1 Climate change is one of the most serious environmental problems the world faces. Floods, storms and droughts here in the UK and across the world show clearly how vulnerable we are to climate extremes and how high the human, environmental and economic costs can be. Some climate change is now inevitable, but the worst effects can be avoided if the world acts now to reduce greenhouse gas emissions.
- 2 The UK plays a leading role in the fight against climate change. The Government presses for a strong global response to the problem. It has reinforced its commitment to action by setting tough emission reduction goals at home and introducing a comprehensive and far-reaching package of measures to achieve them.
- 3 The UK's climate change programme sets out the Government's and the devolved administrations' approach to the challenge of climate change. It explains:
 - why the climate is changing and what its effects might be;
 - how the international community is working to ensure a global response, with agreement to the United Nations Framework Convention on Climate Change and the Kyoto Protocol;
 - the leading role the UK plays internationally and in Europe;
 - the UK's legally binding target under the Kyoto Protocol to reduce its greenhouse gas emissions to 12.5% below 1990 levels by 2008-2012 and its domestic goal of a 20% reduction in carbon dioxide emissions below 1990 levels by 2010;
 - the progress the UK has already made in cutting its greenhouse gas emissions;
 - new measures the Government and the devolved administrations are introducing to reduce emissions further and achieve the UK's climate change targets;
 - the important role of key stakeholders, such as business, local authorities, representative groups, trade unions and each of us as individuals;
- the more significant reductions in greenhouse gas emissions that will be needed beyond 2010, and how the Government is preparing the UK to make a major transformation towards a low carbon economy; and
- how climate change is expected to affect the UK, how we might need to adapt, and the action the Government and the devolved administrations have started to take to prepare for this.

Our climate is changing

- 4 Climate change is beginning to affect all aspects of our society and our environment. We have already seen a significant rise in global temperatures of about 0.6°C during the last century – the 1990s included seven of the ten warmest years on record and 1998 was the warmest year in a 140-year record. We have also seen average temperatures rise in the UK. In England, four of the five warmest years in a 340-year record have been in the 1990s and 1999 was the joint warmest year ever. Latest estimates predict that in the future, unless action is taken, the world could warm by about 3°C over the next 100 years.

Observed and predicted global temperature change



Source: The Met Office's Hadley Centre for Climate Protection and Research

- 5 The rate of climate change will bring more intense and unpredictable impacts that will be felt across the world. For example, sea level rise threatens the existence of some small island states and puts millions of people at risk from flooding. Temperature increases, drought and flooding will affect people's health and way of life, and cause the irreversible loss of many species of plants and animals. The economic, human and environmental costs are likely to be large and could create political tension within and between countries, exacerbating regional instability.



Bleached Coral. Source: Woodfall

A global response

- 6 No single country can tackle this. Climate change is a global problem and needs a concerted global response. The international community has put in place a framework for action through agreement to the United Nations Framework Convention on Climate Change and the Kyoto Protocol. Developed countries have signed up to legally binding emission reduction targets and are starting to implement programmes to achieve them. The UK's Kyoto target is to reduce its emissions to 12.5% below 1990 levels over the period 2008-2012.
- 7 But the targets agreed at Kyoto will only reduce developed country emissions by 5.2%. This is only a first, though important, step in the fight against climate change. In the longer term, global emissions may need to be cut by 60% or more.

The UK's response to climate change

- 8 The UK plays a leading role in the fight against climate change. Its scientists have been in the forefront of those attempting to understand climate change and predict its effects. UK Ministers played an influential role in the international negotiations that led to agreement to the Kyoto Protocol. And the UK is one of the few OECD countries which has reduced its emissions over the last decade. This programme is designed to ensure that the UK continues to lead by

example, by putting in place a strong programme of measures to achieve, and move beyond, its Kyoto target.

- 9 The Government and the devolved administrations believe that the UK will benefit from strong action to tackle climate change, and they have set a separate goal of reducing carbon dioxide emissions to 20% below 1990 levels by 2010. There will be opportunities from taking early action and starting the transition to the lower carbon economy that will be needed in the longer term. The goal is challenging, but that is its purpose. It is designed to give a clear signal of the direction in which policy is moving, allowing long term planning and stimulating innovative responses. The policies that can deliver this reduction are part of the Government's wider drive for a better quality of life, as well as economic and environmental modernisation.
- 10 The climate change programme builds on the solid foundation of action that has been taken over the last decade. The UK's greenhouse gas emissions fell to about 9%¹ below 1990 levels in 1998, and are projected to reach about 13.5% below by the end of 2000. This reflects the positive action that has been taken by Government in partnership with other key players, particularly in the business sector.
- 11 The most significant reductions to date have been delivered by changes in electricity generation following privatisation and market liberalisation and the introduction of abatement technology in the chemical industry. These gains cannot be repeated and, without further action, the UK's emissions are projected to stabilise and then increase again as a result of economic growth, traffic growth and the closure of the nuclear power stations. Beyond 2010, when the UK can expect to face more challenging reduction targets, emissions are projected to increase sharply.
- 12 This climate change programme has been developed in close consultation with key stakeholders. It is designed to ensure that the UK's emissions remain on a downward path and to prepare the UK for making bigger cuts in the future. It aims to:
- reflect the importance of tackling climate change;
 - take a balanced approach, with all sectors and all parts of the UK playing their part;

¹ Compared to the baseline used in the programme.

- safeguard, and where possible enhance, the UK's competitiveness, tackle social exclusion and reduce harm to health;
- focus on cost effective and flexible policy options which will work together to form an integrated package; and
- take a long term view, looking to targets beyond the Kyoto commitment period.

Working in partnership

- 13 Effective action to tackle climate change needs a partnership approach. The UK is already working closely with its partners in the European Union, both to strengthen its voice in the international debate and to deliver emission reductions cost effectively. At the national level, the programme reflects a partnership between the Government and the devolved administrations. And it builds on the commitment and action of businesses, local authorities, pressure groups, local communities and trade unions. The response of all these groups will be critical to the success of the programme. They can take direct action to reduce emissions and they can influence the way others respond by raising awareness of the need for action and providing practical advice on what people can do to make a difference.
- 14 We can all play our part in the fight against climate change, whether at home, at work or in making transport decisions. The snowball effect from lots of individuals doing something – however small a contribution they think that might be – should not be underestimated.
- 15 The responses to the consultation on the draft climate change programme showed that there is a strong consensus in the UK on the need for action and a real determination to achieve results. The programme aims to build on this support and to work more closely with key players. There is a momentum behind action on climate change which we can use to deliver change and maximise the benefits for the UK as a whole.

Emission reductions

- 16 A strategy to reduce greenhouse gas emissions forms the core of the programme. We estimate that the proposals in this programme could reduce the UK's greenhouse gas emissions to about 23% below 1990 levels in 2010. This is well beyond the Kyoto target and means that the UK will be ready to ratify the Kyoto Protocol when the Government, in discussion with its partners in the European Union, decides the time is right.
- 17 The quantified measures in this programme could reduce carbon dioxide emissions by about 19% below 1990 levels in 2010, representing significant progress towards the Government's domestic goal. But there is much more that could be done, and the programme is designed to stimulate a wider response from all parts of society. This could reduce emissions still further and deliver the 20% goal.

Policies to reduce emissions

- 18 Action taken in the UK throughout the 1990s has significantly reduced greenhouse gas emissions. The Government and the devolved administrations are continuing this positive approach with a substantial programme of integrated policies and measures to:
- improve business' use of energy, stimulate investment and cut costs;
 - the climate change levy package, which includes challenging improvement targets for energy intensive sectors through climate change agreements, and additional support for energy efficiency measures in the business sector;
 - a domestic emissions trading scheme, with Government support of £30 million in 2003-2004 to kick start the scheme by providing a financial incentive for companies to take on binding emission reduction targets;

- a new Carbon Trust, which will recycle £130 million of climate change levy receipts to accelerate the take up of cost effective, low carbon technologies and other measures by business and levy payers;
- exemption of good quality CHP (combined heat and power) and renewables from the climate change levy;
- energy labels, standards and other product-related measures designed to deliver 'market transformation' in the energy efficiency of lighting, appliances and other key traded goods; and
- Integrated Pollution Prevention and Control.
- stimulate new, more efficient sources of power generation;
 - electricity suppliers will be obliged to increase the proportion of electricity provided by renewable sources to 10% by 2010, subject to the cost to consumers being acceptable; and

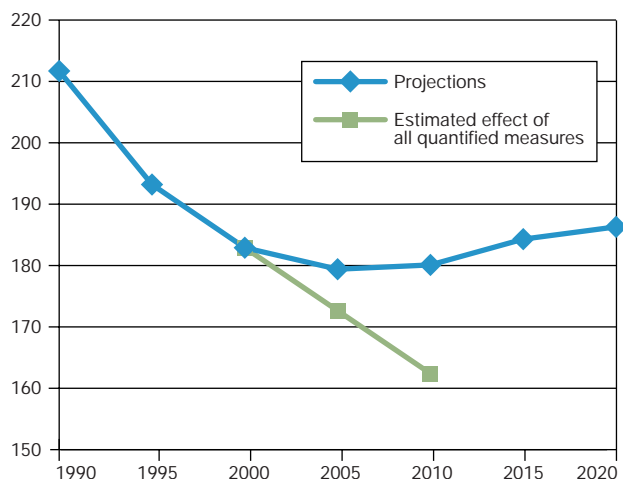


Source: Still Pictures

- a target to at least double the UK's CHP capacity by 2010.
- cut emissions from the transport sector;
 - European-level agreements with car manufacturers to improve the average fuel efficiency of new cars by at least 25% by 2008-2009, backed up by changes to vehicle excise duty and the reform of company car taxation; and

- the 10 Year Plan: £180 billion of investment and public spending on transport over the next ten years to cut congestion and reduce pollution.
- promote better energy efficiency in the domestic sector, saving householders money;
 - a new Energy Efficiency Commitment (successor to the Energy Efficiency Standards of Performance), through which electricity and gas suppliers will help their domestic customers, particularly the elderly and those on low incomes, to save energy and cut their fuel bills;
 - the New Home Energy Efficiency Scheme in England, similar schemes for Wales and Northern Ireland and, in Scotland, the Warm Deal Initiative;
 - an Affordable Warmth Programme, developed in conjunction with Transco, to facilitate the installation of efficient gas central heating systems and insulation in a million homes;
 - the promotion of new community heating and upgrading of existing systems; and
 - more efficient lighting, heating and appliances.
- improve the energy efficiency requirements of the Building Regulations;
- continue the fall in emissions from agriculture by:
 - better countryside management;
 - cuts in fertiliser use;
 - protection and enhancement of forests; and
 - better energy efficiency.
- ensure the public sector takes a leading role by:
 - new targets for improving energy management of public buildings;
 - energy efficiency targets for local authorities, schools and hospitals; and
 - developing green travel plans.

Projections of greenhouse gas emissions and estimated effect of all quantified measures, MtC



The longer term

- 19 Global emissions may need to be reduced by 60%-70% if we are to avoid dangerous climate change. Developed countries may need to make a deeper reduction, perhaps by over 90%. This will require a major transformation in the way we generate and use energy – essentially a move away from fossil fuels to a low carbon economy. We must therefore start to plan now for meeting our future energy needs in a world with tough emission reduction targets.
- 20 This programme of measures illustrates the UK's commitment to reducing the energy intensity of its economy and breaking the link between economic development and higher carbon dioxide emissions.
- 21 The programme is designed to lay the foundation for the more fundamental changes that will be needed in the years to come. It puts in place policies which give clear signals about the changes that will be needed over the coming decades, and which offer incentives and help to adapt to this changing environment. But the Government does not have all the answers. It therefore wants to instigate a national debate on how the UK might make the transformation to a low carbon economy, drawing on the advice of experts to look at technological options for the future and the scope for significantly changing patterns of demand and consumer behaviour. As part of this process, the
- Government plans to review the options for longer term energy choices, considering the scale of emission reductions that might be needed in view of current projections for energy use and the scope and cost of low carbon or energy efficiency options that may exist to bridge the gap.

Adapting to the effects of climate change

- 22 While the UK is unlikely to experience some of the more dramatic impacts of climate change that are forecast elsewhere in the world, significant changes are still expected, to which we will need to adapt. Average temperatures could rise by a further 3°C by 2100. Winters and autumns are expected to become wetter, and spring and summer rainfall patterns to change, so that the north west of England will be wetter and the south east will be drier. There is emerging evidence that winter rainfall is becoming heavier. Gradual changes in climate and sea level will also be accompanied by changes in the frequency of extreme events.
- 23 The prospect of a warmer climate is superficially attractive and will produce opportunities. But the floods and storms in autumn 2000 have vividly illustrated the costs that a changing and more unpredictable climate will bring to our economy, to our environment and countryside, to people's homes and health and to local communities. These costs will far outweigh the benefits. The Government has announced that it will enhance its prediction and assessment of the impacts of climate change to help target adaptation responses effectively.
- 24 The programme looks at the anticipated impacts of climate change on the UK and considers how central and local government, businesses and other organisations might begin to adapt. It provides an initial view of adaptation priorities for the UK and outlines the action the Government has started to take to prepare for climate change. The Government is considering what further steps should be taken to ensure that the country is better able to cope with extreme weather events, such as the severe floods we experienced in autumn 2000. The devolved administrations are also taking action to address the effects of climate change.

Next steps

- 25 International negotiations on climate change have continued since Kyoto. The 6th Conference of the Parties in The Hague in November 2000 is expected to resolve many of the outstanding issues and clear the way for ratification and entry into force of the Kyoto Protocol.
- 26 The Government is confident that this programme is an effective framework of action to reduce the UK's emissions and can form the basis of UK ratification of the Kyoto Protocol. But it is inevitably a snapshot in time and will change and evolve over the coming decade. The Government will monitor the programme carefully to ensure that it receives early notice of any implementation problems or any significant variation from projected emission trends, and can respond appropriately. It will also work with stakeholders to identify areas in which the programme can be developed and improved, particularly to put the UK on a clearer path towards a low carbon economy. There will be a formal review of the programme in 2004.

1

The UK's strategy



What is climate change?

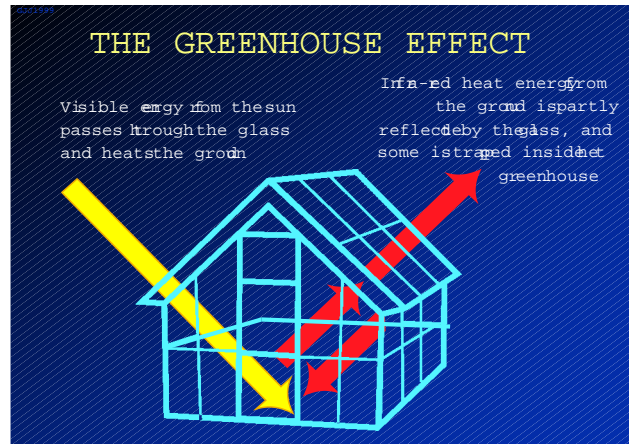
- Man-made greenhouse gas emissions are having an effect on the earth's climate.
- Globally, seven of the ten warmest years on record have been in the 1990s, with 1998 being the warmest year on record.
- The climate could warm by about 3°C over the next 100 years. The costs associated with this could be huge.
- Climate change is likely to have far-reaching effects on the world's environment, economy and society.

Introduction

- 1 The scientific evidence is mounting that man-made greenhouse gas emissions are having a noticeable effect on the earth's climate. Concern about the serious impacts that climate change could have is driving the UK's response. This chapter explains the causes of climate change and looks at the impacts that it might have on the world. Details about how the UK may be affected and about what we can do to adapt to a changing climate can be found in section 3.

The greenhouse effect

- 2 A balance between energy coming in from the sun in the form of visible radiation (sunlight) and energy constantly being emitted from the earth to space determines the temperature of the earth. The energy coming in from the sun can pass through the atmosphere almost unchanged and warm the earth, but the infrared radiation emanating from the earth's surface is partly absorbed by some gases in the atmosphere and some of it is re-emitted downwards. This further warms the surface of the earth and the lower atmosphere. The gases that do this naturally are mainly water vapour and carbon dioxide. An analogy is made with the effect of a greenhouse, which allows sunshine to penetrate the glass that in turn keeps the heat in, hence the greenhouse effect.



Source: The Met Office's Hadley Centre for Climate Prediction and Research

- 3 Without this natural greenhouse effect, the earth would be over 30°C cooler and would be too cold to be habitable. But as greenhouse gas concentrations rise well above their natural levels, the additional warming that will take place could threaten the future sustainability of the planet.
- 4 Very small particles, known as aerosols, also affect our climate. They are formed by emissions from sources such as power stations and transport. They scatter sunlight, which would otherwise reach the surface of the earth, back out to space and therefore have a cooling effect on the climate. Their influence can also be important in heavily polluted regions. But, unlike greenhouse gases, their lifetimes are short and they do not accumulate in the atmosphere. Measures are being taken in Western Europe and North America to reduce sulphur emissions, mainly to tackle acid rain, and this will cut the level of aerosols.

Greenhouse gases

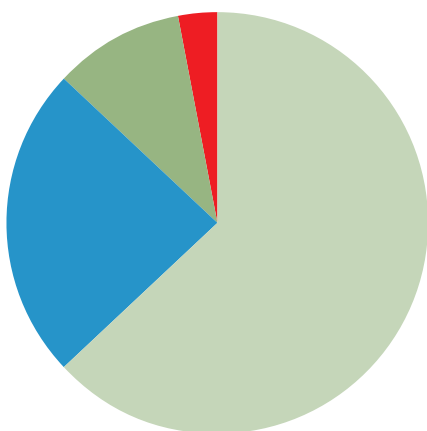
- 5 The most important greenhouse gases are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. It is these gases that are covered by the Kyoto Protocol and this programme. They do not cover chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) which are powerful greenhouse gases but are being progressively phased out under the Montreal Protocol as they also damage the stratospheric ozone layer.
- 6 Ground level ozone, a greenhouse gas that is generated rather than emitted into the atmosphere, can have a detrimental effect on human health and the

environment. Many volatile organic compounds (VOCs) which are greenhouse gases are also ground level ozone precursors. These VOCs are controlled under the UNECE Transboundary Pollution Convention and European legislation. But the other main air pollutants that can affect human health and the environment are not greenhouse gases. The Government's and the devolved administrations' policy to reduce the levels of pollutants of most concern is set out in *the Air Quality Strategy for England, Scotland, Wales and Northern Ireland*.² Many measures to reduce air pollution will also help to reduce emissions of greenhouse gases.

- 7 Each greenhouse gas has a different capacity to cause global warming, depending on its radiative properties, its molecular weight and its lifetime in the atmosphere. Its so-called global warming potential (GWP) encapsulates these. The GWP is defined as the warming influence over a set time period of a gas relative to that of carbon dioxide. A 100-year time horizon is used in the Kyoto Protocol. A complete list of greenhouse gases covered by the Protocol and their GWPs can be found in annex H.
- 8 When the warming effect of current greenhouse gas emissions over the next 100 years is calculated, the graph below shows that carbon dioxide will be responsible for about two thirds of the expected future warming.

Relative warming effect of current emissions of greenhouse gases over next 100 years

- Carbon dioxide 63%
- Methane 24%
- Nitrous oxide 10%
- Other 3%

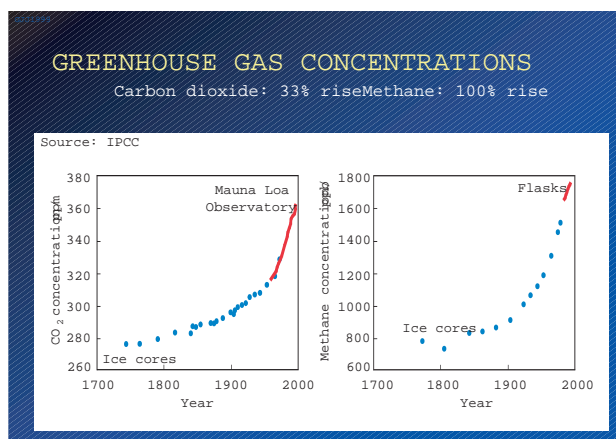


Source: The Met Office's Hadley Centre for Climate Prediction and Research

² CM 4548, January 2000, The Stationery Office.

Historic trends

- 9 The global temperature record indicates that the earth has warmed by about 0.6°C during the last century. Globally, seven of the ten warmest years on record have been in the 1990s and 1998 was the warmest year in a 140-year record.
- 10 The extent to which changes in temperature over the last 100 years are due to human activities has been studied by looking at patterns of change across the surface of the earth, and vertically through the depth of the atmosphere. Climate models predict a characteristic 'fingerprint' pattern of change in response to increasing greenhouse gas concentrations. Statistical analysis shows that this fingerprint can be detected in observed temperature changes, indicating that most of the change which has occurred can be attributed to human activities. The individual contributions of natural effects, for example, variations in the sun's output and volcanoes, have also been studied. They were found to be unable to account for the observed warming. Only when greenhouse gases emitted by human activities are invoked can the observed warming be explained. Borehole measurements worldwide imply a global surface warming of around 1°C during the last 500 years, with about half of this warming occurring in the 20th Century.

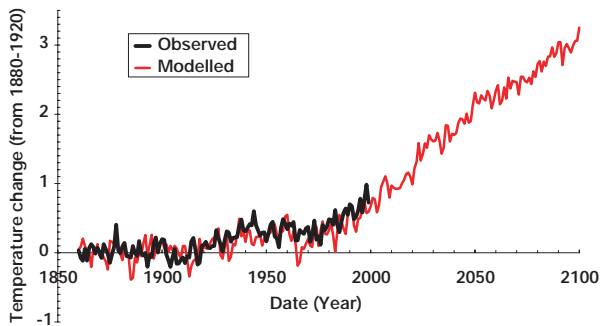


This graph shows how concentrations of most greenhouse gases have been rising over the past few hundred years. On the left hand side, instrumental measurements made since the mid-1950s in Hawaii (red line) have shown a great increase in carbon dioxide. But even before that, concentrations were rising. Evidence from bubbles in ice cores (blue dots) show that the pre-industrial level of carbon dioxide in the atmosphere was about 270 parts per million. It has since risen by about a third to around 370 parts per million. Methane concentrations have also grown rapidly over the last 200 years. Both ice core and instrumental measurements (air collected in flasks) have shown well over a doubling of pre-industrial methane concentrations in the atmosphere. Source: IPCC

How the world's climate may change in the future

- 11 Climate change can be simulated by a computer model – a mathematical description of the earth's climate system. The graph below shows the projected global temperature change from the model used at the Met Office's Hadley Centre. The observed rise in global mean surface temperature from 1860 to 1999 is shown in black. The Hadley Centre's climate model, when driven with all natural and man-made factors over the same period, simulates the observations well (in red). The model prediction is continued with a plausible future scenario of emissions and shows the continuing global temperature rise over the rest of this century.

Observed and predicted global temperature change



Source: The Met Office's Hadley Centre for Climate Protection and Research

Unpredictable changes

- 12 We do not fully understand all the changes that global warming could bring. The possibility of climate 'surprises' can also not be ruled out. For instance, it has been suggested that warming could trigger the collapse of the West Antarctic Ice Sheet and result in a global sea level rise of five metres. It has also been suggested that the Gulf Stream could be affected, cooling North-Western Europe. The probability of such events is considered to be low at the moment but they are hard to quantify and the risks need to be better understood in view of the importance of the Gulf Stream to the UK's climate and evidence of changes to its behaviour in the past. The Hadley Centre has published research that shows that global warming does slow the North Atlantic circulation but not sufficiently to cool Western Europe, which continues to warm over the next 100 years. In a recent risk assessment of the stability of the West Antarctic Ice Sheet, it was concluded that disintegration seems unlikely in the next two centuries at least.

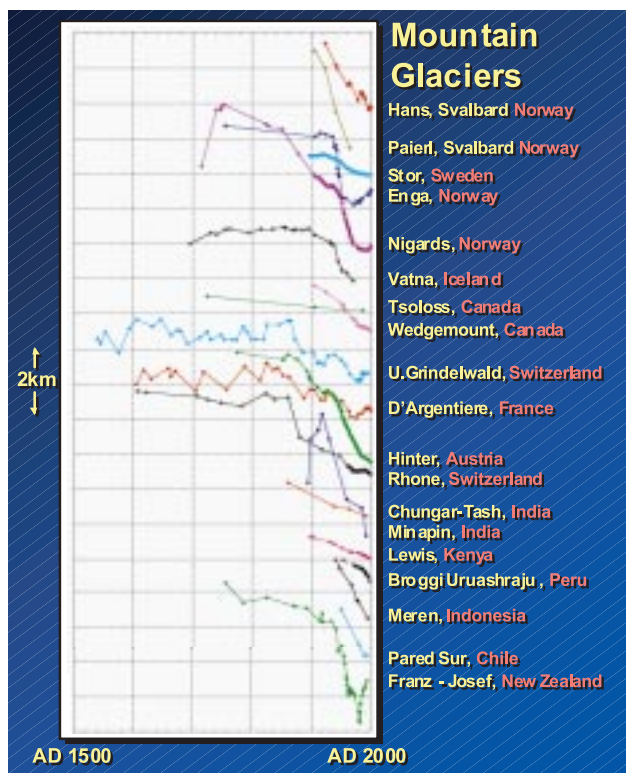
- 13 There has been a significant response to the 20th Century global warming in the cryosphere. Land based glaciers have receded in almost every area of the globe and the rate of recession is increasing, particularly in tropical mountain areas. Throughout the latter half of the last century, there was a steady decrease in the extent of Arctic sea ice, particularly in summer, which now shows a decrease of 15% compared to the first half of the century. There is also now evidence, taken from submarine measurements, for a decrease in the thickness of sea ice. This is consistent with the increased temperature in high northern latitudes but it is not certain whether this is due to global warming or natural variability. Although the melting of sea ice does not contribute to sea level rise, it is clear that sea level has risen. The Intergovernmental Panel on Climate Change (IPCC) estimates that sea level is rising by 1.5 mm per year as a result of thermal expansion of the oceans and the melting of land-based glaciers and ice caps.



Photographs of the Vatna Glacier in Iceland taken in 1931 and in 1999 show how much it has receded.



Sources: Royal Geographical Society and A J Russell, Keele University.



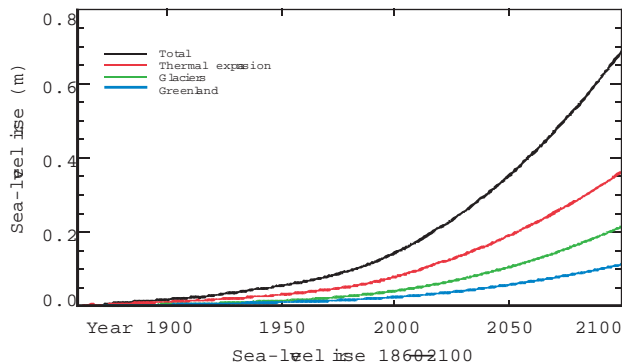
Glaciers in many parts of the world have been receding over the course of the last century. Source: IPCC

How the world may be affected

14 However effective policies to reduce emissions of greenhouse gases are, the world will now experience a significant degree of climate change. This is likely to have far-reaching effects on all aspects of the world's environment, economy and society. The specific effects of climate change will vary greatly from place to place. For example, agricultural production in some countries is expected to benefit through increased rainfall and longer growing seasons. But there is a high risk of serious threats to populations throughout the world, particularly the poor. Sea level rise will threaten the existence of some small island states and put millions of people at risk. Temperature increases and changes in rainfall will affect people's health and livelihoods, as diseases such as malaria spread to previously unaffected areas, and crops fail under the changing conditions. Water resources for drinking and irrigation will be affected by reduced rainfall or as water in coastal zones suffers from salination as sea levels rise. People's lives will be put at risk from an increased frequency of droughts and flooding, a phenomenon which will also increase the burden of poverty in developing countries.

³ This does not include uncertain Antarctic contribution.

Sea-level rise and its components

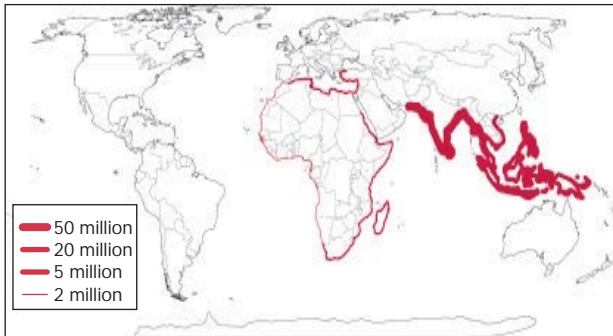


Sea level will rise as the oceans become warmer and expand, and as extra water flows in from melting glaciers and from the Greenland Ice Sheet. Increased snowfall over Antarctica may offset a small amount of this rise (not shown). Source: The Met Office's Hadley Centre for Climate Prediction and Research

- 15 These global impacts cannot be ignored. The social, economic and political consequences of climate change could reach far beyond any local impacts. Many major cities are located in low-lying areas, and could face profound economic consequences as sea level rise makes them increasingly prone to flooding. In a globalised economy, these impacts will not be confined to individual countries.
- 16 There is already international concern about the potential for existing water stress to lead to regional political tension. The impacts of climate change on water resources are only likely to increase these risks. Where the impacts of climate change result in poorer health, increased poverty and increased competition for fragile natural resources, the consequences for social and political stability may be equally serious. While climate change may not be the direct cause, its impacts could add to existing stresses in such a way as to lead to instability with global implications. The poorest people, whether in urban or rural areas, will have fewer resources to enable them to adapt to such major changes and are likely to suffer the most. The stresses caused by climate change could also trigger migration within or across borders.
- 17 Initial work, in association with the Hadley Centre, has attempted to assess the impacts on five areas (coasts, agriculture, water, natural vegetation and human health) and indicates that:
- sea level is expected to rise by over 40 centimetres by the 2080s³ because of expansion of the oceans as temperatures rise and melting of land ice. This could cause sweeping changes to coastal

communities and environments and the dislocation of millions of people. 60% of the additional 80 million people projected to be at risk of flooding are expected to be in Southern Asia (Pakistan, India, Sri Lanka, Bangladesh and Myanmar) and 20% in South East Asia (from Thailand to Vietnam, including Indonesia and the Philippines);

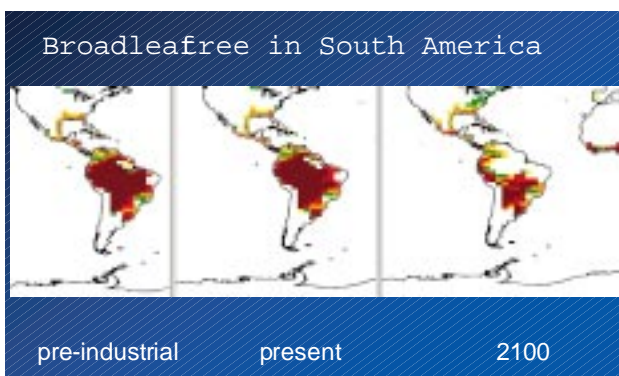
Annual number of people flooded: change by the 2080s under unmitigated emissions



Source: The Met Office's Hadley Centre for Climate Protection and Research

- by the 2070s, large parts of northern Brazil and central southern Africa could lose their tropical forests because of reduced rainfall and increased temperatures. If this happens, global vegetation which currently absorbs carbon dioxide at the rate of some 2-3 gigatonnes⁴ of carbon (GtC) per year will become a carbon source generating about 2 GtC per year by the 2070s and adding to further carbon dioxide build up in the atmosphere. Current global man-made emissions are about 6-7 GtC per year;

Climate-driven Amazon dieback



Source: ITE, Edinburgh

- climate change could affect global food supplies. Africa is expected to experience significant reductions in cereal yields, as are the Middle East and India;

⁴ One gigatonne = 1,000,000,000 tonnes.

- an additional three billion people could suffer increased water stress. Northern Africa, the Middle East and the Indian subcontinent will be the worst affected; and
- climate change could expose an additional 290 million people to the risk of malaria – with China and Central Asia likely to see the largest increase in exposure.

How the UK may be affected

- 18 Many areas of the UK's economy and society will also be affected. This is covered in more detail in section 3.

- The world is responding to the challenge of climate change.
- The UK will be one of the few OECD countries to meet the Rio target.
- Kyoto set challenging targets for developed countries and began a longer term process to tackle the threat of climate change.
- The Kyoto mechanisms give countries flexibility to help them meet their targets.
- Developing countries must be a part of any long term global response.
- Much deeper cuts in greenhouse gas emissions will be needed during the rest of this century.

International response to climate change

- 1 In response to increasing concerns about climate change, the United Nations Framework Convention on Climate Change was agreed at the Earth Summit in Rio de Janeiro in 1992. Around 184 countries have now ratified it. Under the Convention, all developed countries agreed to aim to return their greenhouse gas emissions to 1990 levels by 2000. The UK will be one of a small number of OECD countries who will meet this target.⁵
- 2 It was quickly recognised that the Convention commitments could only be a first step in the international response to climate change. Climate prediction models show that deeper cuts in emissions will be needed to prevent serious interference with the climate. The Kyoto Protocol, agreed in December 1997, was designed to address this issue. Developed countries agreed to targets that will reduce their overall emissions of a basket of six greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride) by 5.2% below 1990 levels over the period 2008-2012. For the first time these targets will be legally binding, and differentiated between Parties.

For example, the European Community and its member states agreed to -8%, the United States to -7%, Japan to -6%, Russia and the Ukraine to return to 1990 levels, and Australia was allowed an 8% increase.

- 3 Under the Kyoto Protocol, the European Community and its member states can agree to meet their commitments jointly. This 'bubble' arrangement allows the Community's target to be redistributed between member states to reflect their national circumstances, requirements for economic growth, and the scope for further emission reductions. In June 1998, under the UK's Presidency, environment ministers agreed how the target should be shared out. The UK agreed to reduce its emissions by 12.5%. This will now become its legally binding target under the Kyoto Protocol.

Member states' targets

	Kyoto commitment (% change in 2008-2012 from a 1990 baseline)
Austria	-13
Belgium	-7.5
Denmark	-21
Finland	0
France	0
Germany	-21
Greece	+25
Ireland	+13
Italy	-6.5
Luxembourg	-28
Netherlands	-6
Portugal	+27
Spain	+15
Sweden	+4
UK	-12.5

- 4 Most developed countries believe that the targets they agreed at Kyoto are demanding. In many cases their emissions are forecast to be significantly higher than 1990 levels in 2010 and the programmes they have in place are not yet delivering the significant emission reductions that will be needed. This view has been confirmed by some reviews of progress which have highlighted the gap between current plans and countries' Kyoto targets.⁶ More action will be needed.

⁵ The UK's greenhouse gas emissions are projected to be about 13.5% below 1990 levels in 2000.

⁶ *The European Union and Global Climate Change*, prepared for the Pew Centre on Global Climate Change, June 2000. *EU Policies and Measures to Reduce Greenhouse Gas Emissions: Towards a European Climate Change Programme*, European Commission, March 2000.

While the content and balance of their climate change programmes is for individual countries to decide, the action proposed for the UK is likely to be mirrored in other countries in efforts to improve energy efficiency, stimulate development of renewable energy, reduce emissions from transport, and develop lower carbon technologies. For example, eight European countries, including seven member states, have introduced carbon or energy taxes and four others, including three member states, are developing schemes.

Kyoto mechanisms

- 5 The Kyoto Protocol established three international mechanisms, known as the Kyoto mechanisms. These are joint implementation, the clean development mechanism and emissions trading. The Kyoto mechanisms allow developed countries to buy emission reductions that have taken place in other countries as a way of meeting part of their Kyoto targets, if to do so is cheaper or easier than reducing emissions at home. The detailed rules for the operation of these mechanisms are still under discussion internationally. Agreement is expected to be reached at the Sixth Conference of the Parties (COP 6) to the UN Framework Convention on Climate Change in November 2000.
- 6 Joint implementation (JI) and the clean development mechanism (CDM) are project-based mechanisms. They allow countries that adopted a target at Kyoto to meet part of that target through projects to reduce emissions in developing countries (CDM) or other developed countries (JI). Donor countries or firms would provide investment and expertise in return for an emissions reduction credit that could be used towards helping them to meet their Kyoto target.
- 7 Emissions trading is perhaps the most far-reaching of the mechanisms. It would allow countries that have achieved emission reductions over and above those required by their Kyoto target to sell the excess to countries finding it more difficult or expensive to meet their commitments. An international trading system for carbon could emerge, with carbon allowances sold on the market just like any other commodity.
- 8 Under the Kyoto Protocol, the reductions generated through the Kyoto mechanisms must be supplemental to action taken to reduce emissions at home. To meet

this requirement, the European Union has proposed a 'concrete ceiling' to restrict the use of the mechanisms to meet Parties' Kyoto targets. No agreement has yet been reached internationally on the design of such a ceiling.

- 9 Many developed countries are proposing to allow their businesses to participate in the Kyoto mechanisms. Individual firms would be given targets to reduce their emissions, and would be allowed to use the Kyoto mechanisms to help achieve these targets. The UK Government is working with business representatives to begin a domestic emissions trading scheme to ensure that UK business is well placed as the international carbon trading market emerges (see section 2, chapter 4). And, to meet increasing interest from UK companies in JI and CDM, the Government intends to launch the Kyoto Mechanisms Office by April 2001 to offer advice on these new opportunities.⁷

Carbon sinks

- 10 The Kyoto Protocol gives a limited allowance for action to offset emissions through absorption of carbon dioxide by forests – or carbon sinks. Countries will be able to use the uptake of carbon by afforestation and reforestation (limited to activities since 1990), less any deforestation losses, to help meet their Kyoto targets. A decision on the definitions needed to implement this will be on the agenda at COP 6 in November 2000, together with a decision on including additional sinks activities. The UK believes that reduction of emissions should be the principal policy response, given the vulnerability and uncertainties associated with sinks processes. Further details are given in annex G.

Developing country participation

- 11 Developed countries are agreed that they should take the lead in tackling climate change. But developing countries already account for about 40% of global carbon dioxide emissions from fossil fuels and their emissions may, by 2010, exceed those of developed countries, although per capita emissions in most developing countries are still relatively low. Developing countries therefore must be a part of any long term

⁷ In the meantime, the Government is running a website giving information about the mechanisms: www.environment.detr.gov.uk/climateoffice/index.htm

global response. The developed world needs to demonstrate to developing countries that it is possible to break the link between economic growth and rising emissions, thereby helping them to achieve sustainable development.

- 12 Many developing countries, including India and China, are already taking action to, for example, improve energy efficiency and limit the growth in their emissions. The Government is encouraging them to pursue further 'win-win' policies. But most developing countries argue that they should not take on legally binding targets until developed countries have demonstrated that they are taking serious action to cut their emissions.

China is making great efforts to control all forms of pollution and increase efficiency, although it is not bound by any formal agreement to specific targets for the reduction of greenhouse gas emissions. These efforts are limiting China's emissions, which can clearly be seen from China's energy statistics.

Between 1978-1997, China's GDP grew at an annual rate of 9.8%, while average annual energy consumption increased by only 4.1%. This was largely due to improved energy conservation practices. From 1981 to 1996, 23 energy conservation regulations, and more than 600 standards covering 14 sectors were formulated. An Energy Conservation Law was introduced in 1998 to stimulate energy conservation activities throughout society and some local authorities, including those in Shanghai, are developing the appropriate regulations.

Although energy conservation is yielding results (between 1980-1995, the cumulative reduction of carbon dioxide emissions was 360 MtC), continuing economic growth means that total energy consumption is set to grow. China currently depends on coal for over 70% of its energy requirements. The Chinese government has, however, declared its intention to reduce reliance on this form of energy over the next 50 years, and has introduced a set of new initiatives to facilitate the expansion of the natural gas sector which currently accounts for only 2% of China's energy use. An amendment to the 1987 Air Pollution Control Law promises (as yet unspecified) incentives for the production and use

of clean and renewable energy (currently providing 6% of energy requirements) with the aim that 10% of China's energy requirements should come from this source by 2010.

The UK Government is working together with China in this important area, in particular through the **Climate Change Challenge Fund**. Examples of this include:

- the Shanghai Research Institute for Building Sciences (SRIBS) is one of the leading technical centres for construction in China, and is an arm of the Shanghai Municipality Construction Commission. In 1998, SRIBS signed a Memorandum of Understanding with a British company, the Building Research Establishment, to foster cooperation in improving levels of energy efficiency in buildings in Shanghai. In 2000, funding from the Climate Change Challenge Fund will make it possible for the MoU to bear fruit. Work will now begin on a major initiative to improve energy efficiency in buildings in Shanghai, building on the UK experience. Opportunities will be identified for private companies to supply the appropriate products, and research will be carried out to identify the potential for emissions trading;
- a major new project is underway to facilitate the generation of landfill gas in China. County Environmental Services Ltd, a Local Authority Waste Disposal Company owned by Cornwall County Council, will work in partnership with Chinese waste management specialists on the project. It will involve training and capacity building, with assistance on design and operation of landfill sites for the production and collection of landfill gas;
- the Pig Slurry Anaerobic Digestion project in Hainan, and the Rice Husk to Energy project in Wuchang. A UK environmental consultancy, Bronzeoak, has been working closely with the Chinese Ministry of Agriculture on feasibility studies for commercial bio-generation in these regions, with the long term aim of replicating projects across China.

Adapting to climate change

- 13 Developed countries need to help developing countries prepare for climate change. Individual countries need a greater understanding of the specific impacts they are likely to face. Poorer countries in particular will need help to assess their vulnerability to future climate change and to incorporate these assessments into their strategies for sustainable development and poverty reduction. Continuing assistance will be required from the UK and the rest of the developed world to help developing countries produce and implement these strategies.

Ongoing international process

- 14 International negotiations have continued since Kyoto. The Kyoto Protocol established a legal framework for delivering emission reductions. But some of the detailed questions, including those mentioned earlier in this chapter, still need to be resolved. An effective compliance procedure also needs to be drawn up to ensure that countries meet their targets. At the Fourth Conference of the Parties (COP 4) in Buenos Aires in 1998, Ministers agreed to a comprehensive two year work programme (the Buenos Aires Plan of Action) which set COP 6 in November 2000 as the deadline for decisions on most key issues. COP 5 in Bonn in November 1999 reviewed progress to date and agreed to intensify the negotiating process so that the COP 6 deadline can be met.
- 15 The Kyoto Protocol will enter into force when it has been ratified by 55 countries, including developed countries accounting for at least 55% of developed countries' carbon dioxide emissions in 1990. Most developed countries will want more certainty on some of the key outstanding issues before ratifying. In particular, countries are likely to want to know how the Kyoto mechanisms will operate, and the consequences of non-compliance with their Kyoto targets. Negotiations on these and other issues are due to be resolved at COP 6, clearing the way for ratification and entry into force.
- 16 There is much speculation about whether the United States of America will ratify the Kyoto Protocol. Technically the Protocol can enter into force without the USA. But the USA is the world's biggest emitter of

greenhouse gases, and it is therefore clearly desirable for the USA to be part of any international response to climate change. There are now real signs of a changing mood in the USA. There is much less dispute about the underlying science of climate change, and business is increasingly recognising the need to take action and to see the commercial opportunities.

- 17 The Kyoto Protocol's entry into force will not be the end of the story – it will merely represent the end of the first phase of negotiations. The Protocol clearly envisages an ongoing international process aimed at delivering the much bigger reductions in emissions that will be needed beyond the 2008-2012 commitment period (see below). The Protocol states that discussions on future targets must start by 2005 at the latest. The UK will continue to play a leading role internationally in trying to secure progress, both by insisting on the need for further emission reductions and by setting an example through its own climate change programme.

International scientific assessment

- 18 The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 to assess the science of climate change. Sponsored by the World Meteorological Organisation and the United Nations Environment Programme, it organises the preparation of detailed scientific assessments covering all scientific, technical and socio-economic aspects of climate change. Reports are prepared by scientists from around the world and agreed at intergovernmental meetings of the IPCC.
- 19 The IPCC has provided two major assessments of climate change in 1990 and 1995, covering the science, impacts and response measures. It has also prepared the internationally accepted methodologies that countries use to estimate emissions, and special reports on specific issues. In 1999, for example, it published a review of the impacts of aviation on the atmosphere, and reports on *Land Use, Land Use Change and Forestry*, *Emission Scenarios*, and *Technology Transfer* were all published in 2000. Its next major assessment, the Third Assessment Report on climate change, is currently in preparation and will be published in 2001.

20 The UK plays a significant role in the IPCC. Sir John Houghton co-chairs Working Group I on the science of climate change, and the Government funds a technical support unit which supports him in this, as well as providing expenses for UK lead authors involved in the preparation of the Third Assessment Report and other IPCC reports. The UK also provided the overall chair for the IPCC's work on Good Practices. The United Nations Framework Convention on Climate Change has recommended countries use this guidance in preparing their national greenhouse gas inventories to help ensure completeness, consistency, comparability, transparency and accuracy.

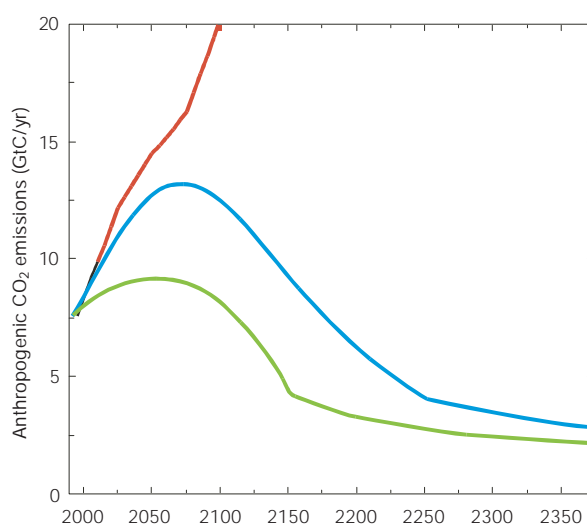
Longer term reductions

21 The Kyoto Protocol should deliver real reductions in emissions from developed countries. But it is only the start of a long term process. The IPCC's Second Assessment Report confirmed that it will be necessary to stabilise greenhouse gas concentrations if dangerous climate change is to be avoided. However, there is as yet no consensus as to what constitutes dangerous climate change or at what level greenhouse gas concentrations should be stabilised. The European Union has indicated that a level lower than 550 parts per million (ppm) of carbon dioxide, which is about twice the pre-industrial concentration, should guide global limitation and reduction efforts. The Royal Commission on Environmental Pollution have also recommended that concentrations of 550 ppm should not be exceeded.⁸ Current global concentrations are about 370 ppm.

22 A report from the Met Office's Hadley Centre which assessed the impact of stabilisation of carbon dioxide at 550 ppm and 750 ppm indicates that, whilst significant impacts would be incurred at 550 ppm, the rate of temperature increase over this century would be approximately half what might be expected if no action was taken. Some severe impacts, particularly the significant loss of tropical rain forests in the Amazon, will be greatly reduced if concentrations were limited to this level. Viewed broadly, the aim of the Kyoto Protocol is to set the preconditions for making such stabilisation achievable. Firstly by setting targets in successive commitment periods that give the incentive for technological and behavioural change. And secondly, by providing the international policy

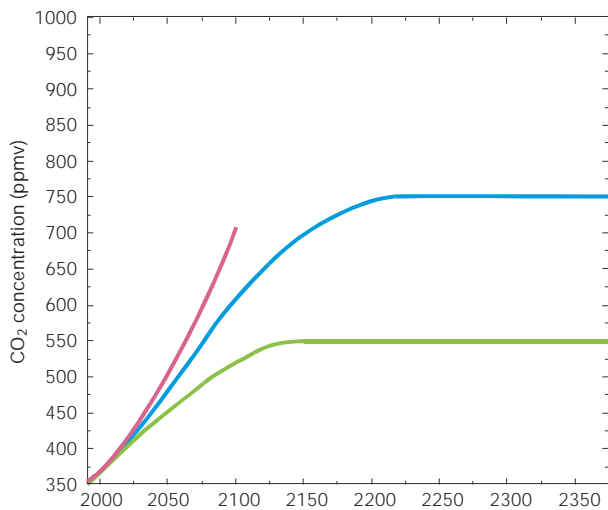
framework which can deliver that change through the provision for emissions trading and the other Kyoto mechanisms that maximise access to emerging technologies.

23 The IPCC has not identified any specific target for future reductions as this will be in part a political decision. But it has assessed the emission reductions that could be needed if atmospheric concentrations were to be stabilised at various levels, including 550 ppm. There is no one path for making the emission reductions that would be needed to reach a particular stabilisation goal. However, the IPCC has shown clearly that for concentrations to be stabilised at about 550 ppm, for example, global emissions would need to be restrained to a small increase on present levels during this century and would then need to be reduced by some 60% or even 70% during the 22nd Century. The higher emissions are in this century the more difficult it could be to achieve stabilisation at a level which avoids significant damage, and the faster emissions would have to come down to achieve stabilisation.



The profile of future anthropogenic emissions of carbon dioxide for the business as usual case (red), and those that would lead to stabilisation of carbon dioxide in the atmosphere at 750 ppm (blue) and 550 ppm (green). Note that there is a wide variety of emission profiles leading to stabilisation. The latter two are those presented by the IPCC in their 1995 report.

⁸ Energy – *The Changing Climate*, Royal Commission on Environmental Pollution, June 2000.



The carbon dioxide concentrations resulting from emissions shown above, stabilising at 750 ppm (blue) and 550 ppm (green), compared with those from business as usual (red). *Source: IPCC*

- 24 The challenge of meeting this level of reduction cannot be overstated. Achieving it would almost certainly require a major shift away from fossil fuels. Restraining emission levels to a small increase on present levels during this century would require major cuts in emissions from developed countries, as well as action by developing countries to reduce the growth in their emissions. But developing countries rightly expect economic growth, which will increase their emissions if they follow similar patterns of industrialisation to developed countries. To accommodate this, developed country emissions may have to be reduced by more than the 60-70% that will be required globally by 2010 – reductions of as much as 95% may ultimately be needed. For comparison, the targets agreed in the Kyoto Protocol will only cut developed country emissions by 5.2% averaged over a five year period.
- 25 The more action that can be taken early to reduce greenhouse gas emissions, the lower the level of stabilisation that could be achieved. This in turn will reduce the impacts of climate change and the costs of adaptation. It will also promote the development of innovative and radical solutions.

- The UK is playing a leading role in the fight against climate change.
- The Government's and the devolved administrations' priority is to deliver the UK's legally binding Kyoto target, but there are real benefits to be gained from doing more and moving towards the domestic goal.
- The climate change programme will act as the framework for a comprehensive, long term strategy for cutting greenhouse gas emissions across the whole of the UK.
- For the first time, the programme looks at how the UK might adapt to the impacts of climate change.

Introduction

- 1 The UK has played a leading role in global efforts to tackle climate change and will continue to do so. UK scientists have been at the forefront in the development of the sophisticated models that assess the effects of future climate change and underpin the policy debate. UK Ministers were influential in the international negotiations that led to agreement of the Kyoto Protocol. And the UK has been developing its domestic programme, in partnership with others, for a number of years. The challenge for this programme is to ensure that we meet the UK's international target from Kyoto and, through the domestic goal of a 20% reduction in carbon dioxide emissions by 2010, ensure that we are well placed to make the more significant cuts in emissions that will be needed in the future.

The UK's international role

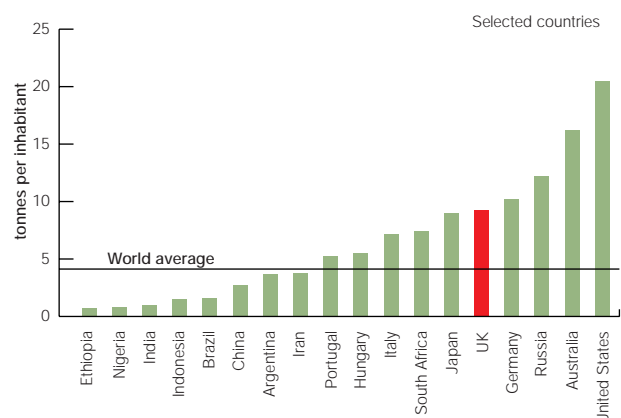
- 2 The Government has argued strongly that the world must act now to avoid the worst effects of climate change and it was instrumental in brokering the agreement at Kyoto. It continues to work with its European Union partners to push the negotiations forward and to keep the process on track for COP 6 and beyond. The Government is also engaged in regular dialogue with other key players, including the USA, Canada, India and China, to share ideas, discuss

concerns and seek to identify solutions. Any global process inevitably creates tensions, but the Government is working hard behind the scenes to encourage constructive engagement by all countries.

Why UK emissions matter

- 3 In 1995, the UK was responsible for about 2% of the world's carbon dioxide emissions, with emissions of just under 10 tonnes of carbon dioxide per capita (about twice the world average). By 2010, on current projections, it is expected that the UK's share of world emissions will have fallen to about 1.6% and fallen slightly in absolute terms.
- 4 Although the UK's emissions represent only a small proportion of the world's total greenhouse gas emissions, as a developed country its per capita emissions are much higher than the global average. The Government and the devolved administrations believe that the UK must take a leading role in the fight against climate change. The burden of responsibility at the moment is on the developed world to lead by example by cutting its own emissions, and to develop the technologies that will help developing countries achieve sustainable development. The UK, as one of the G8 countries, must play a full part in the process. Action to cut emissions at home will also bring many wider environmental, social and economic benefits for the UK.

National emissions of carbon dioxide per head for selected countries: 1995 (emissions from fossil fuel burning and cement manufacture)



Source: World Resources Institute

Delivering the UK's climate change targets

- 5 The UK's first climate change programme was published in January 1994, and has been kept under review since then and updated regularly. The programme has proven to be a successful framework for action to cut greenhouse gas emissions in the UK. Emissions are now expected to be about 13.5% below 1990 levels in the year 2000.
- 6 The focus must now move beyond 2000 to targets for 2010 and beyond. Emission projections suggest that the UK's greenhouse gas emissions are expected to be about 15% below 1990 levels in 2010, and emissions of carbon dioxide about 8.5% below. These figures already take account of the impact of some of the policies the Government has introduced since Kyoto, such as the climate change levy. The projections also show that emissions of carbon dioxide begin to rise again around 2010, at a time when the UK is likely to be asked to make deeper cuts. Section 2, chapter 1 sets out these figures in more detail.
- 7 The Government's priority is to deliver the UK's legally binding target under the Kyoto Protocol but it believes that greater reductions in emissions are feasible, and that there will be real advantages to the UK in aiming to achieve them. That is why the Government and the devolved administrations have agreed a separate domestic goal of reducing carbon dioxide emissions to 20% below 1990 levels by 2010. This will ensure that the UK continues to lead by example on climate change and starts to make the transition to a lower carbon economy.
- 8 The UK Government and the devolved administrations want the programme presented in this document to act as the framework for a comprehensive, long term strategy on climate change for the UK as a whole. The programme is designed to be far-reaching. It also takes the first step towards developing a strategy for adapting to the effects of climate change in the UK.
- 9 Government can set the framework for action, but the responsibility for delivery extends much wider. The programme therefore draws together action across the UK as a whole. The programme has been developed by the UK Government in partnership with the devolved administrations, and reflects the

constitutional settlement through which many powers have been devolved to Scotland, Wales and Northern Ireland. It also recognises that action at the regional and local level can be the most effective way of influencing the way that businesses, local authorities and millions of individuals respond to the challenge of climate change.

Climate research

- 10 The UK carries out a wide range of research on climate change. The Government is funding an £11.5 million research programme in 2000-2001 through the DETR to improve our understanding of the science and impacts of climate change, to quantify the UK's emissions of greenhouse gases, and to inform policies for reducing emissions.
- 11 As part of this programme, the Government funds the Met Office's Hadley Centre, a world leading centre for climate change research. The Hadley Centre monitors global and national climate trends and develops state of the art ocean-atmosphere coupled climate models. It uses them to provide long term global and regional projections of climate change and estimates of the extent to which climate change so far is attributable to human activities.
- 12 The Research Councils support significant programmes of research linked to climate change. Three of the Research Councils are funding a newly established interdisciplinary centre for climate research with a budget of up to £10 million over five years. The Tyndall Centre will investigate the environmental, economic and social implications of climate change for the UK and abroad. The Centre, which will be based at the University of East Anglia in Norwich, was opened in November 2000.
- 13 The UK Climate Impacts Programme (UKCIP), set up by the Government in 1997, is designed to encourage a wide range of stakeholders to be involved in the assessment of climate change impacts and adaptation in the UK. UKCIP provides a coordinated framework for assessing domestic climate change impacts and adaptation strategies, and provides the fundamental tools for carrying out impact assessments. The programme has attracted considerable interest from the public and private sectors and a number of regional and sectoral projects are now completed or underway (see section 3).

- 14 The Government also currently spends £1.4 million a year on research related to climate change and agriculture. Its programme focuses on the measurement and control of greenhouse gases from agriculture; assessing the impacts of climate change on agriculture and on water resources; communicating the research findings to the farming industry; and contributing to the environmental monitoring carried out by the Environmental Change Network.
- 15 From its inception, the Foresight Programme has considered the implications of climate change for many sectors and the possible consequences for the UK's competitiveness and quality of life in the longer term. The Programme brings together diverse interests to develop a view on actions that can be taken today to meet climate change challenges likely to arise well beyond normal commercial planning considerations. It has already stimulated a number of initiatives, particularly in the transport and energy fields.
- 16 The non-nuclear component (ENERGIE) of the European Commission's Fifth Framework Programme supports research and development aimed at delivering cost effective solutions to key energy related problems on a European scale. In particular, the aims of the programme are to minimise the environmental impact of the production and use of energy to reduce emissions and enhance the capability of European industry to compete in world markets.
- 17 No one country can hope to address effectively all the scientific issues associated with climate change and UK scientists are active in many international collaborative research programmes relevant to climate change, including the World Climate Research Programme and the International Geosphere Biosphere Programme.

The Scottish Energy Environment Foundation (SEEF) was launched in March 2000 as a joint industry/university body with funding from three Scottish electricity companies and Scottish Enterprise and support from Strathclyde and Edinburgh Universities. Its objective is to support energy sector investment in the Scottish knowledge base to create an internationally significant centre of excellence in energy and related environmental technologies and their commercial exploitation. SEEF is expected to attract large amounts of research money for energy R&D. Their objectives will be met by:

- identifying energy research which could be successfully commercialised;
- attracting European Union and research funding;
- providing authoritative advice on energy/environment policy issues and options; and
- stimulating economic activity in Scotland as a result of commercialising the research or manufacturing opportunities which would not otherwise have occurred.

The approach to the programme

- The programme will make sure that the UK delivers its legally binding Kyoto target and moves towards its domestic goal.
- It is balanced across all sectors, seeks to safeguard the UK's international competitiveness and focuses on flexible, cost effective policy options.
- It includes measures that are designed to improve our quality of life and lead the way to environmental and economic modernisation.
- It begins to prepare the UK for the fundamental changes that will be needed in the longer term to meet the challenge of climate change.

Introduction

- 1 The climate change programme builds on the solid foundation developed by existing action and reflects comments made during the consultation on the draft programme.⁹ It brings together policies and measures that are already driving emission reductions in the UK and new initiatives that aim to keep emissions on a downward trend to 2010 and beyond. The programme is based on a partnership approach, with emission reductions being driven by a combination of policies introduced by the Government and the devolved administrations, and measures adopted by other key players including the business sector and local authorities.
- 2 The priority for the programme is to ensure that the UK is secure in its delivery of its international target to reduce emissions of the basket of six greenhouse gases to 12.5% below 1990 levels over the commitment period 2008-2012. This target will be legally binding and must be delivered even under adverse circumstances. If the UK were to fail to meet this target, it would face sanctions under the Kyoto Protocol and within the European Union.
- 3 The programme is also designed to move towards the domestic goal of a 20% reduction in carbon dioxide emissions below 1990 levels by 2010. The Scottish

Executive, the National Assembly for Wales and the Department of the Environment in Northern Ireland have agreed that they will join a programme to move the UK as a whole towards this goal.

- 4 Many businesses, local authorities and other organisations are already taking action to cut greenhouse gas emissions. The programme includes details of some of these initiatives as a way of illustrating what can be achieved and the benefits that can be had. Learning from others is a valuable way of helping organisations and people to implement policies and measures in an effective way.

The City of York Council received £80,000 of HECAAction funding in 1998 to run a bulk discount cavity wall insulation scheme, building on a similar project in council properties. The scheme targeted specific wards in York and, with the assistance of the local Energy Efficiency Advice Centre, aimed to cover 15,000 homes in the first year. Advice and a discount scheme were promoted in the targeted wards on a revolving basis.

York Energy Savers group were responsible for printing literature, organising delivery and promotion of the cavity wall insulation scheme. They also coordinated the bulk discount by opening tendering to HEES installers, two of whom were awarded the contract. Delivery of the leaflets was done on a voluntary basis, with organisations such as the local Friends of the Earth group, local sports clubs and schools targeting one ward each. Training was also provided as part of the scheme to parish and ward councillors, voluntary organisations, neighbourhood watch and residents groups. Other key partners included Northern Electric, York Gas and Leeds Metropolitan University.

Key principles of the programme

- 5 The programme is based on a number of principles. It will:
 - reflect the importance of tackling climate change by a positive response to the UK's domestic goal;

⁹ *Climate Change: Draft UK Programme*, March 2000, DETR. The consultation ran until 2 June. *A Summary of Responses to the Draft Climate Change Programme* was published alongside this programme, also by the DETR. Annex A of the programme summarises the main findings.

- take a balanced approach, with all sectors and all parts of the UK playing their part;
 - safeguard, and where possible enhance, the UK's competitiveness, promote social inclusion and reduce harm to health;
 - focus on flexible and cost effective policy options which will work together to form an integrated package;
 - take a long term view, looking to targets beyond the Kyoto commitment period and considering the need for the UK to adapt to the impacts of climate change; and
 - be kept under review.
- 6 The programme includes a range of policy measures – regulation, economic instruments, information programmes and public expenditure. Economic instruments, such as the climate change levy, can play a particularly important role. This was reflected in the Government's Statement of Intent on environmental taxation that set out the aim of shifting the burden of taxation from 'goods' like labour to 'bads' like pollution. By getting the price signals right, polluters are forced to meet the full costs of their action, and given an ongoing incentive to innovate and develop cleaner technologies. Environmental tax measures also raise revenue which can be used to remove other distortions in the economy or to fund specified measures.

The costs and benefits of action on climate change

- 7 The programme is a positive response to the serious threat of climate change. The UK is fully committed to meeting its Kyoto target, but it is prepared to go beyond that towards its domestic goal. Demonstrating that significant cuts in greenhouse gas emissions can be made without causing economic damage will be invaluable as a means of drawing developing countries into the process in the longer term.
- 8 The Government has assessed the costs and benefits of the measures in this programme. It has taken a strategic, qualitative look at the range of impacts – the direct economic costs and benefits and the potential for wider effects on the economy, environment and our quality of life – to assess the scope for sustainable

solutions. The climate change programme is a strategic framework document that provides details of a number of different policies and measures which are all at different stages of development. Each policy has been or will be subject to individual Regulatory Impact Assessments as part of the normal policy development process and have or will include analyses of all the costs and benefits associated with each policy. The Regulatory Impact Assessment for the programme can be found at annex I.

- 9 The measures set out in the programme will deliver wider environmental, social and economic benefits. Many have been introduced to tackle problems such as congestion, poor local air quality or fuel poverty, as well as to deliver emission reductions. For example, action to promote energy efficiency in the home improves comfort and reduces pressure on the health service, especially in winter. Measures to improve our transport system will cut congestion, reduce pollution and improve public health. Other measures are linked to the Government's competitiveness agenda, for example, by stimulating more efficient use of energy by business. The programme is designed to offer incentives to business to develop new, low carbon technologies and to exploit the growing international market for more efficient processes and renewable technologies. By promoting the development of renewable energy, it will also increase diversity in energy sources for power generation and help to lower the costs of these technologies.

Maintaining the UK's competitiveness

- 10 The Government has made clear that it aims to put in place a programme that safeguards and enhances the UK's competitiveness. It recognises the concern business has expressed about the implications of action on climate change for the UK's international competitiveness, but believes that the measures in this programme are consistent with that aim. This view was supported by the vast majority of business responses to the draft climate change programme. The programme is designed to be as flexible as possible with a focus on economic instruments, such as emissions trading, that will allow business to respond cost effectively. It also reflects the specific circumstances of energy intensive sectors competing internationally, for example, through the proposed lower rate of climate change levy for sectors that agree to challenging energy efficiency improvement targets.

- 11 The Government's and the devolved administrations' approach to the 20% goal illustrates their determination to safeguard competitiveness. They have made clear that the 20% goal has a different status to the Kyoto target and that they aim to move towards it through a balanced, partnership approach rather than through a set of quantified, centrally driven policies. All sectors are being asked to participate fully in the programme and there is no question of expecting any one group to make a disproportionate contribution.

With energy accounting for 20% of production costs, United Glass decided to link energy into their 'success through quality' system and achieved annual energy savings of £300,000 per year. The company developed a strategy for implementing energy efficiency by using techniques such as brainstorming and impact diagrams. An energy manager was also appointed and every employee was given a responsibility to save energy. Raising awareness and implementing good housekeeping techniques alone has saved the company £50,000. A further £80,000 was saved by optimising the furnaces using monitoring techniques. Other measures, such as the installation of variable speed drives to cooling tower fans, required capital investment with a one to two-year payback and brought additional energy savings of £170,000 per year.

Flexibilities under the Kyoto Protocol

- 12 The Government expects the Kyoto mechanisms to make an important contribution to the delivery of the UK's targets, once the rules have been agreed internationally. UK businesses support the mechanisms and will want to use them, if allocated a target under the climate change agreements or a domestic emissions trading scheme. The mechanisms will offer firms a more cost effective way of achieving their targets by giving them access to cheaper carbon reductions from overseas, rather than from generating additional savings in the UK. The Government proposes to include any credits generated through the Kyoto mechanisms in its assessment of the UK's progress towards its domestic goal. However, it is confident that the strength of the climate change programme will ensure that the UK does not fall foul of any restrictions on the use of the mechanisms (the so-called 'concrete ceiling') which might be agreed internationally (see chapter 2 of this section).

Exceeding the Kyoto target

- 13 This programme contains measures that will cut the UK's emissions below the levels required by the Kyoto Protocol. The UK can therefore expect to have a 'surplus' over the Kyoto commitment period. The Government does not believe that it would be sensible to take a decision now on how this surplus might be used. Nor does it believe that it would be right to rule out any options.
- 14 The UK would have a number of options for using its surplus – it could sell any over-achievement of its Kyoto target on the international market; 'bank' excess emission reductions for use in future commitment periods when the UK may face more challenging targets; or retire any surplus for the benefit of the environment. The Government cannot predict at this stage which of these would be the most appropriate. Its decision is likely to be influenced by factors such as the stringency of future international targets; the world price of carbon in 2008-2012; and the likelihood of other European Union member states meeting their targets under the agreement sharing out the community's Kyoto target.

Preparing for the longer term

- 15 The programme outlines the UK's long term, strategic approach to tackling climate change. The Kyoto target only covers the period 2008-2012 but, as explained in chapter 2 of this section, more significant reductions will be needed in the longer term. The UK is likely to find meeting targets in the next commitment period more challenging because of changes in its energy mix as existing nuclear power stations close down.
- 16 The Royal Commission on Environmental Pollution (RCEP)'s report *Energy – The Changing Climate*, published in June 2000, reiterated the importance of preparing for the longer term. It highlighted the steep reduction in greenhouse gas emissions that will be needed if the world is to avoid large scale disruptions to its climate. It recommended that the Government should adopt a strategy which puts the UK on the path to a 60% reduction in greenhouse gas emissions by 2050. Other respondents to the draft programme have also suggested that the Government should set emission reduction targets for beyond 2010.

- 17 The Government agrees that action is needed now to start to prepare the UK to meet future targets and to lay the foundation for the more fundamental changes that will be needed in the years to come. It believes the RCEP's report plays an important role in highlighting the scale of action that may be necessary in the longer term in an effective global response to climate change. However, it does not intend to set a target at this stage for reductions beyond 2010. The 20% goal provides a clear signal of the direction in which policy is moving, and this programme also emphasises the scale of reductions that will be needed in the longer term. International discussions on targets beyond the 2008-2012 commitment period are due to start by 2005 at the latest. The Government believes longer term targets must be agreed internationally, reflecting the global challenge of climate change, and that the UK could place itself at a disadvantage in future negotiations by setting a target unilaterally.
- 18 But a major transformation is needed, and the UK must start to plan now for meeting its future energy needs in a world with tough emission reduction targets. The RCEP's report included a number of scenarios to illustrate how the UK might achieve a 60% cut in emissions by 2050. All of these raise difficult questions about the practicality and acceptability of different energy options, such as the scope for reducing energy demand, the speed with which new renewable sources of supply can penetrate the market, the use of nuclear energy and the practicality of large scale carbon sequestration. There are no easy answers.
- 19 The Government therefore wants to instigate a national debate on how the UK might make the transformation to a low carbon economy. This will need to be an open and innovative dialogue, involving a wide range of stakeholders, looking at technological options for the future and the scope for significantly changing patterns of demand and consumer behaviour. As part of this process, the Government plans to review the options for longer term energy choices, considering the scale of emission reduction that might be needed in view of current projections for energy use and the scope and cost of low carbon or energy efficiency options that may exist to bridge the gap. This work will inform its response in 2001 to the report by the Royal Commission. It will also aim to build on the conclusions of work commissioned from AEA Technology on future technological options and how the Government can best contribute to their development (see below).
- 20 The Government and the devolved administrations cannot predict how technology will develop over the coming decades, nor are they best placed to do so. But they can set out the long term goal, offer incentives to change, support the development and introduction of some new technologies, and help organisations to anticipate and start adapting to longer term developments. An increasing number of studies are trying to explore how processes and lifestyles might change. We need to build consensus about the need for change, the priorities and action that can be taken to achieve the optimum rate of change and minimise uncertainty and costs both for business and consumers.
- 21 The Government is putting this philosophy into practice with the establishment of the Carbon Trust. This new organisation, funded partly through the climate change levy package, will be charged with accelerating the take up of low carbon technologies and other energy saving measures by business and other levy payers (see section 2, chapter 4).
- 22 The Carbon Trust will pilot this integrated, longer term, low carbon approach primarily in the business and levy-paying sectors. The approach, however, applies equally to other sectors such as the transport and domestic sectors, and to new energy sources. The Government has in mind to establish an overarching coordinating framework to bring together the delivery of low carbon programmes. It has asked the Advisory Committee on Business and the Environment to advise on this framework, consulting widely. The framework



Source: Environmental Images

will initially cover the Energy Saving Trust's work on domestic energy efficiency and the Carbon Trust's work with business. The framework will be flexible, allowing it to be extended to cover new energy sources and other low carbon programmes as appropriate.

- 23 The major structural changes that will be needed for the supply of energy to become more sustainable will have to be matched by changes in patterns and methods of consumption. The trend established during the late 20th Century – for many user needs and aspirations to be met through greater direct consumption of short-life goods – is not sustainable. It involves high resource intensity in materials and in the energy used in manufacture and distribution, along with growing environmental impacts associated with the consumers' use and the disposal of goods.
- 24 Although many business and household needs will continue to be met by the consumption of goods, the process of supplying them will have to be made significantly more efficient. One expression of the realisation that dramatic changes in resource use will be needed during this century is the concept of 'factor ten'. This implies rigorous new approaches to the design of products to minimise material use, energy use and emissions across the whole of their life cycle.
- 25 Consumption can also become more sustainable if a greater proportion of needs are met through services rather than more resource-intensive goods. The principle extends into many areas of business and household life, where a high standard of performance and utility could be met for the purchaser through contract services, leasing and community-based arrangements. There will be complex issues to address, in terms of assumptions about lifestyles and the way that needs and aspirations are met.
- 26 This theme in environmental policy is relatively new, but will need to be developed quickly to help meet the long term challenges implicit in climate change and other areas where current trends are unsustainable. To some extent, the process will be advanced by innovative technology, pushing social change. But there are questions for Government and the devolved administrations about, for example, putting drivers in place to hasten innovation or influencing the nature of demand through educational or other measures.
- 27 The Government and the devolved administrations recognise the scale of the challenge ahead in transforming the patterns of energy generation, technological development and consumption that currently ensure the UK's economy remains carbon intensive. The programme therefore includes a number of measures which are designed to start to change these patterns and to reduce emissions over the longer term, even if their impact by 2010 may be limited. They could also ensure that UK companies are well placed to exploit emerging business opportunities for low carbon goods and services. The most significant measures are:
- the new strategy on renewable energy (see section 2, chapter 3), which is designed to bring on stream those technologies which are cost effective now, to support the take up of those technologies further from the market and to maintain research into options for the future;
 - substantial new capital grants to support offshore wind and energy crop installations. £89 million is to be made available from the Government and the New Opportunities Fund. An additional £12 million over three years will be available as planting grants for energy crops;
 - action to ensure fair access to the electricity distribution networks for embedded generation, starting to prepare the UK for a transformation in the way energy is generated and transmitted as numerous small and scattered sources of electricity supply come into the market;
 - market mechanisms, such as the climate change levy and emissions trading, which will encourage industry to invest in renewables and low carbon technologies. These should, in turn, lead to further research and development in innovative technology by industry;
 - developing a new coordination framework to ensure that complementary low carbon programmes and other delivery mechanisms are brought together effectively;
 - a significant expansion of programmes to increase the penetration of the next generation of fuel efficient technologies and to overcome barriers to their use;

- changes to the planning system which will influence development patterns and reduce the need to travel;
- launching a Kyoto Mechanisms Office to give advice to business on new opportunities to reduce emissions through joint implementation and the clean development mechanism;
- support for efforts at European Union level to advance the thinking on 'Integrated Product Policy', so that the challenges of more sustainable consumption – and the possible solutions – can be more systematically addressed; and
- work through the Foresight Programme and other research programmes to consider the implications of climate change for the UK, looking beyond normal commercial planning horizons.

28 These measures are only a first step and the Government and the devolved administrations recognise that they will need to take further action to stimulate the development of low and zero carbon technologies, working closely with business and the research community. To support further work in this area, the Government has funded work at AEA Technology to assess future technological options and how it can best contribute to their development. This concludes that energy efficiency and heat and power supply and transport technologies could deliver beyond the level of emission reductions that the IPCC scenarios suggest will be necessary in order to stabilise atmospheric concentrations of carbon dioxide at 550 ppm. Existing infrastructure emerged as a key barrier to the implementation of such technologies, along with the reliability of supply and the safety of unproven technologies.

29 The conclusions of this work would suggest that, on the basis of present knowledge, priority emission reduction technologies for the medium to long term appear to be carbon dioxide sequestration, coupled with engineered sequestration in geological formations; fuel cells; fuel cell feedstocks, particularly those that can be produced from non fossil sources; battery technologies; photovoltaics, windpower, hydropower and biomass; transport integration; and integration of heat demand and sources.

Working as part of the European Union

- The UK maximises its influence internationally by negotiating as part of the European Union.
- The UK supports a deadline of 2002 for ratification and entry into force of the Kyoto Protocol.
- European policies and measures are an important part of the programme.

- 1 The UK's membership of the European Union has a strong influence on its response to climate change. The UK negotiates internationally as part of the European Union; its Kyoto target was agreed at European level as part of an arrangement to share out the Community's target; and a number of important policies and measures to reduce emissions are, and will be, agreed in Europe.
- 2 The UK has played a leading role in the European Union in efforts to integrate the environment into other policy areas. A Heads of Government meeting in the European Council at Cardiff in June 1998, during the UK's Presidency, established clear objectives. For the first time, individual Councils were invited to prepare strategies to integrate environmental and sustainable development concerns into their policy areas. Successive presidencies have taken this forward.
- 3 Effective policy integration is critical to an effective European response to climate change. Many of the key policy decisions will need to be taken outside Environment Council, with Energy, Transport and Agriculture Councils having an important role to play. These and six other Councils have been invited to develop comprehensive strategies to deliver effective policy integration, including timetables and indicators. Several of these have now been completed, and the Helsinki Summit in 1999 asked the Council to complete this work by June 2001 so that the strategies can be implemented, monitored and adjusted. Climate change features in many of the strategies and reports so far.
- 4 The European Commission is pressing ahead with work to help ensure that the Community and its member states meet their Kyoto targets. It published a Communication, *Preparing for Implementation of the Kyoto Protocol*, in June 1999, and followed this with, *EU Policies and Measures to Reduce Greenhouse Gas*

Emissions: Towards a European Climate Change Programme, in March 2000. This focuses on the policy measures that could be used to help ensure that the European Community and its member states meet their greenhouse gas reduction targets under the Kyoto Protocol. It complements a green paper on emissions trading, published at the same time, by emphasising the scope for emission reductions through policies and measures taken nationally and at EU level. The Communication suggests that EU emissions may be 6-8% above 1990 levels in 2010 unless more action is taken. It indicates that only the UK, Germany and Luxembourg are currently on track to deliver their targets.

International negotiations

- 5 The European Union plays an important part in international negotiations on climate change, alongside other groupings of countries such as the Umbrella Group (including the USA, Japan, Russia, Australia, New Zealand and Canada) and developing countries. As a group of countries with high environmental standards, the EU is committed to firm action on climate change and tends to set the pace in the negotiations. The UK's influence on the negotiations as part of the EU is stronger than it would be alone and the UK plays a key role in shaping the EU's negotiating positions.
- 6 At the 5th Conference of the Parties in November 1999, the European Union called for a political deadline of 2002 for ratification and entry into force of the Kyoto Protocol. As the 10th anniversary of the Rio Earth Summit when the United Nations Framework Convention on Climate Change was agreed, a 2002 deadline would be symbolically important, and meeting it would maintain the momentum of the Kyoto process. At least 55 countries, including developed countries accounting for 55% of the carbon dioxide emissions from developed countries in 1990, must ratify before the Protocol can enter into force.

Ratification of the Kyoto Protocol

- 7 The European Community and its member states will aim to ratify the Protocol at the same time. Before they can do so, they must convert the political deal reached in June 1998 on sharing out the Community's

8% reduction target into a legally binding agreement. The UK aims to ensure that this agreement will deliver the Community's and the member states' international obligations fully. All member states must meet their obligations under the agreement and not rely on over-compliance by others to deliver the Community's overall target.

- 8 It is expected that discussions on the format of this agreement will start after COP 6 in November 2000 and continue into 2001.

A European climate change programme

- 9 Member states have agreed that European-level policies and measures (known as common and co-ordinated policies and measures) are essential to help them deliver their Kyoto targets. All member states have a strong interest in ensuring that not only they, but other member states and the European Community as a whole, meet their targets. While national action will be fundamental to meeting those targets, there will be benefits to all in ensuring that some European measures are in place which will reduce emissions in each member state and help to deliver the Kyoto targets.
- 10 Some measures can most effectively be delivered at Community level. In some sectors, for example, there is a strong, single market case for European action. Other measures could have little impact if taken at a national level and could harm the competitiveness of the industry in the member state concerned. European-level coordination also gives member states a valuable opportunity to share experience and expertise on action to reduce greenhouse gas emissions.
- 11 The important measures already in place form a good foundation for a European response to climate change. But member states have agreed that work needs to step up a gear. Environment and energy ministers have both identified priorities for action. The analysis of the progress of member states towards their Kyoto targets in *EU Policies and Measures to Reduce Greenhouse Gas Emissions: Towards a European Climate Change Programme* highlights the need for new initiatives to reduce emissions. The Commission has responded by launching a European Climate Change Programme and producing proposals for action in some key policy areas.

European-level measures already in place include:

- voluntary agreements between the European Commission and the European, Japanese and Korean car manufacturers to improve the fuel efficiency of new cars;
 - measures under the Community-wide SAVE programme which aim to improve energy efficiency and reduce the environmental impact of energy use in the transport, industry, commerce and domestic sectors;
 - the European Best Practice Initiative, which showed the scope for coordinated action on energy efficiency best technology deployment across the EU, and is based on the successful UK Energy Efficiency Best Practice Programme;
 - regulation, such as the Integrated Pollution Prevention and Control and Landfill Directives; and
 - measures to raise the energy efficiency of appliances and equipment, including mandatory labelling, industry wide agreements and minimum standards.
- 12 The European Climate Change Programme is designed to build consensus among the main stakeholders on priorities for action and cooperate in the preparation of policy measures. Groups looking at energy, transport, industry and the Kyoto mechanisms started work in mid 2000 and have been asked to report to the Commission within a year. The working groups are taking a broad look at the scope for action and the cost effectiveness of different measures.
- 13 The Commission published a green paper on emissions trading in March 2000, which discusses the options for launching an EU-wide scheme. The green paper sets out the possible economic and environmental benefits of extending emissions trading beyond national borders and envisages a scheme running between 2005 and 2007, in advance of the launch of international emissions trading in 2008. The Government has welcomed the green paper, and is working closely with the Commission and other member states to take forward the ideas it contains in the most appropriate way. The UK is well placed to play a leading role in this debate because of the experience gained in setting up its own scheme.

- 14 An *Action Plan to Improve Energy Efficiency in the European Community* was produced in April 2000. This aims to integrate energy efficiency into Community policies and proposes measures to support and build on existing energy efficiency work. It is designed to establish the foundation for a continuous and long term improvement in energy efficiency. Detailed proposals for implementing the Action Plan will be produced towards the end of 2000.
- 15 A proposal for a Directive on the promotion of electricity from renewable energy sources in the internal electricity market was adopted by the European Commission in May 2000 and presented to the Energy Council. Negotiations have begun and the expectation is that an EU common position will be reached by December 2000. The draft Directive aims to create a framework that will facilitate a significant increase in renewable electricity within the EU. To this end, it proposes that member states be required to set national targets for domestic consumption of renewable electricity (10% is proposed for the UK), and the introduction of certification of origin of renewables to encourage the trade in green electricity. It also addresses administrative and grid connection issues.
- 16 The UK has been an active participant in discussions on the proposed Energy Products Directive. If adopted, this will set minimum tax rates across the EU for energy products, such as electricity, gas and coal and replace existing mineral oils directives. The Government is willing to see progress on the draft Directive, subject to securing a permanent exemption for the domestic sector.
- 18 The Government will be working closely with the Commission in their efforts to ensure a robust and meaningful monitoring process. It will also highlight the need for a transparent and tough Community compliance regime during discussions on implementation of the agreement sharing out the Community's target.

Monitoring and compliance

- 17 Revised monitoring arrangements came into force in May 1999 which require annual reporting by both member states and the Commission. The UK fully supports the Commission's efforts to improve its monitoring and evaluation of the progress of member states towards delivering their targets. Regular reporting and review of national inventories and projections is essential to allow the Commission, ministers and the European Parliament to assess whether member states and the Community as a whole are on track to meet their Kyoto commitments and to exert pressure on those in danger of non-compliance.

- The climate change programme is being developed within the wider policy framework set by the Government and the devolved administrations.
- The programme covers the whole of the UK. The devolved administrations have joined a programme that will move towards the domestic goal to cut carbon dioxide emissions by 20% by 2010.

Introduction

- 1 The programme has been developed within the framework of existing Government policies. Climate change is a major issue that is influenced by and cuts across many different areas affecting the whole range of people's activities. This section looks at some of the main policies that form the overall background to the development of the climate change programme.

Devolution

- 2 The scope and coverage of this programme is heavily influenced by the constitutional framework. The UK Government retains overall responsibility for the Kyoto target and for ensuring a programme is put in place to deliver it. However, many of the means by which emissions can be reduced have been devolved to the Scottish Parliament, the National Assembly for Wales and the Department of the Environment in Northern Ireland.
- 3 The devolution legislation contains reserve powers that could be used to bind the devolved administrations of Scotland, Wales and Northern Ireland to the UK's international target. These reflect the obligation that each of the devolved administrations has to implement international obligations and are designed to ensure that all parts of the UK work in partnership and make an equitable contribution to the delivery of the UK's target. The power, if used, would follow consultation and would share out the target, based on the level of action which could be taken by Scotland, Wales and Northern Ireland in devolved policy areas.

- 4 The Government does not propose to use these powers at this stage because it is confident that significant emission reductions can be delivered through partnership with the devolved administrations. Emission projections (see section 2, chapter 1) show that action taken so far and the impact of policy measures reserved to the UK Government are expected to reduce emissions beyond the level required by the Kyoto target. The devolved administrations have also agreed to join a programme to move towards a 20% reduction for the UK as a whole, demonstrating their commitment to action to tackle climate change. However, the contribution of the devolved administrations will be kept under review as part of the ongoing monitoring of the effectiveness of the programme.

- 5 An initial exercise to disaggregate the UK inventory of greenhouse gases for 1990 and 1995 was published in 1999. Disaggregated emissions for England, Scotland, Wales and Northern Ireland in 1998 were published in November 2000.¹⁰ Data for subsequent years will now be required annually. Work is also in progress to produce carbon dioxide emission projections for Scotland.

- 6 The climate change programme covers action that will be taken across the UK. The measures set out in section 2, in the main, relate to action in reserved policy areas and in England alone. Action by the devolved administrations in devolved policy areas is set out in section 4.

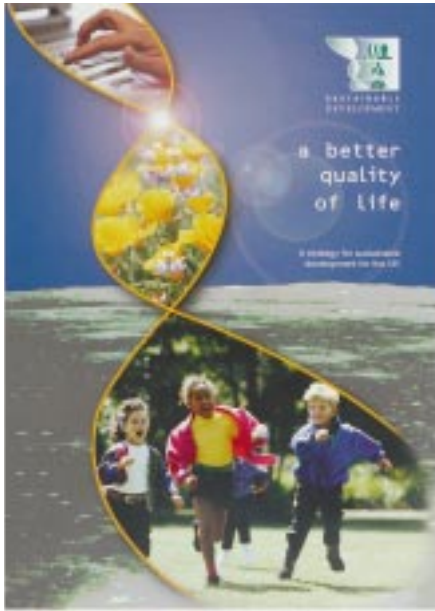
Sustainable development

- 7 The UK Government's strategy for sustainable development, *A Better Quality of Life*¹¹ defines sustainable development as "ensuring a better quality of life for everyone, now and for generations to come". It identifies four objectives that need to be addressed to achieve sustainable development. The climate change programme has these objectives at its heart:
 - social progress which recognises the needs of everyone;
 - effective protection of the environment;

¹⁰ *Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990, 1995 and 1998*, November 2000, National Environmental Technology Centre (NETCEN).

¹¹ *A Better Quality of Life: a Strategy for Sustainable Development for the United Kingdom*, May 1999, Cm 4345, The Stationery Office.

- prudent use of natural resources; and
- maintenance of high and stable levels of economic growth and employment.



- 8 The sustainable development strategy includes headline and core 'quality of life' indicators.¹² These indicators will be used to measure progress against sustainable development objectives. UK emissions of greenhouse gases are one of the headline indicators, and other relevant indicators deal with issues such as energy supply, transport and sustainable production. Sustainable development in Scotland, Wales and Northern Ireland is covered in section 4.
- 9 The Modernising Government white paper¹³ included a commitment that Government would be "producing and delivering an integrated system of impact assessment and appraisal tools in support of sustainable development, covering impacts on business, the environment, health and the needs of particular groups in society." The draft climate change programme was one of the pilots for an interdepartmental working group examining the scope for streamlining this process and the programme has been appraised for its potential impacts on the environment, particular groups of society, business

and health. The environmental benefits of some of the policies and measures have been quantified in terms of carbon savings and these details are included in section 2. A Regulatory Impact Assessment is attached at annex I.

Sustainable development at a regional level

- 10 The Government wants its objectives for sustainable development to be implemented at the regional level. In its sustainable development strategy, the Government said that it wished to see regional sustainable development frameworks in place in all English regions by December 2000. These frameworks will add significant value at the regional level and it is expected that all regions will produce one. They will take a broad overview of regional activity and the regional impact of Government policy and a wide range of stakeholders (Regional Chambers, sustainable development round tables, local government, business networks, the voluntary sector, other public services and the Regional Development Agencies) will be involved in their preparation. Guidance on this has been published.¹⁴ In addition, the Government has made it one of the statutory purposes of the Regional Development Agencies that they should contribute to the achievement of sustainable development in the UK.
- 11 Regional planning guidance for England should make sure that development takes place in a sustainable way. This is the key regional mechanism for encouraging development in ways that reduce the need to travel and make it easier and safer for people to access jobs, shopping, leisure and services by a range of transport modes. It will also encourage regional groups to consider their regions' vulnerability to climate change and to reflect the objectives contained in this programme.
- 12 The Government plans to develop a methodology to provide greenhouse gas emission estimates for regions. These data are expected to be available during 2001 and will be published on the DETR's website.

¹² *Quality of Life Counts: Indicators for a Strategy for Sustainable Development for the United Kingdom: a Baseline Assessment*, December 1999, DETR, ISBN 1 85112 343 1. This publication can also be found at: www.environment.detr.gov.uk/sustainable/quality99/index.htm

¹³ *Modernising Government*, March 1999, Cm 4310, The Stationery Office.

¹⁴ *Guidance on Preparing Regional Sustainable Development Frameworks*, February 2000, DETR.



Transport

13 The Government's integrated transport white paper¹⁵ set out its aim to develop a modern, safe and efficient transport system for the 21st Century, to give the UK an integrated transport system that would match the best in Europe, to develop it jointly in partnership with the public and private sectors and to build a first class transport system that will provide real choice. In July 2000, the Government published its 10 Year Plan for transport¹⁶. The Plan builds on the policies set out in the white paper and sets out a long term investment programme for transport to 2010. It aims to provide:

- a step change in investment through new public and private partnerships;
- the resources to implement the vision of an integrated transport system that was set out in the white paper, improving transport for all; and
- a multi-modal response to the problems of congestion and pollution that threaten our quality of life and our future economic well-being.

14 Both strategies form an integral part of the climate change programme. More details can be found in section 2, chapter 5.

Making better use of energy

15 The Government's energy policy is set out in more detail in section 2, chapter 3. A key element is the white paper on energy¹⁷ that outlines the Government's objective of achieving secure, diverse and sustainable sources of supply. Where fossil fuel is used to generate power, the process should be efficient and make greater use of technologies such as combined heat and power (CHP). The Government has set targets for 2010 of delivering 10% of the UK's electricity from renewables, subject to the cost to consumers being acceptable, and at least 10,000 MWe of installed CHP capacity.

16 Better energy efficiency is a key part of the Government's and the devolved administrations' policy of placing the environment at the heart of policy making. It is in tune with their policy on sustainability. It has major economic and social benefits for households and businesses. And it helps to protect the environment by reducing emissions of carbon dioxide. In particular:

- improved energy efficiency brings benefits to households and businesses by:
 - reducing fuel bills – giving people more money to spend on other needs;
 - attacking fuel poverty and the risk of ill health caused by cold and damp homes, and promoting social inclusion;
 - reducing company's fuel bills, enhancing the UK's competitiveness and releasing resources for business development;
 - lowering building maintenance costs through reduced incidence of mould and condensation.

¹⁵ *A New Deal for Transport: Better for Everyone*, July 1998, Cm 3950, The Stationery Office. A complementary white paper for Scotland, *Travel Choices for Scotland*, a statement for Wales, *Transporting Wales Into the Future*, and a statement for Northern Ireland, *Moving Forward*, were published alongside the UK white paper.

¹⁶ *Transport 2010: The 10 Year Plan*, July 2000, DETR.

¹⁷ *Conclusions of the Review of Energy Sources for Power Generation and Government Response to Fourth and Fifth Reports of the Trade and Industry Committee*, October 1998, Cm 4071, The Stationery Office.

- energy efficiency brings benefits to the economy by:
 - creating jobs in the energy efficiency manufacturing and installation businesses;
 - creating market opportunities for new or more efficient technologies.

17 Energy efficiency programmes aim to overcome barriers to improving energy efficiency, such as a lack of knowledge and awareness about what can be achieved, to develop and promote best practice and to improve the energy efficiency of products.

Waste

18 The Government's waste strategy¹⁸ sets out the framework for sustainable waste management in England and Wales for the next twenty years. The main challenges are to reduce waste and to increasingly recover value from the waste we produce. The strategy announces statutory targets for local authority recycling and composting which will double current rates to reach around 17% by 2003-2004. The Government's overall targets are to:

- recover value from 45% of municipal waste by 2010;
- recycle or compost at least 30% of household waste by 2010; and
- reduce the amount of industrial and commercial waste landfilled to 85% of 1998 levels by 2005.

19 The strategy also announces a system of tradable permits that will limit the amount of biodegradable municipal waste sent to landfill, in line with the requirements of the Landfill Directive. These large reductions in landfill and some increase in the amount of energy from waste will help to reduce greenhouse gas emissions. A research study for the Government¹⁹

estimated that the overall effect of these measures is likely to produce savings of 0.1 to 0.5 MtC in 2010. Further savings in greenhouse gas emissions are expected because of increases in recycling and the Government is planning to carry out a further study to quantify those.

Air quality

20 Policies to improve air quality cannot be considered in isolation from those designed to reduce greenhouse gas emissions, as some policies to improve local air quality can often have the added benefit of producing additional carbon savings, and vice versa. For example, policies designed to reduce the impact that transport has on air quality by tackling congestion and encouraging a shift to public transport, walking and cycling should also reduce carbon dioxide emissions. Measures to improve energy efficiency and cut energy demand should also reduce the air pollutants that are produced during electricity generation. The air quality strategy²⁰ sets out policies to reduce the levels of the air pollutants that are of most concern.

Construction and buildings

21 The production and transport of construction materials accounts for a significant proportion of the UK's energy consumption and the energy used in heating, cooling, ventilating and lighting buildings accounts for about half of the UK's carbon dioxide emissions. The Government's sustainable construction strategy²¹ highlights the need to minimise energy during the construction process and in building use. It shows how this can be achieved through improved manufacturing processes and design coupled with energy efficient building services that are easy to operate and maintain. It also explains how the construction industry needs to be alert to potential changes in weather patterns if it is to deal with the impacts of climate change.

¹⁸ *Waste Strategy 2000: England and Wales, Part 1, May 2000, Cm 4693-1 and Part 2, May 2000, Cm 4693-2, The Stationery Office; National Waste Strategy: Scotland, adopted December 1999, SEPA; Waste Management Strategy – Northern Ireland.*

¹⁹ *Implications of the EC Landfill Directive and the Draft Waste Strategy on UK Greenhouse Gas Emissions: A Preliminary Study, February 2000, AEA Technology.*

²⁰ *Air Quality Strategy for England, Scotland, Wales and Northern Ireland, January 2000, Cm 4548, The Stationery Office.*

²¹ *Building a Better Quality of Life: A Strategy for More Sustainable Construction, April 2000, DETR.*

22 The Government has consulted on its proposals for amending the energy efficiency requirements of the Building Regulations in England and Wales, and the Scottish Executive are consulting on a revision of Part J of the Technical Standards for compliance with building regulations relating to the energy efficiency of new buildings. More details can be found in section 2, chapters 4 and 6, and in section 4.

Planning

23 The framework of planning policy guidance and its application can significantly affect the level of greenhouse gas emissions. Planning policy guidance, which is issued by the Government and the devolved administrations, provides a context for planning decisions and plan making at the regional, county and local levels. Future revisions of planning policy guidance will reflect the aims and objectives of the climate change programme. They are also reflected in the urban and rural white papers.

24 The Government is preparing a good practice guide on climate change and planning to help those involved in land use planning in England and Wales to focus on the role of the planning system in responding to climate change issues. The guide will, for the first time, bring together information about the part that the planning system can play in adapting to the unavoidable impacts of climate change and how it can contribute towards reducing future greenhouse gas emissions.

Housing

25 Energy use in the home is a significant source of carbon dioxide emissions and the link between these emissions and the quality of the housing stock is widely accepted. The Government's housing green paper²² for England outlines a substantial package of new initiatives across the whole spectrum of housing policy, aimed at improving the provision, maintenance and management of homes. The spending plans announced in July 2000 provide the necessary funds to deliver the strategy. This money, an extra £1.8 billion for housing over the next three years together with the additional resources being made available in other programmes, will ensure a major contribution to

the renaissance of our cities and countryside, as will the urban and rural white papers.

26 Spending Review 2000 outlined a three year plan for housing that will result in spending in real terms growing by an average of 12% per annum, and in 2003-2004 being £1.6 billion higher than now. This will mean an extra half a million homes will be modernised by 2004, that publicly funded low cost home ownership schemes will help twice as many families and that there will be an improved supply of social housing in high demand areas. The key Public Service Agreement for housing will ensure that all social housing meets set standards of decency by 2010, that the number of families living in non-decent social housing falls by a third by March 2004, and that most of the improvement takes place in the most deprived local authority areas as part of a comprehensive regeneration strategy.

27 Home Improvement Agencies (HIAs) have an important role in helping elderly, disabled and vulnerable homeowners to improve their housing. This will help people to stay in their own homes and also to improve the condition of the housing stock. A further £5.4 million has been allocated to HIAs over the three years to 2003-2004, bringing total Government expenditure on these agencies in that period to £25.5 million.

²² *Quality and Choice: A Decent Home For All: The Housing Green Paper*, July 2000.

Working with others to deliver change

- Fundamental change is needed to tackle the threat of climate change.
- Government action alone will not be enough, but will set the framework and lead by example.
- Many other groups, organisations and individuals need to participate fully in the programme. Their contributions will be critical to its success.

Introduction

- 1 The scale of the challenge facing the UK should not be underestimated and Government alone will not be able to make the fundamental changes that need to be made. There is a wide range of other groups, organisations, businesses and individuals whose help is needed to make sure that real change is delivered on the ground. The climate change programme has been developed in close consultation with these key stakeholders, and this section identifies the main players whose contributions will be critical to the success of the programme.

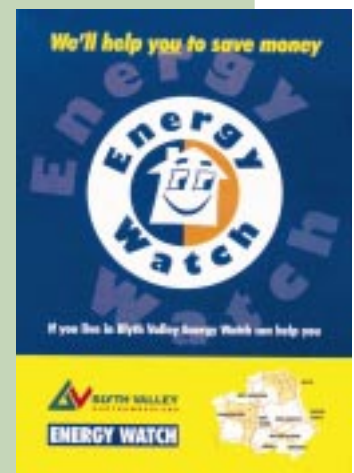
Action by the Government and the devolved administrations

- 2 The Government and the devolved administrations have responsibility for setting the overall strategy for tackling climate change, establishing the right policy framework and ensuring that other policies do not cut across climate change and sustainable development objectives. They can provide clear aims for individual policies and measures by setting targets and by monitoring and measuring progress. They can help to steer people towards the changes in behaviour that are needed through awareness campaigns, regulation or the use of economic instruments like taxes and charges. They can ensure that other organisations, like local authorities, have the right tools to make changes on the ground. They can engage with business, academia and wider groups to pool existing knowledge and expertise and to develop consensus about the best way forward. And they have a responsibility to lead by example. Details of initiatives by the Government and the devolved administrations to cut their own emissions are given in section 2, chapter 8 and in section 4.

Local government

Blyth Valley Borough Council was awarded £200,000 in the first round of HECAAction. The council worked in partnership with a local installer to offer discounted installations to local residents, and trained up to 255 community energy advisers. £18,000 of the grant was spent on a comprehensive publicity programme, including advertisements and articles in the local newspaper, a targeted mailout and display boards in the council's reception area.

Articles were found to be more effective than advertisements in generating responses, especially when focusing on happy local residents who had benefited from the scheme. The targeted mailout was very successful, with a response rate of 32%, in contrast with a response rate of 2-3% for untargeted mailouts. The scheme has resulted in almost 6,000 lofts and cavity walls being insulated, plus 1,200 condensing boilers being installed.



- 3 Local authorities have a special status as local, directly elected bodies. They are uniquely placed to provide vision and leadership to their local communities, and their wide range of responsibilities and contacts means that they are critical to the delivery of this programme. They can take forward the action needed on the ground to cut emissions, working with local communities, and will be central to efforts to adapt to the impacts of climate change.
- 4 Local authority responses to the previous consultations have confirmed the range and depth of their involvement in tackling climate change – both leading by example, cutting emissions from their own buildings and developing travel plans, and by facilitating and encouraging the development of partnerships between other key players such as businesses and individuals.
- 5 The Government and the devolved administrations welcome the action that local authorities have already taken to cut greenhouse gas emissions. But they also

believe that more can be done. In their report, *It's a Small World: A Review of Progress in Environmental Stewardship*, in October 1999, the Audit Commission noted that, for example, 90% of local authorities had assessed the energy efficiency of their housing stock, up from 60% in 1994-1995; and that 38% of local authorities had converted some or all of their vehicle fleets to low pollution fuels, compared with 9% in 1994-1995. But the Commission also noted that energy use in council offices showed no significant fall; and that 10% of local authorities had failed to undertake any local stock condition surveys.

- 6 Building on local authority action, the Government in May 2000 published a discussion paper, *Energy Efficiency and Local Well-Being: A Corporate Priority for Local Authorities*. The paper was addressed to local government Chief Executives and Council Leaders and discussed the important benefits local residents and businesses could gain from local councils adopting action to tackle climate change as a corporate priority. As well as benefiting individual householders, action by local authorities, utilities, businesses and community groups could tackle fuel poverty and its health effects, improve public services, generate employment and training opportunities, and help local businesses – all dimensions of local well-being.
- 7 The positive response by local authorities to the paper and to the draft climate change programme, as well as the many local initiatives that were shared as a result, will shape the future direction of the Government's policy on the implementation of the Home Energy Conservation Act.
- 8 Other important developments enable local authorities to take action on climate change. The Local Government Act 2000 gives local authorities in England and Wales a broad new power to undertake any activities that promote or improve the economic, social or environmental well-being of their area or local people. These powers will greatly extend the scope for authorities to take action in support of the climate change programme. A statutory power of community initiative for local government in Scotland will be introduced at the earliest legislative opportunity to give Scottish local authorities powers similar to those in England and Wales.
- 9 The Act also places a duty on local authorities to prepare a community strategy for promoting or improving the well-being of their areas and contributing to sustainable development. These

strategies, which the Government wants developed jointly by authorities and other local public agencies and private bodies, will set out what the local strategic partners will do to fulfil these objectives. It is hoped that community strategies will build on the work done in many areas to develop Local Agenda 21 strategies. The new community strategy will establish both the short term and longer term priorities of the local community and the action to be taken to address them. They will therefore provide an opportunity for local communities to consider the action they might take to support the climate change programme and to address the longer term impact that climate change might have on an area. It is expected that the new powers contained in the Local Government Act will be available to authorities before the end of 2000. The future operation of the Home Energy Conservation Act will also take account of these developments.

The Warmburgh Plan is the City of Edinburgh Council's strategy for improving the energy efficiency of all residential property in the city by around 31% in 10 years (from 1997). The Council has been active in encouraging energy efficiency activity in the private sector in addition to improving significantly the energy efficiency of its own stock. It has won funding from the Energy Saving Trust for a grants scheme called ReWarm which has been successful in encouraging private landlords to install energy efficient heating systems and insulation. ReWarm won the Scottish Energy Savers Award 1999 and the Chartered Institute of Housing's Scottish Housing and Environmental Innovation Good Practice Management Award 2000.

The Council, as part of a consortium of six neighbouring local authorities in the Lothians, Borders and Fife, has also won funding from the Trust for a grant scheme for owner occupiers called Quality Assured Warmth. This scheme will promote negotiated discount prices on a range of energy efficiency goods and services to owner occupiers and will seek to ensure exceptionally high standards of work. By doing so, it will increase the uptake of energy efficiency measures by directly addressing consumers' concerns.

Once the Warmburgh Plan has been fully implemented, carbon dioxide emissions from all homes in the city built before 1997 will be reduced from 1997 levels by an estimated 459,000 tonnes a year.

- 10 Local authorities throughout the UK have statutory responsibilities for local air quality. Under the Environment Act 1995, they are required to carry out a review and assessment of local air quality and to identify any problem areas. They are then required to draw up action plans to improve air quality in these areas, setting out the measures they intend to take in pursuit of national air quality objectives. Many of the actions local authorities are likely to take will also help to cut emissions of greenhouse gases. This is particularly true for local transport policies as local authorities now have responsibility for drawing up five year local transport plans covering both urban and rural transport (see section 2, chapter 5).
- 11 The Local Government Act 1999 represents a major step forward in the modernisation of local government in England and Wales and aims to raise standards in local services through the Best Value programme. This provides a major opportunity for authorities to provide cost effective, high quality services linked with a regime of national and local performance indicators, reviews and efficiency measures. Some of the indicators cover issues within the scope of this programme, and will act as incentives for local authorities to improve their performance.
- 12 The Government recognises that local authorities can play a fundamental role in delivering this programme. It would like to see a clear commitment to action at local level, and is supporting the development of tools to help local authorities respond to the challenge of climate change.
- 13 The Government, the Improvement and Development Agency (IDeA) and the Local Government Association have established a pilot 'Councils for Climate Protection Campaign' in England and Wales. As part of this project, the IDeA is assessing the scope for applying the International Council for Local Environmental Initiatives (ICLEI)'s 'Cities for Climate Protection Campaign'. Information is also being gathered from all local authorities in England and Wales on existing work on climate change within their areas. This will be used as a comparison with the results of the pilot scheme. All local authorities will be offered training workshops on climate change, drawing on good practice case studies to help them develop their own strategies. Following the pilot, the Government would expect to see an increase over the next few years in the number of local authorities taking

a systematic approach to assessing their greenhouse gas emissions and setting challenging improvement targets.

The Councils for Climate Protection pilot in England and Wales started in April 2000. 23 local authorities have agreed to take part. During the project they will produce local action plans to reduce greenhouse gas emissions and test a tool which allows a standardised approach to assessment, monitoring and voluntary target setting.

The pilot was launched in September 2000. The participating local authorities are:

Nottingham City Council
 Oxford City Council
 Hampshire County Council
 London Borough of Barnet
 Lancashire County Council
 Shropshire County Council
 Bury Metropolitan Borough
 Slough District Council
 Oldham Metropolitan Borough
 London Borough of Camden
 London Borough of Southwark
 Leicester City Council
 Nottingham County Council/
 Newark and Sherwood District (joint bid)
 Chesterfield Borough Council
 Kirklees Metropolitan Borough
 Norwich City Council
 Daventry District Council
 Sandwell Metropolitan Borough
 Bristol City Council
 Suffolk County Council
 London Borough of Tower Hamlets
 London Borough of Hillingdon
 Southampton City Council

- 14 The Government will watch the results of the pilot with interest and consider with the IDeA and the Local Government Association how to strengthen local authorities' involvement in the climate change programme. It welcomes the launch of the Nottingham Declaration on Climate Change in October 2000 which acknowledges the benefits offered by action on climate change and commits signatories to preparing a plan with their local communities to address the

causes and effects of climate change and secure maximum benefit for those communities. The Government encourages local authorities to make this commitment to action.

- 15 The consultation on the draft climate change programme highlighted the need to raise awareness of the broad range of climate change issues amongst senior management within local authorities. The Government, in partnership with the Local Government Association, the IDEa and the Society of Local Authority Chief Executives, is producing a climate change checklist. The checklist will provide a straightforward way of testing whether each local authority is doing as much as it can to reduce greenhouse gas emissions. And, by using the checklist, Chief Executives will be able to review their own operations and the services they provide against the aims and objectives identified in the climate change programme.
- 16 The Government will consider including a theme related to energy efficiency in the third round of the beacon council scheme. This will help to raise the profile of energy efficiency and climate change within local authorities, as well as the scope for action and the range of benefits which could be obtained. Themes for the third round of the scheme will be announced in early 2001.
- 17 Section 2, chapter 8 and section 4 outline some of the other local government activities that will help the UK to meet its climate change targets.

Regional groups

- 18 The range of stakeholders at regional level have an equally important role to play. Regional Development Agencies, regional chambers and assemblies, sustainable development groups, regional level business and community groups are all now actively participating in their region's economic and social development. New regional strategies and guidance are being planned and prepared and it will be important for these to make sure that they reflect the objectives of this programme. As with local government, some good work is already being done and the Government will be looking to expand and better define the role of regional groups as the climate change programme is taken forward.

Northwest England has been a leading region in its work on climate change. The region benefits from an established stakeholder group, the Northwest Climate Group, and a dedicated secretariat in Sustainability Northwest. The Group was the UK's first regional climate change stakeholder group to be established in April 1998 and it published a regional scoping study of the impacts of climate change in December 1998. The work of the Group achieves a high profile with regional leaders and with a wider audience.

As the regional understanding of some of the impacts of climate change has developed through the Group's work, key issues around climate change have been included in the Northwest's draft Regional Planning Guidance, in the region's new Sustainable Development Framework and in the new Regional Strategy published by the Northwest Development Agency. The Group is continuing its work on impacts and is now looking at ways to help reduce greenhouse gas emissions.

Greater London Assembly

- 19 London's directly elected Mayor and Assembly came to power in July 2000. They represent Londoners' interests on a range of issues and coordinate action on a London-wide basis. Together, the Mayor and Assembly have a general duty to promote the economic, social and environmental well-being of London and will bring forward policies to ease traffic congestion and improve air quality in the capital. In 2001, the Mayor will produce strategies for economic development and regeneration, planning, transport, air quality, municipal waste, noise, biodiversity and culture, against the background of national policy. All these strategies will consider their effect on the achievement of sustainable development and all of them have to be consistent with each other. The Mayor has to produce a State of the Environment report for London that will comment on energy use and greenhouse gas emissions. For this reason, the Mayor has added an energy strategy to those required statutorily.

The Environment Agency

- 20 The Environment Agency for England and Wales²³ has an important part to play in reducing emissions from regulated sites (the Agencies cover about a half of the UK's greenhouse gas emissions). It has already been successful in, for example, encouraging landfill sites to install methane control and energy recovery systems, regulating industry through Integrated Pollution Control and promoting the implementation at industrial and commercial sites of waste minimisation action plans. It will be responsible for much of the implementation of the new Integrated Pollution Prevention and Control system that, for the first time, includes a requirement for companies to use energy efficiently. In addition, the Agency has its own targets to improve the energy efficiency of its buildings and operations and to develop travel plans. Its corporate plan includes a key performance target to contribute where it can to the UK's climate change targets.
- 21 The Agency has other responsibilities relevant to climate change. It is a statutory consultee for planning applications and it is also responsible for operating a range of environmental controls covering, amongst others, water quality, water resources, fisheries, air quality and waste disposal issues. These controls may impact on schemes relevant to the programme such as renewable energy developments where, for example, the Agency will need to consider the impact of hydro schemes on river flows and ecosystems and is likely to have to issue abstraction licences. As with the planning system, decisions made by organisations like the Agency will need to take account of climate change and sustainable energy policy in balancing any local environmental impacts against wider environmental benefits.
- 22 The Agency also has a role when it comes to adapting to the effects of climate change (see section 3). For example, its responsibilities cover coastal and river flooding, water resources and water quality. The Agency is therefore taking action to consider the impact of climate change on its business²⁴ and has also started to take action, for example, by producing guidelines for taking account of climate change in water resource planning.

Business

- 23 Business support of the climate change programme will be critical to its success. To win business' commitment to the process, the programme aims to put in place a policy framework that will stimulate action and allow business flexibility in delivery. The Government and the devolved administrations recognise that business is best placed to develop and market the new technologies that will be needed to reduce emissions in the longer term.
- 24 Many firms have already started to respond to the challenge and the Government and the devolved administrations welcome their positive response. For example, many leading businesses have begun to report publicly on their greenhouse gas emissions; some have set themselves voluntary reduction targets; and others are negotiating targets to reduce the energy consumption of the goods they sell. Others are starting to recognise that they could become uncompetitive if they fail to introduce practices that use less energy and fewer natural resources in line with the most advanced companies. In addition, the business-led UK Emissions Trading Group now includes around 100 companies, trade associations and other organisations who are working alongside the Government on the development of a domestic emissions trading scheme.
- 25 But most businesses in the UK, large and small, from a wide range of different sectors, could do a great deal more. There are many opportunities to improve efficiency and save money while, at the same time, reducing greenhouse gas emissions. Several business responses to the previous consultations noted this and highlighted the variety of genuine 'win-win' solutions to be found. The Government and the devolved administrations would like to see business take these opportunities and details of how they are encouraging this are given in section 2, chapter 4, and in section 4.
- 26 The Government recognises business concern over the possible cost of measures to tackle climate change. It has carried out extensive consultation with business and it has considered the implications for business competitiveness carefully in the assessment of the costs and benefits of its proposals. The programme has been designed to safeguard, and where possible enhance, business competitiveness. The approach is set out in more detail in section 2, chapter 4 and in annex I.

²³ Scottish Environment Protection Agency (SEPA) in Scotland.

²⁴ *The Implications of Climate Change for the Environment Agency*, 1999, The Environment Agency.

- 27 Businesses also need to be more aware of the potential impacts of climate change on their activities. Section 3 gives more details about how climate change might affect the UK, and what business may need to do to adapt to its impacts.

Rank Xerox implemented a corporate quality system for all its activities with the twin aims of achieving continuous quality improvement and waste reduction. The system has meant that specific energy consumption has halved and total costs reduced by £1 million per year.

The savings were achieved gradually by applying an effective, systematic approach to energy management, identifying energy saving opportunities and implementing appropriate solutions. Key projects, with an average six-month payback period, included the use of a building management system, setting up an energy management team and optimising energy use in the boiler house.

Representative groups and trade unions

- 28 There are many groups, for example, businesses, environmental and consumer groups who represent large numbers of other people. They have a major role to play in helping to spread the messages that are contained in this programme. The Government would like as many representative groups as possible to play a full and active part in raising awareness of climate change and in giving practical help and advice on ways to reduce emissions.
- 29 There is great potential for trade unions and their representatives to work in partnership with the Government and businesses to address environmental issues and to promote initiatives in the workplace. Trade unions can help to ensure employee support for new programmes that are aimed at reducing emissions. Committees like the Trade Union Sustainable Development Advisory Committee (TUSDAC) can also provide pertinent advice to the Government and to companies. TUSDAC was set up to represent the views of union leaders and their members on employment issues arising from environmental legislation, training and programmes. It reports on the latest developments in climate change discussions that affect employment and is developing

a Workplace Toolkit. This is an initiative aimed at developing the right tools to enable workforce members to take an active role in reducing environmental impacts in the workplace.

Stimulating action by individuals

- 30 Action by individuals is particularly important, whether at home, at work or in making transport decisions. The snowball effect from lots of individuals doing something – however small a contribution they think that might be – should not be underestimated. And even small changes can make a real difference.
- 31 Within the UK, however, people are generally unaware of the collective impact of their individual actions on the environment. In particular, many do not know about the link between their use of energy in their home or in their cars, and climate change. Yet many say they are concerned and want to do something to prevent it. The challenge for any Government publicity campaign developed to support the UK's climate change programme is to motivate people to take action. A crucial starting point is to inform people about the impacts of their individual actions. That can provide a motivator for action, but by itself is insufficient. People often need further incentives to act. Hence, clear personal benefits need to be communicated, combined with incentives such as those offered under Energy Efficiency Commitments (formerly EESOPS) (see section 2, chapter 6).
- 32 Education and incentives, together with clear explanations of the impact of climate change, has characterised the UK's approach to stimulating individual action. The Government will continue to fund publicity campaigns to raise people's awareness and stimulate action, building on:
- the 'Are you doing your bit?' publicity campaign, which focuses on no cost actions, and encourages culture change;
 - the Government financed Energy Saving Trust programme, designed to stimulate consumers' uptake of energy efficient products and services; and

- Going for Green, a national charity, partly funded by the Government, who is a close partner in reinforcing 'are you doing your bit?' and runs programmes informing people of the lifestyle changes that can make a difference to the environment.

Are you doing your bit?



'Are you doing your bit?' 1999 TV advertising campaign.

- 33 'Are you doing your bit?' is currently in year three of a four year programme to educate and inform people to take action to protect the environment. The campaign focuses on four priority areas: transport, climate change/energy efficiency, waste and water.

'Are you doing your bit?' campaign objectives:

- promote awareness of actions which individuals can take to protect the local/ global environment;
- build/reinforce the link between individual action and climate change;
- mainstream the environment;
- create a strong campaign identity.

- 34 To stimulate individual action, attitudes have to be altered first. The campaign strategy therefore has sought to focus on people and their everyday actions as shoppers, travellers, in the home and at work. Humour, rather than hectoring or hard hitting messages, or illustrations of global disaster, have been used to mainstream the environment and to persuade people that environmental action does not involve personal sacrifice and is something that is relevant to everyone.

Campaign Strategy: Awareness – Interest – Motivation – Action

Year 1 (1998/99): £3.4m.	Educate and inform via press and magazine advertisements. Provide incentives.
Year 2 (1999/2000): £7m.	Inform and motivate via TV, radio and press advertisements. Build national and local partnerships. Use roadshow and regional media to carry messages locally.
Years 3/4 (2000/02): £9m each year.	Motivate via TV, press and magazines. Extend partnerships. Provide consumer incentives via commercial sponsorship.

- 35 The campaign, through its TV and press advertising and through building partnerships at national and local level, is helping to mainstream the environment. People have clearly identified with the campaign's approach. There is increasing recognition that people can 'do their bit' as the campaign has personalised the issue through simple messages such as:

This bit of the atmosphere was helped by Mrs Rumney of Carlisle who turns off lights which saves energy and helps fight global warming.

This bit of Bristol was helped by Mary Campbell who boils a half full kettle which helps save energy and helps fight global warming.

- 36 Having explained the link very simply, the campaign has now developed to motivate people to take action by explaining both the personal and collective benefits of action:

Personal benefits:

Every time you make a cup of tea, boil just the water you need, and in one week you'd save enough energy to light your house for a day.

Collective benefits:

When you make a cup of tea, boil just the amount of water you need and in a day we could save enough energy to light virtually every street lamp in the UK.

- 37 Public reaction has been very positive, with significant shifts in public agreement that the campaign is aimed at them, that doing their bit will make a difference and that they plan to start or increase their actions to help the environment.
- 38 The Government intends to build on that. Links are being developed with major companies to promote campaign messages to employees and to engage consumers in stores through incentives to give the campaign an even greater legacy. The campaign focus continues to be on low cost measures in its TV and radio advertising, but it also signposts people to the wider actions they can take and, particularly, to the work of the Energy Saving Trust.

- 39 Further details can be found on the following website:
www.doingyourbit.org.uk

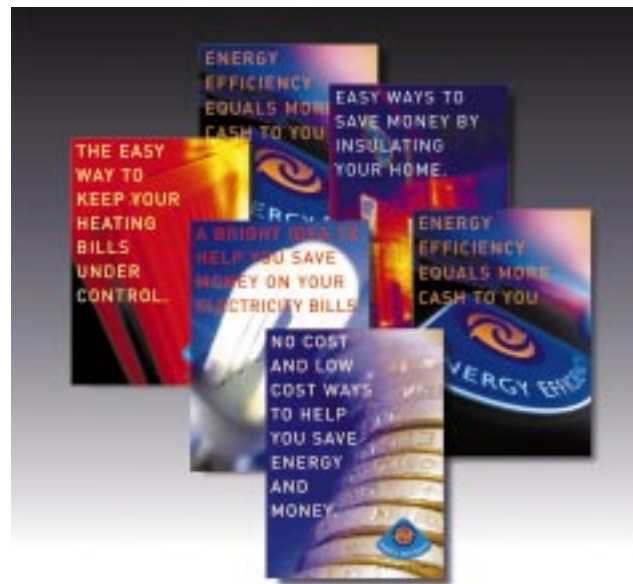
The Energy Saving Trust's 'energy efficiency' marketing campaign

- 40 While 'are you doing your bit?' focuses on the simple actions that people can take and the links to climate change, the Trust's 'energy efficiency' campaign aims to increase consumers' take up of energy efficiency products and services by:

- heightening consumers' awareness that energy efficiency puts money in their pocket; and
- ensuring that energy efficiency products, services and home improvements are high quality and can be purchased easily and with confidence.

This will be promoted through advertising and PR, supported by grants and other incentives, to motivate people to invest in energy efficiency measures.

- 41 The campaign's initial focus concentrated on saving money and energy as a personal motivator. That focus has changed to reflect closer links with the 'are you doing your bit?' campaign and energy efficiency is now presented as a decision people cannot afford to ignore, with the stress on both financial and environmental benefits.



Source: The Energy Saving Trust

- 42 The 'are you doing your bit?' campaign and the 'energy efficiency' programme are mutually reinforcing. Synergies are being further developed. 'Are you doing your bit?', for example, while encouraging people to take simple actions in its main advertising, also encourages people in its supporting literature to go further and invest in energy efficiency measures, taking advantage of the Energy Saving Trust's services.

Going for Green

- 43 Going for Green is a close partner in reinforcing 'are you doing your bit?' and runs a number of programmes aimed at informing people of the lifestyle changes that can make a difference, including saving energy. Some of its programmes include:

- Green Code Programme for Schools which introduces school communities to the issues surrounding sustainable development, including the need to save energy;

- Eco Schools Award Scheme (www.eco-schools.org.uk) which provides a structured programme to encourage and acknowledge school action for the environment, including energy management;
- Eco-Cal which is a computer based programme enabling people to measure how their household and lifestyle has an effect on the environment, including their energy use at home and their personal transport choices;
- Planet Pledge (www.planetpledge.co.uk) encourages individuals, families and businesses to do their bit by pledging to make specific lifestyle changes for the good of the future environment. Examples includes pledges to fit energy saving light bulbs in the home and to use alternatives to the car for local journeys; and
- Sustainable Communities Programme which helps communities to achieve their aims in improving their quality of life and to influence policy and practice towards increasing local sustainable development. This also includes energy efficiency measures.

Fife Council's Brass Monkeys Initiative was designed to raise awareness amongst young people about fuel poverty and how being energy efficient can help to avoid fuel poverty problems. It focused on the difficulties young people experience in cold weather, as recorded by the Youth Enquiry Service and Youth Homeless Project, 'Open Doors Fife'. These organisations worked with young people to produce CDs and cassettes in a format and language appropriate for them. The initiative was launched in January 1998, it is part of Fife Council's Warm and Well in Winter programme, and it was sponsored by ScottishPower and Sound Control. The initiative is currently being used in education and less formal youth provision to raise awareness and inform young people about the issues surrounding energy efficiency, sustainability and climate change.

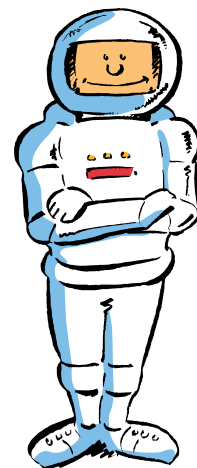
Fife Schools have been actively participating in the ScottishPower Energy Education Project which covers the aims of Environment 5-14 of the curriculum guidelines. The Energy Efficiency Upper Primary resource pack, developed by ScottishPower in partnership with the Energy Efficiency Advice Centre and the Centre for Sustainable Energy, is made available to schools. Primary pupils have also been given talks on energy efficiency. By spring 2000, 120 of Fife's 146 primary schools had taken part in the project.

Educating young people about sustainability and climate change

44 The need to educate and inform children and young people about climate change is an issue that the Government is addressing. In September 1999, the Government announced a revised National Curriculum which creates a new subject of citizenship education. This makes clear reference to environmental issues and sustainable development education in the National Curriculum's general statement of rationale, and the detailed curricula for science and geography. The aim is that children and young people should develop awareness and understanding of, and commitment to, sustainable development.

45 The Government runs an interactive web site for children and young people aged between seven and sixteen, which explains the causes of climate change, why it is causing concern and what they can do to help reduce emissions. This can be found at:

www.schools.detr.gov.uk/global/index.htm



- 46 An information pack for children between the ages of seven and eleven on global warming is also available. The pack includes activities that children can do at home and at school, games and a poster. It is available from the DETR Free Literature Service, tel: 0870 1226 236, or by e-mailing: GA5@detr.gsi.gov.uk

Using I.T. to inform the public

- 47 More and more people are using the internet to find out about climate change and about what they can do to cut emissions. The Government has therefore developed the information available about climate change on the DETR's website (www.detr.gov.uk). The web pages include information for the general public, businesses, individual consumers, the science community and students. There are also links to other relevant websites.
- 48 The Government is currently considering ideas for a new website that gives people authoritative advice on the impacts of the goods they buy, and on how they can act to reduce those impacts. It would include searchable databases which people could use to find the most efficient product that meets their needs.
- 49 Details of other websites which people may find useful may be found at annex J.