

Climate Change Strategic Framework



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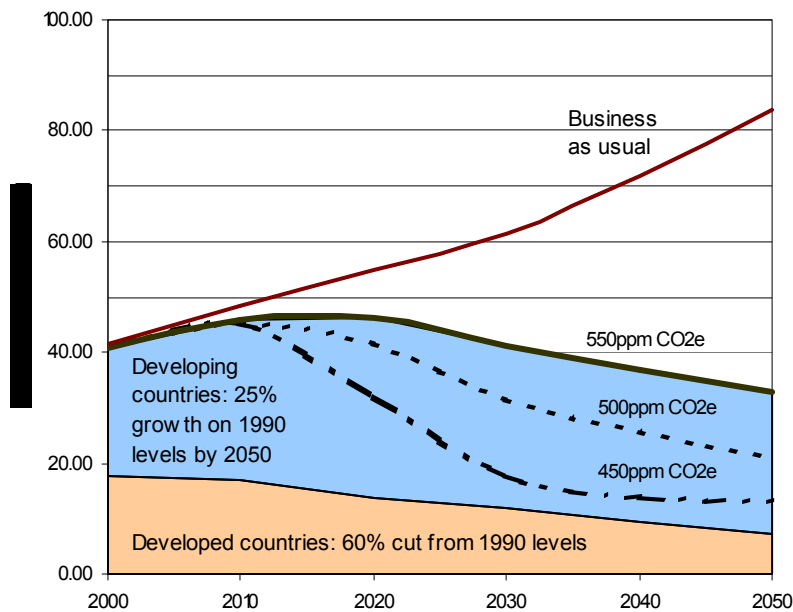
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UK CLIMATE CHANGE STRATEGIC FRAMEWORK

1. Climate change is the most daunting challenge facing the planet. Across the world, citizens, businesses and governments are becoming aware of the environmental, humanitarian and financial consequences of inaction. As former UN Secretary General Kofi Annan said: it has “profound implications for virtually every aspect of human well-being, from jobs and health to growth and security”. The task now is to move from awareness to action.
2. There are strong grounds for being optimistic that we can address climate change. We know the practical solutions, technologies and policies exist to reduce emissions. We know that it will cost less to invest in low-carbon technologies than to deal with the consequences of climate change. We are building on a strong record, with the UK set to achieve nearly double its Kyoto target for cutting its greenhouse gas emissions. The next phase of our strategy must be to extend and deepen action across countries, sectors and parts of society, from government and business to individuals.
3. To do that, the UK is becoming the first country in the world to establish in legislation its goal of becoming a low-carbon economy. This document explains our strategy for achieving the ambitious objectives within our Bill, and how our domestic policy is part of a wider international strategy to create a global low carbon economy. In coming months, it will be backed up by policy documents focused on delivering the targets in the Bill, in particular the Energy White Paper, the Waste Strategy, and the Planning White Paper. This document sets out:
 - the case for action;
 - the opportunities and barriers to addressing climate change;
 - the vision for a low-carbon global economy; and,
 - the UK’s Climate Change Strategic Framework: internationally and domestically.

THE CASE FOR ACTION

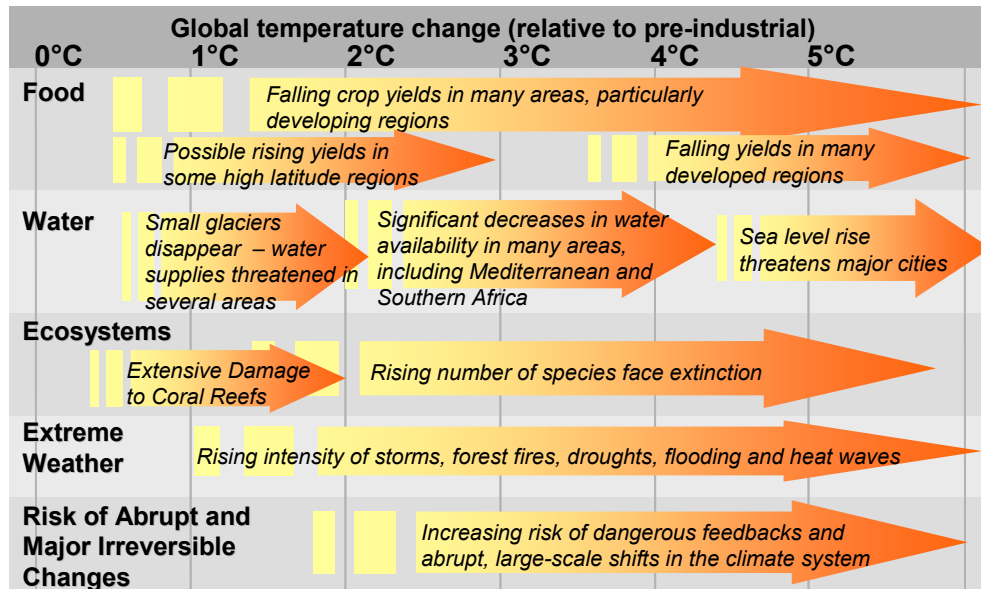
4. The scientific case for action on climate change is unambiguous. The burning of fossil fuels and deforestation have resulted in CO₂ levels rising by 35% since the industrial revolution. As a result, the climate has warmed by 0.74°C over the past century, with 0.4°C of this warming occurring since the 1970s. This rate of change is unprecedented in human civilization.
5. If we carry on with business as usual, as countries grow in wealth and population, the stock of greenhouse gases in the atmosphere will increase dramatically, and climate change could become dangerous or catastrophic. This will have a devastating impact on people, as well as nature.



Projected growth in emissions. The Stern Review recommends a stabilisation goal of between 450 and 550ppm ('ppm' = parts per million concentrations in the atmosphere.)

6. The Stern report showed that, without concerted action, the impact of climate change will be equivalent to a loss in world consumption per head of at least 5% and potentially as much as 20%. Our actions now and over the coming decades could create risks of major disruption to economic and social activity, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th Century. The costs of inaction are also far greater than the expected cost of cutting emissions - estimated at around 1% of GDP if all countries take action.
7. But the economic figures do not express well the humanitarian impact of climate change, particularly in the poorest countries. Extreme weather events such as droughts, storms and flooding will become more common and more intense. Reductions in crop yields will lead to substantial levels of malnutrition. Hundreds of millions of people will be at greater risk from flooding. There will be increasing competition for scarce water supplies. This in turn could trigger mass migration on unprecedented levels and conflict over natural resources.
8. The costs attributed to tackling climate change also underestimate the other benefits of moving to a low carbon economy. In particular, at a time of increasing reliance on imported gas and oil, investment in energy efficiency and low-carbon energy sources can help create energy security as well as tackle climate change.
9. The urgency and scale of the challenge is huge. We have ten to fifteen years for global emissions to peak and then start to decline. If the global average surface temperature increases by more than 2°C above the pre-industrial level, the risks to people and the planet markedly increase. The EU's objective is to limit global warming to no more than 2°C. As the European Commission set out, to meet

this objective, atmospheric concentrations of greenhouse gases have to remain well below 550 parts per million volume (ppmv) CO₂ equivalent, requiring global emission reductions of at least 15% but perhaps as much as 50% by 2050 compared to 1990 levels. Industrialised countries would have to continue to take the lead and explore options to reduce their greenhouse gas emissions by 15-30% by 2020 and 60-80% by 2050.



OPPORTUNITIES AND BARRIERS

10. Global warming is not insoluble. Many of the practical solutions and technologies already exist to ensure we enhance our quality of life while reducing our impact on the environment. For instance, we can reduce our demand for energy, through making homes, cars and products much more energy efficient. We can switch to a range of low-carbon energy sources, from wind and solar power to development of carbon capture and storage technology and biofuels. By producing energy, food and products that use far fewer of our precious natural resources, we need not sacrifice standards of living and reduce our consumption.
11. We also have a good understanding of the policies that will be needed to drive investment in energy efficiency and low-carbon technologies and change behaviour. The first principle is to put a price on greenhouse gas emissions equivalent to the damage it causes to the environment and society, whether through emissions trading, taxation, or regulation. Carbon pricing, alongside measures to accelerate the development of new technologies and remove the barriers to behavioural change should drive investment towards a low-carbon economy.

12. The key barrier is how to mobilise action on a global scale. Unless all major emitters take action, we will not stabilize atmospheric concentrations of harmful greenhouse gases at a safe level. But countries will be reluctant to take on the costs of reducing emissions unless they are confident that other countries will also act. Otherwise they risk facing the costs of switching to a low-carbon economy without the benefits from avoiding dangerous or catastrophic climate change. And countries will not participate in an international agreement, unless there is an equitable distribution of responsibility between richer and poorer nations.

13. The UK therefore faces two strategic challenges.

- how to mobilise support for an international agreement that will drive investment in a low-carbon global economy,
- how to minimise the costs, and maximize the benefits of the UK moving to a low carbon economy. The risk is that we move too far and too fast and place business at a competitive disadvantage, or threaten our ability to maintain secure and reliable energy supplies. The opportunity is that by early UK action we can become leaders in the emerging markets created by environmental industries, diversify our energy sources and avoid locking ourselves into long term investments in high-carbon infrastructure that will increase the costs of moving to a low-carbon economy.

VISION

14. If the global economy is to make deep cuts in greenhouse gas emissions, we will have to live, work and travel differently. The economy will have to become more energy efficient, and use low-carbon energy sources.

15. The power and responsibility to create a low-carbon economy is distributed across society. Every part of society will have to contribute, from government and the public sector to business, consumers and civil society. It need not require a reduction in our standard of living or economic progress, but will require changes in investment and behaviour across society.

16. The scale of change is similar in scope to the first industrial revolution. The boxes below sets out a vision of how we will move to a low-carbon economy in the sectors that account for the vast majority of UK emissions: electricity, heat, and transport. The changes set out are illustrative. It is not for government to prescribe the precise solutions, but to create the policy framework to drive the sort of changes described below.

ELECTRICITY

High carbon economy

Most electricity comes from coal, oil and gas

Products are energy inefficient

Energy suppliers profit from supplying as much electricity as possible

Most consumer don't improve their energy efficiency because of a lack of information, up-front costs, and inconvenience.

Low carbon economy

Electricity comes largely or wholly from low-carbon sources: renewables such as wind, wave and tidal; coal-fired power stations have Carbon Capture and Storage, and Nuclear power.

Products are made lighter, more energy efficient, and easy to recycle

Energy suppliers profit from delivering services (e.g. 'light') which may be by responding to demand, but also helping consumers reduce their energy use, or installing micro-generation.

Most consumers undertake a home energy audit, and have access to companies that can provide a hassle-free renovation service where you can buy now, but pay later as your energy bills come down.

HEAT

High carbon economy

Homes are built that are draughty and waste energy.

Most homeowners do not invest enough in insulation even though it will save them money.

Heat generated for other processing including for electricity is wasted.

Heat generated from burning oil, coal and gas.

Low carbon economy

All new homes are built to require far less or no heating because of insulation, better design and micro- and community scale generation

All homeowners have access to a hassle-free service to reduce their energy demand and invest in insulation.

Waste heat is used through 'combined heat and power' technologies.

Heat is generated from low-carbon fuels and technologies such as biomass and waste.

ROAD TRANSPORT

High carbon economy

Most cars are fossil fuel powered

Fuel suppliers focus on petrol and diesel

Car use increases as incomes rise and fuel efficiency improves

Consumers buy cars with high environmental footprint

Low carbon economy

Vehicles are more fuel efficient, and use low carbon fuels – initially biofuels, and also in the long term electric power or hydrogen fuel cells.

Fuel suppliers create an infrastructure to support biofuels or other types of fuel and engine.

People make more sustainable transport choices including greater use of public transport, walking and cycling.

Consumers are aware of the environmental footprint of cars, and take greater account of this in their purchasing decisions.

17. In the UK, other critical sectors of the economy where we need to do more to tackle greenhouse gas emissions include agriculture and waste management. Internationally, a critical sector is deforestation which accounts for nearly a fifth of global emissions. In each sector, there are ways of reducing emissions. Waste can be reduced by designing leaner products, using less packaging, diverting waste from landfill and increasing recycling. Agriculture can reduce emissions by reducing fertilizer use and creating renewable energy from for example the anaerobic digestion of livestock manure and food waste. A way of reducing deforestation can be by finding ways of financially valuing the carbon benefits from avoided deforestation.

STRATEGY

18. Our strategy is based on action at all levels: through international agreement, through the European Union, and through action within the UK by government, businesses, communities and individuals.

INTERNATIONAL FRAMEWORK

19. If countries are to invest in making the transition to a low-carbon global economy, they need to know that their actions will be reciprocated by others. Climate change is a global problem and requires global cooperation.

20. We need to create an international framework from 2012 onwards (the end of the first commitment period of the Kyoto protocol) If we are to establish a post 2012 framework, this needs to be agreed by 2009 in order to provide sufficient time for countries to ratify the agreement and ensure a seamless transition. We therefore want to agree the building blocks of an international framework by the end of 2007, for detailed negotiation in 2008.

21. Our aim must be to make a reality of the United Nations Framework Convention on Climate Change principle of 'common but differentiated' responsibilities: common because all countries need to take action, but differentiated because richer nations who are responsible for the historic build up of emissions must take more responsibility than developing countries.

22. We consider that the key building blocks of such a framework are:

- **A long-term goal:** This would provide clarity on the level of emissions reductions and the timescale for making the transition. It would stimulate investment in low carbon technologies and provide more clarity on the scale of the investment required to adapt to unavoidable climate change. The goal could be framed in terms of a maximum acceptable temperature rise, or atmospheric concentration levels of greenhouse gases or required levels of emissions reductions.
- **Creating a global carbon price:** the Kyoto Framework enables emissions trading between governments, and between businesses. This is the basis for the EU Emissions Trading Scheme. Carbon markets creates global prices for carbon and stimulate private investment in clean technology and energy efficiency, rewarding those businesses which develop future technologies first. Carbon markets have the potential to generate enormous resource transfers to developing countries through mechanisms such as the Clean Development Mechanism. The carbon market will be driven by deeper emissions reductions by developed countries, but developing countries should also be enabled to reduce the emissions intensity of their development through using instruments such as no-lose targets, sectoral or regional agreements and other measures.
- **Technology and energy efficiency:** emissions trading will be necessary but insufficient to drive the investment in low carbon technologies at the scale and speed required. It needs to be combined with technology policies. These could include regulatory standards for particular sectors, investment in developing and deploying new technologies, supported by the World Bank's Energy Investment Framework, and trade agreements to transfer low-carbon technologies to India, China and other emerging economies and developing countries.
- **Deforestation:** emissions from deforestation in developing countries amount to nearly 20% of global carbon dioxide emissions. Deforestation also severely harms biodiversity. A future agreement must contain incentives for

sustainable forestry management that reflect the value of avoiding deforestation.

- **Adaptation:** We must deliver on our commitment to support developing countries to adapt to the unavoidable effects of climate change. Through funding for development assistance, we must help countries adapt to the climate change already in train, and find ways of scaling up other sources of funding. We also need to help developing countries access better information and research on climate risks and how to ensure their development is resilient to climate changes.
23. The UK is playing a leading role in helping to create an international framework. Our gameplan for achieving an international framework focuses on four main activities:
24. **Domestic actions to show leadership:** in order to break the logjam of distrust within international negotiations, where countries are unwilling to engage in discussions because they believe no country is prepared to take action, we will be showing strong leadership domestically to achieve reductions above our Kyoto commitments and working with other developed economies with ambitious targets. Domestic action can change the terms of the debate by demonstrating that moving to a low-carbon economy need not be at the expense of economic growth and social welfare, and that the industrialized countries are prepared to act.
25. **High-level political engagement:** if we are to secure an international framework, we must make climate change a priority for Heads of state and all the key departments in each country that will be affected by climate change, including finance ministries, and those responsible for national security, energy, development and foreign policy. Climate change must stop being purely an environmental issue. In advance of the formal UN process that will culminate in Bali in December 2007, we will therefore be engaging the leaders of the G8 plus 5 which includes all the major greenhouse gas emitters through a series of activities: the G8 + 5 meeting of Environment Ministers in Potsdam in March, the G8+5 Development Ministerial, the G8 + 5 Summit in Heiligendamm in June, leading to the Gleneagles Dialogue with Energy and Environment Ministers in September. The EU also has a critical role to play here and we will be working closely with the Commission and other Member States following on from Heads of State Spring Council meeting. The International Financial Institutions meetings, especially the World Bank spring and annual meetings are also a key opportunity to push this agenda forwards.
26. **Analysis of the economics and science of climate change:** an international agreement will require countries to appreciate that it is in their financial self-interest to cooperate. Building on the Stern Review on the Economics of Climate Change, we will therefore be working with individual countries to understand the specific costs and benefits of action on climate change in comparison with the impact of business as usual. Utilising UK scientific expertise, we will support the

international scientific community in addressing the causes and understanding the consequences of climate change.

27. **Low-carbon technologies and demonstration projects:** By demonstrating the potential of low-carbon technologies to meet energy needs, particularly in the developing world, we can prove that the choice is not between sacrificing growth and living standards and saving the environment, it is between high-carbon and low-carbon development. The World Bank's Energy Investment Framework will be vital for gearing up low carbon investment and supporting developing countries to improve their domestic investment climate. Within the UK, we are assessing the costs of the technology to enable a decision in 2007 on whether to support a UK-based demonstration plant. We are continuing to work with the Norwegian Government, including a joint study of the infrastructure needed to transport and store carbon dioxide beneath the North Sea. We are also, alongside the EU, working with China on demonstrating Carbon Capture and Storage through the Near Zero Emissions Coal project and aim to extend this approach to other key emerging economies. We will also work with international partners to raise the energy efficiency standards of traded goods, such as lighting and consumer electronics.

Carbon Capture and Storage: Coal will continue to be a significant part of the UK's, the EU's and world's energy mix. This is unavoidable and it is therefore essential that we deploy technology that will make coal climate compatible. Carbon Capture and Storage (CCS) is a process that involves capturing carbon dioxide emitted from the burning of fossil fuels and other industrial processes, and storing it underground, for instance, in old oil and gas fields. CCS technology is currently being demonstrated and has the potential to become commercially viable. To accelerate its development the UK and EU are working with China on the Near Zero Emissions Coal Initiative to demonstrate the technology in China. The European Commission has proposed an initial view that that from 2020, all new fossil fuel-fired power stations built in the EU should capture and store CO₂, subject to developing the necessary technical, economic and regulatory framework to achieve this. We fully support the Commission's ambition.

EUROPEAN UNION

28. Climate change must be a defining part of the mission for the European Union over the next decade. By forming a single negotiating block, the EU will be influential in forging a post 2012 framework. As the largest single market in the world, the EU has the critical mass to drive the transformation of markets in cars and appliances through regulation. By introducing harmonised carbon pricing systems at a European level, UK businesses do not suffer from any intra-EU competitive disadvantages.
29. Over the next year, as set out below in the section on domestic policy instruments, the UK will be pushing for major reforms to strengthen the European Union Emissions Trading Scheme and the regulation of products.

30. At the Spring European Council on 8/9 March 2007, EU Heads of Government agreed an ambitious, independent binding target to reduce Europe's greenhouse gas emissions by at least 20% by 2020 (compared to 1990 levels) and increase this commitment to a 30% reduction as part of an international agreement. They also decided to: increase the use of renewable energy sources so that they make up 20% of EU energy consumption by 2020, with differentiated overall targets for Member States; ensure that a minimum of 10% of EU transport petrol and diesel consumption comes from bio-fuels by 2020; promote energy efficiency by reducing overall EU energy consumption by 20% by 2020; and stimulate the use of new technology on clean coal power stations, with the aim of bringing environmentally safe carbon capture and sequestration (CCS) to deployment with new fossil-fuel power plants, if possible by 2020

UK ACTION

31. The Government has one of the best track records in the world on climate change. We are one of only two countries out of the EU-15 on track to meet our Kyoto obligations, and are actually projected to achieve nearly double our target. At a time when the economy has grown by 24% since 1997, greenhouse gas emissions have gone down by 7%. Policies such as the Climate Change Levy package are predicted to reduce carbon dioxide emissions by over 22 million tonnes per year. Renewable power generation has doubled since 1997. At the same time we have enjoyed unprecedented levels of sustained economic growth.

32. However, while our record compares well internationally, we have still fallen short of our targets. CO₂ emissions have increased since 1997 by 1%. If we are to show leadership internationally, and minimise the costs of moving to a low carbon economy, we need a stronger domestic policy on tackling climate change.

Carbon Budgets

33. The Climate Change Bill is the beginning of a fundamentally new approach for the UK to tackling climate change. The goal of the Bill is to demonstrate the leadership required to encourage others to engage in an international framework, to minimise the cost of making the transition to a low-carbon economy, and create a framework to enable the UK to meet its domestic and international obligations.

34. Our approach is to provide the long term credibility required to stimulate investment in a low-carbon economy, by being clear about the level and timescale for reducing carbon dioxide emissions, while creating the flexibility to allow emissions to be reduced in the most cost-effective sectors and geographical locations.

35. The Bill proposes binding legal commitments to reduce the UK's contribution to carbon dioxide emissions, through domestic and international action, by 60%

below 1990 levels by 2050, and by between 26 and 32% by 2020, with government being held to account through five year carbon budgets, and independent annual reporting against progress in Parliament. An independent *Committee on Climate Change* will recommend five year carbon budgets to meet our long term targets in a way that maximises benefits and minimises costs to the UK - based on a range of criteria including scientific evidence on climate change, economic factors, social circumstance and the international context.

36. Carbon budgets mean that every tonne of carbon dioxide will count. If the UK over achieves one year, it can be carried over to the next, but if the UK underachieves extra effort has to be made later, just as you would expect to balance a financial budget during an economic cycle. Carbon budgets mean that emissions can be calculated, and managed, over a longer period than a single year. This makes it more flexible and comprehensive than targets set for a single year, and annual reporting to Parliament by the new independent *Committee on Climate Change* will act as an indicator as to whether the Government is making the right level of effort to meet the budget requirement.
37. Carbon budgets will be set for three periods ahead. By making such clear commitments 15 years ahead, we will give business greater clarity to make the most cost-effective transition to a low-carbon economy and help avoid being locked into high-carbon energy investments. Early, gradual action is likely to be more cost-effective than later but more abrupt change. The carbon budgets established in legislation will shape all subsequent policy decisions, ensuring the UK is on track to achieve its 2050 target.
38. The focus of the Climate Change Bill is ensuring the UK takes fair responsibility for reducing global emissions. But some changes to our climate are inevitable given the historic build up of emissions in the atmosphere. Adaptation measures, such as flood defense, are needed to protect the UK from the impacts of the climate change already in train. The draft Bill therefore also includes a reporting requirement on the Government with regards to adaptation policy.
39. To mobilise investment and behavioural change across sectors, government needs to act as a role model for change and play an enabling role for others to follow suit. Every part of society can and will play its part, but only if they feel there is a clear shared goal, that their actions are being reciprocated, and if given the right combination of information, incentives and regulation.
40. Where possible, we will seek to get changes at a European level. But action is also required at a UK level. This year we will bring forward a series of policy measures through the Energy White Paper, the Marine White Paper, the Planning White Paper and the Waste Strategy as well as new measures to help citizens make more informed choices.
41. The first element of our approach is to put a price on carbon, so that energy efficient and low-carbon investment is incentivised. There are three ways of doing this: emissions trading, taxation, and regulation. In each case, we will

asses measures in terms of their cost effectiveness and, where appropriate, their impact on the security of our energy supplies.

Emissions trading

42. Emissions trading involves establishing a cap on emissions for the sectors covered by the scheme, but allows organisations either to make reductions within their own organisation or buy reductions from other companies or sectors if it is cheaper to reduce emissions in that way. This establishes a carbon price which will vary depending on the level of the emissions cap and the cost of making savings.
43. The EU Emissions Trading Scheme (EU ETS) forms a central component in the Government's domestic policy framework to tackle climate change. Nearly half of UK CO₂ emissions are covered by the EU ETS including all emissions from electricity production. We want to reform the EU ETS to provide certainty on its long term future beyond 2012, widen its coverage across sectors and greenhouse gases with aviation becoming part of the EU ETS as soon as possible, and surface transport under consideration. We also want to link the EU ETS to emerging carbon markets in other countries as we work towards a global carbon market.
44. As well as European emissions trading, we are considering the creation of UK emissions trading schemes, such as the Energy Performance Commitment for large organisations, including supermarkets and local authorities. The enabling powers within the Climate Change Bill will allow emissions trading to cover all greenhouse gases and sectors within the economy should this represent the most appropriate policy option.

Carbon trading: the European Emissions Trading Scheme sets a limit on emissions from power stations and energy-intensive businesses. Companies can either stick to their quota, make reductions and sell their excess allowances on, or buy allowances from companies who have made reductions. Nearly half of Europe's carbon dioxide emissions are covered by the scheme. The Scheme began in 2005 and puts limits in place on emissions from heavy industry in line with the EU's and Member States' international obligations. The carbon price this scheme generates will act as an incentive for companies to reduce their own emissions either through using cleaner fuels or investing in new technologies and energy efficiency, or require them to buy the equivalent emissions reductions from elsewhere.

Aviation: Low carbon technologies in aviation are a long way from being technically and commercially viable. However, that does not mean nothing is being done now. The UK has been working hard to reduce emissions through various means, such as promoting improvements in the efficiency of aircraft engines, improving air traffic management and supporting voluntary action by industry.

In parallel, the UK has been and continues to press for the inclusion of aviation within an overall emissions limit – the EU Emissions Trading Scheme. This means that if sufficient emission reductions cannot be made in the aviation sector, then it will have to fund those reductions made elsewhere through trading. Building on the success of our Presidency of the EU in 2005, we will now be working with the Commission and other Member States to progress the Commission's legislative proposal of December 2006 to include aviation in the EU Emissions Trading Scheme.

Taxation

45. Tax is a key instrument in climate change mitigation. Taxation works in the opposite way to emissions trading: taxation involves setting a carbon price and allowing the level of emissions reductions to vary according to how people and organisations respond to the penalty. Emissions trading guarantees the environmental outcome, but allows the carbon price to adapt to meet it; taxation fixes the carbon price, but cannot guarantee the level of emissions reductions. The advantage of emissions trading is that it guarantees the emissions reductions will be achieved as the carbon price will rise to the level required to change behaviour. The advantage of taxation is that policymakers can establish the price of carbon and therefore limit the cost to the economy. Transaction costs can also be lowered as taxation requires fewer administrative burdens than trading arrangements.
46. Since 1997, the Government has introduced a range of tax measures which price carbon, or which support emissions reduction by providing incentives to change behaviour and support low carbon technologies. For example:
- **Business and Public Sector:** In 2001, Government introduced a package of measures to support business energy efficiency centred around the climate change levy, a tax on business and public sector energy use. The tax incentivises business energy efficiency and by 2010 it is estimated that the levy will have reduced energy demand in the commercial and public sector by around 15%. To support the competitiveness of the most energy intensive firms, Climate Change Agreements were also introduced which entitle eligible firms to a 80% reduced rate of tax provided they agree to binding energy efficiency targets with Government.
 - **Transport Sector:** The current system of motoring taxation provides incentives to individuals to drive less and to use other modes of transport

(through fuel duty), to drive in a more environmentally friendly way (again through fuel duty) and to purchase more environmentally friendly cars (through the gradation of Vehicle Excise Duty, the Company Car Tax regime and through fuel duty). In setting these tax rates the Government also takes into account the other external costs of motoring such as congestion and the need to maintain sound public finances.

Regulation

47. Emissions trading or taxation are necessary but often insufficient to drive investment with sufficient scale and speed to transform sectors. For example, if business is uncertain about the carbon price or tax in the long term, it can deter investment. Regulation can therefore play a role in bringing forward new technologies or overcoming barriers to change. Regulation can provide long term clarity about the transition a sector needs to make and thereby stimulate innovation. It can also focus on sectors with specific opportunities for major reductions. It can also effect changes where key decision-makers are outside the UK – driving up the environmental performance of imported appliances, for example.
48. Over the next year, the UK and the EU, will bring forward proposals on regulation to transform a series of sectors:
- **Zero Carbon Homes:** The Department for Communities and Local Government consulted in December last year on proposals to make all new homes zero carbon by 2016. The proposals would mean that new homes would produce on average zero net emissions over a year, through better insulation and through the use of renewable energy, like solar panels. This would be achieved through progressive improvements in building regulations to meet the 2016 zero carbon target, supported by a voluntary Code for Sustainable Homes. The Code sets environmental standards for housebuilders that want to go further, ahead of the proposed regulatory changes. The draft Planning Policy Statement on Climate Change, published for consultation at the same time, sets out a planning framework that will support the move to zero carbon through the way development is located, designed and planned, including through greater use of renewable energy.
 - **Low-Carbon Fossil Fuel Power:** The EU is currently considering how to bring environmentally safe carbon capture and storage (CCS) to markets, if possible by 2020 and is working towards strengthening R & D and developing the necessary technical, economic and regulatory framework to achieve this.
 - **Car emissions:** the EU has issued a communication which sets out its ideas on what should replace the current voluntary agreements on new car CO₂, which expire in 2008-9. The Commission intend to propose a legislative framework which will focus on a mandatory scheme to achieve a new car

average target of 130 gCO₂/km by 2012 and a further 10gCO₂/km reduction from other technological improvements and increased use of biofuels.

- **Products:** we will be pressing the EU to bring forward product regulation to increase energy efficiency, for instance, in household lighting appliances. Cooperation with the wider international supply chain, including domestic retailers and international manufacturers, is critical to achieving a long term transformation of these markets.

Low-Carbon Transport: there is strong potential to transform our cars, lorries and buses away from relying on fossil fuels. This can happen through a range of technologies: today biofuels can be made from sugar beet, corn and other produce; but a new generation of biofuels is under development which can use a much wider range of materials including wood and waste, with even better greenhouse gas savings. Improvements in battery technologies are being developed with application in hybrid and some fully electric vehicles (charged by connecting up to the grid). In the medium term, this technology is increasing the speed and range of electric vehicles and reducing charging times particularly when allied to lighter, and hence more fuel-efficient cars.

Technology transformation

49. The second strand to our approach is aimed at driving the transformation of technologies, in particular through Government procurement and subsidy. Carbon trading, taxation and regulation are the main ways of driving new technologies by creating a strong demand for low-carbon technology. As long as carbon does not have a value, the energy market will remain dominated by the least cost type of generation which historically has been based on fossil fuel generation. And there are a number of other market failures that prevent the development of technologies, even with carbon pricing. Some are generic to all new technologies. Companies face uncertain demand for products. They may invest in R&D, but the knowledge generated does not stay within the company so they do not always receive the full benefits. These barriers can stifle innovation. Some barriers are specific to energy. For instance, there is currently very low demand from consumers for 'low carbon' energy as consumers tend to primarily value price. In sectors, where price alone is the basis of comparative advantage, innovation can be stifled.
50. And as already noted, risk and uncertainty over government action are major barriers to investment. The fact that the price of carbon, and hence likelihood of an eventual profit, depends on government action, (and, in the case of the EU ETS, on other governments too) means that a company deciding to invest in technology development is dependent on a political commitment over many decades (see 'long lead times' below). This is one of the key reasons for putting UK policy on a statutory footing all the way to 2050.

51. Over the next year, we will be making major steps to address the remaining barriers:

- As set out in the **Sustainable Procurement Action Plan**, the Government intends to use the £150 billion of investment by the public sector to drive the transformation of particular products. Through more joint procurement, with clarity over the long term emissions reductions required, government can help provide large-scale demand for low-carbon products from vehicles and computers to lighting.
- The new **Energy Technologies Institute**, a 50:50 joint public/private venture, will have a budget of up to £1bn over ten years to accelerate the pace and the volume of research activity directed at future low carbon energy sources. The Institute will connect together the best scientists and engineers working in academic and industrial organisations both within the UK and overseas.
- The **Planning White Paper**, to be published shortly, will also set out proposals to remove the barriers to new low-carbon energy. Decisions on new energy investment, such as wind farms, have national and international benefits beyond the locality in which they are situated. The White Paper will propose ways of speeding up decisions and ensuring projects of national importance are decided nationally.

Mobilising behaviour change

52. Incentives are necessary to mobilise behavioural change, but if we rely on them alone it will be unnecessarily costly. If we are to avoid relying on sharp price increases in high-carbon goods and services to change behaviour, we need to use a range of other measures.

53. Individuals and businesses often fail to act because they lack information and feedback on how their behaviour incurs energy costs, and how simple changes can reduce them; inconvenience and relatively low rewards means that citizens do not make investments that will save them money; and citizens and businesses may be put off changing their behaviour if they do not believe there is a shared willingness to act, cannot see any role models, and feel their contribution will not be matched by others. Over the next six months, we will be introducing a variety of changes:

- Information: in the Energy White Paper, we will set out proposals on real-time information on energy use. All homes put up for sale will have to have an **Energy Performance Certificate** providing details of the energy efficiency of the building. Later this year, we will launch a **Personal Carbon Calculator** that will enable each person to measure their carbon dioxide footprint. We are also assessing the cost-effectiveness and feasibility, in the long term, of personal carbon allowances where people are allocated carbon credits, and

can sell their spare allowances if they can cut their emissions, or buy from others if they cannot.

- Making change convenient: we will also work with companies, as part of the promotion of our **Offsetting Standard**, to ensure all citizens are given the choice to offset their emissions at the point of sale. We will be working with airlines, travel companies and energy suppliers so that all consumers are given an explicit choice of whether or not to offset their travel with offsetting potentially becoming the 'default' option, rather like a restaurant service charge. To encourage more households to become low-carbon, and to develop the energy services model, we will examine the possibility of establishing new methods of financing energy audits and energy-saving measures that could over time pay for themselves in lower fuel bills.
- Shared willingness to act: individuals and business want to contribute, but Government must first set an example. The Government is committed to reducing carbon emissions from Government's offices by 30% by 2020 and making the office estate Carbon Neutral by 2012. The Sustainable Development Commission publishes an annual report of Departmental performance against these targets. We will also be greening the wider public sector, and its supply chain, through a focus on sustainable procurement. A series of major companies are also promoting change, through the proposed 'We're in this together' campaign. The Government will also work with a range of industries to secure sector-wide voluntary agreements to reduce environmental damage. For example, the **Waste Strategy**, to be published later this year, will set out proposals for an extension of the voluntary agreement with the Direct Mail Association on junk mail. We are also currently in discussion with retailers and manufacturers on consumer electronics and lighting. Defra has recently announced agreement with UK retailers on cutting the environmental impact of carrier bags.

CONCLUSION: TOWARDS ONE PLANET LIVING

54. According to the WWF, if everyone in the world were to consume natural resources and generate carbon dioxide at the rate we do in the UK, we'd need three planets to support us. Our goal must be to move towards one planet living in a way that minimises economic costs, and ensures an equitable distribution of responsibility between generations, nations, and sectors.

55. The Climate Change Bill is a critical foundation. It establishes our goal to become a low-carbon economy within a strong global framework. But to achieve it, we need sustained action from all parts of society. The Government and the public sector must set an example and enable other countries, businesses, and individuals to play their part. Climate change is the greatest environmental risk facing all of us. It will require the greatest of efforts from all parts of society if we are to tackle it.