National Audit Office

CLIMATE CHANGE POLICY: OPTIONS FOR SCRUTINY

A REVIEW BY THE NATIONAL AUDIT OFFICE

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SUMMARY

1 This briefing is intended to facilitate the Environmental Audit Committee's further work on climate change. Parts 1 to 3 of this briefing set out the evidence base to enable future inquiries to be structured around the issues which the Committee feels are most significant.

2 Climate change cannot be considered as a purely environmental issue; it has implications across government, the economy, and society. Given the breadth of the topic, and the potentially extensive range of options for future inquiries, in Part 4 of this briefing we suggest a number of ways that the Committee could break down the topic. These are as follows:

- targets, progress and forecasting;
- policy instruments;
- greenhouse gases;
- economic sectors;
- governance and coordination;
- monitoring and reporting; and
- the bigger picture.

This classification could act as a framework for a full inquiry covering all possible aspects of climate change policy, or the Committee might prefer to take these topics separately. For each of these topics, there are many issues which the Committee may wish to explore.

3 The Committee is therefore faced with the challenge of prioritising these issues in order to maximise its inquiries' impact on the UK's policy response to climate change. This is no easy task. Climate change experts – in government, non-governmental organisations, academia and the private sector – will have differing perspectives on which topics merit the greatest consideration, and the recent publication of the revised Climate Change Programme may also cause these priorities to shift as policy evolves. Nonetheless, having a framework within which inquiries can be scoped and designed will enable the Committee to select inquiries independently of policy intervention or the latest media focus.

4 At this stage, however, the Committee may find it helpful to pick up on those aspects of climate change policy where there would appear to be most still left to do:

i The Committee has already launched an inquiry on 'Reducing Carbon Emissions from **Transport**'; this is an ideal opportunity to review policy within a sector responsible for significant greenhouse gas emissions where emissions have been growing.

ii Policy focussed on emissions from the **residential or domestic sector** may also be worth scrutiny. Trends, whilst downwards, are weak and there are few current policy instruments which are likely to bring about significant change; at the same time the scope for improvement in domestic energy efficiency is significant, as the Environment Food and Rural Affairs Committee has reported.

iii **Agriculture and the service industries** (including retail) are other sectors which are relatively untouched by policy instruments to require or bring about significantly lower emissions. How much scope is there to bring them within efforts to reduce greenhouse gases?

iv Another topic for scrutiny would be **how to ensure successful delivery** – why did earlier strategies and policies fall short of expectations and prevent achievement of the UK domestic target for carbon dioxide reductions? How confident can government be that the revised Climate Change Programme and associated policies will be successful? Will government be establishing a trajectory and interim targets to provide an early warning if progress is faltering?

v The Stern Review (expected later in 2006) will focus attention on **longer term thinking**. That review will address the balance between national and international action, the costs and benefits of climate change, and the mix between mitigation and adaptation strategies. At the same time, the UK has a target to reduce carbon dioxide emissions by some 60 per cent by 2050, with significant progress towards this goal by 2020: can this be achieved within the current strategic framework?

vi The Committee could also focus its attention on the effectiveness and operation of those **key policy instruments** thought to make the greatest impact on emissions reductions, namely:

- the EU Emissions Trading Scheme;
- the Climate Change Levy and Climate Change Agreements;
- the Renewables Obligation;
- vehicle manufacturers' voluntary agreements and Vehicle Excise Duty;
- the Energy Efficiency Commitment;
- the Fuel Duty Escalator; and
- the revised Building Regulations.

PART 1

BACKGROUND

1.1 The Prime Minister stated, in the foreword to the recently published 2006 UK Climate Change Programme, that 'climate change is probably the greatest long-term challenge facing the human race'[1]. Recognising the importance of climate change, the Environmental Audit Committee (the Committee) has declared its intention to 'put climate change at the heart of its work over the [current] Parliament'[2].

1.2 But climate change is a very large and complex subject. In this briefing we set out to map climate change policy in the UK, including the key policy instruments employed by government, to help the Committee focus its future work on this important topic. By 'climate change policy' we refer to those policies designed to mitigate (that is, to lessen the degree of) climate change and not those policies for which the principal purpose is to adapt to the effects of climate change (such as sea level rise or greater storminess).

1.3 We take as given the majority scientific opinion that climate change is a fact, and that it is caused by emissions of greenhouse gases from human activities – it is not our role to review the science of climate change, in a field where others have much greater competence.

1.4 This briefing is intended to provide the evidence base to enable the Committee to take forward further work on climate change. The briefing is structured as follows:

- the rest of this Part provides the background to climate change policy in the UK;
- Part 2 describes the sources of greenhouse gas emissions in the UK, trends and progress towards targets;
- Part 3 gives an overview of the UK's current policy instruments designed to mitigate climate change; and
- Part 4 presents a series of options for future Committee inquiries.

The development of climate change policy

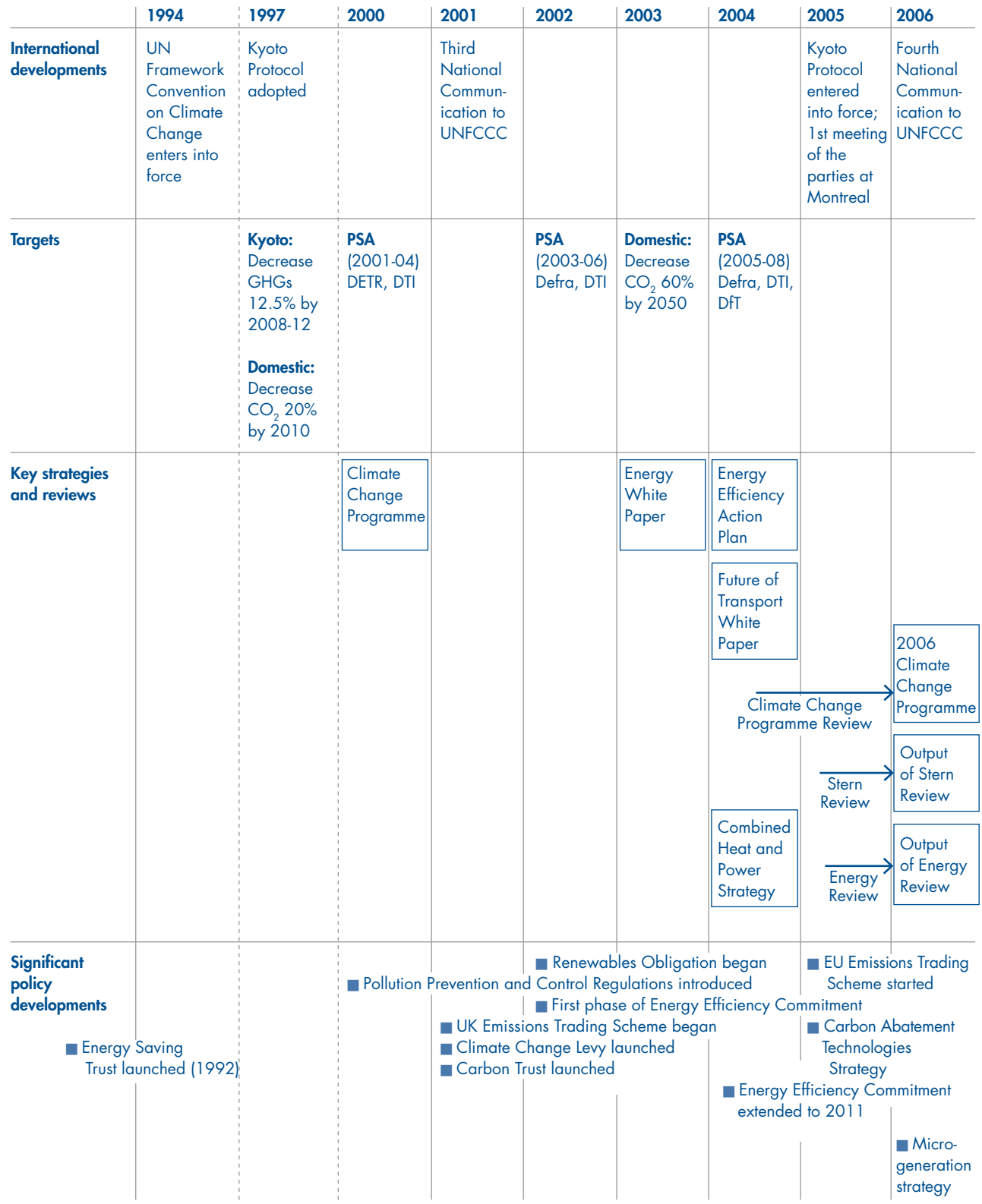
1.5 **Figure 1** shows the major developments in UK climate change policy. In the run-up to the Rio Earth Summit in 1992, governments negotiated the UN Framework Convention on Climate Change (UNFCCC)[3] which entered into force in 1994[4]. In 1997 the Kyoto Protocol[5] established stronger and more detailed commitments for industrialised nations. The UK is a signatory to both the Convention and the Kyoto Protocol and, as such, is required to prepare periodic 'National Communications' on the UK's progress towards greenhouse gas emission reductions.

1.6 As the UK contributes to only two per cent of global carbon dioxide emissions[6], UK climate change policy will have little impact unless it is part of a wider global effort. Defra recognises that 'UK leadership is shaping the way other key players are considering the future of climate change policy'[7]; which indicates that the UK's domestic policy on climate change can have wider impacts than on UK emissions alone.

1.7 Following Kyoto, UK climate change policy was reviewed and brought together in the 2000 Climate Change Programme[8], which in turn was followed by linked but separate policy statements on topics such as energy[9], energy efficiency[10] and transport[11]. These policy statements cover existing policies and introduced some new ones.

1.8 The revised UK Climate Change Programme, published in March 2006, sets out the policies and priorities for action in the UK and internationally[12]. It builds upon the 2000 Climate Change Programme, but sets out the government's intention to 'go further' to mitigate climate change.

1 A timeline of key developments in UK climate change policy



Source: National Audit Office

Climate change targets

1.9 The UK is subject to three key targets, the first two of which are detailed in a PSA target (2005-08) shared by Defra, DTI and DfT[13]:

- under the Kyoto Protocol the UK is required to reduce its **greenhouse gas** emissions by 12.5 per cent below base year levels[14] by 2008-12.
- the UK set a domestic goal in 1997 to reduce **carbon dioxide** emissions by 20 per cent below 1990 levels by 2010.
- in the Energy White Paper (2003)[15] the Government announced a long-term goal to reduce the UK's **carbon dioxide** emissions by some 60 per cent by about 2050, with real progress towards this goal by 2020.

1.10 There are six types of greenhouse gas controlled under the Kyoto Protocol: carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF_6). In contrast, the UK's domestic targets apply to carbon dioxide only.

1.11 There is also an EU-wide target. The European Council achieved consensus that an average global temperature increase of 2°C above pre-industrial levels is the maximum 'safe' level that can be foreseen, and that global concentration levels of carbon dioxide lower than 550 parts per million should guide global limitation and reduction efforts[16]. The Prime Minister has stated that he is 'absolutely' signed up to the EU position of the 2°C limit[17].

Current reviews

1.12 The UK's climate change policy is subject to continuous change and is evolving at a faster pace than ever before. Two major reviews are currently under way:

- **the Energy Review**, due to report findings by summer 2006[18]; and
- **the Stern Review on the Economics of Climate Change**, looking at longer term scenarios nationally and globally for combating climate change, due to report findings by autumn 2006[19].

In addition, the review of the Climate Change Programme concluded recently with the publication of 'Climate Change – The UK Programme 2006'.

As identified in the Energy Review consultation document, several other current or recently completed reviews may also have a bearing on climate change policy. These include the Energy Efficiency Innovation Review, the Renewables Obligation Review, the Barker Review of Land Use Planning, and the Review of the Sustainability of Existing Buildings[20].

1.13 These reviews seem unlikely to change the emphasis given by the UK to climate change mitigation, and many specific climate change policy instruments are likely to remain in place for a number of reasons:

- Defra has indicated that the policy evaluations carried out as part of the Climate Change Programme Review have not identified any policy measure as being particularly unsuccessful;
- some of the policy measures to reduce greenhouse gas emissions implement EU directives (such as the EU Emissions Trading Scheme or Integrated Pollution Prevention and Control) and cannot be revoked; and
- some of the policies to reduce greenhouse gas emissions (such as the Renewables Obligation) are long-term measures which seek to create a policy framework which provides a stable environment for investment, and therefore have clear long-term goals.

1.14 The aim of this briefing is to help the Committee consider the UK's approach to climate change policy. It therefore sets out a framework for Committee inquiries which is independent of the specific policies being proposed or adopted as a result of the above reviews.

UK GREENHOUSE GAS EMISSIONS – TRENDS AND PROGRESS

2.1 Data in this section are drawn from the official e-digest of greenhouse gas statistics on the Defra website[21] which in turn refers to a statistical bulletin[22]. These two sites, published on 23 January 2006, contain the most up to date UK data, including data for emissions by source in 2004. The full UK greenhouse gas inventory covering the period 1990-2004 will shortly be available at www.naei.org.

Background to greenhouse gases

2.2 Some greenhouse gases are more powerful than others in terms of their impact on climate change: the relative effect per tonne emitted is measured by 'global warming potentials'[23]. For example, averaged over 100 years, a tonne of methane has 21 times the effect of a tonne of carbon dioxide, and therefore its global warming potential is 21; sulphur hexafluoride has a global warming potential 23,900 times that of carbon dioxide **(see Figure 2)**.

2 The global warming potentials of greenhouse gases used to calculate national greenhouse gas emissions

Greenhouse gas	Global warming potential averaged over 100 years
Carbon dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous oxide (N_2O)	310
Hydrofluorocarbons (HFCs)[1]	140 – 11,700
Perfluorocarbons (PFCs)	6,500 – 9,200
Sulphur hexafluoride (SF_6)[2]	23,900

Source: Defra, http://www.defra.gov.uk/environment/climatechange/about/g-gas-list.htm

NOTES

1 There are several types of hydrofluorocarbons and perfluorocarbons which have different global warming potentials.

2 The Global Warming Potential values shown in the table were updated in the UNFCC Third Assessment Report, 2001. However, the 1995 values are used by Defra because the Kyoto Protocol states that "global warming potentials used by Parties [to the Protocol] should be those provided by the Intergovernmental Panel on Climate Change in its Second Assessment Report".

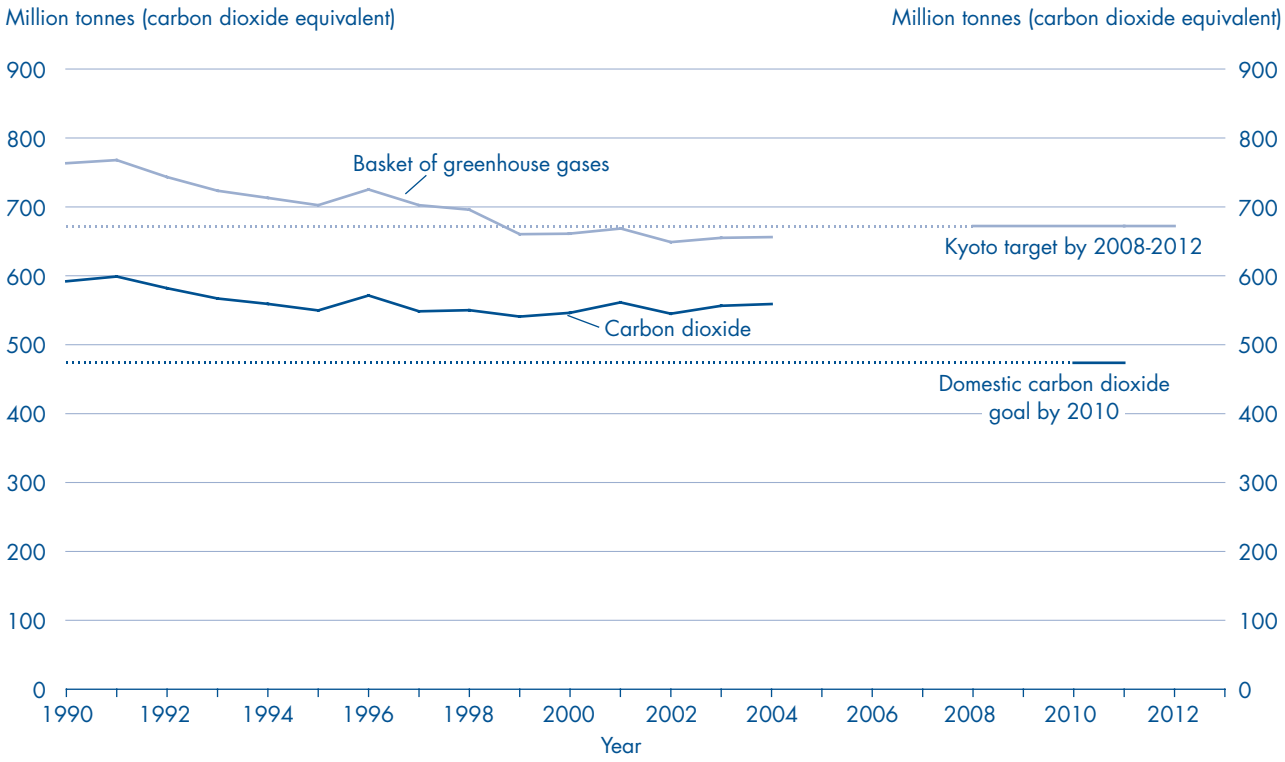
2.3 Despite the higher global warming potential of other greenhouse gases, carbon dioxide is the most abundant and most widely-recognised greenhouse gas; it is responsible for most of human-induced climate change, and is therefore the most significant of the greenhouse gases. Emissions of greenhouse gases are therefore often described in terms of carbon dioxide equivalents (CO_2e), calculated using the greenhouse gases' global warming potentials.

Progress towards Kyoto targets and national targets

2.4 **Figure 3 overleaf** shows the latest position on UK progress towards the Kyoto and national targets. In summary:

- **the UK is 'on track to meet, if not exceed (its) Kyoto target'** according to the consultation paper for the Climate Change Programme Review[24]. In 2004 the UK's greenhouse gas emissions were 14.6 per cent below baseline year levels[25]. This is largely because the emissions of greenhouse gases other than carbon dioxide have fallen significantly. For example, emissions of methane and nitrous oxide approximately halved between 1990 and 2003.
- **progress towards UK's domestic goal to reduce carbon dioxide emissions is less promising**. Emissions were 5.6 per cent below baseline year (1990) levels in 2004[26], yet they have not been on a consistent downward path since 1997. According to Elliot Morley MP, Minister of State for Climate Change and Environment, the reason the UK is lagging behind on its targets is largely due to a decrease in nuclear power generation combined with a greater than predicted increase in electricity demand and an increasing use of coal[27]. DTI's latest projections suggest that, in the absence of additional policies, the UK will have reduced its carbon dioxide emissions to 10.6 per cent below 1990 levels by 2010, 9.4 per cent below the 20 per cent target[28]. The package of new and existing policy measures in the 2006 Climate Change Programme are anticipated to reduce carbon dioxide emissions to **15 to 18 per cent below 1990 levels** which, despite not meeting the target, is described as 'good progress'.

3 UK progress towards Kyoto and national targets, 1990-2004



Source: Defra

2.5 Performance against the Kyoto target relates to the basket of six greenhouse gases. **Figure 4** shows how each gas, adjusted by its global warming potential, contributed to the UK's performance.

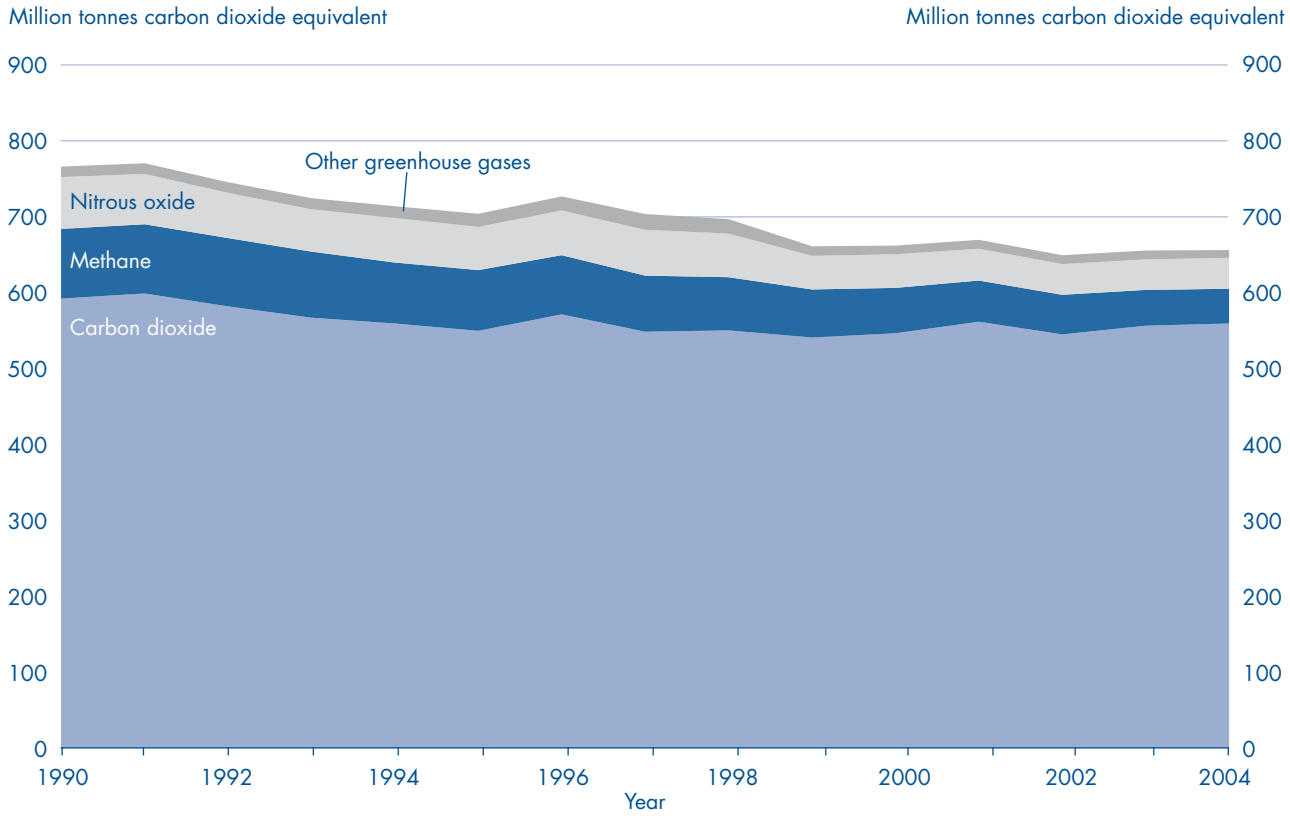
2.6 The main points from Figure 4 are:

- carbon dioxide is the main man-made contributor to global warming, accounting for about 85 per cent of the UK's man made greenhouse gas emissions in 2004 – these have fallen by 5.6 per cent since 1990;
- methane and nitrous oxide together accounted for 13 per cent of greenhouse gas emissions in 2004, and these emissions have fallen by 50 and 40 per cent respectively since 1990; and
- the other three gases – hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride – made a minimal contribution (1.5 per cent) to the UK's greenhouse gas emissions in 2004, even after allowing for their high global warming potential.

Sources of greenhouse gas emissions

2.7 As described above, the data we present in this section are for 2004 – the most up-to-date emissions figures available publicly[29]. These figures describe greenhouse gas emissions by source because 2004 figures for emissions by end user are not yet available (**see Figure 5** for an explanation of how the two data types differ).

4 UK greenhouse gas emissions, by gas, in carbon dioxide equivalents, 1990-2004



Source: Defra

5 Comparison of emissions data by end user and emissions data by source

Emissions by source	Emissions by end user
Emissions are attributed to where they arise	Emissions are attributed to sector which causes the emissions to arise
Emissions are attributed to the energy industries	Emissions are not attributed to the energy industries; they are instead distributed across the economy and attributed to the sectors which use the energy.
Most recent data available for 2004, published by Defra in January 2006[1]	Most recent data for 2004 published by HM Government in March 2006.[2]

Source: National Audit Office

NOTES

1 Defra, e-Digest Statistics, January 2006 http://www.defra.gov.uk/environment/statistics/globatmos/gagginvent.htm

2 HM Government Climate Change - The UK Programme 2006.

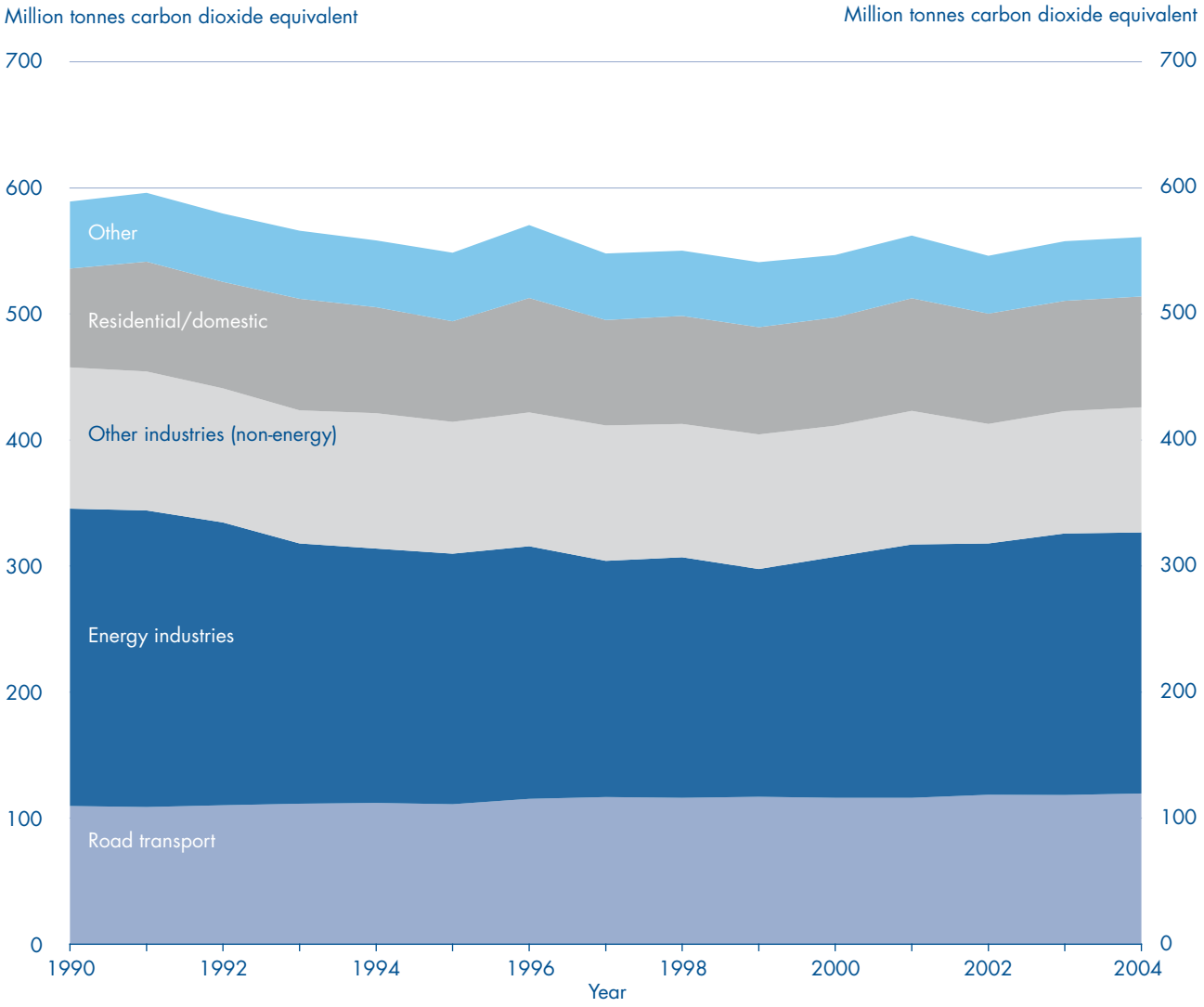
2.8 As **Figure 6** shows, overall emissions of **carbon dioxide** have remained relatively static since 1990 although the contribution of different sectors has altered. The 2004 figures show that:

- the largest emissions of carbon dioxide came from the energy generation industry (37 per cent in 2004) but emissions from this sector have fallen by 12 per cent since 1990; the end-users of the electricity produced from the energy industry include businesses, domestic consumers and the public sector (government, hospitals, schools);
- road transport (such as individual vehicle use and road haulage) was the second largest source with a 21 per cent contribution in 2004; emissions from this sector have risen by 9 per cent since 1990;
- the domestic or residential sector contributed 16 per cent in 2004, as a result of the use of gas (for heating, cooking, etc); emissions from this sector have increased by 12 per cent since 1990 (note that the domestic sector is also one of the end-users of electricity – see Figure 5 for explanation);
- other industries, such as the construction and manufacturing industries, contributed 18 per cent in 2004; emissions from this sector have fallen by 12 per cent since 1990; and
- other sources, which include non-road transport; waste processing and land-use change, contributed 8 per cent in 2004; emissions from this sector have fallen by 11 per cent since 1990.

2.9 **Figure 7 on page 12** shows that emissions of **methane** have fallen by 50 per cent since 1990:

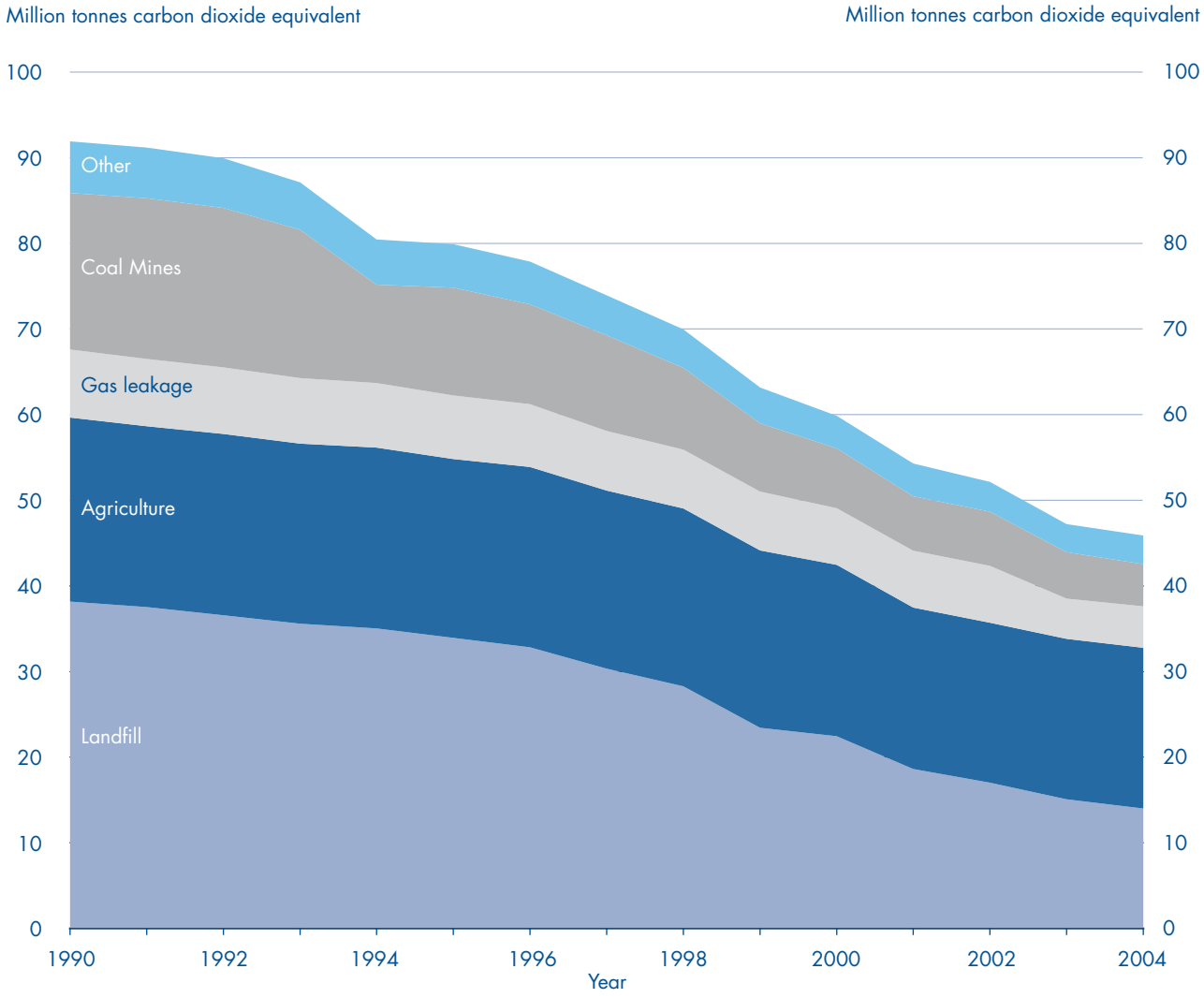
- the two largest sources of methane are landfill and agriculture:
  - emissions from landfill (decomposing biodegradable waste) have fallen by 63 per cent, largely due to improved landfill technologies, and now comprise 31 per cent of methane emissions;
  - emissions from agriculture (digestive emissions from cows, and manure management) are currently the largest source of methane emissions – they account for 41 per cent. They have also fallen but to a lesser extent than emissions from the other sources (by 12 per cent);
- emissions from all other sources have fallen significantly since 1990:
  - emissions from coal mines have fallen by 73 per cent – largely due to a decline in the UK coal industry – and now comprise 11 per cent of methane emissions;
  - emissions from minor sources such as wastewater handling and industrial processes (classified as 'Other' in Figure 7) have fallen by 44 per cent and now comprise 7 per cent of methane emissions;
  - emissions from gas leakage have fallen by 61 per cent and now comprise 11 per cent of methane emissions.

6 Carbon dioxide emissions by source, 1990-2004



Source: Defra

7 Methane emissions by source, 1990-2004

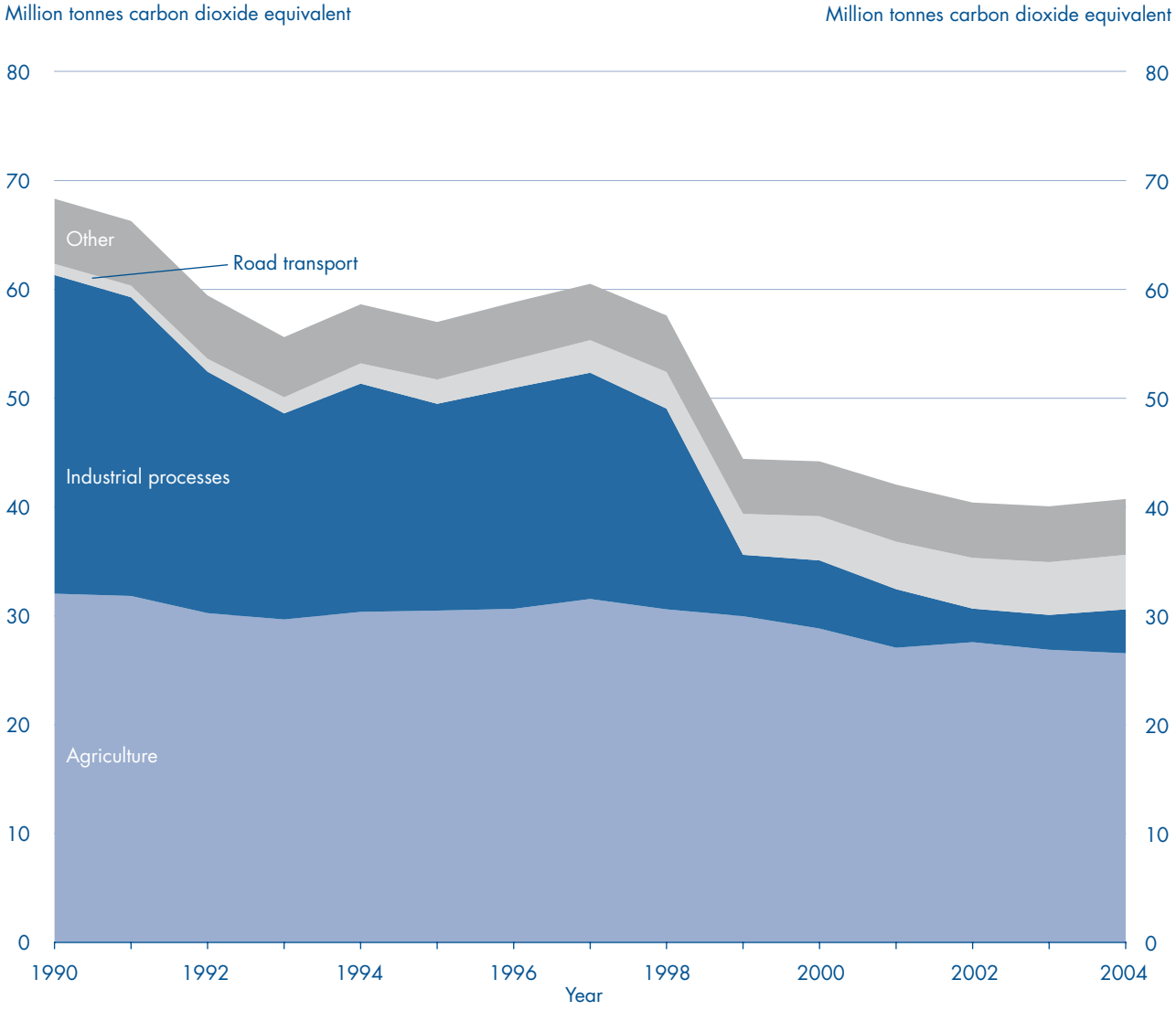


Source: Defra

2.10 Nitrous oxide emissions have also fallen significantly since 1990 - despite the fact that emissions from the transport sector have risen considerably – as **Figure 8** shows;

- this is largely due to the drop in emissions from industrial processes, which fell by 86 per cent between 1990 and 2004 and now account for just 10 per cent of nitrous oxide emissions;
- emissions from the largest source – the use of soil fertilisers in agriculture – which comprised 65 per cent of nitrous oxide emissions in 2004 – have fallen by 17 per cent since 1990;
- similarly, emissions from other sources such as waste have also fallen (15 per cent) and now account for 13 per cent of nitrous oxide emissions;
- road transport emissions have increased noticeably; though they only account for 12 per cent of nitrous oxide emissions, the level of these emissions has increased by almost 400 per cent since 1990, largely as a result of measures to reduce emissions of local pollutants from vehicles (the introduction of catalytic converters has a side effect of producing more nitrous oxide).

8 Nitrous oxide emissions by source, 1990-2004



Source: Defra

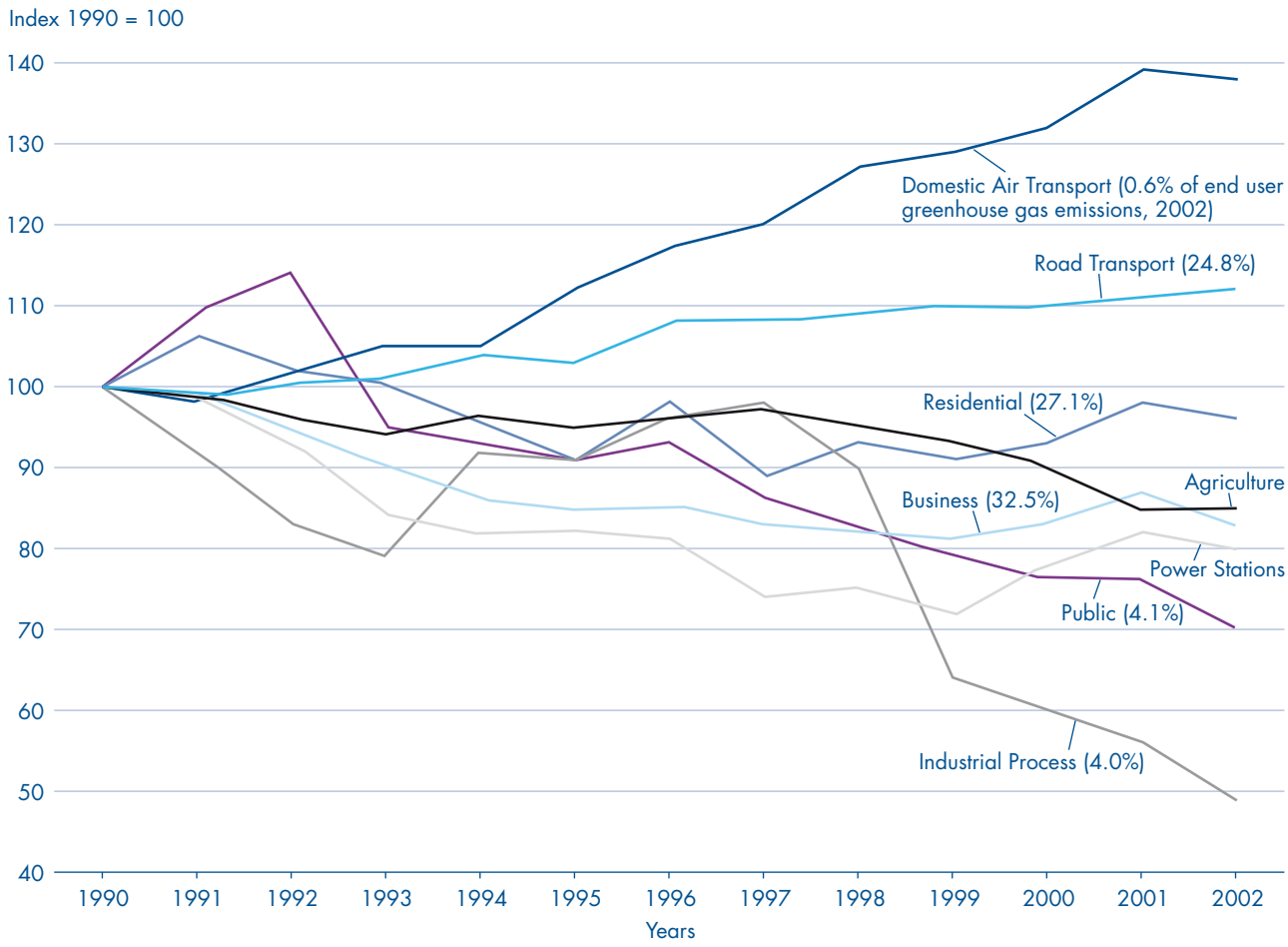
2.11 Emissions of the other greenhouse gases (hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride) derive exclusively from industrial processes – notably the escape of these gases when they are produced for use as refrigerants, aerosols and semi-conductors. They have fallen by 25 per cent since 1990.

2.12 Part 2 has so far summarised trends in all greenhouse gas emissions by source. However, it is also helpful to review trends in emissions by end user. This also means that we can see, for example, the contribution of the public sector. Taking all greenhouse gases together, by end user, it can be seen from **Figure 9** that emissions from transport, especially domestic air transport, have risen whilst those from all other sectors have fallen since 1990:

- emissions from **domestic air transport** have risen by almost 40 per cent[30]; this indicates a general trend in line with the increase in international air travel (the number of passengers flying to, from or between UK airports roughly doubled between 1990 and 2004, to 191 million passengers[31]) but despite this trend, air transport still only accounts for a small proportion of greenhouse gas emissions[32];
- emissions from **road transport** have risen by over 10 per cent; this is due to trends such as:
  - a 21 per cent increase in road traffic since 1990, although the use of public transport has increased in the last six years and rail travel has increased by 40 per cent in the last 10 years[33];
  - transport emissions tend to rise as the economy grows; as people become more prosperous they tend to choose more carbon-intensive travel;
  - in a growing economy, the demand for transport fuel grows faster than demand for other fuels, which explains why road transport carbon dioxide emissions grew by 8 per cent between 1990 and 2000, even though the average new car fuel efficiency has improved by 10 per cent since 1997[34];
  - in addition, the introduction of three-way catalytic converters has had a side-effect of producing higher emissions of nitrous oxide[35];
- the greatest reduction was the 50 per cent fall in emissions from **industrial** processes, largely as a result of the shift away from energy-intensive businesses like steel manufacture to the services and commercial sector;
- the **public sector** has achieved a 30 per cent reduction in emissions through changes to its own procurement and operations;
- emissions from **agriculture** have also fallen by approximately 15 per cent, which the Climate Change Programme Review consultation document suggests may be due to a reduction in the volume or intensity of agricultural activity, or an improvement in the efficient use of inputs[36];
- emissions from the **domestic or residential sector** have remained broadly the same. However, this conceals two opposing trends:
  - a 40 per cent increase in demand for energy since 1990; despite
  - significant improvements in the energy efficiency of, for example, heating systems and some domestic appliances[37]; and
- emissions from **power stations** have fluctuated in recent years, and are at present not visibly on the desired downward trajectory; early falls – largely due to the 'dash for gas' in the mid-1990s – have now been partly offset by the increased use of coal and an increase in demand for electricity by other sectors[38].

These trends reflect, to a certain extent, that the economic efficiency of greenhouse gas emissions reductions is not the same for all sectors of the economy, with some sectors able to make more cost-effective reductions than others. The cost effectiveness of different types of policy intervention is addressed in Part 3.

9 Changes in UK greenhouse gas emissions, by end user, 1990-2002 and end user greenhouse gas emissions as percentages of UK national total, 2002



Source: Review of the UK Climate Change Programme consultation paper, HM Government, December 2004 (p21). But note that percentage contributions of power stations and agriculture for 2002 were not provided

NOTE

Methodological changes in the estimation of aviation emissions between the 2002 and 2003 inventories mean there is a discrepancy between the air transport data in this chart and more recent greenhouse gas emissions data published by Defra. Using the new methodology, end user emissions of carbon dioxide increased by 64% between 1990 - 2002, and by 68% 1990-2003. Carbon dioxide emissions from domestic aviation accounted for 0.4% of the UK total in 2003.

PART 3

SECTORAL IMPACTS AND POLICY INSTRUMENTS

3.1 In the light of the trends set out in Part 2, the Committee may be interested in exploring the greenhouse gas footprint of different sectors of the economy. In this Part of the briefing we therefore set out the contribution of each sector to greenhouse gas emissions and summarise the key policy instruments used to reduce emissions from each sector.

Policy instruments and link to sectors

3.2 There are several key documents which set out the UK's existing policies for climate change mitigation:

- the **UK Climate Change Programme** (2000) summarised existing policy instruments and introduced others;
- the **Energy White Paper** (2003), which set out the UK's energy policy in the context of achieving a low-carbon economy, took forward some aspects of the 2000 Climate Change Programme and introduced new policies;
- the **Energy Efficiency Action Plan** (2004), which built on the Energy White Paper's goal of placing energy efficiency at the heart of UK energy policy, similarly built on the previous two documents and introduced other new policies and commitments; and
- the **UK Climate Change Programme** (2006), which revised and updated the previous Climate Change Programme, introduced some new measures but did not change markedly the government's overall climate change policy.

In addition, the **Future of Transport White Paper** (2004) and the **Waste Strategy** (2000) set out policies which were designed wholly or in part to reduce greenhouse gas emissions. Many of the policy instruments described in this Part of the briefing are detailed within these key documents; it is likely that any new policy instruments will be announced when the results of the Energy Review are published.

3.3 **Figure 10** shows the links between the most significant greenhouse gases (carbon dioxide, methane and nitrous oxide), the economic sectors or sources responsible for the emissions, and an indication of the number of key policy instruments which impact on each sector or source. It can be seen that:

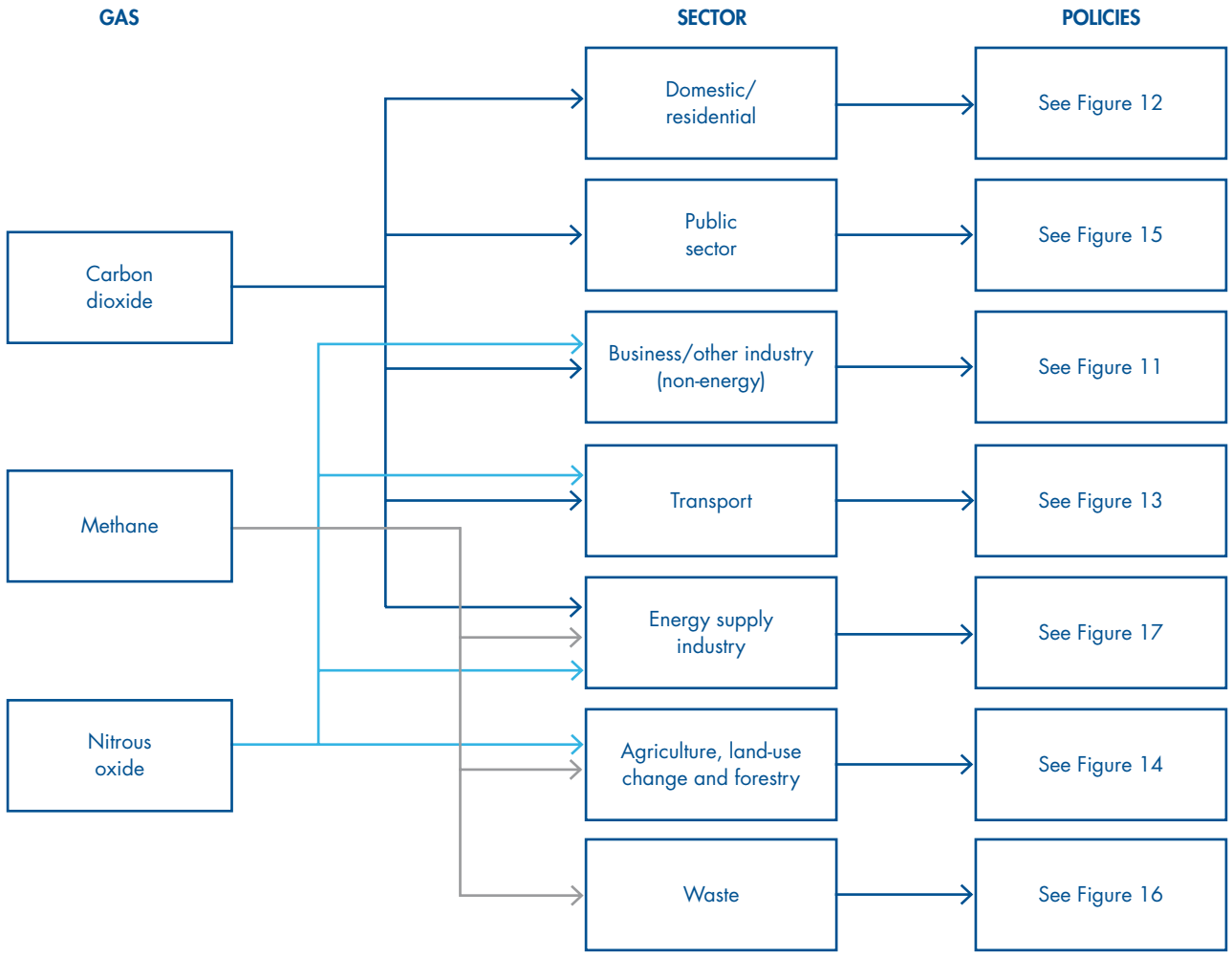
- many key policy instruments focus on industry (both energy supply and other industry), the residential sector, transport and the public sector; but
- fewer key policy instruments focus on the other sources of greenhouse gas (namely agriculture and landfill).

This is largely as a result of the fact that most policy instruments designed to mitigate climate change focus on reducing emissions of carbon dioxide, and not the other significant greenhouse gases.

3.4 In the rest of this Part we describe the key policy instruments intended to tackle greenhouse gas emissions in each sector – in order of sectors' contribution to greenhouse gas emissions. The effectiveness of the policy instruments in reducing emissions and their cost effectiveness is also described, in order to provide a basis for comparison. These figures are presented with the following caveats:

- we have not presented all policy instruments which will reduce greenhouse gas emissions; we have presented only:
  - the key policy instruments **designed to mitigate greenhouse gas emissions**; and
  - instruments **designed to achieve other policy objectives** which nonetheless have a significant impact on emissions reductions.
- care is needed in comparing the impact of policy instruments, as many policies have a principal purpose other than greenhouse gas reduction, including:
  - improving air quality (e.g. policies in the Future of Transport White Paper)
  - promoting innovation (e.g. Powering Future Vehicles Strategy);
  - improving the security of energy supply (e.g. policies in the Energy White Paper);
  - reducing fuel poverty (e.g. New Home Energy Efficiency Scheme[39]); and
  - reducing waste and promoting recycling (e.g. Waste Strategy).

10 The relationship between the principal greenhouse gases and sectors of the economy



Source: National Audit Office

3.5 The emissions data presented in this Part of the briefing are calculated from the data presented in the 2006 UK Climate Change Programme[40], unless otherwise stated. The data are presented on a different basis from those in Part 2. Many of the UK's climate change policy instruments are directed at the end-users of energy (including businesses, domestic consumers and the public sector). In this section, therefore, we set out the proportion of annual greenhouse gas emissions by end-user in 2004, rather than by source, as in Part 2 (see Figure 5 for the differences between these two bases). They provide an indication of the scale of emissions for each sector; this is helpful when assessing whether the scale of policy intervention for each sector is appropriate.

3.6 The other data presented in the tables in this Part of the briefing are taken from the figures compiled and used by Defra in the Climate Change Policy Review[41], unless otherwise stated. Defra's synthesis of policy evaluations does not provide information on every one of the policy instruments which deliver emissions reductions, and the data are therefore not available in all instances. The Committee may nevertheless find it helpful to see which policy instruments are directed to each type of greenhouse gas for each sector, even if the associated data for those policies are incomplete.

3.7 The **cost effectiveness** figures provided in this Part of the briefing, expressed in £ per tonne of carbon, should not be confused with the cost of policy implementation. The cost effectiveness indicator represents the net benefit or cost of saving one tonne of carbon, taking into account all costs and benefits (including ancillary costs and benefits[42]) in values discounted to the present day (net present value). The benefits considered include impacts on air quality, innovation, energy security and fuel poverty, but they exclude the direct benefit of carbon reduction (usually expressed as the social cost of carbon). Positive values indicate a net benefit whereas a negative value indicates a net cost. These figures apply to those directly affected by the policy (firms, consumers, etc), and not to the economy as a whole. **The higher the cost effectiveness indicator, the better the value for money the policy instrument provides.**

Business and other industry

3.8 In 2004 business and other industry (excluding the energy industry) was responsible for some 39.2 per cent of the total end-user greenhouse gas emissions (which equates to 257.7 million tones of carbon dioxide equivalent or 70.3 million tones of carbon equivalent) mostly in the form of carbon dioxide. The main policy instruments for business and other industry are set out in **Figure 11**.

3.9 A key policy gap in relation to business and industry is that SMEs[43] and large businesses with multiple small-scale operational units (such as the retail sector) are not subject to the same level of policy intervention as large energy intensive businesses or industries operating at larger sites. In addition, as highlighted by the Carbon Trust in its submission to the Climate Change Programme Review[44], energy use emissions from commercial and public sector buildings are not effectively covered by any current policy instruments. This led the Carbon Trust to propose a new mandatory consumption based UK Emissions Trading Scheme to cover energy use emissions in large business and public sector organisations (which is presently outside the scope of the EU Emissions Trading Scheme and Climate Change Agreements). The new building regulations target energy performance in new build or refurbishments, but the majority of the energy use in buildings is associated with the existing building stock. Except for requirements within the European Energy Performance of Buildings Directive, which will take time to implement, there is no direct policy measure to tackle energy use in existing commercial buildings.

11 The principal policy instruments for business and other industry (non-energy)

Key policy instruments	Cost effectiveness indicator (£/tC)	Planned impact in million tonnes carbon equivalent (MtCe)	Latest projections: emissions reductions (MtCe in 2010)
Carbon dioxide			
Climate Change Levy	100	5 MtCe per annum by 2010 (CCL & CCA)[1]	3.7
Climate Change Agreements	90		2.9
UK Emissions Trading Scheme	140	Potentially 2 MtCe per annum by 2010[2]	0.3
EU Emissions Trading Scheme	Data not available	–	3.0 – 8.0
Integrated Pollution Prevention and Control	Data not available	–	Data not available
Carbon Trust	120	0.5 – 1.5 MtCe in 2010	1.1
Building Regulations (2002 and 2005)	60	1.0 MtCe in 2010	0.6
Enhanced Capital Allowances Scheme	Data not available	–	Data not available
Measures to encourage SMEs to take up energy saving opportunities	Data not available	–	0.2
Nitrous oxide, methane and fluorinated gases			
Integrated Pollution Prevention and Control	70	–	1.4
UK Emissions Trading Scheme	(10)	–	0.5
Voluntary agreements	50		0.1

Source: Defra (2006) Synthesis of climate change policy evaluations (unless otherwise stated)

NOTES

1 Climate change – The UK Programme, November 2000, p73.

2 Defra, Draft Framework Document for the UK Emissions Trading Scheme, May 2001 http://www.defra.gov.uk/environment/climatechange/trading/uk/draft/01.htm

Domestic or residential

3.10 In 2004 the domestic or residential sector was responsible for some 24.4 per cent of the total end-user greenhouse gas emissions (which equates to 159.9 million tonnes carbon dioxide equivalents or 43.7 million tonnes carbon equivalents) mostly in the form of carbon dioxide. The main policy instruments to reduce emissions from this sector are set out in **Figure 12**.

3.11 Despite the measures set out in Figure 12, the Environment, Food and Rural Affairs Committee stated that 'the Government is failing to get to grips with encouraging energy efficiency at the household level'. Though the Committee welcomed the inclusion of energy efficiency measures in the Building Regulations, it expressed concerns that the Energy Efficiency Commitment is not having sufficient impact on existing housing stock. The Committee reported that, according to the Energy White Paper, insulating 4.5 million cavity walls between 2005 and 2010 would save approximately 1.2 million tonnes carbon, but only six million homes of a potential 17.5 million have installed cavity wall insulation. In addition, the installation of 100 million energy saving light-bulbs (in addition to the 60 million already anticipated by 2005) would result in carbon savings of 0.5 million tonnes carbon, but only 30 million of the 500 million lights in use in UK homes are fitted with low energy light bulbs. The Committee advised that increasing the uptake of easily implemented measures with small financial outlay and comparatively rapid payback periods such as this are 'low-hanging fruit', and recommended that the Government should work with energy providers to overcome the apparent inertia in the adoption of these measures[45].

12 The principal policy instruments for the domestic sector

Key policy instruments	Cost effectiveness indicator (£/tC)	Planned impact in million tonnes carbon equivalent (MtCe)	Latest projections: emissions reductions (MtCe in 2010)
Carbon dioxide			
Energy Efficiency Commitment including Decent Homes	270	1.8 – 3.7 MtCe in 2010	1.6
Community heating	(20)	0.1 – 0.9 MtCe in 2010	Less than 0.05
Building regulations (domestic) 2002	540	1.0 MtCe in 2010	0.7
Building regulations (domestic) 2005-06	Data not available	0.8 MtCe in 2010	0.8
Appliance standards and labelling (e.g. Market Transformation Programme)	570	0.2 – 0.4 MtCe in 2010	0.2
Warm Front (England) and devolved administration equivalents Decent Homes programmes	420	0.2 – 0.3 MtCe in 2010	0.4
Energy Saving Trust	180	–	1.1
Code for Sustainable Homes	Data not available	–	Data not available
Climate Change Communications Initiative	Data not available	–	Data not available
Improvements to billing and metering	Data not available	–	0.2[1]

Source: Defra (2006) Synthesis of climate change policy evaluations (unless otherwise stated)

NOTE

1 Climate Change - The UK Programme 2006, p86.

Transport

3.12 In 2004 the transport sector was responsible for some 25.1 per cent of the total end-user greenhouse gas emissions (which equates to 165.0 million tones of carbon dioxide equivalent or 45.0 million tones of carbon equivalent) mostly in the form of carbon dioxide but also nitrous oxide. The main policy instruments for transport are set out in **Figure 13**.

3.13 The Committee will be familiar with the policy instruments directed at transport as a result of its current 'Reducing Carbon Emissions from Transport' inquiry.

3.14 As a result of the measures described in the Climate Change Programme 2006 (both existing and new) the Government estimates that carbon dioxide emissions from the transport sector will be 13 per cent lower in 2010 than would otherwise have been the case[46].

3.15 It is worth recognising, however, that the policy instruments detailed in Figure 13 focus almost exclusively on road transport; there is no consideration of international air travel. Under the guidelines agreed for UNFCCC, emissions from international aviation and shipping are not included in the UK's emissions. However, estimates are reported as memo items in national greenhouse gas inventories. Using emissions arising from international aviation bunkers as a proxy measure for the contribution of air travel to UK emissions, we can see that in 2004 air travel contributed 33.5 million tones of carbon dioxide equivalent or 9.1 million tones of carbon equivalent[47]; equivalent to 5 per cent of the UK's 2004 emissions[48]. Air travel has increased five-fold over the past 30 years, and demand is projected to be between two and three times current levels by 2030[49]. The Future of Air Transport White Paper[50] and the accompanying analysis[51] recognise both the scale of growth and the effect this will have on emissions in the UK, though this policy intervention has yet to reverse the trend in growth. The White Paper sets out the Government's policies to tackle this phenomenon, such as taking steps to ensure the inclusion of aviation in emissions trading schemes.

3.16 It is also important to note that no policy instruments are directed towards reducing nitrous oxide emissions from transport which, as shown in Figure 8, have increased by almost 400 per cent since 1990. This increase is largely a result of measures to reduce emissions of local pollutants from vehicles.

3.17 Few policy instruments have been implemented to encourage the shift away from road transport to other modes of transport which have less impact on greenhouse gas emissions (such as transferring personal car journeys to public transport and road freight to rail); although some measures are set out in the 2006 Climate Change Programme[52].

13 The principal policy instruments for transport

Key policy instruments	Cost effectiveness indicator (£/tC)	Planned impact in million tonnes carbon equivalent (MtCe)	Latest projections: emissions reductions (MtCe in 2010)
Carbon dioxide			
Renewable Transport Fuels Obligation	Data not available	1.6 MtCe by 2010[1]	1.6[2]
Voluntary Agreement Package (includes Manufacturers' voluntary agreement, company car tax reform and graduated Vehicle Excise Duty)	(365)	1.0 – 2.5 MtCe in 2010	2.3
of which, Company Car Tax	Data not available	1 MtC pa by 2010[3]	0.5
Future Voluntary Agreement	Data not available	–	0.1
Fuel Duty Escalator	250	3.2 – 4.0 MtCe in 2010	1.9
Sustainable distribution (Scotland)	Data not available	–	0.1
Wider transport measures[4]	Data not available	0.1 MtCe in 2010	0.8

Source: Defra (2006) Synthesis of climate change policy evaluations (unless otherwise stated)

NOTES

1 Climate change – The UK Programme, November 2000, p87.

2 Climate Change – The UK Programme 2006. This figure follows the internationally agreed methodology for allocating emissions to individual states, which prevents global double counting of emissions. As such it does not take into account the carbon emitted during the production of biofuels produced abroad but consumed in the UK. When this is taken into consideration the net global reduction in carbon dioxide emissions is 1MtC.

3 DTI, Our Energy Challenge: Securing clean, affordable energy for the long-term, January 2006, p27 http://www.dti.gov.uk/energy/review/energy_review_consultation.pdf

4 Refers to the impact of a programme of investment, announced in the 2000 Ten Year Plan and revised in the Future of Transport White Paper.

Agriculture, land-use change and forestry

3.18 In 2004 agriculture, land-use change and forestry were responsible for some 7.8 per cent of the total end-user greenhouse gas emissions (which equates to 51.3 million tones of carbon dioxide equivalent or 14.0 million tones of carbon equivalent) in the form of carbon dioxide, nitrous oxide and methane.

3.19 The main policy instruments for agriculture are set out in **Figure 14**. Though agriculture is a major source of greenhouse gas emissions, Figure 14 shows that few specific policy instruments are directed at this sector. It is interesting to note that there are no major policy instruments to tackle emissions of methane, despite the fact that agriculture is the major source of this greenhouse gas. Some measures are described in the Climate Change Programme, but these are non-specific and largely indicate the scope for policy intervention rather than specific policies[53].

14 The principal policy instruments for agriculture

Key policy instruments	Cost effectiveness indicator (£/tC)	Planned impact in million tonnes carbon equivalent (MtCe)	Latest projections: emissions reductions (MtCe in 2010)
Carbon dioxide			
Afforestation programmes: Woodlands Grant Scheme (England) Woodland planting (Scotland)	42	0.6 – 0.7 MtCe in 2010	0.7
Energy crops scheme, Bioenergy Infrastructure Scheme and Non-food crops Strategy	Data not available	–	0.1
Nitrous oxide			
Agriculture (soils) - Codes of Good Agricultural Practice	Data not available	–	Data not available
Improvements to Nitrate Action Plan and Catchment Sensitive Farming Programme	Data not available	–	Data not available

Source: Defra (2006) Synthesis of climate change policy evaluations (unless otherwise stated)

Public sector

3.20 In 2002 the public sector was responsible for some 3.3 per cent of the total end-user greenhouse gas emissions (which equates to 21.6 million tones of carbon dioxide equivalent or 5.9 million tones of carbon equivalent) mostly in the form of carbon dioxide. The main policy instruments for the public sector are set out in **Figure 15**.

3.21 As described in Paragraph 3.9, the Carbon Trust has highlighted that energy use emissions from public sector buildings are not effectively covered by any current policy instruments. The forthcoming Energy Performance of Buildings Directive (EPBD) will address this to some extent, by requiring both new and existing buildings to display energy performance certificates, though the current plans for the UK implementation of the Directive are likely to limit the display of certificates to public buildings over 1000m^2, which will therefore reduce its coverage. However, as the Carbon Trust points out, the key weakness of the EPBD is that it does not require building owners or occupants to take any energy saving action[54].

15 The principal policy instruments for the public sector

Key policy instruments	Cost effectiveness indicator (£/tC)	Planned impact in million tonnes carbon equivalent (MtCe)	Latest projections: emissions reductions (MtCe in 2010)
Carbon dioxide			
Framework for Sustainable Development on the Government Estate	Data not available	–	Emissions increasing[1]
Market Transformation Programme/Labelling	Data not available	–	Not quantified for public sector
Building regulations (2002 and 2005)	Data not available	–	Not quantified for public sector
Other measures (including NHS Estates and Schools Programmes)	Data not available	0.5 MtCe in 2010	0.2
New measures introduced in the revised Climate Change Programme (Local Authorities; Schools; Loan Fund for energy efficiency)	Data not available	–	0.3

Source: Defra (2006) Synthesis of climate change policy evaluations (unless otherwise stated)

NOTE

1 In 2004-05 emissions increased 1% relative to 1999-2000 baseline
http://www.sd-commission.org.uk/watchdog/4th_Annual_Report_(final)_UPDATED_30_11_05.pdf (p69)
In 2003-04 emissions increased 3% relative to baseline http://www.sustainable-development.gov.uk/publications/report2004/parte.htm

Waste

3.22 In 2004 landfill was responsible for 15.6 million tonnes carbon dioxide equivalents (4.3 million tonnes carbon equivalents) which equates to some 2.4 per cent of the total - principally in the form of methane[55]. The main policy instruments for landfill are set out in the Waste Strategy (2000); these are set out in **Figure 16**.

16 The principal policy instruments for landfill

Key policy instruments	Cost effectiveness indicator (£/tC)	Planned impact in million tonnes carbon equivalent (MtCe)	Latest projections: emissions reductions (MtCe in 2010)
Carbon dioxide			
Waste management	Data not available	0.1 – 0.5	0.2
Methane			
Waste strategy 2000 (policies include Landfill Tax Credits scheme and Landfill Allowances and Trading Scheme)	Data not available	0.1 – 0.5 MtCe in 2010[1]	2.7

Source: Defra (2006) Synthesis of climate change policy evaluations (unless otherwise stated)

NOTE

1 Climate change – The UK Programme, November 2000, p184.

Energy industries

3.23 Many of the policies designed to mitigate greenhouse gas emissions are directed at the end-users of energy. However, many policies to reduce emissions are also directed at the energy industries themselves.

3.24 In 2004, greenhouse gas emissions from the UK energy supply sector were 225.1 million tonnes of carbon dioxide equivalent (or 61.4 million tonnes of carbon equivalent) which equates to 34.3 per cent of the UK's total emissions by source[56]. This was mostly in the form of carbon dioxide. The main policy instruments for the energy industry are set out in **Figure 17**.

3.25 Reducing carbon dioxide emissions is not the sole purpose of the Renewables Obligation; another key goal includes increasing the security of energy supply by replacing fossil fuels and diversifying the energy generation portfolio. This makes direct comparisons, for example with Emissions Trading, more complex.

17 The principal policy instruments for the energy supply industry

Key policy instruments	Cost effectiveness indicator (£/tC)	Planned impact in million tonnes carbon equivalent (MtCe)	Latest projections: emissions reductions (MtCe in 2010)
Carbon dioxide			
Renewables Obligation	(175)	2.5 – 2.6 MtCe in 2010	2.5
EU Emissions Trading Scheme	Data not available	2 – 4 MtCe in 2020[1]	3.0 – 8.0[2]
Support for Combined Heat and Power	Data not available	4.5 MtCe per year in 2010[3]	Data not available
Support Scheme for Biomass heat	Data not available	–	Data not available
Support for Microgeneration	Data not available	–	Data not available

Source: Defra (2006) Synthesis of climate change policy evaluations (unless otherwise stated)

NOTES

1 Department for Trade and Industry, Department for Environment, Food and Rural Affairs and Department for Transport, Our Energy Future – creating a low carbon economy, CM 576, February 2003, Table 2.1 http://www.dti.gov.uk/energy/whitepaper/

2 Climate Change – The UK Programme 2006.

3 Climate Change – The UK Programme 2006, p39.

PART 4

OPTIONS FOR INQUIRIES

4.1 Having examined the trends in greenhouse gas emissions from various sources (in Part 2) and linked these to the key policy instruments employed by government (in Part 3) we can see that there is scope for the Committee to explore many aspects of climate change policy. The Committee may therefore wish to consider approaching the topic of climate change in future inquiries from a variety of angles. In this Part, therefore, we set out suggestions for breaking down the topic of climate change, to look at:

- targets, progress and forecasting;
- policy instruments;
- greenhouse gases;
- economic sectors;
- governance and coordination;
- monitoring and reporting; and
- the bigger picture.

Targets, progress and forecasting

4.2 As set out in Part 1, the UK is subject to both international and national emissions reductions **targets** (for greenhouse gases and carbon dioxide respectively). There are a number of questions about targets that the Committee may wish to ask, such as:

- Is the domestic target to reduce only carbon dioxide appropriate, or should domestic targets be set for the reduction of emissions of the other greenhouse gases?
- Progress between sectors is variable, and emissions increases in one sector (notably transport) partially offset reductions in the others;
  - are domestic sectoral targets required to buck this trend?
  - or should variable progress between sectors be allowed in order to make economically efficient choices to reduce emissions at least cost?
- Should long term targets be accompanied by interim targets or some other means of setting out a trajectory against which progress can be assessed?
- Should the UK's domestic target be set for 2012 (rather than 2010) to align with the milestones set by the Kyoto Protocol?

4.3 Part 2 set out the UK's **progress** towards Kyoto targets and national targets. On progress, the Committee may therefore wish to consider:

- performance to date, especially on progress towards the domestic target of carbon dioxide reductions by 2010; e.g. whether a 5.6 per cent reduction in carbon dioxide emissions between 1990 and 2004 is acceptable;
- whether performance to date is more or less than was predicted or expected;
- the reasons for progress, or lack of it, and how these are being addressed; and
- whether the trends highlighted in Part 2 indicate that a greater level of policy intervention is required in certain sectors.

4.4 On **forecasting** of future progress, the Committee might examine:

- the likelihood that future targets will be met, and the degree of confidence there can be in such forecasts;
- whether these forecasts take account of the main drivers which produce greenhouse gas emissions (e.g. trends in car use, economic growth etc.);
- the key assumptions which underlie the forecasts, and whether these are credible;
- the degree of uncertainty and imprecision that attach to such forecasts, and how these can be reduced or at least reflected in the way they are presented;
- the main risks or eventualities which would threaten the achievement of targets, and how these risks have been managed.

Policy instruments

4.5 Whereas the previous section focused on overall performance, this section focuses on individual policy instruments, and on the choice between them.

4.6 Part 3 sets out the main policy instruments intended to bring about reduced emissions of greenhouse gases for each sector of economic activity. For each policy instrument the Committee could consider aspects of **effectiveness and impact**:

- whether impacts (that is, emissions reductions) have been forecast, measured and reported;
- the extent to which policy instruments address the scale of reductions needed – are the forecast reductions significant in proportion to the volume of emissions, or just a pin prick;
- the accuracy of forecasts, and the reasons for any shortfall against forecast;
- the results of any policy evaluations; and
- whether any adverse impacts or unintended consequences have been identified.

4.7 There is also the question of the **cost-effectiveness** of each policy instrument, and how this should be measured. Where emissions reductions are the principal aim of a policy, then the cost per tonne of carbon reduction is a suitable high level measure. But when should the cost per tonne be considered too high to be worthwhile or affordable? And how should the market cost of carbon dioxide reductions or the social cost of carbon be factored into these considerations? Furthermore, many policy instruments have emissions reductions as an auxiliary benefit rather than their prime policy focus – so how should their cost-effectiveness be assessed and compared?

4.8 The questions in paragraphs 4.6 and 4.7 could be asked of any or all of the policies listed in Part 3 of this paper. However, the Committee might wish to focus its attention on those policies which the policy evaluations feeding into the Climate Change Programme identified as having the **greatest potential impact** on greenhouse gas reductions, namely:

- the EU Emissions Trading Scheme (which could contribute to emissions reductions of 3.0-8.0 million tonnes of carbon equivalent in 2010)[57]; this could include a consideration of:
  - whether sectors covered by the EU ETS are passing the costs of reducing emissions to consumers; and
  - whether the EU ETS may fall foul of EU state aid rules, particularly if sectors within the EU ETS are gaining from unfair windfall profits;
- the Climate Change Levy and Climate Change Agreements (which could contribute emissions reductions of 3.7 and 2.9 million tonnes of carbon equivalent respectively in 2010)[58];
- the Renewables Obligation (which could contribute emissions reductions of 2.5 million tonnes of carbon equivalent in 2010)[59];
- vehicle manufacturers' voluntary agreements, Vehicle Excise Duty and company car tax (which could contribute emissions reductions of 2.3 million tonnes of carbon equivalent in 2010)[60];
- the revised Building Regulations (which could contribute emissions reductions of 2.1 million tonnes of carbon equivalent in 2010[61]);
- the Fuel Duty Escalator (which could contribute emissions reductions of 1.9 million tonnes of carbon equivalent in 2010[62]);
- the Energy Efficiency Commitment (which could contribute emissions reductions of 1.6 million tonnes of carbon equivalent in 2010)[63].

4.9 Government must also make informed **choices between policies** – based in part on cost and cost effectiveness. The Committee might therefore examine:

- whether Defra (or another body) maintains a comprehensive record of all policies which recognise emissions reductions (to mitigate climate change) as an ancillary benefit, in order to evaluate their impacts; and
- whether data on cost and cost-effectiveness, or the results of any wider evaluations that have been carried out, indicate whether some policies should be withdrawn or reduced, in favour of others which should be introduced or expanded.

4.10 Choices between policies may also need to take account of the **incidence of the burden** these policies place on different parts of society or the economy. The Committee may wish to consider:

- the incidence of burden on different parts of society (i.e. is there any explicit consideration of the impacts of climate change policy on the poorest parts of society);
- the incidence of burden on energy producers and consumers and whether the balance is equitable;
- the incidence of burden on economic sectors; this may include a consideration of:
  - the basis on which government decides which sectors to focus on (i.e. relative contribution to emissions, cost effectiveness of emissions reductions, impact of lobbying); or
  - whether the degree of control across sectors is equitable (compare the degree of regulation in some sectors to the use of voluntary measures in others); and
- the incidence of burden on different regions (i.e. as volume of emissions varies from region to region, whether the impact of the policies varies accordingly[64]).

4.11 The Committee may also wish to look at the **targets set for individual policy instruments**; for example:

- whether targets have been set for all policy instruments and on what basis;
- whether the targets set are stringent enough; for example whether the targets set under the National Allocation Plan for the EU Emissions Trading Scheme are stringent enough to deliver benefits; and
- the implications of setting the targets at too low a level (e.g. for policies linked to emissions trading, if the target is too low the market value of carbon will also be low, which will deter companies from striving to make additional emissions reductions).

Greenhouse gases

4.12 Carbon dioxide emissions are the principal focus of the UK's domestic targets and the UK Climate Change Programme, and are therefore covered in the other bases for inquiry we outline elsewhere in this Part. However, other greenhouse gases account for approximately 15 per cent (in carbon dioxide equivalents) of the UK's greenhouse gas emissions. The Committee may therefore wish to explore the progress in – and further opportunities for – emissions reductions for the other gases:

- methane;
- nitrous oxide; and
- the fluorinated compounds (hydrofluorocarbons; perfluorocarbons and sulphur hexafluoride).

Economic sectors

4.13 In the same way that the Committee has recently launched an inquiry on 'Reducing Carbon Emissions from Transport', it may wish to address **each sector** in turn to explore whether the policy measures to reduce greenhouse gas emissions (carbon dioxide and other greenhouse gases) directed to each sector are sufficient. In particular, the Committee may wish to focus on those sectors with trends in emissions increases or insignificant decreases (as described in Part 2):

- transport (where annual emissions are rising steadily);
- energy supply industry (where annual emissions are fluctuating);
- business (where annual emissions are not falling significantly);
- domestic (where annual emissions are not falling significantly);
- agriculture (where annual emissions are not falling significantly); and
- public sector (where annual emissions are falling overall, but rising on parts of the government estate).

The Committee could focus on sectors in which the trends towards emissions increases (or insignificant decreases) are notable since the **baseline year** or in the **last few years**.

4.14 The Committee may also wish to investigate whether the policies directed at each sector are comprehensive. For example the retail industry is subject to less policy intervention than other forms of business and industry; the Committee may therefore wish to explore whether any other significant policy gaps exist.

Governance and coordination

4.15 As set out in Part 1, 2005-06 has seen several **reviews** related to climate change policy (notably the Climate Change Programme Review; the Stern Review and the Energy Review). The Committee may therefore wish to consider issues such as:

- whether the reviews were joined up and the outcomes consistent;
- whether the reviews were working from the same data and assumptions;
- whether the outcome of the Stern review will necessitate a re-think of the Climate Change Programme and the Energy Review;
- whether there is a smarter way of co-ordinating the periodic reviews of climate change and energy policy; and
- whether the processes for monitoring and review of climate change policy set out in the 2006 Climate Change Programme are sufficient, or whether there is a need for some form of overarching management system to drive the implementation of additional policies if annual emissions reductions are lower than expected.

4.16 The 2006 UK Climate Change Programme will set the tone for short-term action in order to work towards the domestic target of reducing carbon dioxide emissions by 20 per cent below 1990 levels by 2010. The Committee may therefore wish to consider:

- how well the Review of the **UK Climate Change Programme** was carried out, in relation to, for example:
  - whether the revised UK Climate Change Programme constitutes an adequate review of climate change policy;
  - whether, given the domestic target to reduce carbon dioxide emissions by 20 per cent below 1990 levels by 2010, a reduction of 15 – 18 per cent which the Programme is projected to deliver is sufficient; and
  - the extent of the consultation and how effectively the outcome fed into the revision of the Programme.
- how the effectiveness of the existing or proposed policies was appraised; for example:
  - the extent to which the scale of potential emissions reductions was considered;
  - the extent to which cost-effectiveness was considered;
  - the extent to which economies of scale were considered (e.g. investing in new technologies can be cost-prohibitive, but when new technologies achieve market penetration the costs are considerably reduced); and
  - how the effectiveness of the *individual* policies in the current policy mix was appraised. For example, in the industry sector, how were the impacts of the Climate Change Levy, Climate Change Agreements, the UK Emissions Trading Scheme and the role of the Carbon Trust separated?
- whether the **focus** of the UK Climate Change programme was correct in relation to, for example:
  - the balance of policy instruments between the different sectors;
  - the balance between supply-side and demand-side policy instruments (in relation to energy, for example, supply-side instruments focus on the energy sources, such as the Renewables Obligation, whereas demand-side instruments look at the use of that energy, such as the Energy Efficiency Commitment); and
  - whether there is a need for a more explicit link with the sustainable consumption and production agenda (i.e. a study by the Carbon Trust found that consumer purchasing decisions are the ultimate driver of all carbon emissions[65]; does the Climate Change Programme therefore need a greater emphasis on the impact of lifestyle choices?)

- given that a key focus of the UK Climate Change programme is meeting the 2010 domestic target for carbon dioxide emissions, how well is the government co-ordinating activity to put in place **long term measures** to meet its target of reducing carbon dioxide emissions by 60 per cent by 2050? For example:
  - are the policies sufficiently ambitious? and
  - are the long-term supporting frameworks in place?

4.17 Since April 2004, government departments are required to assess the environmental impact – including impact on emissions – of all new policies, as part of the **Regulatory Impact Assessment** (RIA) process. The Committee might therefore examine:

- whether this requirement is being fulfilled; and
- what are the assessed impacts of new policies (remembering that the RIA process also applies to policies which run counter to climate change policy as well as those which support it).

4.18 The Committee may also wish to review the responsibilities and activities of the key government **departments responsible** for delivering emissions reductions. Though Defra has overarching responsibility for climate change, the PSA target for greenhouse gas emissions reductions is shared between Defra, DTI and DfT. The Committee may therefore wish to investigate:

- how co-ordinated the departments' activities to bring about emissions reductions are[66];
- whether the departments are using the same data sources and modelling techniques (and if not, why not); and
- whether each of these departments is taking adequate steps to contribute to meeting this target; for example:
  - whether **DfT** should develop an overarching strategy for reducing carbon dioxide emissions from the transport sector;
  - whether **Defra** should do more to reduce emissions from the agriculture sector (notably to reduce methane emissions from animals and nitrous oxide emissions from soils); and
  - whether **DTI** should be doing more to address issues of energy demand from the parts of the business and industry sector which are not subject to policy intervention under the EU Emissions Trading Scheme, the Climate Change Levy and Climate Change Agreements.
- the Committee may also wish to examine the role of other key departments:
  - **HM Treasury**: e.g. Do the current fiscal structures encourage energy efficiency?
  - **Cabinet Office**: e.g. Has the 'Better Regulation' agenda affected the extent to which new climate change policies can be introduced?
  - **ODPM**: Should ODPM have a greater responsibility for emission reductions (e.g. in relation to house building)?

4.19 Another issue for Committee scrutiny would be Defra's ability to bring about **policy direction and change across Whitehall**, especially in areas close to other departments' key responsibilities (for example, transport and energy). In this respect, the Committee may also want to know about the internal Whitehall mechanisms, up to and including Cabinet, to ensure delivery of climate change policy.

4.20 Though this briefing has focused on national measures to reduce greenhouse gas emissions, the Committee may also wish to explore the role of **the devolved administrations and local government** in delivering climate change policy, for example:

- how are the devolved administrations and local government involved in delivering climate change policy; and
- should the devolved administrations and local government be held to account for their actions which could increase or reduce emissions?

Monitoring and reporting

4.21 The evaluation of the success or otherwise of UK climate change policy is underpinned by the government's **monitoring and reporting** activity. The Committee may therefore wish to explore:

- whether it is appropriate that annual greenhouse gas emissions are reported by source, rather than by end-user, given that many of the climate change policies are directed towards the end-user;
- whether the two-year time-lag on UK greenhouse gas emissions (by source) data could be shortened;
- how the government's aim to report annually to Parliament on progress on reducing greenhouse gas emissions will be fulfilled;

- whether there is a need for the performance of all individual policy instruments to be monitored and reported on an annual basis;
- whether the government's reporting framework is meeting the requirements of stakeholders such as the UNFCCC secretariat; and
- whether reported impacts should be standardised in terms of tonnes of carbon equivalents or carbon dioxide equivalents, or remain in term of tonnes of gases emitted, in order to make the figures simpler to report and compare.

4.22 A difficult question when monitoring the success of policy intervention is how to establish the effect of that intervention over and above what would have happened anyway – i.e. proving **additionality**. A reduction in carbon dioxide emissions since 1990, for example, could be largely attributed to the switch to gas-fired power stations; which calls in to question the proportion of additional emissions reductions due to policy intervention. The Committee may wish to explore the concept of proving additionality in relation to:

- overall greenhouse gas emissions reduction; or
- the impact of individual policy instruments.

The bigger picture

4.23 The climate change policy discussed in the rest of this paper is national rather than international – focusing on what the UK can do within its borders (and within the framework of European law and policy). But there is also an **international dimension**:

- the Stern review is looking at the pros and cons of international versus national action, and the appropriate balance between the two; this paper does not delve further into these questions, although the Committee may wish to consider the key questions asked by the Stern Review[67] and see how the outcome of the Review is taken forward in UK national and international policy making; and
- the Committee may also wish to explore the Government's activity in Brussels in relation to European climate change policy, and whether it is actively taking the lead on policies which would be helpful in securing long-term emissions reductions (such as minimum standards for vehicles and electrical products).

4.24 The Kyoto Protocol established innovative **'flexible mechanisms'** to lower the overall costs of achieving its emissions targets[68]. The Committee may therefore wish to address the UK's approach to the use of these mechanisms. For example:

- how will the implementation of the **EU Emissions Trading Scheme** link to existing UK policies such as the Climate Change levy?
- the 2006 Climate Change Programme sets out that the UK will work with EU partners to strengthen the **Clean Development Mechanism**[69]; what implications will this have in the UK?

4.25 The UK's climate change policy focuses primarily on **mitigation**, rather than adaptation to climate change. However, as the UK Climate Change Programme (2000) states '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'. The Committee may therefore wish to review:

- whether the UK's policy response to the need for adaptation is adequate; and
- whether the balance of policy measures for climate change mitigation and adaptation is appropriate.

4.26 The Committee may also wish to consider how the Government is tacking the attitudes of citizens to climate change, and their approach to encouraging a **behavioural response**. This includes questions such as:

- how effective is the government's communications campaign? Is the balance between the advertising budgets of the climate change communications initiative[70], the Carbon Trust and the Energy Savings Trust appropriate;
- do the current policy interventions make it easier and cheaper for individuals to make choices which will reduce emissions and, if not, how could this be encouraged; and
- does the National Curriculum in schools equip students with the necessary information to understand climate change and understand their personal ability – and responsibility – to make choices which will reduce emissions.

4.27 Lastly, the Committee may wish to review the Government's approach to **developing and encouraging the required technology** to help us meet our 2050 target. This might include a consideration of whether the present policy framework sends the right signals to the markets to encourage long-term investment in new technology.

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