

Living in the Greenhouse

Policies to Tackle Climate Change



Policy Paper 26

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Summary

Climatic change caused by human activities – or ‘global warming’ – poses a serious long-term threat to the stability of the natural environment and the survival of current models of human society. The emission into the atmosphere of ‘greenhouse gases’ resulting from industrial and agricultural activity is projected to increase the global temperature by about 2°C over the next century, a faster rate of warming than any seen in the last 10,000 years. The resulting impacts are potentially very serious, including sea level rise, changes in rainfall patterns, increases in storms and desertification and the spread of disease.

No UK government has yet adequately addressed these problems. This policy paper sets out Liberal Democrat proposals to reduce emissions of greenhouse gases, both in the UK and throughout the world, and to help society adjust to the impacts of climate change.

Our *overall target for emission reductions* is derived from placing an upper limit on the damage humanity should be allowed to cause the planet. We believe that action should be taken to limit global temperature rise to 0.1°C per decade, with an upper limit of 1–1.5°C total increase. This translates into a UK target for a *reduction in emissions of carbon dioxide* (CO₂, the main greenhouse gas stemming from human activities) *of 30% from 1990 levels by the year 2010*, with accompanying cuts in other greenhouse gas emissions. We recognise that this is an ambitious target, but its achievement will bring additional benefits in terms of new employment and export opportunities and improvements in quality of life; and the costs of doing nothing are substantially higher than the costs of action.

Liberal Democrats want to see the rapid development of the *international regime* established by the UN Framework Convention on Climate Change. The UK Government should argue for an industrialised-world target of *20% reduction in CO₂ emissions by 2005 and a 30% cut by 2010*. Over time the targets should be progressively strengthened and (once progress is demonstrated in the industrialised world) extended to developing countries; effective enforcement mechanisms must also be developed. An emissions trading system should help in the cost-effective achievement of targets and could be piloted at an EU level. While accepting the principle of a joint EU target with differentiated member state commitments, we oppose any national target allowing an increase in emissions.

Within the UK, *a reduction in overall energy use is the essential component of Liberal Democrat policy to reduce CO₂ emissions*. We will reduce demand for energy by applying a carbon tax to fossil fuel sources of energy, using the revenue to reduce other taxes; implementing a major programme of investment in home energy conservation; reforming supply licences to ensure that energy supply companies invest in conservation projects; reducing VAT on energy conservation materials; and raising energy efficiency standards for buildings, machinery, appliances and vehicles. We will provide additional support for combined heat and power and for renewable energy, including small-scale, local and

community-owned sources; we aim to generate 20% of UK electricity from renewables by 2010. We will argue for a rapid end to fossil fuel subsidies throughout the EU.

CO₂ emissions are rising fastest in *the transport sector*, and an integrated approach, such as that introduced by the Liberal Democrat-sponsored Road Traffic Reduction Act, is needed to reduce them. We will improve fuel efficiency levels by arguing for tougher EU standards, graduating VED and company car tax by engine size/fuel efficiency, creating incentives for fuel-efficient public transport and strictly enforcing speed limits. We will aim to reduce the overall volume of private road and air travel by a steady real rise in the price of road transport fuels, pressing for EU or international taxation of aviation fuel, reforming the taxation of free fuel for company cars and of private non-residential parking and introducing road pricing in congested urban areas. We will increase investment in public transport, promote walking and cycling and company 'green commuter' travel schemes, encourage a large-scale switch in freight from road to rail, and use the planning system to reduce the need to travel.

Systems of *agriculture* which rely less on inputs of fuel and chemicals should be encouraged through reform of the CAP and taxation of fertilisers and pesticides. Forestry, which acts as a carbon sink, should be expanded. In *industry*, we will encourage the manufacture of products that are easier to repair, reuse or recycle. We will increase the landfill tax to reduce methane emissions from waste, and tighten controls on nitrous oxide and fluorocarbons. We will use *overseas aid* to encourage energy efficiency and sustainable development in recipient countries, and press for reform of the *world trading system* to permit the pursuit of environmental sustainability.

Concentrations of greenhouse gases have already reached such a level that *the impacts of climate change* will already be significant. In the UK, coastal regions, the water industry, agriculture, biodiversity, health services and the property insurance industry will all be particularly affected. There will also be increasing numbers of environmental refugees worldwide, and a greater need for humanitarian relief. Government needs to develop, publish and encourage debate on forward adaptation strategies, reforming policy where necessary to enhance environmental protection and help businesses and citizens adapt to these impacts of climate change.

Institutional change is required to achieve these policies. A new World Environment Organisation is needed, along with generous resource and technology transfer to developing countries. The EU similarly needs to embed sustainable development at the heart of its policy, and develop new powers to enforce common emissions reduction targets. UK government needs to be reformed to ensure that a coherent climate change programme can be implemented across all departments and agencies: we propose a Sustainable Development Office within the Cabinet Office, a Climate Change Cabinet Committee and a Parliamentary Environmental Audit Committee. Public participation and involvement, together with information and education programmes, are needed to build a broad consensus for action to tackle the growing challenge of climate change.

Climate Change

1.0.1 Human-induced climatic change – or ‘global warming’ as it is more commonly known – poses a serious long-term threat to the stability of the natural environment and the survival of current models of human society. The emission into the atmosphere of various gases resulting from industrial and agricultural activity is changing the world’s climate in ways which are only just beginning to be understood. The impacts of this changing climate are wide-ranging and potentially very serious, posing, in some cases, a direct threat to the very existence of communities and nations. As World Meteorological Organisation scientists warned in 1988, humanity is in effect conducting an uncontrolled experiment on the planet, ‘with consequences second only to nuclear war’.

1.0.2 It is inevitable that current global patterns of production and consumption, and present lifestyles, will have to change in response to these impacts and in order to avert long-term catastrophe. National governments and international institutions are only now, however, starting to respond, and action to curb polluting emissions has so far been very limited.

1.1 Greenhouse Gases

1.1.1 The ‘greenhouse effect’ is the name given to the process by which certain gases in the Earth’s atmosphere allow solar radiation to penetrate to the surface but trap a proportion of the heat which is re-radiated from the Earth. Without the greenhouse effect, the temperature of the planet’s surface would be too low to support life. Over the last century, however, human activities have been altering the concentrations of some of the greenhouse gases in the atmosphere:

- Carbon dioxide (CO₂ – main human sources: fossil fuel consumption, land conversion such as deforestation) has increased in concentration by nearly 30% from pre-industrial times. This is the main greenhouse

gas deriving from human activities, projected to account for about 70% of the ‘radiative forcing’ of climate over the next century.

- Methane (CH₄ – main human sources: agriculture, waste disposal, fossil fuel production and use; natural emissions from wetlands account for about 20% of the total) has more than doubled in concentration.
- Nitrous oxide (N₂O – main human sources: agriculture, industry; natural sources are probably twice as large) has increased in concentration by 15%.
- Fluorocarbons (industrial chemicals such as chlorofluorocarbons (CFCs)) have increased rapidly but are now declining as a result of limits on their production imposed to protect the Earth’s ozone layer. Non-ozone depleting substitutes for CFCs, such as hydrofluorocarbons (HFCs), are, however, increasing in concentration and may have a significant impact on climate.

Ignoring ozone-depleting substances, CO₂ accounted for 81% of the total global warming potential from UK greenhouse gas emissions in 1990, methane for 12%, nitrous oxide for 5%, and HFCs and other fluorocarbons for 2%.

1.1.2 The impact of rising concentrations of these gases is masked to a certain extent by aerosols (particles, dust and small droplets) that are present in the atmosphere as a result of processes both natural (e.g. dust storms and volcanic activity) and human (e.g. fossil fuel and biomass burning). By scattering and absorbing radiation, aerosols cool the surface regionally. Action currently being taken to limit the emissions of sulphur and nitrogen oxides from power stations will remove this masking effect and accentuate climate change.

1.1.3 Emissions and concentrations of greenhouse gases are projected to continue to rise steadily in

the absence of controls. The evidence suggests that this is already having an effect on climate. Global mean surface temperature has increased by 0.3–0.6°C since the beginning of the century, recent years have been amongst the warmest since 1860, and global sea level has risen by 10–25 cm over the past 100 years. Until recently, the changes fell within the natural range of climatic variability. The latest (June 1996) report of the UN-sponsored Inter-governmental Panel on Climate Change (IPCC), however, concluded that ‘the observed warming trend is unlikely to be entirely natural in origin’ and that ‘the balance of evidence suggests that there is a discernible human influence on global climate’.

1.1.4 This represents an important advance in the development of scientific knowledge on the part of an organisation involving hundreds of leading scientists worldwide regularly assessing and reviewing the latest developments in climate science. The IPCC report is accepted by governments as the best available summary of the present state of knowledge. It should be emphasised that considerable uncertainties remain, particularly over the effects of climate change at the regional level, its impact on extreme weather events and the costs of possible policy responses, and a continued and intensified research effort is clearly necessary. There is no doubt, however, as to the reality of climate change itself.

1.2 The Impact of Climate Change

1.2.1 The effect of this rise in concentration in greenhouse gases is an increase in global temperature. The IPCC predicts a rise in global mean surface air temperature of about 2°C by the year 2100 (more accurately, within the range 1–3.5°C). For any figure within this range, the average rate of warming would probably be higher than any seen in the last 10,000 years. Even if stabilisation of greenhouse gas concentrations is achieved, temperature will continue to rise afterwards due to the thermal inertia of the oceans.

1.2.2 The impacts of this rising temperature are many and varied. The IPCC’s major predictions include:

- A rise in sea level, due mainly to thermal expansion of the oceans – the IPCC predicts a 50 cm rise by 2100 (range 15–95 cm) – with accompanying damage to coastal regions and islands.
- Potential increases in the variability of ocean currents.
- Possible increases in storms and extreme weather events, though this is uncertain.
- Shifts in the composition and geographic distribution of ecosystems, including reduced biodiversity and major changes in the composition of forests.
- An increase in the temperature of deserts and an increasing likelihood of desertification becoming irreversible.
- The disappearance of between a third and half of existing glacier mass (already evident in the Swiss Alps).
- Shifts in rainfall patterns, an increasing likelihood of water shortages and a degradation of the quality of supplies, particularly in areas such as the Middle East and Central Asia where water supplies are already low.
- Major impacts on human health and mortality from increased temperatures (partly offset by reduced cold-weather deaths), extreme weather events, water shortages and the spread of infectious diseases such as malaria.
- Damage to human infrastructure, particularly in coastal and island regions, and accompanying stress on the property insurance industry.

1.2.3 The most vulnerable areas in almost all these cases are, of course, developing countries. Agricultural production and water availability are already under pressure in many countries from increasing consumption and pollution; climate change will exacerbate these problems. There is also significant potential for increased conflict over natural resources, especially water. Increases

in forced migration can be anticipated, in a world in which refugee numbers have already quadrupled in the last two decades.

1.3 Impacts in the UK

1.3.1 In the absence of corrective action, the impact of climate change on the UK will be significant – though regional modelling is still quite weak, and more work is needed. By the 2020s, according to the UK Climate Change Impacts Review Group (March 1996) temperature will be about 1°C higher than in the period 1961–90, and by the 2050s about 1.5°C higher. The frequency of a 1995-type summer (the second warmest since records began in 1659) will rise from the current figure of 1 in 90 to 1 in 10 by the 2020s and 1 in 3 by the 2050s.

1.3.2 Annual precipitation over the UK as a whole is expected to increase by about 5% by the 2020s and by nearly 10% by the 2050s. Summer rainfall, however, declines in the south, so that on average the south-east becomes drier and the north-west wetter. Seasonal wind speeds increase over most of the UK, with average gale frequencies 30% higher by the 2050s. Sea level rises at the rate of 5 cm a decade, exacerbated in the south and east by sinking land and mitigated in the north by rising land.

1.3.3 Impacts of particular concern to the UK are listed below:

- Coastal defences: coastal regions and low-lying areas are vulnerable to sea level rise and storm surges.
- Property insurance: the insurance industry can expect severe stress if the pessimistic assumptions about extreme weather events are realised, and in any case will have to cope with a greater incidence of subsidence from foundations built on clay (particularly common in southern Britain), subject to shrinkage in drier summers.
- Agriculture: likely to suffer from soil erosion, to wind in regions which become drier, and to water elsewhere, and also to land loss to coastal erosion. Farmers will have to adapt to

changing growing seasons, variations in pest infestation and shifts in weather and rainfall patterns. Some crops will become easier to grow, others more difficult, and farmers will have to learn to adapt frequently. Forestry yields should improve in northern and central Britain.

- Water: the UK water system, already exhibiting signs of stress, will face an additional 5% increase in demand in southern Britain (on top of the 12% already predicted) by the 2020s; demand for spray irrigation could increase by over 100%.
- Health: increases in heat-related diseases, such as those affected by urban air pollution and the spread of infection vectors, are expected. Cold-related illness should, however, decline.
- Energy: demand for heating may fall as winters become milder, though air-conditioning is likely to become more widespread. All of the UK's oil refineries and most of its fossil fuel and nuclear power stations are situated on the coast or on river estuaries, and are vulnerable to sea and storm damage.
- Biodiversity: climate change will occur too rapidly for species to adapt in an evolutionary sense, so many will be forced to migrate northwards to survive; several, particularly coast- and mountain-dwellers, will be threatened.

1.3.4 The Review Group's models are based on an assumption of linear change, and it should be remembered that more abrupt shifts in climate are also possible. Any changes in ocean currents, for example, are of particular importance to the UK, since the Gulf Stream maintains a much milder climate in Britain than would be expected. If it were to weaken, the UK's climate could come to resemble that of other parts of the world at the same latitude, becoming, in fact, significantly colder than at present.

1.4 The UK Record

1.4.1 The Conservative Government first set out its proposals for tackling climate change in

Climate Change: The UK Programme in January 1994. For carbon dioxide, the main greenhouse gas, it went no further than the target accepted in 1992 at the Rio 'Earth Summit', to return emissions to 1990 levels by 2000 (which still implies, of course, a rising concentration of gases in the atmosphere). The Programme aimed to reduce CO₂ emissions by 10 million tonnes of carbon per year (MtC/yr) below what they would otherwise have been by 2000, through measures including the application of VAT to domestic fuel, increases in road fuel duties and various energy conservation targets for the public and private sectors, achieved mainly through the establishment of the Energy Saving Trust (EST).

1.4.2 The EST has failed to achieve its targets so far due to inadequate funding. The gas and electricity regulators decided not to allow the levies on domestic energy bills required to fund the EST programme, and the Government failed to override them. Compared to the original figure of 2.5 MtC/yr savings, EST activities are now likely to save only 0.5 MtC/yr, and the Programme as a whole is projected to achieve about 75% of its target. However, the large-scale replacement of coal in the electricity supply industry by gas and nuclear power has ensured that the UK will in fact exceed the Rio target, with a predicted *fall* of about 5% in CO₂ emissions by 2000.

1.4.3 The Climate Change Programme also included a gradual increase in afforestation (to

increase CO₂ uptake), assistance to developing countries, publicity and educational campaigns and a continued research effort. The 1990–2000 reduction target for methane was 10%; a 22% reduction is now projected. The target for nitrous oxide was 75%, and a 62% reduction is projected. Emissions of fluorocarbons were not all included in the original Programme, but are now projected to fall by 58%.

1.4.4 The total global warming potential of all UK greenhouse gas emissions (weighted for the different impact of each gas) in 2000 is projected to be about 10% below the 1990 level. In EU discussions in March 1997, the Conservative Government refused to adopt anything other than the highly unambitious UK target of a 10% reduction in greenhouse gases by 2010 – assuming, in other words, no real progress over the decade following 2000.

1.4.5 The Labour Government came to power with a manifesto commitment of a 20% reduction in CO₂ by 2010. The manifesto contained no detail, however, on how this was to be achieved, and the Government does not propose to publish its full programme until 1998. At least one other Labour policy – the reduction in VAT on domestic fuel to 5% – runs directly counter to the aim of reducing emissions. It is almost impossible to see how the Government expects to achieve its reasonably ambitious target without substantial new tax and public expenditure proposals, which seem highly unlikely to be forthcoming.

The Liberal Democrat Approach

2.0.1 It is already far too late to talk about halting climate change. The only achievable policy goal is to minimise its impact on the planet. We believe that targets for greenhouse gas reductions should be derived not from conventional beliefs about what particular groups may or may not tolerate in the short term, but from an attempt to put an upper limit on the damage humanity should be allowed to cause to its planet.

2.1 Minimising Climatic Change

2.1.1 The objective of the 1992 UN Framework Convention on Climate Change is the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human interference with climate. Such a level should be achieved, states the Convention, within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.

2.1.2 The impact of climate change depends partly on the total degree of warming and partly on the rate at which change occurs. In 1990, the Advisory Group on Greenhouse Gases established by the UN Environment Programme (UNEP), the World Meteorological Organisation and the International Council of Scientific Unions concluded that temperature increases should be limited to 0.1°C per decade to protect vulnerable ecosystems. Furthermore, a total increase beyond 1°C (above pre-industrial global mean temperature) could ‘elicit rapid, unpredictable and non-linear responses that could lead to extensive ecosystem damage’. A rise of 2°C ‘can be viewed as an upper limit beyond which the risks of grave damage to ecosystems, and of non-linear responses, are expected to increase rapidly’.

2.1.3 This implies an upper limit to the concen-

tration of CO₂ (the main greenhouse gas) in the atmosphere of 330–400 parts per million volume (ppmv) for a 1°C rise, and 400–560 ppmv for a 2°C rise (the exact figure depends on climate sensitivity, still somewhat uncertain). In contrast, pre-industrial concentrations of atmospheric CO₂ were about 280 ppmv, and the 1990 level was about 350 ppmv. Current rates of increase are 15 ppmv/decade, resulting in a temperature rise of 0.2–0.3°C per decade and a likely increase of 2°C over the next century (see 1.2.1).

2.1.4 In June 1996 the EU Council of Ministers agreed that the global average temperature rise should not exceed 2°C, implying a CO₂ level of 550 ppmv. On this basis, it concluded that the EU should argue for 15% reductions in greenhouse gas emissions from 1990 levels by 2010 at the next round of international negotiations (see Chapter Three).

2.1.5 Liberal Democrats believe this stance is both too pessimistic and too dangerous. We endorse the UNEP group’s belief that a 0.1°C increase in global temperature per decade is the maximum that should be tolerated, along with an upper limit of 1–1.5°C total rise. To this end, the UK should adopt a target of a 30% reduction in carbon dioxide emissions by 2010 (representing a trend rate of reduction of 2–2.5% per year). The UK should adopt this as a domestic target and argue for it within the EU and amongst industrialised countries as a whole.

2.1.6 Reduction targets for other UK greenhouse gas emissions also need to be set. We propose a 50% cut in methane emissions from the 1990 level, a 75% cut in nitrous oxide emissions and a 75% reduction in fluorocarbon emissions. For the latter two categories, other environmental objectives – the spread of catalytic converters in vehicles (which produce nitrous oxide in the process of reducing emissions of nitrogen oxides) and the phase-out of CFCs and other ozone-depleting substances (for which HFCs are a substitute) will inevitably counteract otherwise

larger reductions.

2.1.7 We recognise that further substantial reductions beyond these targets will be necessary if our upper temperature limit is not to be breached over the longer term. Even stabilisation of greenhouse gas concentrations at double pre-industrial levels (the EU target) will eventually require global emissions to be less than 50% of current levels – 2000 MtC per year from CO₂ rather than the current 5–6000 MtC. Furthermore, we accept some increases in emissions from developing economies as an inevitable concomitant of development, implying that industrialised countries will need to accept correspondingly greater reductions.

2.2 Policy Implications

2.2.1 Liberal Democrats have long argued for a new concept of ‘security’ as a policy goal for government. Traditionally security has been seen in terms of the threats posed to the UK from the armed forces of its potential enemies abroad and from terrorist activity at home. Climate change is a classic example of a real and pressing danger to national, and global, security, affecting almost every aspect of national and international life. Meeting this threat demands new thinking, new policies and a new approach to government.

2.2.2 If the challenge of climate change is to be met successfully, it will demand:

- A commitment to environmental sustainability: to recognise the need to ensure that all economic and social development is environmentally sustainable.
- A willingness to confront the vested economic interests which may suffer (in the short term) from the policies necessary to confront climate change.

- Vigorous action to stimulate innovation and spread best practice throughout the economy, using regulatory and fiscal tools (e.g. energy efficiency standards and a carbon tax) to set the framework within which the market operates.
- The ability to think and plan for the long term, beyond the bounds of single-term parliaments and governments.
- A willingness to work together with other countries and within international institutions (especially in Britain’s case, the EU) in order to achieve coordinated action to combat a global problem.

2.2.3 The remainder of this paper applies these principles to particular areas of government action. Chapter Three describes the global and EU regimes we believe need to be established in order to reduce greenhouse gas emissions. Chapter Four sets out reduction policies for the UK, while Appendix One summarises and contrasts these with existing Government plans. Many impacts of climate change are already becoming evident and cannot be reversed; Chapter Five therefore sets out our policy proposals for adapting to its impacts. Finally, Chapter Six describes the institutional changes that we believe necessary if the world, and specifically the UK, is able to respond vigorously to the threat of climate change.

2.2.4 The ambitious strategy we set out in this paper will inevitably involve costs to some sectors of the UK economy, though these will be offset by policy impacts not directly related to climate change, such as reductions in local air pollution or in traffic congestion. But if climate change is *not* tackled, all sectors will suffer. The costs of doing nothing are substantially higher than the costs of action.

3 International Action

3.0.1 The UN Framework Convention on Climate Change (FCCC) was agreed at the ‘Earth Summit’ in Rio in 1992. Its major aim, as described in 2.1.1, is the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human interference with climate. The negotiation of the Convention established the principle that climate change was a serious problem and action could not wait upon the resolution of scientific uncertainties. Developed countries were to take the lead, providing compensation for any additional costs undertaken by developing countries. Given strong opposition from the US, no binding policy commitments were included, but the FCCC indicated that industrialised countries should agree as a first step to return greenhouse gas emissions to 1990 levels by 2000 – a target which, for the vast majority, is not being met.

3.0.2 The Convention entered into force in March 1994, and has so far been ratified by 167 countries. The first conference of the parties, in Berlin in 1995, agreed that the Rio target was inadequate and that work should be commenced to identify and agree targets for the limitation of emissions, and possibly their reduction below 1990 levels, for adoption if possible in 1997. The institutional machinery of a secretariat and various subsidiary bodies was also established, though strong opposition, in particular from the oil-exporting group of countries, meant that formal rules of procedure for the conference (including a voting mechanism) were never agreed. Most developing countries supported the call by the Alliance of Small Island States (AOSIS) for tough action on emission targets – specifically, a 20% cut by 2005.

3.0.3 The second conference of the parties took place in Geneva in July 1996. Although the wrangle over procedural rules was still not settled, the meeting marked a shift in a number of countries’ positions, including most notably that of the US, in favour of the adoption of legally-

binding targets and timetables for emission reductions – though significant opposition was still voiced by the oil-exporters, now joined by Russia and Australia (a large coal exporter).

3.0.4 A protocol to the Framework Convention is currently under negotiation, and is due to be agreed at the third conference of the parties, in Kyoto in December 1997. This should include specific emissions limitation and reduction objectives for the ‘Annex I’ parties to the Convention (essentially, the industrialised world). Unlike the Rio target, these should be legally binding on the signatories to the protocol. As with other environmental treaties, whatever is agreed in Kyoto will prove to be only the first step in a continuous process of renegotiation of further targets and policy mechanisms.

3.0.5 The remainder of this chapter sets out Liberal Democrat objectives for the evolution of the international climate change regime, and for the role of the EU. We recognise that not all of these proposals can be successfully negotiated at the Kyoto Conference – but these are the objectives towards which we believe the UK Government should aim, in 1997 and in the future.

3.1 The International Regime

3.1.1 *Targets.* Chapter Two explains our belief in the necessity of a 30% reduction in carbon dioxide emissions from 1990 levels by 2010, based on an eventual upper temperature limit. Agreement on an additional shorter-term target for 2005 will represent an important kick-start to the process; we endorse the AOSIS target of a 20% reduction. It is, unfortunately, distinctly unlikely that international agreement will be reached on such ambitious targets, but it is vital to begin the process of negotiating reductions convincingly. All targets must be legally binding on the signatories; non-binding targets, such as that agreed at Rio, are insufficient.

3.1.2 The protocol agreed at Kyoto should also

recognise, however, that any target agreed will be only an interim one, and a process should be established that allows for regular reviews and revisions. We also recognise the desirability for the development of more sophisticated targets than simple flat-rate reductions from the 1990 baseline, which are inherently unfair to countries with relatively low existing emission levels. Various 'differentiation' formulae have been suggested for targets based on, for example, emissions per capita or per unit of GDP. Although a flat-rate target is the only one that could reasonably be agreed at Kyoto, we believe that such differentiated targets are ultimately desirable and work should start on their negotiation. Other refinements are also possible, such as targets in the form of 'budgets' (total emissions over a period of years); while endorsing this proposal, we reject the related concept of 'borrowing' from future budget periods as likely to undermine national commitments.

3.1.3 Although all greenhouse gases need to be controlled, CO₂ is both the main one and the least difficult to measure; significant uncertainties still exist over sources and sinks for methane and nitrous oxide. Separate targets should therefore be agreed for each of the greenhouse gases, recognising that those for carbon dioxide and the industrial fluorocarbons will at this stage be easier to verify and can therefore be more precise.

3.1.4 *Developing countries.* The FCCC currently contains no obligations for emission reductions from developing countries, on the grounds that the bulk of greenhouse gas emissions have historically emanated from the industrialised world, which also has a greater capacity for achieving reductions. However, should the latter group begin to make significant action to control their own emissions, developing countries will have to join them at some point, otherwise growth in their economies will offset this progress. Similarly, without controls in developing countries, developed country industries facing tough domestic limits may simply migrate to escape the controls, shifting the problem around rather than solving it.

3.1.5 We believe that developing countries should therefore accept a commitment to begin negotiations on their own targets once the Annex I

parties achieve a specified reduction (say, 10%) from 1990 levels. Work on the design of international mechanisms for financial and technological assistance for developing countries should begin immediately. Such assistance should be made available to developing countries which accept reasonable targets of their own in advance of general agreement on developing country targets.

3.1.6 *Emissions trading.* Liberal Democrats have always supported the concept of a global system for trading greenhouse gas emissions, in which countries unable or unwilling to reduce emissions to the given target pay to purchase 'emission quotas' from countries which are able and willing to make larger reductions than the target. Since this system ensures that resources are concentrated on those countries where emission reductions can be made most cheaply, it is highly cost-effective, resulting in a higher total reduction in emissions for any given cost. Emission trading systems permit a high degree of national flexibility and have worked well in the US in limiting sulphur dioxide and other pollutants and in a number of countries in phasing out CFCs.

3.1.7 The US is pressing strongly for such a system to be adopted at Kyoto for CO₂ emissions, though it seems unlikely in practice that there is enough negotiating time left for agreement to be reached. We support a trading system in principle, and aim to see it adopted at the earliest opportunity. In due course, it should be extended to operate at inter-industry as well as intergovernmental levels, permitting even greater flexibility and cost-effectiveness in achieving emission reductions. There are, however, substantial practical difficulties to be overcome, and it would be desirable to pilot the system at, for example, the EU level (including, perhaps, central and eastern Europe) before it is extended more widely. An interim measure, which could be agreed at Kyoto, is the adoption of the concept of 'joint implementation' where a party gains credit for emission reductions achieved in another party (with their own targets) but financed by the former – a kind of bilateral emissions trading system.

3.1.8 *Policy harmonisation.* Some policies needed to tackle climate change are more likely to be

effective if adopted at an international level (e.g. carbon taxes, energy-efficiency standards and labels) and a few *must* be subject to international agreement – notably the taxation of ‘bunker’ (aviation and marine) fuels. Negotiations should begin in these areas as soon as possible.

3.1.9 *Implementation.* If the FCCC is to be effective, it will need to develop credible enforcement and compliance mechanisms, with respect both to parties and to non-parties, whose non-participation effectively threatens the stability and prosperity of the rest of the world. Trade sanctions against non-parties, and parties in breach of their obligations, have proved effective in other international environmental agreements and negotiations should begin on their design and inter-relationship with the world trading system (see 4.5.3). The Convention secretariat needs to be given sufficient resources to verify effectively the annual reports parties are already obliged to submit under the FCCC and to provide technical assistance with policy design and implementation.

3.2 The EU Regime

3.2.1 In March 1997 the EU agreed to adopt a negotiating position for Kyoto of a 15% cut in greenhouse gas (carbon dioxide plus methane plus nitrous oxide) emissions by 2010. The agreement included a system of internal burden-sharing, with member states committed to entirely different individual targets. These

ranged from a 25% cut (Austria, Denmark and Germany) to a 40% rise (Portugal); the UK accepted a 10% cut. The aggregate of member states’ targets comes to only a 10% reduction (though it should be noted that if the UK accepted our 30% target, the shortfall would be entirely made up); the remaining 5% was to be achieved through unspecified ‘additional national and common and coordinated Community policies and measures’.

3.2.2 Liberal Democrats accept the principle of individual member states’ targets together with a single EU commitment. We do not accept, however, the principle of *increases* in emissions for any state – which is in any case already undermining the EU’s negotiating position. Even the poorest EU members are amongst the world’s richest nations, and stabilisation at 1990 levels should be the least they accept. The UK Government should regard it as a high priority to use its own offer of larger cuts to revise the basket of member state objectives. The adoption of an emissions trading system within the EU (see 3.1.6–7) would make it easier to achieve more ambitious targets, while offering valuable lessons for the construction of a similar system at a global level.

3.2.3 The acceptance of differentiated targets within the EU also raises an important institutional implication. If it is the EU rather than the member states which possesses the responsibility to achieve the legally-binding FCCC target, it *must* also possess an internal enforcement mechanism, with the power to over-ride member state policies when they are failing to achieve the required national target. This is considered further in Chapter Six.

4 The UK Climate Change Programme

4.0.1 This chapter deals with the actions that should be taken to reduce greenhouse gas emissions in the UK. We have argued in Chapter Two for a trend rate of reduction of 2–2.5% in carbon dioxide emissions per year (30% by 2010) and accompanying reductions in other greenhouse gases. Whatever international target may be agreed at the Climate Change Convention negotiations in Kyoto, we believe that the UK should adopt these tougher targets and aim to meet them. This chapter describes the policy measures necessary to meet the targets; Appendix One lists the emissions reductions which we believe should result.

4.1 Energy

4.1.1 A reduction in overall energy use is the essential component of Liberal Democrat policy to tackle emissions of carbon dioxide. This is entirely consistent with the maintenance of a high level of energy *services* (light, heat, power, etc.) because of the appalling inefficiency of current energy consumption. Government estimates show that 50% of the energy used in the UK could be saved with existing technology alone. Even at current prices, energy use is at least 20–30% higher than would be economically optimal, representing an economic loss of about 3% of GDP annually.

4.1.2 By improving the efficiency of energy use in the UK, and thereby reducing overall demand, CO₂ emissions will be significantly reduced. Our key policy measures (outlined in more detail in Policy Paper 22, *Conserving Tomorrow – Energy Policy for the Future* (1996)) are:

- Environmental tax reform: the phased application of a carbon tax to fossil fuel energy sources, with the revenue recycled into the economy through reductions in other taxes. The expectation that energy prices will rise gradually in the long term is essential to

convince consumers, designers and manufacturers that energy-efficient machines, appliances and buildings are all desirable investments. Raising the price of energy through taxation is the easiest way to ensure this change in emphasis.

- A major (at least £1 billion per year) programme of investment in home energy conservation directed through the Energy Saving Trust and carried out largely by local authorities and the energy supply companies. Revenue would be raised for this programme by introducing a Sustainable Energy Levy on the gas and electricity suppliers and by reforming the system of supply licenses to compel suppliers to invest in energy efficiency improvements in their customers' homes. EST spending would be targeted on poorly-insulated and low-income households, ending the entirely avoidable phenomenon of fuel poverty (and helping to increase employment levels, as conservation work is labour-intensive).
- A reduction in VAT on energy conservation materials to the same level as that applying to domestic energy. Together with other financial incentives such as low-cost loans, this would encourage better-off households to improve the energy efficiency of their homes, and stimulate similar improvements (for which there is very substantial scope) in the industrial and commercial sectors.
- The use of mandatory standards to improve the energy efficiency of buildings, machinery, vehicles and appliances (including energy labelling of houses at the time of sale); the provision of advice, information and education to encourage consumers to conserve energy.
- A determined effort within the public sector to

improve the energy efficiency of its buildings, together with public procurement policies aimed at encouraging the spread of energy-efficient vehicles and appliances.

4.1.3 An unusual feature of the next few years is the extent to which domestic energy prices are likely to continue to fall sharply as a consequence of increased competition, improved technology and low world gas and oil prices. This provides an ideal opportunity for the introduction of our carbon tax and energy levy proposals, allowing substantial sums to be raised (and therefore other taxes to be cut and energy conservation work carried out), while protecting consumers from price rises. In the absence of such action, falling energy prices will undercut conservation incentives and depress energy efficiency levels across the economy – as is now occurring. The Liberal Democrat-sponsored Home Energy Conservation Act already provides the framework needed for the identification of the necessary conservation work.

4.1.4 Greenhouse gas emission reductions are also necessary on the supply side. Low world gas prices and improved technology have helped displace coal as the main fuel for electricity generation, and substantially lowered UK carbon dioxide emissions. At the same time, the place of nuclear power in the UK fuel mix is beginning to decline as the nuclear stations reach the end of their operating lives; by 2020, only one station should be left. Electricity privatisation has revealed the high real costs of nuclear power, and we will ensure that remaining decommissioning and waste disposal costs are fully borne by the nuclear industry, effectively ruling out nuclear power as a cost-effective option. It is essential that the nuclear stations are replaced not by new fossil fuel stations, but by renewable sources of energy such as onshore wind power, landfill gas and biomass, and, in the longer term, wave and solar power.

4.1.5 Our objective is to generate 20% of the UK's electricity requirements from renewable sources by 2010 (compared to 2% today), with further improvements thereafter. This will require renewed and expanded requirements on the electricity generators to employ renewable sources

(an extension of the current system of Renewable Energy Orders and Obligations) and additional funding from the Sustainable Energy Levy to offset the higher (but declining) prices of such sources. The development of small-scale, local and community-owned renewable generation is an essential part of this programme, helping to defuse local opposition, for example, to wind turbines.

4.1.6 Combined Heat and Power (CHP) also plays a crucial role in reducing CO₂ emissions. CHP plant is highly efficient and frequently small in scale, making it quite easy to install. Our proposals for carbon tax and local power generation will encourage CHP; in addition, we will amend planning regulations to adopt a presumption against any new thermal generation project which does not have high efficiency standards. The UK is currently aiming at 5 GW of installed CHP capacity by 2000; we believe that a target of 14 GW by 2010 is achievable.

4.1.7 Governments have traditionally subsidised many energy sources, for a variety of (usually spurious) reasons with (almost invariably) negative environmental impacts. The privatisation and liberalisation of the gas and electricity industries has in fact signalled an end to most such subsidies in the UK. Fossil Fuel Levy funding for the nuclear industry and the remaining 'premium price' coal contracts held by the electricity generators are due to end in March 1998. The UK is therefore well placed to argue for a rapid phase-out of fossil fuel subsidies within other EU member states (where they remain substantial), a process which is slowly under way as a single market in energy develops. Subsidies should only be provided for renewable energy sources and energy efficiency improvements, reflecting their non-commercial environmental benefits. Similarly, taxation regimes for fossil fuel production should be reviewed on an international basis, as part of the negotiations around the Climate Change Convention.

4.1.8 About a third of the methane emitted in the UK derives from fossil fuel energy production and use, including coal mining (17%), gas distribution (9%), fuel combustion (4%) and offshore oil and gas (2%) (1990 figures). Strict requirements should be placed on coal mine and gas pipeline

operators to measure and minimise emissions and leakage.

4.2 Transport

4.2.1 Surface transport accounts for a continuously growing proportion of the UK's CO₂ emissions. In 1970, it represented only 12% of the total, rising to 20% in 1990 and an expected 28% by 2000. Britain's recent reduction in overall CO₂ emissions has hidden the disturbing growth from the transport sector. If left unchecked, this would overwhelm both the reductions to date and any substantial further improvements in the domestic and industrial sectors. Other sectors cannot compensate for transport, which should be set a reduction target at least as stringent as the national average.

4.2.2 Existing policy on transport is set out in Policy Paper 15, *Transporting People, Tackling Pollution* (1995)). The proposals here represent a development of this earlier framework, and are aimed at reducing:

- The amount of CO₂ emitted per vehicle-mile.
- The volume of travel by motorised modes of transport.
- The volume of travel by car and air compared to ground public transport.

Measures are needed to affect each of these components so as to reduce emissions for the transport system as a whole. Concentrating merely on one component will fail, as growth in the others will counterbalance even substantial isolated improvements. For example, the introduction of current best technology into the car stock without measures to manage the growth in traffic would still result in transport's CO₂ emissions rising by 12% by 2025.

4.2.3 *Emissions per vehicle-mile.* Fuel-efficiency technologies introduced in the UK in the last 20 years have predominantly been used to increase vehicle performance, with the result that the average fuel economy of the British car fleet has improved from 29.5 mpg in 1970 only to 31.1 mpg in 1993. This is worse than the EU average;

Italy and Denmark, for example, now have car fleets 20% more fuel-efficient than the UK's, averaging 38 mpg. Current, largely unapplied, fuel-efficiency technologies have the potential to improve fuel economy to almost 200 mpg; with such a 'best', an eventual fleet average of about 70 mpg should be possible. CO₂ emissions can be further reduced by combining such designs with cleaner fuels, particularly natural gas.

4.2.4 We will therefore press for higher fuel-efficiency standards at an EU level. The current negotiations on a voluntary agreement with manufacturers, aiming at about 56 mpg by 2005, or possibly 2010, are insufficient to deliver substantial reductions, and tougher and more rapidly-achieved targets are necessary. We will encourage the spread of fuel-efficient cars by:

- Reducing VED from the current £145 to £10 for cars with engines up to 1600cc (paid for by a one-off 3% rise in road fuel duty in addition to the current 'escalator'), encouraging companies and private owners to buy more fuel-efficient cars on average. As new EU fuel efficiency figures are agreed, and providing they can be enforced, VED should be linked to the fuel efficiency of the vehicle. If these policies fail to improve the fuel efficiency of the car fleet quickly enough, VED may need to be raised over time for the least efficient vehicles (as recommended by the Royal Commission on Environmental Pollution)
- Graduating company car taxation by the fuel efficiency of the vehicle – of substantial importance, given that the majority of new cars bought in the UK are company cars. We will abolish the current mileage bands (which give drivers higher discounts off their tax liability for higher mileages driven) and create a range of scale charges based on the engine size (and in due course, fuel efficiency) of the car. The resulting tax revenue (of about £1 billion a year) will be redirected to support green business travel schemes and rail freight (see 4.2.7).
- Creating incentives for fuel-efficient public transport, introducing, for example, appropriate clauses in rail franchises and

quality standards for bus licenses, and graduating the fuel duty rebate paid to buses by fuel-efficiency levels.

- Introducing programmes to diffuse low CO₂ technologies and designs into the market. This will include the introduction of EU-wide fuel-efficiency and emissions labelling systems, together with public awareness campaigns; and government procurement programmes designed to encourage fuel-efficient vehicles and cleaner fuels.
- Strictly enforcing the current 70mph maximum speed limit. Fuel efficiency levels deteriorate rapidly over about 55mph, and this measure by itself would improve car fuel economy by 2%. If necessary, we would consider the introduction of a lower maximum to combat congestion and improve fuel economy.

4.2.5 *The Volume of Travel.* The second essential component of Liberal Democrat transport policies is a reduction in the volume of motorised travel – a desirable objective not only for cutting greenhouse gas emissions, but also in terms of reducing traffic congestion and related health and social impacts. The traffic reduction targets in the original version of the Liberal Democrat-sponsored Road Traffic Reduction Act – reductions in UK traffic from current levels of 5% by 2005 and 10% by 2010 – should be adopted as government policy. (These targets can be adjusted according to progress with emission reductions over the period.)

4.2.6 The following measures are required to ensure that road (and air) transport starts to bear the cost of the environmental damage it causes and therefore falls in overall volume:

- A steady rise in the price of transport fuels (which also affects vehicle purchasing choices). The current ‘escalator’ fuel duty mechanism of a minimum 5% (now 6%) annual real increase has had little impact against a background of falling oil prices and increased competition in the retail sector; in fact, fuel prices are still lower in real terms than they were in the late 1950s. We therefore believe that it must be continued, and that

there may be a need for further increases beyond 6% if prices continue to fall for other reasons.

- The taxation of aviation fuel (and marine fuel) at an international level if possible, and at an EU level if not. Further increases in the airport departure tax, particularly for domestic flights (with social exceptions such as flights to remote island communities), and regulation of landing and take-off slots to encourage aircraft to carry as many passengers as possible are also desirable. (Full policy proposals on air transport are set out in Policy Paper 27, *Our Skies* (1997).)
- Reform of the taxation of free fuel for company car drivers, i.e. fuel paid for by the employer but used for non-business purposes (including commuting). This is currently charged at an annual flat rate determined by engine capacity, but since it is independent of mileage driven or fuel costs, it insulates the driver from any price incentives. Drivers should be taxed on the actual value of the fuel received, on a per mile rate, possibly varied by the fuel efficiency of their car. (The reform of company car taxation we propose in 4.2.4 would also reduce unnecessary mileage.)
- Reform of the taxation of private non-residential parking, which contributes significantly to the volume of commuting, and encourages out-of-town retail and business developments. All parking spaces should be rated separately for business rate purposes, and higher rates should be imposed, providing revenue for local public transport.
- The introduction of road pricing in congested urban areas, with the revenue earmarked for improving local public transport. Previous Party policy has envisaged this as an option for local authorities, but this is unlikely to be sufficient for our CO₂ target; after the conclusion of pilot schemes, we would consider making it a *requirement* in the most congested urban areas. Additional policies, such as peak-hour bans, should also be options for local authorities working to overall traffic reduction targets.

4.2.7 Acceptable alternatives to private road transport also need to be developed if these policies are to have their full effect. We support:

- Investment in local public transport, using the revenue generated from road pricing and taxation of private non-residential parking.
- Specific investment measures such as the linking of international airports to mainline railway services (not just city shuttles) to reduce the need for internal flights.
- The reallocation of road space away from private cars to pedestrians, cyclists and public transport – as implemented by many Liberal Democrat councils.
- The development of integrating measures to combine pedestrian access, cycling and public transport modes into a comprehensible ‘low environmental impact’ transport system.
- The promotion of company ‘green commuter’ and business travel schemes such as tax relief for season ticket and cycle purchase, financed by higher taxation of company cars (see 4.2.4).
- Encouragement for a large-scale switch in freight from road to rail, including providing financial support for intermodal (road/rail) facilities, restricting heavy road freight to particular routes, and arguing for EU-wide taxation of lorries according to a combination of their fuel efficiency and axle weight (which determines the damage they cause to roads).

4.2.8 The planning system should be used to reduce the *need* to travel, particularly by private vehicles. This includes incentives for the development of transport-substituting activities, such as business rate and/or tax rebates for local shops and services in areas that are deficient, home delivery services, and telecottage developments linked to good public transport access. Countries such as the Netherlands already rate planning proposals according to sites’ accessibility to public transport, and limit levels of parking and road space accordingly.

4.2.9 Most of these policy proposals are not particularly new, but have never been implemented before in a coherent and integrated manner. What is needed is a complete package of measures that discourages the use of the most environmentally-damaging travel methods while allowing and providing for incentives for people to change their travel behaviour. The mechanism included in the 1997 Road Traffic Reduction Act introduced to Parliament by a Liberal Democrat MP provides a useful starting point. Local authorities are to identify the traffic reductions they can achieve under existing institutional constraints, and then indicate where national action or enabling powers are required for further progress. Central government is required to evaluate what local authority actions can achieve towards a national traffic reduction target and then implement national and enabling measures to achieve specific targets. Combined with tough targets for road traffic reduction – which may need to be raised over time in order to achieve our climate change objectives – and appropriate local government performance indicators, this provides the framework necessary to achieve our emission reduction targets in the transport sector.

4.3 Agriculture

4.3.1 Liberal Democrat policy on agriculture is set out in Policy Paper 5, *Reclaiming the Countryside* (1994). As agricultural systems have become more specialised and the scale of operations has grown, energy use has increased sharply, mainly in the machinery now used on farms, but also in the manufacture of chemicals such as pesticides and fertilisers.

4.3.2 The development of an effective climate change policy needs to encourage energy efficiency in the agricultural sector; see section 4.1. In addition, we aim to encourage agricultural systems which are ‘cyclical’ or ‘closed-system’ in nature and less intensive, relying less on inputs of fuel, fertiliser and pesticides. Reform of the Common Agricultural Policy needs to channel resources towards environmental aims such as these rather than to price and production support. The taxation of fertilisers, pesticides and insecticides, which we will introduce to raise revenue for the treatment of polluted water and

food, will also help in the reduction of energy use. More efficient use of fertilisers will also decrease emissions of nitrous oxide from agriculture, which accounts for about 9% of the UK total.

4.3.3 Agriculture can also contribute to a sustainable energy policy. There is considerable scope for the development of energy crops for biomass power stations, and biofuels from oil crops. The Countryside Management Contracts we envisage as part of CAP reform should include incentives for their production. Energy crops will also benefit from the introduction of the carbon tax, which will increase the relative price of fossil fuels.

4.3.4 Improvements can also be made by increasing forestry cover, which will help remove CO₂ from the atmosphere (a 'carbon sink'). The British climate is more favourable to forestry than much of Europe, yet currently only 10% of the UK's land area is covered by trees (the EU average is 22%). Liberal Democrats therefore set a target in *Reclaiming the Countryside* of a long-term doubling of the present UK land area under forestry. Added to this, however, need to be policies designed to encourage the use of wood, for instance in buildings, to ensure that the carbon is removed from the atmosphere for many decades.

4.4 Industry and Commerce

4.4.1 The primary objective of climate change policy in the industrial and commercial sector is to reduce the energy used in processes, buildings and transport; see sections 4.1 and 4.2. It should be noted that the process of improving energy efficiency levels in the industrial sector will also bring substantial export opportunities, as clean and efficient products are increasingly demanded in ever-more environmentally conscious world markets.

4.4.2 Product design also has a major role to play. We will encourage the manufacture of products that are easier to repair, reuse or recycle, introducing deposit-refund schemes and pressing for EU-wide minimum standards for product design, energy efficiency and reuse. We will help consumers choose environmentally-friendly products by arguing for comprehensive and

understandable EU-wide energy-efficiency labels and ecolabelling schemes.

4.4.3 Landfill waste accounted for 43% of all UK methane emissions in 1990. Our increased emphasis on renewable energy sources will stimulate improved recovery of landfill gas for electricity generation; we also support increases in the landfill tax over time to reduce the overall volume of waste destined for landfill. It is important that waste incineration is not encouraged excessively as a response, however; our primary aim is an overall reduction in volumes, along with encouragement for recycling and reuse. The Party will be publishing further policy proposals on waste disposal in our forthcoming paper on pollution.

4.4.4 A number of greenhouse gases emanate directly from industrial processes. 85% of human-induced UK emissions of nitrous oxide (which accounts for about 6% of the direct global warming effect) stem from industry, mostly nylon manufacture. Manufacturers are already implementing abatement strategies which should lead to an almost total elimination of emissions.

4.4.5 Most fluorocarbons, of which the main category was CFCs, have already been phased out in the UK under the terms of the Montreal Protocol on Substances that Deplete the Ozone Layer. Liberal Democrats have argued for a rapid phase-out of the remaining ozone-depleting (and greenhouse) gases, hydrochloro-fluorocarbons (HCFCs) and methyl bromide, and tougher enforcement action at an international level against any evasion of the controls. We will also consider the imposition of a tax on the production of hydrofluorocarbons (HFCs), non-ozone depleting replacements for CFCs which are powerful greenhouse gases, should the current voluntary agreements with industry fail to control emissions.

4.4.6 Some businesses have already proved highly innovative in developing strategies to reduce environmental pollutants such as greenhouse gases; others have displayed a depressing degree of ignorance and inertia. We wish to encourage voluntary agreements where they achieve the aims set out elsewhere in this paper; to the extent that they fail, however, the case for tougher regulation

and higher taxation becomes stronger. We will provide more resources for current advice and assistance schemes such as the Energy Efficiency Best Practice Programme, and work with business organisations such as Business Links to encourage industry to realise the many energy-saving and pollution-reducing opportunities available to them.

4.5 International Policy

4.5.1 Even without the presence of FCCC controls on CO₂ emissions in developing countries, overseas development policy can play an important role in helping economies to develop sustainably – particularly in areas such as energy efficiency and the development of renewables. Party policy on overseas development is set out in Policy Paper 25, *A World of Opportunity* (1996). It includes a requirement for environmental impacts to be incorporated into all aid project planning, assistance to developing countries in negotiating and implementing international agreements, and an urgent increase in the resources of the Global Environment Facility.

4.5.2 Total world population is expected to grow from the present 6 billion to 10 billion by 2050. Assistance to constrain population growth is therefore essential, including the provision of aid for family planning services and education, to ensure all women have the opportunity to limit their fertility. It should be remembered, however, that although the industrialised world will contribute only 5% to world population growth during the next 50 years, this will account for 30% of the environmental damage resulting from total growth. Limiting population growth in poorer countries is pointless without also limiting consumption growth in richer ones.

4.5.3 Party policies on international trade are described in Policy Paper 12, *The Balance of Trade* (1995). They describe the ways in which the world trading regulations implemented through the General Agreement on Tariffs and Trade (GATT) need to be amended to permit the pursuit of environmental sustainability. This includes establishing a presumption of compatibility between the GATT and international environmental treaties with trade provisions such as, potentially, the Climate Change Convention (see 3.1.9).

4.5.4 They also include extending the existing environmental exemption which permits countries to restrict the import of products which are environmentally damaging (providing that domestic like products are treated similarly), to allow import bans directed against products on the basis of the way in which they are produced. This is obviously of importance to climate change policies, since it would permit GATT-legal action directed against goods produced by processes which involved excessive emissions of greenhouse gases. These modifications of the world trading system should be argued for vigorously in the next world trade round.

5 Adaptation: Coping with Change

5.0.1 Climate change strategies tend almost entirely to concentrate on mitigation – reducing emissions of greenhouse gases. Concentrations of the gases are already at such a level, however, that even if drastic international action is taken now – which seems highly unlikely – the impacts of climate change will still be significant. This is even more true given the lag in responses which natural systems exhibit; temperatures will keep on increasing, and sea levels will carry on rising, even after the point of stabilisation of greenhouse gas concentrations.

5.0.2 It is therefore vital that policies aimed to *adapt* to the consequences of climate change are considered, and it is a matter of concern that so little attention has been paid to them so far. It should also be stressed that adaptation is not a single one-off event. Given the nature of climate change, it will be a continuous and long-term process, requiring every government, industry and individual to change many aspects of their ways of life, and to keep on changing them.

5.0.3 Areas of particular concern to the UK are considered in the remainder of this chapter; section 1.3 describes the impacts themselves. Not every effect of climate change will be negative, of course; there will be some positive offsetting outcomes. The overall impact, however, could be immense in the long term. In terms of policies, there is relatively little specific that can be proposed; the important thing is that all affected areas and industries plan ahead in full awareness of the likely impacts of climate change.

5.0.4 *Coastal regions* – especially in low-lying regions of the UK – could face a significant risk of increased flooding, inundation and erosion. There are major choices to be made over coastal defence strategies, in terms, for instance, of large-scale public works versus a strategy of ‘managed

retreat’, whereby certain areas are abandoned to inundation and salinisation. We therefore propose an early strategic study of land use planning options in all coastal regions. Government should publish a national coastal protection and compensation strategy for the period from now to the year 2050, in full consultation and cooperation with relevant local authorities. Among other features, this should identify ‘high hazard’ areas where new housing or other developments should be constrained.

5.0.5 *Water*. Climate change will place additional strain on an industry already exhibiting signs of stress. Liberal Democrat policies are set out in Policy Paper 24, *Water: Policies for Affordable, Available and Clean Water* (1996). We aim to see water companies increase levels of investment in leakage reduction, extend water metering (with a two-part tariff to protect low-income households) and promote the use of more water-efficient appliances. We will establish a Water Services Trust, funded by a 2% levy on water company profits, to promote and fund water conservation and environmental measures. We will also require the Environment Agency to prepare a national water resources plan capable of matching demands with resources in a sustainable way for the period to 2020 and beyond – considering, for the first time, demand management on a par with new water resource development. This national water resource plan must take account of the projected effects of climate change in the period to 2020 and beyond.

5.0.6 *Agriculture*. Farmers will have to cope both with the effects of increased soil erosion and of changing growing seasons, variations in pest infestation and shifts in weather and rainfall patterns. Some crops will become easier to grow, others more difficult, and farmers will have to learn to adapt frequently. CAP support mechanisms and governmental advisory services

need to promote rapid adaptation, and central government needs to ensure that the industry plans and operates in full knowledge of the likely impacts of climate change. Although in global terms, agricultural production is unlikely to suffer, its distribution will change markedly, and it is conceivable that the EU will need to raise its output overall in order to export to areas severely affected by climate change; this possibility needs to be kept under review.

5.0.7 Biodiversity. Countryside protection policies need to adapt to the increasing number of species placed at risk from climate change. The reform of the CAP which Liberal Democrats envisage would ensure that increased resources became available for the protection of rare species and habitats. Legal protection for vulnerable areas also needs to be strengthened.

5.0.8 Health services will find themselves coping with different patterns of infectious diseases, allergic disorders from exposure to new pollen and spores, and illnesses related to heat, reduced supplies of fresh water and exacerbated urban air pollution. Government needs to ensure that health service purchasers and providers are aware of likely changes in the demand for services.

5.0.9 Industry and commerce. Climate change will affect economic activities before its most adverse impacts on the physical environment become noticeable, particularly in the property insurance sector. Industry located at the coast will require protection, but major relocations are unlikely to be required until some time after 2050. Once again, government programmes need to provide the information required by business to adapt to new conditions, together with examples of best practice. Particular geographical areas of vulnerability should be identified by the planning system, and measures to avoid or minimise damage to vulnerable parts of the established land use and transport systems should be put in place.

5.0.10 International policy. The impact of climate change on the weaker economies of many developing countries will be far greater than on the UK, and a substantial increase in the number of environmental refugees can be expected – possibly exacerbated by increasing conflict over scarce resources in some regions. Britain, along with other developed countries, will need – and has the moral duty – to shoulder a part of the costs of humanitarian relief and peace enforcement.

6 Institutions

6.0.1 Institutional reform is crucial to the achievement of effective climate change mitigation and adaptation policies – and, more widely, to the adoption of successful sustainability policies. Liberal Democrat approaches to sustainability, the creation of thriving communities, the modernising of British democracy and international relations are closely associated.

6.0.2 Sustainable development requires partnership between government and society, the empowerment of local communities and the close involvement of individuals in the decision-making process which is the primary aim of the reformed and decentralised political system in which Liberal Democrats passionately believe. Equally, it requires an international system which relies on cooperation and consensus through the development of effective supranational institutions – again, the core of the Liberal Democrat approach.

6.0.3 Our policies for institutional reform are set out more fully in Policy Paper 8, *Agenda for Sustainability* (1994). Here we concentrate on those directly relevant to climate change.

6.0.4 *Global*. Effective international cooperation and the establishment of dynamic supranational institutions is vital to successful mitigation policies. The UK Government should work for:

- A new World Environment Organisation (developing from UNEP) with the status and resources necessary to entrench sustainable development at the heart of the UN system.
- An effective Climate Change Convention secretariat, operating an independent emissions monitoring and verification system, and, in due course, the necessary framework for emissions trading systems.
- The development of a mechanism for generous financial and technology transfer to developing

countries, possibly organised through the Global Environment Facility.

- A review of World Bank and IMF strategies as far as they relate to climate change impacts; reform of the GATT (see 4.5.3) to ensure that global trading and environmental regimes do not clash.

6.0.5 *EU*. Reforms to the EU are similar in principle to those required at the global level, with the aim of embedding sustainable development at the heart of European policy (see further in Policy Paper 19, *Meeting the European Challenge* (1995)). A strengthening of the role, status and resourcing of the Commission's Environment Directorate-General (DGXI) and of the European Environment Agency are both necessary. The introduction of an emissions trading system within the EU would require some institutional reform.

6.0.6 More importantly, as we pointed out in section 3.2, the adoption of a common EU target in the FCCC negotiations has important implications. Any member state in breach of its own national target must be compelled to comply if the EU as a whole – and member states which *are* meeting their own targets – is not to be in breach of the Convention. EU institutions must therefore be able to deploy effective enforcement powers to ensure that the collective EU target is met. A preliminary solution (at the least) to this problem needs to be found before the Kyoto Conference if the EU position is not to be compromised.

6.0.7 *UK*. Central government needs to be able to assess the threats and impacts of climate change, draw up an effective strategy to counter and adapt to it, and implement those policies which must be brought in at UK level while creating the appropriate framework for regional and local governments to implement their own climate change strategies. We therefore call for:

- The establishment of a Sustainable

Development Office as part of the Cabinet Office, monitoring the activities of all government departments and agencies, suggesting initiatives, carrying out threat assessments, and so on.

- The creation of a Cabinet Committee to coordinate and implement the UK climate change programme across all departments.
- Reform of the Department of Environment and Transport to incorporate the energy and water industry functions of the Department of Trade and Industry, together with the Ministry of Agriculture. (A new department of local government should be created for the oversight of local government policy.) A powerful department with a Cabinet-level minister is necessary to exercise the clout needed to tackle the problems at central level.
- The creation of an Environmental Audit Committee in Parliament, modelled on the Public Accounts Committee, to report on the environmental implications of all

government policies and make recommendations for change.

6.0.8 Local and regional governments also need to be coordinating their climate change strategies. The Road Traffic Reduction Act (see 4.2.9) provides a good model for ensuring that local and national government cooperate to address a problem that can only be tackled effectively by all levels of government working together.

6.0.9 Public participation and involvement is necessary to build a broad consensus for action. The National Round Table on Sustainable Development should be developed as a fully independent organisation in which all key sections of society are represented and all have equal rights and responsibilities. Similar Round Tables should be established at a more local level, building on the existing work of Local Agenda 21 committees. Finally, public information and education programmes need to be developed to spread awareness of the climate change issue, together with the many steps that individuals can take to counter it.

Appendix 1

The Liberal Democrat Climate Change Programme

This Appendix provides an illustration of what could be achieved under the policy framework outlined in *Living in the Greenhouse*.

Summary of Carbon Savings by 2010

		Govt MtC/yr	Lib Dem MtC/yr
DOMESTIC SECTOR			
A1	VAT	1	0.5
A2	Home energy conservation programmes (existing stock)	1.5	11
A3	Building regulations (new build)	2	4
A4	Appliance standards and labels	1	2
	Savings from domestic sector	4.5	17.5
INDUSTRY, COMMERCE AND PUBLIC SECTOR			
A5	Combined heat and power	5	6.7
A6	Public sector	2	4
A7	Energy efficiency improvements: process plant	3	8
A7	Energy efficiency improvements: buildings	0.5	6
A8	Efficiency standards for office equipment	0	0.9
A8	Standards for industrial and commercial equipment	0	1.7
	Savings from industry, commerce and public sector	10.5	27.3
ELECTRICITY SUPPLY INDUSTRY			
A9	Gas replacing coal in ESI	25	25
A10	Renewable energy	3	8
A5	Increased use of CHP on new generation capacity		
	Savings from electricity supply industry	28	33.0
TRANSPORT			
A11	Vehicle fuel efficiency	0	5.9
A12	Reduced car journeys	6	12
A13	Reduction in emissions from air travel	0	5.9
A14	Changes in freight transport	0	4.4
	Savings from transport	6	28.1
TOTAL FROM ALL SECTORS			
	Total saved	49	106.0
	Total projected without offsetting measures	219	219
	Total projected with measures	170	113.0
	Change from 1990 (167 MtC)	+2%	-32.2%

Notes

1 Particular targets, implementation dates, and levels of tax and expenditure are included for illustrative purposes only. In government these would be set as part of an annual overall strategic review, taking into account the need for increased or relaxed overall targets, as well as progress, obstacles or costs in particular areas. This process would, in effect, be similar to the negotiation of the Budget, and might form a parallel 'carbon budget'.

2 The table above compares the Liberal Democrat programme described in this paper and the current UK Climate Change Programme drawn up by the previous Conservative Government. The new Labour Government is expected to publish its own Programme in 1998, but no details are yet available. The one Labour policy with a known impact on emissions (an increase) is covered in A1 below.

3 No specific savings have been assumed from the increase in energy prices deriving from the carbon tax (see **4.1.2**). Savings have been assigned to particular policy instruments such as increases in vehicle fuel efficiency, home energy conservation programme, etc. The carbon tax both drives these improvements and ensures that the higher resulting efficiency levels are not translated into an increase in consumption (e.g. more travel) instead of a reduction in emissions.

4 Paragraph references to policies explained in *Living in the Greenhouse* are in **bold**.

Domestic sector

A1 Takes into account the reduction on VAT on fuel to 5% (from 8%) in July 1997.

A2 This figure, based solely on retrofitting the existing building stock, starts from the 30% target for improvement in efficiency under the Home Energy Conservation Act. Policy measures include (see **4.1.2-3**): a £1 billion annual home energy conservation programme directed through the EST, implemented by local authorities and energy supply companies, and targeted on low-income households; mandatory energy labelling of houses

at point of sale (in line with the current Liberal Democrat private member's bill); and a reduction in VAT on energy-saving goods to 5%. 10% of electricity generating capacity is assumed to be displaced by 2010 by improvements in efficiency, in line with estimates in the draft EU Integrated Resource Planning Directive.

While part of the improvement in efficiency would be taken as increased warmth, rather than reduced consumption, especially in low-income households, these programmes are likely to trigger additional investment by higher-income households, thus having a multiplying effect. The net effect of these programmes is assumed to be a 50% reduction in emissions from the current housing stock.

A3 There are phenomenal opportunities in the next few years, given government estimates of another 4.4 million houses needed by 2010. Almost 16% of the housing stock could be affected by new standards, in addition to replacement of existing stock built to poor standards in the postwar period. New standards should be based on the very best from elsewhere (e.g. Sweden), including, for example, triple-glazed rather than double-glazed as standard, dedicated fitting for compact fluorescent lamps (CFLs), and a ban on electric resistance heating. Where gas is not available, new markets can be developed for heat pumps, solar hot water heating, and effective passive solar design. (**4.1.2** and **4.1.4**.)

A4 An integrated programme of technology procurement, rebate schemes through the EST, and tough mandatory efficiency standards at EU level, could realise 2 MtC savings at no increase in overall cost to the consumer (Environmental Change Unit, University of Oxford DECADE programme). (**4.1.2**).

Industry, commerce and public sector

A5 Combined heat and power target of 14 GW (compared to 70 GW capacity currently): small scale from industry and commerce (under the Energy Efficiency Best Practice Programme) and large scale as part of new build generating capacity (from changed planning regulations). To avoid double counting, no savings have been counted

under ESI below. (4.1.6)

A6 We would aim to double savings in the public sector from 2% currently to 4%. Much of this is relatively simple, e.g. installing CFLs in public buildings, better heating and ventilation controls, and would offer improved comfort as well as long-term financial savings.

A7 Energy efficiency improvements in process plant, and in commercial buildings deriving from a greatly expanded and reorganised Energy Efficiency Best Practice Programme. Soft loans to industry, tied to advice under the scheme, could rapidly increase the uptake of well-known and well-demonstrated efficiency improvements. Such measures have a payback period usually of less than two years, and always less than five years, improving industrial and international competitiveness and realising energy savings of as much as 25%. (4.1.2)

A8 Efficiency standards could be introduced via a framework directive at the EU level for office equipment, motors and drives, commercial refrigeration etc., aiming at a 30% improvement, and affecting half the stock by 2010 (4.1.2). Such programmes would underpin cost-effective savings identified in the Energy Efficiency Best Practice Programme.

Electricity supply industry

A9 We believe the savings from switching from coal to gas will have run their course. No new gas generating capacity need be encouraged; licensing and subsidy arrangements (e.g. nuclear) need to be examined to ensure that the market is genuinely competitive, and there are no barriers to new entrants to the market, e.g. renewables. (4.1.4-7)

A10 Renewable energy is a major element in the Liberal Democrat programme: 20% of supply – given the lower total demand following vigorous efficiency programmes – is assumed by 2010. (This is consistent with DTI Energy Paper 58, which suggested that by 2005 renewables could supply 52 TWh, equivalent to 18% of UK electricity demand in 1990.) This target implies a much wider portfolio of projects, both in terms of fuel (including for example, onshore wave power,

tidal power, and solar water heating) as well as size of project (including single generator community wind farms as well as large commercial projects with upwards of 150 turbines). To achieve these targets needs better policy action and integration, including continued long-term support for renewables through a sustainable energy levy, and action to encourage, develop, and regulate markets, post 1998, for green electricity schemes. (4.1.4-5)

Transport

A11 A target of a 56 mpg or 5 litres/100 km by 2005 has been discussed at Commission level. The UK currently has a less efficient car stock than most EU countries, and could go further than the rest of the EU. Policy instruments include reform of company car taxation, graduated VED, incentives for fuel-efficient public transport, etc. (4.2.4). These UK-specific measures need underpinning by EU-wide efficiency standards (4.2.3-4). If the target above were met, and given the average life of a car is 10 years, it would affect around 25% of the stock, but importantly, around 50% of the miles travelled, with a saving of 5.9 MtC even after demand management measures have reduced the number of projected journeys (see below).

A12 1989 Road Traffic Forecasts projected traffic levels increasing by 83-142%, but these will be revised down to 60-90% in a new NRTF report. These projections reflect a 'build to meet demand' philosophy, and do not take proper account of demand management approaches. The figure here follows the Road Traffic Reduction Act's original target of a 10% cut in traffic from current levels by 2010 (i.e. at the very least a 70% cut from forecast levels). Instruments include a continued fuel duty escalator, reform of company car taxation (including taxation of free fuel) and taxation of private non-residential parking, road pricing and other traffic reduction measures. Revenue derived from this programme would be invested in public transport, providing a better alternative to the private car; the targets of the Royal Commission on Environmental Pollution (1994) were to increase the percentage of journeys by public transport from 12% in 1993 to 20% by 2005, and 30% by 2020. (4.2.5-8)

A13 The number of passengers passing through UK airports has been projected to increase by 73–163% between 1992 and 2010 (RCEP 1994). This figure assumes a constraint in air movements of 10% (the same target as the Road Traffic Reduction Act), additional improvements in fuel efficiency, and increases in passengers per aircraft movement – achieved through aviation fuel tax, airport departure tax and regulation of landing and take-off slots. All of these actions, could constrain CO₂ emissions from aircraft at present levels (RCEP 1994), whereas, under a business-as-usual scenario, they are projected to double. Air travel currently consumes around 15% of fuel used in transport, thus current emissions, and potential savings are 5.9 MtC. (4.2.6)

A14 Since 1952 freight moved by rail has fallen by a factor of three, whereas freight moved by road has increased nearly five-fold. This is a combination of both the amount of freight carried, which has doubled, and the distance for which it is carried. Savings could come from a similar combination of a reduced number of freight journeys and shorter journeys, modal switches from road to rail (rail gives one third of emissions from road transport), and improvements in vehicle efficiency. This figure assumes 20% of all freight journeys are avoided (a similar rate of change over

the next decade as in the last, but in the opposite direction); an increase in the proportion of tonne-kilometres carried by rail from 6.5% in 1993 to 20% by 2010, in line with the recommendations of the Royal Commission; and improved vehicle efficiency by 10%. The net effect would be a saving of 2.4, 1.2, and 0.8 MtC respectively, or 4.4 MtC from freight in total. (4.2.7)

Total from all sectors

The above package of measures would make savings in CO₂ emissions across all areas at a level which is feasible both technically and politically, and is economically attractive.

Figure 1 on page 29 compares savings in each sector between the Liberal Democrat and the former Government's programme. The largest increase is inevitably transport, but the largest absolute reductions still come from the electricity supply industry.

Figure 2 shows CO₂ emissions over time under different scenarios. The Liberal Democrat programme is not only the most comprehensive published to date, but also the most demanding of those of all three parties – as it needs to be, to meet effectively the challenge of climate change.

Figure 1: Carbon savings by sector

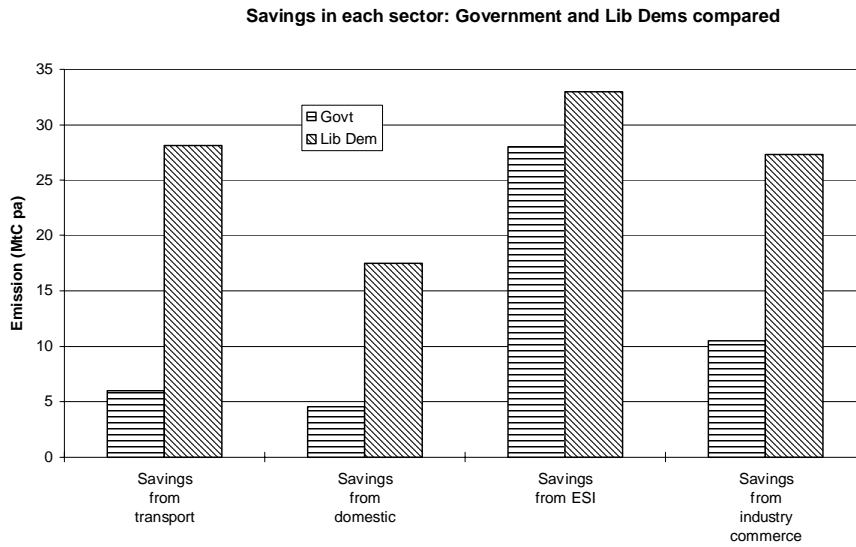
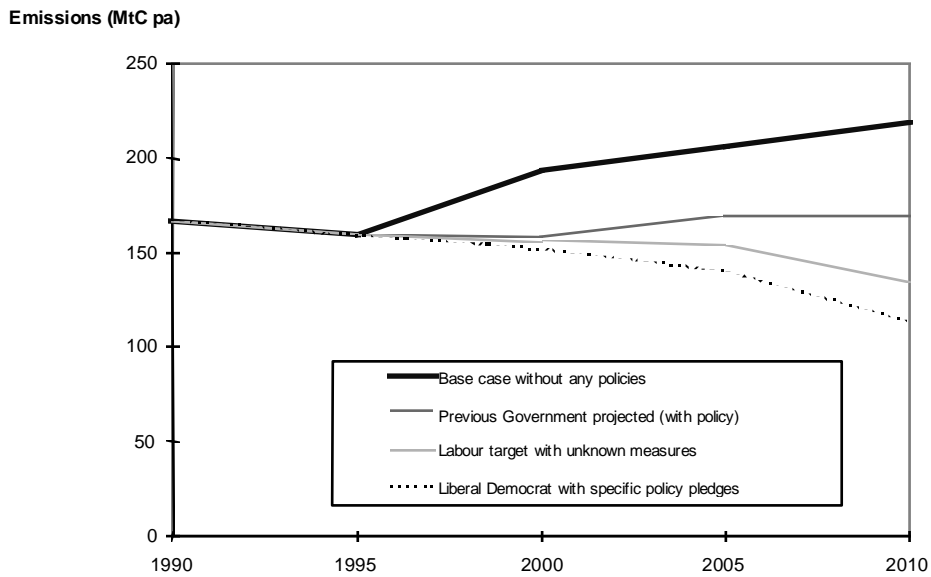


Figure 2: UK carbon emissions scenarios



Appendix 2

Consultations

The following organisations submitted responses to Consultation Paper 30, *Climate Change*, published in August 1996:

Action with Communities in Rural England
Electricity Association
Royal Society for the Protection of Birds
World-Wide Fund for Nature

The following organisations and individuals gave evidence directly to the working group during the process of writing the policy paper:

Confederation of British Industry
Electricity Association
Friends of the Earth
Green Alliance
Greenpeace
Royal Institute of International Affairs
Royal Society for the Protection of Birds
Sir Crispin Tickell (Convenor, British Government Panel on Sustainable Development)

This Paper has been approved for debate by the Federal Conference by the Federal Policy Committee under the terms of Article 5.4 of the Federal Constitution. Within the policy-making procedure of the Liberal Democrats, the Federal Party determines the policy of the Party in those areas which might reasonably be expected to fall within the remit of the federal institutions in the context of a federal United Kingdom. The Party in England, the Scottish Liberal Democrats and the Welsh Liberal Democrats determine the policy of the Party on all other issues, except that any or all of them may confer this power upon the Federal Party in any specified area or areas. If approved by Conference, this paper will form the policy of the Federal Party.

Many of the policy papers published by the Liberal Democrats imply modifications to existing government public expenditure priorities. We recognise that it may not be possible to achieve all these proposals in the lifetime of one Parliament. We intend to publish a costings programme, setting out our priorities across all policy areas, closer to the next general election.

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Note: Membership of the Working Group should not be taken to indicate that every member necessarily agrees with every section or every proposal in this paper.

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