July 2000

Environmental Action Plan

A Discussion Paper

Foreword by the Director General

Much of Ofgem's work affects the environment. Addressing fully the social and environmental issues involved in our work is one of our five priority areas for action in our work plan in 2000/1. This focus by Ofgem reflects the objectives set for Ofgem under the new Utilities Act. Ofgem has approached these environmental issues in a wide variety of contexts: price controls for distribution businesses in both gas and electricity, setting energy efficiency standards of performance, the design of the new electricity trading arrangements and monitoring of combined heat and power generation are obvious examples. But until now Ofgem has not brought together all the environmental issues which we have to address. This document aims to do that.

Environmental issues frequently involve difficult decisions on priorities between social, environmental and economic objectives. For example, the higher energy prices that will result from pursuing greater renewable generation targets will weigh particularly heavily on the fuel poor, unless the Government takes specific ameliorating action. Conversely, Ofgem's actions to tighten price controls for regulated natural monopolies which result in price reductions for customers will lead to increased energy consumption, and hence make the UK's emissions targets more difficult to achieve, unless the Government takes countervailing action. This tension between objectives requires thoughtful public debate and difficult value judgements. Many of these judgements should be and are the responsibility of Government rather than Ofgem alone.

Ofgem intends to work closely with other parts of Government on environmental issues, for example as a response is formulated by Ministers to the recent recommendations by the Royal Commission on Environmental Pollution on climate change, as DETR take over responsibility from Ofgem for setting Energy Efficiency Standards of Performance, and as the Environment Agency regulates power stations emissions. Often, as with the application of the Non Fossil Fuel Obligation at present or with the application of the Government's future policy on renewables, Ofgem has a responsibility for administering a policy which is set by Government. In a wide range of Ofgem's own decisions, environmental issues will be important. In all our decisions, we will want to consider whether there are environmental issues which should be considered and if so how much weight should be given to them.

This document is intended to be the first stage of Ofgem's work in preparing an Environmental Action Plan. It sets out the important roles we play in relation to the environment and how these relate to the roles of other organisations. It attempts to identify clearly what Ofgem can

and should do, and – equally important – which environmental issues are more properly dealt with by other parts of Government, and are consequently not best or effectively dealt with by Ofgem. It suggests areas for consultation. It is designed to raise issues and stimulate debate. We look forward to challenging responses, so that we can work up the Plan with the involvement of all those affected. We shall then monitor our progress against the commitments we make.

CALLUM McCARTHY

DIRECTOR GENERAL OF GAS AND ELECTRICITY MARKETS

Executive summary

This discussion paper is the first step in the process of drawing up an Environmental Action Plan for Ofgem. The decision to initiate this process has been taken in view of the growing importance environmental issues have assumed at international and national levels, and in recognition of the important impact on the environment which the activities of gas and electricity companies have. The Utilities Act provides Ofgem with a secondary duty in relation to the environment, and provides for the Government to issue Ofgem with social and environmental guidance. The paper aims to bring together for the first time all the environmental issues which Ofgem has to address.

The paper is divided into seven parts. First, in the introduction, it sets out clearly Ofgem's role and responsibilities in relation to the environment, and the ways in which this fits with the roles of others. In this way, it identifies clearly what Ofgem can and should do in relation to the environment, and what is better left to other parts of Government. The introduction also describes the process we intend to follow in working up the Environmental Action Plan.

Second, the paper describes the international and national contexts in greater depth. It sets out the international agreements on climate change and sustainable development stemming from the Earth Summit in Rio de Janeiro in 1992. It looks at the EU framework for environmental action; and at the UK legislation which particularly affects Ofgem's environmental work.

Third, the paper sets out the specific legislative framework within which Ofgem is working. It describes the changes brought about by the Utilities Act, and discusses the social and environmental guidance which the Government intends to issue to Ofgem early next year. It also sets out the provisions for environmental reporting which already exist in the Electricity and Gas Acts.

Fourth, the paper looks at the range of Ofgem's activities and the way they impact on the environment. These activities include our role in regulating the generation of electricity, the setting of price controls on transmission and distribution networks and in regulating various activities of the supply companies.

In the section on the generation of electricity, the paper looks at emissions of CO_2, SO_2 and NO_x from power stations. It also looks at the implications of the New Electricity Trading Arrangements for the environment. Finally it discusses the future role of embedded generation, Combined Heat and Power (CHP), and electricity generated from renewable sources.

In the section on the setting of price controls, the paper looks at the aims of setting price controls, and the way the process takes into account environmental considerations. It also looks at the pricing mechanisms, and assesses the impact these might have on the environment. It also considers the issue of transmission and distribution losses, and the incentives on these which the price control mechanism has had in the past, and could have in the future.

In the section on the activities of supply companies, the paper looks at Ofgem's role in energy efficiency schemes, in approving green tariffs, and in encouraging suppliers to provide advice to customers on the efficient use of energy.

Lastly, the paper summarises a set of commitments which Ofgem could make with a view to taking forward the Environmental Action Plan process. These commitments aim to improve the coherence and transparency of Ofgem's activities in the environmental field across the board, and cover, for example, the areas of: renewables, CHP and embedded generation; energy efficiency; environmental impact assessment; environmental reporting; links with other organisations; and Ofgem's own working practices. Ofgem will develop these further in the light of the comments we receive.

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1. Introduction

1.1 The need to protect the environment in which we live is now widely accepted as a priority at national and international level. The activities of the gas and electricity companies have an important impact on the environment, and the way that companies are regulated needs to take account of this. This document sets out Ofgem's role and responsibilities in relation to the environment, and how this fits with the roles of others.

Ofgem's role in environmental issues

1.2 Policy decisions on major environmental matters are properly the responsibility of Ministers. Implementation of environmental policy, within the framework set by Ministers and approved by Parliament, falls to a number of organisations, including Ofgem. Some of these, such as the Environment Agency, and its equivalent in Scotland, have a substantial role to play.

1.3 Ofgem already has an important implementing role in relation to the environment. In the future, we will have responsibility for administering the Climate Change Levy exemption for renewables, the Percentage Obligation for renewables, including the trading of green certificates, and the next Energy Efficiency Standards of Performance scheme. The impact on the environment of Ofgem's decisions goes beyond questions of implementation. The design of price controls, the level of price controls, the design of both gas and electricity trading arrangements, and the approach towards unrestricted gas consents policy all have important environmental effects, which Ofgem recognises. In carrying out our responsibilities Ofgem acts within its statutory powers, and in future will be required to take account of guidance received from the Secretary of State.

1.4 Policy decisions on environmental matters often require important choices to be made. For example: the extent to which the UK raises taxes on the basis of companies' emissions to the environment can have an important impact on the UK's economic competitiveness relative to that of countries with different levels of environmental taxes; the level of excise duty on petrol can have a particular impact on those living in rural areas; and raising the cost of energy to domestic customers will, unless countervailing action is taken, disadvantage those in fuel poverty; conversely, reducing energy costs through greater competition or tighter price regulation can lead to more environmental pollution. Ofgem welcomes the Government's recognition that it needs to take such decisions, as for example it will be doing, under the Utilities Act, from 2002 onwards to

set the extent to which charges to domestic customers are required to finance Energy Efficiency Standards of Performance.

1.5 Ofgem's work in promoting competition in gas and electricity markets and in regulating effectively those parts of these markets which are not currently sufficiently competitive has an important impact in lowering energy prices. Such reductions benefit all consumers directly, and are also of particular value to the fuel poor. The number of people defined as fuel poor in the UK is estimated to have reduced by 500,000 since 1996 as a result of lower gas and electricity prices. Clearly such price reductions do increase demand - although the relevant elasticities are quite low, as described in section 4 - and consequently have an environmental impact. In Ofgem's view, if the Government decides that fuel prices need to be increased to secure environmental benefits then this should be done by the Government levying charges on polluting activities, or by creating incentives for environmentally desirable activities. Such instruments can be effectively targeted towards environmental protection, and can be introduced after careful consideration has been given to their social and economic consequences.

1.6 Under the new Utilities Act, Ofgem's primary regulatory duty will be to protect the interests of consumers, where appropriate by promoting competition. Consumers are defined in terms not only of present but also future consumers of the gas and electricity industries, thus enabling a view to be taken beyond the immediate future. It will be for Ofgem to judge how to interpret this duty, and how to balance it with our other secondary duties. These include the need to have regard to low income and rural customers and, in relation to the environment, to 'have regard, in carrying out [Ofgem's] functions, to the effect on the environment of activities connected with the generation, transmission, distribution or supply of electricity and the conveyance of gas through pipes'.

1.7 This will require Ofgem to strike a careful balance between our primary duty and our secondary duties. In some cases there may be no conflict between our economic, social and environmental responsibilities, for example in creating incentives in the price regulation of transmission and distribution systems which reduce losses of gas and electricity. In other cases there may be a tension which will require choices to be made. The Government will issue social and environmental guidance to Ofgem, so that a range of the Government's wider policy objectives will be identified. It should be recognised that Ofgem will need to respond to guidance which is unlikely to be unambiguous: social objectives, such as help for those on low incomes, may weigh against

environmental objectives, and vice versa. The draft guidance invites Ofgem to 'recognise that regulating the energy industry has a social and environmental dimension' as well as an economic one.

Structure of this document

1.8 This document first describes the environmental context in which Ofgem carries out its work. This context ranges from the global debate concerning climate change and sustainable development and to specific items of national environmental legislation relevant to the energy industry. It also sets out the roles and responsibilities of the range of other relevant bodies with whom Ofgem works, thereby putting Ofgem's role into a proper context.

1.9 The document next looks at Ofgem's major regulatory responsibilities, and describes the impact of our decisions on the environment. It identifies the ways in which environmental impact is taken into account. It also looks at mechanisms for identifying and, where possible, resolving potential conflicts arising from carrying out our responsibilities. Lastly, the document sets out some suggestions for ways in which Ofgem could take account of environmental considerations in a more consistent and coherent way, and seeks comments and suggestions on issues we should consider further so that Ofgem can fulfil its environmental duty fully within the overall set of duties it has been given.

The international and national contexts

1.10 The UK Government has made it clear that all relevant policies must be consistent with its overall goal of achieving sustainable development. There are essentially three interlinked elements to sustainable development; economic, environmental and social. These are explained in more detail in Appendix 1. The Government has a Sustainable Development Strategy which embodies its intentions and aspirations in this area.

1.11 The UK has legally-binding targets for the reduction of greenhouse gases, and in particular CO_2 emissions. The existence of these targets will influence the way Government and industry carry out their work over the next twenty years. In particular Ofgem recognises that, for the Government to achieve its stated aim of moving towards 'a sustainable, lower carbon economy' by 2010, the energy industry will have a major role to play. To this end, the Government has published a draft UK Climate Change Programme. A final Programme will come into effect later in the autumn.

1.12 Much legislation – of EU and of national origin – governs the emissions from power stations, as well as from distribution networks. These form the legislative context within which Ofgem carries out its work. While it is not Ofgem's responsibility to police these obligations, we need to work closely with the Environment Agency and other parts of Government to ensure that emissions regulation fully takes into account Ofgem's statutory duty to promote competition in gas and electricity markets.

1.13 The Freedom of Information Act, soon to be in force, incorporates certain provisions of the Environmental Information Act 1998, obliging the Government and others, including Ofgem, to divulge information on the environment which could be deemed to be in the public interest. In parallel, stronger rules which the Government is introducing on liability for damage to the environment, in line with the 'polluter pays' principle, will mean that individual companies are becoming more aware of their responsibilities to the environment.

1.14 Partly in response to these developments, there are moves in the direction of more open reporting of environmental activities on the part of many companies. Some are leading the way by carrying out full environmental audits. Respecting the environment is being seen by many companies as a strategic goal capable of reaping benefits and increasing shareholder value.

1.15 The Royal Commission on Environmental Pollution published in June its 22nd Report entitled *Energy – the Changing Climate*. The report calls on the Government to set tougher targets to achieve substantial reductions in CO_2 emissions, and to put in place much stronger incentives for the generation of electricity from renewable sources. A summary of the recommendations is provided in Appendix 5. The Government is formulating its response to this report over the next year, and Ofgem will work with the Government in this process.

Rationale

1.16 The new Utilities Act has given Ofgem a specific secondary objective in relation to the environment. Much of our work has a significant environmental dimension. It is appropriate now to describe coherently all the environmental issues which we have to address, and how our environmental objective will need to be considered alongside all our other statutory objectives.

1.17 It is appropriate to start drawing up an Environmental Action Plan for Ofgem by undertaking a process of consultation. This will help us to identify the key issues to be

taken forward, and to finalise our Plan in the coming months. This process will be informed by the Government's further consultation on the social and environmental guidance which it is required to give Ofgem under the Utilities Act.

Next steps

1.18 This document represents a first stage in setting out Ofgem's role in relation to the environment. We are seeking comments on this document, and in particular on the issues for possible further action identified in section 7, by the end of September. Specific issues on which we are seeking comments are shown in bold text, as well as being listed in section 7. We will consider carefully all the comments we receive, which will help us to develop and refine our plan. As part of the consultative process, we intend to hold bilateral meetings with interested parties, and organise workshops to discuss some of the important issues raised. A worked up version of the plan will then follow.

1.19 Comments on this document should be sent by 30 September to:

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Unless clearly marked confidential, responses will be placed in the Ofgem library.

1.20 Any questions about this document should be addressed to Virginia Graham (e mail: virginia.graham@ofgem.gov.uk or telephone 020 7932 1639) or Karen Marshall (e mail: karen.marshall@ofgem.gov.uk or telephone 020 7932 5828) at Ofgem, 16 Palace Street, London SW1E 5JD.

2. International and national contexts

2.1 The UK Government's priorities in respect of energy and the environment are much influenced by global and international factors, including the international agreements and EU policies to which the UK is committed.

2.2 The three linked issues which currently have the most bearing on the environmental debate are the drive for sustainable development, the commitment to combat global warming and policies designed to integrate pollution control. All of these issues have global, international, European and national dimensions. This section provides some information on these issues, and how they relate to policy on the environment in the UK. More detailed information on sustainable development, the EU's energy and environment policy and global warming is contained in Appendices 1, 4 and 6.

The global context

International agreement on sustainable development

Agenda 21

2.3 In June 1992 nearly 180 countries met at the UN Conference on environmental development, (the 'Earth Summit') in Rio de Janeiro to discuss how to achieve sustainable development. They agreed a plan of action, *Agenda 21*, and recommended that all countries should produce their own national sustainable development strategies. The UK was one of the first to do so, in early 1994. This was later amended by the incoming Government in 1997. Further details of the UK's strategy, as well as general definitions of sustainable development, are contained in Appendix 1.

International agreements on climate change

Rio de Janeiro, 1992

2.4 At the same UN Conference on environmental development in 1992, the pre-negotiated Framework Convention on Climate Change (FCCC) was opened for signing. Over 160 countries signed up to it, including all the industrialised nations and most of the principal developing nations including India, China, Brazil and Mexico. The Convention entered into force in March 1994.

2.5 The objective of the Convention was to stabilise CO_2 emissions by 2000 at 1990 levels, according to the principle of respecting the 'common but differentiated responsibilities'

of the parties. The final text of the Convention contained no specific timetables or targets for limiting emissions: rather it was a 'framework'.

Kyoto, 1997

2.6 The Kyoto Protocol was signed in December 1997. It went considerably further than the Convention. The objective was to require developed nations to cut their greenhouse gas emissions by an average 5.2 per cent from 1990 levels by 2012. (For example, the target for the US was 7 per cent.) For the first time:

- differentiated targets were envisaged, recognising that each country must address climate change based on its own national energy profile and circumstances
- countries would be allowed to pursue their own paths to lower emissions, whether it be a tax or an internal trading system
- market-based international mechanisms, such as emissions trading, were embraced.

2.7 The Protocol will only become law when it is ratified by 55 countries, representing at least 55 per cent of 1990 developed world emissions. (World nations were listed in Annexes to the Protocol, designated as either 'rich' or 'poor'.) This threshold does not look likely to be met for the foreseeable future.

2.8 Under the Kyoto Protocol, the European Union and its Member States can agree to meet their commitments jointly. The EU's target could thus be redistributed among the Member States to take better account of their national circumstances.

Conferences to the parties

2.9 The fourth meeting of the Conference of Parties to the UNFCCC took place in Buenos Aires in November 1998 to continue the work begun in Rio and Kyoto. The US signed the Kyoto Protocol on 12 November 1998 as a gesture of goodwill, but it has yet to be ratified by Congress.

2.10 The next meeting of the Conference of the Parties to the UNFCCC will take place in the Hague, in November 2000. Additionally, a much larger Rio + 10 Conference is planned for 2002.

Ozone: Vienna Convention and Montreal Protocol

2.11 The Vienna Convention for the Protection of the Ozone Layer, signed in March 1985, details measures to protect human health and the environment against adverse effects

resulting or likely to result from human activities which modify or are likely to modify the ozone layer. The Montreal Protocol on Substances that Deplete the Ozone Layer, negotiated and adopted in September 1987, and subsequent amendments, was the first international agreement to provide preventative measures to protect the global environment. The agreement provided for restrictions on the production and consumption of certain CFCs and halons.

The European context

Fifth environmental action programme

2.12 EU actions on the environment have been co-ordinated under a series of ten-year Action Programmes. The Fifth Environmental Action Programme is subtitled 'Towards Sustainability', and was developed in parallel with Agenda 21, agreed at the Earth Summit in Rio. The Programme has sought to supplement the 'command and control' Directives and Regulations of the previous Programmes with a wider range of reforms aimed at sustainable development.

2.13 The Action Programme focuses on five main economic sectors which can damage the environment, one of which is energy. The Programme seeks to address some of the most important environmental issues: climate change, acidification and air pollution, depletion of natural resources and biodiversity, water resources, deterioration to the urban environment, coastal zones, waste and industrial risks.

2.14 One of the key initiatives under the Fifth Action Programme was to have been the introduction of an EU-wide CO_2/energy tax. However this proposal has now been indefinitely postponed. The challenge the EU now sees for the future is: 'to strengthen the integration of the environment into energy planning and supply, and to search for new synergies between the environment, the competitiveness of European industry, and the security of the European Union's energy supplies'. The Sixth Environmental Action Programme is under preparation and is expected to be issued in 2002, in advance of the Rio + 10 Conference.

Communication on climate change

2.15 In June 1998 the EU agreed how its Kyoto target would be distributed. The UK agreed to reduce its emissions by 12.5 per cent. This has now become its legally binding target. Targets for other Member States ranged from a cut of 21 per cent for Germany and Denmark, and a cut of 6 per cent for the Netherlands, to permitted increases of 13 per

cent for Ireland, and 27 per cent for Portugal. The Commission issued a Communication on the EU's contribution to a global strategy on climate change.

Clean air programme: 1999 – 2004

2.16 The Clean Air Programme provides an umbrella for policies having a direct impact on the oil, natural gas, coal and electricity sectors, including:

- the Air Quality 'Framework' and 'Daughter' Directives
- the Acidification Strategy
- the Ozone Abatement Strategy
- the National Emissions Ceiling Directive.

Air quality directives

2.17 The EU has adopted a considerable amount of legislation relating to the environment. Much of it is directly relevant to the energy sector. Of particular importance is the Air Quality Framework Directive, and its associated 'Daughter Directives'. European legislation and international agreements now impact on all aspects of air quality policy, from the setting of long-term limits for ambient air quality to the control of emissions to air from a wide range of industrial processes.

2.18 The Directive establishes a framework under which will be set limit values or target values for specified pollutants. These supersede existing air quality legislation. The pollutants in question are: sulphur dioxide; nitrogen dioxide; particulate matter; lead; carbon monoxide; benzene; ozone; poly-aromatic hydrocarbons; cadmium; arsenic; nickel; and mercury. The first 'Daughter Directive', agreed in 1998, set legally-binding limit values for sulphur dioxide, nitrogen dioxide, particulate matter and lead. The Directive also set, for the first time, European limit values for oxides of nitrogen and sulphur dioxide for the protection of vegetation and ecosystems. Proposals for further Daughter Directives contain: limit values for benzene and carbon monoxide; and target values for ozone (in conjunction with the proposal for a National Emissions Ceiling Directive).

Acidification strategy

2.19 Published in May 1997, the Strategy's aim was to reduce beyond existing commitments emissions of sulphur dioxide, nitrogen oxides and ammonia. As a result, the Commission

proposed to reduce the area of ecosystem at risk from acid rain from 6.5 per cent (on the basis of existing commitments) to 3.3 per cent by 2010. The Strategy has three key elements:

- Sulphur Content of Certain Liquid Fuels Directive
- Amendment to the Large Combustion Plant Directive
- National Emissions Ceiling Directive and 'Daughter' Directive.

Sulphur Content Directive

2.20 Agreed in 1999, the Directive sets maximum levels for sulphur content of heavy fuel oil (HFO) at 1 per cent from 2003 and for gas oil at 0.1 per cent from 2008. (HFO is used as a refinery fuel and in industrial boilers, power stations and furnaces; gas oil is used in small industrial and domestic boilers, as a domestic heating fuel and as a light marine fuel.)

Large Combustion Plant Directive

2.21 The 1988 Directive set emission limit values for new plant and gave a national 'bubble' of emissions for existing plant. The proposed amendment to this Directive aims further to reduce emissions of SOx, NOx and particles from new large combustion plants, mostly power stations, refinery boilers and large boilers in industry – taking account of technical progress over the past ten years. Gas turbines are also to be included. The estimated effect of the measure is a reduction in EU Member States of 1,000 kilotonnes of SOx, 4,000 kilotonnes of NOx and particles over the period 2000 – 2010.

National Emissions Ceiling Directive and 'Daughter' Directive

2.22 The Commission published in 1999 a proposal for a Directive to set National Emissions Ceilings for each EU Member State as the primary means of implementing its Acidification Strategy, and to make progress on the problem of ground-level ozone. Ceilings will be set for national emissions of SOx, NOx, ammonia and Volatile Organic Compounds (VOCs), to be attained by 2010.

Integrated Pollution Prevention & Control (IPPC) Directive

2.23 The IPPC Directive came into force in October 1999, affecting the way certain industries are regulated. It is designed to prevent, reduce and eliminate pollution at source through prudent use of natural resources. It is intended to help industrial operators

move towards environmental sustainability. It expands upon Integrated Pollution Control legislation by including noise, vibrations, safety and energy efficiency. It looks widely at the pollution impact of a plant or activity, including the energy industry.

The national context

Gas and electricity legislation

2.24 The specific legislative framework within which Ofgem works is described in the next section. In addition to the Gas and Electricity Acts, as amended by the Utilities Act, the Competition Act 1998 came into force on 1st March 2000.

The Competition Act 1998

2.25 The main provisions of the Competition Act 1998 came into force on 1 March 2000. The Act replaced or amended the Fair Trading Act 1973; the Restrictive Trade Practices Act 1976; the Resale Prices Act 1976; and the Competition Act 1980.

2.26 The Act introduced two prohibitions. The Chapter I prohibition prohibits agreements between undertakings, concerted practices and decisions by associations that have the object or effect of preventing, restricting or distorting competition in the United Kingdom. The Chapter II prohibition prohibits the abuse of a dominant position by an undertaking in the United Kingdom. Section 60 of the Act seeks to ensure that, as far as possible, the Act is applied in a manner consistent with EC competition law. Undertakings can be fined up to 10% of their UK turnover for each year or part year, up to a maximum of three years, in which they breach either prohibition. A statutory instrument providing guidance from the Director General of Fair Trading (DGFT) as to how penalties will be calculated under the Act has been passed by Parliament[1].

Greenhouse gas emissions

2.27 As a result of the Kyoto Protocol and EU commitments resulting from these, the UK has a legally-binding target to reduce its greenhouse gas emissions. The UK Government has decided to exceed both of these targets by setting itself a goal of cutting carbon dioxide emissions by 20 per cent below 1990 levels by 2010. As set out in the DETR's *Draft Climate Change Programme* (March 2000), the Government intends that this will be achieved via the following range of policies relevant to the energy sector:

1. Improving business use of energy (stimulating investment and cutting costs)

[1] "Guidance as to the appropriate amount of a penalty", Office of Fair Trading, February 2000.

- Climate Change Levy – to improve efficiency and the use of low carbon technologies
- Integrated Pollution Prevention and Control
- Carbon Trading.

2. Stimulate new and more efficient sources of power generation

   - Suppliers obliged to obtain 10 per cent of electricity from renewable sources by 2010 – subject to cost to consumers being acceptable
   - Target to double the capacity of CHP by 2010.

3. Promote better efficiency in the domestic sector

   - New Energy Efficiency Standards of Performance requiring gas and electricity suppliers to help (disadvantaged) domestic customers
   - New HEES (Home Energy Efficiency Scheme) and for Scotland: Warm Deal
   - Improvements to community heating
   - More efficient appliances.

4. Ensure the public sector takes a leading role, for example:

   - New targets for improving the energy management of public buildings
   - Energy efficiency targets for local authorities, schools and hospitals
   - Green travel plans.

5. Cut emissions from the transport sector:

   - The average fuel efficiency of new cars is due to improve by 25 per cent by 2008-9 under EU agreements with manufacturers
   - *A New deal for Transport: Better for Everyone* White Paper sets out measures to cut congestion and pollution
   - Changes to be made to car taxation.

6. Continue the fall in emissions from agriculture and forestry:

- Better countryside management
- Cuts in fertiliser use
- Protection and enhancement of forests
- Better energy efficiency.

2.28 In March 1999 the DTI published a Consultation paper: *New and Renewable Energy – Prospects for the 21st Century.* Working alongside the DETR's climate change programme, the paper details the Government's proposals for the development and support of renewable energy. The focus will be placed upon a new Percentage Obligation, which will require all suppliers to meet 10 per cent of the electricity supplied from renewable sources by 2010, subject to the cost to consumers being acceptable. Section 4 provides more details on this. Unlike the Non Fossil Fuel Obligation, this policy will not be funded through a levy but through the companies themselves and, ultimately, the consumer.

2.29 The Electricity Works (Assessment of Environmental Effects) Regulations 2000, through the Electricity Act 1989, implement the EU Directive (97/11/EC). This amendment to the Electricity and Pipeline (Assessment of Environmental Effects) Regulations 1990, requires any development made under sections 36 and 37 of the Electricity Act to apply for consent from the Secretary of State. Developments considered to have a significant effect on the environment will then have to submit an environmental impact assessment and an environmental statement.

UK National Air Quality Strategy

2.30 In 1997, a National Strategy for Air Quality[2] was published, after wide consultation, which maps out the future of ambient air quality policy in the UK at least until the year 2005. The Strategy sets out a framework of standards and objectives for the pollutants of most concern which will lead to reductions in the number and extent of episodes of air pollution, both in summer and winter.

2.31 The air quality standards in the Strategy have been set with regard to the scientific and medical evidence on the effects of particular pollutants on health. The Expert Panel on

[2] Department of the Environment, Welsh Office, Scottish Office (1997). The United Kingdom Air Quality Strategy (1997).

Air Quality Standards (EPAQS) was established in 1991 to advise on air quality standards in the UK and EPAQS recommendations have been used, where they exist, as the air quality standards on which the setting of objectives will be based. Where EPAQS has not made a recommendation, the relevant information from the World Health Organisation (WHO) has been used, where available. For some pollutants, concentration thresholds have been identified at or below which effects are unlikely even in sensitive population groups. In other cases, it is not possible to identify levels at which there is zero risk and standards have been set at levels at which the risk to public health would be exceedingly small. The Strategy is currently under review. The review was originally scheduled for 1999, but has been brought forward for completion by the end of 1998. The review will explore the scope and arguments for revising existing standards and objectives.

2.32 Local air quality management provisions in Part IV of the Environment Act 1995 commenced in December 1997. Local authorities are required to review air quality in their area and assess it against the objectives specified for each pollutant in the Regulations. They will be required to designate Air Quality Management Areas where it appears that the objectives will not be met by 2005 and will have to establish action plans for those areas in pursuit of the objectives. The pollutants for which the Regulations set objectives are: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, fine particles (PM_{10}) and sulphur dioxide.

White Paper on Energy Sources

2.33 The Government White Paper: Conclusions of the Review of Energy Sources for Power Generation (DTI October 1998) set out a comprehensive reform programme for the energy sector and committed the Government to:

- new arrangements for electricity trading
- seeking practical opportunities for divestment of coal-fired plant by the major generators
- pressing ahead with competition in electricity supply for all customers
- separating supply and distribution in electricity markets
- resolving certain technical issues about the growth of gas, including the proper remuneration of flexible plant
- continuing to press for open energy markets in Europe; and

- maintaining a Cleaner Coal Technology Development Programme.

2.34 This paper stated that security and diversity of electricity supply could be compromised by gas-fired generation (the so called 'dash for gas') and that the speed of introduction of such new plant was the result of significant market distortions and not of underlying economics. The result was to propose a moratorium on building new gas-fired generation. The DTI announced on 17 April 2000 that this stricter consents policy would be lifted, once the new electricity trading arrangements come into effect. The DTI intends to provide state aid to assist the coal industry through the transitional period. More details on this decision and the background to it are set out in Appendix 3.

2.35 Table 2.1 provides a summary of Government initiated environmental and related policies affecting the gas and electricity industry. Ofgem's responsibilities in achieving these policies are highlighted, along with the roles of other key players.

Table 2.1 Summary of Government Environmental and Related Policies affecting the Gas and Electricity Markets

Government Initiated Policy	Sector Affected	OFGEM responsibilities	Other Key Influences
1. Reduction in greenhouse gases	Energy Industry	To ensure Ofgem's practices have regard to Government policies.	International/European/Domestic legislation Government Guidance and Working Groups Environment Agency: enforcement of Integrated Pollution and Prevention Control and sets emission levels from coal and oil fired power stations
	Targeted at top 350 UK companies		DETR guidelines for reporting greenhouse emissions
1a. Government target: 10 per cent UK electricity supplied from renewable energy by 2010 and Percentage Obligation (Renewables)	Electricity generators and suppliers	Monitoring and ensuring compliance of Obligation Reporting on the extent of compliance and additional costs to consumers Advising on buy out price	Government set target DTI sets the obligation, manages and issues policy documents Planning Authorities
1b. Non Fossil Fuel Obligation Programme and Transitional Arrangements	Public Electricity Suppliers Renewable Generators All electricity customers	Advises Secretary of State Carries out the will-secure test Sets fossil fuel levy and is responsible for collection and payment	DTI sets the obligation, manages and issues policy documents Planning Authorities

Government Initiated Policy	Sector Affected	OFGEM responsibilities	Other Key Players
1c. Climate Change Levy	Non domestic gas and electricity customers Levy collected by Suppliers on behalf of HM Customs & Excise CHP and renewable generators seek exemption	Accrediting and auditing exemptions for renewables	Exemptions for CHP and Negotiated Agreements The Treasury e.g. enhanced capital allowances scheme announced in the March 2000 budget Customs & Excise set and collect the Levy from suppliers
1d. Non-binding CHP target: 5000 MW target during 2001 10 000 MW target by 2010	Local electricity generators, distributors, suppliers, customers (e.g. businesses)	Collect and review information (CHP database) Embedded Generation Working Group	DETR set target in climate change programme Planning Authorities
1e. Aim to relax strict consents regime on gas fired generation	Electricity generation	Deliver NETA as condition for relaxing consents procedure	DTI/DETR
2. Energy Efficiency Standards Of Performance (EESoP)	Delivered by domestic gas and electricity suppliers and targeted at domestic customers (particularly those who are disadvantaged)	Target setting (until March 2002) Enforcement and monitoring Individual scheme approval	Energy Saving Trust - management/administration role Government to set standards for future schemes (from April 2002)
3. Other Energy Efficiency schemes e.g. Home Energy Efficiency Scheme	Domestic gas and electricity customers	Participation in working groups e.g. Energy Efficiency Partnership for Homes	National Energy Action /Energy Saving Trust /Energy Advice Grants Agency etc The Treasury fiscal measures e.g. VAT
4. Planning Permission	Energy Industry, particularly generators, transmission and suppliers	None	DTI/DETR/Local Authorities all have responsibilities Legislation e.g. The Electricity Works (Assessment of Environmental Effects) Regulations 2000 new Government policy to plan for renewable provision

Government Initiated Policy	Sector Affected	OFGEM responsibilities	Other Key Players
5. To reduce disruption from utilities street works	Transmission and Distribution companies	None	DETR legislation (New Roads and Street Works Act 1991) DETR policy e.g. lane rental
6. Cleaning up contaminated land	Energy Industry particularly large land owners and Transco	Approval and verification of capital expenditure under the price control regime	DETR legislation (Contaminated Land (England) Regulations 2000 [Statutory Instrument Number 227] and Environment Act 1995) DETR policy Environment Agency regulation and technical guidance Local authorities identification of sites and enforcement
7. Other environmental/safety improvement policies e.g. removing nitrogen oxide from compressors	Energy Industry particularly generators and transmitters	Approval and verification of capital expenditure under the price control regime	Government legislation Enforcement agencies e.g. HSE, Environment Agency

3. The legislative framework of Ofgem's work

3.1 The present legislative framework has recently been reformed through the Utilities Act. The Act makes many important changes to the previous legislation, the Gas Act 1986 and the Electricity Act 1989, and makes the Gas and Electricity Markets Authority's principal statutory objective the protection of consumers' interests, wherever appropriate by promoting effective competition. In carrying out this objective the Authority must have regard to ensuring that all reasonable demands for gas and electricity are met, and that companies can finance their licensed activities.

3.2 Subject to these primary duties the Authority must exercise its functions in a manner which it considers best calculated to promote efficiency and economy on the part of licence holders or persons exempt; to protect the public from dangers arising from the conveyance of gas through pipes or from the use of gas conveyed through pipes and from dangers arising from the generation, transmission, distribution or supply of electricity; and to secure a diverse and viable long-term energy supply. In carrying out these functions the Authority must have regard to the effect on the environment of activities connected with the generation, transmission, distribution or supply of electricity, and the conveyance of gas through pipes.

3.3 In performing its duties under the Act, the Authority must have regard to the interests of individuals who are disabled or chronically sick; individuals of pensionable age; individuals with low incomes, and individuals residing in rural areas.

3.4 The Utilities Act has removed the previous reference in the Electricity Act to the physical environment, and now refers consistently to the environment in relation to both gas and electricity.

3.5 Section 1 has already commented on the tension that may exist for Ofgem on some issues between the various statutory duties which it has been given by the Utilities Act. The Government's understanding of the priority to be given to Ofgem's different objectives was set out by Lord McIntosh of Haringey in the House of Lords on 13 June (Hansard, column 1579):

> "It is right that the Authority's general duties should have an economic focus. However, we recognise that the way in which the Authority exercises its functions can have significant social and environmental consequences. That is why the Authority is subject to secondary duties in relation to energy efficiency, public safety and the environment and will be required to take account of social and environmental guidance issued by the Government.

…. that ensures that when the Authority is making a choice between alternatives of equal benefit to the consumer, it should lean to the one that does the most for energy efficiency, public safety and the environment and takes account of the Government's social and environmental objectives. But it would be wrong to remove the priority afforded to the interests of consumers by making these considerations of equal importance to the principal objective ….. To do so would run counter to the principal purpose of regulation. Measures which run counter to the interests of consumers, which could arise if we give it equal prominence, fall outside the scope of economic regulation and are properly matters for Government."

3.6 Through the Electricity Act 1989, Ofgem has a range of roles to play in respect to the environment. The Act provides the guidelines for the Energy Efficiency Standards of Performance (EESoP) and for the Non Fossil Fuel Obligation (NFFO) and the Fossil Fuel Levy. These schemes promote energy efficiency (in the domestic environment) and the development of renewable energy technologies. The Electricity Act also makes provisions for combined heat and power, requiring Ofgem to collect information about the generation of electricity particularly the development of generation using Combined Heat and Power (CHP). Ofgem's role and environmental policy in relation to these and other issues is described in the following sections.

Statutory social and environmental guidance

3.7 Sections 10 and 14 of the Utilities Act require the Secretary of State to issue guidance to Ofgem on any of the Government's social or environmental policies 'in order that the Authority can make an appropriate contribution to the attainment of these policies'. Below is the relevant wording:

"(1) The Secretary of State shall from time to time issue guidance about the making by the Authority of a contribution towards the attainment of any social or environmental policies set out or referred to in the guidance, in particular policies to reduce emissions of greenhouse gases in line with the target of a 20 per cent cut in carbon dioxide emissions by the year 2010 and any subsequent climate change targets that are adopted and any other targets set out or referred to in the guidance.

(2) The Authority shall, in carrying out its functions under this Part, have regard to any guidance issued under this section.……"

3.8 The Guidance will be provided by means of a Statutory Instrument. The Secretary of State is required to consult the Authority, the Gas and Electricity Consumer Council, licence holders and other 'appropriate' persons before issuing the Guidance. Draft Statutory Social and Environmental Guidance to the Gas and Electricity Markets

Authority ('the Guidance') was issued in February 2000 by the DTI as a preliminary consultation document[3]. A further consultation document is expected in the autumn.

3.9 The important role of the utility industries in contributing to the Government's social and environmental policies was highlighted in the Government's response to the consultation following the publication of the Utilities Green Paper 'A Fair Deal for Consumers' in 1998. The Government's aim is to ensure that utility regulators, in this case Ofgem, take account of the Government's wider social and environmental policies during their decision-making processes.

3.10 The Government has given Ofgem a primary objective to protect the interests of consumers, including both present and future consumers. However, the draft guidance indicates that economic regulation should be conducted in a way that is alert to the Government's wider social and environmental goals, and, where possible, supportive of them. The guidance is intended to assist Ofgem to exercise its functions in this way. The Government has stated that it is for Ofgem to decide how these objectives are to be reflected in the way its functions are carried out and, in particular, to decide how to resolve conflicts which might arise both between the various social and environmental objectives to which Ofgem must have regard; and between these and other statutory duties.

3.11 It should be recognised that environmental issues frequently involve difficult decisions between different social, environmental and economic objectives. For example, lower energy prices will, unless countered by other Government action, result in higher energy consumption, and make environmental targets more difficult to meet; the higher energy prices implied in higher renewable targets will, in the absence of any action by Government, weigh particularly heavily on the fuel poor; or – more generally – there is a choice between present consumption and future resources which may involve Government intervention to change consumption patterns.

3.12 The draft proposes that the Guidance will be in effect for a period of approximately five years, although the Secretary of State may issue further guidance as appropriate. By having regard to the Guidance the Government envisages that Ofgem will promote and support appropriate industry initiatives.

For example Ofgem will consider what use might be made of Codes of Practice. We will also encourage all companies we regulate to report

[3] Draft Statutory Social and Environmental Guidance to the Gas and Electricity Markets Authority. A consultation document from the Department of Trade and Industry. February 2000

annually on their environmental activities (many already do), and publicise examples of good practice.

Sustainable development

3.13 Overall, the Government intends the regulatory system to make an appropriate contribution towards achieving sustainable development. The Government's sustainable development strategy is set out in A Better Quality of Life. [More details on the UK Strategy are contained in Appendix 1.]

In developing our policy response Ofgem will consider how we interpret our new primary responsibility to protect the interests of consumers. For example, how far does this extend to protecting the interests of future consumers as against those of present consumers?

In order to show that environmental implications are properly addressed in our internal decision-making processes, Ofgem might consider developing a checklist to assist us with our work.

In addition Ofgem might consider whether it would be helpful to draft guidelines for each of the economic, environmental and social elements of sustainable development.

Environmental objectives

3.14 In setting the parameters for the environmental objectives, the Government draws attention to its *Draft Climate Change Programme*[4] as well as to the Strategy on Sustainable Development already mentioned.

3.15 Ofgem's attention is drawn to the need to reduce the UK's emissions of greenhouse gases, now and in the long term. In particular, the draft Guidance refers to two objectives:

- to meet the UK's Kyoto Protocol to reduce greenhouse gas emissions to 12.5 per cent below 1990 levels by 2008-2012
- to move towards the domestic goal of a 20 per cent cut in CO_2 emissions by 2010.

3.16 In addition, the draft Guidance refers to two further sustainable development objectives:

- to reduce air pollution and ensure air quality continues to improve through the longer term
- to make prudent use of natural resources, with the objective of moving away from disposal of waste towards waste minimisation, re-use, recycling and recovery.

3.17 The draft Guidance draws attention to four issues in particular which the Government considers to be particularly relevant to Ofgem. These are:

- energy efficiency
  - ensure access to information about energy efficiency and sources of help
  - ensure access to information on the role of community heating and energy services
  - ensure that energy savings measures are directed to disadvantaged customers
- renewables
  - ensure that renewable sources of energy have access to the transmission and distribution network on reasonable and proportionate terms
- energy services
  - have regard to maximising awareness of energy service options as an alternative to energy supply
- Combined Heat and Power (CHP)
  - have regard to the target for CHP capacity by 2010
  - ensure that CHP can compete fairly in a competitive market.

3.18 Ofgem will continue to take account of the various Government targets in its decision making process.

Ofgem will consider facilitating the development of energy services options, for example by supporting Energy Saving Trust's programme

[4] *Draft Climate Change Programme,* published March 2000.

to promote energy services, and by investigating evidence presented to us of barriers, and monitor this development

Information, consulting and reporting

3.19 Lastly, the draft Guidance devotes some paragraphs to information, consultation and reporting. It states that Ofgem should encourage companies to produce an annual environmental report, and to consider producing one itself.

Ofgem also intends to report annually on our activities in relation to the environment, including progress towards commitments made in the Environmental Action Plan.

Environmental policy statements

3.20 In addition to the environmental reports that large companies produce, specific requirements apply to electricity and gas companies.

Schedule 9 Statements – Preservation of Amenity and Fisheries

3.21 Licensed electricity suppliers and generators are required under schedule 9 of the Electricity Act to have a transparent policy for preserving amenity when constructing or operating power stations, installing electric lines (above or below ground), or carrying out other works in connection with the transmission or supply of electricity.

3.22 When drawing up proposals for power stations and lines etc companies are required to have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and to do what they reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects. In Scotland, the requirements also cover the preservation of fisheries.

3.23 Each company is required to draw up a statement setting out how it intends to preserve amenity (and fisheries in Scotland) in consultation with English Heritage, the Countryside Commission and English Nature, or the equivalent bodies in Wales and Scotland. In these statements companies must set out their procedures for consulting over issues which may affect amenity. Companies are required to publish the statements and are expected to update them periodically.

3.24 The statutory bodies which companies are required to consult over their Schedule 9 statements have drawn up a model statement for companies to follow. This model includes that companies should:

- acknowledge a commitment to environmental sustainability;
- prepare environmental assessments to accompany relevant planning applications;
- publish regular reports on the steps taken to meet their Schedule 9 policy commitments;
- publish an Environmental Policy Statement to include the company's environmental strategy in areas such as emission controls, energy efficiency, and recycling
- prepare a database of all sites of amenity value within the company's area; and
- review their policies with respect to amenity issues at least once every three years, and publish the results of the review.

Schedule 3 statements – environmental statements

3.25 The Public Gas Transporter Pipe-line Works (Environmental Impact Assessment) Regulations 1999 implement Council Directive 85/337/EEC (3) which requires that, in certain cases, development consent for public or private projects should be given only after an environmental impact assessment has been carried out.

3.26 The Regulations require a public gas transporter proposing to undertake pipe-line works which meet criteria specified in Part 1 of Schedule 3 of the Regulations to submit an environmental statement in relation to those works and apply to the Secretary of State for consent to carry them out. A public gas transporter is defined as a licence holder under section 7(1) of the Gas Act 1986 (c. 44). The criteria specified in Part 1 of Schedule 3 are defined as pipe-line works in respect of a pipe-line with a diameter of more than 800 millimetres and a length of more than 40 kilometres. Information to be included in the environmental statement is detailed in Schedule 1 of the Regulations. In summary these are:

- description of the proposed pipeline works

- a description of the aspects of the environment likely to be significantly affected by the proposed pipeline works
- a description of the likely significant effects of the proposed pipe-line works on the environment which may result from:
  - the existence of the proposed pipeline
  - the use of natural resources
  - the emission of pollutants, the creation of nuisances and the elimination of waste
  - a description of the forecasting methods used to assess these effects
- a non-technical summary of the above
- an indication of any difficulties encountered in compiling the required information.

3.27 Before giving an opinion on the information to be included in the environmental statement the Secretary of State must consult with the following bodies: the relevant planning authority; the Countryside Commission, Nature Conservancy Council for England, Environment Agency, or Scottish/Welsh equivalent bodies, and the public gas transporter. Ofgem has no duties prescribed in the Regulations.

Ofgem has started to discuss with the Environment Agency whether they might take over the responsibility for analysing and reporting on the gas and electricity companies' statements.

4. Generation of electricity

4.1 Generation of electricity from the combustion of fossil fuels is a major factor causing emissions of greenhouse gases. It contributes to CO_2 emissions, which account for 80 per cent of greenhouse gas emissions in the UK. Some fossil fuels are also a major cause of emissions to the air of pollutants like sulphur dioxide and nitrogen oxides.

Carbon dioxide emissions

4.2 Over the last 10 years emissions from power stations have decreased. This is due partly to the increased use of nuclear and gas as fuels for generation and the reduction in coal fired plant. By way of illustration, natural gas emits less than half the amount of carbon dioxide per unit of energy as coal, and nuclear generated electricity emits no carbon dioxide at all.

4.3 Emissions of carbon dioxide have also reduced due to the efficiency levels of power stations with newer stations generally being more efficient. However, some reduction in emissions has been offset by increased consumption of electricity, which has risen from 284.4 TWh to 324.3 TWh between 1990 and 1999.

Sulphur dioxide and nitrogen dioxide emissions

4.4 Emissions of sulphur dioxide and nitrogen oxide from power stations have also reduced since 1990. In 1990 approximately 2.7 million tonnes of sulphur dioxide (SO_2) was emitted from power stations as a result of coal and oil being burned. By 1997 emissions of SO_2 had been reduced to approximately one million tonnes. This constitutes some 60 per cent of the current national emissions of SO_2. As in the case of carbon dioxide emissions, the reduction in SO_2 has been largely due to a reduction in coal fired generation and an increase in generation from gas and nuclear sources. Since 1990, SO_2 emissions have also been further reduced by the introduction of flue gas desulphurisation (FGD) equipment at two coal fired power stations and increased reliance on lower sulphur content imported coal. Emissions of nitrogen oxide from power stations have reduced from approximately 777,000 tonnes in 1990 to approximately 350,000 tonnes in 1997, due to the reduction in the use of coal and the installation of low NO_x burners on coal fired power stations.

4.5 It is the responsibility of the Environment Agency (EA) to control sulphur dioxide emissions from electricity generation plant. The current method of regulation is to issue emission quotas to both electricity generating companies and individual power stations.

Individual power station quotas, known as "A-limits", are designed both to address local environmental concerns and to reduce national emissions. Company wide quotas, known as "B-limits", are designed solely to reduce national emissions.

Ofgem's position on SO_2 emissions limits

4.6 Ofgem recognises that the control and regulation of sulphur dioxide emissions from generation plant has an important role to play in meeting the UK's obligations to control SO_2 emissions because of the significant proportion of national emissions attributable to electricity generation. Further reductions in sulphur dioxide emissions from generation plant could be achieved through: further substitution away from coal-fired generation to alternative, cleaner fuels; by substituting high sulphur British coal for lower sulphur imported coal; retrofitting FGD abatement technology at existing coal fired plant; or a combination of all three options.

4.7 The A- and B-limits are allocated in such a way to give generating companies with a portfolio of coal- and/or oil-fired power stations some flexibility in deciding how to operate their SO_2 emitting plant. Under the Environment Agency's latest SO_2 controls, a company agreeing to retrofit FGD to a generating unit within its portfolio will receive a temporary increase in its overall company B limit (providing that the A-limits are adhered to). The Environment Agency requires that FGD units are run ahead of the non-FGD units within portfoliois. Provided companies run at twice the level of the non FGD unit the company will receive further increases in its B limit– the so called 2:1 rule.

4.8 Ofgem recognises that the Environment Agency's incentives for retrofiting FGD are consistent with the Government's October 1998 White Paper. However Ofgem is concerned that the Agency's incentives may distort competition in generation and/or increase the cost of generation by forcing generators to retrofit costly FGD rather than switch to cleaner fuel sources. This could lead to higher prices for electricity customers. Ofgem is also concerned that the government's proposed coal subsidy scheme, which encourages the use of relatively high sulphur British coal, may exacerbate the effects of the Environment Agency's controls. Furthermore the Environment Agency's controls favour generators with portfolios of coal and/or oil-fired generation and this may deter new entrants seeking to purchase existing coal fired stations.

4.9 Ofgem believes that the most efficient way of meeting a given sulphur dioxide emissions target without distorting competition in generation would be to allow 'B' limits to be freely traded. Trading would reveal the market price for B limits and would allow companies to make efficient investment decisions on the most cost-effective means of

meeting emissions targets based on the relative prices of the alternative options. The introduction of a tradable permits scheme would address Ofgem's concerns about the impact of the current controls and incentives on competition in generation and the potential for this to lead to higher prices for electricity consumers. Ofgem recognises that the extension of a tradable permits scheme may not be possible for 'A' limits, as these are designed to address local environmental issues and this may limit the scope for trading of these permits.

New Electricity Trading Arrangements (NETA)

4.10 New Electricity Trading Arrangements (NETA) are due to be introduced in autumn 2000. The primary purpose of the new arrangements is to promote efficiency through encouraging competition in the electricity market, and lower electricity prices. The Government has indicated that market reforms, including NETA, will result in reductions in wholesale electricity prices of at least 10 per cent over the medium term.

4.11 Under the new arrangements the Pool will be abolished and bi-lateral trading between generators, suppliers, traders and customers will be introduced. An environmental impact assessment paper, issued by Ofgem and DTI in October 1999[5], identified two main results of NETA which are likely to have environmental consequences which are elaborated further below:

- lower electricity prices; and
- changes to the relative competitive position of market participants.

Lower electricity prices

4.12 NETA is expected to result in reductions in wholesale electricity prices, which contribute around 50 per cent of final retail prices. Increased consumption of electricity resulting from lower prices could lead to an increase in CO_2 emissions as most electricity is generated using fossil fuels – a 10 per cent reduction in the wholesale price is calculated to increase CO_2 by around a quarter of one per cent of its 1990 level[6].

4.13 However, emissions of SO2 and NOx could continue to be reduced due to the increasing contribution of new gas-fired generation and the SO2 and NOx abatement technologies applied to coal and oil-fired power stations. [See Appendix 3 for more information on power station consents.] Gas fired plants emit virtually no sulphur

[5] The New Electricity Trading Arrangements: Ofgem / DTI conclusions document. October 1999
[6] DTI Energy Model

dioxide and much less NOx than coal or oil fired plants, per unit of output. The effect of a 10 per cent fall in wholesale prices is calculated to reduce SO2 and NOx emissions by 0.1 per cent. [See Appendix 6 for information on the cooling effects of sulphate aerosols.]

4.14 The NETA arrangements imply a more active role for electricity suppliers and, potentially, for customers. Suppliers will be able to offer balancing services to the system operator if they can encourage customers to take steps to reduce electricity consumption at short notice. The increased incentives for demand-side participation could offset to some degree any increased consumption arising from lower prices.

Impact of lower prices on consumption levels

4.15 It is sometimes argued that, by promoting competition and ensuring effective regulation in the gas and electricity markets, the lower prices which result cause increased consumption which is bad for the environment because this leads to higher emissions and reduces the incentive for energy efficiency measures.

4.16 In Ofgem's view, this is not a helpful analysis. Well targeted competition and regulation can be complimentary to a coherent environmental policy, so long as there is clarity of responsibility for each element. Ofgem suggests that it should continue to be a main objective of regulatory policy, via a mixture of competition where feasible and price control where competition is not feasible, to put downward pressure on costs and margins, thereby reducing the prices which an efficient producer will earn for his services to a level at which he earns a normal return on capital. Higher costs and margins would imply inefficiency (an avoidable waste of resources). Waste of resources cannot be good for the environment; resources that would otherwise be "wasted" could be redeployed to activities that have positive environmental effects. Neither can it be desirable to allow companies to extract monopoly rents from sectors which are not competitive, in the hope that the higher prices that result may help the environment.

4.17 Difficulties can arise when environmental costs are not reflected in the prices paid or other costs incurred. The appropriate way to handle this is for Government to correct this position where it feels that this is appropriate, by means of environmental taxes, tradable emissions permits or other measures, not by seeking to increase prices via the encouragement of inefficiencies on the supply side.

4.18 Further discussion of studies into possible ways of identifying the external costs of electricity generation is included in the box below.

4.19 It is interesting to note that the price elasticity of demand for electricity and gas is not as high as often assumed. The DTI has recently estimated that the long run price elasticity of demand is 0.29 for electricity and 0.35 for gas[7]. (Therefore, if the price of energy is reduced, demand for it will only increase by a small amount, and vice versa.)

4.20 The imposition of taxes on energy for environmental reasons is one of the clearest examples of where there can be a conflict between social and environmental objectives. In some instances it may be possible to design the tax so that the effect on the fuel poor is mitigated, as Ofgem has done by directing most of the benefits of the early Energy Efficiency Standards of Performance to disadvantaged consumers. In the case of other environmental objectives, such as the new Percentage Obligation designed to promote renewable generation, it may be less easy to mitigate the burden on the fuel poor in this way.

External Costs of Electricity Generation

External costs are those costs imposed on society and the environment that are not accounted for by the producers and consumers of energy. Such costs include the effect on or damage to health, landscape, water and agriculture. These costs are not usually incorporated into the market price of energy.

The ExternE project[8] carried out by the European Commission and the US Department of Energy examined possible methodologies for quantifying the external costs of electricity generation. The Report calculated the cost of the damage caused by the use of different fuels for generation of electricity. Although some impacts are difficult to value, the project did offer some conclusions:

'External costs are technology dependent and, for some older power plants, are large compared to electricity prices. Global warming and nuclear accidents have very uncertain external costs and pose threats to sustainability. Well located renewable energy sources have low external costs and provide sustainable energy options.'[9]

From the results it is not possible to identify either fossil or nuclear generation as environmentally preferable to the other. It is clear that both have potentially large external costs, even with the use of modern technology. The use of cogeneration reduces fossil fuel emissions by 20 – 50 per cent. Similarly, clean coal technologies would reduce coal generation externalities to levels close to those of gas powered generation.

[7] These figures are taken from the "Energy Projections for the UK, Working Paper, March 2000"
[8] European Commission DGx11 Science Research and Development. ExternE: Externalities of Energy 1995
[9] External costs: what do they mean for energy policy? Nick Eyre, Energy Policy, Vol. 25, No.1, pp 85-95, 1997.

Changes to the relative competitive position of market participants

4.21 Generation from renewable sources and efficient CHP can provide environmental benefits and add to diversity and sustainability. These types of generation are expected to make a significant contribution to achieving the UK's targets to reduce emissions. The next section describes the steps being taken by Government to encourage and promote generation from renewable sources. However, under NETA whilst flexible and predictable plant will be rewarded, plant that is inflexible or unpredictable will face imbalance charges. This will apply to some generation from renewable sources and some Combined Heat and Power (CHP) stations.

4.22 Some CHP and renewables generators have expressed concern that the NETA arrangements are particularly onerous for them and introduce risks that other participants can offset more readily. In recognition of these risks special facilities will be available to allow such generators to manage their imbalance risks. This can be done either directly or through parties to the Balancing and Settlement Code who are prepared to take on imbalance risks from a number of sources and combine them, reducing overall uncertainty and thus the risk. Parties undertaking such a role are referred to as consolidators (previously referred to as aggregators). It is likely that there will be a number of parties ready to take on the consolidator role within the new trading arrangements.

4.23 Ofgem recognises that some CHP and renewables generators consider that these measures do not go far enough in reducing the impact of NETA. Work to identify and address any barriers is going forward in the Embedded Generation Working Group, which is looking at technical, charging and longer term issues as well as the publication of information. This is one way that Ofgem and the Government are seeking to tackle this problem together.

Ofgem will consider quickly how to act on any relevant recommendations of the Embedded Generation Working Group.

4.24 In addition other measures are being taken by the Government to encourage and promote CHP and renewables, including the exemption under the Climate Change Levy, and the supplier percentage obligation, together with the special arrangements for NETA. These should enable CHP and renewables generators to make an important contribution to the generation market.

Generation from renewable sources

4.25 Renewable sources of energy produce significantly lower levels of environmental pollutants than fossil fuels. In particular they emit no greenhouse gases or are neutral over their life-cycle (for example, energy crops produce carbon dioxide when they are burned, but the new crop growth absorbs an equivalent amount of carbon dioxide from the atmosphere, making the process carbon neutral). Waste for which there is no more economic use, such as landfill, can also be used as a fuel and achieve savings in fossil fuel use and reductions in CO_2.

4.26 Generation from renewable sources is expected to play an important part in meeting the targets of a 12.5 per cent reduction in greenhouse gases by 2008-2012 and a 20 per cent reduction in carbon dioxide emissions by 2010. Generation from renewable sources is also regarded as important for contributing to diverse, secure and sustainable energy supplies.

Non Fossil Fuel Obligation

4.27 The Coal Review White Paper[10] announced the Government's intention to work towards a figure of 1,500 MW of new renewable generating capacity in the UK by the year 2000.

4.28 The Government's main means of promoting and providing support for renewables has so far been through the Non Fossil Fuel Obligation (NFFO) programme. The Electricity Act enables the Secretary of State, by means of an Order, in the form of a Statutory Instrument, to require the Public Electricity Suppliers (PESs) to secure a certain amount of electricity from renewable sources. The obligation arising from such an Order is called a Non-Fossil Fuel Obligation.

4.29 Before an Order is made the DGES (Director General of Electricity Supply) is responsible for:

- advising the Secretary of State on the means of meeting the Order; and
- considering whether the contracts that the PESs propose entering into with generators will secure the required capacity.

[10] Coal Review White Paper (CM 2235), March 1993

4.30 Five Orders have been made in England and Wales and three Orders in Scotland. A total of 903 contracts have been awarded under these orders, with a total contracted capacity of 3609 MW.

4.31 The additional cost of purchasing this renewable electricity is met from the Fossil Fuel Levy which is paid by all electricity customers. The Levy is set by the DGES, and is presently set at 0.3 per cent in England and Wales, and at 0.8 per cent in Scotland. In 1999/2000 £66m was raised by the Levy in England and Wales. The levy rate in Scotland was zero per cent in 1999/2000.

4.32 The advice given by the DGES to the Secretary of State before each Order was made took into account the cost to customers of projects being supported by the Levy. The advice therefore recommended that the lowest priced contracts should be included in the Order, but in recognition of the Government's wish to encourage diversity, suggested instead that the lowest priced contracts from a range of different technologies might be included, rather than including only the lowest priced projects overall.

4.33 The NFFO programme has had only limited success in increasing the amount of electricity generated from renewable sources. To date there are only 296 NFFO projects generating in England and Wales with a contracted capacity of 760 MW. In Scotland, 16 projects, out of a total of 109, are generating with a capacity of 38 MW. Details are shown in Tables 4.1 and 4.2. However more projects are expected to be commissioned and the Great Britain total might reach around 400 with a total contracted capacity of 1500 MW by 2003.

Table 4.1 Projects contracted and those generating under NFFO 1-5[11]

	PROJECT CONTRACTED		PROJECTS GENERATING	
	Number	Capacity MW	Number	Capacity MW
Wind	247	971	53	105
Landfill gas	306	654	155	332
Municipal and Industrial Waste (MIW)	62	1 096	12	149
MIW (CHP)	17	185	0	0
Hydro	106	59	44	33
Agricultural Waste	6	7	0	0
Energy Crops	16	190	2	46
OTHER	34	109	30	95
Total	794	3 271	296	760

[11] Data taken from NFPA quarterly returns, June 2000

Table 4.2 Projects contracted and those generating under SRO 1- 3

	PROJECT CONTRACTED		PROJECTS GENERATING	
	Number	Capacity MW	Number	Capacity MW
Wind	47	168	7	25
Waste to Energy	27	109	5	10
Hydro	29	34	4	3
Biomass	3	25	0	0
Wave	3	2	0	0
Total	109	338	16	38

4.34 One important reason for projects not going ahead is because of failure to obtain planning consent. The Government has acknowledged that the planning system has an important role in helping to deliver the targets for renewable energy. It has indicated that there needs to be an open and constructive dialogue between prospective operators, planning authorities and local people about identifying suitable sites with sensitivity and care.

4.35 The Government's new policy is intended to provide a positive strategic approach to planning for renewable energy provision to facilitate its development, whilst continuing to protect the countryside. The Government is therefore proposing that regional renewable energy assessments should set the framework for a more strategic land-use planning approach at regional level, itself providing the framework for local authorities' development plans and decisions on individual energy policies. Ofgem has no role in the planning consent process and this will remain the position under the new arrangements described below.

Future policy on renewables

4.36 In March 1999 the Department of Trade and Industry published a consultation paper on renewables[12] setting out the Government's commitment to work towards a target of 10 per cent of electricity from renewable sources by 2010 (with an interim target of 5 per cent by 2003). The European Commission has published a Directive on Renewables. It proposes that Member States should set national targets for renewable energy .

Percentage obligation on suppliers

4.37 The Utilities Act gives power to the Secretary of State to require electricity suppliers to supply a certain proportion of the electricity from renewable sources. A supplier will be able to meet the obligation either by supplying electricity generated from renewable

[12] New & Renewable Energy. Prospects for the 21st Century. DTI March 1999

sources or by purchasing certificates. It is not yet entirely clear how these certificates will operate. The current proposal is for the amount of electricity and its 'green' value to be notionally separated. In this way, a supplier who supplies more renewable electricity than he is required to under his obligation would be able to sell the 'green' value of this extra electricity to a supplier who has not supplied enough. Any supplier failing to meet the obligation will be required to make a payment – a fixed price per kWh shortfall. This is referred to as the buy-out price. The proceeds of the buy-out price will be paid back to suppliers, although exactly how this will work is also not yet clear. Ofgem will be responsible for monitoring and ensuring compliance with the obligation.

4.38 Ofgem will also be responsible for reporting on the extent of compliance and the additional cost to electricity consumers. The cost will effectively be capped by the buy-out price since suppliers are unlikely to pay a much higher price to purchase electricity from renewable sources than the price to be paid for failing to meet the obligation. The Government has indicated that the level of the buy-out price will be set following consultation and on advice from Ofgem. The additional cost of purchasing electricity from renewable sources, other than that from NFFO projects, will not be met through a levy, but will be passed on directly to customers. Initial indications from the Government suggest that it will be seeking views on whether an increase in the price paid by customers building up to about 2 per cent by around 2010 would be acceptable. This would amount to approximately £5.40 per year on a typical domestic customer's electricity bill.

4.39 The Government has indicated that there will be no further NFFO Orders. Instead renewables will be promoted through the new obligation placed on suppliers. Output from projects that have been awarded contracts under the five NFFO Orders made between 1990 and 1998 may contribute towards the new obligation and the additional cost of buying this output will continue to be met through the Fossil Fuel Levy.

Climate change levy

4.40 The Government has announced that that it intends to allow electricity generated from renewable sources (with the exception of large scale hydro) to be exempt from the Climate Change Levy. In order to qualify a supplier will have to contract with a generator or generators of renewable energy to purchase such electricity and to supply it to non-domestic customers. Ofgem will be responsible for accrediting and auditing the generation and supply of electricity for which the exemption is claimed.

Ofgem will therefore have a number of important roles in relation to renewables. We will continue to investigate potential barriers to generation of electricity from renewables and take justified steps to eliminate any that are identified

Combined heat and power

4.41 Combined heat and power (CHP), or cogeneration, is the simultaneous generation of electricity and usable heat from the same plant. Such stations achieve higher overall system efficiency compared to conventional power stations, through the recovery of otherwise wasted heat. CHP provides environmental benefits due to this improved efficiency and lower overall fuel consumption. Consequently the Government strongly supports the development of CHP as a key contribution to sustainable development, and promotes its use wherever economic.

4.42 Every 1,000 MWe of CHP can reduce carbon emissions by 1 million tonnes per year. Greater efficiency of CHP stations compared to other forms of generation also means lower production costs. In recognition of these benefits a Government White Paper[13] set a target for CHP of 4,000 MWe of installed capacity by the year 2000, doubling the capacity that existed at the time. In 1993 as part of the UK's Climate Change programme, the Secretary of State for the Environment announced an increase in the target to 5,000 MWe. At present installed capacity is around 4,000 MWe and the 5,000 MWe target is expected to be met during 2001. Table 4.3 gives details of the number of CHP installations.

Table 4.3 CHP Installations by capacity size ranges – Data from the Digest of UK Energy Statistics, July 2000

Installed Generating Capacity	Installations		Generating Capacity	
	Number	% of Total	Total (MW)	% of Total
Less than 100 kWe	638	49	36	1
100 kW – 999 kWe	447	34	113	3
1MW – 9.9 MWe	147	11	636	15
> 10 MWe	81	6	3 454	81
Total	1 313	100	4 239	100

4.43 The Government's target for CHP has now increased to 10,000 MWe by 2010. A consultation paper produced by DETR in July 2000 seeks views on the Government's strategy to deliver the benefits of CHP during the next decade and sets out the proposed

[13] This Common Inheritance. Government White Paper 1990

regulatory, fiscal and other measures to encourage the uptake of CHP. The fiscal measures include exemption from the Climate Change Levy for good quality CHP. Regulatory issues affecting CHP are discussed further in the section below on embedded generation.

4.44 Section 47 of the Electricity Act places a duty on the Director General to keep under review generation and collect information – in particular about CHP. Ofgem has compiled a database of CHP projects recording details of CHP projects. The information held includes details and a description of the plant, location, capacity, electricity and heat output, and fuel use.

4.45 The database, which is updated annually, includes details of 1147 CHP schemes with a capacity of 3635 MWe as shown in Table 4.4. These figures are lower than the total number of schemes and capacity actually operating, because information for inclusion on the database, which is made available to the public, is provided by generators on a voluntary basis and not all generators have agreed to provide data. Ofgem reviews the database on a regular basis with a view to making improvements where appropriate. Table 4.4 gives details of the number of CHP installations included on Ofgem's database.

Table 4.4 CHP installations by capacity size ranges – data from Ofgem public CHP database July 2000

Installed Generating Capacity	Installations		Generating Capacity		Max. Heat Output
	Number	% of Total	Total (MW)	% of Total	MWth
Less than 100 kWe	522	46	32	1	45
100 kW – 999 kWe	454	40	119	3	145
1MW – 9.9 MWe	108	9	453	13	625
Greater than 10 MWe	63	5	3 031	83	4 954
Total	1147	100	3 635	100	5 769

Energy efficiency standards of performance - CHP

4.46 Residential CHP schemes can count towards companies' energy savings targets under the Energy Efficiency Standards of Performance (EESoP). Eleven separate CHP schemes have been included under the previous Standards providing conversions from old, inefficient, electric heating systems. Similar projects can be considered for EESoP3. In addition, where CHP is being added to an existing communal heating system, or where it replaces gas heating, it can count towards the EESoP3 gas savings target. The Energy

Saving Trust has estimated that 10,000 households might be covered by CHP projects under EESoP3[14].

Embedded generation

4.47 Embedded generation is plant connected to the electricity networks of regional distribution companies rather than the high voltage transmission networks such as the National Grid System. Embedded generators are generally small stations based on industrial sites, CHP plant or renewable stations. In addition to the environmental benefits of CHP and renewable generation, local embedded generation can also reduce transmission and distribution losses.

4.48 The amount of embedded generation is expected to increase over the next ten years if Government targets for CHP and renewables are met. In recognition of the need for distribution networks to accommodate more embedded generation and to identify any barriers to embedded generation, in November 1999 DTI issued a consultation paper on Network Management Issues[15]. The paper looked at issues such as network access, management and charging, with a view to identifying any changes needed to level the playing field for embedded generation access to distribution networks.

4.49 The draft European Directive on renewables[16] published in May 2000 recommends that member states should take the necessary measures to ensure that transmission and distribution system operators grant priority access to the transmission and distribution of electricity from renewable sources. The Royal Commission on Environmental Protection Report[17] published in June 2000 recommends that Government should take the lead in a fundamental review of how electricity networks can best be financed, managed and regulated in order to stimulate and accommodate large contributions to energy supplies from CHP plants and renewables sources, whilst maintaining reliability and quality of supplies.

4.50 An Embedded Generation Working Group has been set up to consider the range of issues which affect the ability of developers and operators of embedded generation plant to gain access to and use distribution networks. The Group is chaired by Ofgem and includes representatives from DTI and DETR, as well as representatives from the

[14] Under Ofgas' E Factor Scheme, which operated between 1992 and 1997, some 60 residential CHP projects received support, to a total of £2 million, from British Gas.
[15] Consultative Document – Electricity Network Management Issues. DTI. November 1999
[16] Proposal for a Directive of the the European Parliament and of the Council on the promotion of electricity from renewable energy sources in the internal electricity market. Commission of the European Communities. May 2000
[17] Energy – The Changing Climate. Royal Commission on Environmental Pollution Report. June 2000

electricity transmission and distribution companies, generators, suppliers, consumers and an independent member.

4.51 The Group has been in operation since March 2000. There has been a considerable amount of detailed consideration of each of the issues by all industry representatives and a high level of constructive participation has been evident throughout.

4.52 The terms of reference of the Group include:

- technical issues: including possible measures for network design and management so as to ensure that distribution companies consider embedded generation as an alternative to network reinforcement
- publication of information: such as the need for the publication of additional information to allow prospective generators to make informed judgements about appropriate points of connection
- charging issues: consideration of the rules and principles under which embedded generators should be charged for connection to and use of the distribution system and the potential for net metering for some renewable sources such as domestic photovoltaic panels
- longer term issues: the possible need in the medium and long term to encourage distribution companies to design networks to facilitate the accommodation of embedded generation and the need to manage those parts of the network where embedded generation is connected or proposed.

4.53 Although the work of the Group continues, present indications are that consensus views will be put forward from all industry participants in many of the above areas. The Group is likely to recommend reviews of several areas of regulation including:

- connection policy approaches
- incentives (or the lack of them) for distribution operators to consider embedded generation or load management as alternatives to network development
- the need for better information for generators to guide their decisions on connection locations
- the extent to which distribution network philosophy would have to change to accommodate significant extra levels of embedded generation as envisaged by

Government targets; and how this might be achieved in the short, medium and longer terms.

4.54 The Group will report and make recommendations later in the year. Further details of the composition and work of the Group, including papers agreed by the Group, can be found on the DTI web site (http://www.dti.gov.uk/).

4.55 In addition to the work of the Group, Ofgem is considering the effect that a distribution constraint or failure can have on embedded generation. A consultation paper on Distribution Networks and NETA issued by Ofgem in June 2000[18] seeks views on whether the existing framework of incentives on distribution businesses, embedded generators and suppliers should be adjusted to take account of imbalance costs arising as part of NETA, whether there should be compensation payments for generators and suppliers who incur imbalance costs as a result of distribution constraints and failures, and whether distribution charges to generators and suppliers should be increased to recover the costs of these payments.

[18] Distribution Networks and NETA. Ofgem consultation paper. June 2000

5. Transportation and distribution of gas and electricity

Price controls on transmission and distribution companies

5.1 Ofgem sets and enforces price controls on companies operating distribution and transmission networks in the energy sector – Transco, licensed electricity distribution and transmission companies. These companies face no effective competition; they are natural monopolies. In the absence of price controls such companies would have little incentive to improve efficiency and, at the same time, could earn high monopoly profits by charging excessive prices to their customers. Price controls and regulation are designed to improve incentives to reduce costs, improve efficiency, protect quality of service and encourage innovation.

5.2 In carrying out its duties under the Utilities Act, Ofgem is required to have regard for the impact of its decisions on the environment. Ofgem's policy on price controls is based on ensuring the efficient and economical development of the system and giving incentives to companies to act accordingly.

Ofgem's view is that it should continue to operate price controls to ensure efficiency on the part of the companies involved.

Setting Price Controls

5.3 In setting price controls Ofgem seeks to establish reasonable estimates of operating and capital expenditure necessary to run the business and maintain the network in an efficient manner. In considering appropriate levels of capital and operating expenditure Ofgem takes account of the availability of energy efficient alternatives where such a choice exists. For example, in assessing NGC's capital expenditure on the transmission system, Ofgem sought assurances from NGC that it will select low loss conductors for its overhead lines and will take account of the cost of losses when selecting transformer designs.

5.4 Expenditure which is specifically required for environmental reasons is taken into account in calculating price control revenues. Ofgem has also stated that it would be willing to consider re-opening a price control if there were changes in environmental or health and safety legislation which caused significant changes in future expenditure. For example, the impact of overhead electricity lines is a sensitive issue, which is the responsibility of the planning authorities rather than Ofgem. However, if there were to

be a major change to the planning regime requiring more undergrounding of electricity cables, this might trigger Ofgem to reopen a price control decision.

Impact of Price Controls

Price Effects

5.5 Price controls encourage price reductions of gas and electricity to end consumers. Their purpose is to encourage efficiency and reduce monopoly prices and profits. The impact of price reductions in increasing energy consumption is discussed in paragraphs 4.15 – 4.20.

Resource Effects

5.6 Price controls give network companies incentives to keep costs down and become more efficient. This will have environmental benefits. For instance, increased efficiency means that less resources are used or wasted in running the business. In turn this reduces emission levels. For example, Transco has an incentive under the price control to reduce shrinkage costs (the cost of gas lost from the system due to leakage, theft and in operating the system).

Leakage

Leakage from gas pipelines is an important source of methane gas, one of the major greenhouse gases. The concentration of methane has more than doubled over the past 200 years, mostly as a result of human activities. It is thought to contribute about one fifth of the current enhancement of the greenhouse effect. Around 28% of methane emissions are thought to be associated with fossil fuel extraction through leakage from coal mines, gas pipelines and oil wells. [See Appendix 6 for more information on greenhouse gases.]

Each year, Transco has to make up the cost of what is lost in shrinkage, according to a 'shrinkage factor'. Last year, Transco calculated that this was equivalent to 0.89 per cent of throughput. This figure is made up of the following elements: 0.81 per cent is leakage from medium and low pressure distribution mains - this causes methane to be emitted into the atmosphere; 0.05 per cent is from operational usage, accounted for by gas used for high pressure compressors and pre-heating – this causes no methane emissions, although CO_2 is emitted; 0.03 per cent is accounted for by theft and metering inaccuracies, which does not result in emissions.

Transco estimates leakage by means of a computer model which takes account of: pipe materials and diameter; gas conditioning; and average operating pressure. In 1995, Transco voluntarily

undertook to reduce leakage from the low pressure distribution system, with an aim to reduce leakage in 2000 by 20% compared to 1991 levels. The 1999 estimate of leakage represents an 8.7% reduction from1991 levels in absolute terms. However, this has to be set in the context of higher system throughput than had been anticipated. Taking this into account, the leakage rate in 2000 is expected to be 30% lower than that in 1991.

Transco replaces less than 1 per cent of its network each year. Its replacement programme is driven mainly by risk and safety factors, rather than environmental ones. A small part of the replacement programme is driven by the desire to reduce leakage, although the rate of return on this is low. Therefore, the major part of Transco's methane reduction programme is being achieved by means of more sophisticated pressure control and gas conditioning, in addition to its replacement programme.

Revenue Drivers

5.7 Most price controls link a company's allowed revenues to variables such as volumes transported or transmitted. The nature of the revenue driver may incentivise the behaviour of the regulated company in particular ways.

5.8 Half of Transco's current price controlled revenues are related to the volume of gas which passes through its system. This may encourage Transco to connect new customers in order to increase demand for gas. If the energy source replaced as a result of such connections were more detrimental to the environment than gas, then the form of the price control may have beneficial effects on the environment. The situation for electricity is different. NGC's price control has a cap on overall revenue, with no direct link to the amount of electricity transported. Distribution companies have, since 1995, had a revenue driver based equally on customer numbers and the amount of electricity distributed. This choice is intended in part to ensure that companies do not have artificial incentives to increase sales of electricity.

5.9 Losses are caused by transporting electricity through the network and result in the heating of transformers, underground cables and overhead lines. Companies can reduce losses by installing lower-loss equipment or by changing the configuration of the network. All electricity companies have incentives which encourage them to reduce the level of losses on their systems with associated beneficial environmental effects.

Other incentives

5.10 In setting price controls it is important to create an appropriate balance between factors such as cost reduction and quality of supply, and energy efficiency. During the 1999 distribution price control review a further adjustment (based on relative performance of each company with respect to loss reduction) was made to each company's allowed revenue in order to strengthen incentives for energy efficiency.

5.11 Not all revenues are recovered through the price controls. Some revenues lie outside of the scope of price controls where the services they relate to are typically provided on request and are not considered normal network services. Ofgem has allowed the networks to exploit economies of scope in several areas of their systems and some of these have had beneficial environmental effects. For instance, Transco, NGC and the PESs are allowed to rent space on their transmitter masts to mobile phone companies. This has reduced the need for such companies to build their own mobile masts. This reduces the use of resources, disruption and aesthetic implications of the proliferation of such masts.

Charging Structures

5.12 NGC, Transco's and the PESs' charges are regulated by Ofgem. The office attempts to ensure that the prices charged act as signals to encourage efficient and economical use of the system.

5.13 Ofgem considers that pricing for transportation and transmission services should encourage efficient and economical use of the systems. Generally, cost reflective charging is the best way of ensuring that the correct signals are sent to customers. Otherwise, customers will base their behaviour on misleading signals and there will be a loss of efficiency and higher system costs. Therefore encouraging efficient use of the system reduces waste and misuse of resources – something which is clearly beneficial in environmental terms. There may also be wider benefits from the existing charging frameworks, for instance in encouraging connections to the gas network and reducing electrical losses in transmission.

Cost related charging

5.14 In the absence of bottlenecks or constraints, Ofgem considers cost reflectivity to be an important aspect of charging. Customers of the networks should face prices which reflect the impact that they have on the system. In other words, customers should face the cost

of their choices. For instance, a customer deciding where to connect to a network should have to take into account the cost of transporting energy to that location, including any need to build, operate and maintain the network. If charges do not reflect the actual costs, customers will base their behaviour on misleading signals, and there will be a loss of efficiency and higher system costs. It is important to note that behaviour based on misleading signals could have detrimental side effects on the environment through an increase in waste and unnecessary use of resources.

5.15 There are a number of factors which may determine costs on energy networks. The distance which gas is transported or electricity is transmitted/distributed may be one such factor. For instance, when gas is transported greater distances, pumping and equipment costs increase. When electricity is transmitted greater distances, losses from the system may increase. Geography may also affect costs. Customer density, whether the area is urban or rural, rock or soil types and terrain may all affect the cost of transportation, transmission or distribution. Another factor which will probably affect cost is the time of consumption. For instance, at times of peak demand, transmission of an extra unit of electricity may actually require reinforcement of the system to increase its capacity. In contrast, when these systems are operating off-peak, the cost of transmitting an extra unit of electricity will be very low.

In general Ofgem attempts to ensure that charges levied for use of Transco, NGC and the PESs' services reflect costs.

Use of System Charges

Distance related charges

5.16 As noted above, cost reflectivity suggests that charges faced by customers should reflect costs related to distance. NGC's charging has a distance related aspect to it. Demand (suppliers and customers) and generation face different charges depending on their location. In areas where there is relatively more demand than generation (and so electricity has to be transmitted into the area) transmission charges to suppliers and customers are higher. Similarly generators locating in such areas face negative charges (they are paid by NGC). Such price signals should curtail consumption of electricity in these areas and encourage generators to locate there. These price signals encourage efficient behaviour and may have wider environmental benefits. For instance, charges related to distance may encourage a pattern of demand and generation that reduces losses. On the other hand, there may be opposition to the location of generation stations next to urban areas or in areas of outstanding natural beauty.

5.17 Gas transportation charges also have some distance related element to them but to a lesser extent than NGC. There are different National Transmission System (NTS) exit charges according to the area of the country in which gas is offtaken from the NTS. Local Distribution Zone (LDZ) charges to some extent proxy for distance as they assume that certain sized loads use different amounts of the assets of the system and charge accordingly. However, after a consultation early in 2000, Ofgem decided that further distance related charging on the LDZ network should not be introduced by Transco. Such a change in charging would involve high administrative costs and would be difficult to apply (gas does not flow consistently down certain pipes or along certain levels of the system).

5.18 The PESs' charges may also be said to have a distance related aspect. Like Transco's LDZ charges, the PESs' charge for asset use, using voltage level as a proxy for this, which will to some extent proxy for distance.

Peak and Off Peak Charging

5.19 NGC, Transco and the PESs' charges are collected to cover capacity and commodity costs. Capacity refers to the extra costs of transporting a unit of gas or electricity at the time of system peak demand (when there is no spare capacity). Commodity refers to the extra costs of transporting a unit of gas or electricity when the system is not at peak use (i.e. when there is spare capacity). Most of the costs of transmission, distribution and transportation systems are related to capacity not commodity. For instance, it costs very little to transport an extra unit of gas when there is spare capacity on the system – there are only minor extra pumping costs. If an extra unit of gas is required when the system is at peak use, the costs of transporting that extra unit include not only any extra operating costs but also the fixed costs of increasing the size of the system. Given that significant costs are related to extra capacity, for price signals to encourage efficient use of the transmission and transportation systems, they should include an appropriate capacity element. NGC's charges are currently relatively more capacity based than gas transportation charges.

Access Charging

5.20 Cost reflectivity is also important in relation to connections charging. Transco, NGC and the PESs' are required by their licences to offer terms to customers connecting to their system on a non-discriminatory basis. In other words, charges for connection can only differ between customers as a result of differences in the costs of connection.

5.21 Some aspects of connection charging may have environmental implications. For instance, Transco operates a "shallow connection policy". A load connecting to Transco's system may require not only new assets at the actual connection point but also reinforcement of the network upstream to cope with the higher demand. The "Shallow Policy" states that the costs of reinforcement need not be paid if the load is so large that Transco's returns from that specific connection will outweigh the extra reinforcement costs.

5.22 Transco's shallow policy may have environmental implications. If connection to Transco's system and so use of gas, is encouraged at the expense of use of coal or other more polluting forms of energy such as oil, then shallow charging would have a beneficial impact on the environment.

Ofgem will continue to consider how price controls on distribution and transmission companies can best provide incentives for companies to reduce distribution and transmission losses, including as part of our Information and Incentives Project

Ofgem might undertake to develop a checklist to assist us in ensuring that environmental implications are properly addressed in our internal decision-making processes; this would be expected to mirror the way we take account of safety and other risk considerations, taking into account the need to balance the interests of present and future consumers

6. Supply of gas and electricity

Competition and market liberalisation

6.1 The gas and electricity markets are now open to competition and customers are able to choose their supplier. Competition adds to the downward pressure on prices. In making their choice of supplier, price is not necessarily the only consideration for customers. Some customers, for example, take into account a supplier's environmental policy before making their choice.

Supply price controls

6.2 Although the gas and electricity markets are now fully open to competition, British Gas Trading (BGT) remains the dominant supplier of gas; and the Public Electricity Suppliers (PESs) remain dominant suppliers of electricity within their authorised areas. In order to protect customers from high prices that might otherwise be charged by these dominant suppliers, Ofgem is continuing at present to set price controls.

6.3 New price controls for BGT came into effect in April 2000 for customers on Prompt Pay, standard and prepayment meter tariffs. The price control, which is set for one year and is due to end in March 2001, cut BGT's revenue by about 4.5 per cent, amounting to a reduction of around £12 per price controlled customer.

6.4 At the same time that the new price control came into effect BGT removed all standing charges on its domestic gas and electricity tariffs. As a result the unit charge is higher than it would otherwise have been. This benefits low consumption customers and means that energy efficiency measures which lead to lower consumption are of greater value. Other supply companies also offer standing charge free tariffs.

6.5 New controls on the prices charged by PESs for electricity also came into effect on 1 April 2000. These controls apply to the standard domestic, prepayment and Economy 7 domestic tariffs and are set for a period of two years, and are due to end in March 2002. The price control takes the form of a cap on final prices in the first year. In the second year of the control maximum prices will be required to remain at their nominal levels. The price control will amount to an average reduction of about £15 (about 6 per cent) on an average annual bill for standard domestic customers and about £5 (about 2 per cent) for Economy 7 customers.

Energy Efficiency Standards of Performance

6.6 Section 41 of the Electricity Act gives the Director General the power to set standards of performance for PESs in connection with the efficient use of electricity. The first Energy Efficiency Standards of Performance were set in England and Wales in 1994 as part of the PES Supply Price Controls. In Scotland the first Energy Efficiency Standards of Performance were set in the following year.

6.7 These Standards (known as EESoP1) ran until March 1998, and imposed obligations on each of the 14 PESs to achieve specified energy savings. Funding to meet the Standards was provided through a special revenue allowance in the Price Control, equivalent to £1 per franchise customer per year. The aggregate target for the 14 PESs for EESoP1 was 6,103 GWh in accredited savings with an allowance of £101.7m. Subsequent to EESoP1, a similar programme, EESoP2, was launched for a two year period from April 1998 to March 2000, with an aggregate target of 2,713 GWh, and an allowance of £48.1m. This April, EESoP3 was launched to run until March 2002. EESoP3 applies to gas as well as electricity and is based on an indicative cost of £1.20 per annum for each gas customer and each electricity customer, giving a total cost of around £110 m. The energy savings targets for EESoP3 are 6,200 GWh for gas and 5,050 GWh for electricity.

6.8 EESoP1 and EESoP2 have delivered important environmental gains. The Energy Saving Trust, which monitor the energy savings achieved from projects, estimates lifetime CO_2 savings from EESoP1 and EESoP2 combined at 10 million tonnes. Forecast lifetime CO_2 savings from EESoP3 are estimated at 7 million tonnes. In addition EESoP1 and EESoP2 are estimated to have delivered SO_2 savings of around 110,000 tonnes and NO_X savings of around 35,000 tonnes.

6.9 In line with the statutory framework, EESoP targets are set in terms of final customer energy savings in gas and electricity (not primary energy savings), but carbon emission factors are used to assess fuel switching and CHP projects. The effect on the physical environment is a criterion for selecting projects.

6.10 The Standards are driven by social and fuel poverty concerns as well as environmental considerations. This is reflected in Ofgem's guidance that 65 per cent of expenditure should be for disadvantaged customers who (as confirmed by monitoring) benefit mainly through improved comfort rather than energy savings.

This weighting as between social and environmental considerations was broadly supported by stakeholders during Ofgem's consultation

on the EESoP3 during 1999, and we intend to ensure that this balance is maintained during its implementation.

6.11 Beyond EESoP3, the Government will assume responsibility for setting future Standards, using new powers contained in the Utilities Act. The Government issued a consultation document in March setting out its initial proposals for the regime which would apply during 2002-2005 (to be known as the Energy Efficiency Commitment). These proposals are based on an estimated annual cost of on average £3.60 for each gas customer and £3.60 for each electricity customer and are forecast to cut greenhouse gas emissions by around 750,000 tonnes of carbon a year. The Government intends to finalise the level of the Energy Efficiency Commitment later this year.

6.12 Decisions on the appropriate level for the Energy Efficiency Commitment are a matter for Government, though Ofgem is being consulted over these. The successful implementation of the Energy Efficiency Commitment, particularly if the programme is on a significantly larger scale than EESoP1-3, will require the building of an effective consensus with all key stakeholders, not least energy companies and their customers. Under the Utilities Act important functions for administering the Energy Efficiency Commitment regime will be delegated to Ofgem. As part of this, Ofgem will have responsibility for the evaluation and monitoring of companies' programmes.

6.13 An important element of the scheme will be the help it provides to those on low incomes and in fuel poverty. Ofgem hopes to see that the final scheme will show at least equivalent preference towards those in fuel poverty to previous schemes. It will be important to ensure that all fuel poor households have the opportunity to benefit as early as possible from the Energy Efficiency Commitment and that the higher fuel charges implied by the Commitment are not regressive in their impact on the fuel poor.

Ofgem will continue to provide information on the suppliers' energy efficiency schemes to organisations in regular contact with consumers, and especially those in fuel poverty.

We will also encourage companies to do more to link the provision of energy efficiency advice with their debt prevention and management policies, and make clear and explicit the links between the environmental and social objectives of the current and future Energy Efficiency Standards of Performance.

With government Ofgem will continue to work to demonstrate the clear links between the Energy Efficiency Commitment and other schemes promoting energy efficiency (for example, the New Home Energy Efficiency Scheme, Local Government responsibilities under the Home Energy Conservation Act etc.).

Ofgem might undertake to issue guidelines to companies on how they may best fulfil their social and environmental obligations consistent with the promotion of competition in supply.

Codes of practice on the efficient use of electricity and gas

6.14 Electricity suppliers have been required, as a condition of their licence, to provide for customers a Code of Practice setting out ways in which guidance on the efficient use of electricity will be provided to enable customers to make informed judgements on measures to improve the efficiency with which they use electricity. The codes, which have been approved by the Director General, include information and advice for the guidance of customers on the efficient use of electricity supplied to them.

6.15 The codes also set out the arrangements for maintaining sources from which customers may obtain further information about the efficient use of electricity supplied to them, including the maintenance of a telephone information service. Suppliers also make available free of charge to any customer a statement of other sources of additional information or assistance about measures to improve the efficiency with which they use electricity, together with details of any basic information about financial assistance that might be available from central or local Government.

6.16 Gas suppliers have also been required, as a condition of their licence, to provide to their domestic customers advice on the efficient use of gas given or prepared by a suitably qualified person. The supplier should have arrangements to provide advice in a number of respects, but there has been no requirement for a Code of Practice.

6.17 The Social Action Plan, published by Ofgem in March 2000, aims to level up the best practice between the gas and electricity industries in order to provide a similar regime for the operation of social obligations across the two industries. New licence arrangements, agreed with suppliers in May 2000, allow for greater clarity and consistency. There is now a requirement for a Code of Practice for gas suppliers, and a revised Code of Practice for electricity suppliers. These Codes will be approved by the end of September. As part of this, Ofgem will allow companies supplying electricity and

gas to produce a single Code of Practice on the efficient use of both fuels, which should be more helpful to customers.

6.18 The amended licence conditions include a number of improvements in the Codes of Practice. Previously, electricity suppliers had to provide a telephone advice line, whereas gas supply companies had to use suitably qualified staff to give or prepare advice. The amended licences extend to gas suppliers the requirement to prepare and make available free of charge statements setting out the information and advice on energy efficiency, including sources outside the organisation, and to operate a telephone information service. For electricity the amended licence conditions include the requirement for a suitably qualified person to give or prepare the guidance. Suppliers are required to give energy efficiency advice to customers in debt.

6.19 Copies of the amended licences are set out in Ofgem's decision document: *Enhancing Social Obligations,* May 2000. The licence changes also provide for Ofgem to give directions requiring suppliers to alert customers to information on energy efficiency. The requirements for gas and electricity suppliers' Codes are now almost identical. Ofgem is proposing to monitor activities in this area more closely. Also, as part of the Social Action Plan, a research project is being carried out by the Electricity Association into the delivery of energy efficiency advice to low income customers.

6.20 Overall, the Codes of Practice on the efficient use of electricity and gas, and the advice and information provided to customers, should result in reduced consumption and lower fuel bills and will therefore result in environmental benefits. For some customers, however, as has already been suggested, energy efficiency measures will not reduce consumption but will improve the warmth and comfort levels of their homes. Typically, these are customers who currently do not use enough energy owing to the cost.

Ofgem is committed to promoting opportunities for all customers to improve their energy efficiency, including through these revised Codes of Practice, and in the way we monitor and enforce compliance with them.

Green tariffs

6.21 Following the opening up of the competitive market for electricity a number of suppliers now offer green tariffs or contracts. Customers on these tariffs or contracts generally pay more for their electricity than customers on other tariffs or contracts. There are two different types of tariff or contract: a green 'fund' tariff or contract; and a green 'energy'

tariff or contract. With a green fund contract the premium paid by customers is paid into a fund to support future investments in new renewable energy. With a green 'energy tariff' the supplier agrees to match the amount of electricity supplied to customers with purchases of electricity from renewable sources.

6.22 On behalf of the Government, the Energy Saving Trust (EST) has set up an accreditation scheme for green tariffs. Suppliers who meet the criteria set out by EST are able to use the 'Future Energy' logo. The EST currently includes all non-fossil fuel and non-nuclear sources. Large-scale hydro (in excess of 10 MW installed capacity) commissioned before 1 January 1990 will only be allowed if it accounts for less than 50 per cent of the energy supplied. The criteria may change depending on the definition for renewables exemption used for the Climate Change Levy. Renewable energy capacity currently being operated with support from the Non Fossil Fuel Obligation or Scottish Renewables Orders is not included. To date 14 tariffs from 11 suppliers in Great Britain have been awarded Future Energy accreditation as shown in Table 6.1. Figures from EST indicate that around 14,000 customers have so far signed up to the green tariffs offered.

Table 6.1 List of Electricity Tariffs & Offerings Accredited under Future Energy[19]

Name of Supplier	Type of Renewable Energy Offering	Regional/ National offering	Target Customers
Eastern Energy	Fund	Eastern Region	Domestic
London Electricity	Supply	National	Non - Domestic
npower	Fund	National	Domestic
PowerGen	Supply	National	Non-Domestic
PowerGen	Supply	National	Domestic
SEEBOARD plc	Fund	SEEBOARD Region	Domestic
Scottish and Southern Energy	Supply	Southern Electric Region	Domestic
Scottish and Southern Energy	Supply / Fund	National	Domestic
ScottishPower MANWEB	Fund	ScottishPower &MANWEB Regions	All Customers
ScottishPower MANWEB	Supply	ScottishPower &MANWEB Regions	Non-Domestic
SWALEC	Supply/Fund	SWALEC Region	Domestic
SWEB	Supply	England & Wales	All Customers
Unit [E] Ltd	Supply	England & Wales	All Customers
Yorkshire Electricity	Supply	National	All Customers

6.23 Ofgem's role in respect of electricity tariffs is to assess and approve tariffs offered by dominant suppliers (presently the PESs operating within their authorised areas) to ensure that they comply with conditions set out in the PES licence. Tariffs offered by dominant suppliers must not show undue preference or undue discrimination and must not be unduly onerous or predatory. Green tariffs are assessed against these criteria in the same way as other tariffs offered. In addition Ofgem seeks confirmation of the auditing arrangements put in place by the supplier, to ensure that the premium paid by customers is used as described.

6.24 Prices and terms and conditions offered by non-dominant suppliers do not have to be approved by Ofgem but, as with dominant suppliers, the terms must not be predatory or show undue preference or undue discrimination.

[19] Details as of 04/04/00

Ofgem will continue to evaluate and approve suppliers' green tariffs beyond the introduction of the percentage obligation for electricity from renewable sources.

Customer fuel choices and the environment

6.25 The choice of fuel by the customer has environmental implications. By switching from electricity to gas, the delivered energy will increase, since gas appliances are less efficient when viewed in terms of delivered energy. However, because the carbon intensity of electricity is significantly higher than that of gas, there is likely to be a reduction in overall carbon emissions.

6.26 A recent study[20] for the DETR and European Commission estimated that significant carbon savings could be achieved by switching from electricity to gas just for water heating and appliances (i.e. not counting space heating). This would require continuing expansion of the gas network in the UK and the more intensive use of gas in those households on the network.

6.27 Customer choice of which fuel to use is influenced by a variety of factors, not least the relative price of gas and electricity, the geographic coverage of the gas network, and the cost of connecting to the network. Each of these factors is potentially a matter for regulation. In terms of the relative price of gas and electricity, existing price control arrangements do not seek to affect price relativities, but are based on the separate cost structures associated with each fuel. We believe that this should remain the basic approach to price regulation and would not favour any attempt to use the price control system to support fuel switching.

6.28 In terms of the coverage of the mains gas network there are no national or published industry targets for expansion of the gas network. At present approximately 80 per cent of households in Great Britain have a mains gas supply. The number of customers connected has grown by an average of 1.5 per cent per year in recent years through a process of extending the network geographically to new areas and joining more households to the network in areas where gas is already available.

6.29 The coverage of the national gas network and the number of households connected are also heavily influenced by the cost of extending that network. This may depend on the

[20] "Lower Carbon Futures for European Households", Oxford University's Environmental Change Unit, ISBN: 1874370273

degree of competition in providing extensions, and by the terms on which customers are connected to the network, i.e. the basis on which they are charged for a connection.

7. Summary of actions

7.1 This is a list of possible commitments which Ofgem could make in taking forward the Environmental Action Plan process. The individual proposals are picked up in more detail in the body of the text. Comments are sought on these specific proposals and on possible further commitments.

Environmental impact checklist

7.2 With view to demonstrating consistency of approach, Ofgem might undertake to:

- develop a checklist to assist us in ensuring that environmental implications are properly addressed in our internal decision-making processes; this would be expected to mirror the way we take account of safety and other risk considerations, taking into account the need to balance the interests of present and future consumers
- continue to consider how price controls on distribution and transmission companies can best provide incentives for companies to reduce distribution and transmission losses, including as part of our Information and Incentives Project
- consider whether it would be helpful to draft guidelines for each of the economic, environmental and social elements of sustainable development.

Renewables, CHP and embedded generators

7.3 Ofgem has already carried out considerable work in this area, for example in relation to assessing the effects of NETA on CHP, and considering how NETA might be further developed in the light of this; and in chairing and facilitating the Embedded Generation Working Group. In the light of this, Ofgem might further undertake to:

- continue to investigate potential barriers to generation of electricity from renewable, CHP and other embedded sources, and take justified steps to eliminate any that are identified
- consider quickly how to act on any relevant recommendations of the Embedded Generation Working Group, which is looking at technical, charging and longer term issues as well as publication of information

- continue to monitor the development of NETA taking account of the impact of the new arrangements on CHP and renewables generation

- continue to evaluate and approve suppliers' green tariffs beyond the introduction of the percentage obligation for electricity from renewable sources.

Energy efficiency

7.4 The Utilities Act means that Ofgem will no longer have statutory duties to set standards of performance for energy efficiency, although we will still have an important role in administering future schemes. In the light of this, Ofgem might undertake to:

- demonstrate that we are promoting opportunities for all customers to improve their energy efficiency, including through the revised Codes of Practice on energy efficiency advice, and in the way we monitor and enforce compliance with these

- provide information on the suppliers' energy efficiency schemes to organisations in regular contact with consumers, and especially those in fuel poverty

- encourage companies to do more to link the provision of energy efficiency advice with their debt prevention and management policies

- demonstrate that there are clear links between our actions on promoting energy efficiency and those of others (New Home Energy Efficiency Scheme, Local Government responsibilities under the Home Energy Conservation Act etc.), and show how our indicator on warm homes initiatives fits into the overall context

- facilitate the development of energy services options, for example by supporting Energy Saving Trust's programme to promote energy services, and by investigating evidence presented to us of barriers, and monitor this development

- make clear and explicit the links between the environmental and social objectives of the current and future Energy Efficiency Standards of Performance

- issue guidelines to companies on how they may best fulfil their social and environmental obligations consistent with the promotion of competition in supply.

Transparency and understanding of environmental issues

7.5 In light of our commitment to transparency, Ofgem might undertake to:

- consider whether we ought to encourage transparent billing, so that consumers would be made aware of any extra charges for energy efficiency and energy generated from renewable sources, together with details of information about the proportion of electricity generated from renewable or other sources
- collaborate with any Government information campaign explaining the role of domestic energy consumers in achieving climate change targets.

Environmental reporting

7.6 With a view to improving the amount and quality of information available in the public domain, and to being better able to assess the activities of the companies we regulate, Ofgem might undertake to:

- look at the statutory requirements for electricity companies to provide environmental statements and, in the interests of consistency and completeness, work with the Environment Agency to establish if they should take over responsibility for analysing and reporting on these
- encourage all companies regulated by Ofgem to report annually on their environmental activities (many already do), and publicise examples of good practice on the part of companies
- report annually on Ofgem's activities in relation to the environment, including progress towards commitments made in the Environmental Action Plan.

Links with other organisations

7.7 In view of the complex interrelationship of roles and responsibilities in the environmental field, Ofgem might undertake to:

- clarify our relationship with the Environment Agency, for example by means of a concordat or Memorandum of Understanding; and set up regular, high-level meetings with the Environment Agency, as we have with the Health and Safety Executive

- clarify Ofgem's relationship with other organisations which have a role in environmental policy [see Appendix 2]

- clarify with all those regulated by Ofgem what their environmental responsibilities are and, in particular, where these overlap with Ofgem's regulatory duties and powers, and make clear our approach to enforcing these

- set up regular dialogue with non Governmental organisations active in the environmental/energy field

- improve information to external sources with a view to making sure that Ofgem's role vis-à-vis that of others in this area is transparent and clearly understood, and explain how our approach/response to environmental questions is consistent.

Ofgem's working practices

7.8 In the light of our forthcoming move to Millbank, and the opportunities such a move affords us for reviewing our own working practices, and recognising that working practices send a clear signal to other organisations with which we have links, Ofgem might undertake to:

- establish objectively-validated 'environmentally friendly' working practices in Millbank; and publicise this, both internally and externally by means of an Environmental Policy Statement

- promote wider awareness within Ofgem of Government targets and other aspects of the environmental legislative framework which might affect our work

- establish responsibility within Ofgem for ensuring consistency of treatment on environmental issues and providing a flow of information to all relevant directorates.

Ofgem's Internal Environmental Policy

Ofgem will be moving to a new Headquarters building in Millbank in Autumn 2000. In planning for Ofgem's needs at Millbank, close account is being paid to environmental features of the accommodation. An environmental assessment of the premises is being performed under the Government's BREEAM[21] programme and this will be used to inform the detailed design of office facilities.

Ofgem will introduce an internal Environmental Policy Statement to coincide with the move to Millbank. This will cover building services such as heating, ventilation and air-conditioning, lighting and use of energy for office needs. It will also address Ofgem's approach to use of resources including recycling, as well as Ofgem's policy on travel. The Environmental Policy Statement will be made available to all staff and will be reviewed and updated in future.

Following the introduction of the Climate Change Levy and the renewables Percentage Obligation, Ofgem will consider the scope for purchasing electricity from renewable sources, taking into account the requirement to obtain value for money and other Government departments' policies on this issue.

[21] BRE Environmental Assessment Methodology

Appendix 1 Sustainable development

The UK Strategy on sustainable development

1.1 Shortly after coming to power in 1997 the Government announced its intention to prepare a new Sustainable Development Strategy to replace the one that had been adopted in 1994 following the Earth Summit in Rio. (See Section 2, above, for more details on the global strategy for sustainable development.)

1.2 A consultation document, *Opportunities for change*, together with a summary leaflet for the general public, was published in February 1998. Supplementary consultation documents on particular aspects of sustainable development were produced; and the Government also consulted on a set of 'headline indicators' for sustainable development.

1.3 The Strategy for sustainable development subsequently adopted has four main aims:

- social progress which recognises the needs of everyone
- effective protection of the environment
- prudent use of natural resources
- maintenance of high and stable levels of economic growth and employment.

1.4 For the UK, priorities for the future have been defined as:

- investing more in people and equipment for a competitive economy
- reducing the level of social exclusion
- promoting a transport system which provides choice, and also minimises environmental harm and reduces congestion
- improving the larger towns and cities to make them better places to live and work
- directing development and promoting agricultural practices to protect and enhance the countryside and wildlife

- improving energy efficiency and tackling waste
- working with others to achieve sustainable development internationally.

Key objectives in the UK strategy

1.5 The UK Strategy concentrates on setting key objectives, supported by indicators and targets. The Government's policies take account of ten principles and approaches which reflect key themes from the *Rio Declaration on Environment and Development*, the 1994 strategy, and responses to the *Opportunities for change* consultation, set out below. Some are established legal principles; while others might better be described as 'approaches' to decision making.

1.6 **Putting people at the centre**: Sustainable development should enable people to enjoy a better quality of life, now and in the future. In the words of the *Rio Declaration:* 'human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.'

1.7 **Taking a long-term perspective**: Sustainable development thinking cannot restrict itself to the life of a Parliament, or the next decade. Radical improvements have to begin now to safeguard the interests of future generations. At the same time we must meet today's needs - for example, people need warm homes, which, at present, means using predominantly fossil fuels.

1.8 **Taking account of costs and benefits**: Decisions must take account of a wide range of costs and benefits, including those which cannot easily be valued in money terms. In pursuing any single objective, we should not impose disproportionate costs elsewhere. Public values, the timing of costs and benefits and risks and uncertainties should be taken into account.

1.9 **Creating an open and supportive economic system**: Sustainable development requires a global economic system which supports economic growth in all countries. We need to create conditions in which trade can flourish and competitiveness can act as a stimulus for growth and greater resource efficiency.

1.10 **Combating poverty and social exclusion**: Eradicating poverty is indispensable for sustainable development. We must help developing countries to tackle widespread abject poverty. In this country, everyone should have the opportunity to fulfil their

potential, through access to high quality public services, education and employment opportunities, decent housing and good local environments.

1.11 **Respecting environmental limits**: Serious or irreversible damage to some aspects of the environment and resources would pose a severe threat to global society. Examples are major climate change, overuse of freshwater resources, or collapse of globally significant fish stocks. In these cases, there are likely to be limits which should not be breached. Defining such limits is difficult, so precautionary action needs to be considered.

1.12 **The precautionary principle**: The *Rio Declaration* defines the precautionary principle as 'where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'. Precautionary action requires assessment of the costs and benefits of action, and transparency in decision-making.

1.13 **Using scientific knowledge**: When taking decisions, it is important to anticipate early on where scientific advice or research is needed, and to identify sources of information of high calibre. Where possible, evidence should be reviewed from a wide-ranging set of viewpoints.

1.14 **Transparency, information, participation and access to justice**: Opportunities for access to information, participation in decision-making, and access to justice should be available to all.

1.15 **Making the polluter pay**: Much environmental pollution, resource depletion and social cost occur because those responsible are not those who bear the consequence. If the polluter, or ultimately the consumer, is made to pay for those costs, that gives incentives to reduce harm, and means that costs do not fall on society at large. At the same time, it may not always be possible for everyone to bear all such costs, particularly for essential goods and services.

Major challenges for the UK

1.16 The Strategy identifies several major environmental and resource challenges for the UK. These include the need to:

- achieve major long-term cuts in greenhouse gas emissions whilst ensuring secure, diverse supplies of energy at competitive prices in environmentally-acceptable ways
- improve the quality of our air
- safeguard freshwater resources and water quality, at a time when pressures from climate change and household demand are likely to increase
- safeguard the health and productivity of the seas around our shores
- minimise the loss of our soil resource, and maintain and enhance soil quality
- reverse trends of damage to our landscape and wildlife
- reduce the spread of persistent or diffuse pollutants and improve the management of waste
- work with others to combat global challenges such as climate change and threats to biodiversity, oceans and forests.

The Government's approach to meeting the challenges

1.17 In order to meet the challenges outlined above, the Government aims to:

- achieve overall improvements in environmental quality and, where overall standards are already relatively good, ensure that they do not slip back
- ensure continued productivity of renewable resources and, while making prudent use of non-renewable resources, encourage alternatives for the longer term
- achieve environmental improvements in ways which reinforce economic and social objectives, such as better health, more efficient use of energy, or competitiveness
- act proportionately recognising that not every environmental improvement will be justifiable when all sustainable development objectives are taken into account.

Relevant Government commitments and indicators

1.18 As a follow-up to *Opportunities for change,* the Government published a White Paper, *'A better quality of life'*[22] in May 1999. This document identifies sustainable development actions and priorities for the UK. A subsequent document, *'Quality of life counts'*[23] published in December 1999, sets benchmarks against which the Government can measure its future progress. The Government has also stated that it intends to publish an annual report detailing actions taken in the priority areas, as well as actions proposed but not yet taken.

1.19 *'Quality of life counts'* contains a number of key indicators affecting the gas and electricity industry, including:

1.20 **A headline indicator on emissions of greenhouse gases**: UK emissions of the 'basket' of six greenhouse gases, weighted by global warming potential (GWP), fell by 9 per cent between 1990 and 1997. Emissions of carbon dioxide, the main greenhouse gas, fell by 7 per cent between 1990 and 1998. Under the Kyoto Protocol, the UK has a legally binding target to reduce emissions of the 'basket' of six greenhouse gases by 12.5 per cent relative to the 1990 level over the period 2008-2012. It also has a domestic goal to cut CO_2 emissions by 20 per cent below 1990 levels by 2010.

1.21 **Headline indicators on tackling poverty and social exclusion:** The headline indicators on tackling poverty and social exclusion include a reduction in the proportion of elderly households experiencing fuel poverty. In 1996, over half of single over 60s in England experienced fuel poverty.

1.22 **An indicator of electricity from renewable sources:** The Government has a target of working towards 10 per cent of all UK electricity being provided from renewable sources by 2010, with an interim target of 5 per cent by 2003, up from just 2 per cent at present.

Consumption of fossil fuels

1.23 Consumption of fossil fuels is one of the key sustainable development issues in the UK Strategy, because it is the single largest factor causing emission of greenhouse gases. It

[22] DETR A better quality of life: a strategy for sustainable development in the United Kingdom, May 1999
[23] DETR Quality of life counts: indicators for a strategy for sustainable development for the UK, December 1999

causes almost all CO_2 emissions which account for 80 per cent of greenhouse gas emissions in the UK. Some fossil fuels are also a major cause of emissions to the air of pollutants like sulphur dioxide and nitrogen oxides.

1.24 The Strategy sets out how uncoupling the impacts of energy consumption, i.e. air emissions, from future economic growth may be achieved through:

- **increasing energy efficiency** by reducing energy consumption per unit of output through, for example, combined heat and power (CHP), improved technology for individual vehicles and appliances, increased efficiency of producing electricity, better insulation of buildings and reducing waste energy
- **reducing environmental impacts** per unit of energy consumed, for example by switching to less polluting fuels, using more renewables, installing equipment to remove pollutants in power stations, vehicles etc.

1.25 The Strategy acknowledges improvements in the UK in energy between 1970 and 1998. Energy consumption has been rising steadily since the early 1980s, although at a significantly slower rate of growth that the economy as a whole: primary energy consumption has risen by around 10 per cent while GDP has increased by over 80 per cent.

1.26 The Strategy indicates that there has been some success in uncoupling energy consumption from CO_2 emissions, mainly because of the switch from coal and oil to gas and nuclear power in power stations, and because of significant restructuring of the economy (the relative decline in manufacturing industry and the growth in services). Between 1970 and 1998, CO_2 emissions in relation to output have fallen by a half.

1.27 However, according to the Strategy, scope is limited for future reductions in CO_2 per unit of energy consumed, except through a switch to renewable sources. It is likely that the contribution of nuclear power to reducing emissions will decrease in the first decades of the 21st century as existing capacity is retired, although it may prove possible to extend reactor lifetimes by several years. The Strategy states that there is limited further scope for achieving savings through switching fuels.

1.28 Therefore, if the UK is to achieve its goal of major long term cuts in greenhouse gas emissions, a very significant contribution will have to come from reducing energy use

and increasing energy efficiency. The Government has a target for the installation of 10,000 MWe of CHP electrical capacity by the year 2010. Installed capacity at the end of 1999 stood at 4,238.9[24] MWe.

1.29 There has been greater success in uncoupling other pollutant emissions from energy consumption. Emissions of sulphur dioxide have fallen by 76 per cent between 1970 and 1997, for example. The reduction in sulphur dioxide emissions is mainly because of the switch from coal to gas and use of de-sulphurisation plant equipment in power stations. The recent sharp fall in emissions of nitrogen oxides has occurred mainly because of catalytic converters in vehicles.

Other key indicators

1.30 Other key indicators included in the '*Quality of life'* document concern environmental reporting and managing environmental risk.

1.31 **Environmental reporting:** reporting on environmental performance is a useful way for companies to demonstrate their commitment to improving environmental performance and to communicate with relevant stakeholders (the workforce, the local community, shareholders and customers). The Government intends to put in place guidance to allow large businesses to report publicly to a common standard on major environmental impacts. It will look for the top 350 businesses to report to these standards by the end of 2001 and will then work to extend this to the 7000 UK businesses with more than 250 employees. To help this process, it will issue a guide to reporting on greenhouse gas emissions, followed by similar guidance on waste and water.

1.32 **Managing environmental risk:** Fund managers, banks and insurers are beginning to take greater notice of companies' environmental performance and management of environmental risk. The UK insurance industry has drawn up guidelines for business on public liability insurance for pollution incidents. Increasingly, businesses that manage environmental risks effectively will pay less than if they expose themselves, their employees, neighbours and insurers to a heavy risk of pollution costs.

[24] Digest of UK Energy Statistics, July 2000

*O*bjectives and indicators for the domestic energy market

1.33 The Round Table on Sustainable Development (a Government Advisory body) has studied the implications for sustainable development of the introduction of competition in the domestic energy market. The report, *'The Domestic Energy Market: 1998 and Beyond*'', published in January 1996, concluded that market liberalisation was unlikely to have a significant effect on the consumption of energy resources; that the market alone could not meet all the economic, environmental and social objectives of a sustainable energy policy; and that Government and the regulators would need to set the framework for companies.

1.34 The Round Table's 1999 Annual Report lists the following objectives:

- to maintain a competitive market for energy and energy products
- to ensure that the needs of all consumers are met efficiently
- to protect the needs and interests of all consumers, particularly vulnerable sections of the community
- to minimise any risk to the health and safety of the population, through the supply and use of energy
- to ensure the continued availability of long-term energy resources
- to minimise the use of resources in the production of energy
- to minimise emissions of greenhouse gases and pollutants during production and consumption, and to meet internationally agreed standards
- to ensure that the energy sector does not impact adversely on priority species, habitats and sites, and to minimise the impact on landscape.

Definitions of sustainable development

Sustainable development has been defined in a number of different ways. For example, the most famous definition describes sustainable development as: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'[25]

Another commentator explains that: 'If sustainability means anything, it must require that something be conserved for the very long run. It is very important to understand what that something is. I think it has to be a generalised capacity to produce economic well being.'[26]

Economic aspects of sustainable development

The IPCC stresses that: 'although sustainable development began as an ethical principle, it is at the same time an economic concept, focussing on two issues:

intertemporal equity

capital accumulation and substitutability.'[27]

Intertemporal equity

This idea is based on the requirement that future generations be at least as well off as current generations. Any environmental degradation should be offset by increases in capital stock to ensure future generations at least the same standard of living. Therefore sustainable development does not preclude the use of exhaustible natural resources, but requires that any use be appropriately offset. In practice, this requires calculations as to what is needed to 'offset' the resources.

Capital accumulation and substitutability

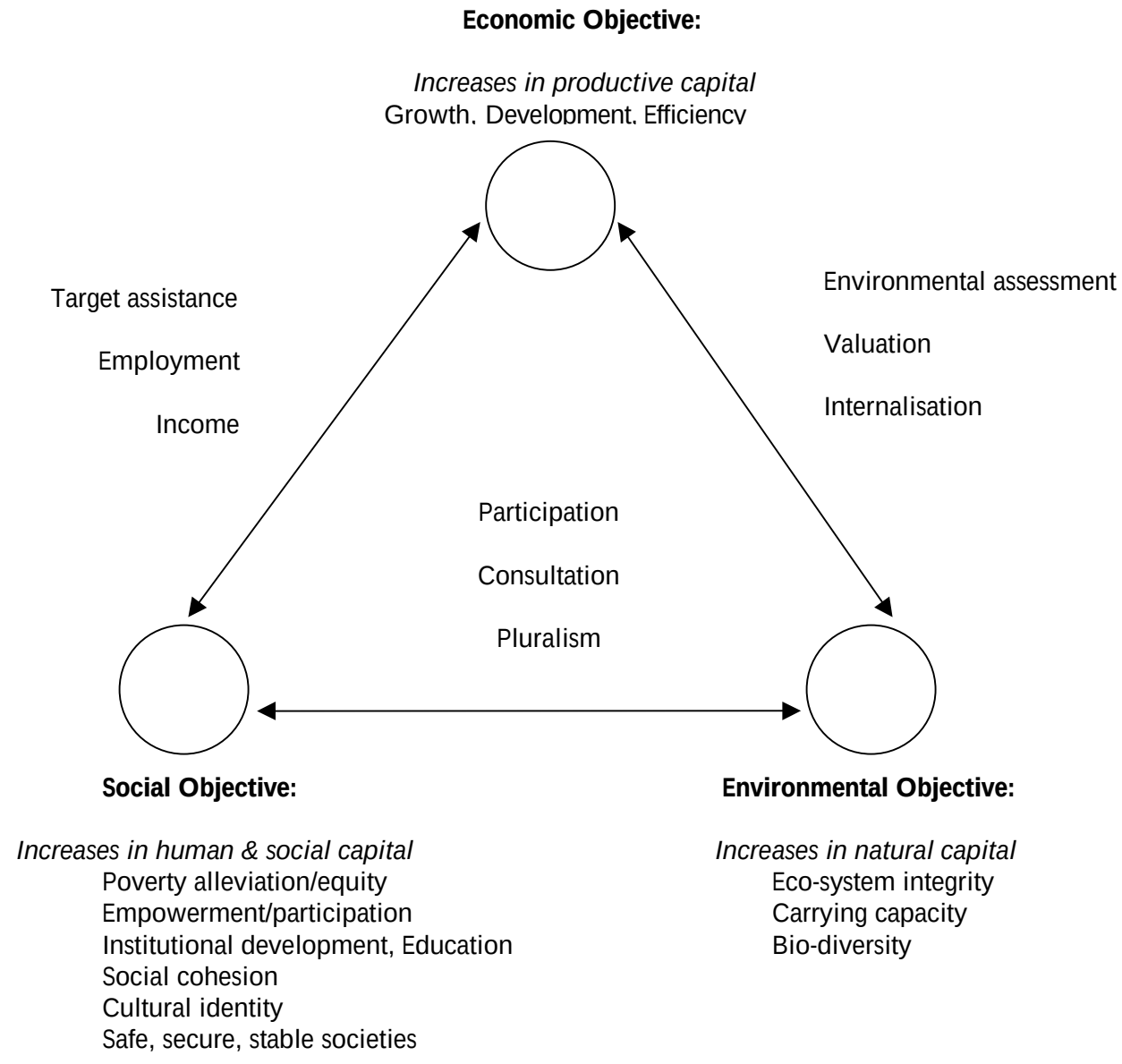
This concept is based on the question of how far technology, skills and capital equipment can substitute for a decline in exhaustible resource stocks. Many economists believe that substitutes exist for all resources, and that no single resource is indispensable.

[25] Bruntland, 1987

'Strong' versus 'weak' sustainability

Commentators make the distinction between 'strong' sustainability which requires that a part of any natural capital, being irreplaceable, should be retained, and 'weak' sustainability which allows for any depletion of natural capital to be offset by other forms of natural capital.

The sustainable development nexus[28]



[26] Solow, 1992
[27] International Panel of Climate Change (IPCC), 1995 Report
[28] Adapted from Munasinghe, 1993; Khan, 1995 & Serageldin and Steer, 1994

Appendix 2 Key organisations in environmental policy

2.1 Detailed below are the organisations which have key roles in defining and implementing national environmental policy, and in raising awareness of important issues. The list includes Government departments and the devolved assemblies, as well as non-departmental Government bodies such as the Environment Agency (EA), the Health and Safety Executive (HSE) and the other industry regulators. The list does not include the gas and electricity companies themselves. Their role and obligations in relation to the environment are covered in detail in Section 4-6.

The Treasury

2.2 The Treasury is responsible for fiscal measures. The Treasury sets the rate of VAT, which affects the price of fuel and goods such as insulation materials and energy efficiency equipment. The Treasury is also responsible for the fund for capital allowance schemes for energy efficiency measures under the climate change programme. Firms investing in energy saving measures could benefit from the introduction of capital allowances.

2.3 The Treasury had a role in the design of the Climate Change Levy, for example the decision to make the levy fiscally neutral by reducing employers' National Insurance Contributions. It will also have a role in the collection and implementation of the Levy.

Department of the Environment, Transport and the Regions (DETR)

2.4 The stated aim of the Department of Environment, Transport and the Regions is: 'to improve the quality of life by promoting sustainable development at home and abroad, fostering economic prosperity and supporting local democracy'. The Department is split into Groups, one of which, the Environmental Protection Group, is mainly responsible for developing environmental policy. Its main policy areas are climate change and sustainable development. The Group sponsors the Energy Saving Trust, the Advisory Committee on Business in the Environment, the Government Panel on Sustainable Development and the UK Round Table on Sustainable Development.

2.5 The Round Table was established in January 1995. Its aim was to encourage discussion on major sustainable development issues and to build consensus between people who have different perspectives and responsibilities. The Government issues objectives to the

Round Table, which includes members from all parts of the United Kingdom representing various industry sectors.

2.6 The Round Table and Panel are shortly to be subsumed into a new Sustainable Development Commission, announced in the White Paper *A Better Quality of Life: A Strategy for Sustainable Development for the UK* (May 1999)[29]. The purpose of the new Commission will be to monitor progress towards sustainable development. Specific monitoring will result in recommendations, actions and indicators. Output from the Commission will be in the form of interactive advice and encouragement. The Commission was established on 21 July 2000.

2.7 Within the Group, the Environment and International Directorate is responsible for the protection and improvement of air quality and co-ordinating the domestic climate change programme. A Draft Climate Change Programme was published in March 2000. This document includes a target for increased output from CHP. Following the announcement of the Climate Change Levy DETR has had a role in negotiating agreements with industry on energy efficiency. In July 2000 DETR published a paper *CHP to 2010 – A new Strategy for Combined Heat and Power* which sets out regulatory, fiscal and other measures to encourage the uptake of CHP. The paper includes details of the proposed arrangements for exemption from the Climate Change Levy of good quality CHP. DETR also issues guidelines to companies for reporting greenhouse gas emissions.

2.8 Also within the Group, the Environment Protection Strategy Directorate looks across the Government's environmental policies as a whole and is responsible for promoting sustainable development. The principal policy document - *A Better Quality of Life: A Strategy for Sustainable Development for the UK* promotes "a better quality of life for everyone, now and for generations to come."

2.9 From April 2002 the Department will have responsibility for Energy Efficiency Standards of Performance (to be known in future as the Energy Efficiency Commitment). Further details of the Energy Efficiency Standards of Performance (EESoP1-3) are contained in Section 6. Ofgem will continue to work closely with DETR in administering future energy efficiency programmes.

[29] CM4345

2.10 The Water and Land Directorate works closely with the Environment Agency and Ofwat. The Drinking Water Inspectorate's role is to ensure supply companies supply water that is safe to drink and meets the standards set in the Water Quality Regulations.

2.11 Within the Planning, Roads and Local Transport Group the Planning Directorate is responsible for the system of town and country planning which regulates land use and development. The aim is to create a fair and efficient system that respects regional differences and promotes high quality, sustainable development. To achieve this, the Directorate prepares national planning policy guidance, comments on regional guidance and advises on specific significant planning cases. Within the Strategy & Corporate Services Group the Central Strategy Directorate sponsors the HSCE.

2.12 Another policy objective is to reduce disruption from street works carried out by the utilities. Utility companies have statutory rights of access to public roads in order to install or maintain their equipment. However, this can cause considerable inconvenience to road users. The Government is therefore keen to reduce disruption by implementing fully s 74 of the New Roads and Street Works Act 1991. This would mean that companies would be charged for occupying the road for longer than the agreed period.

Department of Trade and Industry (DTI)

2.13 The DTI's overall aim is: 'to increase competitiveness and scientific excellence in order to generate higher levels of sustainable growth and productivity in a modern economy'. The Department works to ensure the provision of safe, secure, diverse and sustainable supplies of energy at competitive prices. This involves reviewing energy sources in the UK and includes the promotion of renewable resources. The Department also produces an annual UK Energy Report giving details of energy production, consumption and prices in the UK.

2.14 The DTI has a role in planning policy including issuing regulations for the consent for the construction of generating stations and overhead lines (s 36-37 Electricity Act 1989). DTI has recently issued a Consultation Paper and Guidance on The Electricity Works (Assessment of Environmental Effects) Regulations. The Regulations implement EC Directive (97/11/EC). Ofgem has no role in issuing planning permission although the DETR and Local Authorities both have responsibilities.

2.15 The DTI has a major role in promoting renewable sources of electricity. The Utilities Act will confer the necessary powers on the Government to put in place the new arrangements for encouraging electricity generated from renewable sources. Ofgem monitor compliance with these arrangements, in accordance with the Act and subsequent Statutory Instruments. International energy technology is handled by the European Energy Policy and Consents Directorate. The DTI will also be responsible for monitoring the Guidance on social and environmental issues which the Government will issue to Ofgem.

2.16 The DTI has an Energy Advisory Panel which makes recommendations on various aspects of energy policy. For example, the Panel has suggested that Ofgem's Environmental Action Plan might set out the reductions CO_2 expected to be achieved from the various measures (Energy Efficiency Commitment, renewables obligations, CHP etc). Progress reports from companies could measure the CO_2 reductions secured, compared with the Plan. On charges and tariffs, the Panel has concluded that in Great Britain it would not be appropriate to base tariffs on lower prices for low consumption levels.

Devolved Parliaments

2.17 The National Assembly for Wales, the Scottish Executive and the Northern Ireland Assembly now have direct responsibility for certain policy issues, including the environment. The Devolved Parliaments are all committed to tackling climate change. The Draft Climate Change Programme covers their geographical areas.

Green Ministers

2.18 The 1990 White Paper, *'This common inheritance'*, suggested the concept of having a Green Minister in each Government Department to ensure that environmental and sustainability issues are fully integrated into the policy-making procedure. Green Ministers would also be responsible for 'greening' operations, for ensuring that Government buildings are managed efficiently, and for improving the environmental performance of Departments. In the words of the Prime Minister:

2.19 'We must make the process of Government 'green'. Environmental considerations must be integrated into all our decisions, regardless of the sector and must be in at the start, not bolted on later.'[30]

Local Authorities

2.20 Local Authorities are responsible for a range of services including planning at a regional and local level, as well as for environmental health. Local Authorities are also responsible for implementation of the *Local Agenda 21* sustainable development initiative.

2.21 The Home Energy Conservation Act 1995 requires energy conservation authorities to produce reports on strategies to improve energy efficiency in their areas by 30 per cent over a 10-15 year period.

2.22 Local Authorities also have responsibilities for identifying contaminated land sites in their areas and enforcement of remediation work where necessary. Under the Waste Strategy 2000 document the Government has set recycling targets for councils to recycle or compost 25 per cent of household rubbish by 2005; 30 per cent by 2010 and 33 per cent by 2015.

2.23 Many Local Authorities are very active in environmental matters, for example in areas such as CHP and green and ethical purchasing policies. Local Authorities can also maximise the benefits of environmental education, both in schools and adult education. Some Local Authorities are active in local air pollution monitoring and the management of Pollution Action Zones. Responsibilities also include the local protection of wildlife, habitats and green space and the protection of local heritage, listed buildings and trees.

HM Customs and Excise

2.24 HM Customs & Excise is managed by a Board of Commissioners who are responsible for the collection, care and management of customs duties, excise duties, value added tax, insurance premium tax and landfill tax.

2.25 HM Customs and Excise will be responsible for setting and collecting the Climate Change Levy from electricity suppliers, once this comes into force. Ofgem will be

[30] At the United Nations General Assembly in July 1997.

responsible for accrediting and auditing exemptions from the Levy for qualifying renewables.

Environment Agency

2.26 The Environment Agency (EA) is a non-Departmental public body accountable to Ministers. The vision of the Agency is: 'a better environment in England and Wales for present and future generations'. The role of the agency is defined in the Environment Act, 1995. It is: 'to protect or enhance the environment, taken as a whole, in order to play its part in attaining the objective of sustaining development'. One of the key responsibilities of the agency is to enforce the Integrated Pollution Prevention Control Directive. The Agency has produced guidance on its contribution to sustainable development and has written an Environmental Strategy document. These are currently under review as part of a comprehensive review of the Agency's activities and management.

2.27 The Environment Agency is also responsible for setting emission levels for power stations and has a regulatory function defined under the Environmental Protection Act 1990. The limits are designed to protect the environment from excessive emissions of sulphur dioxide, nitrogen oxides and particulate matter. The Agency's underlying approach is to ensure that best available techniques not involving excessive costs (BATNEEC) are used to prevent or minimise pollution to the environment as a whole.

The Scottish Environmental Protection Agency

2.28 The Scottish Environment Protection Agency (SEPA) is the body responsible for the protection of the environment in Scotland. SEPA became fully operational on 1 April 1996. SEPA's task is to protect the land, the air, the water, the core elements forming the fabric of the environment. It will do so in partnership with others and in a way which enables Scotland to sustain a strong and diverse economy.

Health and Safety Executive

2.29 The aim of the Health and Safety Executive (HSE) is 'to ensure that risks to people's health and safety from work activities are properly controlled'. The HSE has key functions under the Control of Major Accident Hazards (COMAH) 1999 and the Control of Substances Hazardous to Health (COSHH) 1999 legislation.

2.30 Part of the HSE's Nuclear Safety Directorate is HM Nuclear Installations Inspectorate (NII), which has statutory duties described in the Nuclear Installations Act 1965. A site cannot have nuclear plant on it unless the user has been granted a site licence by the HSE. NII has responsibilities in the regulation of radioactive waste management and decommissioning on nuclear licensed sites. NII consults the Environment Agency/Scottish Environmental Protection Agency to ensure that all regulatory requirements are met in a consistent manner.

2.31 HSE enforces safety legislation, for example removing nitrogen oxide from compressors. Ofgem approves and verifies capital expenditure under the price control regime for companies with targets to meet in this area.

2.32 One purpose of the Better Regulation & Environment Branch (BREB) of the HSE's Policy Unit is to ensure coherence in HSE's approach to Europe, the environment and quality regulation. BREB produces a six monthly HSE Environmental Bulletin.

Advertising Standards Authority

2.33 The Advertising Standards Authority (ASA) was established in 1962 'to make sure that non-broadcast advertisements appearing in the UK are legal, decent, honest and truthful'. The ASA achieves this by ensuring that British Codes of Advertising and Sales Promotion rules are followed by all those who prepare and publish advertisements.

2.34 The ASA takes action to investigate complaints that an advertisement is misleading or offensive. The majority of complaints received against utility companies concern misleading claims of price savings compared with competitors or the promotion of renewable energy tariffs. Ofgem is responsible for approving supply tariffs but this does not include vetting all promotional or advertising material for the tariff. Ofgem has taken the view that this is a role more appropriate for the ASA.

2.35 Complaints may also be sent to Trading Standards Officers in Local Authorities and, for those which result from independent television, to the Independent Television Commission.

Ofreg

2.36 The Office for the Regulation of Electricity & Gas in Northern Ireland (Ofreg) is an independent public body set up to monitor the electricity and natural gas industries in Northern Ireland. Ofreg is headed by the Director General of Electricity Supply and Director General of Gas for Northern Ireland. This discussion document applies to Great Britain only. However experience in Northern Ireland may be relevant, notwithstanding the fact that in Northern Ireland there is limited availability of mains gas and limited competition in electricity supply.

2.37 The DTI's Energy Advisory Panel has examined arrangements in Northern Ireland and assessed their transferability to Great Britain. The Panel has noted that, in view of the more competitive market structure in Great Britain, it might be less appropriate to oblige the many players to produce a CO_2 reduction strategy. However the Panel has suggested that it would be useful to ask them to describe each year what has been done (perhaps in a broadly common format) and to assess what more might be done with appropriate incentives, and in an appropriate framework. This would be part of the wider issue of securing common standards for reporting on environmental performance.

Other Regulators

2.38 The Office of Water Services (Ofwat) is a non-Ministerial Government Department statutorily independent of the DETR. Ofwat is financed by Parliament through licence fees received from the water and sewerage companies. Ofwat is responsible for economic regulation of the water industry, but environmental considerations obviously play a key part in this. In Scotland there is an Office for the Commissioner for Water Services.

2.39 The Competition Act 1998 seeks to ensure that the regulators act consistently in decision making. Regulators must also ensure that each case is dealt with by one body. The Directors General of Ofgem, Ofwat, the Office of Telecommunications (Oftel), the Office for the Rail Regulator (ORR) and Ofreg meet five times a year. There are also a number of working groups, including one on social and environmental affairs, which met for the first time in early June.

Gas & Electricity Consumers Groups

2.40 The Gas Consumers Council was set up in 1986. Its statutory duties and powers are laid down in the Gas Act 1986, and subsequently the Competition and Service (Utilities) Act 1992 and the Gas Act 1995.

2.41 The Electricity Consumers' Committees were set up under the Electricity Act 1989 to represent the interests of all electricity customers. They operate independently of both OFGEM and the electricity companies. Each Committee has a wide-ranging remit to pursue the interests of all electricity customers in its area and to consider how the needs of those customers can best be met.

2.42 A new organisation, the Gas and Electricity Consumer Council is being created by the Utilities Act and will replace the two bodies described above.

Energy Savings Trust

2.43 The Energy Saving Trust (EST) was set up following the Rio de Janeiro Earth Summit in 1992. EST's vision is to 'work through partnerships towards the sustainable and efficient use of energy'. EST is responsible for a range of activities, including DETR-funded activities (such as a national network of Energy Efficiency Advice Centres); and non-DETR funded activities (such as Energy Efficiency Partnership for Homes (EEP).

2.44 EST evaluates projects for the EESoP scheme and also runs a Green Futures accreditation programme for renewables. Ofgem works closely with the EST on the management of the EESoP programme and in the participation of working groups, such as EEP.

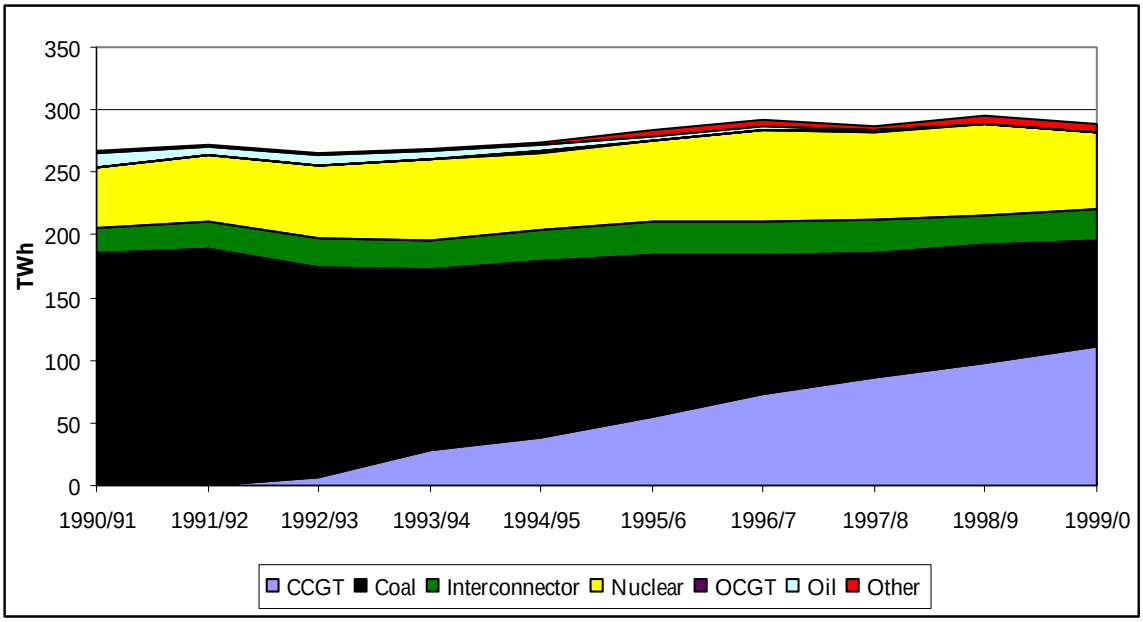
Appendix 3 Power station consents

3.1 Government policy on the generation of electricity takes into account the effect on the environment and diversity and security of supply. During the 1990s diversity increased with the introduction of Combined Cycle Gas Turbine stations (CCGT). In 1990/91 70 per cent of electricity was generated from coal fired stations, with nuclear contributing 18 per cent. By 1999/2000 electricity generated from coal fired stations had fallen to 29 per cent, with 21 per cent of electricity being generated from nuclear and 39 per cent from CCGT plant.

Fuel Output since vesting

Fuel Type	1990/1	1991/2	1992/3	19934	1994/5	1995/6	1996/7	1997/8	1998/9	1999/0
CCGT	0.00	0.26	2.28	10.77	13.87	19.15	24.83	30.22	33.09	38.22
Coal	69.52	68.87	63.66	53.54	51.39	45.78	38.36	34.29	32.21	29.35
Intercon-nector	7.62	8.49	8.73	8.58	9.21	9.27	9.34	9.24	7.87	8.87
Nuclear	17.85	19.04	21.78	23.64	22.60	22.97	24.65	24.64	24.66	21.01
OCGT	0.03	0.02	0.05	0.09	0.12	0.22	0.21	0.12	0.09	0.01
Oil	4.26	2.84	2.91	2.75	1.88	1.37	1.23	0.07	0.06	0.17
Other	0.72	0.49	0.60	0.63	0.93	1.23	1.38	1.41	2.01	2.37
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Financial Year Output (TWh)

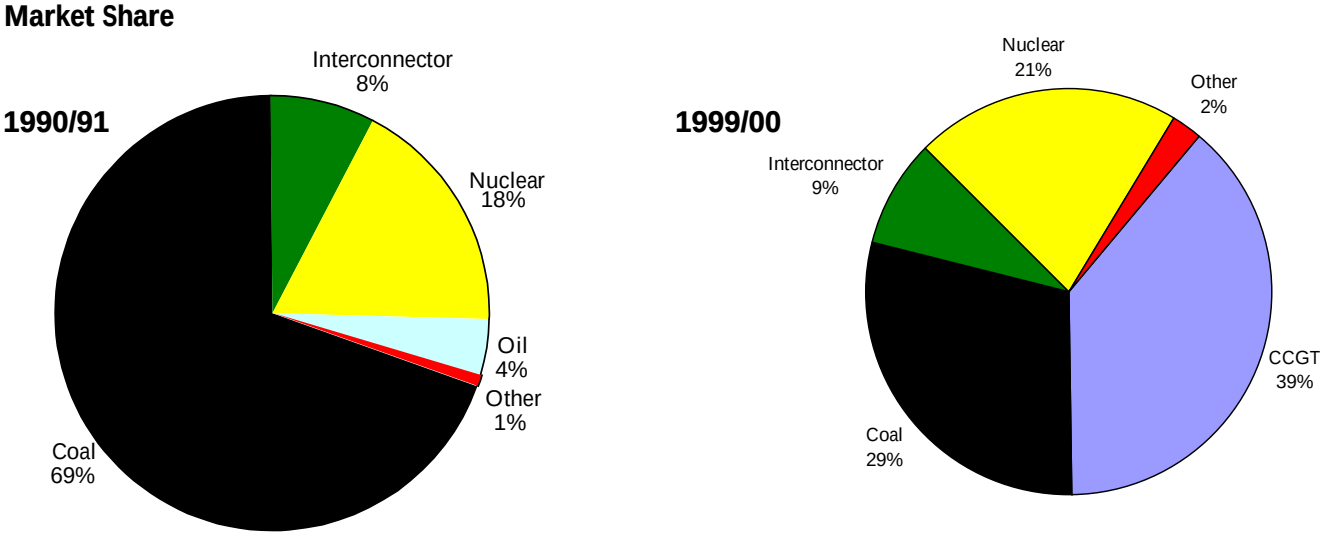


Since vesting (1990)

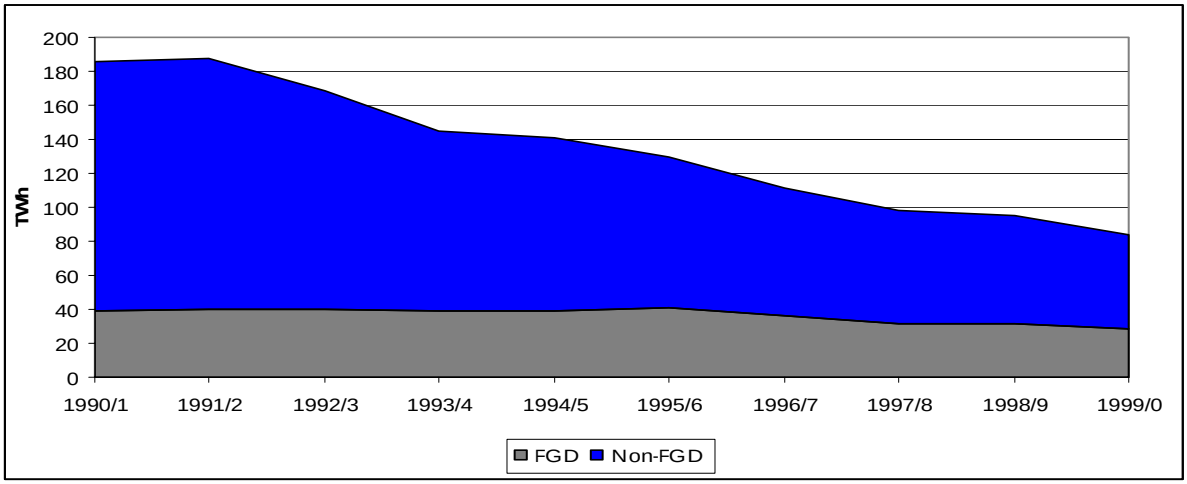
3.2 The above table displays the following trends in fuel output from 1990 - 2000:

- total system output increased 8 per cent
- the introduction of CCGT stations provided a valuable source of output, accounting for 112.2TWh of output during 1999/00 - the largest market share of the fuels
- output of coal stations fell 55 per cent
- output of the interconnector rose 26 per cent
- output of OCGT (Open Cycle Gas Turbine) stations fell 70 per cent
- output of oil stations fell 96 per cent
- the market share of coal stations fell 40 per cent since vesting – with CCGT gaining a 39 per cent market share
- the market share of nuclear fuel stations increased by 5 per cent since vesting
- the market share of oil fell 4 per cent since vesting.

Market Share



Coal – FGD's & Non FGD's



Fuel Output since 1990

3.3 In October 1998 the Government published its Conclusions of the Review of Energy Sources for power generation[31]. The review assessed medium and longer term scenarios for the development of generating capacity and sources of fuel supply for generation and considered the implications of high levels of dependence on any particular fuel, notably the growing dependence on gas. The Review was based on the Government's overriding energy policy objective of ensuring secure, diverse and sustainable supplies of energy at competitive prices, and took account of the objective of sustainable development (including the meeting of environmental targets). The focus of the Review was how these objectives could best be met in terms of the arrangements for electricity generation in Great Britain.

3.4 In the Review the Government emphasised its responsibility for ensuring that energy plays a proper role in sustainable development, for instance by ensuring that renewable energy sources, CHP and energy efficiency measures continue to be developed and that environmental considerations are taken into account. The Government also stressed its responsibility for ensuring that the framework, which it establishes, does not prejudice energy security and diversity. Here the Review found that security and diversity could be put at risk by the speed of introduction of new gas-fired generation, and that the rate of growth of gas-fired generation did not appear to be justified by the underlying economics but was due to a number of significant distortions in the operation of the

wholesale market for electricity (the Pool), and to inadequate competition, particularly in the coal fired generation sector. The distortions relate to the operating of the electricity Pool. Baseload generators (including gas fired and nuclear powered plant) in practice bid into the Pool at zero, or near zero, in the knowledge that in all likelihood they will receive the higher price set by the more flexible coal plant.

3.5 Arising from the Review the Government initiated a major programme of reform in the electricity market in conjunction with Ofgem. In view of the risk that in the interim fuel choice would be distorted and diversity and security of supply suffer, the Government introduced a stricter policy for power station consents, whereby new natural gas-fired generation is currently treated as generally inconsistent with the policy objectives of security and diversity.

3.6 The Review noted that it was not possible to quantify the impact of the new energy policy framework on emissions, but indicated that the new policy did not put at risk the achievement of the Government's environmental commitments, and was consistent with emissions from the electricity sector declining from 1997 levels. The Review noted that the impact of the new policy on CO_2 emissions, such as it was, had to be seen in the wider picture, not only of the overall approach to greenhouse gas emissions, but also of the Government's objective of secure, diverse and sustainable supplies of energy at competitive prices. In particular any CO_2 detriment had to be weighed against the benefits of the policy in terms of diversity and security of supplies and the resource use aspects of sustainable development.

3.7 This April the Government announced that the restrictions on the building of new gas fired power stations will be lifted, once new electricity trading arrangements come into effect. This decision was on the basis that Ofgem had been successful in already achieving the other reforms which the Government had indicated were necessary. The Government's announcement indicated that the lifting of the stricter consents policy will allow new gas stations that are genuinely competitive, including CHP, to contribute to greater energy efficiency and cut down on carbon emissions.

[31] Conclusions of The Review of Energy Sources for Power Generation and Government response to fourth and fifth

Legislative framework for power station consents

3.8 Proposals for new power stations and new overhead lines are subject to a system of statutory consent. Power stations over 50 MW are subject to the consent of the Secretary of State for Trade and Industry in England and Wales, under section 36 of the Electricity Act 1989. (In Scotland, this is a devolved matter.) Stations of 50 MW and below are subject to consent from local planning authorities under the normal planning regime. In addition, any power station proposal of 10 MW or more which is proposed to be fuelled by natural gas or oil has to seek clearance for the Secretary of State for Trade and Industry under section 14 of the Energy Act 1976. All higher voltage overhead line proposals must obtain development consent from the Secretary of State for Trade and Industry in England and Wales, under section 37 of the Electricity Act 1989. (In Scotland this is a devolved matter.)

3.9 Section 36 and 37 of the Electricity Act provide for the views of the local planning authority, the local community and statutory bodies such as the Environment Agency, Countryside Agency and English Nature to be brought into the decision-making process. All applications are sent to the local planning authority and if that authority objects the Secretary of State is obliged to call a public inquiry. Even if the local planning authority does not object, the Secretary of State has a discretionary power to call a public inquiry in the light of other views received.

3.10 In processing cases, DTI considers the environmental consequences of what is proposed. Most power station cases have a formal environmental impact assessment carried out. With overhead lines, the most significant projects have a formal environmental impact assessment. Even if a formal environmental impact assessment is not called for, in practice developers will carry out some form of environmental assessment. This can take the form of a more limited environmental report or, at a minimum, a statement on how the proposal complies with the company's amenity duty set out in Schedule 9 of the Electricity Act 1989. Recently the Department has gone to consultation on revising the environmental impact assessment requirements and is currently considering the responses.

3.11 In granting consent the Secretary of State will normally also give 'deemed' planning permission with a number of planning conditions attached to mitigate the impact of the

development in terms of noise, access, landscaping etc. These requirements will arise out of the consents process and often will be a condition of the local planning authority not objecting to the proposal.

3.12 The criteria for Section 36 and 37 cases are: their acceptability in energy policy terms; and whether there are planning/environmental grounds for refusing consent. With power stations the energy policy terms are set out in the October 1998 White Paper 'Conclusions of the Review on Energy sources for Power Generation ...'. On overhead lines the energy policy terms are that the companies have a statutory duty under the Electricity Act 1989 to develop and maintain efficient, co-ordinated and economical networks. On planning/environmental grounds the Department will take into account planning policy guidance, circulars, structural plans and local environmental issues.

3.13 Major current issues concern the timetable for the stricter consents policy on power stations to be relaxed and how this is to be handled in terms of the backlog of cases built up and new ones coming in.

Appendix 4 EU context

Overview of energy consumption

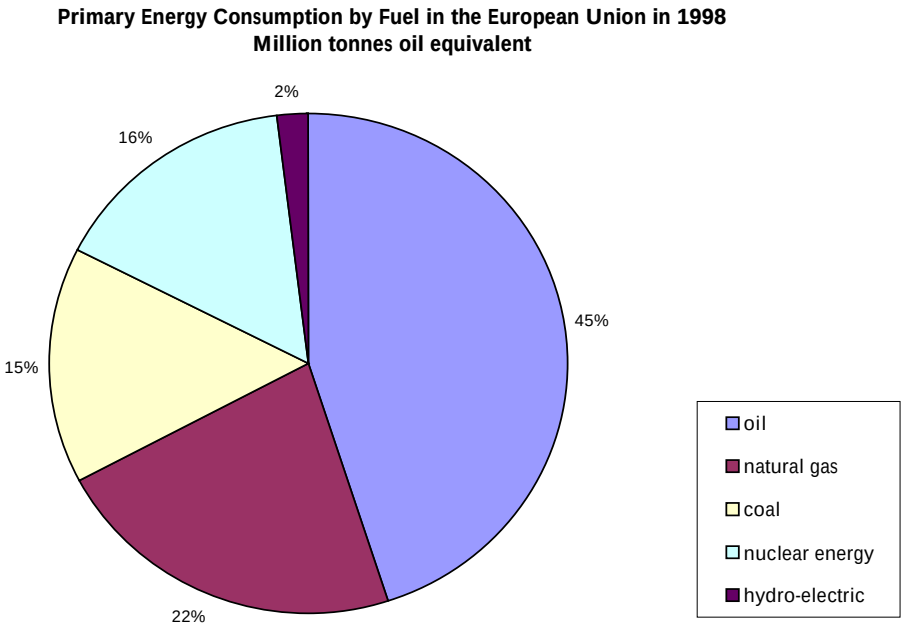
4.1 Coal, as the most abundant fossil fuel, continues to have an important role in the EU's energy industry, particularly in electricity generation[32]. Almost 20 per cent of the gross energy consumption in the EU comes from coal generated electricity, of which about 68 per cent is produced indigenously. The continued use of coal has implications for environmental policy. The use of clean technologies and improved combustion efficiencies are critical to its future use. Gas also has a crucial role with its increasing use in electricity generation and the environmental benefits when compared to fuels such as coal. The share of natural gas in the European Community is expected to rise to 24 per cent of total primary energy consumption by 2010. Oil and gas will provide more than 80 per cent of the expected increase in world and EU energy demand over the next 15 years.

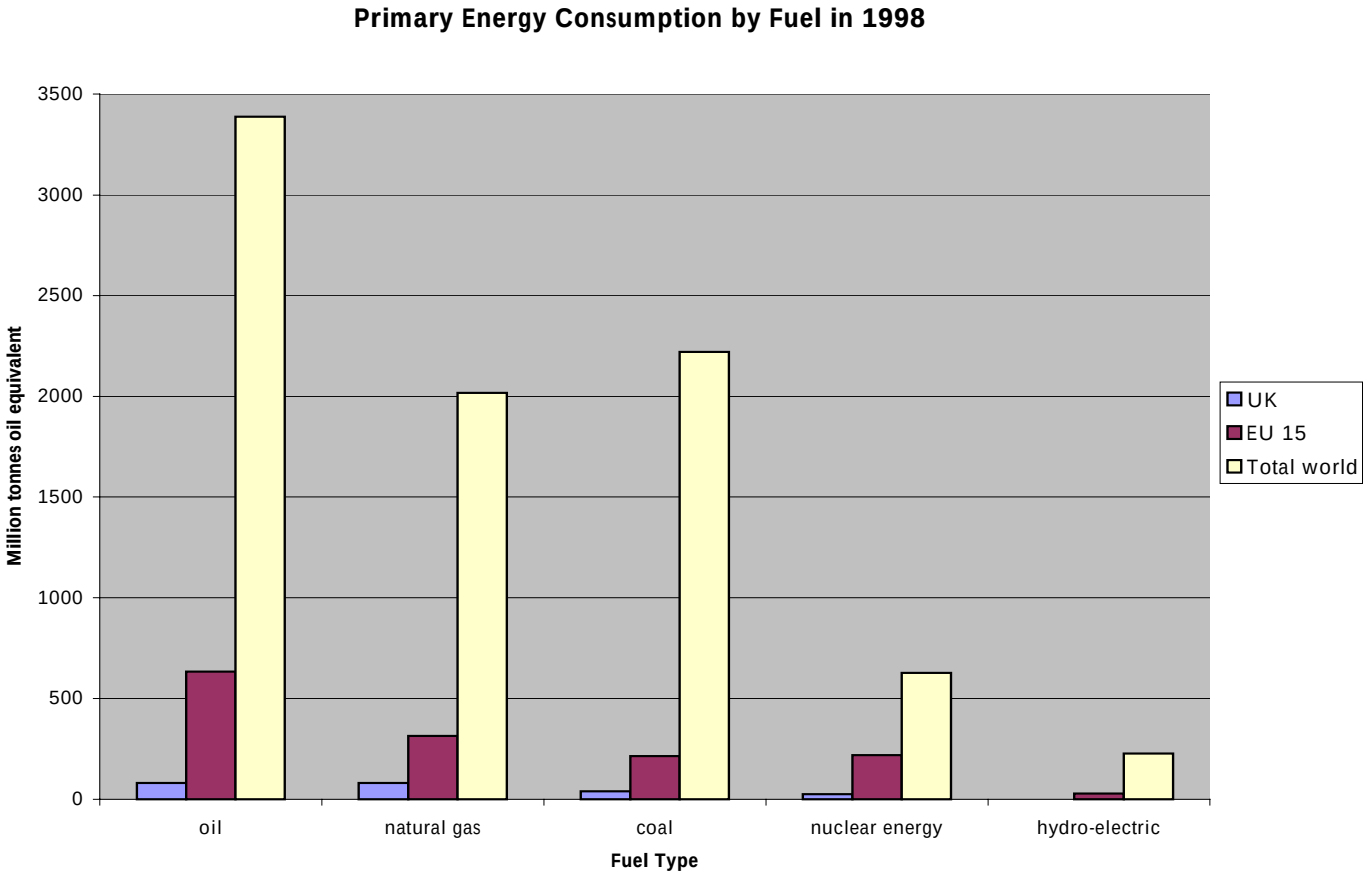
4.2 Nuclear production accounts for a larger proportion of electricity generation in the EU than in other areas of the world. Nuclear energy accounted for 16 per cent of total primary energy consumption in 1998[33]. The nuclear industry is also important because of the amount of employment it sustains.

4.3 In 1991 4 per cent of final energy consumption in the EC came from renewable energy sources. There is significant variation between countries, for example in the UK the figure is around 2 per cent while in Portugal it is 17 per cent.

4.4 The following diagrams display the primary energy consumption by fuel in the EU in 1998 and energy consumption in the UK, EU and world for 1998. Data is taken from the BP Amoco Statistical Review of World Energy, 1999.

[32] Source: Green Paper: 'For a European Union Energy Policy'
[33] BP Amoco Statistical Review of World Energy 1999


Primary Energy Consumption by Fuel in the European Union in 1998
Million tonnes oil equivalent
2%
16%
45%
15%
22%
oil
natural gas
coal
nuclear energy
hydro-electric


Primary Energy Consumption by Fuel in 1998
Million tonnes oil equivalent
3500
3000
2500
2000
1500
1000
500
0
oil
natural gas
coal
nuclear energy
hydro-electric
Fuel Type
UK
EU 15
Total world

Legal background

4.5 Energy has been a central competence of the European Union (EU) since the signing of the Treaty of Paris in 1951, establishing the European Coal and Steel Community (ECSC). This created a common market for coal and steel with common objectives and common institutions, and – very importantly - rules for the granting of state aid. This was followed, in 1957, by the signing of the Treaty of Rome which set up the European Atomic Energy Community (EAEC). The idea was to facilitate the development of a powerful nuclear industry by encouraging investments in Member States, and by periodically publishing indicative programmes reflecting this objective.

4.6 The Treaty of Rome also established the European Economic Community (EEC), the third of the 'European Communities'. The underlying rationale of the Treaties was that, by sharing control of the principal means of production, rearmament would be impossible, and thus future European wars would be avoided.

4.7 The ECSC and EAEC Treaties provided the basis for work in the energy field right up to 1974, following the first oil crisis, which prompted urgent calls for a more coherent energy policy. One of the key objectives was to be security of supply. By 1983 there were calls from the Member States for the setting of 'common energy objectives', stressing the need for co-ordination of national energy policies. And, in 1986, the Council adopted a series of horizontal and sectoral objectives designed to achieve a single market in energy, in line with the Single European Market.

4.8 The Treaty on European Union, signed in Maastricht in 1991, had an important impact on the energy sector in many different ways. Firstly, 'measures in the sphere of energy' were listed as legitimate activities for the Community in its guiding principles. The Treaty covered many other relevant areas, including the development of trans-European networks, commercial policy, research and development and consumer protection. Most importantly, the Treaty considerably boosted the chapter on environmental protection, first introduced in the Single European Act in 1986. After this time, EU documents on energy policy start to highlight the importance of making energy policy as environmentally friendly as possible, for instance by improving energy efficiency and by promoting electricity generated from renewable sources.

4.9 By 1 January 1993, the Single European Market was officially complete, with free movement of goods, services, people and capital throughout the EU. In fact, many

important elements of the internal market remained to be agreed and implemented, including the Directives relating to the liberalisation of the gas and electricity markets (see below).

4.10 In 1993, the Commission published a Green Paper, '*For a European Union Energy Policy*', setting out the framework for energy policy in the future. In the words of the Commission at the time: 'the energy sector is entering a period of far-reaching changes marked by increasing dependence on energy, by the constraints of environmental protection arising from rising energy consumption and by the geopolitical changes affecting both supplies to the Community and consumption patterns'. This was followed, in 1995, by a White Paper, '*An Energy Policy for the European Union*', on the basis of which annual work programmes are agreed.

The Directives

4.11 **The Electricity Market Directive**[34] aims to establish common rules for the production, transmission and distribution of electricity among the 15 Member States. The Directive was due to have been transposed into national legislation in the 15 Member States by 19 February 1999. In order to monitor progress on this, a Group of Member States has been set up and met twice in 1999. Several countries have requested transitional regimes. The Competition Directorate General is keen to encourage 'common approaches to effective regulatory control' among the Member States. Other initiatives linked to the Directive are:

- the development of principles for transmission pricing
- EU-wide dispute settlement and payment systems
- rules and guidelines on available transfer capacity
- a study into the employment implications of liberalisation
- modifications to the Price Transparency Directive.

4.12 A proposal for a **Directive on renewable sources of energy** has recently been adopted by the European Commission. The aim is to spearhead the promotion of renewables in the internal electricity market. The draft contains indicative targets for the percentage of generation to come from renewable sources in EU Member States, although it is not

clear that these will be accepted by Member States. The Commission is to publish monthly statistics on various aspects of energy in the EU, including market shares for the different forms of electricity generated from renewable sources in each Member State.

4.13 **The Gas Market Directive**[35] aims to allow eligible customers to choose their gas supplier and have access to systems within the EU. The deadline for the Directive to be transposed into national legislation is 10 August 2000 and the UK Government has recently passes the necessary legislative hurdles to meet this deadline.

4.14 The Directive allows for some leeway in transposition, and is not as prescriptive as the Electricity Markets Directive. A Group of Member States has also been set up to monitor implementation of the Gas Directive. The EU is currently exploring the alternative to a sectoral approach to reducing methane emissions.

Green Paper: For a European Union Energy Policy

4.15 In the Green Paper, the Commission set out the future energy objectives for the European Union as follows:

- overall competitiveness
- security of supply
- the environment.

4.16 The Commission admitted that the different objectives were pulling in different directions and could conflict: 'Energy policy requires a continual balance between the sometimes contradictory objectives of competitiveness, security of supply and environmental protection.'

4.17 According to the Green Paper, sustainable, non-inflationary growth respecting the environment is one of the Community's principle objectives. Synergies between the objectives of competitiveness, energy security and environmental protection need to be developed; and, in the case of conflicts between objectives, flanking measures need to be devised. The Green Paper also recommends:

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[34] (96/92/EC)
[35] (98/30/EC)

- the internalisation of external costs is central to energy and environmental policy
- the integration of the environment into energy policy is to be pursued through standards for products and processes, emission limits, fiscal incentives/charges, voluntary agreements, civil liability, etc. with cost effectiveness and co-responsibility as major criteria for determining the role of the various instruments
- the fostering of markets for energy efficiency offering business opportunities
- the putting in place of a robust long-term energy strategy, taking these issues into account, is required in case the current preoccupations concerning global warming are confirmed
- the fostering of new technologies which will have an important role in achieving all aspects of Community energy
- the integration of various aspects of energy policy, particularly security of supply and environmental protection.

White Paper: An Energy Policy for the European Union

4.18 The White Paper details the mechanisms for implementing the European Union's energy policy, as described in the Green Paper. These include:

- integration of the market
- management of the external dependency
- promotion of sustainable development
- support of energy research and technology.

Energy Action Plan

4.19 The first full overview of the EU's energy policy resulted in the decision of April 1997 to make Community policy more transparent. "*An Overall View of Energy Policy and Actions*"[36] also restates the three strategic energy challenges facing the EU:

- the external energy dependency of the EU is currently 50 per cent, and is likely to increase to between 70 per cent and 90 per cent for natural gas, coal and oil[37]
- competition needs to be encouraged to lower prices: European manufacturers pay far more for their energy than those in the US, up to 45 per cent for some sectors
- in response to the Kyoto Summit of December 1997, the EU has set a legally binding target to reduce the main emissions of greenhouse gases by 15 per cent by 2010.

4.20 An overview of EU Actions outlined in the document is listed below:

- *Ensure security of supply and international energy co-operation and diversification of energy supply* – boost relations with supplier countries, aid co-operation and technical assistance programmes, take account of EU priorities and international co-operation, and prepare the accession of new states.
- *Integrate energy markets* – contributing to social and economic cohesion and the finance of energy investments
- *Promote sustainable development in the energy field* – efficient use of resources, promoting new and renewable energy and compatibility between environmental and energy objectives.
- *Promote energy research and technological developments* – including dissemination of energy technology and nuclear research.

[36] (Document COM(97) 167 final)
[37] Figures based on those in: *European Energy to 2020: A Scenario Approach,* EC, spring 1996.

Framework programme

4.21 The EU's 1998 - 2002 *Energy Framework Programme* (EFP)[38] is aimed at rationalising the range of individual energy R&D programmes. The programme is implemented in the UK through the DTI and DETR. These programmes are predominately driven by the need to reduce CO_2 emissions, and aim to promote energy efficiency measures and renewable energy sources to help limit other pollutants such as SO_2, NOX and tropospheric ozone.

4.22 **SAVE** stands for Strategic Action for Vigorous Energy Efficiency. Launched in 1991, this Programme had two aims, firstly to contribute to stabilising CO_2 emissions and, secondly, it aimed to achieve a 20 per cent energy efficiency improvement by 1995. The follow-up SAVE II was later launched in May 1995. This expanded on the scope of the previous Programme with the inclusion of improvements to energy management at a regional and urban level.

4.23 **ALTENER** is the EU non-technological programme aimed at promoting the use of renewable energy sources within the EU. Its actions are specifically designed to overcome non-technological barriers, to accelerate market penetration of renewable energy sources, and to encourage public and private investments in the production and use of energy from renewable energy sources.

4.24 **SYNERGY** is the European Commission's international co-operation programme with non-EU countries designed to encourage the formulation and implementation of energy policy for third countries, promotion of industrial co-operation between the EU and third countries, and closer co-ordination of the EU's external activities in the energy field.

4.25 **CARNOT** seeks to promote the use of European solid fuel technologies, especially clean coal technologies, in which the UK and European industry has great expertise. It aims to foster industrial strategic co-operation, including the promotion of exports of European technology.

4.26 **ETAP** is a programme of studies, analyses, forecasts and related work concerning the future development of energy policy within the EU. Other components of the programme are related to security of energy supply; competitiveness and completion of the internal energy market; and the integration of the environment into energy policy analyses.

4.27 **SURE** is a programme used to review and, if necessary, harmonise safety practice in the transport of radioactive materials in the EU, and to help to establish an effective and reliable system of safeguards through co-operation measures and promote industrial co-operation and co-operation between regulatory bodies within the relevant countries.

State aids, energy and the environment

4.28 The European Commission's Community Competition Policy aims to help strengthen the competitiveness of European industry and create conditions for markets to function well[39]. State aid available for industry, is designed not to distort this competition policy without compromising efficiency. Aid granted to the manufacturing sector has principal objectives to be included: research and development, small and medium sized enterprises, trade, restructuring, energy savings and the environment. Aid can come in a number of forms, including providing tax exemptions and grants. Such aid can then be an incentive to adopt modern technologies such as using renewable energy and energy efficiency.

European Union environment policy

Legal background

4.29 The EU first started to develop an environmental policy in the 1970s in recognition of the fact that the environment 'knows no boundaries'. A range of early Directives focused on the testing and labelling of dangerous chemicals, improving the quality of drinking-water and surface-water, and controlling air pollutants such as SO_2, NOx and particulates from power plants and motor vehicles. The EU, since its inception, had been committed to improving the living and working conditions of its citizens, and the quality of the environment came to be seen as fundamental to this.

4.30 The Single European Act, in 1986, formally introduced environmental protection into the Treaty for the first time, identifying three objectives:

- preserving, protecting and improving the quality of the environment
- protecting human health

[38] 1998-2002 *Energy Framework Programme* COM(97)550).
[39] Eighth Survey on State Aid in the European Union, April 2000 (COM(2000) 205)

- promoting the prudent and rational use of natural resources.

To these, a fourth was later added:

- promoting measures at an international level to deal with regional or worldwide environmental problems.

4.31 The Treaty on European Union, agreed in 1991, formally introduced the concept of sustainable development into EU law, and by 1997 this had been boosted even further by a new Article which states that:

'environmental protection requirements must be integrated into the definition and implementation of the Community policies and activities referred to in Article 3, in particular with a view to promoting sustainable development'.

4.32 Articles 174 - 176 of the consolidated Treaty deal with the environment. Article 174 states that EU policy on the environment 'shall aim at a high level of protection'. The policy should be based on: 'the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay'.

4.33 Whereas most environmental legislation can be adopted by means of a qualified majority, 'measures significantly affecting a Member State's choice between different energy sources and the general structure of its energy supply' must be taken unanimously.

European Environment Agency

4.34 The European Environment Agency aims to 'support sustainable development and to help achieve significant and measurable improvement in Europe's environment through the provision of timely, targeted, relevant and reliable information to policy making agents and the public'. The Agency helps the European Union in its policies of environmental improvement and sustainability.

Trans-European Networks

4.35 Trans-European Networks (TENs) are major, trans-European infrastructure projects funded by the EU. The aim of supporting the transport, telecommunications and energy

infrastructure projects is to improve EU competitiveness and to increase employment. An annual budget of around 30 million Euros is available for funding energy projects.

4.36 The projects should promote interconnection and interoperability of national networks as well as access to such networks; and take account of the need to link island, landlocked and peripheral regions with the central regions of the EU. In selecting projects for funding under the TENs programme, the EU takes account of various criteria, including the likely environmental consequences of the project. In energy, the principal aim of the programme is to boost the main transportation networks for electricity and natural gas. Distribution networks are not covered.

4.37 In electricity the projects are aimed at:

- high voltage lines
- submarine links
- protection, monitoring and control systems

4.38 In gas, the projects are aimed at:

- high pressure gas pipelines
- underground storage facilities
- reception, storage and regasification facilities for liquefied natural gas (LNG)
- protection, monitoring and control systems.

4.39 Electricity projects currently underway affecting the UK include:

- connection by submarine cable of Northern Ireland to Scotland
- connection by submarine cable of the Isle of Man
- strengthening of connections between Ireland and Northern Ireland
- connection by submarine cable between South East England and Central Netherlands

4.40 Gas projects currently underway affecting the UK include:

- connection between the gas networks of Ireland and the United Kingdom

- submarine connection between the gas networks of the United Kingdom and the continent through Belgium.

Regional Development (Agenda 2000)

4.41 Funding provided through grants must take into account environmental protection and improvement. The EU is an important source of funding for Member States. The Structural and Cohesion Funds are to be used for development plans which concentrate on principals, including boosting the competitiveness of regional economies in order to create sustainable employment. In order to achieve this principal energy efficiency and renewable energy sources are included in a list for consideration.

European Energy Charter Treaty

4.42 In February 1991 the Commission proposed the concept of a European Energy Charter which was originally designed to aid economic recovery in eastern Europe and the then Union of Soviet Socialist Republics could be catalysed and accelerated by co-operation in the energy sector. The Energy Charter Treaty, 1995, aims to promote east-west industrial co-operation by providing legal safeguards in areas such as investment, transit and trade. It also began negotiations on Protocols in the fields of energy efficiency, nuclear safety and hydrocarbons, although in the last case negotiations were later suspended until completion of the Energy.

Appendix 5 Summary of the Royal Commission report *Energy – the changing climate*

5.1 In August 1997 the Royal Commission on Environmental Pollution announced that it intended to review energy prospects for the 21st Century and their environmental implications. In September 1998 it said its main focus would be the implications of considerably reducing the use of fossil fuels as an energy source in the UK by 2050, or even phasing them out completely.

5.2 One of the key conclusions of the report is that the UK should plan for a reduction of 60 per cent over the next 50 years in the amounts of carbon dioxide it produces by burning fossil fuels. The report explores what this would mean for industry and ordinary households, and how Government policies would need to change.

5.3 The Royal Commission's report makes 87 recommendations. Many of them are addressed to the devolved administrations in Scotland, Wales and Northern Ireland as well as to the Government at Westminster. Of the 19 key recommendations the two with particular relevance to the scope of the Environmental Action Plan are listed below:

- Absolute reductions in energy demand and a large deployment of alternative energy sources will be needed if the UK is to make deep and sustained cuts in carbon dioxide emissions while protecting its environment and quality of life. Longer-term targets should be set for expanding the contribution from renewable sources well beyond 10 per cent of electricity supplies to cover a much larger share of primary energy demand. A range of targets should be developed for raising energy efficiency in all sectors of the economy. A central policy objective must be a very large reduction in demand for energy for heating and cooling, achieved through much more sophisticated management of heat and much wider use of combined heat and power schemes for industrial, commercial and domestic markets. The resulting heat networks, supplied initially by fossil fuels, could ultimately obtain heat from energy crops and electrically powered heat pumps.

- [The Commission] recommend that the Government should take the lead in a fundamental review of how electricity networks can best be financed, managed

and regulated in order to stimulate and accommodate large contributions to energy supplies from combined heat and power plants and renewable sources, while maintaining reliability and quality of supplies.

5.4 The report highlights that despite the enormous potential of renewable energy sources in the UK, there has been slow progress in increasing the UK's supply of energy from non-fossil fuel and non- nuclear sources. The report recommends that Government policies should continue to be based on facilitating and stimulating the emergence of new technologies and reducing their environmental impacts. The report recommends that a carbon tax would help renewable energy sources compete with fossil fuels.

5.5 While providing guarantees and subsidies for the proven renewable technologies (those closest to providing energy at market prices) the report highlights the need for research and development into the less developed technologies that offer great potential. Due to the constraints of the land use planning system the report calls for a more strategic approach to selecting sites.

5.6 The report recommends that regulatory and planning policies should encourage the widest possible adoption of combined heat and power technology in urban locations to provide heat. Although reinforcing the use of a fossil fuel the report recommends that gas-fired CHP plant will reduce carbon dioxide emissions by making more efficient use of the energy.

5.7 The report stated that the relatively small size of renewable energy plants generating electricity and local CHP plants does not fit easily with an electricity distribution and transmission network based on massive generators and highly centralised control. The national grid and the regional distribution systems need to become more favourable to small generators and regulatory policies need to promote and not inhibit this development. The report states that the Government must stimulate research into solving the problems that large-scale intermittency and embedded generation would pose to the electricity supply system as a matter of urgency.

Appendix 6 Climate change

The 'greenhouse effect'

6.1 The Greenhouse Effect is that by which an extra warming of the surface and the lower atmosphere is produced, leading to disturbances in the geosphere / biosphere system and in the mean sea level. It is caused by an increase in the concentration of greenhouse gases. As a result, additional infrared radiation, which otherwise would have been lost to space, is absorbed in the lower atmosphere, and the earth's radiation balance is upset. This energy is re-emitted in all directions, a large proportion being sent back to the earth's surface. This yields a radiative imbalance, which can be restored only through the warming of the troposphere. Without the natural greenhouse effect, the earth would be over 30ºC cooler and would be too cold to be habitable.

Greenhouse gases

6.2 Atmospheric 'greenhouse gases' include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20) and chlorofluorocarbons (CFCs and HCFCs), together with ozone and water vapour. The amount of greenhouse gases in the atmosphere has increased since pre-industrial times by an amount that is equivalent to about a 50 per cent increase in CO_2[40].

6.3 The Intergovernmental Panel on Climate Change (IPCC), which carried out two important assessments in 1990 and 1995, predict an effective doubling of greenhouse gas concentrations (as measured in CO_2 equivalents) between 1990 and 2030. (The IPCC is currently working on a Third Assessment, to be published in 2001.)

Global warming

6.4 This enhancement of the concentration of greenhouse gases is now believed to be the result of human activities which have increased the natural greenhouse effect, causing 'global warming'. In the 20th Century, the global mean temperature rose by about 0.6°, and, at current rates, will continue rising by around 3° over the next 100 years. (By contrast, the global mean temperature during the Ice Age was only 5° colder than

[40] The term 'CO2 equivalent' is often used to measure changes in the total amount of greenhouse gases that are radiatively equivalent to an increase in CO2.

today.) The term 'climate change' is normally used to refer exclusively to changes in temperature brought about by human activities[41].

Carbon dioxide emissions

6.5 It is estimated that human exploitation of the world's natural resources – primarily fossil fuels (coal, oil and natural gas) – result in the release each year of over 20,000 million tonnes of CO_2 into the atmosphere. This is equal to an increase of 25 per cent in CO_2 emissions since 1750, pre-industrialisation: from 280 parts per million by volume (ppmv) then to around 370 ppmv now. Emissions are now estimated to be increasing by about 0.4 per cent per year.

6.6 Burning fossil fuels has contributed to four fifths of the extra CO_2 emissions, with the rest coming from the manufacture of cement, deforestation and other changes in land use.

Methane emissions

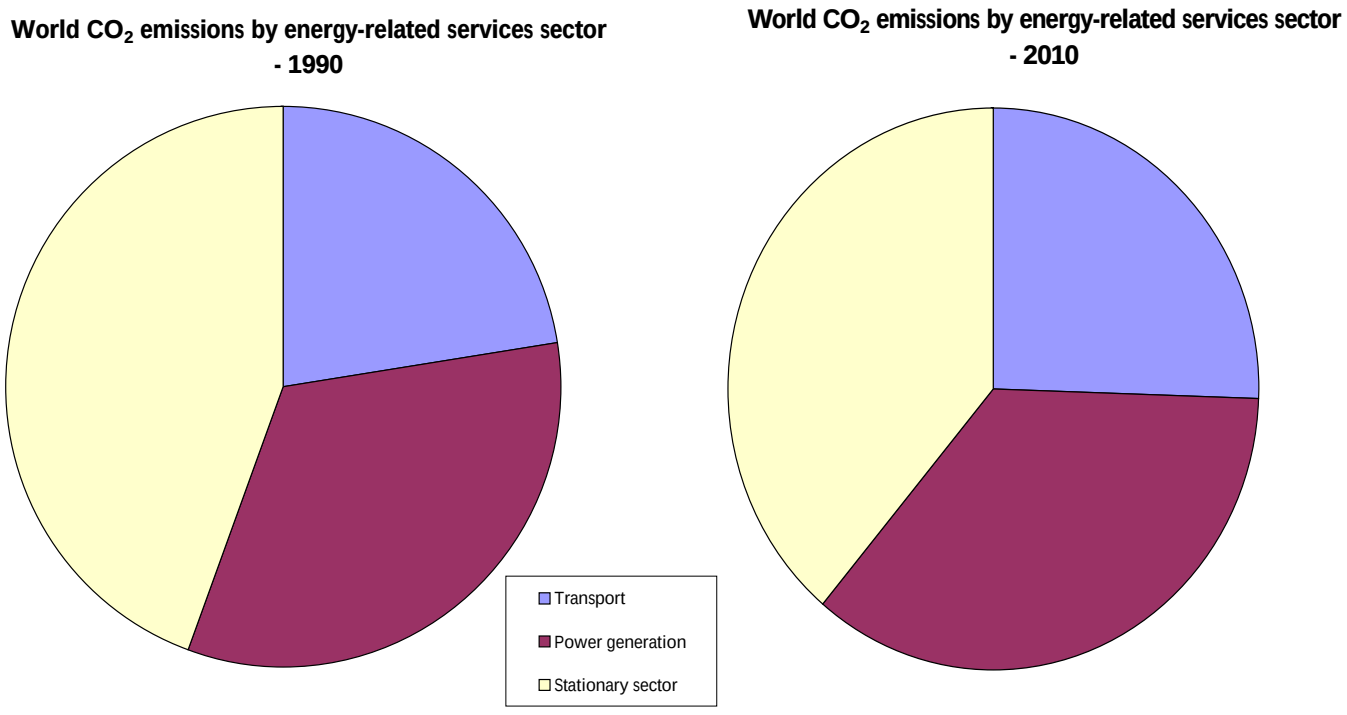
6.7 Methane, nitrous oxide and chlorofluorocarbons, are also being released as a result of human activities. The concentration of methane has more than doubled over the past 200 years: a large proportion of methane emissions are the result of land use, but around 28 per cent is thought to be associated with fossil fuel extraction (through leakage from coal mines, gas pipelines and oil wells). Around 10 per cent is thought to come from landfill sites.

[41] This was the definition used in the UNFCCC and now widely adopted. Scientists still tend to use the term to refer to changes in temperature from any cause.

Relative direct sources of greenhouse gases in 1990

Sources	CO_2	CH_4	N_2O	CFCs
Energy	80	26	9	-
Deforestation/land clearing	18	-	17	-
Other industry	3	-	15	100
Fertilised soils	-	-	48	-
Enteric fermentation	-	24	-	-
Rice cultivation	-	17	-	-
Landfills	-	11	-	-
Biomass burning	-	8	11	-
Animal waste	-	7	-	-
Domestic sewage	-	7	-	-

Source: Intergovernmental Panel on Climate Change (IPCC), 1992



Source: International Energy Agency, Energy and Climate Change, OECD, 1997

Expected increases in global emissions of greenhouse gases

6.8 Global emissions of greenhouse gases are expected to rise as follows in the next decade:

Carbon dioxide (CO_2)	0.5 per cent per year
Methane (CH_4)	0.9 per cent per year
Nitrous oxide (N_20)	0.3 per cent per year
Chlorofluorocarbons (CFC)	expected to decrease around the year 2000 (following internationally agreed phase-out measures).

6.9 Each greenhouse gas has a different capacity to cause global warming, depending on its radiative properties, its molecular weight and its lifetime in the atmosphere (collectively, this is known as 'Global Warming Potential' or GWP).

Global warming potential (GWP) of some greenhouse gases[42]

Greenhouse gas	GWP
Carbon dioxide	1
Methane	21
Nitrous oxide	310
HFC134a	1,300
Perfluromethane	6,500
Sulphur hexafluoride	23,900

The effects of global warming

6.10 Some assessments suggest that global warming will have the following effects on coasts, agriculture, water, natural vegetation and human health:

- sea level is expected to rise by 40 centimetres by 2080: the oceans will expand due to rising temperatures and melting polar ice caps

[42] Intergovernmental Panel on Climate Change (IPCC), 1992

- by 2070 large parts of Brazil and central southern Africa could lose their tropical rain forests because of water shortage
- Africa, the Middle East and India are expected to experience significant reductions in cereals yields
- Northern Africa, the Middle East and India will be affected by water distress
- 290 million extra people could be exposed to the risk of malaria, especially in China and Central Asia.

Global warming policies

6.11 According to the Royal Commission on Environmental Pollution's recent report *Energy – the Changing Climate*:

> "Nothing the world community can do now will prevent climate change occurring on a substantially greater scale than has happened already. But measures to limit the increase in the carbon dioxide concentration in the atmosphere could bring major benefits. In addition to any benefits from reducing the concentration eventually reached, some measures could have major effects in spreading changes over longer periods."[43]

6.12 The aim of any global warming policy must therefore be to balance the cost of reducing greenhouse gas emissions now against potential damage from future climatic change. An important element in this involves valuing the impacts of CO_2 emissions to the atmosphere.

6.13 One way to do this is to measure the marginal impact of a tonne of carbon emitted to the atmosphere. In economic terms, this corresponds to the carbon tax level needed to internalise the 'externalities' associated with climatic change. However, the marginal impact per tonne of carbon has a highly uncertain value. This makes setting global warming policies complicated and controversial.

6.14 One model was developed for use by EU decision-makers in 1991, known as Policy Analysis for the Greenhouse Effect (PAGE)[44]. The model was updated in 1995 to take account of further developments in the science and economics of global warming. The new model is known as PAGE95. For example, the role of CFCs and HCFCs are reduced

[43] Royal Commission on Environmental Pollution's 22nd Report, *Energy – the Changing Climate*, June 2000.
[44] Hope, CW, Anderson, JP, and Wenman, P, (1993) 'Policy analysis for the greenhouse effect' *Energy Policy* 21 (3) 327-338.

in the newer model: once thought to be the most potent greenhouse gases, they are now believed to have only a slight effect because they destroy ozone, itself a strong greenhouse gas. However, the authors of the model stress that global warming policy should be informed by a range of possible outcomes since 'all aspects of the global warming problem are subject to profound uncertainty'[45].

The cooling effects of sulphate aerosols

The PAGE95 model referred to above also takes account of the cooling effect of sulphate aerosols, only recently understood. It appears that sulphate aerosols, the cause of acid rain, also backscatter incoming solar radiation and interfere with cloud formation, producing a reduction in radiative forcing. This counteracts the greenhouse effect.

Aerosols are produced primarily by metal smelting and the combustion of biomass and fossil fuels. These activities produce gases containing sulphur, carbon and nitrogen which are converted to aerosols (small, solid particles) by chemical reactions in the atmosphere. The primary actor is SO_2 gas which is oxidised to produce sulphate (SO_4) aerosol, known to contribute to acid rain.

Aerosols have also been found to have a direct effect on climate by reflecting incoming sunlight, known as the 'direct cooling effect'; and an indirect effect involving cloud formation. Firstly, aerosols increase the overall volume of clouds. Since clouds increase the reflectivity of the atmosphere, more incoming sunlight is reflected into space. Secondly, aerosols reduce the mean cloud droplet size. This interferes with rainfall, the distribution of clouds and water vapour. Since water vapour is an important greenhouse gas, this plays a major role in climate change, although it is difficult to quantify.

Aerosols counteract global warming. However, their effect is very local since they only exist in the atmosphere for around six days. By contrast, CO_2 emissions remain in the atmosphere for centuries, and mix themselves uniformly in the atmosphere. Therefore, the cooling effect of aerosols has been much more evident in the Northern Hemisphere where the bulk of SO_2 emissions have been emitted. The restrictions on emissions now in place in most countries will mean that the cooling effect of sulphate aerosols is likely to reduce in future.

[45] Plambeck, E and Hope, CW (1996) *Energy Policy*, 24, No ç, 783 – 793.

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