DEPARTMENT OF TRADE AND INDUSTRY

The Prospects for Coal

Conclusions of the Government's Coal Review

Presented to Parliament by the President of the Board of Trade
by Command of Her Majesty
March 1993

Cm 2235

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CHAPTER 1

INTRODUCTION

1.1 The coal industry has undergone enormous changes during the past 30 years. Important parts of its market have disappeared. Hundreds of pits have closed and hundreds of thousands of mining jobs have gone. At the time of nationalisation in 1947 the National Coal Board had some 980 pits with around 700 000 employees. By the end of the 1984-1985 strike, British Coal had 169 collieries and employed around 221 000 people. These figures had fallen to 50 and around 54 000 by October 1992. British Coal's decision last October to close 31 of its remaining pits would have further reduced the number of its employees to around 24 000.

1.2 On 19 October the President of the Board of Trade announced that the Government had introduced a moratorium on the closure of 21 of the 31 pits. On 21 October he announced that the Government intended to undertake a wide ranging Review of their prospects. The President made it clear that the Review would consider views and evidence on each of the 21 pits in the context of the Government's energy policy, including its consequences for British Coal and the employment prospects of the industry.

1.3 The Review's detailed terms of reference, announced by the President on 26 October 1992, are set out at Appendix A. The Review gave due regard to Scottish and Welsh interests and considered the particular needs of Northern Ireland.

1.4 This White Paper sets out the results of the Review. It describes the framework of energy policy within which the prospects of the coal industry in this country have been assessed. It examines the market for coal, particularly in the light of developments in the electricity supply industry and the development of other sources of supply. It considers the employment and wider consequences of pit closures and looks at the scope for improvements in the efficiency of British Coal. The main conclusions are summarised in Chapter 2.

1.5 In reaching the conclusions set out in this White Paper the Government has taken full account of the analysis and recommendations in the report of the House of Commons Trade and Industry Committee (TISC) *British Energy Policy and the Market for Coal*, published on 29 January 1993. The Government's formal response to the Committee's individual recommendations is set out in Chapter 16. The Government is publishing separately its response to the report of the Employment Select Committee *Employment Consequences of British Coal's Proposed Pit Closures*, published on 19 January 1993. The President of the Board of Trade also gave evidence to the Environment Select Committee on 8 February on the environmental effects of the Coal Review.

1.6 In conducting the Review the Department of Trade and Industry (DTI) commissioned a number of reports from external consultants. The John T Boyd Company ("Boyds"), the international mining engineering consultants, have visited each of the 21 pits, together with all the pits scheduled to remain open after British Coal's October announcement. They have reached an independent view on the future costs and potential productivity of each of these pits. Their conclusions are considered in Chapter 12.

1.7 Ernst & Young considered British Coal's organisational efficiency and cost structure and advised on improvements which could be made in this area. PIMS Associates Ltd ("PIMS") provided an additional overview of British Coal's cost structure and productivity in relation to international comparators. The results of their work are discussed in Chapter 12.

1.8 Caminus Energy Limited ("Caminus") have assessed the market for coal. Their conclusions have contributed substantially to the analysis in Chapter 11.

1.9 The full terms of reference of the consultants, as announced in Parliament on 20 November 1992, are at Appendix B. The consultants' reports were published on 22 January, along with a separate summary of the main findings of the Boyds and Caminus Reports.

1.10 Ernst & Young prepared an additional report on the avoidable costs of nuclear generation. The results are summarised in Chapter 7. Their report was published on 9 February.

1.11 In announcing the terms of reference of the Review the President of the Board of Trade invited interested parties to submit evidence. The DTI wrote individually to over two hundred organisations asking for their views. Over 300 individuals and organisations have submitted evidence to the Review. Inevitably those submitting evidence take widely differing views on the key issues and on many of them no consensus has emerged.

1.12 A full list of those who have submitted evidence is at Appendix C. This appendix also explains how the evidence may be consulted and copies of individual pieces of evidence obtained. Appendix B gives the details of publication of the consultants' reports.

1.13 The Government has, in addition, taken full account of the oral and written submissions made to the House of Commons Trade and Industry and Employment Select Committees in the course of their recent enquiries into the coal industry.

CHAPTER 2

SUMMARY OF CONCLUSIONS AND PROPOSALS

2.1 This chapter summarises the principal conclusions and proposals of the Government's Coal Review. References are given to the paragraphs or chapters where the conclusions are spelled out fully.

Energy policy

2.2 Competitive markets provide the best means of ensuring that the nation has access to secure, diverse and sustainable supplies of energy in the forms that people and businesses want, and at competitive prices. The Government's energy policy therefore centres on the creation of competitive markets. Government nevertheless continues to have specific responsibilities in a number of areas, as well as a general role in encouraging the development of competition. **(Chapter 3)**

An annual Energy Report

2.3 The Government intends to publish an annual Energy Report to provide information relevant to business and investment decisions. It will deal with issues such as trends in energy supply and demand, licensing activity, and regulatory developments across the whole energy field. In preparing the Report, the Government will be advised by a new Energy Advisory Panel of independent experts. The Panel will advise on the interpretation of the information in the Report, its implications for the way markets may develop in the future, and on commissioning special studies. The Panel may also offer advice to Government on the exercise of responsibilities such as licensing. **(Paragraphs 3.31 to 3.32)**

The market for coal

2.4 The coal industry must take its place within a competitive energy market. It must compete with other fuels and other suppliers to meet the needs of its customers at commercial prices. Its dominant market is in electricity generation. The report prepared by Caminus and other forecasts provided in evidence to the Review demonstrated clearly that the demand for coal in this market is set to decline significantly from current levels. There is no likelihood of significant growth in demand in other markets and a substantial risk of further decline. **(Chapter 11)**

2.5 Under British Coal's existing contracts, which expire on 31 March, it will supply 65 million tonnes of coal to the major electricity generators in England and Wales this financial year. British Coal's decision to close 31 pits reflected the assessment that they were unlikely to sell the generators more than 40 million tonnes of coal in 1993/94, falling to no more than 30 million in each of the four following years. Even these

tonnages were uncertain and subject to further negotiation with the generators. At the time of the October announcements British Coal had no contracts for sales to its most important customers beyond March 1993. **(Chapter 4)**

2.6 The consultants' reports and other analysis underlying the Review confirm that the decision to close the 31 pits was soundly based given the market conditions. The decision reflected a series of economically rational developments in the preceding years against the background of a market then tilted in favour of coal. In part, these decisions resulted also from the restructuring and privatisation of the electricity supply industry which moved it away from state monopoly and towards a competitive structure. **(Chapter 4)**

2.7 The Government recognises, however, that in the difficult wider economic context prevailing at the time the speed and scale of the closures announced by British Coal in October 1992 were too great to be acceptable to a wide body of public and Parliamentary opinion. It also recognises the considerable hardship and dislocation which the proposed closures would have caused. **(Chapter 5)** The Review has therefore considered whether there is any scope and justification for taking measures to increase the size of the market for United Kingdom coal and whether this could result in a larger viable coal industry in the longer term.

2.8 There have been various forecasts of the total electricity demand in England and Wales over the next five years. TISC used a forecast amounting to 586 million tonnes of coal equivalent (mtce). Caminus put the figure at 565 mtce and British Coal at 563 mtce. These differences partly, but not wholly, reflect differences of definition. The companies involved in buying coal in the market place will form their own judgements about the size of the market. **(Paragraphs 11.6 to 11.7)**

2.9 The market for United Kingdom-produced coal in electricity generation depends both on overall demand and on the share of it taken by coal. There are many competitors in the market: gas, oil, Orimulsion, nuclear, renewables, coal from various sources, and electricity supplied through the interconnector with France. **(Chapter 7)**

2.10 The Coal Review has considered in detail the fuels used in electricity generation, and in particular the relative costs of generating electricity from coal, gas and nuclear fuels. Its conclusions are broadly in line with those of TISC:

(a) continuing coal production at the same levels as in recent years is not necessary in order to ensure security of electricity supplies;

(b) estimates provided to the Review and to TISC suggest that, although predictions are inevitably very uncertain, there is no reason to believe that the United Kingdom's economically recoverable gas reserves will run out much before its economically recoverable coal reserves;

(c) coal will continue to be the most significant source of electricity for some time, but gas is an increasingly important and commercially attractive alternative;

(d) new gas fired plant is significantly cheaper than new coal plant and, when decisions were made on most of the current tranche of gas fired stations, it stood to produce cheaper electricity than the existing coal plants with which it directly competed; more recently the balance of cost advantage has shifted towards existing coal stations;

(e) on an avoidable costs basis, generation from existing nuclear plant is cheaper than coal or gas. **(Paragraphs 7.113 to 7.114)**

2.11 The Government concludes that there is no economic justification for requiring Nuclear Electric to close any of its Magnox stations before the end of their planned lifetimes. The Government will, however, wish to look closely at any requests from Nuclear Electric for approval for capital investment for extending the life of any Magnox stations. The Government will bring forward work on its review of the future prospects for nuclear power and will make a further announcement later this year. **(Paragraph 7.80)**

2.12 The Government is committed to assisting renewables to enter the commercial electricity generating market. It will publish a renewable energy strategy review document later this year. For the present it notes the Renewable Energy Advisory Group recommendations and intends to work towards a figure of 1500 MW of new electricity generating capacity from renewable sources for the United Kingdom as a whole by 2000. **(Paragraph 7.94)**

2.13 The Government has reviewed its policy in respect of the use of its consent powers under section 36 of the Electricity Act 1989 for new gas fired power stations. It intends to maintain the existing policy that, as a general rule, matters such as the need for a generating station, its capacity, choice of fuel and type of plant are commercial matters for the applicant for such consent. Applications for consent will continue to be considered on their merits against this background. **(Paragraph 13.35)**

2.14 HMIP are currently considering what measures may need be taken to control emissions from power stations burning Orimulsion, within the criterion of best available techniques not entailing excessive cost. The Chancellor of the Exchequer announced on 16 March that he would extend hydrocarbon oil duties to all fuel substitutes, including Orimulsion. The excise duty on Orimulsion will be linked to that on fuel oil. There are existing contracts for the import of Orimulsion into the United Kingdom, with which the Government cannot legally interfere. The Government has, however, been informed by the Venezualan authorities that Orimulsion exports to the United Kingdom are likely to stay at their minimum contractual level for the foreseeable future. This should entail a reduction in the consumption of Orimulsion in the United Kingdom of at least 500 000 tonnes equivalent of coal a year from current levels. **(Paragraph 7.63)**

2.15 A summary of legal advice received by the Government on matters relating to the interconnector with France was made publicly available on 18 March. Restricting imports of electricity across the interconnector would run counter to Article 30 of the Treaty of Rome and would also put the Government at financial risk under the

indemnity given to the National Grid Company at the time of electricity privatisation. **(Paragraph 7.102)**

2.16 At present, electricity supplied from France is not subject to the fossil fuel levy. If the Government were to remove non-leviable status, EdF would need to be given the benefit of levy payments. Far from reducing imports from France, this could reinforce their position and United Kingdom customers could end up paying more for their electricity as a result. **(Paragraph 7.104)**

2.17 The French Government is taking measures to increase the transparency of the French electricity market, and the indications for sales of British electricity through the interconnector in future years are promising. **(Paragraph 7.106)**

2.18 The principal sources of coal are United Kingdom deep mines, United Kingdom opencast, and imports.

2.19 Opencast coal is an economic source of energy which needs no subsidy and can play an important role in some places in reclamation and redevelopment of derelict land. In most cases, however, as a number of those submitting evidence pointed out, it is intrusive on the local environment and can be disruptive to local communities. Opencast coal also has different quality characteristics from deep mined coal which are important in enabling British Coal to meet the coal quality requirements of the electricity supply industry. British Coal, in its evidence to the Review, projected a reduction in its opencast output from the current level of 16 million tonnes to 12 million tonnes in 1997/98. British Coal's current expectation is that opencast output will now be somewhat below this level. **(Paragraph 13.32)**

2.20 The Secretary of State for the Environment is currently reviewing guidance to planning authorities on opencast coal. He will be announcing how he will be taking forward this review in the light of this White Paper. **(Paragraph 13.31)**

2.21 As part of the legislation to privatise the coal industry, the Government will remove the provision, under section 36(2) of the Coal Industry Nationalisation Act 1946, which limits the licensed opencast sector to sites where coal production is unlikely to exceed 250 000 tonnes. **(Paragraph 13.27)**

2.22 The major generators in England and Wales have accumulated levels of coal stocks well above those which purely commercial considerations would lead them to maintain - some 33 million tonnes at the end of February 1993. If they were to run these down rapidly there would be a sharp reduction in demand for coal. The closure announcements made in October 1992 assumed that the generators would reduce their stocks at the rate of 11 million tonnes a year in 1993/94 and 1994/95. **(Paragraphs 13.17 to 13.20)**

2.23 The Government has exercised its powers under the Electricity Act 1989 to require the generators to maintain substantial stocks to ensure continued electricity generation in the event of a major disruption to their fuel supplies. In 1992/93 the required stocking figures are 10-20 million tonnes depending on the time of year.

2.24 In March 1992 the Government informed the electricity generators and NGC, which advises the Government on endurance matters, that it would be reviewing the basis for the current requirements with a view to arriving at new arrangements for the year 1993/94. TISC suggested that 20 million tonnes of coal would represent a reasonable minimum level of stocks to guarantee security, but did not explain how this figure was reached. The use of existing powers is constrained by the duties in section 3 of the Electricity Act 1989 and it would be unlawful to use them simply to enhance the market for British Coal. Furthermore, there would be no justification for taking new powers whose sole purpose would be, in effect, to force private sector companies to buy goods that they did not want to buy, for the benefit of another commercial entity. The Government will, however, be taking forward its consultations with the generators about stocking arrangements for 1993/94 as a matter of urgency. **(Paragraph 13.23)**

2.25 National Power and PowerGen have confirmed their intention to enter into five year contracts with British Coal for 160 million tonnes of coal: 40 million tonnes in 1993/94 and up to 30 million tonnes in each of the following four years. The Regional Electricity Companies have also agreed in principle the necessary back-to-back contracts for the electricity which the generators will produce. **(Paragraph 13.1)**

2.26 Substantial negotiations have taken place between British Coal and the generators about the possibility of supplementary contracts for further supplies from British Coal, which might substitute for imported coal and other black fuels. The negotiations will continue.

2.27 The Government is ready to offer a subsidy for any additional deep mined tonnages British Coal is able to sell to the generators, whether or not on long term contracts. The level of subsidy will be for negotiation, but the Government is prepared to embrace the range of figures put forward by TISC. **(Paragraphs 13.10 to 13.14).** The aim is to give British Coal time to implement the productivity and cost improvements which both it and the Government's consultants consider possible and which can make British Coal competitive with world prices within five years.

2.28 The subsidy will reduce progressively over the period to full privatisation, which the Government intends to achieve at the earliest practical opportunity. Financial assistance on the same basis as for British Coal will also be provided to the private deep-mine sector in relation to genuinely additional tonnages sold to the generating companies, consistent with the relevant EC provisions. **(Paragraphs 13.13 to 13.14)**

2.29 The new subsidy will lead to a reduction in the effective level of underlying support to British Coal sales from its current level of around £1 billion. Electricity prices to domestic consumers will be lower in 1993/94 in real terms than they were in 1992/93, although there is likely to be some variation between different public electricity suppliers. **(Paragraph 13.15)**

2.30 These arrangements and the contracts referred to in paragraph 2.25 above will be notified to the European Commission under the State Aids and competition provisions of the EEC and ECSC Treaties at the appropriate time. Initial contacts suggest that the Commission will adopt a positive approach to granting the necessary

authorisations. **(Paragraph 9.12).**

2.31 As TISC recognised there is no market for coal in prospect which avoids the need for pit closures. Decisions on which pits will remain open and which will close will be for British Coal. The Government has no powers under the relevant legislation to direct British Coal to close or to keep open particular pits. The number of pits which survive will depend on the amount of coal sold and in the long run on British Coal's success in reducing its costs. The additional tonnages achieved with the aid of the Government's subsidy will only be known as negotiations proceed in the market place.

2.32 It makes no sense to produce coal which no-one wants to buy. Supplementary contracts have not yet been agreed, and there are huge stocks already on the surface. There is no point in adding to these stocks. British Coal has been considering how best to bring supply more closely into line with demand. From discussions with British Coal it appears that the measures under consideration include:

(a) the closure of pits nearing economic exhaustion;

(b) the cessation of production at pits and putting them on care and maintenance;

(c) continuing development work only.

These measures would be likely to involve 8 or 9 pits in total. British Coal has informed the Government that any such pits, save for the possible exception of pits where development only continues, would be offered to the private sector. **(Paragraph 14.2)**

2.33 Putting a pit on development only would involve capital investment to create a world-class pit with truly competitive costs and a more secure future and will help to ensure that its reserves are available into the next century. **(Paragraph 14.3)**

2.34 The Chairman of British Coal has confirmed that in advance of privatisation any pit which the Corporation does not itself wish to keep in operation will be offered to the private sector. Pits so offered will be kept in operation or on care and maintenance until the private sector has had a chance to express its interest. Private sector mines would also be able to seek Government financial backing for supplementary sales at world related prices on the same basis as British Coal provided that they could demonstrate that this was for genuinely additional tonnages. **(Chapter 14)**

2.35 The Review has considered whether it is sensible to mothball pits proposed for closure. The cost of mothballing pits can vary significantly depending on the period the pit is intended to be out of production and the extent of the structure of the mine that is to be preserved. There may be good reasons to mothball pits over a shorter period when there is uncertainty about the likely level of demand during that period or to permit the private sector to evaluate the possibility of purchasing a particular pit. **(Paragraph 14.38)**

Privatisation

2.36 The reports produced by Ernst & Young, PIMS and Boyds show that there is substantial scope for British Coal to reduce its costs and improve efficiency. The Government has emphasised to British Coal the urgency of implementing the changes needed to produce the level of performance improvements identified. The Chairman of British Coal had already committed the Corporation to halving its overhead costs from 1991/92 levels by March 1995. British Coal is committed to achieving improvements which go beyond Ernst & Young's recommendations. It has appointed its own consultants in this area and will be coming forward with revised and detailed proposals shortly. The Chairman has also said that he is confident of achieving the performance expectations set out in the Boyds report, generally in a shorter period than three years. **(Chapter 12)**

2.37 Over the medium term the industry is likely to be able to reduce its costs to an extent which will enable electricity produced from United Kingdom coal to compete on price with electricity produced from imported coal. This will require effective management and substantial changes in working practices, which will need the commitment of the workforce. The Government believes that the coal industry will be best placed to make these changes when it has been fully returned to the private sector. **(Paragraphs 14.14 to 14.21)**

2.38 The Government intends, subject to a consultation process, to remove the impediment to efficiency represented by the limits placed on underground working hours by the Coal Mines Regulation Act 1908. **(Paragraph 12.30)**

2.39 The full implications of the proposals in this White Paper for the structure and timing of the privatisation of the coal industry require further detailed consideration. In the meantime British Coal will offer for sale or licence any pit which it does not intend to keep in production. The Government intends to bring forward the necessary legislation as rapidly as possible. For the present, British Coal will of course have to work within the framework of existing legislation, but will begin immediately to prepare for privatisation so that it can move quickly once the necessary new legislation is in place. British Coal will also be prepared, in the context of its preparations for privatisation, to consider with interested parties proposals for the sale of regional coal mining packages. **(Paragraph 14.21)**

2.40 Safety must, of course, continue to be paramount. The Government is determined to ensure, in consultation with the Health and Safety Commission, who will remain responsible for safety regulation in the industry, that the existing high safety standards in such mines are maintained after they pass into the private sector. There can be no question of a lowering of safety standards in this process.

2.41 The Government intends to legislate, as soon as opportunity allows, to remove the restrictions in Section 36(2) of the Coal Industry Nationalisation Act 1946 under which British Coal is unable to license mines at which more than 150 underground workers are to be employed. **(Paragraphs 14.31 to 14.32)** The privatisation legislation to be introduced by the Government will also provide for an entirely new licensing

regime and an independent Coal Authority which will be responsible for licensing all coal mining activities and for maintaining records of mining activity. The rights of third parties, in particular in relation to subsidence will continue to be protected. The headquarters of the Coal Authority will be in Nottinghamshire. **(Paragraph 14.18)**

Environmental constraints

2.42 The Government attaches great importance to the protection of the environment. It is fully committed to meeting its international obligations to reduce levels of environmentally harmful emissions, of which the burning of fossil fuels, particularly coal, in power stations is a major source. The measures proposed in this White Paper should not threaten the fulfilment of the existing commitments to curb emissions of sulphur dioxide and oxides of nitrogen by the electricity generating industry. As regards emissions of carbon dioxide, the Government will prepare the United Kingdom's full national plan for meeting its obligations in the light of the responses to the discussion document *Climate Change: our national programme for CO_2 emissions* issued in December 1992, and of other Government policies including the outcome of the Coal Review. The higher the level of coalburn by the electricity supply industry, however, the more stringent the measures to curb CO_2 emissions in other sectors of the economy, including transport, would need to be. In the longer term, environmental concerns are likely to constrain the amount of coal that can be burned in the United Kingdom. **(Chapter 8; paragraphs 14.12 to 14.13)**

Clean coal technology

2.43 The Government has long recognised the importance of the contribution research and development can make in the coal industry. Public sector support for coal R&D over the past decade is a recognition of this and of coal's long term future in meeting the United Kingdom's electricity generation needs. This support will continue at around present levels, with £12 million of additional funds made available over the next three years to support research at British Coal's Coal Research Establishment (CRE) on coal science and the development of the Topping Cycle. This will enable the CRE to make a successful transition to the private sector where its long-term future lies. **(Chapter 15)**

Regulation of the electricity market

2.44 The Government has considered a number of aspects of the electricity market during the Review. The principal responsibility for regulation of the market remains with the Director General of Electricity Supply (DGES). His functions are set out in Chapter 6, and his conclusions on the aspects of the Review which he has considered in Chapter 10.

2.45 The Government reaffirms its commitment to a competitive market in electricity generation, distribution and supply. It will support the DGES in his efforts to create and sustain competition in the industry.

2.46 The Government welcomes any initiatives to improve the workings of the

electricity pool arrangements. It is considering whether allowing large users to by-pass the pool will be beneficial to the electricity market. The pool authorities are considering the introduction of demand-side bidding into the electricity pool. The Government welcomes proposals designed to improve the workings of the electricity market and will embark shortly on further consultations with the DGES, the electricity industry and large users on whether such a proposal would be beneficial to the electricity market. The Government is also reviewing the current regulation of on-site generation, which can offer large users a competitive source of electricity. **(Paragraph 10.23)**

2.47 The Government does not propose to modify the position described in the privatisation prospectus and embodied in the licences of the relevant companies that the franchise within which the RECs in England and Wales and the Scottish electricity supply companies have an exclusive right to supply will be reduced from its current level of 1 MW to 100 kW in 1994 and be abolished altogether in 1998. **(Paragraph 10.30)**

Assistance for those affected by closures

2.48 Some pits will inevitably close. The Government recognises the pain and hardship this will cause both to individuals and to communities. It accepts a responsibility to alleviate hardship and to aid the process of adjustment. **(Chapter 5)**

2.49 On 17 March, British Coal announced that its generous miners' redundancy scheme was to be extended until the end of December 1993. Payments to an average miner with 15 years service would be around £23 000, and payments to an average non-industrial employee would be around £27 000. **(Paragraph 5.15)**

2.50 As already announced, there will be a substantial package of regeneration measures for areas affected by closures. The total funding available will be increased to £200 million. The additional money will allow important extra projects to go ahead. **(Paragraph 5.17)**

CHAPTER 3

THE GOVERNMENT'S ENERGY POLICY

3.1 The development and use of energy is of fundamental importance to a prosperous and successful economy. The aim of the Government's energy policy is to ensure secure, diverse and sustainable supplies of energy in the forms that people and businesses want, and at competitive prices. This aim needs to be pursued in the context of the Government's economic policy as a whole, of other Government policies, especially on health, safety and the environment, and of the United Kingdom's European Community and other international commitments.

3.2 The Government firmly believes that its aim will be achieved most fully through the mechanisms of the market. The market is the most effective and efficient means for meeting energy needs, both nationally and internationally. It is within competitive markets that prices are best determined and costs can be exposed to rigorous test. Competition gives businesses the strongest incentives to meet the needs of their customers and empowers the purchasers of fuel and consumers of energy, enabling them to get the best deal. Government should not attempt to impose all-embracing plans about how much energy of what kind should be produced or consumed by whom. The uncertainties of supply and demand, of technology, and above all of the behaviour of people and companies, doom such plans to failure.

3.3 Security and diversity of supply are best achieved through the operation of competitive and open markets. A range of firms with freedom to make their own decisions about how best to meet the needs of their customers and secure their own future profitability is a more reliable means of ensuring diversity and security of supply than central planning or closed arrangements between a series of monopoly operators. The Government will continue to monitor the operation of the market to confirm that the aim of its energy policy is achieved.

3.4 It is impossible for the full disciplines of the market to operate on industries in state ownership, which do not depend on capital markets for their finance and are usually shielded from competition. In 1979 the Government inherited a largely state-owned energy sector. The state-owned energy industries were in many cases significantly subsidised and overmanned, while protected from the disciplines of the market place. These elements exemplified and contributed to the failure of the British economy at the time. Since then the Government has been working to bring about the progressive liberalisation of the energy sector. The Government's policy has been and remains to encourage effective markets and make them work efficiently.

3.5 The key elements of the Government's policy have therefore been and will remain:

(a) to encourage competition among producers and choice for consumers - the best guarantee that energy will be produced and supplied efficiently and securely to the benefit of consumers and users - and to establish a legal and regulatory framework to enable markets to work well;

(b) to ensure that service is provided to customers in a commercial environment in which consumers pay the full cost of the energy resources they consume;

(c) to ensure that the discipline of the capital markets is applied to state-owned industries by privatising them where possible;

(d) to monitor and improve the performance of the remaining state-owned industries, while minimising distortion;

(e) to have full regard to the impact of the energy sector on the environment including taking measures to meet the Government's international commitments;

(f) to safeguard health and safety;

(g) to promote wider share ownership;

(h) to promote energy efficiency.

3.6 Implementing this policy after the failures of the past has inevitably involved a long and difficult process of transition. But much has already been achieved. The success of the North Sea oil and gas sector is likely to produce a second peak in production this decade, leaving the United Kingdom, alone in the European Community, broadly self-sufficient in energy. Increasing efficiency at British Gas, and an effective regulatory regime, have held down prices while competition is developing. Industrial gas prices, for example, have fallen by 28% in real terms in the last five years and by about 36% since privatisation. Equipment suppliers to the energy industries have also benefitted from the more market-driven approach. They have been able to plan ahead better and invest in new more efficient products and processes. In the short time since electricity privatisation there has already been substantial progress towards improved efficiency, greater competition and consumer choice. Most of the main conditions for, and elements of, a successful energy sector are now in place.

3.7 The Government recognises that its energy policy needs to deal with circumstances where markets are inhibited from working effectively. The sectoral regulators and competition policy both have an important role to play here. Wherever competition cannot be expected, at least initially, to deliver products consumers want to buy at competitive prices, independent regulators have been established by legislation. Their main role is to encourage the development of competition, and, where monopoly remains, to protect the interests of consumers by administering price controls which encourage industries to become more efficient, and by enforcing standards of service.

The role of Government

3.8 In moving towards its objectives, the Government will continue to exercise substantial responsibilities. It has responsibilities in relation to the United Kingdom Atomic Energy Authority (AEA), British Nuclear Fuels plc (BNFL), Nuclear Electric plc, Scottish Nuclear Ltd, and, until they are privatised, British Coal and Northern Ireland Electricity plc.

3.9 In the electricity sector, the Government is responsible for consents for power stations and overhead lines.

3.10 The Government issues licences for oil and gas exploration and production to ensure the maximum economic development of the United Kingdom's oil and gas resources in a manner consistent with good oil field practice, due care for the environment, and the best use of energy and other resources. The Government collects oil royalties and is responsible for the United Kingdom Continental Shelf fiscal regime.

3.11 The Government has emergency planning responsibilities, including setting stocking provisions for coal and oil.

3.12 The Health and Safety Commission has responsibilities in respect of safety standards and ensuring their implementation throughout the energy sector.

3.13 The Government has a key role to play in protecting the environment, and in promoting long term development of the economy in a way which can be sustained without jeopardising the inheritance of future generations. This includes a commitment to energy efficiency and to work on renewable sources of energy. It also involves implementing the Government's international commitments to environmental standards. Some of the most important of these bear directly on the energy sector.

3.14 The Government also funds some energy research and development.

3.15 The Government's policy is thus aimed at creating and sustaining a fully commercial energy sector free from unnecessary interference, which offers secure, diverse and sustainable supplies of energy in the forms that people and businesses want, at competitive prices, and which can compete in world markets. The Government's role is to provide the sector, its customers and the public with a stable and effective framework of law and regulation, which will protect health, safety and the environment and allow competition to flourish. Government will carry out those duties which can only be performed by Government, and will ensure that markets have the information which they need to function efficiently. It will not, however, return to the discredited policies of central planning and massive interference.

Implementation of the Government's policy

3.16 The implementation of the Government's policy has faced a number of hurdles, partly stemming from the nature of the energy sector. In some parts of the sector there are elements of natural monopoly. For example, it is probably not economically

feasible for there to be more than one electricity cable to the same house. This does not make competition in the provision of cables and the supply of electricity to that house impossible, but it does mean that, as with other utilities, a regulatory framework is needed to ensure fair competition which would not be needed in most other industries.

3.17 A still greater obstacle to progress has been the legacy of the past. The behaviour of state-owned monopolies is often very different from that of commercial firms in a competitive market, and the transition from one to the other is always difficult. Businesses which have been sheltered from the forces of competition tend to be inefficient. The increases in productivity achieved in many businesses as a result of preparing for and undergoing privatisation illustrate how far state-owned monopolies often fall below the best commercial practice.

3.18 A further unwelcome legacy is that state-owned industries have often made uncommercial investments, or preserved activities well beyond the time when their commercial rationale ran out, often as a result of political intervention. Privatisation forces such issues to be confronted and reveals the real costs of economic activities, which have often been disguised in the past. It forces more commercial purchasing policies where cosy relationships previously existed. The necessary changes can be painful.

3.19 The transition to a competitive market by definition involves increasing competition, whether by breaking up existing monopolies, or by introducing new competitors, or both. It is important in this transition to take account of existing industrial strengths to ensure that these are not lost. This can mean that the transition takes time.

3.20 In the case of the energy market particularly, with its past history of state intervention, it is inevitable that competition has developed at different speeds in different parts of the market. The oil sector has many companies and competition in gas supply is growing rapidly. Electricity generation is still dominated by a few large companies, but competition in both generation and supply is developing. There are inevitably problems arising from the interaction of different sectors in which competition has developed to varying extents.

3.21 The Government nevertheless remains convinced that the transition from monopoly to competitive energy markets is necessary. An efficient and competitive market for all forms of energy will benefit producers and consumers alike. But the Government recognises that there are limits to the speed at which change can be accommodated.

3.22 This White Paper proposes measures which advance the Government's aim of a market-based policy for energy, while recognising the real concerns about the impact of the changes proposed in October 1992 on the coal industry. These measures aim to provide an period of transition in which the industry has the opportunity to become competitive as part of an active, developed and increasingly international energy market. This transition will have a cost, but it offers the opportunity for a larger part of the

industry to survive into the next century.

An Energy Agency

3.23 It is against this general background that the Government has considered the various proposals for an Energy Agency or Commission which appeared in several pieces of evidence both to the Review and to TISC. Unfortunately the use of similar terms tended to disguise considerable divergence on what an Agency was intended actually to do.

3.24 Some evidence saw an Energy Agency as primarily regulatory, based on a merger of OFFER and OFGAS, with the possible addition of licensing functions for new power stations, coal developments, and gas and oil fields. Other evidence saw it as having a largely analytical function, including publication of information on energy markets and studies of their development, sometimes combined with advice to Government.

3.25 The TUC argued for an Energy Commission "comprising representatives from all interested parties, including consumer groups and trade unions ... to oversee the formulation of an integrated energy strategy". NALGO also argued for a Commission "responsible for drawing up national energy plans for consideration by Parliament and ultimate implementation by Government. The plans should ... include issues of energy supply and demand, pricing policy, research and development, renewable energy sources and energy conservation and efficiency".

3.26 OFGAS opposed an Energy Commission on the grounds that it would be a retreat from a market-based policy towards central planning, arguing that there was no need for closer coordination of their activities with those of OFFER.

3.27 TISC recommended that the Government should investigate the potential value of an Energy Commission which it envisaged as combining the independent status and statutory powers of the Monopolies and Mergers Commission with the duties of a Select Committee to scrutinise Government policy. It would conduct public hearings and investigations, publish information and advise the Government. Where its advice was rejected, the Government would have a duty to give reasons.

3.28 As this summary of the different views makes clear, some advocates of an Energy Agency/Commission see it taking decisions, or providing the basis for decisions, about a wide range of issues such as depletion policy or pricing. They argue that such decisions cannot be left to the commercial judgement of private companies. They wish to retreat from a market-based approach to energy into the failed policies of corporatism and central planning.

3.29 Others have argued that an Energy Agency would help to remove important areas of decision from the political arena. This is seductive but naive. There are important decisions which are inescapably political and which are rightly taken by Ministers, responsible to Parliament.

3.30 The Government firmly rejects either a return to central planning or handing over policy responsibilities to a body independent of Government. It recognises, however, that if markets are to work effectively they need information which in some cases Government is in a unique position to provide. For example the annual "Brown Book" is a highly respected publication within the oil and gas industry which outlines the state of United Kingdom oil and gas exploration, field development and production, gives estimates of reserves, and provides more general background information. One of the comments to emerge from the evidence submitted by the power generation equipment industry was the need for regular information on energy policy to better inform investment decisions.

3.31 In addition, the Government recognises a need for greater public information on developments in the energy sector. **The Government therefore intends to publish an annual Energy Report to provide information relevant to business and investment decisions. It will deal with issues such as trends in energy supply and demand, licensing activity, and regulatory developments across the whole energy field.**

3.32 **In preparing the Report, the Government will be advised by a new Energy Advisory Panel of independent experts. This Panel will include people from different sectors of the energy industry, including suppliers to it, as well as academics or other independent commentators and representatives of energy users. It will advise on the interpretation of the information in the Report, and its implications for the way markets may develop in the future. It will advise on commissioning special studies, like some of those which have been published in the course of this Review, and may also offer advice to Government on the exercise of responsibilities such as licensing.**

CHAPTER 4

BACKGROUND TO THE OCTOBER 1992 ANNOUNCEMENTS

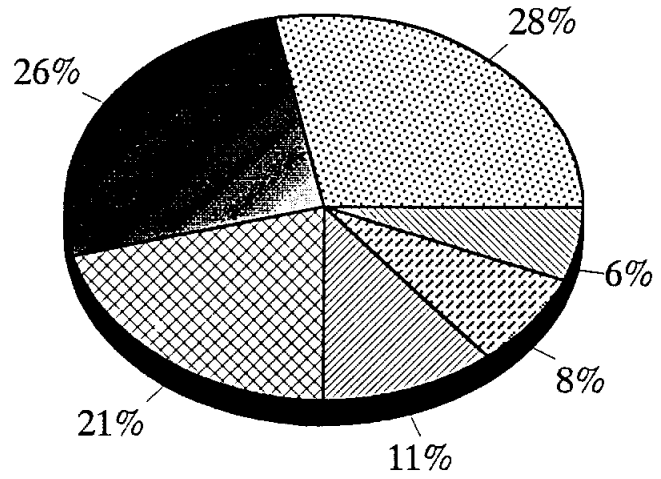
4.1 This chapter explains the background against which British Coal announced on 13 October 1992 its intention to close or mothball 31 collieries.

Supply and demand for coal

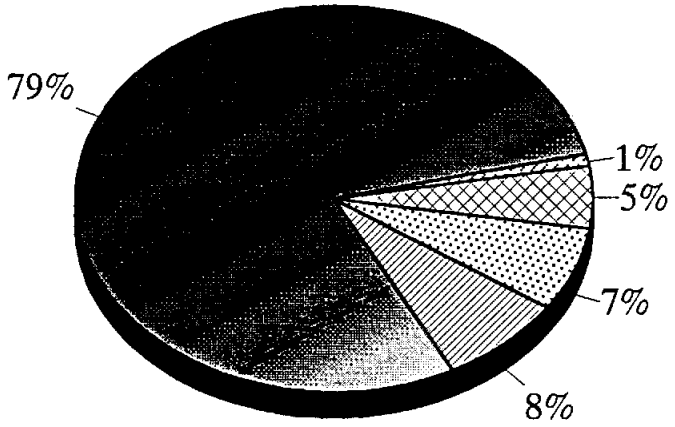
4.2 It is self-evident that the United Kingdom mining industry cannot for long continue to produce coal for which there is no market. By the time of the October 1992 closure announcements the market for coal had been in decline for decades. At nationalisation in 1947 the National Coal Board's output of 200 million tonnes was already only about two thirds of the industry's output thirty years earlier. Over the following forty years a series of technological changes eliminated much of the remaining market for coal. The market for house coal in Great Britain virtually disappeared with the spread of central heating and other forms of gas and electric heating in the home. The great coal fired locomotives that had fired the imagination of steam enthusiasts were driven from the railways by diesel and electric engines. The replacement of town gas by natural gas from the 1960s removed another major market. At the same time the fall in demand for industrial coal was accompanied by the exhaustion of much of Britain's reserves of the types of coal needed in industrial applications, particularly coking coal for use in the iron and steel industry.

4.3 By the 1960s coal was beginning to become dependent on the electricity generation market. This trend was reinforced over the following decades and is illustrated in Figure 4.1 below. The effects are shown by the breakdown of coal consumption in 1992. Of the 101 million tonnes of coal consumed in the United Kingdom in that year, 79% was used for electricity generation. Of the remaining 21%, 8% was used in the iron and steel industry, 5% by other industrial users, 7% in the domestic fuel supply market and 1% by commercial and public service users. British Coal supplied 77 million tonnes of the market in 1992 and the private sector licensed opencast and deep mined sector nearly 4 million tonnes. The remaining 20 million tonnes were imported.

4.4 While these changes were taking place in its market, the state-owned coal industry was largely protected from competition from other coal producers. In the key electricity generation market it was also largely protected from competition from other fuels. This provided no real incentive to achieve the highest standards of productivity and management. There have been substantial improvements since the coal strike of 1984-1985, but British Coal nevertheless failed to improve performance as swiftly as it needed to.



200 million tonnes of coal consumed in the United Kingdom in 1960



101 million tonnes of coal consumed in the United Kingdom in 1992

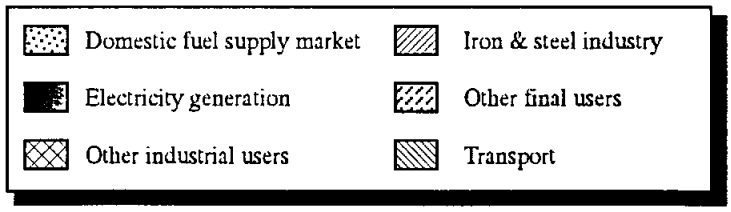


Figure 4.1: United Kingdom coal consumption by sector 1960 and 1992

British Coal's sales to the electricity generators

4.5 The process of privatisation and increasing competition in electricity generation and supply freed the electricity industry to seek competitive fuel sources, thus putting greater pressure on the United Kingdom coal industry to reduce costs.

4.6 At the time of electricity privatisation in 1990 British Coal entered into three year contracts with the electricity generators in England and Wales, giving it a guaranteed market for a substantial proportion of its output. Equivalent five year contracts were entered into between British Coal and the Scottish electricity supply industry. All these contracts were at substantially above market prices. In 1992/93 they provide for the sale of 65 million tonnes of coal to the generators in England and Wales. However, despite making considerable progress in reducing its costs, British Coal proved unable over this period to achieve cost levels fully competitive with world coal prices and this lies at the heart of the current difficulties.

4.7 It was clear from 1990 onwards that British Coal was unlikely to secure contracts for similar volumes once the England and Wales contracts expired in March 1993. The development of new Combined Cycle Gas Turbine stations (CCGTs), encouraged by the repeal of the EC Directive restricting the use of gas for power generation, eroded the market for coal, as did increased nuclear output. British Coal's progress in reducing its unit costs was insufficient to enable it to offer the generators a price low enough to compete with imported coal so that it could maintain its share of the declining market.

4.8 Although there were some earlier discussions, British Coal did not begin its contract negotiations with the generators in earnest until the beginning of 1992. Before British Coal had made clear to the generators the scope for further reducing costs and prices, National Power and PowerGen had entered into a series of contracts with gas suppliers committing them to purchasing gas over a number of years for their new CCGTs. In addition a number of the RECs had signed long term contracts for electricity generated by CCGTs operated by new independent generators, in which the RECs were often substantial shareholders, entering the market in competition with the established generators. These companies had in turn signed long term contracts with gas suppliers including so called "take or pay" provisions under which the generators would have to pay for contracted volumes of gas regardless of whether they ultimately took delivery of them. Altogether some 15 gas fired stations were expected to come on stream by 1995. These were likely to displace some 25-30 million tonnes of coal from the England and Wales electricity generation market by 1996/97, compared with a total demand for coal in this market of around 75 million tonnes in 1992/93.

4.9 The increasing use of gas in power generation was the most significant factor in displacing coal from the expected future electricity generation market in England and Wales. At the same time Nuclear Electric was achieving increased output and reliability from its existing nuclear stations and expected to have the new station at Sizewell B on stream in 1994. Renewable sources of energy were also expected to make a small but increasing contribution to the United Kingdom's electricity generation. Sizewell B and increased renewables output were together likely to displace up to a

further 5 million tonnes of coal by 1997/98.

4.10 At the end of 1992, the electricity generators were able to import coal into the Thameside power stations at a delivered cost of £31 to £35/tonne or £1.15 to £1.30/gigajoule. (A gigajoule (GJ) is a unit used to measure the energy content of fuel; imported coal usually has a higher energy content per tonne than British coal and actual prices per tonne therefore need to be adjusted for valid comparison.) The delivered cost of imported coal at inland stations would be £0.10 to £0.25/GJ higher depending on location. This compares with the average delivered cost, under the present contract with British Coal, of £2.00/GJ or more, including the pit head price of £1.85/GJ and the delivery costs. As well as being more expensive than imported coal, the majority of British coal is also of significantly lower quality than its internationally traded counterpart, especially in respect of sulphur, ash and chlorine content; this mainly reflects inescapable facts of geology.

4.11 Continued cost cutting and improved productivity enabled British Coal to make a final offer to the generators in September 1992 of a price of £1.51/GJ for 40 million tonnes at the pit head in 1993/94, falling to £1.33/GJ for 30 million tonnes in 1997/98 in October 1992 money. The cost of delivery to the power station must be added to this price.

4.12 TISC noted that at a price of £1.51 British Coal's output would be unlikely to be price competitive at coastal power stations and might not be price competitive at some inland ones; the further reduction to £1.33 would still be likely to leave it uncompetitive at most coastal stations. Furthermore, if output from coal fired stations were to decline substantially, there would be greater competition *between* coal fired stations, so that inland stations buying their fuel from British Coal would have to compete with coastal stations using imported coal.

4.13 The generators were also building new port facilities for importing coal. The new bulk terminals for importing coal which are expected to open at Bristol and Liverpool this year will be capable of handling larger ships than can existing facilities. This will reduce the cost of importing coal to a number of power stations by removing the need for coal to be transshipped at a continental port or to be imported in smaller ships at a higher price.

4.14 British Coal therefore found itself in late 1992 unable to compete with coal produced at world prices at the same time as coal in general faced a sharply declining share of the electricity generation market relative to other fuels. Higher output resulting from improved productivity at British Coal, continued coal imports by the generators and the take or pay nature of the existing coal contracts (under which the generators were obliged to pay for coal covered by the contracts whether they took delivery of it or not) meant that the market was already oversupplied with coal. At the time of the closure announcements coal was being added to stock at the rate of 1 million tonnes a month. British Coal had accumulated stocks of 14.5 million tonnes, and the generators had built up stocks of 33.6 million tonnes reducing their incentive in the short term to take even the reduced supplies of coal being discussed in the contract negotiations.

4.15 Taking account of these developments, N M Rothschild advised the Government in 1992 that total demand for coal from the England and Wales electricity supply industry would fall from over 70 million tonnes in 1992/93 to 45-50 million tonnes in 1996/97. British Coal's ability to secure the largest possible share of that market would depend on its costs and the prices at which the generators could buy the coal on the world market, which in turn would be substantially influenced by exchange rate movements.

4.16 As noted above, a key factor in the negotiations between British Coal and the generators on the one hand, and the generators and the RECs on the other, was that the prices being offered by British Coal were above world prices. The generators argued that it was not for them to take the fuel price risk implied in a commitment to buy from a more expensive source for a 5 year period and therefore wanted their contracts with British Coal to be backed up by parallel contracts to supply electricity to the RECs.

4.17 The RECs in their turn wanted to be sure that they had a market for this electricity over the whole period. They were only prepared to commit themselves to take electricity based on fuel supplied at above world prices for this long period if they could be sure of selling it. The size of their guaranteed market - in which they were not subject to competition - was constrained by the limit on the size of their "franchise market". Until 31 March 1994, this includes all customers with a maximum demand below 1 MW (approximately the electricity consumption of a medium sized office block) and, from then until 31 March 1998, all customers with a maximum demand of less than 100 kW. Taken together with the RECs' existing commitments to independent power generation projects and to Nuclear Electric, and allowing headroom for contracting flexibility, this meant that the scope for such back to back contracts was limited to electricity equivalent to about 40 million tonnes from British Coal in 1993/94 and 30 million tonnes in each of the subsequent 4 years. Sales of coal to the non power generation market were expected to average around 8 to 9 million tonnes over the 1990s, and sales to the Scottish power industry to be in the range of 3-5 million tonnes per year. These expectations are shown in Figure 4.2, which shows the anticipated share of the market taken by British Coal on the assumption that its estimated further cost savings were made.

4.18 In October 1992 British Coal had still not been able to sign contracts with the England and Wales electricity generators for the period beyond March 1993. With the prospect of sharply declining sales, British Coal was faced with the urgent necessity to reduce capacity further. On 13 October the Chairman of British Coal announced that the Corporation would cease production at 31 collieries over the course of the following five and a half months, with four of these pits being kept on a care and maintenance basis to retain access to their coal reserves. Up to 30 000 mineworkers and staff at pits, offices and elsewhere would lose their jobs, including job losses at several of the collieries which would continue in production.

4.19 It is clear that in October 1992 British Coal faced an inevitable squeeze on its markets over the following five years. In particular, there was no scope for it to secure a greater share of the electricity generation market given the existence of long term gas contracts, the continuing improvement in nuclear output with

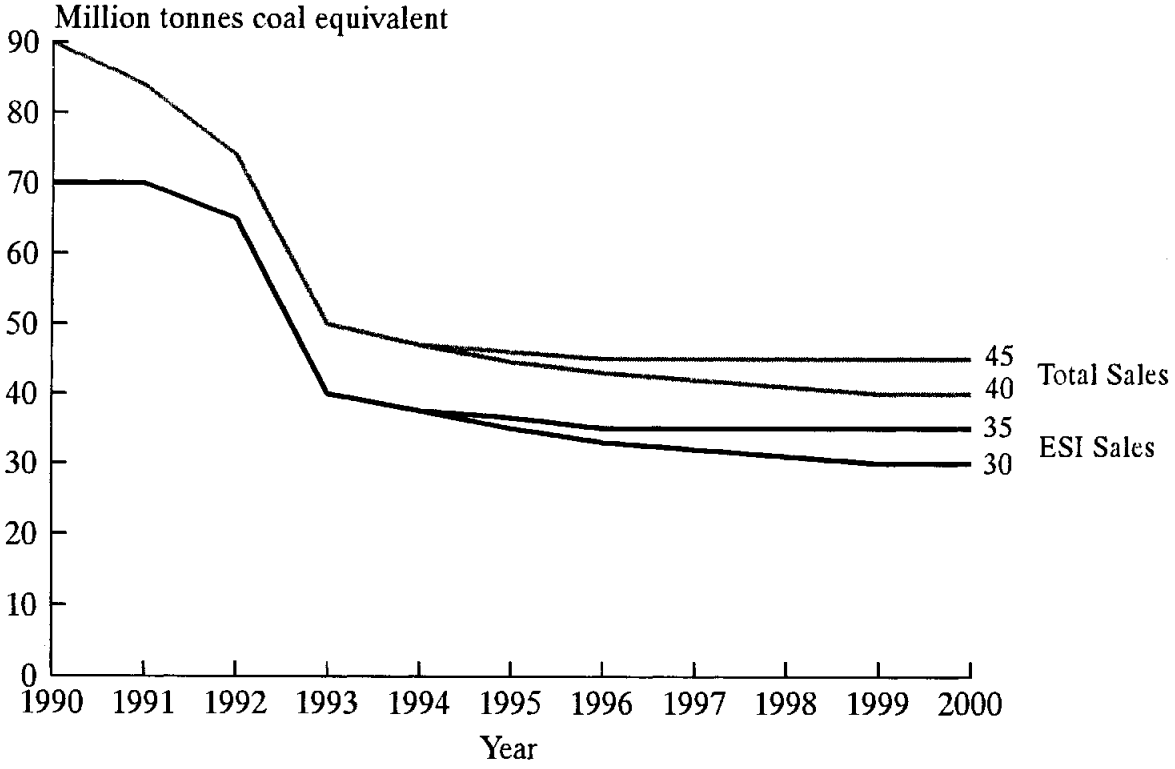


Figure 4.2: NM Rothschild projections for sales by British Coal and its successors in the United Kingdom

avoidable costs below the pool price, and the ready availability of substantially cheaper coal from overseas. It was in these circumstances that British Coal announced its programme of closures. The Review which followed the reaction to this announcement has examined the extent to which these constraints can be removed through government action, and the desirability or otherwise of doing so.

Assessment of the pits proposed for closure

4.20 British Coal is run by an independent board whose functions and duties are laid down in law. The President of the Board of Trade has a number of statutory powers and duties in relation to British Coal, including powers to make loans and pay grants. He does not, however, have any statutory responsibility for the day to day management of British Coal nor to approve the closure of pits. His powers of direction over British Coal under relevant legislation are very limited, and he does not, in particular, have any powers to determine which pits British Coal should keep open and which it should close.

4.21 The Government's major involvement in the decisions which led to the October announcements was through its financial oversight of British Coal and through its responsibility for any loans and grants needed to meet the costs of closure. The Government has annual discussions with British Coal about its financial targets and financing requirements and its strategic options over the medium term. Discussions in 1992 were conducted on the basis of the objectives set for the Chairman of British Coal by the Government in January 1992, in particular the general requirement to

develop a coal-mining business which achieves sustainable profitability, and specific requirements to:

(a) achieve a bottom-line profit over the period 1991/92 to 1993/94;

(b) achieve overall operating profits in the same period at deep mines whilst breaking even on operational cash flow;

(c) withdraw from loss making business except where there was a realistic prospect of sustained future profitability.

4.22 While these discussions continued, commercial negotiations between British Coal and the generators for 5 year contracts from 1 April 1993 were also in progress. As discussed above, in the course of these negotiations it became clear that the generators were unlikely to take more than 40 million tonnes in 1993/94 with smaller tonnages thereafter.

4.23 The DTI made its own assessment of which pits might close in order to prepare measures to mitigate their impact. But it was not until 12 October that British Coal informed the President of the Board of Trade of the number and names of the pits it proposed to close.

4.24 The strong public reaction to the speed of the programme of closures proposed in British Coal's announcement on 13 October led the Government to announce a moratorium on closure of 21 of the pits involved. British Coal stated that the remaining 10 pits were currently loss making and had no prospect of viability in the foreseeable future. These pits are the subject of a consultation process being undertaken by British Coal. A study by Boyds to ascertain whether the criteria for their proposed closure are met was published on 18 March - *Independent Review: 10 Collieries under consultation.*

Employment trends

4.25 The mining redundancies proposed in October 1992 need to be seen in the context of the long term decline of employment in the coal industry.

4.26 The decline in numbers from around 1.25 million employees in the coal industry in 1920 continued to the point where British Coal had about 221 000 employees at the end of the 1984-1985 strike. By October 1992 this number had fallen to a little over 54 000. This historical trend is illustrated in Figure 4.3. In addition there were some 94 small scale private deep mines under development or in production. The total workforce in the private deep mined sector was just under 1 700. Direct employment by contractors at British Coal deep mines was over 6 000 and at opencast sites around 6 500. In addition, employment in private sector licensed opencast was estimated at around 2 500.

4.27 Until 13 October, British Coal had for many years maintained a policy of voluntary redundancies. When a pit closed, miners not wishing to accept redundancy

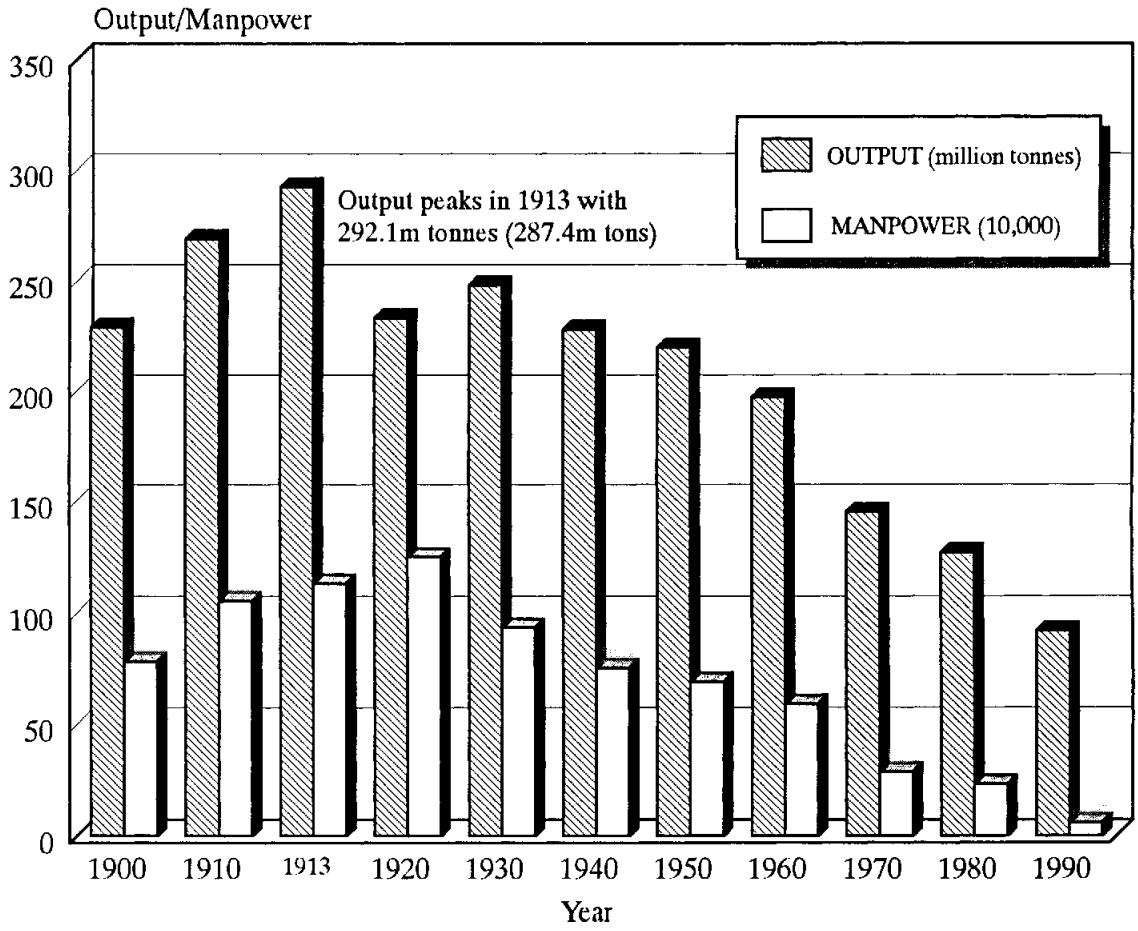


Figure 4.3: Contraction of the United Kingdom coal industry 1900-1990

were offered jobs elsewhere. Although many miners chose to leave the industry, the requirement to find jobs for those who wanted to stay left many pits overmanned. Partly as a result, the coal they produced was unnecessarily expensive, at a time when British Coal desperately needed to reduce costs in the face of competition not only from imports but from other fuels. British Coal therefore proposed compulsory redundancies in October 1992, with reduced numbers at pits scheduled to stay open as well as at those proposed for closure.

4.28 If the closure programme proposed in October had been fully implemented, British Coal's workforce would have fallen to around 24 000. Total employment in the coal mining industry would have been around 37 000, including British Coal contractors and those employed in the licensed sector.

4.29 The wider effects of these reductions are discussed in the next chapter.

CHAPTER 5

SOCIAL AND WIDER ECONOMIC ISSUES

5.1 Much of the evidence received by the Review has commented on the possible effect on individuals and communities of job losses on the scale involved in British Coal's announcement last October. There has also been comment on the possible consequences for other industries.

5.2 At the time of the October announcement, British Coal employed 25 700 people at the 31 pits. Their closure would have led to the loss of a further 4 000 jobs elsewhere in British Coal.

5.3 It is not possible to make precise estimates of the wider overall impact of pit closures on employment, either in supplying industries, or in mining communities. Even in industries that supply directly to coal deep mining, relatively few firms are entirely dependent on given pits.

5.4 Analysis provided by the Government to the Employment Select Committee suggests that if all 31 pits had closed, the effect might have been to put at risk a further 20-25 000 jobs in other industries and in local mining communities.

5.5 In looking at the likely effect on communities of the closures announced in October, it is natural to start from the labour market. The smallest scale on which consistent figures are available is the Travel to Work Area (TTWA). It is recognised that pit closures have their most significant impact on local communities, and that the effects, particularly in geographically isolated communities, will be more concentrated than an analysis at the TTWA level can show.

5.6 Appendix D shows the TTWA location of the 31 collieries originally scheduled for closure, the percentage of the workforce in employment in each TTWA represented by employment in those pits and the rates of total and male unemployment as at December 1992. The final column in Appendix D shows pit jobs at risk in closure TTWAs as a proportion of the estimated workforce in employment in June 1991, the latest period for which data are available.

5.7 Evidence to the Review by local government bodies, trade unions and colliery campaign groups reflects the extent of local concern about the social and economic impact of pit closures, especially in areas of already high unemployment; and in areas where the scale of closures in relation to local activity would have had a marked effect.

5.8 Much of the evidence to the Review which raised economic and social issues argued for time to adjust. Coal mining areas have in the past demonstrated a considerable capacity to adjust over time. Between 1987 and October 1992, 84 000

jobs were lost in British Coal. Over the same period, total unemployment in the areas where pits have closed actually fell, and the fall was faster than in Great Britain as a whole. This is part of a longer term pattern which has seen the number of British Coal deep mines fall from 980 at the time of nationalisation in 1947 to 50 now, and colliery manpower decline in the same period when real income in the economy has almost trebled with the emergence of many new industries and occupations.

5.9 Prospects for reemployment for many of those leaving the pits are helped by their age and skills. According to British Coal, nearly half the industrial staff at the 31 pits (not including managerial and clerical staff) are aged under 35, whilst only a little under 7% are aged 50 or over. Over a quarter are classified as technicians or skilled/semi skilled craftsmen, and in general the skills required in modern mining lead to a workforce that is able, adaptable, and competitive in the general labour market.

5.10 Local communities have also recovered from severe job losses. The scale of the changes that have already taken place in mining areas is itself evidence of that. In industrial South Wales, for example, there were significant colliery job losses during the 1980s which led to relatively high unemployment. Following a substantial and sustained effort to secure inward investment and develop indigenous industry, employment in the region as a whole grew from 604 000 to 656 000, between September 1984 and September 1989, an increase of 8.6 per cent. Although unemployment has risen since and problems continue, past efforts have made a significant contribution to the industrial restructuring of an area that for two centuries had relied on the coal and steel industries as the main generators of economic activity.

5.11 There are parallel examples from other industries. For example, unemployment in Corby rose to 6 691 following the loss of 3 500 jobs in steel making in 1979/80. Since then, aided by Assisted Area Status and significant Government expenditure, 11 000 new jobs have been created, and by November 1989 unemployment had fallen to 1 259. In common with the rest of the country, unemployment in Corby has increased subsequently but it remains below the level for the East Midlands as a whole.

5.12 As these examples show, communities and the individuals associated with them have proved in the past that they can be resilient and resourceful in the face of change, and that they are willing and able to secure new opportunities. Not least, with the help of Government measures, new jobs can be created and individuals resettled into productive employment.

5.13 Unemployment is a traumatic and distressing experience for the individuals concerned and their families. Constant turnover in the labour market itself gives rise to opportunities as up to 400 000 individuals come on to the count each month and a similar number usually leave. Moreover, on a national basis four out of five people who become unemployed cease to be unemployed within a year, and most do so more quickly. It follows that for the majority of those who become unemployed, this is unlikely to lead to permanent exclusion from the labour force.

5.14 Over time, as the economy adjusts and redundant workers find new employment, the loss of jobs from pit closures would be broadly matched by compensating

developments elsewhere. New jobs might be in different industries, and to some extent in different areas, but overall employment would return broadly to its previous level. If jobs in one industry were sustained by subsidy, even of a transitional kind, this would inevitably have an adverse effect on jobs and new job opportunities elsewhere, including other fuel industries and their suppliers. These potential effects are discussed further in Chapter 14.

Redundancy terms and assistance package

5.15 The Government agreed in October 1992 to fund generous redundancy terms for miners and white collar staff losing their jobs as a result of the proposed closures. On 17 March British Coal announced that its miners' scheme was to be extended until the end of December 1993. Payments to an average miner with 15 years service would be around £23 000, and payments to an average non-industrial employee would be around £27 000. These payments can be further augmented by cash sums in lieu of working a notice period. Around 9 500 staff have accepted these terms during the period of the Review.

5.16 Those leaving British Coal as a result of closures can also receive help from British Coal Enterprise (BCE), a subsidiary of British Coal. BCE has been operating successfully for a number of years. It has helped create some 83 000 employment opportunities since October 1984. BCE's activities include financial support to job creating businesses, the provision of managed workspace for new or expanding small businesses and the Job and Career Change Scheme (JACCS) a comprehensive job resettlement programme for ex-British Coal employees. Through JACCS, some 29 000 people - 85% of former British Coal employees actively seeking jobs during the period - have been resettled or retrained for identified jobs.

5.17 The Government has also recognised the serious impact of pit closures and the concentration of redundancies in particular localities that would result from them. In addition to the redundancy package, the Government announced in October a substantial and wide-ranging package of new measures to assist the coalfield communities. Measures included the advance commitment of Assisted Area status or enhanced status for Doncaster, Barnsley and Mansfield; assistance from European Community Structural Funds; a major programme of premises and sites provision by English Estates; a major Employment Department programme of training, counselling and job finding support from the Employment Service and the Training and Enterprise Councils; a Coalfield Areas Fund to provide immediate benefit to the communities; the introduction of new Enterprise Zones in areas where they would be most effective; extra help for inward investment promotion and additional activity in British Coal Enterprise. In Wales £43 million of public funds has been targeted on pit closure areas. These funds are being allocated for a variety of projects managed through local authorities, the Training and Enterprise Councils, and the Welsh Development Agency. **The Government has now decided to increase the amount available for regeneration measures to £200 million. The additional funds will allow important new major projects to go ahead which will promote new employment opportunities.**

5.18 Lord Walker was appointed in October 1992 to advise both the President of the

Board of Trade and the Secretary of State for Wales. His remit was to ensure that the regeneration measures are effectively coordinated and closely focused to bring real help to the areas concerned. These measures will aid the process of economic adjustment in closure areas, and help to sustain existing activity as adjustment takes place. Where necessary clearance will be sought from the European Commission for regeneration measures.

5.19 Change is inevitable in a modern industrial economy. Companies and industries rise, flourish and decline; and others take their place. Mining and its associated activities cannot be exempt from this process, which has been seen many times and in many places. The Government accepts the need to assist this process, for example through its regional and training policies. In some circumstances, such as adjustment to these closures, additional assistance may be needed to help the communities most directly affected to cope with change. The measures the Government has announced will aid the process of change in closure areas and help to sustain existing activity as adjustment takes place.

CHAPTER 6

THE STRUCTURE AND REGULATION OF THE ELECTRICITY MARKET

6.1 British Coal is critically dependent for its market on the electricity generation industry. This chapter sets out the structure of the market since privatisation.

6.2 Electricity privatisation saw the establishment of 19 new companies to take over responsibility for the vast majority of electricity supplies in England, Wales and Scotland. It also opened up the possibility for new players to enter the business of power generation and supply.

6.3 The greater part of the generating capacity of the old Central Electricity Generating Board (CEGB) was divided between three companies: Nuclear Electric, which remained Government owned, National Power, and PowerGen. In Scotland, the old South of Scotland Electricity Board was divided into Scottish Nuclear, which remained in the public sector, and Scottish Power which was privatised. The North of Scotland Hydro Electricity Board was privatised as Scottish Hydro Electric.

6.4 Low voltage networks distributing electricity to customers in England and Wales are owned by the 12 RECs. Subject to certain conditions, the RECs must make their networks available for use by third parties on the same terms as they apply internally to their own supply businesses. Each REC has a licence to supply customers in its own regional area. Customers using more than 1 MW are currently free to choose a supplier, and may buy from any REC or one of the generators or any other licensed supplier. The 1 MW limit - the franchise limit - is due to be reduced to 100 kW in 1994 and removed altogether in 1998. In Scotland, transmission, distribution and supply are the responsibility of Scottish Hydro Electric and Scottish Power. The same franchise arrangements apply as in England and Wales.

6.5 Transmission of electricity through the high voltage system in England and Wales is the responsibility of the National Grid Company (NGC), which is ultimately owned by the RECs. NGC also owns two pumped storage stations, which can be called to generate at very short notice, and is responsible for operating a wholesale market for electricity known as the "pool" and for settling accounts between generators and suppliers of electricity.

6.6 The main purpose of the pool is to match the supply and demand for electricity hour by hour, day by day, by determining which stations will run at any given time. It is a way of combining the benefits of central scheduling with a competitive market. Although almost all electricity passes through the pool, and prices are set by the pool, these prices do not reflect the terms on which most electricity is traded. "Contracts for differences" (CFDs) between generators and suppliers have the effect of settling in advance the price at which the vast bulk of electricity is bought and sold and thereby

provide protection against the uncertain price of electricity in the pool. Generators and suppliers will, however, often be exposed to pool prices at the margin. Some large consumers also buy directly at pool prices.

6.7 NGC is responsible for matching supply and demand in England and Wales. (In Scotland, Scottish Power and Hydro Electric perform this function themselves). Each day the generators indicate to NGC which of their generating units are available for each half hour of the following day, together with an offer price for their electricity output. The generators' offer prices are ranked in order, lowest first, by NGC until there is sufficient plant to meet the load expected on the system in each half-hour of the following day. The pool price at which electricity is bought and sold is the offer price for the most expensive plant required to meet the forecast demand for a given half-hour, plus a payment for capacity, which increases as the margin between the level of demand and the amount of capacity available falls. The pool selling price also bears an "uplift" charge to cover certain other costs associated with system operation.

Northern Ireland

6.8 In Northern Ireland there are four main generating plants with an installed capacity of 2 080 MW, together with auxiliary gas turbines with a total capacity of 240 MW. Prior to March 1992 all plant was owned and operated by Northern Ireland Electricity plc (NIE).

6.9 In March 1992 all four generating stations were sold individually by tender. One station (Ballylumford) went to British Gas, one (Coolkeeragh) to a management buy-out and the other two (Belfast West and Kilroot) to a consortium of Applied Energy Services and Tractebel. The purchase of Ballylumford was on the basis that British Gas will construct a pipeline from Scotland and convert the station to gas firing as a means of reducing the over dependence in Northern Ireland on oil for generation. The importance of these developments has been recognised by the European Commission which has approved a grant of up to 90 million ECU towards the cost. The Government has ensured that potential gas suppliers will have access to the pipeline, providing the opportunity for competition in the future development of the gas market in Northern Ireland. Decisions on the regulation of the future downstream market in gas will be taken at the appropriate time.

6.10 Transmission, distribution and supply of electricity is now the responsibility of NIE. At privatisation, power purchase agreements were signed between the generating companies and NIE. These contracts allow NIE to match supply and demand by scheduling and despatching the generators in a manner which reflects the characteristics of the plants and the agreed price of energy. The Government intends to sell its shares in NIE, the transmission and distribution company, as soon as possible.

Regulation

6.11 The Electricity Act 1989 established a new regulatory framework for the industry in Great Britain, and the post of Director General of Electricity Supply (DGES). The post is held by Professor Stephen Littlechild. He is supported by the

staff of the Office of Electricity Regulation (OFFER). There is a separate DGES and OFFER for Northern Ireland. The DGES is responsible for the economic regulation of the industry and for general supervision and enforcement of the licensing regime. His general duties include duties to exercise his functions under the Act so as:

(a) to secure that all reasonable demands for electricity are satisfied;

(b) to secure that licence holders are able to finance their licensed activities;

(c) to promote competition in the industry;

and, subject to the above:

(d) to protect the interests of consumers in respect of prices and other terms of supply;

(e) to promote efficiency and economy by those authorised to supply or transmit electricity.

6.12 The DGES has a wide range of regulatory and consumer protection functions. The most important regulatory functions are:

(a) granting of licences to new entrants;

(b) enforcement of licence conditions including:

(i) the operation of the price control formulae covering the transmission, distribution and supply of electricity (but not its generation);

(ii) other powers such as ensuring open access to the transmission and distribution systems;

(c) modification of licences by agreement or after reference to the Monopolies and Mergers Commission (MMC), including review and modification of the price controls;

(d) enforcement of general competition law in the electricity industry, carried out concurrently with the Director General of Fair Trading.

6.13 Electricity supply price controls are due to be reset from April 1994 and those for distribution from April 1995. New transmission price controls were announced last year and will come into effect in April. The DGES has already accepted a recommendation from the former Select Committee on Energy that not later than 1995 he should consider whether to recommend referral of the market for electricity generation in England and Wales to the MMC.

6.14 The Government reaffirms its commitment to a competitive market in electricity

generation, distribution and supply. It will support the DGES in his efforts to create and sustain competition in the industry.

CHAPTER 7

SUPPLY, DEMAND AND COMPETITION IN THE UNITED KINGDOM ENERGY MARKET

7.1 The previous chapters have made clear that the October 1992 closure announcements reflected the development of the United Kingdom energy market over the preceding years. This chapter considers the broad picture of supply and demand in the United Kingdom energy market. In accordance with the terms of reference of the Review, it considers the United Kingdom's coal and gas reserves, the international coal market, and the main competitors to coal in electricity generation: gas, heavy fuel oil, Orimulsion, nuclear and renewable sources, together with the operation of the electricity interconnectors, including that with France.

United Kingdom energy demand

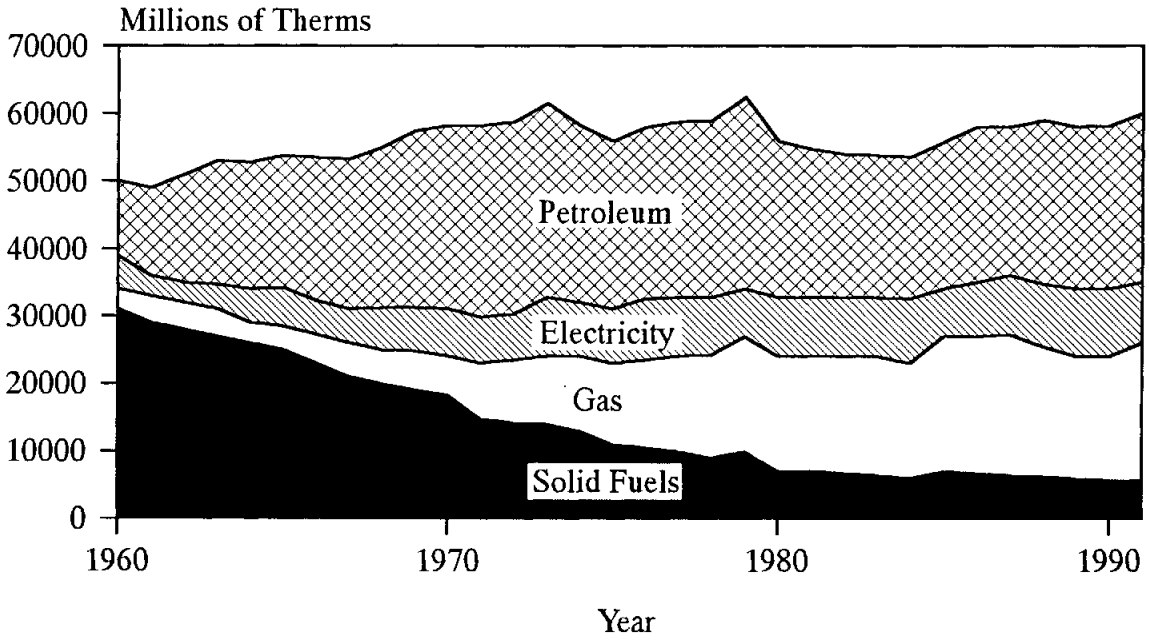


Figure 7.1: Final United Kingdom energy demand 1960-1991

7.2 Figure 7.1 illustrates trends in United Kingdom energy demand over the years 1960-1991. The decline in the market for coal outside electricity generation is clear. It is discussed in more detail in Chapter 11.

7.3 The DTI's recent Energy Paper 59 (*Energy Related Carbon Emissions in Possible Future Scenarios for the United Kingdom*) (EP59) suggests that for the period 1990-2005 final demand for energy in the United Kingdom could grow by between 0.6 and 1.8% per annum.

7.4 The critical market for British Coal lies in electricity generation. Over the last few years, total electricity demand has grown by around 2% a year, with the strongest growth in the commercial sector. Data for the first three quarters of 1992 suggests total demand in those nine months fell by about ½%. Given a return to average levels of economic growth, it seems likely that electricity demand will grow over the next five years by 1-2% a year, depending on fuel prices and the evolution of the economy. Increased use of energy efficient technologies is likely to exert downward pressure on demand. NGC forecast growth of around 1% a year, but this excludes demand growth met by non-centrally despatched generation (for example, surplus capacity from industrial own-generation), allowance for which gives a higher growth rate, closer to 1.5% a year. The central growth/low fuel prices scenario of EP59 suggests that electricity demand could be some 30% higher in 2005 than in 1990. Measures needed to meet environmental targets may, however, have the effect of slowing anticipated rates of growth in demand. For example, the application of VAT on domestic use of fuel and power, including electricity, from 1994 announced in the Budget, might reduce the total demand for electricity by around 1% in the long run.

United Kingdom gas supply and demand

7.5 The supply of gas depends partly upon the reserve base, partly upon the availability of a market; and both these factors are themselves affected by the price of gas.

7.6 The United Kingdom is fortunate to be one of the few gas-consuming countries of Europe which possesses substantial indigenous gas reserves. Natural gas was first discovered offshore in 1965 and production began in 1967. Since that time gas has been a growing resource for the United Kingdom. At one stage it was believed that reserves would have been depleted by now. In fact, in recent years the annual rate of discovery on the United Kingdom Continental Shelf (UKCS) has remained higher than the rate of production.

7.7 The DTI consults annually with all UKCS operators when preparing its estimates of the gas reserves of the United Kingdom. The Department's most recent estimates were published in the Minister for Energy's April 1992 report to Parliament, *Development of the oil and gas resources of the United Kingdom* (the "Brown Book"). These are summarised in Table 7.1.

7.8 Discovered recoverable reserves are the quantities of gas expected to be available from dry gas fields, gas condensate fields and associated gas found in oil fields. These reserves are expressed in three categories:

Proven: those reserves virtually certain to be technically and economically producible, having a better than 90% chance of being produced.

Probable: those reserves which are not yet "proven" but which are estimated to have a better than 50% chance of being technically

and economically producible.

Possible: those reserves which at present cannot be regarded as "probable" but which are estimated to have a significant but less than 50% chance of being technically and economically producible.

		(Billion cubic metres)
Discovered recoverable reserves		**1805**
of which:		
Proven	540	
Probable	695	
Possible	570	
Potential additional reserves		**135 to 305**
Undiscovered recoverable reserves		**260 to 1252**
Total (all categories)		**2200 to 3362**

Table 7.1: UKCS gas reserves at 31 December 1991

7.9 Potential additional reserves are discovered reserves which have not been sufficiently appraised for them to meet the criteria for inclusion in any of the preceding categories, while the category of undiscovered recoverable reserves provides an estimate of the extent of recoverable reserves not yet discovered, based on geological work on the UKCS. It is incomplete, because not all areas have been assessed. Estimates are available for the Central North Sea, Southern Basin, Irish Sea and, onshore, in the East Midlands, Weald, West and South East of England, North Yorkshire and Humberside. Estimates are not available for the West of Scotland, West of Shetland and other offshore and onshore areas. No estimate has been made of coal bed methane.

7.10 The threefold categorisation of reserves is widely used within the industry. Proven reserves can be regarded as immediately available "stock on the shelf" as this categorisation is only given after a development plan has been approved. Proving discovered reserves is expensive and is not undertaken in advance of a perceived market opportunity.

7.11 Reserves data evolve in two ways. Reserves recorded by the data are depleted by production (the cumulative production from the UKCS has been deducted from the reserves estimates above), but are also added to as the industry's appraisal activity

confirms the existence of reserves. The rates of exploration, appraisal and production reflect factors including demand, development costs, prices, levels of imports and technological developments.

7.12 The longevity of gas reserves depends on many uncertain factors. These include the rate of future exploration, appraisal and production of reserves, and the level of future demand, and these are themselves dependent on gas and other energy prices. The discovered reserves in Table 7.1 would last for just over 30 years at the 1991 level of consumption (59 billion cubic metres). The addition of the estimated potential additional reserves would raise this to up to 35 years and, if the undiscovered reserves were included, the duration would exceed 50 years.

7.13 Market demand for gas will rise. The extent and timing of this rise are uncertain. EP59 suggested a range of future gas demand scenarios up to 2020. By then, growth of demand for gas in EP59 is very slow (less than 2 billion cubic metres per year). An indication of the likely duration of the Brown Book reserves beyond 2020 can be provided by assuming an unchanged rate of demand in subsequent years. On this assumption, and before taking into account any trade in gas, the total discovered reserves and the range of undiscovered reserves in the 1991 Brown Book could meet the top end of the EP59 range for between 23 and 31 years before being fully depleted. On a similar basis, these reserves could meet the lower end of the range in Energy Paper 59 for between 25 and 33 years.

7.14 The evidence received by the Coal Review included several submissions which discussed gas reserves. The consensus was that UKCS reserves fell within the Brown Book range: several major producers gave estimates near the top of that range. There was a range of views on how long UKCS reserves might last. Some contributors thought that gas could not meet prospective future demand at acceptable prices, but the major producers considered that United Kingdom gas reserves could meet all United Kingdom demand, including expected growth, for at least 20 years, and some of them put the duration at more than twice as long. TISC considered that "as realistic an estimate as any" was that of British Gas who estimated that, taking account of the increase in demand, the United Kingdom's gas reserves could last for about 40 years.

7.15 Most submissions made the point that future availability of reserves is as much influenced by market considerations and the extent of trade in gas as by geology. Gas producers argued that recovery of gas reserves would depend on the United Kingdom remaining a stable environment in which companies had confidence to commit to large-scale investments.

7.16 In their submissions to the Review, North Sea gas producers indicated the importance they attached to the Government's approach to liberalising the gas and electricity markets in assessing the attractiveness of the UKCS for future investment. But they warned that the confidence of North Sea producers would be seriously eroded if, as a result of the Review, the sales contracts which they had entered into with power station customers were to be frustrated, or if the prospects for further gas fired generation were artificially limited. Producers have pointed out that large-scale investments in offshore infrastructure have been made in the expectation that gas would

be allowed to compete freely in the power generation market. If this infrastructure were under-utilised, as a direct result of measures taken to increase markets for coal, producers would be reluctant to commit to further gas-related UKCS investment. This would in turn have a significant impact on development and hence on jobs offshore and in the onshore supply industries.

7.17 Several submissions made the point that some gas reserves are economic to develop only if the gas can be used in large plants such as power stations. This can arise because the gas may contain impurities such as nitrogen or sulphur in such high concentrations that it would be prohibitively expensive to prepare it to the specification required for it to be transported through the public gas supply system. The only outlet for such gas is likely to be through a dedicated pipeline to a power station. Another example may arise where the gas field is located in an area where there is inadequate pipeline capacity to transport the gas from the beach through the public gas supply system to existing markets. In this case, the only economic outlet for the bulk of the gas may be a large new generating plant close to where the gas lands. In the case of onshore gas developments, it may, depending on distance and terrain, be uneconomic to construct pipelines to link into the public gas transmission pipelines and the only economic outlet may be a small power station close to the wellhead.

7.18 In cases where power generation is the only economic outlet for the gas, and that outlet is not available, development of the field would be jeopardised. There would be similar implications for some oil developments where there was associated gas which was unsuitable for public supply and could not find another use.

Trade in gas

7.19 The United Kingdom has since 1977 supplemented its own indigenous supplies of gas by imports from the Norwegian Continental Shelf. The contribution of these imports to total United Kingdom supply peaked at over 28% in 1984, but had fallen to 10.1% by 1991. In recent years there has been a developing momentum towards freer trade in gas across Europe. The Government welcomes this and expects shortly to sign a gas pipeline treaty with the Republic of Ireland. Some United Kingdom gas has been sold to the Netherlands and Germany from the transboundary Markham field and a number of Continental buyers have shown interest in making further purchases in the future.

7.20 There is at present no gas interconnector between the United Kingdom and mainland Europe although several companies are currently carrying out studies into the commercial feasibility of such a link. Integration with the Continental gas grid would have important benefits. It would offer alternative markets for UKCS gas, permit two way trade with other European countries and give United Kingdom customers access to gas from other sources in the longer term.

7.21 It has been estimated that some three quarters of the world's proven reserves of gas are potentially within technical and economic reach of the United Kingdom market. The extent to which the United Kingdom participates in future gas trade - and timing of this involvement - will influence the rate of depletion of the gas reserves of the

UKCS.

Gas prices

7.22 The United Kingdom price of gas at the beach can be expected to move more closely in line with the traded price of gas in Western Europe as physical integration with the Continent and development of the EC internal energy market take place. The price of natural gas in Western Europe has historically been closely aligned with the price of corresponding oil products. Given the important contribution to world oil production from regions which have proved vulnerable to conflict and political instability, it would be rash to assume that oil prices will not be subjected to sudden shocks brought about by political crises. The broad consensus of views reflected in the evidence submitted to the Review, however, is that oil prices are likely to remain at or about current levels in real terms for some years. Some commentators believe that this situation could persist beyond the end of the decade, whilst others believe that some gradual real oil prices increase is likely later this decade as the existing excess of supply over demand is eroded by rising demand and as new higher cost capacity is developed in some producing areas.

7.23 Some oil and gas producers and other commentators also believe that the huge expansion of demand for gas in the Western European market will result in some real price increase in future contracts in order to secure the development of the substantial but more distant sources of supply. It is not, however, universally accepted among commentators that such price rises will necessarily occur. A number of those submitting evidence draw a distinction between the price of new gas supplies and gas already contracted. They note that where contracts have been agreed the contract terms usually offer long term price stability against other fuels. The balance of evidence received suggests that gas will remain fully competitive with other fuels.

Coal Reserves

7.24 Many of the considerations relevant to gas reserves apply similarly to coal reserves. It is an underground resource requiring exploration, appraisal and development, followed by sale into an uncertain market.

7.25 There is no one internationally recognised and uniform method for the recording, categorisation and designation of coal reserves. This has resulted in the development of a number of different definitions and methods. British Coal divides its estimates of recoverable reserves into Classified and Unclassified Reserves. Classified Reserves are those which British Coal considers able to support mining projects at the time of classification and which it therefore regards as economically recoverable. Unclassified Reserves are those which are unable to support mining projects at the time of classification. They are divided into speculative reserves (tonnages which appear attractive, but where the geological information is insufficient to support a mining project) and reserves which are uneconomic.

7.26 Boyds regard British Coal's procedures for classifying reserves as acceptable, and consider that the resulting Classified Reserves offer a conservative statement of a

colliery's available coal reserve base. They do not accept, however, that all Classified Reserves will necessarily be economically recoverable since this depends on world coal prices. Boyds regard British Coal's definition of Unclassified Reserves as comparable to equivalent categories in international coal resource standards.

7.27 The vast bulk of the nation's coal resources are not within the take of currently operating pits. In their evidence to TISC, British Coal estimated that the 50 pits plus Asfordby (currently under development) had Classified Reserves of 1 084 million tonnes and Unclassified Reserves of 1 102 million tonnes. Figures supplied to Boyds for the 41 pits they considered in their work for the Review were based on slightly earlier data. For those 41 pits, British Coal estimated Classified Reserves of 883 million tonnes and Unclassified Reserves of 1 232 million tonnes. The differences illustrate the difficulty in being precise about reserves, even at existing pits. On either set of figures, however, reserves at existing pits are barely 1% of the 190 billion tonnes which, in their 1991/92 Annual Report, British Coal estimated lies under the United Kingdom in seams over 0.6 metres thick, and less than 1 200 metres deep.

7.28 British Coal judges that, of this 190 billion tonnes, 45 billion tonnes could be brought to the surface using known technologies. But this figure takes no account of the cost of extracting the coal or of whether planning permission could be obtained. The cost of extraction is such that there is no prospect of it becoming economic to exploit more than a small proportion of the coal which could be mined. Even at existing mines it is not economic to recover all the coal that could be accessed.

7.29 There is inevitably considerable uncertainty about any assessment of the size of economically recoverable reserves. Estimates depend on assumptions about the future level of costs and about the prices of alternative fuels and coal imports. On current expectations, a programme of investment in new mines could not be economically justified. This is likely to remain the case for the foreseeable future. The reserves which can be economically mined are therefore effectively limited to those which can be accessed from present workings. Reserves elsewhere will, however, remain to be exploited by future generations, perhaps with different technology, should it become economic to do so.

7.30 British Coal's estimate that there are 2.1 billion tonnes at the 41 pits analysed by Boyds includes some Unclassified Reserves which could be accessed by relatively minor works from present mine workings. For this reason, Boyds added 153.8 million tonnes of Unclassified Reserves to British Coal's Classified Reserves to arrive at a total of around 1 billion tonnes of estimated immediately accessible reserve base at the 41 pits, as the basis for their own work.

7.31 The potential duration of coal reserves is inherently extremely uncertain, depending on depletion rates, which become very difficult to forecast even a few years into the future, as well as on mining techniques, production costs, coal demand, coal prices, and the price of competing fuels. In answer to a question from TISC, British Coal stated that currently economically viable reserves at continuing mines would have a life of between 20 and 40 years.

7.32 In addition to the reserves of bituminous coal in Great Britain, there are reserves of lignite in Northern Ireland. Some of these could be economic if used by a mine mouth power station. Lignite will be able to compete against other fuels in the planned competition for the next tranche of generation in Northern Ireland. There are no significant reserves of lignite in Great Britain.

7.33 The United Kingdom's coal reserves are small by international standards. For illustration, coal underlies less than 15 000 square miles of the nation's land area compared to more than 450 000 square miles of the USA. Assessment of world coal reserves is difficult because different countries produce figures on different bases but the general view in the industry is that United Kingdom coal reserves amount to less than 1% of the world total. For example, figures quoted in the World Energy Council's 1992 Survey of Energy Resources suggest that United Kingdom reserves account for less than 0.6% of the world total for anthracite and bituminous coal and less than 0.4% of the world total by tonnage of all coal, including lignite. Not included in these world totals are the probably large undiscovered resources of coal in the southern hemisphere, where only Australia and South Africa have been explored to any extent.

The international coal market

7.34 Coal is found in many parts of the world, with a significant proportion in developed countries. There is a wide range of coal exporting countries, including Australia, China, Colombia, Indonesia, Poland, Russia, South Africa, the USA and Venezuela. In 1991, 218 million tonnes of steam coal were exported world-wide, with Australia, South Africa and the USA accounting for almost two thirds of the total. The coal trade, unlike some other mineral markets, is not heavily concentrated in the hands of a small number of companies. The diversity of coal reserves and exporters makes it unlikely that political factors or a cartel will in future pose a threat to supplies.

7.35 Prior to 1973, imported coal was uncompetitive with heavy fuel oil in European markets and European coal imports were largely restricted to coking coal. The two oil price shocks in 1973 and 1979 led to a sharp rise in coal demand and a temporary rise in coal prices. Coal production capacity and transportation links have, however, since developed to the extent that coal has to a considerable extent displaced heavy fuel oil from electricity generation markets. The price of heavy fuel oil tends to provide a ceiling for the price of internationally traded steam coal, but oil prices are not otherwise a major determinant of coal prices.

7.36 The entry of new competitors into the international steam coal market led to a sustained fall in prices during the early and middle 1980s. Prices reached a low point in 1987 and Table 7.2 shows that they then increased until 1990/91. Movements in shipping freight rates as well as coal export prices contributed to this trend. Prices weakened in 1991/92 and have weakened further during 1992/93 due to an excess supply of coal on the world market, to which the world recession and a series of warm winters in Europe have been contributory causes. The price rises in 1988 and 1989 were sufficient to induce a large expansion in coal export capacity world-wide. The regular survey published in IEA Coal Information showed, in 1991, that potentially available coal exporting capacity was 107 million tonnes or 30% in excess of total

	Average Import Price	Marker Price For Imported Coal (MCIS)	Marker Price For Imported Coal (DTI)	Average Import Price	British Coal Price	Exchange Rate
	$/tonne	$/tonne	$/tonne	£/GJ	£/GJ	$/£
1985/86	42.10			1.27	1.86	1.38
1986/87	38.13			1.06	1.77	1.49
1987/88	35.41		33.56	0.87	1.73	1.70
1988/89	38.72		38.83	0.91	1.79	1.77
1989/90	42.03		41.65	1.08	1.77	1.62
1990/91	44.27		42.75	1.00	1.77	1.85
1991/92	42.77	40.41	41.74	1.03	1.83	1.74
92Q2	42.21	38.39	39.09	0.97	1.85	1.81
92Q3	42.86	34.78	37.09	0.93	1.85	1.92
92Q4		34.44	36.77		1.85	1.58

Notes

1) Expressed in money of the relevant period.

2) All figures adjusted to 24 GJ per tonne. Price for imported coal is at the port and for British coal is at the pithead.

3) The average import price for power station coal is from European Commission figures (original basis: 29.3 GJ/tonne).

4) The McCloskey Information Services (MCIS) marker price is as published in FT International Coal Report (original basis 25.1 GJ/tonne). This is the best indicator of spot prices. The MCIS marker price is only available since 1991. Therefore a DTI estimate of the marker price, based on coal export prices and freight rates quoted in Coal Week International, is also shown. This may partly reflect contract as well as spot prices.

5) Figures exclude delivery costs. Delivery costs for British coal average about 15p/GJ to 20p/GJ from the pithead to inland power stations and 40p/GJ for coastal stations. Delivery costs for imported coal would be about 20p/GJ to 25p/GJ to coastal stations, (less for coal from the Baltic which might be delivered direct) and from 30p/GJ to 50p/GJ to inland stations, including the cost of new deep water ports.

Table 7.2: Comparison of prices for power station coal

seaborne demand for steam and coking coal. There were at that time 63 million tonnes of additional coal export capacity under construction across the world and a further 208 million tonnes of capacity expansion planned.

7.37 The average price of power station coal imported into the European Community was around $43 per tonne ($1.78 per GJ) in 1991/92 (based on prices at the port). These average prices reflect both contract and spot purchases, although most coal is

purchased under contract. The spot price for a single delivery to North West Europe of imported coal has since fallen to around $33 per tonne (according to the MCIS marker price as published in FT International Coal Report for February 1993 and adjusted to 24 GJ/tonne). Caminus suggest that the price of internationally traded steam coal is expected to average about $38 per tonne for the year 1992/93. Current indications are that average import prices will fall further in 1993/94 as the proportion of spot purchases is likely to increase and contract prices weaken in response to lower spot prices. These factors may outweigh the effect of any increase in shipping freight rates.

7.38 The sterling price of imported coal also depends on exchange rate movements; both the exchange rate of sterling against the US dollar and of the US dollar against other coal exporting countries (which affects the level of international coal price in US dollars) are relevant. Nevertheless, Table 7.2 shows that, despite exchange rate fluctuations, British coal has remained between 50% and 100% more expensive than imported coal throughout the period 1985/86 to 1992. Expectations about the future US dollar price of imported coal are discussed below. The Review's analysis has made no assumptions about future exchange rate movements.

7.39 Some commentators, including some submitting evidence to the Review, have suggested that the low price of imported coal results from poor employment conditions and exploitative labour practices. Such practices may occur, and, if so, the Government strongly condemns them. There is, however, little evidence that they are an important influence on world coal prices: the largest exporters - such as the USA and Australia - employ modern capital intensive techniques and efficient working practices which are reflected in low costs.

7.40 Some of the evidence to the Review suggested that a likely increase in shipping freight rates would contribute to higher coal prices over the next five years. Other evidence suggested that the average Rotterdam import price of power station coal was likely to remain at $40 or below. None of the evidence suggested a price as low as the current spot price of $33 nor was there evidence expecting a large increase in prices during this period. The price, especially the spot price, may be volatile but a substantial sustained price increase seems unlikely, given remaining excess steam coal export capacity. TISC suggested that the consensus view was that the price delivered to Rotterdam in 1997/98 would be in the range $45-50. This is based on 26 GJ/tonne, and adjusting it to 24 GJ/tonne produces a range of $41.5-46. Caminus used figures for 24 GJ/tonne coal of $38 and $45, reflecting the range within which average prices may lie in real terms (1992/93 prices) over the period 1993/94 to 1997/98.

7.41 There are different views about the likely trend of real coal prices in the longer term (2000 and beyond). The evidence quoted by TISC suggests only a slow rise or none at all. It may, however, be better to say simply that the longer term coal price remains highly uncertain.

Relative costs of electricity generation from gas and coal

7.42 A large volume of evidence and much public debate, has addressed the relative costs of generating electricity from coal and from gas. The Review has considered the

range of evidence about these costs.

7.43 In practice, comparisons of costs between different stations are affected by a number of factors: the type and location of individual stations; the cost of fuel at each station, both now and in the future; expectations about the volume of electricity which can be sold from each plant; and expectations about future environmental regulations. Decisions to purchase electricity are, however, based on the **prices** at which it is offered for sale, rather than on its generation **costs**. Cost comparisons therefore provide only a partial picture of coal stations' relative position in the market place; this point is discussed in paragraph 7.55 below. With these qualifications in mind, the following broad conclusions can be drawn.

7.44 Where both coal and gas stations are already in existence, all other things being equal, the marginal costs of running the stations should determine for how long each should be run. Marginal costs depend mainly on the cost of fuel. Most of the CCGTs, either completed or under construction, have secured gas on more favourable terms than the current British Gas price schedule, and it is likely that their fuel and other variable costs will therefore be below those of existing coal stations, even when coal is available at imported prices. In these circumstances, these stations should be run on baseload (that is used to generate electricity more or less continuously).

7.45 Where the choice is what type of new capacity to build, whether to replace retired plant or to meet the growing demand for electricity, the relevant comparison is between the full costs of new coal plant and new gas plant. This comparison is, therefore, relevant to the longer term prospects of each fuel. A common theme in the evidence submitted to the Review is that it would require a large drop in coal prices or a big rise in gas prices for new coal plant to compete with new CCGTs. Estimates of the gas price required before new coal plant would be competitive with gas range from 28p to 34p a therm - substantially higher than current levels. Conversely, it seems likely that, at current gas prices, even with a pit head coal price close to zero, new baseload coal plant (which would need to incorporate Flue Gas Desulphurisation (FGD) equipment) would be uneconomic compared with new CCGT plant. It is, therefore, clear from the evidence that new coal fired power stations would not be competitive with new gas fired capacity at anything like current fuel prices. If new generating plant is to be built, gas has clear economic advantages over coal.

7.46 Much of the debate during the period of the Review has been about the comparative costs of building and operating new gas fired stations as against the costs of continuing to operate existing coal fired plant. This comparison is relevant to decisions about whether to invest in new capacity which will displace output from plant which is already on the system.

7.47 Many of those submitting evidence suggested that, in the case of plant running on baseload, the costs of generating electricity from existing coal fired stations were lower than the costs of running a new CCGT. For an existing station only the **avoidable costs** of existing stations are relevant (that is those costs incurred as a result of running an existing power station rather than not running it but excluding sunk costs such as the initial capital investment), whereas the **full costs** of the planned gas stations, including

the costs of the initial capital investment and a rate of return, must be covered. This produces a result which is more favourable to the existing coal stations.

7.48 There is some debate about whether some costs, such as corporate overheads, can properly be regarded as avoidable. Different views were given in evidence to the Review. In practice, even where overheads vary with output, this is not likely greatly to affect the comparison between different types of plant. The most straightforward assumption for present purposes is, therefore, that a narrow definition of avoidable costs is appropriate.

7.49 A related question is whether the costs of existing coal stations should also include a margin to cover additional capital costs to keep the stations going, fund debt payments and provide a return to shareholders sufficient to ensure that the company owning the station is viable and able to meet its outstanding obligations. Although the two main generators have not overtly sought to price their coal fired output on this basis, it is nevertheless relevant to a comparison of long run costs and to the price levels necessary to sustain an ongoing generation business. The DGES announced on 23 February that he had requested information from the generators which will allow him to assess and monitor their margins. In order not to pre-judge the DGES' investigation, the cost comparisons reported below do not make any allowance for a margin on top of fuel and running costs in existing coal stations and therefore understate the price at which coal fired generation has been or is likely to be offered for sale. This is discussed further in paragraphs 7.55 and 7.56 below.

7.50 The comparison between the costs of generating with existing coal fired and new gas fired plant requires a range of other assumptions, for example about the proportion of the time which each plant will be run - its "load factor" - and about its efficiency. Drawing on evidence submitted to the Review and on the work of Caminus on these and other factors, the following broad conclusions about today's costs in plants of average efficiency may be drawn.

(a) At the prices in the prospective contract for British Coal supplies from April 1993 onwards, the avoidable cost of generating electricity from large existing coal fired stations (using 500 MW turbines) is generally less than the full costs of a new CCGT, assuming that both run on baseload.

(b) The smaller coal generating sets are typically less efficient, and operate at a lower load factor, than the big 500 MW sets. They have higher avoidable costs per kWh which broadly fall within the range of the full costs of generating from CCGTs (though those CCGTs which have access to the cheapest supplies of gas tend to have full costs which are lower than the avoidable costs of the smaller coal sets).

(c) The environmental disadvantages of coal also affect the comparison. The relative position of gas is much stronger when FGD is retro-fitted to coal burning plant. If a carbon tax were imposed on fuels in order to encourage lower emissions of CO_2 (as part of a package of measures

designed to allow the United Kingdom to meet its commitments under the Climate Change Convention; see Chapter 8) this would further favour gas. In assessing the relative cost of a new CCGT compared to an existing coal station, potential purchasers will have taken a view on the likelihood of coal's competitive position worsening as a result of environmental measures.

7.51 TISC analysed in some detail the relative costs of electricity generated by coal and gas fired stations. The Committee's conclusions on the comparative costs of baseload stations (set out in paragraph 106 of their report) are broadly in line with those of the Review. The above analysis, however, compares the costs of gas stations with a mix of both baseload and non-baseload coal fired plant. This is the appropriate basis for a comparison with a new CCGT because output from CCGTs will in practice displace output from both baseload stations and from more expensive non-baseload stations.

7.52 A comparison of the costs of electricity from new gas fired stations and from existing coal stations, based on the gas and coal prices on offer at the time decisions were taken and taking into account the mix of coal stations likely to be displaced by CCGTs, generally shows coal fired generation to be as costly as that from gas, even before allowance is made for the additional costs identified in paragraphs 7.48 and 7.49. The opening up of the generation market to competition following electricity privatisation enabled new generators to enter the market, and CCGTs provided the obvious technology for them to use to get new capacity into the market-place quickly. This provided an important spur to improved efficiency on the part of the established generators.

7.53 More recently, the balance of advantage between existing coal and new gas stations has been changing: most notably, the prices offered by British Coal under the proposed 5 year contract have fallen while gas prices have risen (most CCGTs have contracts which provide them with gas which is significantly cheaper than that available on the current British Gas schedule known as LTI 3). At current prices, provided existing coal fired power stations have similar overheads to CCGTs, do not incur additional costs, such as FGD, to meet environmental obligations, and are not expected to earn a margin above avoidable costs, they can offer strong competition to as yet unbuilt CCGTs. The less that these conditions are met, however, the weaker the competitive position of existing coal stations will become.

7.54 Even now, it is quite possible that further gas fired projects may be economic, particularly where gas can be bought from independent suppliers; where there are supplies of gas which would not otherwise have a market in the public gas supply system; or where the project is a Combined Heat and Power plant. Decisions by the existing major generators and the Independent Power Projects (IPPs) on the one hand, and the RECs on the other, will continue to be based on a range of assumptions about the likely changes in costs, and the likely development of competition. In particular, the balance of advantage is likely to shift again as environmental regulations further restrict the use of coal.

7.55 The decisions by the RECs to purchase electricity from new sources were, of course, based not on the underlying **costs** of generation but on the **prices**, including a margin above costs, that were offered by the generators. DGES's recent Review of Economic Purchasing (see paragraphs 10.39 to 10.45 below) concluded that, at the prices which National Power and PowerGen were recently offering the RECs for coal backed contracts, gas backed contracts were as cheap or even cheaper. The issue was whether, after allowing for all reasonable costs, the generators could have been expected to have asked the prices they did for the output of existing coal fired stations.

7.56 The prices asked by the generators were almost certainly above the level of avoidable costs (even taking a broad definition of such costs). Market prices will, however, tend to reflect the full costs of new entrants, rather than the avoidable costs of incumbent operators. The issue of the major generators' profits is considered in paragraphs 10.46 to 10.48 below.

Heavy fuel oil

7.57 Heavy fuel oil is the residue left from refining crude oil to make lighter petroleum products. It is supplied directly from refineries or can be purchased as a product on the international market. The price of heavy fuel oil is determined by the international market and generally stands at 65-75% of the crude oil price. Heavy fuel oil with higher sulphur content, typically around 3%, sells at a discount to low sulphur fuel oil and the price difference has widened as environmental regulation has become tighter. Heavy fuel oil also bears excise duty at a rate of £1.05/litre, equivalent to about £10.61/tonne, currently representing about 14% of its cost to the customer. Heavy fuel oil is cheaper to transport and can be burned more efficiently than coal. Since many major power utilities abroad are able to switch from coal to oil burning, the price of heavy fuel oil sets an upper limit to the price of coal in the international market.

7.58 There were some 9 GW of oil burning thermal power stations in Great Britain and a further 4 GW of dual and mix fired capacity at the end of March 1992. These power stations were built in the 1960s and early 1970s when oil was relatively cheap, and have run at low levels of utilisation since the oil price increases of the 1970s, mostly to satisfy peak requirements or niches within the grid. Between 1987 and 1991 power station oil consumption fluctuated between 5 and 7 million tonnes a year. Approximately 70% of Northern Ireland's generating capacity is oil fired.

7.59 During 1992, heavy fuel oil consumption at United Kingdom power stations fell to below 5 million tonnes, despite low crude oil prices and fuel oil prices at a historically large discount relative to crude oil. Oil industry evidence to the Review suggests that the power station market for fuel oil is expected to decline further. The need to run oil fired stations to meet the requirements of the grid in England and Wales is likely to disappear as gas fired stations, particularly in the South East, are commissioned. In analysing the likely future fuel mix for electricity generation during the Review, it has been assumed that after 1995 heavy fuel oil will effectively be limited to a role as a standby or emergency fuel, although it could potentially have a larger role if there is a significant realignment of the relative prices of oil and coal.

Orimulsion

7.60 Orimulsion (a registered trademark) is an emulsion of bitumen and water produced in Venezuela. It is being evaluated by both National Power and PowerGen for use in converted oil fired power stations which are currently underutilised. Orimulsion has a high sulphur content (typically 2.8% against 1.6% average for British coal received by the England and Wales electricity supply industry) and, in the absence of FGD, a higher level of sulphur emissions for each unit of electricity generated. Its combustion produces less dust than coal, but more than oil. The fitting of FGD equipment would remove up to 90% of the sulphur emissions and would also trap the bulk of the residual particulates which would otherwise escape from the electrostatic precipitators. The energy content of Orimulsion is approximately 10% higher than coal.

7.61 The CEGB started trials at Ince, Cheshire, in 1988 when a single burner was modified to allow the burning of 200 tonnes of Orimulsion. Further trials, chiefly by PowerGen, at Ince and at Richborough, Kent, led to the burning of one million tonnes in 1991. Both Ince and Richborough are fitted with electrostatic precipitators. PowerGen have certificates of registration from Her Majesty's Inspectorate of Pollution (HMIP) under the Health and Safety at Work Act etc 1974 to burn Orimulsion at these stations. These specify that releases of sulphur must be no greater than if burning heavy fuel oil on full load.

7.62 National Power has applied for authorisations under the Environmental Protection Act 1990 to burn Orimulsion at Pembroke and Padiham power stations although these applications have now been suspended while National Power considers the commercial prospects. PowerGen has similarly applied to continue burning Orimulsion at its Ince and Richborough stations. HMIP are currently considering what measures may need be taken to control emissions from power stations burning Orimulsion, within the criterion of best available techniques not entailing excessive cost.

7.63 In the past, Orimulsion has not been subject to excise duty. Two important EC directives were, however, approved by the Council on 19 October 1992. Directive 92/81/EEC concerns the structures of excise duties on mineral oils, and potentially subjects Orimulsion to excise duty. It provides that where mineral oils are not allocated a specific rate of duty, but are used as heating fuel or motor fuel, the rate to be charged will be the same as the rate for the fuel for which they are a substitute. Directive 92/82/EEC prescribes the minimum rates of duty. It does not allocate a specific rate to Orimulsion, but sets a minimum duty of 13 ECU/tonne (about £10/tonne) for fuel oil. The Chancellor of the Exchequer announced on 16 March that he would extend hydrocarbon oil duties to all fuel substitutes, including Orimulsion. The excise duty on Orimulsion will be linked to that on fuel oil.

7.64 There are existing contracts for the import of Orimulsion into the United Kingdom, with which the Government cannot legally interfere. The Government has, however, been informed by the Venezualan authorities that Orimulsion exports to the United Kingdom are likely to stay at their minimum contractual level for the foreseeable future. This should entail a reduction in the consumption of Orimulsion in the United Kingdom of at least 500 000 tonnes of coal equivalent a year from current

levels.

Nuclear

7.65 The two main nuclear generators in the United Kingdom are Nuclear Electric and Scottish Nuclear. They use two types of reactor: Magnox reactors built in the 1960s, and Advanced Gas-cooled Reactors (AGRs) built in the 1970s and 1980s. The new Sizewell B station, which is under construction by Nuclear Electric, is a Pressurised Water Reactor.

7.66 Electricity supply by nuclear generation in the United Kingdom is currently around 65 TWh a year, accounting for about 20% of available electricity. This has been rising gradually and is expected to continue to rise, to around 80 TWh in the mid 1990s, as existing reactor performance is improved and Sizewell B comes on stream. The current plan of Nuclear Electric is progressively to close its seven Magnox stations by the early years of the next century, with the eventual loss of about 20 TWh per year. Scottish Nuclear's one Magnox station is already being decommissioned, as is an eighth Nuclear Electric Magnox station, at Berkeley.

7.67 The construction times of nuclear reactors are such that no new stations begun now could generate electricity before 2000. No nuclear stations will be given capital approval by the Government pending the outcome of a review of the future prospects for nuclear power (see paragraph 7.80 below).

7.68 Those submitting evidence to the Review on the role of nuclear power in the electricity market are divided between advocates of a reduction in nuclear output and the removal of its perceived protected status in the market, primarily to make more room for coal, and those arguing for no change in nuclear generation's market share or status.

7.69 The first group is made up largely of coal mining interests, supported to some extent by consumer groups, environmental groups, and the privatised generators. This group argues that coal is being unfairly pushed out of the electricity market by subsidised nuclear power; that the Non Fossil Fuel Obligation (NFFO) and the fossil fuel levy (see paragraphs 7.81 to 7.83 below) should be abolished, to benefit coal and/or electricity users; and that substantial reductions in nuclear output should be made. Many of them advocate closing the Magnox stations only, but some also argue for shutting some AGRs and deferring the start-up of Sizewell B.

7.70 The second group includes all the major players in the nuclear industry, together with unions and employers' groups and some academics. They see nuclear as a natural partner for coal, and point out its advantages in helping the United Kingdom to meet its environmental targets. They also point out the large number of jobs dependent on the nuclear industry. The nuclear industry argues that it is working very hard to improve the competitiveness of its stations. The industry also argues that it makes good economic sense to continue running its existing stations because the vast bulk of Magnox decommissioning and reprocessing costs are already committed and unavoidable, and that the avoidable costs are low. This argument is considered in more

detail below.

The costs of nuclear power

7.71 The overall cost of electricity from nuclear power stations in the United Kingdom is high. Including allowances for past capital costs and for future reprocessing, waste management and decommissioning, the average operating cost per unit sold by Nuclear Electric in 1991/92 was 3.9 p/kWh. The argument about the economics of continued operation of existing nuclear power stations depends, however, not on the **total** accounting costs of generation but on the **avoidable** costs. Avoidable costs include only those costs incurred as a result of continuing to operate power stations rather than closing them. They exclude the capital cost of building the plant and the costs of decommissioning the stations when closed.

7.72 Evidence provided by Nuclear Electric to TISC and to the Review gave estimates for the avoidable cost of continuing to operate a single Magnox station as being 1.2 p/kWh on average and the avoidable cost of continuing to operate all Magnox stations as being some 1.5 p/kWh. The latter cost is higher because there would be significant fixed costs that could be saved if all the stations were closed, but which would continue to be carried if some stations were to remain open.

7.73 In view of the doubts expressed in other evidence to TISC and to the Review about the true costs of nuclear electricity, and in particular of continued operation of the Magnox stations, the Government commissioned Ernst & Young to assess and analyse data supplied by Nuclear Electric in respect of its Magnox stations. Ernst & Young were assisted by Nuclear Electric's auditors. Their report, *Review of Magnox avoidable and unavoidable costs*, and a short supplementary report of the same title, were published on 9 February. Copies can be obtained from the DTI Energy Library (address in Appendix C).

7.74 Nuclear Electric considered six scenarios:

(a) **immediate total closure** of all 7 Magnox power stations;

(b) **immediate partial closure**, in which 5 stations representing about half the total output would be closed;

(c) **continued operation to 30 years**, which envisages operating the stations to the end of a 30 year life, except for Bradwell which operates for 36 years; this is in line with the accounting lives reflected in Nuclear Electric's accounts for 1991/92;

(d) **continued operation to 32 years** average life;

(e) **phased closure** with the last station closing in 1998/99;

(f) **accelerated phased closure**, with the last station closing in 1996/97.

Ernst & Young looked at the total future cash outflows of each of the scenarios.

7.75 Ernst & Young confirmed Nuclear Electric's view that the additional costs of future electricity generation by Magnox stations for each scenario, as compared with immediate total closure of all Magnox stations, expressed as a percentage of total cash outflow under each scenario are as shown in Table 7.3. This table also shows the additional electricity that would be produced under each scenario.

	Additional electricity (TWh)	Avoidable cost as a % of total cash outflow
Partial closure	82	10%
30 years operation	105	12%
32 years operation	145	16%
Phased closure	82	9%
Accelerated phased closure	44	6%

Table 7.3: Avoidable costs of Magnox closures under different Ernst & Young scenarios

7.76 These additional costs can be said to be the **avoidable costs** of keeping all or some of the Magnox stations running. When translated into costs per unit of electricity, and after discounting at a rate of 8% to allow for the time at which expenditure is incurred, the figures lead to avoidable costs of 1.5 p/kWh in the first three scenarios, 1.3 p/kWh in the phased closure scenario and 1.4 p/kWh in the accelerated phased closure scenario.

7.77 The reasons for these low avoidable costs per unit, compared with the high total costs of electricity from these stations, are:

(a) very little capital expenditure is required to keep the stations running;

(b) The stations will require decommissioning whether or not they continue to run; the costs of decommissioning are therefore unavoidable and would be incurred sooner if the stations were closed immediately;

(c) A significant proportion of the fuel costs relates to the provision of facilities for fuel fabrication and reprocessing; these facilities already exist and their capital costs are therefore sunk.

7.78 The range of 1.3 to 1.5 p/kWh as the avoidable cost of additional output from the Magnox stations compares favourably with the avoidable costs of generation from existing coal fired stations as given in evidence to the Review, and with the range of figures quoted by TISC in Table 15 of their report (from 1.84 p/kWh at inland stations without FGD and coal priced at £1.33/GJ to 2.57 p/kWh at an inland station with FGD and coal priced at £1.51/GJ). The avoidable cost of electricity from the Magnox stations is also substantially below the current pool price for electricity.

7.79 Payments to BNFL under contracts for fuel services constitute a significant part of Nuclear Electric's costs. In reaching its estimates of avoidable costs, Nuclear Electric has made its own assessment of the contract payments that might be avoidable if the stations were shut. In addition to unit prices specified in the contracts, its assessment includes possible savings on fixed contract payments where closure of Magnox stations would permit fuel deliveries and reprocessing operations to be completed sooner.

7.80 **The Government concludes from this analysis that there is no economic justification for requiring Nuclear Electric to close any of its Magnox stations before the end of their planned lifetimes. TISC reached the same conclusion. In avoidable cost terms, nuclear power provides a cheap source of electricity. Nuclear power also offers other substantial benefits. It contributes to diversity and security of supply and helps the United Kingdom to meet its international obligations for curbing gaseous emissions which contribute to acid rain and the threat of global warming. Nuclear stations must, of course, continue to meet the safety requirements of the Nuclear Installations Inspectorate and maintain existing high standards of environmental protection. The Government will, however, wish to look closely at any requests from Nuclear Electric for approval for capital investment in relation to proposals for extending the life of any Magnox stations. The Government will bring forward its review of the future prospects for nuclear power and work will begin on the review later this year.**

The financing of nuclear generation

7.81 Because of the economic and other attractions of continuing to operate nuclear generation capacity, the Government put in place at the time of electricity privatisation arrangements to enable the full costs of nuclear generation to be met. These arrangements also provide a means of encouraging the use of renewable sources of electricity (see paragraphs 7.89 to 7.94 below).

7.82 The Electricity Act 1989 enables the Secretary of State to make orders obliging each public electricity supplier to contract for a specified amount of electricity generating capacity from non-fossil sources. These orders implement the NFFO, and must be satisfied by the securing of capacity from nuclear and renewable sources (including wind, solar, geothermal, tidal, refuse and landfill gas).

7.83 The additional costs incurred by the RECs under collective contracts entered into to satisfy the NFFO, compared with the costs of fossil fuel generation, are shared with other suppliers to ensure that the RECs are not at a competitive disadvantage. This is

achieved by re-imbursing the additional costs through a levy, the fossil fuel levy. The levy is charged as a fixed percentage on the value of leviable electricity sales in England and Wales. In accordance with the Fossil Fuel Levy Regulations made by the Secretary of State, the DGES has set the levy rate, currently at a rate of 11% and at 10% from 1 April 1993.

7.84 In common with the other generators in England and Wales, Nuclear Electric is required to sell its electricity through the pool. In addition, a contract was put in place at the time of privatisation in March 1990 between Nuclear Electric and the RECs which enables the RECs to meet their legal obligations under the nuclear NFFO. This contract provides Nuclear Electric with a premium over the market price of electricity to cover the higher total costs of generating nuclear power. Nuclear Electric only receives the premium on output up to a pre-determined limit in each year up to 1997/98, when the nuclear NFFO arrangements end. It is only the premium paid by the RECs under this contract which is reimbursed by the levy. The amount raised by the levy for Nuclear Electric is scheduled to decline in real terms and to terminate in 1998.

7.85 For output over and above this predetermined limit Nuclear Electric will receive only the market price which is expected to cover its avoidable costs. The company sells CFDs to RECs and other customers to reduce its exposure to fluctuations in the pool price. These commercial arrangements provide Nuclear Electric with market based signals on which to base decisions about marginal changes in output. Output in excess of the predetermined limits was around one-fifth of Nuclear Electric's output in 1991/92, and is expected to be around two-fifths by the middle of the decade.

7.86 The result of these arrangements is that each year Nuclear Electric receives two independent streams of income, one from electricity sales at market rates (either from CFDs or from the pool) and the other from the premium as set down in the nuclear NFFO contract. Nuclear Electric expects to be able to cover with this income the full costs of generating electricity from its stations (including operating costs, depreciation and provisions for the so called "back end" liabilities of nuclear power). Without the levy, Nuclear Electric would make a loss.

7.87 In the run up to electricity privatisation in Scotland, a Nuclear Energy Agreement was negotiated between Scottish Nuclear, Scottish Power and Hydro Electric, covering the sale of all Scottish Nuclear's output. The Agreement binds Scottish Power and Scottish Hydro Electric to take all Scottish Nuclear's output until the contract expires in 2005, effectively giving Scottish Nuclear a market for its baseload generation.

7.88 The price specified in the Agreement is currently fixed until 1994. After 1998 it will be set in relation to the price payable for baseload generation in the England and Wales market. The latter arrangement is phased in from 1994 to 1998. Scottish Nuclear is bound by the Agreement not to sell nuclear generated electricity to third parties.

Renewables

7.89 Electricity generation from renewable sources in the United Kingdom currently amounts to around 5 TWh/year, most of this coming from large hydro-electric stations in Scotland. The potential for further large hydro schemes in the United Kingdom is very limited.

7.90 Government policy has been to stimulate the development of renewable energy sources wherever they have prospects of being economic and environmentally acceptable. The Government has been working towards a figure of 1000 MW of new renewable generating capacity by 2000. The report of the independent Renewable Energy Advisory Group (REAG), commissioned by the Government and published on 17 December 1992, recommends a figure of 1500 MW of new electricity generation from renewable energy sources by 2000.

7.91 One part of the Government's support for renewable generation in England and Wales is achieved through the making of successive Orders to implement the NFFO. Two such Orders have been made so far. The first, in 1990, resulted in the RECs contracting with 75 projects with a total capacity of 152 MW; the second, in 1991, with 122 projects representing 472 MW. The premium elements of the prices payable under these contracts are recovered via the Fossil Fuel Levy. The Orders could, therefore, lead to some 600 MW of capacity coming on stream by around 1996 if all of the contracts are fulfilled, although it is unlikely that all of the capacity will be forthcoming. Discussions on Renewables Orders for Scotland and Northern Ireland are in hand.

7.92 The costs of renewable generation vary widely both from one technology to another and between sites using the same technology. In some areas, such as land-fill gas burning, generation costs may not be much above current electricity prices. In others, they may be much higher, and many of the possible technologies still carry very large margins of uncertainty. Work done for the REAG report suggests that by 2025 the range of the estimated contributions of renewable sources of generation is about 15-60 TWh a year, the higher figure being feasible if there are substantial increases in the price of alternative fuels, and, as a result, renewable energy becomes more competitive.

7.93 A number of submissions to the Review dealt with renewables. Many of these were from companies and individuals directly involved in this area, arguing for a particular form of renewable power. The major benefits cited were environmental acceptability and sustainability in the longer term; it was not suggested that renewables are cheaper than conventional generation in normal accounting terms.

7.94 **The Government is committed to assisting renewables to enter the commercial electricity generating market. It is right that those technologies which have the potential to become commercially competitive should have the opportunity to prove their worth. Although this will inevitably restrict the market available for coal, for the present the Government notes the REAG recommendations and intends to work towards a figure of 1500 MW of new electricity generating**

capacity from renewable sources for the United Kingdom as a whole by 2000. It is seeking European Commission approval to the extension of the NFFO arrangements for renewables beyond their scheduled expiry in 1998. Approval is also being sought for analogous renewables obligations to be placed upon the Scottish and Northern Ireland electricity supply industries. The Government will publish a fuller renewable energy strategy review document later this year, in the light of the REAG report.

Interconnectors

7.95 There are two existing and two proposed electricity interconnectors which are relevant to this White Paper. Of the two existing interconnectors one, between Scotland and England, cannot affect the total demand for, or supply of, electricity in the United Kingdom. This interconnector currently has a capacity of 850 MW. Work should be completed in 1993 to expand the capacity of the interconnector to 1 200 MW, and further work will increase its capacity to 1 600 MW by 1995.

7.96 The coal fired capacity in Scotland, principally the Longannet power station which is linked to the mine of the same name, is the marginal capacity whose use will be most affected by the interconnector. Since the marginal capacity in England and Wales is also coal fired, the use of the interconnector is unlikely to affect total coal burn, though it will affect where this burn takes place.

7.97 The second existing interconnector is between England and France. The idea of an electricity link below the seabed with France was first raised between the CEGB and Electricité de France (EdF) in the mid 1970s. Capital expenditure approval was given by the then Government in 1978. Planning permission was granted in 1981, at which time the CEGB and EdF signed the protocol governing the operation of the link. The interconnector has a capacity of 2 000 MW. As TISC correctly note, the interconnector was built for mutual system support and to trade electricity when one country could supply it more cheaply than the other. Since it was commissioned in 1986 it has normally supplied baseload electricity from France to England. This reflects the fact that EdF, because of low avoidable generation costs at its nuclear plants, has been able to supply electricity first to the CEGB and, since 1990, into the pool, at prices lower than the marginal cost of indigenous fossil-based supplies.

7.98 At privatisation, NGC took over CEGB's role as a party to the Protocol. The Protocol is a commercial agreement and the Government is not a party to it. The Protocol does, however, contain a provision which obliges either party (that is either NGC or EdF) to compensate the other if its Government is responsible for a unilateral decision which has the effect of neutralising the normal operation of the Protocol. In view of the consequences to NGC if a successful claim were brought against it, the Government issued NGC in November 1990 with an indemnity against material liabilities it may incur as a result of being unable for reasons beyond its control to perform its obligations under the Protocol.

7.99 The supply of electricity through the cross-Channel interconnector since April 1990 has taken place under three year contracts signed between EdF and the RECs at

the time of vesting. These contracts are due to expire at the end of March this year, but the Protocol will continue in force. The negotiation of new contracts with EdF is a commercial matter for the RECs and others. EdF is a member of the pool, from which it cannot be arbitrarily excluded. Even in the absence of new contracts with the RECs, therefore, EdF would still be able to sell directly into the pool, if the prices at which it bids into the pool are low enough to ensure that it is called to generate.

7.100 Future prospects for trade over the interconnector will depend on the commercial attractions of trading arrangements to the parties on either side. However, there are some indications that the amount of electricity supplied to the United Kingdom through the interconnector could decline over the next few years, for several reasons.

7.101 First, surplus generating capacity in France is expected to decline as domestic demand grows. Second, with new capacity coming on stream in England and Wales and with falling coal prices as a result of the contracts between the generators and British Coal, indigenous electricity supplies will become more competitive, particularly at times of peak demand in France (which do not coincide with times of peak demand in England and Wales), when relatively high cost fossil fuel generating stations in France would normally be operating. This prospect will have been reinforced by the recent depreciation of sterling against the French franc. While future prospects are inevitably uncertain, evidence provided by NGC to TISC suggests that net exports to the United Kingdom could progressively but significantly reduce after 1995. In this context, it is worth noting that EdF and PowerGen have recently signed Heads of Agreement on a contract for the export of electricity from 1993/94 to France at times of peak demand. While the amount of electricity involved is initially small, the agreement provides for rising supplies through the 1990s.

7.102 Several pieces of evidence to the Review argued that the Government should, by one means or another, prevent or restrict trade in electricity through the interconnector with France. Legal advice received by the Government, a summary of which was published on 18 March, confirms that measures of this sort would breach Article 30 of the EEC Treaty, would not therefore be effective and could result in successful infraction proceedings against the United Kingdom and claims for damages. Under the Protocol, action to prevent or restrict imports of electricity from France could also give rise to a very substantial claim for damages against NGC, which could run to hundreds of millions of pounds. Through the indemnity mentioned in paragraph 7.98 above, any damages for which NGC was liable (after the first £15 million) would fall on the taxpayer. Irrespective of other policy considerations, this risk would be enough to make any Government action against the use of the interconnector for the import of electricity from France profoundly unattractive.

7.103 TISC suggested that electricity supplied from France should cease to be non-leviable, and that EdF's ability to negotiate future contracts to supply baseload electricity into England and Wales should be conditional on reciprocal, non-discriminatory access to the French electricity market and, through the French transmission system, to third countries.

7.104 Electricity supplied by EdF is not contracted for by the RECs in pursuance of

their obligations under the nuclear NFFO. Those RECs with output contracts with EdF can show that the electricity they import from France is supplied from designated nuclear stations, subject to evidence being provided to the reasonable satisfaction of the DGES. As a result, in accordance with the provisions of the Electricity Act 1989, these supplies of electricity are not subject to the fossil fuel levy. The legal advice referred to in paragraph 7.102, however, includes advice that it is doubtful whether removing the non-leviable status of electricity imports from France would be possible or effective. EdF's non-leviable status could not be removed without giving EdF the benefit of levy payments. In other words, EdF could have to be given the same premiums for its electricity as are now given to Nuclear Electric and financed by the Levy. Far from reducing imports from France, this would reinforce their position and British customers would end up paying more for their electricity.

7.105 On the question of non-discriminatory access to the French electricity market, any restriction or prohibition on the export of electricity from the United Kingdom to France would be in breach of Article 30 of the EEC Treaty. TISC offers no evidence that EdF or the French Government is in breach of its Community obligations in this way. The French Government has confirmed that access to the French electricity market is on a non-discriminatory basis. EdF meets the demand for electricity by scheduling production on the basis of a "merit order", according to which EdF calls upon the least costly sources of supply at each instant, whatever its origin, be it domestic or foreign. The operation of a merit order guarantees non-discriminatory access for British suppliers, as it does to all foreign producers.

7.106 The Government understands that, from the beginning of April, EdF plans to provide to the pool a day in advance the bid prices at which it intends to supply electricity across the interconnector. These prices will more closely reflect the marginal costs of supply in each half hour of the succeeding day. The Government welcomes this step, which should improve the prospects of United Kingdom generators selling into the French electricity market and will ensure that, provided United Kingdom electricity is competitive in price with French supplies, after taking account of charges for use of the interconnector, exports will occur.

7.107 The French Government has also confirmed that EdF applies the terms of the EC directive on the transit of electricity through transmission grids to third countries "without reservation". The directive requires that the conditions of transit should be non-discriminatory and fair for all the parties concerned, and should not include unfair clauses or unjustified restrictions, except where the transit of flows would endanger the security of supply or the quality of service. In cases of dispute, the directive includes provisions for conciliation on conditions of transit by a body set up and chaired by the Commission; and, if a request for transit is refused on unjustified or insufficient grounds, for the implementation of procedures provided for by Community law.

7.108 Even if an immediate and marked reduction in imports from France were achievable, the benefits to British Coal may not be so great as much of the evidence received would imply. Evidence to the Review from NGC indicates that in 1993/94 lower electricity imports would be replaced primarily by increased coal and oil consumption at power stations in the South of England. This occurs partly because of

limited spare capacity at the coal fired stations in the Midlands and North and partly because of limitations in the transmission system. Southern coal fired power stations are relatively distant from British coal mines, and most have ready access to port facilities able to handle imported coal. They are therefore the stations where British coal is least competitive - it has been calculated that British Coal would need to sell its output at a pit head price substantially below the world market price to compete at those stations. Imports of electricity could therefore simply be replaced by imports of coal and oil, with little benefit to British deep-mined coal.

7.109 The NGC evidence shows that the position will change as new CCGT plant is commissioned in the South of England, since this will tend to relieve the constraints on the transmission system and on the capacity of the Midlands and Northern stations. At that time, given the efficiency and the location of those CCGT stations, a reduction in imports of electricity (or equally in the operation of those CCGTs) would then be more likely to slow the reduction in consumption of British coal.

7.110 Plans are well advanced for the construction of a 250 MW interconnector between Scotland and Northern Ireland, to be commissioned in 1996. A commercial agreement has been signed between Northern Ireland Electricity and Scottish Power. The project would supply some 17% of Northern Ireland's electricity and help to overcome the problems of a relatively small isolated system. It is supported in evidence submitted to the Review by certain Scottish and Northern Irish interests. Electricity through the link is likely to be generated by coal fired stations in Scotland. The European Commission has agreed to provide financial support towards the construction of this interconnector.

7.111 The second proposed interconnector is between Britain and the Republic of Ireland. NGC is in negotiation with the Irish electricity supply industry (ESI) for the provision of a 600 MW interconnector. A seabed survey is under way to establish the optimum route. However, the time for construction of the link and the need for capacity requirements in Ireland mean that the link is unlikely to be constructed until the end of the decade. The availability of financial support for the interconnector is likely to be important in reaching decisions on the project.

7.112 NGC is considering other interconnectors, to Norway and Belgium. A link has also been suggested between Iceland and Scotland, allowing the import of geothermal power from Iceland. None of these proposals is likely to have an impact on the United Kingdom electricity market before the end of the century.

Conclusion

7.113 This chapter has illustrated the complexity and diversity of the United Kingdom energy market. It has looked at the range of other fuels with which coal competes in the electricity supply industry. This review confirms that economically recoverable gas reserves are unlikely to run out significantly more quickly than economically recoverable reserves of coal. There are plentiful supplies of both coal and gas available on world markets and no reason to believe that the supplies of either are likely to be subject to major disruption. Continuing coal production at the levels of recent years is

therefore not necessary in order to ensure that the United Kingdom has secure supplies of fuel for its electricity generation needs.

7.114 The balance of use of the different fuels in electricity generation will be determined by the interplay of the forces affecting supply and demand outlined in this chapter. It is clear that, regardless of the October closure proposals, coal will continue to be the most significant single source of electricity generation for a considerable period. But the analysis of the costs of generation shows that market forces are making gas an increasingly important alternative. New gas plant is substantially cheaper than new coal plant. At the time when decisions were taken to build the current tranche of CCGTs, their total costs compared favourably with the avoidable costs of the coal fired capacity they were displacing. More recently, higher gas prices and the prospect of lower British Coal prices have improved the competitive position of existing coal fired stations, although they remain vulnerable to any additional costs, such as those arising from further measures to reduce the environmental impact of burning coal. On an avoidable cost basis, generation from existing nuclear plant is cheaper than coal or gas, and will therefore continue to provide an important element of the United Kingdom's baseload generating capacity. Renewables will play a small but growing role and heavy fuel oil and Orimulsion a minor and probably declining one. The interconnector with France will continue to play a useful role in ensuring diversity of potential electricity supply.

7.115 This chapter has concentrated on the economic factors underlying fuel choice in electricity generation in the United Kingdom. Specific environmental factors are also an increasingly important influence on fuel choice and are considered in detail in the next chapter.

CHAPTER 8

ENERGY AND THE ENVIRONMENT

8.1 The Government attaches great importance to the protection of the environment at all levels, from the most local to the global. The United Kingdom has an excellent record of compliance with its international obligations in this area, and intends that record to be maintained. Environmental commitments will inevitably affect the market for coal, from whatever source, in the longer term.

8.2 No form of power generation is free from environmental consequences, as much of the evidence to the Review acknowledged. The principal consequences of burning of fossil fuels, including coal, which need to be considered are the emissions from power stations. Issues which featured prominently in evidence to the Review included "acid rain", to which emissions of sulphur dioxide (SO_2) and oxides of nitrogen (NO_x) contribute, and the threat of global warming, arising from man-made emissions of greenhouse gases, the most important of which is carbon dioxide (CO_2). Electricity generation is not by any means the only source of these pollutants. It is, however, the major source of SO_2 and CO_2 emissions and second only to transport as a source of NO_x. In general, the international commitments into which the United Kingdom has entered on both these issues were recognised as constraining the use of fossil fuels. The environmental aspects of nuclear power also featured frequently in evidence to the Review.

8.3 Generally speaking, the respondents fell into three main groups:

(a) those who argued that gas fired power stations are necessary if the United Kingdom's targets, particularly on CO_2 are to be met;

(b) those who argued that the targets could be met with coal fired stations, especially if clean coal technology were introduced;

(c) those who argued that other options, such as nuclear power, renewables, Combined Heat and Power (CHP) and energy efficiency, should feature more prominently in any portfolio of measures designed to achieve the targets.

8.4 Some of the environmental groups found themselves attempting to reconcile a wish for strict emissions targets, and hence a wish to phase out all fossil fuel burning, with a dislike for the nuclear option and support for coal in the short term. They were able to do so only by implausible assumptions about the speed at which renewables and energy efficiency could contribute.

8.5 TISC acknowledged that burning coal results in greater emissions of SO_2, NO_x

and CO_2 than burning almost any other fuel, and that on most estimates the economics of burning coal will therefore be more strongly affected by environmental regulation.

Acid Rain

8.6 Combustion of fossil fuels may cause the emission of oxides of sulphur (mainly SO_2) and nitrogen (NO_x) into the air. These gases add to the natural sources of acidity of rain and to acid deposition in general. This in turn increases the rate of damage to buildings and other materials exposed to the weather throughout the United Kingdom, and affects ecosystems in geologically sensitive soils and freshwaters over much of upland North and West Britain. Acid emissions from the United Kingdom also affect sensitive areas on the Continent, and vice versa. In 1990, electricity generation was responsible for over 70% of SO_2 emissions in the United Kingdom, but less than 30% of NO_x emissions, of which the main source is now road transport. United Kingdom SO_2 emissions have already fallen by over 40% from their peak in the 1960s, but NO_x emissions are estimated to have increased by nearly 20% through the 1980s. NO_x emissions from transport are, however, expected to reduce significantly over the next few years as a result of recent EC legislation on vehicle emissions.

8.7 The EC's Large Combustion Plants Directive (88/609/EEC) (LCPD) requires the United Kingdom to reduce SO_2 emissions from existing plant by 60% below 1980 levels by 2003 and NO_x levels by 30% by 1998. The LCPD is due for review in 1994. In advance of that, preparations have begun for a revised SO_2 protocol to the United Nations Economic Commission for Europe's Convention on Long-Range Transboundary Air Pollution Control. It is hoped that the protocol will be ready for signature by November 1993. The EC is also preparing a Small Combustion Plants Directive aimed at limiting emissions from plant below the lower size limit of the LCPD.

8.8 Power stations in England, Scotland and Wales, together with many other industrial processes, are also subject to Integrated Pollution control under Part I of the Environmental Protection Act 1990. Such processes require authorisation by HMIP (in Scotland by Her Majesty's Industrial Pollution Inspectorate). Authorisations must include conditions to ensure that best available techniques not entailing excessive cost (BATNEEC) are used to minimise harmful releases to the environment. The Chief Inspector has a duty to keep BATNEEC under review.

8.9 Coal and heavy fuel oil typically contain sulphur in quantities up to a few per cent by weight. The average sulphur content of United Kingdom coal received by the England and Wales electricity generators is about 1.6%, and that of heavy fuel oil is about 2.5-3%. Natural gas as supplied to the customer has negligible sulphur content. So-called "low sulphur" coal, with a sulphur content below 1%, is at present readily available on the world market and in Scotland. Sulphur can be removed from oil before combustion, or from flue gases after combustion, but at a cost in both financial and energy terms. The usual form of removal, where this is necessary, is FGD. There are many technologies for this, but by far the most common world-wide are the wet lime or limestone-gypsum processes. These consume limestone and water and produce gypsum (calcium sulphate) and carbon dioxide. Fitting an existing 2 000 MW coal fired power station with FGD using these processes could involve a capital cost of

around £250 million, reduce electricity output by around 50 MW and increase CO_2 emissions by a small amount.

8.10 The "clean coal" technologies discussed in Chapter 15 can provide more effective means of reducing sulphur emissions from coal burning, but they are unlikely to be in large scale use before the year 2000 and are likely to have much higher capital costs than gas.

8.11 Oxides of nitrogen come partly from oxidation of the nitrogen content in coal, and partly (for all fuels) from oxidation of nitrogen in the air which takes place in the high temperature conditions of the combustion flame. NO_x emissions can be reduced by careful control of the flame conditions, for example by fitting "low NO_x" burners. Flue gas clean-up measures are also available, but at much higher cost than low NO_x burners.

8.12 In order to fulfil its commitments under the existing LCPD, the United Kingdom is carrying out a programme to limit SO_2 and NO_x emissions from existing large combustion plants. This is set out in a National Plan made under the Environmental Protection Act 1990. This Plan provides for a phased annual rundown of both SO_2 and NO_x from large combustion plants, including power stations, oil refineries and other industries burning fuels primarily for producing energy. The measures in the Plan include the fitting of low NO_x burners at all major coal fired power stations, and installation of FGD at a total of 8 GW of existing coal fired plant. 6 GW are already under construction and an application by PowerGen for consent under section 36 of the Electricity Act 1989 for the construction of a further 2 GW is under consideration. The Secretary of State for the Environment has powers under the Environmental Protection Act 1990 to direct HMIP to require the installation of FGD equipment at specific sites and will consider using those powers if necessary.

8.13 These measures are sufficient to meet the SO_2 and NO_x emissions targets under the LCPD for the United Kingdom generators for its remaining period up to 2003. The outcome of the Coal Review should not threaten the fulfilment of these commitments.

8.14 The possibility that tighter limits may be imposed in the future, however, introduces an element of uncertainty, and hence a perception of increased commercial risk, which weighs particularly against coal. If tighter targets are set as a result of forthcoming reviews, potential coal burn will be correspondingly reduced in the absence of additional emission abatement measures such as further FGD or more expensive NO_x control technologies, with adverse implications for the economics of coal use in power generation.

Global warming

8.15 Burning fossil fuels also produces carbon dioxide (CO_2). This is a "greenhouse gas" which helps to trap the sun's heat, warming the earth's surface. Greenhouse gases are naturally present in the atmosphere, and without them the world would not be habitable. However, over the last two hundred years man-made emissions have substantially increased the atmospheric concentrations of CO_2 and other greenhouse

gases. While there are many uncertainties, the scientific consensus is that without special action to limit these emissions the global mean temperature would increase by about 0.3 degrees Centigrade per decade, leading to sea level rises of about 6 centimetres per decade over the next century.

8.16 In June 1992, the United Kingdom along with over 150 other countries and the European Community, signed the UN Framework Convention on Climate Change. The ultimate objective of the Convention is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference by man with the climate system, within a timescale sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

8.17 The Framework Convention will enter into force when 50 countries have ratified it. The United Kingdom is committed, along with the other Group of Seven leading industrial countries, to seek to ratify the Convention and to publish its first national implementation plan, by the end of 1993. Amongst other provisions, the Convention commits developed country parties to take measures aimed at returning emissions of CO_2 to 1990 levels by the year 2000.

8.18 Whereas the sulphur in coal is an impurity, the carbon is what makes coal valuable as a fuel, and burning coal will inevitably produce CO_2. The Government is funding some analysis of the technical options for the removal and disposal of CO_2 from power station flue gases. The indications are that this option would be very expensive and would have significant environmental implications of its own. FGD and other techniques for removing sulphur do not remove CO_2; in fact they make CO_2 emissions somewhat greater. The new clean coal technologies also do not reduce CO_2 emissions per tonne of coal, but, to the extent that they are more efficient, less coal needs to be burnt for each unit of electricity generated.

8.19 Projections of energy demand and CO_2 emissions for the United Kingdom under a range of assumptions about future economic growth and energy prices were published as EP59. CO_2 emissions in 1990 were 160 million tonnes of carbon (mtC). The central GDP growth/low energy price projection of annual CO_2 emissions in EP59 for the year 2000 which is currently being used for CO_2 policy planning purposes is 170 mtC. A major reason for the projected increase in CO_2 emissions in this period is increasing demand for fuel for road transport. On the basis of these figures, the United Kingdom will need to reduce its projected emissions by 10 mtC by 2000 to meet its Convention commitment. The Department of the Environment published a discussion document *Climate Change: our national programme for CO_2 emissions* on 14 December 1992 inviting comments on how this might be achieved. The document was addressed primarily at measures to influence the demand for energy rather than its supply, but many of the possible measures discussed in the paper would have an effect on the balance of fuels used in electricity generation: any reduction in total electricity demand is likely to have a disproportionate impact on coal burn because of coal's position as the fuel most used to meet marginal changes in electricity demand.

8.20 The Government is fully committed to ensuring that the United Kingdom's

obligations for curbing CO_2 emissions are met. The Budget of 16 March announced the introduction on VAT on domestic fuel and power and a long term policy of raising road fuel duties. These measures, together with measures already announced, should achieve two-thirds of the savings required for meeting the United Kingdom's CO_2 commitment. The Government will need to prepare the United Kingdom's full national plan for meeting its obligations, taking account of the responses to the discussion document, and of its other policies including the outcome of the Coal Review. The higher the level of coalburn by the electricity supply industry, however, the more stringent the measures to curb emissions in other sectors of the economy, including transport, would need to be. In this respect, the illustrative level of coalburn set out in Table 25 of TISC's report, if it were to be sustained to the year 2000, would be likely to present a very significant challenge for the United Kingdom in meeting its international obligations to curb CO_2 emissions.

8.21 The National Plan will also report on the United Kingdom's programme to limit emissions of methane, the next most important greenhouse gas. The mining of coal is accompanied by emissions of methane, and the Government is discussing with the industry measures to control these emissions.

Energy efficiency

8.22 Energy efficiency is widely recognised as one of the quickest and most cost effective ways of limiting power station emissions, by reducing the demand for electricity and so the amount of fossil fuel which needs to be burnt. Reductions in electricity generation arising from energy efficiency measures would be likely to have a particular impact on coal burn because coal is the marginal fuel for electricity generation. Options for further improvements in energy efficiency were included in the discussion document mentioned in paragraph 8.19. In recognition of the close links between energy efficiency and the environment, the Energy Efficiency Office (EEO) was transferred to the Department of the Environment as part of the reorganisation of Government Departments following the April 1992 General Election.

8.23 A number of pieces of evidence to the Review pointed out that a large amount of energy is wasted and that improving energy efficiency would benefit the environment, would generate employment and would implicitly improve security of supply by reducing overall demand.

8.24 CHP was put forward in some evidence as a way of achieving very high efficiency in the use of fuel, and so promoting energy efficiency more generally. It was argued that CHP schemes faced unnecessary disadvantages, particularly in selling their electricity output to RECs. CHP as a highly fuel-efficient technology which puts to good use heat which would otherwise be wasted was underlined by the Government's White Paper *This Common Inheritance* published in 1990 (Cm 1200). CHP has the potential to improve the environment and reduce energy costs for users in all sectors of industry and commerce. The EEO continues to promote the technology under its Best Practice programme and will aim to ensure that an identified potential of a further 2,000 MW of capacity by 2000 will if possible be achieved.

Other environmental impacts

8.25 There are other environmental factors relevant to energy policy and its impact on the future demand for coal. For example, the LCPD sets limits on the emission of SO_2, NO_x and dust from new combustion plant, in addition to the aggregate reductions it requires from existing plant. Any new conventional coal fired plant would need to be fitted with FGD to comply with the SO_2 limit and electrostatic precipitators to meet the dust standard. There are also solid and liquid wastes arising from the use of coal in power stations. The most well-established FGD processes use limestone, which needs to be quarried and is often found in areas of particular natural beauty. Water discharges from abandoned mines of any kind can cause pollution of watercourses, and this has to be taken into account before final decisions are taken to abandon a disused mine. Opencast coal mining may be intrusive and dirty, but may also offer the opportunity to clean and restore areas of dereliction.

8.26 But all energy sources have environmental impacts to some extent. Nuclear power stations produce radioactive waste which needs to be disposed of safely, and the stations themselves need to be decommissioned safely after closure. Even renewable energy sources can have negative environmental consequences, such as the visual impact of wind farms. Orimulsion and its future use in the United Kingdom was discussed in paragraphs 7.60 to ? above. It has a sulphur content of around 3%, equivalent to that of high sulphur heavy fuel oil, but because it has a lower calorific value than heavy fuel oil more Orimulsion needs to be burned to produce the same amount of energy. The fitting of FGD equipment would remove 90% of the sulphur emissions and would also trap the bulk of any residual fine dust which would otherwise escape from the electrostatic precipitators.

The longer term

8.27 In the longer term environmental pressures will continue to operate against coal as a primary source of energy. The problems in relation to SO_2 and NO_x emissions are technically soluble, though at a price which may risk making coal uneconomic as compared with other fuels. The clean coal technologies discussed later in this White Paper offer the prospect of more effective solutions, but the economic barriers to implementation are likely to remain unless there is a substantial increase in the price of gas in relation to coal.

8.28 Unless the technical options for the removal and disposal of CO_2 from power station flue gases become commercial reality (which seems unlikely), CO_2 emissions pose substantial long term problems. The existing CO_2 target will already constrain coalburn by the year 2000. Any tightening of the CO_2 target in future reviews which are scheduled before the end of the decade is bound to constrain further the amount of coal burnt unless very stringent measures to curb emissions are taken in other areas, including transport.Furthermore, if the means used to control emissions includes a carbon/energy tax of the kind currently being proposed by the European Commission, this is bound to affect the economics of high-carbon fuels such as coal. TISC recognised this point, but did not address the question of how the CO_2 target could be met consistently with the levels of coalburn they put forward.

8.29 There will be room for coal in the future energy economy, but on environmental grounds alone this role must be expected to diminish somewhat over the next decade.

CHAPTER 9

INTERNATIONAL ASPECTS

9.1 The Government's energy policy has to be carried out in the context of the United Kingdom's membership of the European Community and of its other international obligations.

European Community

9.2 Many provisions of the EEC Treaty, as amended and extended by the Single European Act and, once ratified, the Treaty on European Union and the European Economic Area Agreement, affect national energy policies. They include those concerned with competition policy, State aids, the free movement of goods and services and protection of the environment.

9.3 The European Commission is seeking to create a Community framework within which Member States will pursue national energy policies. This includes:

(a) completion of the internal energy market;

(b) development of energy relations with third countries;

(c) protection of the environment;

(d) oil crisis management;

(e) energy research, development, and demonstration;

(f) development of trans-European energy networks.

The Community has accordingly adopted measures in such areas as public procurement in the energy sector, transit of electricity and gas, transparency of electricity and gas tariffs, the protection of supplies in an oil emergency, and the control of emissions from large combustion plants, which all affect Member States' national energy policies.

9.4 The framework for direct Community decisions on the production, sale and trading of coal is the Treaty of Paris, which established the European Coal and Steel Community (ECSC). This Treaty has equal standing with the EEC Treaty, whose provisions apply to coal related matters only where the Treaty of Paris contains no overlapping provisions. The ECSC Treaty is due to expire in 2002.

9.5 The Treaty is intended to bring about a common market in coal and steel. The means to achieving this have centred on free trade and competition within the EC.

Restrictive practices, and subsidies and aids granted by Member States, are deemed to be incompatible with the Common Market.

9.6 It became clear, however, in the years following the signing of the ECSC Treaty, that Community coal industries were beginning to have difficulty selling their output. Starting in 1965, the Commission has brought forward a series of Decisions - made under Article 95 of the Treaty and requiring the unanimous approval of the Council - which provide a framework of principles within which Member States may be allowed to grant aid. Grants of aid have to be notified to and approved by the Commission within the terms of the State aids Decision. In practice the Commission has wide discretion to give or to withhold its approval.

The EC coal industry

9.7 Trade in EC produced coal between Member States is small. Imports of coal into the United Kingdom from producers elsewhere in the EC amounted to only half a million tonnes in 1991 - well under 0.5% of total coal consumption in the United Kingdom. Over half of this total was anthracite, which is produced in only limited quantities in the United Kingdom.

9.8 The only EC Member States apart from the United Kingdom which have coal industries of any significance are Germany, Spain and France. The last mine in Belgium closed in 1992. None of these industries produces coal at a cost which is competitive with imports of coal from third countries. In 1992, Germany produced 72 million tonnes (excluding lignite), France 9 million tonnes, and Spain 19 million tonnes. Although output in Spain had been increasing at around 1.5% a year since 1973, over the same period German output had declined at 2% a year and French at 5% a year. In total, Community production has fallen from nearly 500 million tonnes per year at the end of the 1950s to 184 million tonnes in 1992. Imports from outside the Community were 132 million tonnes in 1991. Employment in the Community coal industry has shown a similar decline. In 1955 there were 1.86 million workers employed in the coal industry (in the current 12 Member States); by 1991 there were 260 000.

9.9 The United Kingdom undoubtedly has the lowest cost coal industry in the Community. Its viability depends, however, on its ability to compete not with other EC producers, but with other fuel sources and with coal imports from outside the EC.

The future State aids regime

9.10 The Commission has recognised the need for State aids to facilitate the restructuring process referred to in paragraph 9.8. The present State aids decision expires at the end of 1993. The Commission has recently published a draft Decision to replace it. This proposes that future aid should be directed to three aims:

(a) promoting the economic viability of the Community coal industry;

(b) easing social and regional problems linked to closures;

(c) helping the coal industry to meet new environmental standards.

9.11 The Commission proposes to bring about a gradual reduction in aid to producers whose production costs are above average EC costs in 1992. In addition, specific assistance will be permitted to cover payments arising from final closure costs and, for the first time, more specific aid to cover exceptional costs arising from re-structuring or to comply with environmental protection measures.

9.12 The Government has discussed in broad terms with the Commission the State aid which it proposes to make available to the British coal industry. The Commission has indicated that it will be able to consider aid for 1993/94 under the terms of the Coal Aid Decision 2064/86/ECSC, which expires at the end of 1993; and that authorisation for aid for later years will depend on adoption of the draft replacement Decision. The Government believes that its proposals are compatible with both the present and proposed Decisions. Initial contacts with the Commission suggest that they will adopt a positive approach towards a State Aid notification and also towards notification under the competition provisions of the EEC Treaty of the contract arrangements referred to in paragraph 13.1 below.

GATT

9.13 Coal is also subject to the United Kingdom's normal obligations under the General Agreement on Tariffs and Trade (GATT), discussed in paragraph 11.41 below. The Commission speaks for the Community as a whole in GATT, and would do so in respect of any questions about trade in coal.

European Energy Charter

9.14 The EC and its Member States, including the United Kingdom, are playing a central role in the negotiation of a Basic Agreement designed to put the commitments in the European Energy Charter, signed in the Hague on 17 December 1991, into a legally binding form. The objectives of the Charter are to improve the energy economies of Eastern Europe and the former Soviet Union and the security of supply of all participating countries. It would do this by attracting Western investment in the Eastern countries through reducing the political risks and bringing those countries into the global economy by creating open, liberal and non-discriminatory energy markets and removing trade barriers. Increased foreign exchange earnings for the energy-exporting Eastern countries will make it easier for them to buy British goods and services and should reduce their need for financial assistance. Greater competition will help to lower costs and improve resource allocation and will reduce the ability of other Member States to gain competitive advantage for particular energy consuming industries by subsidising the price they pay for their electricity. As currently drafted the Basic Agreement would by reference apply GATT rules to trade in energy with the non-GATT members of the Charter. That is unlikely to affect the market for British coal in the next few years.

The International Energy Agency

9.15 The United Kingdom is also a member of the International Energy Agency (IEA). The IEA has generally supported competition and liberalisation and, in 1991 member countries noted that, although progress had been made in reducing barriers and other distortions to coal trade, effective measures were needed to achieve further significant reductions leading to improved competition, accompanied by appropriate regional and social policies.

CHAPTER 10

THE ELECTRICITY MARKET SINCE PRIVATISATION

10.1 The period following electricity privatisation in England and Wales has seen, as was intended, a considerable growth in competition. In generation, 15 new gas fired power stations with a total capacity of 9.1 GW are either in operation or under construction, and of these 9, amounting to about 6 GW, are IPPs, owned by companies other than the established generators. Almost all the new capacity built, under construction or proposed is gas fired CCGT plant. This is quick to construct and has the highest efficiency and best environmental performance of any fossil-fuelled plant.

10.2 In supply, over 40% of the customers with the freedom to do so (those using over 1 MW - the upper limit of the "franchise" market, see paragraph 6.4) have exercised their right to choose an alternative supplier.

10.3 Prices for smaller consumers, including small industrial consumers, are controlled by a formula enforced by the DGES. Under this formula, prices for this group as a whole have increased slightly more than the Retail Price Index. For larger industrial users, there have on average been significant reductions in real terms. It is clear, however, that a relatively small number of major users who previously benefited from special terms are experiencing significant price rises. This is discussed further in paragraphs 10.18 to 10.24 below.

10.4 About 1 000 industrial users now have contracts related to the pool price. At the time of vesting in April 1990, the average pool selling price (PSP) was 1.84 p/kWh. The average monthly price fell during the first three months of operation to a low of 1.52 p/kWh, but then rose again, and in 1991 fluctuated between a low of 2.02 p/kWh and a high of 2.72 p/kWh. During this period, the DGES launched an inquiry into pool prices, as a result of which certain changes were made to the generators' licences and to the pool rules governing their bidding practice. During 1992, the average monthly PSP fluctuated from 1.99 p/kWh to 2.60 p/kWh.

10.5 In July 1991 the DGES set guaranteed and overall standards of customer service which the RECs must follow. The overall success rate in meeting these standards in the first nine months was 99.87%. Payments totalling £150 000 were made to 13 000 customers where standards were not met. He is now proposing enhancements to these standards.

10.6 This performance has been combined with strong profit growth by both RECs and generators. In 1991 the RECs produced profits on average 27% higher than forecast in their prospectuses, and for 1991/92 they registered an average increase of 46% over the previous year. This came from a combination of cost cutting and inflation-related corrections to prices permitted under the price formulae. Average

dividends grew by 15%. The generators saw lower growth, with 1991/92 profits increased over the previous year by 18% for National Power and 32% for PowerGen. Generator revenues were largely determined by the three year contracts put in place at vesting; generators cut costs vigorously and rapidly.

10.7 Many submissions to the Review argued that prices are too high, both for industrial and domestic customers, that the profits made by privatised electricity companies are excessive and that the dominant position of these companies is preventing real competition.

10.8 Consumer groups for domestic and franchise customers (for example the Electricity Consumers' Committees and the National Consumers' Council) voiced concerns about the "excessive" profits of the electricity companies and argued for tougher regulation of both the generators and the RECs. Some urged immediate price reductions for domestic customers.

10.9 Some of those offering evidence made recommendations which they considered would improve the operation of the market and reduce prices. Both consumers and RECs argued that National Power and PowerGen act as a duopoly, stifling competition, manipulating pool prices and offering contract prices which do not reflect their costs. Some recommended more aggressive regulation by the DGES. Others recommended breaking up the generators into several companies. The generators, however, argued that pool prices are still too low to cover the costs of their existing plant and must rise towards contract price levels if new investment is to be forthcoming.

10.10 Large users, supported by PowerGen, British Coal and some RECs, proposed deferring the reduction in the REC franchise monopoly so that any additional costs from supporting coal could be passed on to smaller users. Franchise consumer groups argued that the franchise reduction should take place as planned to increase competition for smaller consumers. Most also maintained that any support for coal should be funded from general taxation.

10.11 TISC argued for stricter regulation, including controls over the generators' prices, and tighter controls over the RECs' distribution charges which would take into account return on capital. They also proposed that the protection of consumers should become one of the Director General's primary duties, and that he should have a secondary duty to consider the legitimate long-term interests of indigenous fuel producers (which may, of course, run counter to those of consumers).

10.12 The regulatory system set up at the time of electricity privatisation, like that devised for other privatised utilities, is based on the regulation of companies' prices, not of their profits, as some have proposed. While protecting consumers by restricting prices to a formula related to movements in the retail price index, this form of regulation also gives companies a strong incentive to improve efficiency and reduce costs in order to maintain profit levels.

10.13 The periodic review of these price formulae is a key element of the regulatory regime. The DGES takes profitability into account along with other factors when

revising the price controls. The reviews help to ensure that the benefits of improved efficiency within the electricity industry are passed on to the consumer. They also renew the incentive on electricity companies to improve further their efficiency in order to maintain profits.

10.14 The timetable for these reviews is set out in the various licences under which the electricity industry operates. In line with this, the DGES has completed a review of the transmission price control with the result that a new tighter control will come into effect in April. In the summer, he will announce the conclusions of his review of the price control on the RECs' supply business. He is due to complete his scheduled review of the RECs' distribution price formula next year with any change to take effect from April 1995. Most REC profits are made on their distribution business. In aggregate they made a small loss on their supply business in 1991/92.

10.15 The Government continues to believe that direct regulation of profit levels, in the electricity industry as in other sectors, would not help to produce a more efficient allocation of resources or a better deal for consumers. It would instead undermine companies' incentive to improve their efficiency and make cost savings, with the result that the benefit to consumers of such improvements would be lost.

10.16 In response to complaints about increasing prices in the pool, the DGES undertook a review of pool prices the results of which were published on 18 December 1992. He concluded that pool prices had indeed risen, and that the main reason for this was the exercise of market power by National Power and PowerGen. Each company wished to secure higher pool prices and they were able to achieve this, given the very limited competition in the market. On the other hand, in 1991/92 average pool prices were lower than the average avoidable costs of generation. The Director General concluded that it would be unreasonable to insist that a company should persistently offer its product at a price below avoidable cost. That the generators should continue to make profits in such circumstances reflects the fact that the pool is not the generators' sole source of revenue; most electricity is sold through CFDs.

10.17 The DGES considered that avoidable costs of generation were likely to fall in real terms, and that as a result pool prices were likely to be lower than they would otherwise have been. However, he considered that competitive pressures were necessary to achieve these reductions and to pass them on to customers. The existence of a duopoly also added to the unpredictability of pool prices.

Electricity prices to industry

10.18 Average electricity prices to industry in Great Britain have fallen fairly steadily in real terms over the past decade. DTI statistics show that this decline has continued since privatisation. Electricity prices to industry were 8.6% lower on average in real terms in 1992 than in 1989, before privatisation. Price movements over this period have, however, varied for differing categories of industrial consumers as shown in Table 10.1. Average prices to extra large customers have actually increased by 0.7% in real terms over the past three years, with much of this increase attributable to well above average increases to certain highly intensive electricity users. A similar situation

applies in Northern Ireland, where certain highly intensive users are facing above average increases.

Size of Industrial Consumer	Electricity prices in pence per kWh, 1990 prices, calculated using GDP market price deflator		
	1989	1992	Change
	(Whole year averages)		
Small	5.83	6.30	+8.0%
Medium	4.77	4.18	-12.3%
Moderately large	4.01	3.42	-14.8%
Extra large	2.86	2.88	+0.7%
Average	3.96	3.62	-8.6%

Size bands defined by annual consumption:

Small	less than 880 MWh
Medium	880-8,800 MWh
Moderately large	8,800-150,000MWh
Extra large	greater than 150,000 MWh

Table 10.1: Electricity prices to industrial consumers

10.19 Electricity accounts for less than 2% of total production costs for the industrial sector as a whole. Only in a few cases does it account for more than 5%. In some sectors, however, the proportion is rather higher (around 10% in cement manufacture, for example) and for some specific processes the proportion is higher still (more than 40% in the case of chlorine production). Electricity prices can therefore be an important factor in the competitiveness of the most intensive energy users.

10.20 The IEA produces data on industrial electricity prices. These show prices in Japan to be significantly higher than those elsewhere, with prices in the United Kingdom broadly in the centre of the range for other major developed countries, below Germany and Italy but above the USA, Canada and France. The relativities have not changed greatly since 1987. Within these broad figures, however, there can be substantial variation in the terms under which customers are able to negotiate specific contracts.

10.21 In their evidence to the Review, large users argue that their competitive position against rivals overseas has been eroded by increases in the price of electricity to them. Large users adduced evidence to show that the prices enjoyed by some of their overseas competitors are much lower, and said that present and future investment in industry is being endangered by electricity prices which are higher than those prevailing in some other countries. Large users also argue that the pool mechanism does not adequately

reflect the size of their demand or its baseload character. Some propose that the generators should be forced to offer large users bulk discounts and seek exemption from, or capping of, the fossil fuel levy.

10.22 TISC considered it an essential principle that major energy users in the United Kingdom should not be disadvantaged relative to their overseas competitors by high electricity prices. They suggested that large users should be able to by-pass the pool, and that demand-side bidding in the pool should be introduced.

10.23 Large users which take electricity generated on-site are already permitted to by-pass the pool. The Government is currently working with the DGES to examine the circumstances under which other large users might contract directly with generators outside the pool and to examine the regulatory changes which may be needed to enable this to happen. There are complex issues to be resolved if such measures are not to disadvantage other users. The Government is keen to encourage any proposals designed to improve the workings of the electricity market and will embark shortly on further consultations with the DGES, the electricity industry and large users, on whether such a proposal would be beneficial to the electricity market. Demand side bidding is a matter for the pool authorities and the DGES. The Government welcomes the fact that the pool is considering this issue as part of its current study and that the DGES is supporting progress.

10.24 Generating its own electricity on site can often be a competitive means for a large industrial user to provide electricity. This is particularly the case if there is a substantial CHP element to the project, which, through the provision of direct heat from the project as well as electricity, can increase the overall efficiency of fuel use considerably. The Government has assisted the development of "own generation" by exempting the owners of such projects from the need to hold a supply licence if at least 51% of the electricity output from the project is used on site. The Government has been reviewing the operation of the present exemption and is currently considering whether these arrangements could be further improved.

10.25 TISC also suggested that the fossil fuel levy be tapered so that larger users paid a lower percentage. The Electricity Act 1989 requires that the fossil fuel levy is raised from all electricity suppliers in proportion to the value of their electricity sales. These additional charges are passed on to customers.

10.26 The Government accepts that certain large United Kingdom electricity users may have faced a competitive disadvantage as compared with companies in other countries where electricity supply arrangements are generally different. If larger users were to pay a lower percentage of the levy, however, that would mean that smaller users, including smaller industrial users and domestic customers, would have to pay more. For example, a cap on levy payments set at the level of consumption of 30 GWh a year, would increase electricity bills for other consumers by around 1%. The Government does not believe that it would be right to oblige smaller consumers to subsidise large users in this way. The Government will continue to work with the DGES to examine ways in which the regulatory system, for example in relation to the proposals discussed in paragraph 10.23, can

be adjusted to ease the position of large users, both in England and Wales and in Northern Ireland.

The franchise limit

10.27 The existing public electricity supply companies in England, Wales and Scotland currently have a monopoly of supply to customers below the "franchise limit", currently set at 1 MW. The limit is due to be reduced to 100 kW in April 1994 and removed entirely in April 1998.

10.28 As noted in paragraph 10.10, a number of pieces of evidence suggested that the reduction in the franchise limit should be delayed as part of a package in which the generators and the public electricity supply companies would agree to buy more coal and coal-based electricity at higher prices than they would otherwise have done. TISC was attracted to this proposal, subject to a number of conditions.

10.29 The main objection to the proposal is that, by delaying the introduction of competition, it could also help to entrench the margins taken by the various players in the electricity market. Given the criticisms that have been levelled at these margins, it would be wrong to make existing franchise users continue to pay them without being able to test them through competition. Any delay to the changes in the franchise limits would also impose a penalty on the many customers who have already spent significant sums preparing for the change.

10.30 **The Government believes that the electricity market needs more competition, not less. Reducing the franchise limit in 1994 as planned will bring the benefits of competition to a further 40 000 consumers over and above the 4 000 or so who currently enjoy them. Furthermore, investors, both shareholders in electricity companies and in organisations contemplating entering the electricity market, have acted since privatisation on the basis that the franchise will be reduced from 1994 and abolished from 1998. The Government wishes the movement towards greater competition to continue, and accordingly does not propose to make any change in the present arrangements providing for the reduction of the franchise limit to 100kW from 1994 and its complete abolition from 1998.**

Use of consent powers

10.31 The construction of any new power station above 50 MW, or the extension of an existing power station, requires consent from the Secretary of State under Section 36 of the Electricity Act 1989. Government policy since privatisation has been that as a general rule matters such as the need for a generating station, its capacity, choice of fuel to be used and type of plant should be treated as commercial matters for the applicant concerned. In March 1992, the Government announced that it might need to consider if it should review the use of its powers under the Electricity Act to issue consent to power stations. The President made clear on 21 October 1992 that such a review would form part of the Coal Review.

10.32 Tables 10.2 and 10.3 highlight the status of those major (above 50 MW) gas fired power stations that have received section 36 consent, together with those that have received permission to construct such a station under legislation before the Electricity Act 1989 came into force.

10.33 Of the 16 projects listed in Table 10.2, 10 were given construction consent under the Electricity Act 1989. Of the 10 projects listed in Table 10.3, 7 were given construction consent under the Electricity Act 1989.

10.34 Section 14 of the Energy Act 1976 requires notification to the Secretary of State of:

(a) proposals to build a gas fuelled or oil fuelled power station (or to convert a station to gas or oil);

(b) proposals to obtain a supply of gas to a power station.

10.35 The Secretary of State may, if he thinks it expedient having regard to current energy policies, direct that a proposal not be carried out, or be carried out in accordance with conditions specified in the direction. No such direction has ever been made.

10.36 Section 14 was enacted to give effect to the EC Directives (75/404/EEC and 75/405/EEC) restricting respectively the use of natural gas and oil in electricity generation. The EC's gas burn Directive was repealed in March 1991. The Commission is also re-examining the oil burn directive. The Government has already announced that it intends to repeal Section 14 in respect of gas as soon as a suitable opportunity arises, and it will review the Section 14 restrictions on oil burn at the same time. In the meantime it does not intend to use its powers under Section 14 to frustrate consents given under Section 36. The conclusions of the Government's review of its consent powers under Section 36 are set out in Chapter 13.

Restriction on gas burn in power stations

10.37 Natural gas cannot easily be stored and the systems for producing and transporting gas must be designed to cope with the maximum expected level of throughput. For these reasons, gas is cheaper when supplied and used at a constant rate and CCGT plant is thus most economic when run on baseload. The operators of gas fields who supply CCGTs are also keen to maintain a steady level of depletion. In order to deal with maintenance periods and unexpected problems, however, the finance and gas purchase contracts of CCGT projects are usually organised so that the projects can cover their costs and make a return on capital on a somewhat lower level of throughput, below which financial and contractual penalties come into play. This level may vary from project to project. It has been suggested in evidence to the Review, and by TISC in their report that, if CCGT projects were constrained to these levels of throughput, extra coal could be burned without the projects suffering financially.

OPERATIONAL

Location	Capacity (MW)	Promoter	Operational
Killingholme# (South Humberside)	900	PowerGen	1993
Roosecote# (Cumbria)	229	IPP (Lakeland Power)	1991

2 gas-fired projects representing 1.1GW of capacity.

UNDER CONSTRUCTION

Location	Capacity (MW)	Promoter	Due on-line
Barking* (East London)	1000	IPP (Barking Power)	1995
Brigg# (South Humberside)	240	IPP (Regional Power Generators)	1993
Calder Hall# (Cumbria)	160	IPP (BNFL)	1993
Charterhouse Street* (City of London)	90	IPP (Citigen Ltd -gas/fuel oil project)	1994
Corby# (Northamptonshire)	350	IPP (Corby Power)	1993
Deeside* (Clwyd)	450	National Power (Deeside Power Dev. Co.)	1994
Keadby 1* (Humberside)	680	IPP (Keadby Power)	1995
Killingholme "A" (phase 1)* (South Humberside)	650	National Power	1993
Little Barford* (Bedfordshire)	680	National Power	1995
Medway* (Kent)	660	IPP (Medway Power)	1995
Peterborough# (Cambridgeshire)	355	IPP (Peterborough Power)	1993
Rye House* (Hertfordshire)	680	PowerGen	1994
Spondon* (Derbyshire)	318	IPP (Derwent Cogeneration)	1995
Wilton* (Teesside)	1750	IPP (Teesside Power)	1995

13 gas-fired projects and 1 gas/fuel oil project representing around 8.1 GW of capacity.

* Construction consent given under Section 36 of the Electricity Act 1989
# Construction consent received under other legislation before the Electricity Act 1989 came into force.

Table 10.2: New major (above 50MW) gas-fired power stations operational and under construction

Location	Capacity (MW)	Promoter
Angle Bay* (Dyfed)	1280	IPP (Texaco/Mission Energy)
Coryton* (Essex)	460	IPP (Coryton Cogen)
Killingholme "A" (phase 2)* (South Humberside)	370	National Power
King's Lynn* (Norfolk)	118	IPP (Energy Supply Co.)
Newcastle Upon Tyne#	150	IPP (Forth Energy Ltd)
Sheffield#	120	IPP (Sheffield Heat & Power)
Shoreham* (West Sussex)	500	IPP (South Coast Power)
Shotton# (Clwyd)	225	IPP (Shotton Paper Co.)
Stallingborough* (South Humberside)	1100	IPP (Humber Power)
Sutton Bridge* (Lincolnshire)	700	IPP (Independent Power Generators)

10 gas-fired projects representing 5.0GW of capacity.

* Construction consent given under Section 36 of the Electricity Act 1989
# Construction consent received under other legislation before the Electricity Act 1989 came into force.

Table 10.3: Other new major (above 50MW) gas-fired power station projects with construction consents

10.38 In practice, some CCGT plant may well operate at close to its minimum throughput level if the avoidable cost of operating the plant is higher than the pool price. (This could be the case if the pool price was being determined by competitively-priced coal.) Taking action to constrain all CCGTs to operate at minimum throughput levels would, however, not only be administratively and legally complex, but, more importantly, would require substantial intervention by Government in freely negotiated commercial contracts. It would also increase the ability of National Power and PowerGen to influence pool and contract prices, to the detriment of other generators and of the development of a more competitive market place. Finally, it would remove pressure on operators of coal fired and other plant to operate efficiently and would be likely to increase the price of electricity.

RECs' economic purchasing obligation

10.39 The RECs are obliged by Condition 5 of their Public Electricity Supply licences to buy electricity "at the best effective price reasonably obtainable having regard to the sources available." This is known as the economic purchasing obligation. In complying with it, the RECs are allowed to take into consideration factors including "the future security, reliability and diversity of sources of electricity available for purchase."

10.40 Much of the evidence to the Review, and much public comment, suggested that the RECs' contracts with IPPs for gas fired capacity breached this condition. It was argued that existing coal fired power stations could generate power more cheaply. Some commentators suggested that some RECs were unduly influenced by the prospects of making profits through shareholdings in the IPPs. Suggestions were made to limit the RECs' ability to pass on the allegedly excessive costs to their customers, or to disallow IPP contracts in the franchise market.

10.41 The costs of gas fired against coal fired generation were discussed in paragraphs 7.42 to 7.56 above. There is, however, a difference between the **cost** of generating electricity and the **price** at which the generator offers that electricity to potential buyers. This point was recognised in several pieces of evidence, at least one of which stated that had coal based price offers been closer to coal generation costs this might well have altered perceptions of the relative merits of coal based and gas based electricity contracts.

10.42 Enforcement of the conditions of the RECs' licences is the responsibility of the DGES. He has powers to obtain the information he requires from licensees in order to carry out his functions.

10.43 On 10 December 1992 the DGES published a preliminary report on how the RECs had complied with the economic purchasing condition. He compared contracts with new IPPs for gas fired capacity with those available from Nuclear Electric and with offers from National Power and PowerGen based on their coal stations. He found that the IPP contracts appeared to compare well with other contracts available to the RECs. They tended to compare favourably on price and in addition gave RECs a greater diversity of fuel source and supplier and reduced vulnerability to environmental pressures on power station emissions.

10.44 The DGES made a further report on 23 February. Although the Director General sees possible scope for future improvements in RECs' purchasing practices and in the regulatory regime, this report confirmed that he found no basis for concluding that the RECs had breached their economic purchasing conditions.

10.45 The Director General did, however, record that he was not convinced that the costs associated with producing electricity from coal fired plant were sufficient to justify contract prices as high as those offered to the RECs by National Power and PowerGen.

Major generators' profits

10.46 The DGES said in his further report that he wishes to consider further the question of whether the potential levels of profit obtained by the generators in their generation business represent an abuse of market power. He has requested further information in order to analyse the two generators' costs and profit margins on their licensed business and has stated that he will monitor the situation particularly closely.

10.47 On 9 March 1993, he published a statement accepting that the plant closures proposed by the major generators were reasonable. This followed a report from an Independent Assessor, as provided for in the new licence condition put in place following the pool price inquiry of December 1991. The statement noted that new entry into United Kingdom electricity generation is important as a source of innovation and continuing pressure on incumbent generators. It urged the major generators to explore more thoroughly the possibility of selling plant (not just that scheduled for closure) to potential purchasers.

10.48 The DGES will consider not later than 1995 whether a reference of the major generators to the MMC is necessary. He will take into account the development of the major generators' costs and profit margins and the development of the companies' policies on the disposal of plant in reaching this judgement.

Provision of generating capacity

10.49 Some commentators have argued that in the absence of a strategic plan to build new coal fired capacity now, there will be a shortfall of generating capacity during the first decade of the next century. The Government's policy has been to create a competitive generation and supply market as the most effective and efficient way of meeting future capacity needs. TISC suggested that there was doubt about the market's ability to respond in time to needs for new capacity, and that there might be real grounds for concern.

10.50 With 9 GW of gas fired capacity currently under construction or recently completed, there is, as TISC acknowledged, no immediate prospect that capacity will be inadequate to meet foreseen demand to the end of the century. Thereafter construction of further new capacity, either as a net addition to the system or to replace less efficient or ageing plant, will be a commercial matter for the generating companies concerned, subject to the environmental constraints applying at the time. It will be for these companies to judge how to provide additional capacity, from the following alternatives:

(a) delayed retirement of the older less efficient coal fired stations;

(b) refurbishment of coal fired stations;

(c) employment of new coal burning technologies;

(d) construction of new gas fired stations;

(e) construction of new stations running on other fuels including renewables;

(f) construction of CHP stations.

10.51 The time at which such new stations are brought forward and whether they are designed to run on baseload or satisfy peaks in demand depend, among other factors, on the relative price at which electricity can be produced compared to the expected price of electricity in the future and the willingness of suppliers to enter into contracts. The obligation on NGC to produce a seven year statement about supply and demand is intended to help identify any projected shortfall in future capacity.

10.52 The Secretary of State and the DGES each has a duty under section 3(1) of the Electricity Act 1989 to exercise his functions under the Act in the manner which he considers is best calculated to secure that all reasonable demands for electricity are satisfied. The Government believes that the operation of the market will bring forward new capacity in a timely way as it is needed.

CHAPTER 11

THE MARKET FOR COAL

11.1 In October 1992 British Coal recognised that at the lowest prices at which it could supply coal, there would not be a market for a substantial part of its present productive capacity. The public reaction to the closure announcements which followed was in part based on a widespread view that there was nonetheless scope to intervene to expand the market. A primary purpose of the Review has been to examine the scope that there may be for securing a larger market for coal and to consider whether there is a case for doing so. This chapter and Chapter 12 set out the conclusions of this work.

11.2 The DTI employed Caminus to assist in the work of assessing the market for coal. They have examined the short term and longer term markets for coal in the United Kingdom and elsewhere. They have considered the market available to British Coal under competitive conditions and using a range of assumptions for the availability and price of alternative forms of energy. The impact of measures to reduce the cost of British Coal's output was taken into account. Their report *Markets for Coal* was published on 22 January. Their conclusions have been tested against the extensive evidence received by the Review on these issues. The Government's conclusions therefore reflect independent analysis and input from a wide range of outside bodies.

11.3 As noted in Chapter 4, British Coal is now overwhelmingly dependent on the electricity generation industry as a market for its output. The Review has, however, also considered carefully the scope for increasing sales elsewhere.

England and Wales power station market

11.4 Under the three year contracts with the coal fired electricity generators which expire at the end of March 1993, British Coal is supplying some 65 million tonnes of coal to the England and Wales electricity supply industry in 1992/93. This is expected to account for about 60% of generation. The announcements of October 1992 were primarily the result of the large fall in sales from 1992/93 levels which British Coal's preliminary negotiations with the generators on new contracts had established would take place. A fall in sales was expected as the generators ran down their stocks, which stood at 33.6 million tonnes in October 1992, took an increasing proportion of their fuel for power generation from other sources and lost market share to nuclear and gas stations owned by Nuclear Electric and independent producers.

11.5 Establishing the future demand for electricity is the first step in determining the size of coal's share of the electricity generation market. This was discussed in Chapter 7. Demand since April 1992 has changed little in comparison with the same period in 1991. General economic recovery should stimulate demand, but there is little prospect

of a very marked increase in sales of electricity in the medium term as energy efficiency measures continue to take effect.

11.6 A number of those providing evidence to the Review and to TISC have also provided forecasts of electricity demand in England and Wales over the five years from 1993/94 to 1997/98. Various organisations' projections are compared in Table 11.1.

11.7 Southern Electric based its forecasts on the NGC Seven Year Statement, which was updated in October 1992. Others, including

	1993-94	1994-95	1995-96	1996-97	1997-98	TOTAL
			(mtce)			
Southern Electric/ NGC/TISC	115	116	117	118	120	586
East Midlands Electricity	112.2	113.6	115.2	116.8	118.5	576.3
British Coal	111	111	112	114	115	563
Caminus	110.9	111.8	112.6	114.1	115.8	565.2

Note TWh converted to mtce using 1 tonne = 24GJ and 36% efficiency

Table 11.1: Electricity demand in England and Wales

Caminus, used lower figures reflecting more recent views about the speed of recovery from the recession. British Coal's estimate is closely in line with that adopted by Caminus. Differences in definition account for some of the differences shown in the table. The Caminus demand figures, for example, exclude demand from generating stations themselves and demand met from pumped storage stations and industrial generation. These items amount to about 3 million tonnes of coal equivalent (mtce) a year. The effect of such differences of definition on projections of the market for coal is likely to be small in relation to the inherent uncertainty associated with such projections. The imposition of VAT on domestic fuel from 1994 will also have some effect on electricity demand, which is probably not reflected in the figures in Table 11.1.

11.8 Chapter 7 examined the role of the fuels which compete with coal in the power generation sector. The report prepared by Caminus analysed in considerable detail the outlook for coal demand from the England and Wales electricity generators over the five year period 1993/94 to 1997/98. Their approach to assessment of future demand for coal was market based and assumed that the price of fuels would be the primary factor determining shares of the England and Wales power generation market. All gas fired power stations presently under construction were assumed to go ahead, as was Sizewell B. No account was taken of the proposed five year coal contracts under discussion before the October 1992 closure announcements.

11.9 Caminus made use of a detailed model of the market to produce coal demand projections under two scenarios, one constructed with assumptions which favour the use of British coal (the "High Coal" scenario), the other with assumptions which made the use of alternative fuels or other sources of coal relatively more attractive (the "Low Coal" scenario). The assumptions underlying the model are set out in detail in Chapter 3 of the Caminus report. It should be emphasised that these two scenarios represent views within a range of possible outcomes. Both are based on a series of internally consistent assumptions, which do not take account of any policy initiative designed to increase the market for coal. Although the likelihood of any particular scenario being realised in all its detail is low, the likelihood of the demand for British coal falling within this range is high.

11.10 Caminus' report also uses two different assumptions for the level of cost reduction achieved in the future by British Coal's pits. The Continued Improvement case assumes that British Coal will reduce the average cost of deep mined coal to £1.30/GJ in 1997/98 through continuation of the improvements which British Coal already has in hand. The Lower Cost case assumes that more extensive improvements are possible. The assumptions are very close to the findings by Boyds' separate study on the scope for cost reduction.

11.11 Caminus conclude that under the High Coal/Lower Cost view, total coal use in the England and Wales power sector is likely to fall from 62 million tonnes in 1993/94 to 49 million tonnes in 1997/98. The share of this taken by British Coal's deep-mine output would fall in the range from 27 million tonnes to 33 million tonnes over the same period. These sales assume stock draw down is limited to 5 million tonnes per year. It should be stressed that this is the most optimistic of the scenarios Caminus examined, assuming, for example, that neither of the large CCGT projects at Didcot and Connah's Quay, planned by National Power and PowerGen respectively, goes ahead.

11.12 The Low Coal scenario examined by Caminus presents a much bleaker picture for British Coal. Total demand for coal in the England and Wales power sector falls from 43 million tonnes in 1993/94 to 40 million tonnes in 1997/98, with the share taken by British Coal's deep mined output lying in the range from 4 million tonnes to 9 million tonnes in the Continued Improvement case. These results reflect the much higher cost of deep mined coal compared to imported coal in this scenario.

11.13 The conclusions of the Caminus study on this, the key market for coal, are clear. The demand for coal in the England and Wales power sector is set to decline significantly from current levels. Even under the High Coal scenario British Coal's deep mine sales in a competitive environment decline despite continued cost reduction measures. Under the most pessimistic of the Caminus scenarios, only 5-10 British Coal pits would be supplying this sector by 1997/98. These conclusions are illustrated in Figure 11.1. Since international coal and oil prices are presently close to the levels assumed in the Low Coal scenario, these results confirm that the base contracts which have now been agreed with the generators for 40 million tonnes in 1993/94, declining to 30 million tonnes in 1994/95 represent a good deal for British Coal.

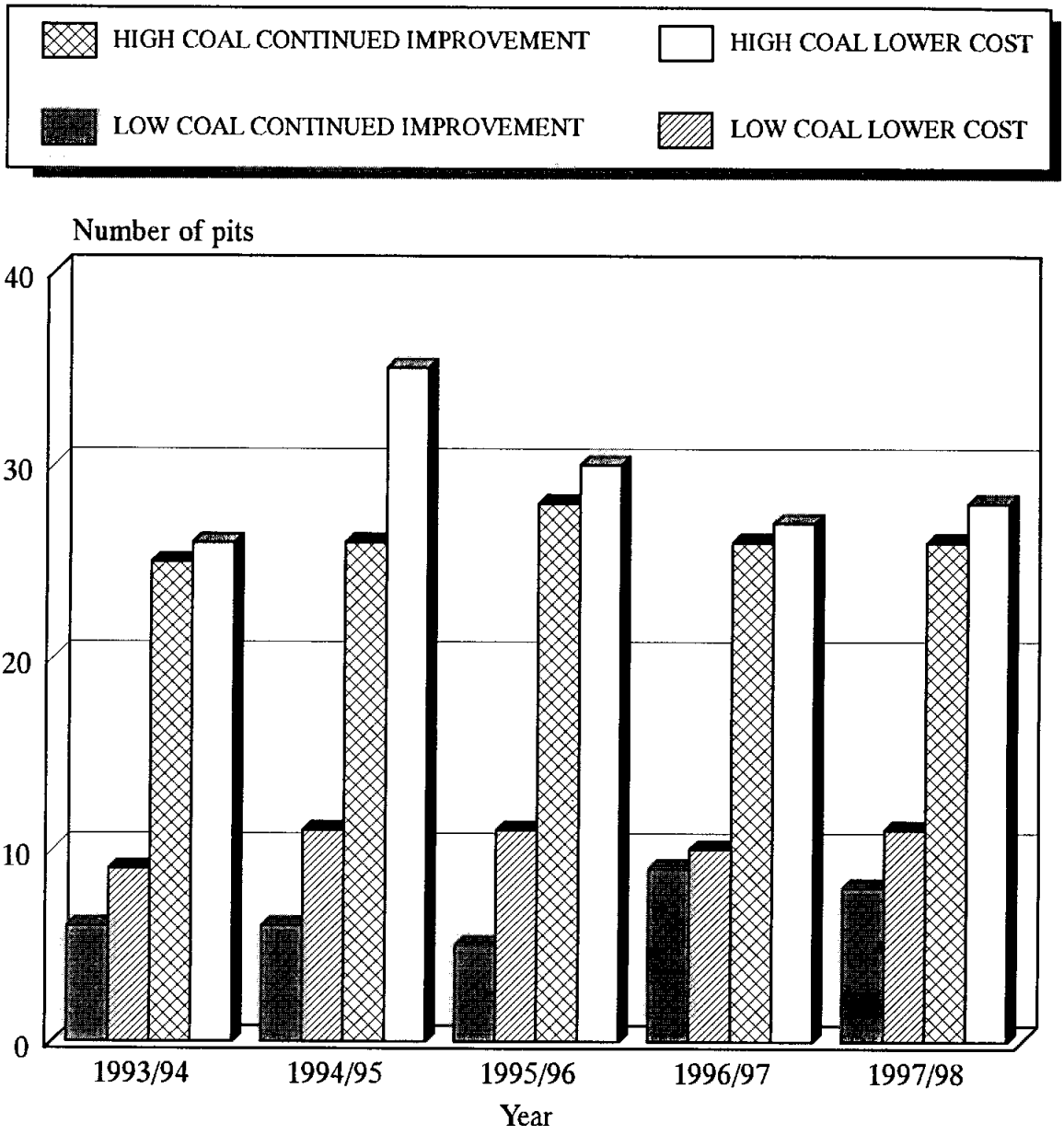


Figure 11.1: Caminus estimate of number of British Coal pits supplying the England and Wales ESI

Other forecasts

11.14 A number of those providing evidence to the Review and to TISC also provided projections of the fuel mix to be used in power stations in England and Wales over the five years from 1993/94 to 1997/98. TISC included such a table (Table 25) in its own report, based largely on data from Southern Electric evidence.

11.15 Table 11.2 compares the market for coal over the 5 year period foreseen in these projections and Table 11.3 sets this in the context of the overall fuel mix for the 5 year period in aggregate. Differences in definition may account for a relatively minor part of the differences in the projected figures. Caminus' figures for oilburn, for example,

do not include fuel used in starting up coal fired stations, unlike the British Coal and East Midlands Electricity figures.

	1993-94	1994-95	1995-96	1996-97	1997-98	TOTAL
			(mtce)			
TISC	74.5	68.5	60	54	56	313
Southern Electric	70	63	57	57	59	306
East Midlands Electricity	69.8	62.5	54.6	53.6	54.9	295.4
British Coal	64	56	46	43	44	253
Caminus - High coal	62.2	56.9	48.0	47.3	49.0	263.4
- Low coal	42.7	42.7	39.2	38.2	40.1	202.9

Table 11.2: Forecast coal burn in electricity industry in England and Wales

	TISC	Southern Electric	British Coal	East Midland Electricity	Caminus Low Coal	Caminus High Coal
				(mtce)		
Total Demand	586	586	563	576.3	565.2	565.2
Nuclear	138	113	117	113.5	120.2	120.2
Gas	106	100	121	98.4	141.5	114.9
Inter-connectors	14	54	43	54.2	49.1	49.1
Hydro	-	-	-	-	0.5	0.5
Black fuels	328	320	282	310.4	253.7	280.4
Of which						
Oil	*13*	*10*	*15*	*15*	*35.9*	*2.9*
Orimulsion	*2*	*4*	*14*	-	*15.0*	*14.0*
Coal	*313*	*306*	*253*	*295.4*	*202.9*	*263.4*

Table 11.3: England and Wales ESI: Fuel Mix 1993-94 to 1997-98

11.16 These tables show that TISC is the most optimistic in its views on the size of the likely market for coal in the England and Wales electricity market. This is largely due to its assumption that action is taken against French imports and Orimulsion. In the absence of such action, TISC's projected market for coal would fall by some 40-50 million tonnes over the period to about 260-270 million tonnes.

Welsh power station market

11.17 The main coal fired power station in Wales, Aberthaw, is designed to burn low volatile coal which is available in the United Kingdom only from the local South Wales coalfield. The station can also use imported coal of the right quality. Aberthaw can consume up to 4 million tonnes of coal a year. Projected demand for coal from Aberthaw and other Welsh stations is included in the discussion of total demand from the England and Wales power sector.

Scottish electricity market

11.18 Power generation in Scotland is largely provided by Scottish Nuclear, Scottish Hydro-Electric and Scottish Power. The Scottish electricity supply industry's current contract with British Coal expires in March 1995. Coal supplied under this contract includes 2.5 million tonnes a year from British Coal's Longannet deep mine, falling to 2 million tonnes over the next two years. Additional tonnages of coal are purchased on a short term basis by competitive tender from British Coal, private mines and the international market.

11.19 There is currently a large excess of generating capacity in Scotland - over 2 GW in 1992/93 according to the Caminus study. Nuclear, hydro-electric and gas fired plant currently run on baseload and are expected to continue to do so. Coal fired plant is therefore not fully utilised.

11.20 Caminus conclude that demand for coal in the Scottish Power generating industry will fall in the short term before returning approximately to current levels by the mid 1990s. The major factor depressing demand in the immediate future is the coming on stream of the Miller oil and gas field in August 1992. Scottish Hydro-Electric has a must take obligation in respect of all the Miller gas delivered up to a daily maximum. Sufficient gas is likely to be produced to allow the Peterhead station to generate at an output of over 800 MW until the end of 1996. Assuming hydro and nuclear plant is all kept on baseload, this capacity is likely to displace much of the coal not covered by the long term contract referred to in paragraph 11.18.

11.21 By 1997 coal demand may be restored by the increase in capacity of the electricity interconnector with England and Wales, expected to give a capacity of 1600 MW by 1997, combined with a gradual fall in the flows of gas from Miller. The interconnector with Northern Ireland is also expected to be operational by 1997, with a likely capacity of 250 MW. The electricity these links export could be derived from coal burning plant. Caminus conclude that coal demand for power generation in Scotland could be as high as 7 million tonnes. The ability of British Coal to secure a future for Longannet within this market will depend on achieving lower production costs at the mine sufficient to ensure that its product is burned in preference to opencast or imported coal. Both of these alternatives are currently significantly cheaper, even taking account of the considerable transport cost advantage Longannet receives from its direct conveyor belt link with the power station. Under High Coal assumptions this could be achieved, but under the Low Coal scenario imports would be cheaper.

Northern Ireland power station market

11.22 Following the conversion of the Kilroot power station to dual coal/oil firing, the proportion of Northern Ireland electricity generation from coal fired stations has increased to around 30%. Demand for coal over the next year is likely to be just over 1 million tonnes and remain at that level until Belfast West power station is decommissioned. The market is fully open to competition from international suppliers and British Coal faces much higher transport costs to deliver coal than it would do for inland power stations in Great Britain. British Coal supplied this market in the past from opencast sites in Scotland, but virtually all contracts for 1993 have been placed on the international market. However, if British Coal can successfully compete with imports it may be able to regain this market.

The United Kingdom non-power sector market

11.23 Demand for steam coal in the United Kingdom in 1991/92, other than for electricity generation by the generating companies, totalled 14.7 million tonnes: 6.7 million tonnes were used by industry, 6.6 million tonnes by the domestic and commercial sectors (including concessionary coal for miners), and the balance of 1.4 million tonnes by solid fuel manufacturers to produce smokeless fuels, mostly for sale to the domestic sector. 10 million tonnes of coking coal were used in coke ovens, mainly in the iron and steel industry. British Coal produces less than a million tonnes of coking coal a year, mainly for sale to solid fuel manufacturers. Imports of coking coal are therefore essential to meet United Kingdom demand.

11.24 Only a relatively small proportion of the output of most of British Coal's pits, which produce coal primarily for sale into the electricity supply industry, is able to meet the demanding coal type and quality requirements of non-power sector steam coal customers. As some of those submitting evidence to the Review noted, British Coal's ability to supply non-power markets therefore depends largely on the volume of sales to the electricity supply industry. A contraction in sales to the electricity supply industry, and therefore in the number of pits producing steam coal, will tend to reduce British Coal's ability to meet demand in non-power markets.

Industrial use

11.25 The largest industrial use of coal is in on-site power generation, accounting for around 2 million tonnes a year, much of it in non-ferrous metal industries. The chemical, mineral products, paper and food processing industries account for the bulk of the rest of demand. In all these areas demand is affected by wider economic conditions and has generally been declining in recent years. Coal is often in competition with other fuel sources, such as petroleum coke, a refinery by-product, in the cement industry. In most cases, imported coal also offers an alternative source of supply.

11.26 Predictions of future demand from this sector are inevitably difficult, depending to a large extent on the commercial decisions of a relatively small number of customers. Price movements of imported coal and alternative fuels will have an important impact

Coal is in a strong position where it is able to offer secure supplies at the price and quality required by the customer, with the capacity to offer technical support which suppliers of imported coal cannot match. However, pollution control constraints could also have an important effect, depressing demand for British coal, with its relatively high sulphur content, especially if they are framed in terms of upper limits on allowable sulphur content.

11.27 Gas, and to a lesser degree heavy fuel oil, are certain to displace some coal consumption. The Caminus High Coal scenario projected that British Coal's sales to the United Kingdom industrial market would decline in the short term, recovering slightly to a level around 6.3 million tonnes in 1997/98. Under the Low Coal scenario, with industrial customers turning increasingly to other fuels, British Coal's sales could fall to 3.2 million tonnes by 1995/96.

11.28 It is clear that British Coal's sales to the industrial sector will probably fall. The evolution of this market will reflect the commercial decisions of private companies responding to wider developments in the energy market. Although there are one or two pits for which industrial demand is significant, industrial use offers little scope for increased coal consumption nationwide.

Solid Fuel Manufacture

11.29 In 1991/92 1.4 million tonnes of coal were used in the manufacture of solid fuels in the United Kingdom. Half of this volume went to Coal Products Limited, a wholly owned subsidiary of British Coal, the other half to two other companies. Solid fuel is sold almost exclusively to the domestic sector and therefore faces the same pressures described in paragraph 11.30 below. Total sales are unlikely to be more than 1 million tonnes by 1997/98, corresponding to 1.3 million tonnes of coal. British Coal's ability to supply this market in the face of competition from imports remains uncertain.

Domestic and commercial use

11.30 The outlook for coal demand from the domestic and commercial sector is poor. In total, demand from this sector was 6.6 million tonnes in 1991/92, of which around 0.5 million tonnes was concessionary coal supplied by British Coal free of charge to current or former employees. This included 1.6 million tonnes of graded anthracite, much of it imported due to there being insufficient supplies of British anthracite available. The domestic and commercial market has been in continuous decline for many years with the development of the gas transmission network leading to the widespread displacement of coal by gas in space and water heating. Northern Ireland is an exception, with 70% of households still using coal as their main source of heating. The decline has occurred both in the domestic market and in schools, hospitals and offices, and is likely to continue (though possibly at a slower rate) as more homes use natural gas; as gas for domestic use falls in price under the price control formula for British Gas imposed by OFGAS, and as the number of miners entitled to concessionary coal continues to fall. Caminus estimate that total British Coal sales to the commercial and domestic sectors are likely to be no more than 0.3-0.5 million tonnes and 2.0-2.5

million tonnes respectively by 1997/98, with licensed mines and imports meeting the balance of demand.

11.31 To summarise, British Coal's total sales to non-power markets are, on Caminus' High Coal view, likely to weaken in 1993/94 to 10.6 million tonnes and remain level thereafter. On the Low Coal view, total British Coal sales to these sectors fall steeply to 6 million tonnes in 1997/98, just over half their 1991/92 level. Over the next five years there is no realistic prospect of significant growth and a substantial risk of significant decline, as longer term trends of substitution of coal by other fuels continue and British Coal is likely to find increasing difficulty competing with imports.

Exports

11.32 Exports of British coal represent only a small proportion of total production in the United Kingdom, running at some 2 million tonnes a year in recent years, declining to 1.4 million tonnes in 1991/92. British Coal has said, in evidence to the Review, that it expects to export only 0.7 million tonnes of coal during 1992/93. This is a reduction of 50% on 1991/92, reflecting the Corporation's decision to withdraw as quickly as possible from loss making business.

11.33 Around half of exports in 1992 were of small sizes of steam coal, suitable only for burning in power stations or by large industrial customers. The main recipients in 1992 were Denmark, the Republic of Ireland, Germany and Portugal, although in earlier years significant amounts were also sold to the other Scandinavian countries and Morocco. A small quantity of larger steam coal was exported to the Republic of Ireland. The remainder (about 40% of total exports in 1992) was exports of anthracite to France, Belgium and Spain.

11.34 The prospects for exports over the next five years are not good unless there is a sharp decrease in British Coal's unit costs or a significant increase in international coal prices. The Boyds report (see paragraph 12.15 below) estimates that British Coal would need to produce at a pit head price of 40-60 p/GJ at inland pits and 60-70 p/GJ at coastal pits in order to be able to export substantial volumes of steam coal for power generation at current world prices. The report concludes that there is no prospect of British Coal being able to produce coal at these prices. There may be limited scope for profitable export of larger sizes of coal and of anthracite, which are effectively niche markets, but readily accessible United Kingdom supplies are limited.

11.35 This analysis supports that in British Coal's evidence, which makes clear that there is no prospect of exports increasing without massive subsidies. The more optimistic scenario in the Caminus report assumes that anthracite exports, and volumes to the Republic of Ireland and Scandinavia, hold up. More pessimistically, the closure of high cost pits, environmental pressures and declining overseas demand for solid fuel could lead to cuts elsewhere. On this basis, Caminus have concluded that the likely future range of exports is 0.5 to 0.9 million tonnes per annum.

11.36 The prospects for United Kingdom coal consumption and for total British Coal sales under Caminus' High Coal and Low Coal scenarios are summarised in Table 11.4.

Imports

11.37 Many of the submissions received by the Review advocated restraining coal imports in order to increase the market for British Coal's output. Much public attention has focused on the role of imported coal in displacing part of British Coal's output. It is important to be clear about the scale and nature of coal imports before considering these arguments.

11.38 Coal imports in 1992 were made up by the following elements:

(a) 8.4 million tonnes of coking coal, almost all of it metallurgical coal for the steel industry;

(b) 6 million tonnes of steam coal for use in the England and Wales electricity supply industry;

(c) 1.6 million tonnes of steam coal for use in the electricity industry in Scotland and Northern Ireland;

(d) 4.4 million tonnes for industrial, commercial and domestic use, of grades of coal (including anthracite), of which the United Kingdom has insufficient sources of supply.

11.39 The potential for displacing imports of metallurgical coal is severely limited: very little coking coal is produced by British mines, and what there is has higher sulphur and ash content than imported coal, reducing its suitability for use in metallurgical processes. None of the pits included in the Review produces anthracite, though it was produced from one of the pits (Betws) which is the subject of a consultation process being carried out by British Coal.

11.40 Scope for displacing imported coal is therefore largely confined to the steam coal market. The majority of steam coal imports go to the electricity supply industry in England and Wales. This was considered in detail in paragraphs 11.4 to 11.13 above.

11.41 Coal imports could not be restricted by government action without a serious risk that such action would be incompatible with the United Kingdom's EC and GATT obligations. Article XI of GATT bans quantitative import restrictions subject to certain exceptions, none of which could be invoked to justify restrictions on coal imports. An aggrieved GATT member would have recourse under GATT disputes settlement procedures. In the event of an adverse finding against the Community in respect of actions taken by the Government, the United Kingdom would be obliged to comply with any GATT recommendations for remedying the default.

11.42 Several submissions referred to British Coal's anti-dumping complaint which is

All figures in million tonnes

HIGH COAL SCENARIO

UK steam coal consumption

	1991/92	1993/94	1994/95	1995/96	1996/97	1997/98
Power sector	80.5	67.0	62.9	55.1	54.4	56.8
of which:						
England and Wales	75.0	62.3	57.1	48.0	47.2	49.0
Non-power sector	14.7	14.4	14.3	14.2	14.2	14.2
TOTAL	95.2	81.4	77.2	69.3	68.6	71.0

British Coal sales

	1991/92	1993/94	1994/95	1995/96	1996/97	1997/98
Power sector	73.0	34.9	41.2	43.6	40.9	42.4
of which:						
England and Wales	70.0	32.4	37.6	38.6	35.5	36.6
Non-power sector	11.3	10.6	10.7	10.7	10.7	10.6
Exports	1.4	1.3	1.2	1.1	1.0	0.9
TOTAL	85.7	46.8	53.1	55.4	52.6	53.9

LOW COAL SCENARIO

UK steam coal consumption

	1991/92	1993/94	1994/95	1995/96	1996/97	1997/98
Power sector	80.5	47.1	48.4	46.1	45.7	47.7
of which:						
England and Wales	75.0	43.1	43.3	39.7	38.7	40.3
Non-power sector	14.7	13.1	12.2	11.2	11.0	10.9
TOTAL	95.2	60.2	60.6	57.3	56.7	58.6

British Coal sales

	1991/92	1993/94	1994/95	1995/96	1996/97	1997/98
Power sector	73.0	10.7	13.6	11.7	16.0	16.3
of which:						
England and Wales	70.0	8.4	10.8	8.7	13.0	13.3
Non-power sector	11.3	9.1	7.7	6.6	6.3	6.0
Exports	1.4	1.2	1.0	0.9	0.7	0.5
TOTAL	85.7	21.0	22.3	19.2	23.0	22.8

Table 11.4: Summary of Caminus High and Low coal scenarios

currently with the European Commission. Taking the complaint forward is a matter for the Commission. Allegations of dumping relate, however, to no more than 6% of the total United Kingdom coal market. It is not clear that reduced imports from the countries in question would create a larger market for British coal: as TISC acknowledged, additional imports from other countries could fill any gap.

11.43 The Government sees no case for imposing restrictions on the import of coal, even if this were possible within its EC and other international treaty obligations. The Government is a strong advocate of free trade policies and has been in the forefront of efforts to bring the Uruguay GATT round to a successful conclusion. The existence of alternative sources of supply is important to ensuring the security of the United Kingdom's electricity supplies, and the need to compete with coal produced elsewhere is in an important spur to further improvements in the British coal industry's own performance.

CHAPTER 12

BRITISH COAL: VIABILITY AND COMPETITIVENESS

12.1 The preceding chapters set out the structure of the energy market within which British Coal must operate. Chapter 11 considered in more detail the prospects for British Coal's sales in that market. This chapter examines the prospects for British Coal achieving the full commercial viability which will be needed if it is to take full advantage of the opportunities the market offers.

Government financial support

12.2 Over the last thirteen financial years British Coal has been persistently and heavily dependent on grant payments. Between 1979 and 1992 the Government has provided for nearly £18 billion in assistance to the coal industry. This assistance has been provided in several forms including deficit and operating grants (£4 843 million), social and restructuring grants (£4 423 million) and payments under the Redundant Mineworkers Payments Schemes (RMPS) (£2 464 million). Table 12.1 summarises the Government's assistance to the coal industry and British Coal's losses before grants since 1979.

12.3 The largest single injection of aid came in 1990 when the Corporation's record accumulated group deficit of £6 153 million was eliminated by provision of an equal sum of deficiency grant. This accompanied a £2 606 million write down of British Coal's assets and enabled the Corporation to make £1 476 million and £500 million provisions respectively for liabilities in respect of concessionary fuel supplies and compensation for noise-induced hearing loss. In the period since the 1990 financial reconstruction direct production subsidies have not been provided but aid has continued on a large scale in the form of restructuring grant, payments for early and enhanced pensions, and pit closure grant. Substantial payments under the RMPS continue.

British Coal's financial position

12.4 In addition to Government financial aid, the coal industry has also benefitted to the extent of about £1 billion a year over the last three years from the financial advantage conferred through the premium over market prices which the electricity generators have been paying for their coal supplies from British Coal.

12.5 In the first two financial years following the 1990 financial reconstruction British Coal reported bottom-line profits of £78 million (1990/91) and £170 million (1991/92). These profits were achieved with the benefit of the advantageous prices just mentioned as well as grant assistance totalling £141 million (1990/91) and £457 million (1991/92). British Coal made operating profits before interest of £238 million (1990/91) and £361 million (1991/92). Within these profit figures opencast mines accounted for operating

Financial Year	Loss before grants (a)	Grants to British Coal (a)	RMPS Payments (b)	Total Financial Assistance
1979/80	[251]	251	15	266
1980/81	[254]	254	15	269
1981/82	[575]	575	48	623
1982/83	[520]	520	80	600
1983/84	[1145]	1145	190	1335
1984/85	[2414]	2414	200	2614
1985/86	[563]	563	563	1126
1986/87	[882]	882	610	1492
1987/88	[972]	677	295	972
1988/89	[500]	297	168	465
1989/90	[6166]	7243	126	7369
1990/91	[63]	141	93	234
1991/92	[287]	457	61	518
TOTAL		**15419**	**2464**	**17883**

(All figures in £ million)

NOTES

(a) Figures used are taken from British Coal's Annual Report and Accounts. Grants to British Coal include operating and deficit grants, deficiency grant and social and restructuring grants. Figures on accruals basis.

(b) Redundant Mineworkers Payments Scheme. Figures exclude administration costs.

Table 12.1: Grants to British Coal; British Coal results; payments under the RMPS

profits of £150 million (1990/91) and £171 million (1991/92), thus contributing significantly to the Corporation's overall financial performance.

12.6 British Coal remains strongly cash negative. The cash generated from British Coal's operations is insufficient to meet the requirements of the business for working

capital and funds for capital investment. Last year, for example, despite the reported bottom-line profit of £170 million, British Coal's requirement for external financing, met by Government grants and loans, was £605 million. The Corporation's external financing requirement is expected to reach nearly £800 million this financial year and to be in the region of £1 400-1 900 million next year. Thus British Coal has been and continues to be a major burden on public finances.

12.7 It is all the more important therefore that British Coal has made major strides in improving productivity in recent years, increasing output per man shift at its deep mines from 2.43 tonnes in 1983/84 to 5.31 tonnes in 1991/92. Since 1985/86 unit costs at deep mines have been reduced by over 35% in real terms and costs at opencast sites by 17%. Nevertheless, as discussed in paragraph 4.7, costs at British Coal's deep mines remain well above world prices and the rate at which the Corporation has reduced costs has been slower than that recorded by coal industries elsewhere.

12.8 It was the gap between world prices and British Coal's costs, together with the displacement of coal by other fuels, which led to the October closure announcements. British Coal was unable to produce coal at a sufficiently low price to secure as large a share of the market as the protected contracts entered into at the time of electricity privatisation had previously given it. Much of the criticism of the announcement arose from the view that a number of pits proposed for closure were capable in time of competing at prevailing market prices. A critical element of the Review has been to test this assertion by examining closely the scope for further cost and productivity improvements which could be achieved other than by further pit closures.

British Coal's organisational efficiency

12.9 The key determinant of British Coal's costs is the efficiency of individual mines. Its pricing and competitiveness are, however, also affected by the costs and effectiveness of the central and group management structure above pit level. The management consultants Ernst & Young scrutinised these aspects of British Coal's activities on behalf of the Government as part of the Review. PIMS also undertook a comparative exercise placing British Coal's performance in these areas in the context of comparable international companies. Both their reports were published on 22 January.

12.10 The total administrative expenditure of British Coal in 1991/92 reviewed by Ernst & Young was £268.2 million, out of a total cost base for the core businesses of deep and opencast mines of £3 433 million. This covered 7 210 employees in March 1992. The significant reductions in administrative costs in recent years have not matched the rate of reduction in the colliery workforces and costs. The ratio of non-industrial to industrial staff has risen from 1:6 in 1989/90 to 1:5 in 1991/92. While recognising the special factors which arise in the case of British Coal, Ernst & Young conclude that there is considerable scope for savings through reducing British Coal's overheads.

12.11 The Ernst & Young report sets out detailed recommendations for cost savings which could be obtained from re-structuring and rationalisation, as part of the process

of reducing overheads to reflect reducing production activities.

12.12 The potential benefits to be derived from organisational changes and efficiency improvements along these lines is confirmed by the work which Ernst & Young and PIMS have carried out comparing British Coal with international benchmark companies. The PIMS study concluded that on the basis of international comparisons, British Coal should be able to achieve an overhead level of 4.9% of sales, based on the experience of similarly positioned raw materials businesses, with a long term target of 2.9% of sales, compared with 7.4% now.

12.13 Ernst & Young estimate that if all the changes they suggest are implemented, by 1996/97 they would produce permanent cost savings of up to £74 million a year, assuming that 26 collieries remain open in 1996/97 (the high scenario in British Coal's evidence to the Review). Savings would increase to £107 million in Ernst & Young's low scenario, with only 15 pits remaining open in 1996/97. The one-off cost of the redundancy payments needed to implement the changes is estimated at £109 million in the low scenario. Between 2 000 and 3 300 managerial and administrative jobs would be lost, depending on the number of collieries remaining open.

12.14 The Government fully recognises the strides British Coal has made to improve efficiency and competitiveness in recent years. The Ernst & Young report demonstrates the further scope for improvement at regional, group and national level. British Coal had already made progress in this area and is already committed to reducing its overheads to 50% of their 1991/92 levels in sterling terms by March 1995. British Coal is committed to achieving improvements which go beyond the recommendations of Ernst & Young. It has appointed its own consultants in this area and will be coming forward with revised and detailed proposals shortly. The Government has emphasised to British Coal the urgency of further action in this area and will be reviewing progress with the Corporation. Further jobs will inevitably be lost. But change cannot be evaded if British Coal is to achieve full commercial viability in the longer term.

Viability of the 21 pits

12.15 The contract prices offered by British Coal to the generators in the later stages of negotiations in 1992 recognised the scope for further cost improvements arising from more efficient working at British Coal's pits. When the Coal Review was set up, the Government appointed Boyds, a USA-based firm of mining engineering consultants, to prepare an independent review of the viability of each of the 21 pits. They also examined each of the 20 pits intended to remain (19 existing pits plus one under development at Asfordby). This was intended in part to confirm the scope for cost savings at the pit level and to determine how far British Coal's mining costs could be reduced with further changes to management practices and working methods. Their detailed report was published on 22 January and only a few key points are summarised here.

12.16 The key conclusions of the Boyds report were that:

(a) the general strategy and overall selection of pits used by British Coal to establish the October 1992 "continue to operate", "care and maintenance" and "closure" colliery categories appear reasonable within the constrained market volume projected by British Coal;

(b) the opportunity exists within British Coal mines for significant cost reductions (and improved safety and productivity) by the application of modern technology and by removing a number of outdated or otherwise inappropriate operating constraints;

(c) the technological and structural problems will need to be addressed as soon as possible in order to achieve early cost benefits.

12.17 Boyds' remit was to examine the viability of each of the 21 pits in the context of British Coal's continuing operations. Boyds examined historical operating data, mine plans, coal reserves, commercial factors associated with each colliery, and environmental factors associated with either closure or continued operation. Boyds produced a ranking of the coal reserve base at each colliery taking into account aggregate coal thickness, remaining mine life, geology and coal quality. They also looked in detail at colliery operations, particularly the productivity and cost potential of the existing collieries.

12.18 Boyds note that there are qualified people at all levels of British Coal colliery management, experienced in the traditional mining techniques of British Coal. They recommend that the role of the colliery manager needs to be strengthened to give local autonomy and full commercial accountability. Boyds also recommend reorganisation of colliery staff to reduce demarcation barriers, establish front-line supervision and create a simplified chain of command oriented towards production. They regard the British Coal workforce as capable both in technical skills and in acceptance of hard work. They should be able to deliver substantial productivity gains provided they accept new technology, reductions in excess manpower, and a better standard of supervision and accountability. The use of contractors should be reduced.

12.19 In the area of mining technology and practice, Boyds recognise that the geological conditions found in the United Kingdom are generally worse than those elsewhere in the world. There is, however, also considerable variation in the quality of underground conditions in the USA and Australia. They conclude that there is nothing in the geology of many British mines to prevent the introduction and extension of modern international mining techniques by British Coal. In particular, they support the transition to retreat mining using the longwall system and the use of heavy duty equipment. They recommend consolidation of the number of faces at each colliery, and a move to the multiple-entry system of mine development with extensive use of rock-bolting wherever it can be incorporated into a colliery plan in a technically competent manner. It is Boyds' firm opinion that the multiple-entry system has wide application in British Coal collieries. These changes would take 2-5 years and require a priority programme of geotechnical work and field testing.

12.20 Boyds do not recommend widespread introduction of room and pillar mining.

They do, however, recommend continued operation of Point of Ayr colliery to allow commercial development of this mining system, and modifications to the existing room and pillar system at Ellington, which they regard as a prime candidate for switching entirely to the system once remaining thick seam reserves suitable for longwall mining are exhausted.

12.21 Boyds consider that changes need to be made to existing legislation and other changes introduced in British Coal's policies and working practices if British Coal are to operate in a fully commercial way and achieve potential cost reductions. These changes include:

(a) flexible work schedules to allow extended shift times and weekend work;

(b) compulsory redundancy at all levels of employment;

(c) restructuring of colliery management;

(d) modern underground working practices (for example use of electrical cable splicing, cutting torches and welding equipment, and mining in-seam).

12.22 Boyds review the future costs achievable at each of the 41 pits by 1 April 1996 under two scenarios:

Case I, which assumes technology improvements and reduced staff, but within existing regulations and working practices;

Case II, which assumes an unconstrained industry operating under modern mining regulations in a commercial setting.

The costs which Boyds consider achievable over a three year period at each pit on each of the two scenarios are set out in Tables 12.2 and 12.3. These rankings do not on their own provide a basis for decisions on the commercial viability of any of the pits. Such decisions will need to take account of a range of site specific factors.

12.23 These figures assume British Coal's overheads above the pit level are controlled to a level of £1.50/tonne. This is near the top of the range for US pits.

12.24 Boyds commend the 234% increase in British Coal's average colliery productivity over the last seven years but point out that this has limited significance in the world coal context. Average productivity is 20-35% of that achieved in the USA and Australia and deep mined production costs are double to triple those of major exporting countries. Although Boyds are satisfied that British Coal's pits have the potential to achieve the substantial improvements in productivity and cost reductions which they have identified, Boyds stress that the technical, managerial and structural problems will need to be addressed as soon as possible if early cost reductions are to be achieved. They estimate that it will take two to five years (depending on conditions at individual collieries) to achieve the full projected cost savings. Major continued

Colliery	Annual Saleable Output ('000)	Estimated Total Costs £/GJ (1 April 1996)	Final Colliery Ranking
Closure Review (21 pits)		*Case 1 Economic Ranking*	
Maltby (a)	1251	1.31	1
Hatfield (a)	783	1.39	2
Prince of Wales (a)	1556	1.32	3
Frickley	1046	1.39	4
Point of Ayr	542	1.16	5
Bentley	801	1.44	6
Rossington	803	1.52	7
Wearmouth (a)	1337	1.34	8
Calverton	905	1.66	9
Kiveton Park	904	1.53	10
Bilsthorpe	1292	1.53	11
Silverdale	980	1.51	12
Shirebrook	1286	1.55	13
Markham	1359	1.57	14
Bolsover (b)	650	1.65	15
Clipstone	814	1.73	16
Rufford	716	1.68	17
Sharlston (b)	900	1.80	18
Bevercotes	708	1.87	19
Westoe	1141	1.72	20
Easington (b)	1200	1.80	21
Total	**20974**		
Closure Review (21 pits)		*Case 2 Economic Ranking*	
Maltby (a)	1520	1.11	1
Hatfield (a)	953	1.19	2
Prince of Wales (a)	1825	1.15	3
Frickley	1298	1.22	4
Rossington	1114	1.22	5
Point of Ayr	637	1.02	6
Wearmouth (a)	1578	1.16	7
Silverdale	1172	1.26	8
Bentley	899	1.33	9
Shirebrook	1553	1.34	10
Bilsthorpe	1472	1.36	11
Calverton	973	1.56	12
Clipstone	931	1.46	13
Kiveton Park	989	1.45	14
Rufford	874	1.43	15
Markham	1420	1.47	16
Bevercotes	770	1.64	17
Sharlston (b)	900	1.65	18
Bolsover	650	1.80	19
Westoe	1401	1.66	20
Easington (b)	1200	1.80	21
Total	**24129**		

(a) Mines designated for care and maintenance programme
(b) Projected to close prior to 1 April 1996

Table 12.2: Boyds ranking for 21 "closure review" pits

Colliery	Annual Saleable Output ('000)	Estimated Total Costs £/GJ (1 April 1996)	Final Colliery Ranking
Continue to Operate (20 pits)		*Case 1 Economic Ranking*	
Daw Mill	1860	1.13	1
Wistow	2285	1.02	2
North Selby	1762	1.16	3
Riccall	2068	1.18	4
Thoresby	1870	1.18	5
Goldthorpe (a)	1400	1.15	6
Asfordby	1644	1.17	7
Manton	1315	1.26	8
Harworth	2047	1.23	9
Longannet	1693	1.32	10
Welbeck	1565	1.28	11
Kellingley	1839	1.38	12
Whitemoor	1213	1.30	13
Ollerton	1511	1.30	14
Annesley	1320	1.30	15
Stillingfleet	2365	1.36	16
Silverwood	892	1.44	17
Littleton	1038	1.50	18
Tower	666	1.61	19
Ellington	1086	1.83	20
Total	**31439**		
Continue to Operate (20 pits)		*Case 2 Economic Ranking*	
Daw Mill	2212	1.00	1
Wistow	2283	0.95	2
North Selby	2385	0.98	3
Riccall	1400	1.00	4
Thoresby	1930	1.07	5
Goldthorpe (a)	2462	1.07	6
Asfordby	1930	1.04	7
Manton	2111	1.11	8
Harworth	1493	1.15	9
Longannet	2223	1.20	10
Welbeck	1793	1.14	11
Kellingley	1347	1.19	12
Whitemoor	1774	1.25	13
Ollerton	1476	1.17	14
Annesley	2730	1.24	15
Stillingfleet	1121	1.34	16
Silverwood	1260	1.30	17
Littleton	966	1.36	18
Tower	753	1.46	19
Ellington	1304	1.57	20
Total	**34953**		

(a) Projected to close prior to 1 April 1996

Table 12.3: Boyds ranking for 20 "continue to operate" pits

improvements and great efforts from the management and workforce of British Coal will be required. British Coal has said that it is confident of achieving the performance expectations set out by Boyds, generally in a shorter period than their three year framework. The Government welcomes this assessment and is in discussion with British Coal about implementation of the Boyds recommendations.

12.25 The Boyds and Caminus reports broadly confirm that, if more productive mining techniques and working practices are implemented and the mining community adopts a proactive business attitude, British Coal can be competitive with imported coal at inland power stations. On this point they are supported by other evidence quoted by TISC.

12.26 Inherent geological conditions, the age of most British pits and operational and statutory limitations mean that British pits will never be able to produce significant tonnages at the low prices of major exporters like Australia, the USA and South Africa. Hence British Coal will not be able to sell significant amounts of coal outside its home market where transport costs give it an in-built advantage.

Statutory framework: proposals for change

12.27 The Boyds report brings out the direct contribution of more flexible working arrangements to British Coal's ability to make pits more competitive. A particular area of difficulty is the Coal Mines Regulation Act 1908. This Act stipulates that mineworkers may not remain below ground for more than 7 hours and 30 minutes plus one "winding time" in any 24 hour period. As pits age and working seams move further away from the bottom of the pit shaft a higher proportion of time under ground is spent travelling - up to 2 hours a shift in some pits.

12.28 In practice mineworkers often work for longer than the statutory maximum on a voluntary overtime basis. But the Act prevents British Coal from negotiating new contractual arrangements with the mining unions to secure more productive use of working time - for example a 36 hour week with four nine hour days.

12.29 TISC recommended that a high priority be placed on reforming working practices, including the passing of any necessary legislation, where this would reduce costs without compromising safety, and considered that particular attention should be given to the reform of working hours.

12.30 Repeal of the 1908 Act does not require primary legislation. The Coal Industry Act 1992 provided for the 1908 Act to cease to have effect on a date appointed by the Secretary of State by statutory instrument. The Government intends, subject to a consultation process, to remove the impediment to efficiency represented by the Act.

Safety regime

12.31 The existing coal mining safety regime is the responsibility of the Health and Safety Commission (HSC). The regime is largely based on regulations made under the

Mines and Quarries Act 1954. The HSC are in the course of modernising this regime through regulations made under the Health and Safety at Work etc Act 1974. The Management and Administration of Safety and Health at Mines (MASHAM) package is an important part of this, addressing a variety of safety issues including safety related aspects of management and the arrangements for inspection and supervision at mines. One important proposal concerns the current dual role of pit deputies, combining supervision of work in mines with responsibility for safety inspections. MASHAM recommends that managers should be able to separate these roles provided that both continue to be carried out.

12.32 In its evidence to the Review, British Coal stressed the need to implement the MASHAM package as soon as possible. Boyds also suggested that the adoption of modernised legislation would be helpful in modernising the management structure in British Coal's mines. Implementation of the package is a matter for the HSC. The establishment of clear front-line supervision is, however, a matter for management. As Boyds acknowledge, such supervision and a simplified chain of command is already being implemented in part at Asfordby under the existing regulations and the Government expects that British Coal will wish to consider how this can be extended more widely. Boyds advise that British Coal management needs to provide the strategic impetus to maximise productivity gains, regardless of the regulatory framework within which they are operating.

12.33 **The Government attaches the highest priority to achieving high standards of safety in the mining industry through an updated and flexible package of regulations. It looks forward to receiving advice from the HSC on modernised regulations.**

CHAPTER 13

THE GOVERNMENT'S PROPOSALS

13.1 It is worth summarising the position described so far. The future of the British coal industry depends on its sales to the electricity supply industry, especially that in England and Wales. Under the contracts concluded in 1990, which expire on 31 March, British Coal will supply 65 million tonnes of coal to the power generators in England and Wales this financial year. British Coal's decision to close 31 pits reflected its assessment that it was unlikely to sell these generators more than 40 million tonnes in 1993/94, falling to no more than 30 million in each of the four following years. National Power and PowerGen have confirmed their intention of entering into contracts with British Coal for these tonnages. Prospects for additional sales above these levels are discussed in paragraphs 13.10 to 13.16.

13.2 The evidence confirms that British Coal's decision was soundly based in the market conditions. The Caminus report amply confirms that, at current world coal prices, the outlook for British deep mined coal in the power sector in a free market would be even worse than that implied by the contracts under discussion in October 1992. In reality, the market was tilted in favour of coal. Britain's coal industry was shielded for too long from competition under cosy arrangements between state-owned monopolies. The move towards a freer market in electricity exposed these arrangements and hastened their demise. At the time of electricity privatisation in 1990, British Coal was given a further period to adapt, through three year contracts with the generators at substantially above the price at which imported coal was available. British Coal's failure to take full advantage of this opportunity, and its lack of competitiveness in world terms, lie at the heart of the current problem.

13.3 The Boyds and Ernst & Young reports confirm earlier advice that there is scope for substantial cost reductions. If fully implemented, which will take time, these could allow British mines to offer substantially more coal at prices which could be competitive with imports.

13.4 Caminus conclude that if prices can be brought down to levels competitive with imported coal, there is a potential for substantially more British coal to be sold into the England and Wales electricity generation market in 1997/98 (49 million tonnes in their High Coal/Lower Cost scenario). However, the size of the future market cannot be predicted with certainty, and different commentators take different views.

13.5 Nevertheless, Caminus' analysis suggests that, if the British coal industry brings its costs down to the extent which the Boyds and Ernst & Young reports suggest is possible, there is the potential for a larger economically viable coal industry in 1997/98 than would have resulted if the October closure proposals had been fully implemented. Some form of temporary support from Government could help provide the time for

these cost reductions to be implemented.

13.6 The Government does not, however, believe that this future can be realised so long as the vast majority of the industry remains state-owned. Exposure to the disciplines of the market will be essential to provide the right incentive for cost reduction and more commercial attitudes. The Government's hope for a larger viable industry can be achieved only with the industry in the private sector.

13.7 Supporting the industry while viability is achieved will carry a substantial cost, both directly, in terms of the payments to British Coal, and indirectly, in terms of the lost economic activity displaced by subsidised coal production. The Government recognises, however, that a substantial part of these costs would inevitably have been incurred as a result of the need to respond to the widespread concern that the impact on communities of the proposed closures should be softened by phasing closures over a substantially longer period. The Government wishes to provide this support in such a way as to maximise the opportunities for economically viable British coal production in the longer term.

13.8 **The Government has therefore concluded that there is a case for enabling British Coal to phase the inevitable closures needed and also offering the coal industry the chance of a competitive future in the private sector.** More pits will be kept open for longer in the interim. This will have the further benefit of easing the distress and dislocation which would have been caused in coalfield communities by the sudden contraction in the industry announced last October.

Improving the prospects for British coal in power generation

13.9 The Government has considered a large number of possible ways of intervening to help British Coal whilst it seeks to become competitive. Many of these have been suggested in evidence to the Review or to TISC. In reaching its views, it has taken a number of factors into account:

- the United Kingdom's international obligations. Coal imports could not be restricted by government action without a serious risk that such action would be incompatible with the United Kingdom's EC and GATT obligations. The Government recognises the importance of these obligations to the United Kingdom's success as a trading nation and has no wish to breach them.

- The impact on employment in other sectors. Much of the evidence provided to the Review has drawn attention to the employment problems that would be caused in other energy sectors by some proposals designed to help find a market for coal. Undue intervention in the market for gas fired generation could put at risk jobs in the exploration and production part of the oil and gas industry, the construction industry, the power generation equipment sector and in the related oil services sector. Many jobs are also involved in servicing the nuclear generation industry. More generally, intervention which had the effect of increasing electricity

prices to industrial consumers would have damaging consequences for industrial competitiveness and employment in a wide range of industries.

- The impact on the operation of the electricity market. Competition in the electricity market must continue to develop. The concerns expressed in evidence on this subject spring from too little competition rather than too much. Ways of assisting coal sales that depend on greater restrictions on competition not only entrench monopoly positions within the electricity industry but also store up problems for the time when the restrictions are removed.

13.10 Against this background, the Government has decided that it is prepared to play its part in sustaining the coal industry by providing financial assistance to British Coal and the private sector. This will apply only to deep mined coal and only to tonnages which the electricity supply industry in England and Wales agrees to purchase above the amounts in the base contracts referred to in paragraph 13.1. Similar assistance will also be available to incremental tonnages purchased from Scottish pits by the ESI. The financial assistance is to assist British Coal in selling additional tonnages of deep mined coal at world-related prices.

13.11 The base tonnages will not be supported by any Government subsidy. They will be supplied at prices agreed between British Coal and the generators declining each year to reflect British Coal's anticipated cost reductions. These prices nonetheless remain above those at which the generators could import coal in the first year of the contracts, declining to a price expected to be equivalent to that of imported coal by the end of the period.

Structure of new support to the coal industry

13.12 Substantial negotiations have taken place between British Coal and the generators about the possibility of supplementary contracts for further supplies from British Coal, which might substitute for imported coal and other black fuels. The negotiations will continue. The Government has authorised British Coal to negotiate on the basis that it would supply at the world market price as envisaged by TISC. The Government has offered to subsidise at a declining rate, again as envisaged by TISC, the difference between the cost of British Coal's production and the world price.

13.13 The Government is ready to offer a subsidy for any additional tonnages that British Coal is able to sell to the generators, whether or not these are on long term contracts. The subsidy will reduce progressively over the period to privatisation, which the Government intends to achieve at the earliest practical opportunity. The Government will also continue to meet its commitment to the social costs associated with the restructuring of the coal industry.

13.14 Financial assistance on the same basis as for British Coal will also be provided to the private deep mine sector in relation to genuinely additional tonnages sold to the generating companies, consistent with the relevant EC provisions. British Coal or

private opencast will not benefit from the subsidy. The costs of production for opencast coal are much closer to world levels and the Government sees no need to provide a subsidy to such workings. The Government does, however, look to the generating companies to honour existing contracts.

13.15 Because in future the generators will be buying coal from British Coal at a lower price and in lower quantities than at present, the price of electricity to the consumer should fall from current levels, provided that the generators pass on the reductions in their costs. The reduction in fuel prices should lead to electricity prices to the domestic consumer being lower in 1993/94 in real terms than they were in 1992/93, although there is likely to be some variation between different public electricity suppliers.

13.16 The additional tonnages of British deep mined coal which the generators take will displace other fuel which would otherwise have been burned. The Government anticipates that they will choose to import less coal than they would otherwise have chosen to, since the cost advantage in doing so will be lost. The precise level of their continued imports will, however, be a matter for them. As discussed in paragraph 11.43 above, the Government sees no case for placing restrictions on the generators' imports, even were this possible within its international obligations. Chapter 7 made clear that the amount of Orimulsion used in power generation is in any case likely to decline, and that heavy fuel oil is also likely to play a declining role.

Role and costs of stocks

13.17 The continuing imbalance between production and consumption of coal in the United Kingdom has led to an accumulation of stocks of coal well in excess of those which would be required by normal commercial considerations. This is recognised in much of the evidence submitted to the Review. British Coal had stocks of some 12 million tonnes at the end of February 1993, considerably higher than its operational needs. Stocks held by the two main generators at power stations totalled some 33 million tonnes.

13.18 The Government has exercised its powers under section 34 of the Electricity Act 1989 to require the electricity generators in England and Wales to maintain substantial stocks in order to ensure continued electricity generation in the event of a major disruption to their fuel supplies. This level is currently set at nine months endurance in the event of a complete disruption of deliveries from British Coal. In 1992/93 the required stocking figures are 10-20 million tonnes depending on the time of year.

13.19 In March 1992 the Government informed the electricity generators and NGC, which advises the Government on endurance matters, that it would be reviewing the basis for the current requirements with a view to arriving at new arrangements for the year 1993/94. The Government considers that, whilst the current period of endurance supply underlying the stock levels required remains appropriate, it is unlikely that there is any case for treating imported coal differently from indigenous coal for these purposes, as currently happens.

13.20 The closure announcements made in October 1992 assumed that the generators

would reduce their stocks at the rate of 11 million tonnes a year in 1993/94 and 1994/95. A number of those submitting evidence have suggested that there is a strong case for continuing to hold stocks at levels above those which purely commercial considerations would dictate to protect against price shocks or supply disruption. Coal is one of the fuels that can safely be stockpiled to a significant extent.

13.21 Maintaining high levels of stocks is costly, and their continued existence can threaten the potential for future coal production by providing a readily available alternative source of coal for use in power stations. On the other hand, a rapid rundown of stocks by the generators can have an immediate impact on coal sales.

13.22 TISC argued that coal stocks should be regarded as the main guarantee of security for the electricity system, and suggested that 20 million tonnes of coal would represent a reasonable minimum level of stocks to guarantee security. TISC did not, however, explain how this figure was reached. However, the Government must behave in a way which is rational and legally defensible. The use of existing powers is constrained by the duties in section 3 of the Electricity Act 1989 and it would not be lawful to use them simply to enhance the market for British coal. Furthermore, there would be no justification for taking new powers whose sole purpose would be, in effect, to force private sector companies to buy goods that they did not want to buy, for the benefit of another commercial entity.

13.23 The Government will be taking forward its consultations with the generators about stocking arrangements for 1993/94 as a matter of urgency, in the light of the considerations set out above.

Opencast coal

13.24 British Coal Opencast produced 16.7 million tonnes of coal in 1991/92 (including 0.6 million tonnes produced for British Coal by licensees) from 59 sites. This compares with the 71 million tonnes produced by British Coal's deep mines in the same period.

13.25 United Kingdom opencast sites are small by world standards and have an average life of only five years. If no new British Coal opencast sites entered production, its output would quickly reduce, falling by over 50% by the mid 1990s and to zero in the early years of the next century. In fact, British Coal had, at 1 March 1993, received planning permission for 7 new sites, permission in principle for one more and has appeals outstanding for a further 5.

13.26 All British Coal's opencast sites are operated by civil engineering companies under contract. According to British Coal, these sites generate around 6 500 jobs directly and a further 8 000 indirectly in supply industries. In some areas, such as parts of Ayrshire and Northumberland, opencast is one of the major generators of employment.

13.27 In addition to operating British Coal's opencast sites under contract, the private sector also operate their own sites under licence from British Coal. In 1991/92, there

were 77 such sites in Britain employing around 2 500 people (according to a British Coal estimate) and the licensed sector produced 2.3 million tonnes of coal. This sector, similar to British Coal's own opencast, can be exploited profitably in a competitive market. **Accordingly, as part of the legislation to privatise the coal industry (see paragraphs 14.14 to 14.21 below) the Government will remove the provision in the Coal Industry Nationalisation Act 1946 which limits the licensed sector to opencast sites where coal production is unlikely to exceed 250 000 tonnes.** The same legislation will also include proposals to transfer British Coal's licensing responsibility (for amongst other things private sector opencast sites) to a new public sector body.

13.28 Under the terms of the licences, private sector opencast producers pay royalty to British Coal currently at the rate of £4.50/£5.00 a tonne. British Coal has announced that the royalty for 1993/94 will be at the rate of £2.00 a tonne.

13.29 British Coal's projections assume that 70-85% of its opencast output would be sold to the electricity supply industry. Its low levels of ash, chlorine and moisture enable British Coal to meet the generators' overall quality requirements, particularly in respect of chlorine content. Opencast coal is thus an important element in British Coal's supplies to the generators.

13.30 In a number of particular areas in Scotland, Wales, the Midlands and the North of England, opencasting has produced landscape improvements through the clearance of dereliction and enabled some important reclamation and redevelopment schemes to proceed which would otherwise be uneconomic. On the other hand, a number of those submitting evidence said that opencasting is intrusive on the local environment and can be disruptive to local communities. Evidence submitted to the Review conflicted on the degree to which opencast mining left permanent environmental damage.

13.31 Some submissions argued that opencasting should be restricted because of the environmental damage caused, or objected to the current planning guidance on opencast coal and TISC also proposed changes in planning guidance. These are matters for the review of planning guidance currently being conducted by the Department of the Environment. The Secretary of State for the Environment will be announcing how he will be taking forward this review in the light of this White Paper.

13.32 Other submissions to the Review argued in favour of limiting opencast production, and TISC proposed restrictions on the grant of licences. However, opencast production is economic and can already compete in the market place with alternative fuels. The Government does not see a need for the imposition of arbitrary controls. In the near to medium term, however, the prospect is that the level of opencast output will fall. British Coal, in its evidence to the Review, projected a reduction in its opencast output from the current level of 16 million tonnes to 12 million tonnes in 1997/98. The availability of financial support for additional sales of deep mined coal will be a significant change in the financial and business planning outlook for British Coal, and, in the light of possible supplementary sales to the generators, British Coal's current expectation is that opencast output will be somewhat below that projected in its evidence to the Review during the transitional period while it reduces deep mined costs in order to secure a viable deep mined industry in the longer term.

13.33 It will remain a matter for British Coal to decide the level of output for which it wishes to aim in any period in the light of market conditions. Similarly, it will be for current or prospective developers in the licensed sector, in the light of their own business plans, to decide the level of output for which they wish to aim.

Section 36 consent policy for new gas fired power stations

13.34 In the light of the views expressed, the Government has reviewed carefully the policy underlying its current approach to consents under Section 36 of the Electricity Act 1989. This approach has been that, as a general rule, matters such as the need for a generating station, its capacity, choice of fuel used and type of plant are commercial matters for the applicant. This policy was set out, for example, by the Minister for Energy on 23 February 1993 in answer to a Parliamentary Question from Mr Martin O'Neill MP. The Government has, however, considered whether any changes are needed to its policy on power station consents for the future, in the light of its proposals for assistance to the coal industry set out in paragraphs 13.10 to 13.14. In doing so, it has taken careful account of TISC's view that, in view of the need for some stability in the new electricity market, there should be very careful consideration before any new applications for Section 36 consents for CCGTs are granted. TISC proposed giving priority to projects with a substantial CHP element, projects using "sour gas", and projects not promoted by the two main generators.

13.35 The Government's proposals for support for coal should ensure that British coal remains a competitive fuel for electricity generation. **The Government therefore sees no need to depart from its previously announced policy in relation to new power station consents.** The Government believes that a stable regulatory framework is required to enable effective competition in generation to develop. Any significant departure from its existing policy would risk damaging investor confidence both in the electricity market and in the oil and gas sector, with potentially damaging consequences there. **Applications for consent will continue to be considered on their individual merits against the background of the policy in paragraph 13.34.**

13.36 It has been suggested in evidence to the Review that the Government should intervene to prevent or control the operation of gas fired power stations for which consent has already been given. The Government has no powers to do so. Such action would be virtually unprecedented other than in a national emergency. In the Government's view, to enact and use such powers would constitute unacceptable interference in the commercial affairs of those concerned. Companies would be left with no firm basis for planning and there would be a significant risk that they would default on contractual and financial undertakings. This would have a serious impact on confidence, both in relation to UKCS development, and in industry more widely. The proposal to restrict the output of existing CCGTs was discussed further in paragraphs 10.37 and 10.38.

CHAPTER 14

THE IMPACT OF CHANGE

14.1 The measures outlined in the previous chapter will give British Coal an opportunity to become competitive with imported coal and other competing fuel sources. They should allow the future private sector coal industry to be efficient and effective with a larger number of pits than that envisaged in British Coal's October announcement. The Government believes that these proposals should provide British Coal with the opportunity to sell additional tonnages to the generators, but there will be no guarantees offered. The onus will be on British Coal to achieve the performance which will allow it to secure its own future with the help of the strictly limited support that is offered.

14.2 It makes no sense to produce coal which no-one wants to buy. Supplementary contracts have not yet been agreed, and there are huge stocks already on the surface. There is no point in adding to these stocks. British Coal has been considering how best to bring supply more closely into line with demand. From discussions with British Coal it appears that the measures under consideration include:

(a) the closure of pits nearing economic exhaustion;

(b) the cessation of production at pits and putting them on care and maintenance;

(c) continuing development work only.

These measures would be likely to involve 8 or 9 pits in total. British Coal has informed the Government that any such pits, save for the possible exception of pits where development only continues, would be offered to the private sector.

14.3 Putting a pit on development only would involve capital investment to create a world-class pit with truly competitive costs and a more secure future and will help to ensure that its reserves are available into the next century.

14.4 The size and speed of the contraction of the coal industry in the longer term will depend on its success in achieving additional sales and in becoming more competitive. Decisions on how many and which pits will stay open and which will close are for British Coal.

14.5 The Chairman of British Coal has confirmed that in advance of full privatisation any pit which the Corporation does not itself wish to keep in production will be offered

to the private sector. The Government welcomes this commitment. The Government is prepared to consider a subsidy on the same basis as for British Coal to the new private sector operators of such pits to enable them to sell their output at world prices where a genuinely additional demand for their coal is demonstrated. The sale of individual pits to the private sector is discussed in greater detail in paragraphs 14.22 to 14.32.

Impact on employment

14.6 As noted above, it will be for British Coal and the privatised industry to decide, in the light of the measures put forward in this White Paper to increase the market for its coal, and of its negotiations with its principal customers, which pits will in the future need to be proposed for closure, and when. Until those decisions have been taken, it is not possible to estimate in any helpful way the impacts on communities and on other industries.

14.7 What must, however, be acknowledged is that there are and have been no easy choices. The increased share of the power generation market which the Government's measures are intended to secure for British deep mined coal must be at the expense of other fuel sources, and those who supply the equipment to extract and transport them. There may be fewer people employed in handling coal imports; there may be fewer people employed in opencast (directly or indirectly) than would otherwise be the case and there could also be an adverse effect on the ordering of specialist equipment for opencast mining. In addition, the additional public expenditure implied by the proposed measures must either be diverted from elsewhere in the public sector, with employment consequences there, or result in increased taxes or government borrowing, which can also impact adversely on employment.

14.8 Despite the measures the Government is taking, there will be closures over the next few years, and those closures will hurt local communities and industries. The Government has made it clear that it will help to promote the economic regeneration of areas hit by closures. This was discussed in Chapter 5. A substantial package of measures was announced by the President of the Board of Trade in October 1992 for English areas, with a parallel package for Wales. **The Government has now decided to increase the amount available for these measures to £200 million.**

14.9 In addition to reducing the impact of closures on British Coal and the mining communities, the proposals in this White Paper will also reduce their impact on the industries that supply the deep mines, and in particular the mining equipment industry. That industry will nevertheless need to adjust to lower coal production in the United Kingdom. The Government has made clear to the industry that it will give it every proper assistance to build on its success in world markets. This includes supported export missions, trade exhibitions and the prospects currently being explored with the Chinese authorities on forms of specific export financing facilities which might enhance the industry's prospects for securing orders.

14.10 While the industry, in common with those companies involved in mechanical handling of coal, will continue to face a difficult and challenging period, the measures

proposed in this White Paper will improve Britain's chances of retaining a viable equipment supply industry which is competitive in the world market.

Environmental impact

14.11 It is not possible to specify precisely the environmental effect of measures put forward in this White Paper. The additional coal burn that results will depend on British Coal's success in selling additional tonnages with the benefit of the subsidy offered. This cannot be predicted accurately in advance. Nor is it possible to be certain about either what quantities of other fuels will be used or what those quantities would otherwise have been.

14.12 Nevertheless, analysis has shown that measures are in place which are sufficient to meet the existing SO_2 and NO_X emissions targets under the LCPD for its remaining period up to 2003. The outcome of the Coal Review should not threaten the fulfilment of these commitments. As regards CO_2 emissions, the Government will prepare the United Kingdom's full national plan for meeting its obligations in the light of the responses to the discussion document, and of other Government policies including the outcome of the Coal Review. It must be recognised, however, that the higher the level of coalburn by the electricity supply industry, the more stringent the measures to curb emissions in other sectors of the economy, including transport, would need to be.

14.13 If the United Kingdom's international environmental obligations tighten in the next century, with a tighter CO_2 target, coalburn would inevitably be further constrained unless very stringent measures were taken to cut CO_2 emissions in other sectors. Tighter limits on SO_2 would be likely to constrain coalburn by the electricity generators, unless further FGD was fitted, which would have adverse implications for the economics of coal use. In the longer term a further fall from current levels of coalburn is therefore likely.

Privatisation plans and regulatory changes

14.14 It has been the Government's clearly stated intention since 1988 that the activities of British Coal would in due course be returned to the private sector. Work on the possible options for privatisation has proceeded since then, accelerating with the appointment of financial, legal and other advisers to the Government in June 1991.

14.15 Paving legislation for privatisation - the British Coal and British Rail (Transfer Proposals) Act 1993 - received Royal Assent on 19 January. The Act enables British Coal to play a full role in preparations for privatisation.

14.16 Substantive progress with the main privatisation legislation has been delayed for the period of the Review. Such legislation will need to cover a number of areas, including licensing arrangements, protection of third parties suffering subsidence as a result of mining, liabilities in respect of former employees, pension rights and the transfer of property, rights and liabilities to successors. The legislation will also remove the current restriction which prevents the licensing of opencast sites likely to produce amounts of coal greatly in excess of 250 000 tonnes a year. The Government will

ensure that the pension and concessionary fuel entitlements of existing and past employees of the industry are safeguarded.

14.17 The Government is proposing a new form of regulatory structure for the coal industry to replace the statutory regime which has been in place since nationalisation. The Government intends to separate the regulatory and mining functions of British Coal to remove the potentially serious conflict of interest which could arise from British Coal licensing its competitors, and which TISC acknowledged. This proposal was strongly supported by a number of those submitting evidence to the Review.

14.18 The Government proposes to establish a new public sector body to be known as the Coal Authority which will be responsible for licensing all coal mining activity, including that in existing British Coal mines and all current and future private sector mining operations. In doing so the rights of third parties, in particular in relation to subsidence, will continue to be safeguarded. The Coal Authority itself will be prohibited from mining. It will be required to make available to potential licensees and other interested parties records of past, present and planned mining and geological information in its possession, subject to commercial confidentiality and any reasonable fee that may be charged. Its headquarters will be in Nottinghamshire.

14.19 The Government is committed to ensuring that the current safety standards of British Coal are maintained or improved. The prime safety responsibility will remain, as now, with the owners of coal mines and the regulatory responsibility will remain with the HSC.

14.20 The coal industry is also subject to more general regulation, including the land use planning regime and environmental regulation. No changes to these regimes are recommended by this White Paper. As already noted, the Department of the Environment is currently conducting a review of planning guidance relevant to coal developments.

14.21 There are clear benefits to the coal industry and to consumers of coal in freeing the managers of Britain's coal industry from the constraints of public sector ownership. It is to a large extent these constraints that have brought British Coal to its present position, and there can be no confidence that within them the industry will achieve the dramatic changes necessary if it is to have a long term future. The full implications of the other proposals in this White Paper for the structure and timing of the privatisation of the coal industry require further detailed consideration. The Government intends, however, to bring forward the necessary legislation as rapidly as possible. British Coal will begin immediately to prepare for privatisation, so that transfers to the private sector can be implemented as quickly as possible once the legislation is passed. British Coal will also be prepared, in the context of its preparations for privatisation, to consider with interested parties proposals for sale of regional coal mining packages.

Sale of individual pits to the private sector

14.22 The Government currently has no powers to sell British Coal's assets or to issue

licences for the operation of pits. Nor does the Government have any power to give specific directions to British Coal concerning the exercise of British Coal's licensing function. The Government's powers to give specific directions concerning disposal of assets are limited to those conferred by section 7 of the Coal Industry Act 1971.

14.23 The Coal Industry Nationalisation Act 1946 created the National Coal Board which was given the exclusive right and duty to work coal in Great Britain. Section 36(2) of the Act made exceptions to this exclusion but only for certain minor cases (such as the extraction of coal as an incidental part of some other mining venture) and for those who were granted licences to mine coal by the Board under its limited licensing powers. This basic structure remains in place today. The Act is based on the premise that there is to be a single public sector body, owning the freehold of all save a very small portion of the coal reserves and conducting nearly all mining operations itself. The licensed mines were to be few and small in size and would not have a major position in the industry. The duties and functions of British Coal reflect these assumptions which are now fundamentally outdated.

14.24 Until 1990 private sector operations were limited in size by statutory provisions preventing the licensing of private mines at which the underground workforce was likely greatly to exceed 30 persons. The figure of 30 was raised to 150 by the Coal Industry Act 1990. In practice, most existing private sector pits are much smaller than this limit. In September 1992 there were 94 private sector deep mines, mainly in Wales, producing 1.1 million tonnes of coal, and each employing an average of 12 people underground. The licensed opencast sector produced just under 3 million tonnes in 1991/92.

14.25 Almost all British Coal's pits employ more than 150 people underground. Significantly extending the role of the private sector in the mining of coal will therefore require primary legislation.

14.26 A number of those submitting evidence to the Review, including both existing private sector mining organisations and independent commentators, argued that private sector mining companies could substantially increase efficiency at a number of the pits proposed for closure by British Coal in October. New owners, it was suggested, would be more open to new mining techniques, and competition between them would provide a greater incentive for cost reduction. A number of commentators discussed the question of the position of the existing workforce if private sector companies did purchase individual pits and the responsibility for making any necessary redundancy payments.

14.27 There are clearly considerable attractions to giving private sector mining companies the opportunity to run pits which would otherwise close. New management teams might be able to produce gains in efficiency which British Coal has not been able to secure. There would be the prospect of greater competition, with a number of private sector operators in the market seeking to supply the major customers.

14.28 It is the size of the market which will determine how many pits survive. Coal produced by private sector pits could simply displace British Coal's product from the

market, reducing the viability in the market place of the pits which remained in its control. This effect would be avoided only if production from private sector mines could be sold at low enough prices to increase the total size of the market. However, in certain parts of the United Kingdom and in particular in the North East and Wales, there may be local means of preserving coal mining activity, involving collaboration with the private sector in measures to benefit and maintain local employment opportunities, and involving sales to non-ESI markets.

14.29 British Coal has been seeking to achieve long term viability of its deep mining operations through cost reductions and increased productivity based on substantial investment in modern mining equipment and techniques designed to secure the long term future of its mines. The further changes suggested by Boyds in their report will accelerate this process. There would be a risk that some private companies might operate purely for the short term, producing as much coal as possible at as low a cost as possible, then abandoning the mine as further major investment was required to enable production to continue in the longer term.

14.30 These concerns will not apply in all cases. The Betws mine in South Wales, for example, has unworked reserves of anthracite which is in short supply in the United Kingdom. There has been significant interest shown by the private sector in taking over this mine, which British Coal proposes, subject to consultation, to close.

14.31 For these reasons, the sale or licensing of any individual pit needs careful consideration, and it is right that each case should be examined on its merits. It is, however, also right that where a private sector operator is prepared to take on a pit for the long term that operator should have the opportunity to succeed or fail in the market. **The Chairman of British Coal has confirmed that he will offer to the private sector pits which British Coal does not itself wish to keep in production. The Government welcomes this commitment.**

14.32 In considering bids the Corporation will, of course, have to have due regard to its statutory duties. Newly licensed mines will have to find new outlets for their production and will not have access to British Coal's contracts with the electricity supply industry. **The Government intends to legislate, as soon as opportunity allows, to remove restrictions on British Coal's power to license mines, and to take powers to sell all British Coal's commercial operations to the private sector. Provision will also be made in the privatisation legislation for an entirely new licensing regime and an independent licensing authority (see paragraphs 14.17 and 14.18 above).**

Mothballing

14.33 British Coal's announcement of October 1992 included proposals to keep four pits open on a care and maintenance basis, but not in production. Some commentators and a number of those submitting evidence to the Review have argued that putting pits onto a longer term care and maintenance basis (known as mothballing) should be used more widely to maintain easy access to coal reserves should demand for coal pick up if other energy sources become more expensive in the early years of the next century

as some predict.

14.34 Of course, coal reserves which are not worked are not lost. They remain where they are now, beneath the surface of Britain and available for use in the future whenever the combination of technology, economics, and other factors makes it possible and sensible to exploit them. But it may be worth bearing the costs of mothballing to increase the accessibility of the reserves if there is a realistic chance that these reserves will become economic to extract in the foreseeable future. If not, the money spent on mothballing would almost certainly be wasted.

14.35 Mothballing does not guarantee immediate future access to reserves. Costs and timescales vary from mine to mine and depend on the extent of the structure of the mine that is to be maintained. The longer the period of the mothballing, the less certain are the costs. In particular, the reactivation period and costs may increase with a longer period of mothballing as it may be necessary to recruit and train a workforce and adapt the mine to suit extractive equipment and techniques developed since production ceased at the mine. There may, however, be good reason to put pits onto a care and maintenance basis for a shorter period, when there is considerable uncertainty about the likely market during that period.

14.36 British Coal believes that a mothballed mine might employ perhaps 50-150 industrial workers, depending on the extent of the structure of the mine to be maintained, with very little indirect employment since there would be little demand for new machinery.

14.37 Investment in new mines, like investment in mothballing, is worth making only if a market for the coal is confidently expected. New mines take very much longer to bring into full production than mothballed ones, and the cost of sinking the shafts for a new pit is estimated at £100-120 million. On the other hand, their workable reserves can be expected to be much nearer to the shaft bottom: for this and other reasons their operating costs are likely to be lower.

14.38 **It is important to allow the market to be fully tested. British Coal is therefore considering putting a number of pits on short term care and maintenance until the private sector has had an opportunity to evaluate the possibility of taking them over.**

CHAPTER 15

CLEAN COAL TECHNOLOGY

15.1 In the long term, the future of the British coal industry will depend on it and its customers keeping up with the most advanced technologies both for extracting coal and for using it. Environmental concerns give particular point to this need.

15.2 The Government has long recognised the importance of the contribution research and development can make in the coal industry. Historically, most expenditure on coal research and development in the United Kingdom has been undertaken by British Coal. Work on coal utilisation technologies has been undertaken at British Coal's Coal Research Establishment (CRE), Cheltenham, and its outstations at Point of Ayr and Grimethorpe. Work on mining technologies has been undertaken at British Coal's Technical Services and Research Establishment, Bretby. In addition a significant contribution was made by the research programmes of the former nationalised gas and electricity industries. Over the past ten years or so the United Kingdom public sector, with support from funding from the EC, has invested over £1 billion in technologies to improve the efficiency, economics and environmental performance of coal mining and utilisation.

15.3 This public support for coal R&D is a recognition that coal supplied by the British coal industry has a contribution to make to the United Kingdom's future energy supply requirements. Worldwide, coal use is set to rise over the next decade and there are also significant overseas market opportunities for clean coal technology.

15.4 The Government is currently funding a portfolio of approximately 56 projects with a contract value of over £114 million. Many of these projects are collaborative projects undertaken in partnership with industry, British Coal and overseas organisations under the auspices of the EC and the IEA programmes. The DTI's contribution to this portfolio of projects is £24 million.

15.5 In addition to the work funded by the DTI's coal research programme, a wide range of coal research projects is underway at universities in the United Kingdom covering both coal utilisation and mining technologies. The Science and Engineering Research Council (SERC) is supporting 18 coal research projects at 10 different universities at a total cost of over £1.8 million and the European Commission is supporting a further 14 projects at 8 universities at a cost of over £3 million. As part of a new initiative to coordinate United Kingdom coal research activities at universities, the DTI has recently established two collaborative coal research programmes with SERC and the British Coal Utilisation Research Association.

15.6 The Government attaches considerable importance to developing international collaborative projects as part of its coal research programme activities. In recognition

of the substantial energy research activity underway in the USA, particularly associated with clean coal technology, the DTI renewed in 1990 a Memorandum of Understanding on Energy R&D between the USA and the United Kingdom. This provides a useful framework for United Kingdom industry and universities to develop collaborative projects with their US counterparts, particularly those involving Government funding. A number of useful exchanges of information have taken place over the past few years and a number of technical workshops involving United Kingdom industry and universities have been held or are planned for the near future. The DTI has taken an active part in encouraging this collaboration.

15.7 Several of those who submitted evidence to the Review argued that considerably enhanced efficiencies are available from coal fired power generation with the use of new techniques, principally involving gasification of the coal and burning in gas turbines with heat recovery. Some of these techniques are discussed below. Respondents comment on the $2.5 billion programme of the US Department of Energy, which covers cleaning of fuel prior to use, emissions reduction, and advanced generation cycles. Firms in the power generation sector, in particular, wanted to see an early Government commitment to support the development of clean coal technology.

15.8 A number of submissions argue that coal is an essential part of security of energy supply in the longer term and that work therefore needs to be carried forward on advanced forms of coal fired generation so that British industry will have the capacity to manufacture and export coal-based technologies into the next century. Some submissions directly seek support for projects involving advanced generation cycles.

Coal Task Force report

15.9 Growing environmental concerns and the reduction in long term strategic research by the privatised energy industries led the Government to initiate a major review of coal R&D in 1990. A new advisory committee - the Coal Task Force - was established to undertake a comprehensive review of all coal technologies. This review was published in August 1991 as a consultative report. The report was received as a thorough and balanced analysis and in recognition of this it is being used to shape the development of the Government's coal research programme. Since the completion of the report, 37 projects with a contract value of over £44 million have been initiated within the strategy proposed by the Coal Task Force. A number of further projects are at the planning and formulation stage.

15.10 The Coal Task Force report emphasised that for coal to play an important role in meeting future energy requirements, the United Kingdom will need to have available clean coal technology to begin replacing the conventional pulverised fuel power stations at the end of the decade and beyond. The main priority of the strategy proposed is therefore to ensure that advanced power generation technologies are available in the United Kingdom by the end of the decade to enable coal to achieve its full economic potential in the energy market. The Government is working with British Coal, manufacturing industry and the generating companies to explore ways of achieving this, taking account of the competitive pressures of the market both domestically and

internationally.

15.11 The Coal Task Force report also emphasised the value of international collaboration to complement activities in the United Kingdom. As already noted, the present programme contains a number of collaborative projects under the auspices of the IEA, with the EC and the US Department of Energy. Continued emphasis will be placed on developing the opportunities for international collaboration.

15.12 The commercial deployment of advanced power generation systems using clean coal technology, such as integrated gasification combined cycle, or hybrid systems combining gasification and combustion technologies, such as British Coal's Topping Cycle technology, will not be realised until the end of the decade at the earliest. Much of the current research, development and demonstration work currently being undertaken in the United Kingdom is therefore directed at improving existing coal utilisation technologies, particularly with regard to environmental performance.

15.13 The Coal Task Force report examined a wide range of mining research issues as part of their study. In order to secure a demand for British coal to supply future clean coal technology markets, research and development work will need to be performed to assess and promote ways of improving product quality and reducing production costs. Work will also be necessary to develop new extraction technologies which could increase the exploitable coal reserves. Shorter term research in mining technology is properly the responsibility of the mining industry, whether privately or publicly owned. Any Government support will therefore be limited to contributing to innovative long term research not catered for within the normal commercial interests of the industry.

Clean coal technologies

15.14 Several technologies have been proposed to improve the efficiency and the environmental consequences of burning coal. Some clean coal technologies are already being exploited and others are sufficiently developed for commercial exploitation without further R&D. For example, in the United Kingdom, some 100 fluidised bed boilers are already being used by industry, and two advanced systems, Integrated Gasification Combined Cycle (IGCC) and Pressurised Fluidised Bed Combustion (PFBC), are currently being demonstrated on a commercial scale in Europe. Whilst both IGCC and PFBC are likely to be competitive with conventional coal fired power stations in the longer term, the handful of advanced clean coal stations currently in operation or under construction around the world are all being supported as demonstration projects with some form of special finance.

15.15 IGCC technology seems to be attracting most interest worldwide, and designs are being offered by at least five international companies. IGCC systems convert coal to gas by reacting it with steam and oxygen in a gasifier. The gas is cleaned to remove sulphur and other impurities and then fed into a combined cycle gas turbine. Two IGCC demonstration plants are being built in Europe - in the Netherlands and Spain - using two different proprietary designs of gasifiers. The slagging gasifier developed in the United Kingdom by British Gas in collaboration with Lurgi has undergone extensive

trials at Westfield in Scotland, but has yet to be selected for a full scale power station.

15.16 The Government recognised the importance of IGCC technology some years ago and commissioned a design study in collaboration with industry to assess its efficiency and environmental performance. A summary of the findings was published in March 1992: *IGCC Technology in the United Kingdom; a study of a 300 MW power plant* (contractor report, Coal R 005). This indicated that the construction cost of such a plant would be around 2½ times the cost of a gas fired power station, without taking account of interest payments during construction. It estimated that the cost of electricity from an IGCC station would be between about 3p/kWh and 4p/kWh depending on the fuel cost assumed and the rate of return required by investors.

15.17 The Government has been approached before and during the Review by several organisations about potential projects to demonstrate clean coal technologies in the United Kingdom. During the Review the Government consulted a number of interested companies in more detail about the level of support required and the value of such demonstration projects to industry. From these discussions it was clear that none of these projects was economic in present market conditions and that they would only proceed on the basis of a substantial level of Government funding.

15.18 The Government has concluded that it would not be justified in granting substantial public money towards a clean coal technology demonstration plant at the present time. The construction of a new coal fired power station would not in itself increase the market for coal this century and might even reduce it, given the higher efficiency of modern clean coal technology plant. Such a plant would therefore not materially affect the number of coal mines kept in operation in the United Kingdom over this decade. There are, however, substantial development programmes already underway in other countries and this technology will be available to the United Kingdom market through the major power plant equipment suppliers who operate internationally. The Government recognises, however, that there are still some uncertainties about the impact of environmental regulations on the use of coal and will keep the situation under review in the light of this and other market developments.

The Topping Cycle

15.19 The Topping Cycle is a clean coal technology system developed by British Coal in which some of the coal is converted to hot gas for use in a gas turbine and the remaining char is burnt in a fluidised bed to raise steam for a conventional steam turbine.

15.20 In December 1991 the Government set up a Working Party of experts from industry and academia to review the Topping Cycle and to compare it with other clean coal technology systems. The Working Party concluded that the Topping Cycle appeared to offer performance and electricity cost benefits over most competing systems, but that significant development of both the system and its components was necessary before it could be offered commercially. A development strategy was set out, in which development of the gasifier was a key element. The Government recognises the limited window of opportunity to take the technology forward to commercialisation

and has over the past two years increased its contribution by nearly £5 million to keep the programme on schedule.

15.21 The Government believes that the Topping Cycle R&D programme currently being carried out by British Coal should now be taken forward by an industry-led consortium with a direct interest in the commercial development of the technology. British Coal, the Government and the European Community have already agreed to contribute to the component development phase of the programme which is being undertaken at CRE.

The Coal Research Establishment

15.22 Much recent work on the development of clean coal technology in the United Kingdom has been undertaken at CRE. Over the past 40 years CRE has established a well deserved international reputation for the development of clean coal technologies, and the DTI's coal research programme is supporting 20 projects being undertaken by CRE scientists and engineers. These include the £41 million Point of Ayr coal liquefaction project and the current £30 million topping cycle research programme. The Government recognises the important contribution which CRE has made to the development of clean coal technologies. The worldwide reputation of CRE is reflected in the growing international work it undertakes. The Government welcomes this growing level of commercial success.

15.23 The future of CRE is a matter for British Coal, but the Government believes that the best way of widening the opportunities available for CRE to grow and offer its skills to the substantial world market for clean coal technology is as an independent research organisation. In order to ensure that CRE's senior management have sufficient time to further develop CRE's business and attract funds from elsewhere, the Government has agreed to increase its support for research undertaken at CRE on coal science and Topping Cycle development. This will help to ensure that the United Kingdom's technological lead in these areas is maintained.

15.24 The Government recognises the importance of ensuring that coal is used as cleanly and efficiently as possible in existing plant and that full advantage is taken of advances in coal science or combustion engineering. **To ensure that there is adequate support for R&D on coal utilisation in the United Kingdom the Government has decided to increase its support for coal R&D from £3 million per annum to around £7 million per annum for the next three years.** This will enable research in developing Topping Cycle technology and other coal science activities to continue at CRE, universities, and in industry, and help to ensure that full advantage can be taken of international collaboration.

CHAPTER 16

GOVERNMENT RESPONSE TO THE RECOMMENDATIONS OF THE TRADE AND INDUSTRY SELECT COMMITTEE

16.1 This chapter sets out the Government's response to the recommendations made by TISC in its First Report for 1992-93, *British Energy Policy and the Market for Coal* (HC 237). Many of the topics considered by the Committee have been dealt with elsewhere in this White Paper.

16.2 References in the form "**(55)**" are to paragraphs in the Committee's report; references in the form "paragraph 7.37" are to this White Paper.

Select Committee Recommendations

1. A high priority should be placed on reforming working practices, including the passing of any necessary legislation, where this would reduce costs without compromising safety. (55).

16.3 Accepted. The Government welcomes the Committee's support for the reform of British Coal's working practices. Whilst the main responsibility for this must fall on the management of British Coal, the Government acknowledges that it has a responsibility for the legislative and regulatory environment. Its position in this area, in which safety rightly has the highest priority, is set out in paragraphs 12.27 to 12.33.

2. The Government should resist the introduction of the carbon/energy tax unless it can be shown that the tax is essential to achieve the United Kingdom's or EC's commitments on CO_2 emissions and is more cost-effective than other measures. (73).

16.4 The Government has made it clear that it is not convinced that a carbon/energy tax as proposed by the European Commission is either a necessary or an appropriate response to the problem of global warming. The Government will continue to appraise the proposed tax along with other measures, at both national and a Community level, for achieving reductions in CO_2 emissions. The Government will also continue constructive discussions with other Member States and the European Commission on the proposed Directive.

3. The nuclear element of the Fossil Fuel Levy should be reduced to a sum sufficient to cover the liabilities which are to be discharged by 1998. (126).

4. Consideration should be given to using part of the present Fossil Fuel Levy income for other purposes. (127).

5. Nuclear Electric should cease to receive income from the Fossil Fuel Levy and should cease to be responsible for discharging inherited nuclear liabilities. (130).

16.5 The Government will take full account of the Committee's recommendations in the forthcoming review of the future prospects for nuclear power. The current position on the fossil fuel levy is explained in paragraphs 7.81 to 7.88. It should be noted, however, that the Committee's recommendations in this area would have no direct impact on the market for coal. Any reduction in the amount of levy income received by Nuclear Electric if part of the levy were diverted elsewhere would involve a cost to the taxpayer: to the extent that Nuclear Electric is unable to meet its liabilities because of a reduction in its levy income, the taxpayer would have to meet them instead.

6. The nuclear review should be brought forward to 1993. (131).

16.6 Accepted. The Government will bring forward work on its review and will make a further announcement later this year.

7. Electricity supplied from France should cease to be non-leviable, and EdF's ability to negotiate contracts to supply baseload electricity from 1993 should be made conditional on United Kingdom generators having non-discriminatory access to the French electricity market and through the French transmission network to other countries. (142).

16.7 It is difficult to see how the Government could legally interfere with trade across the interconnector in the manner suggested. The French Government is taking measures to increase the transparency of the French electricity market, and the indications for sales of British electricity through the interconnector in future years are promising. The French interconnector is discussed more fully in paragraphs 7.97 to 7.109.

8. HMIP should insist on FGD as a condition of using orimulsion or high-sulphur heavy fuel oils for generation. (148).

16.8 In the case of processes which are subject to Integrated Pollution Control under Part I of the Environmental Protection Act 1990, HMIP has a duty to impose conditions to ensure that best available techniques not entailing excessive cost are used to prevent or minimise harmful emissions. HMIP must consider all relevant circumstances in deciding the conditions appropriate to an individual case, rather than stipulating in advance that a particular technique must be used.

9. The Government should give greater consideration to the possible increase in the use of oil generation. (150).

16.9 Accepted. The use of heavy fuel oil in electricity generation is considered in paragraphs 7.57 to 7.59.

10. Planning guidance relating to opencast mining should be changed to restrict

consents to sites where there are clear benefits, either locally in terms of reclaiming derelict land or to the nation through making available particular qualities of coal and thus helping to sustain the coal industry. (157).

16.10 Planning guidance on coal is a matter for the review currently being undertaken by the Secretary of State for the Environment. This will take full account of the Committee's recommendations. He will be announcing how he will be taking forward this review in the light of this White Paper. (Paragraph 13.31)

11. British Coal or the proposed "Coal Reserves Authority" should use their control over licences to bring about a reduction in opencast coal output. (157).

16.11 The Government does not see a need for the imposition of arbitrary controls. In the near to medium term, however, the prospect is that the level of opencast output will fall. (Paragraph 13.32)

12. The boundary of the RECs' franchises should remain at the present 1 MW level until 1998 instead of being lowered in 1994, provided that: (i) both RECs' and generators' prices are tightly regulated; (ii) retention of the franchise is conditional on the RECs agreeing to contract for a larger quantity of electricity generated from British coal; and (iii) the boundary is reduced to 100 kW as planned in respect of CHP schemes. (223).

16.12 The Government does not wish to delay the extension of competition in the electricity market nor undermine confidence in the stability of the regulatory framework established at the time of privatisation. The Government's views on the franchise limit are set out fully in paragraphs 10.27 to 10.30.

13. British Coal and the generators should explore alternative forms of contract of the types suggested by our witnesses and British Coal should seek to obtain contracts for part of its output extending beyond ten years. (225).

16.13 New forms of contract, including longer contracts, are primarily a commercial matter for British Coal and the generators. The Government has, however, encouraged British Coal and the generators to agree contracts which provide a stable framework for the long term future of the British coal industry, covering a period long enough for the British coal industry to achieve viability.

14. The Government should provide a subsidy to the generators of England and Wales to burn up to 16 million tonnes of deep mined BC coal per annum above the quantities of 40 million tonnes falling to 30 million tonnes which they already expect to contract for in 1993-98, and the subsidy should be equal to the difference between the delivered costs of the additional BC coal and imported coal. (228).

15. The Government should consider financial assistance to contracts undertaken in the non-ESI market up to a maximum level of 3 million tonnes per annum for five years. (228).

16. In negotiations with the generators, the Government should require the generators to contract for an additional 5 million tonnes in 1994/95 above the tonnages already mentioned, bringing the total in that year to 51 million tonnes. The Government should agree with British Coal target prices for the additional coal for each of the next five years. (228).

17. As regards the proposed subsidy:

it should be limited to the period up to 1998 (at the latest);

- **it should be conditional on the achievement of specified reductions in British Coal's operating costs, and on British Coal keeping open as many pits as possible.**

- **the RECs' should if necessary be required to purchase the electricity generated from the additional tonnages, possibly by making the retention of each REC's franchise dependent on doing so;**

- **subsidies towards FGD or clean coal technology should, if possible, be determined at the same time as the subsidies for additional tonnages and as part of the same agreement with the generators;**

- **similar subsidies should be available in respect of the output from licensed mines, to ensure that they are not disadvantaged by subsidised BC coal. (229).**

16.14 The Government accepts the Committee's recommendation that a subsidy should be available for additional sales by British Coal to the England and Wales generators and the proposals it has put forward in negotiations between the generators and British Coal incorporate several of the Committee's suggestions on the form the subsidy should take. The level of support will be for negotiation, but the Government is prepared to embrace the range of figures put forward by TISC. Financial assistance on the same basis as for British Coal will also be provided to the private deep-mine sector in relation to genuinely additional tonnages sold to the generating companies, consistent with the relevant EC provisions. The Government's detailed proposals are set out in paragraphs 13.1 to 13.14.

16.15 The Government has looked carefully during the Review at the scope for increasing sales of British coal into the non-electricity generation market. The Caminus report has shown clearly that over the next five years there is no realistic prospect of significant growth in British Coal sales to the non- power sector and a substantial risk of significant decline. Even against a background of falling demand, British Coal made it clear in its evidence to the Review that it is likely to continue to be constrained by insufficient supplies of the grades and quality of coal required by the non-power sector. It does not expect price to be an obstacle to selling the relevant types of coal. The extent to which non-power sector coal is available to British Coal will depend on which pits remain open and on how much coal they sell to the electricity generators. British Coal is satisfied that it will be able to find a market for any such non-power sector coal

which it produces. The Government has, therefore, concluded that a subsidy would be unlikely to increase British Coal sales to the non-electricity generation market.

18. The Government should use its powers at an appropriate time to ensure that PowerGen installs FGD on a further 2 GW of coal fired plant. (235).

16.16 As the United Kingdom's National Plan for implementing the LCPD indicates, the retrofitting of FGD at coal fired plant is only one of several means by which the generators intend to meet their contribution to reducing SO_2 emissions. 6 GW of FGD are already under construction, while PowerGen has applied for consent under section 36 of the Electricity Act 1989 to construct a further 2GW at Ferrybridge C. The President of the Board of Trade expects to rule on this application very soon. PowerGen has indicated that it believes it will be able to meet its contribution to reducing SO_2 emissions without at this stage constructing a further 2GW of FGD. The Government is considering PowerGen's position. The Secretary of State for the Environment has the power to direct HMIP to require the fitting of FGD in a particular case if he considers it appropriate.

19. In return for a contribution from Scottish Power towards installing FGD in England and Wales, a corresponding proportion of its share of the required reduction in sulphur emissions should be transferred to the generators of England and Wales. (236).

16.17 The United Kingdom's National Plan for meeting the reductions in SO_2 emissions required by the European Commission sets out the allocation of emissions on both a regional and a sectoral basis. There is no immediate intention to change the balance of emissions between Scottish Power and the generators in England and Wales. However, the Government is willing to respond as necessary to any change in circumstances by considering a redistribution of emissions quotas on either a regional or a sectoral basis, while remaining within existing overall limits.

20. The DTI should determine the relative cost-effectiveness in terms of environmental improvement and continuing markets for British coal of support for clean coal technology compared with support for installing FGD. Subject to that investigation and conditional on the generators concerned agreeing (under penalty) to use specified quantities of British coal, subsidies (possibly derived from the present Fossil Fuel Levy) should be given towards measures to ameliorate the environmental impact of coal fired generation through installing further FGD beyond the 8 GW already planned or bringing clean coal generating technology into commercial use. (237).

16.18 The Government recognises the important role of clean coal technology in securing a long term future for coal. Its policy on clean coal technology is set out in Chapter 15. FGD is, as the Committee recognises, one of a number of means of ameliorating the environmental impact of burning coal. More extensive use of FGD on its own is unlikely to promote further coal burn since, as indicated in Chapter 8, future coal burn will be limited by constraints on emissions of CO_2 and NO_x as well as SO_2. The Government will, however, keep the position under review.

21. The effect of the pool's operation on coal fired generation should be considered as part of the present pool review. (243).

16.19 The Government welcomes all initiatives aimed at increasing the efficiency of the pool's operation. The present pool review is, however, a matter for the DGES and the pool Executive Committee.

22. In determining whether new capacity should be licensed preference should be given to: projects with a substantial CHP element and thus major environmental benefits; projects using sour gas, which is unsuitable for other purposes and thus unlikely otherwise to be developed; projects not promoted by the two main generators. (247).

16.20 The Government recognises the potentially favourable economics of new power station projects which make use of sour gas or have a substantial CHP element. In the light of its other proposals, however, it intends to maintain the existing policy that, as a general rule, matters such as the need for a generating station, its capacity, choice of fuel and type of plant are commercial matters for the applicant for such consent. Applications for consent will continue to be considered on their merits against this background. The Government's policy is set out more fully in paragraphs 13.34 to 13.36.

23. The Government should explore the possibility of some of the CCGTs being used as mid-merit or peak instead of baseload capacity. (250).

16.21 The Government has carefully considered this possibility in the course of the Review. It has concluded, however, for the reasons set out in paragraphs 10.37 to 10.38, that it should not seek to interfere in freely negotiated commercial arrangements governing the use of CCGTs.

24. The Director General should be given some powers over the generators' prices and should be encouraged to use them. (256).

16.22 The Director General is responding separately to this recommendation. He is free to seek powers to regulate generators' prices, or to propose other measures, if he is not satisfied that competition has developed sufficiently.

25. The Government should require the generators to hold total stocks of not less than 20 million tonnes of coal. (259).

16.23 The Government will as a matter of urgency be consulting the generators about stocking arrangements for 1993/94. There would be no justification for taking new powers whose sole purpose would be, in effect, to force private sector companies to buy goods that they did not want to buy, for the benefit of another commercial entity. (Paragraph 13.23)

26. British Coal or licensees should extract already-accessed coal where this can be done at a low cost and any colliery proposed for closure should be put into the

Modified Colliery Review Procedure. (272).

16.24 The Government welcomes the statement by the Chairman of British Coal that he will offer to the private sector any pit which British Coal does not itself intend to keep in production. It also welcomes the involvement of private sector operators in the extraction of the coal which remains in pits scheduled for closure, provided that there is a market for such coal. The use of the Modified Colliery Review Procedure is a matter for British Coal to consider in the light of the High Court judgement of 21 December.

27. The consideration of applications to license former British Coal mines should be given to an independent authority, which would be the custodian of Britain's coal reserves. (273).

28. Royalties paid by licensed mines to British Coal should in future be levied by the coal reserves authority and be paid into public funds. (274).

29. The proposed coal reserves authority should be required to publish information on reserves. (275).

16.25 The Government's proposals for a new Coal Authority are in line with the Committee's recommendations. They are set out in paragraphs 14.17 to 14.18.

30. The Government should demonstrate its commitment to the long-term future of the coal industry by announcing support for clean coal demonstration projects as part of its coal review. (277).

31. The Department should determine the future funding of research into coal use, including the funding of the Coal Research Establishment, as a matter of urgency. (280).

16.26 The Government remains strongly committed to the development of clean coal technologies. Its position on these issues, including that of funding, is set out in detail in Chapter 15.

32. DTI should investigate the potential value of an Energy Commission along the lines we have suggested, as well as alternative ways of achieving the same results, with a view to increasing the level of public information and scrutiny in the energy field (288).

16.27 The Government accepts the Committee's suggestion that there should be an improved level of information in the energy field. Its proposals for a new Energy Advisory Panel and Annual Energy Report are set out in Chapter 3 (paragraphs 3.30 to 3.32).

33. The Director General's duties should be amended to make protection of consumers one of his primary duties, and a new secondary duty should be added requiring him to consider the legitimate long-term interests of indigenous fuel

producers in carrying out his duties. (292).

16.28 The DGES already has a duty to protect consumers in respect of prices and other terms of supply, and a primary duty to ensure that all reasonable demands for electricity are satisfied. The main protection for both consumers and suppliers is, however, the development of effective competition in the electricity supply industry, and promotion of competition is again one of the Director General's primary duties.

34. The Department should review the powers of the energy regulators, with the aim of securing a greater degree of government and parliamentary control over the more discretionary aspects of the regulators' work, notably in respect of promoting competition, and it should review whether the different regulatory bodies in the energy field should be merged to ensure a more consistent approach. (293).

35. The Electricity Act 1989 should be amended to empower the Secretary of State to require the Director General to make a particular review as a matter of priority. (294).

16.29 The independence of the regulators has been an important element in the Government's programme of utility privatisations. A stable regulatory environment is essential to investor confidence. The Government will continue to keep the effectiveness of current regulatory arrangements under review, but believes that the provision of specific powers of direction over the regulators would tend to undermine confidence in the regulatory environment.

36. The Director General should conduct his review of the RECs' distribution charges immediately, and the starting point for any new price control formula should be determined by what is an appropriate level of return on capital relative to risk rather than the present high return. (296).

16.30 The DGES has set out his reasons for holding to the present timetable in his own response to the Committee.

37. The Department should set up a review of how, in the long term, a satisfactory balance between capacity and demand can most effectively and economically be achieved. (298).

16.31 The Government agrees that a long term balance between capacity and demand is desirable. It believes that a competitive market in electricity generation and supply is the best way to bring this about (see paragraphs 10.49 to 10.52).

38. The Fossil Fuel Levy should be tapered, so that larger users pay a lower percentage. (301).

16.32 The Government is considering various proposals to adjust the regulatory system in order to ease the position of large users. The Government does not believe, however, that it would be right to oblige smaller consumers to subsidise large users by adjusting

the fossil fuel levy in the manner suggested. (Paragraph 10.26).

39. Urgent steps be taken to introduce demand-side bidding in the pool and to provide for large users with unvarying demand to be able to by-pass the pool and contract directly with generators. (301).

16.33 The Government welcomes any initiatives to improve the workings of the electricity pool arrangements. It is considering whether allowing large users to by-pass the pool will be beneficial to the electricity market. The pool authorities are considering the introduction of demand-side bidding into the electricity pool. The Government welcomes proposals designed to improve the workings of the electricity market and will embark shortly on further consultations with the DGES, the electricity industry and large users on whether such a proposal would be beneficial to the electricity market. The Government is also reviewing the current regulation of on-site generation, which can offer large users a competitive source of electricity. (Paragraphs 10.26 to 10.24)

APPENDIX A

TERMS OF REFERENCE OF THE COAL REVIEW

The President of the Board of Trade announced the terms of reference for the Coal Review in a written answer to a Parliamentary Question from Mr Jim Lester MP (Broxtowe) on
26 October 1992:

"As I announced to the House on 21 October, I have put in hand a full and wide-ranging review of the prospects for the 21 pits proposed for closure by British Coal but not subject to the statutory consultation currently being undertaken by British Coal. This review will consider views and evidence on the future of each of the pits in question, in the context of the Government's energy policy, including the consequences of that policy for British Coal and the employment prospects for the industry.

"It will decide whether the case for closure at each of the pits in question has been fully made and whether it is sensible to mothball some of these pits. It will consider whether the market prospects for coal have been correctly assessed and, in consultation with the Director General of Electricity Supply, whether any company is abusing its position in the market place. It will look at the level of coal stocks, both at the pit head and the power stations, and whether plans to run them down are sensibly phased.

"It will consider the consequences of the switch to gas in power generation and the relative costs of gas and coal fired generation. It will look into the latest estimates of likely reserves of gas and draw conclusions. It will consider the present scale of gas-generated power stations in production, being built and in the planning process. In this connection, it will review the use of my consent powers under the Electricity Act 1989.

"The review will consider the implications of the statutory obligation on electricity suppliers to purchase non-fossil power, including that from nuclear sources.

"The review will explore the opportunities for the private sector in the production of coal. It will consider the existing and anticipated level of imports and the wider economic implications of this.

"The review will give due regard to Scottish and Welsh interests and will also give consideration to the particular needs of Northern Ireland.

"Consultation will take place with all the principal providers and consumers of energy, the trades unions and other interested parties. I have already announced that I have invited Boyds, an international mining consultancy, to report to me on the viability of the 21 pits. I also intend to appoint consultants to report on the prospects for British Coal, including any alternative markets that may exist for coal and to comment

generally on the competitiveness of British Coal as an organisation. I may wish to commission further independent studies.

"My intention is to publish all evidence and the findings of the review to the fullest extent possible except where information has been provided in confidence and is commercially sensitive. I shall be discussing with the Trade and Industry Select Committee the means by which such confidential information might be made available to them.

"Early in the New Year, I shall publish a White Paper setting out the results of the review in the context of the Government's energy policy, and making clear the consequences of that policy for British Coal, the implications for individual pits and the employment prospects for the industry. Before then, the Select Committee will have a full opportunity to consider all the issues as it thinks fit. I shall present the conclusions and the Government's future decisions to the House, which will have an opportunity to debate the issues fully."

APPENDIX B

CONSULTANTS' TERMS OF REFERENCE

In a written answer to a Parliamentary Question from Mr David Porter MP (Waveney) the President of the Board of Trade announced that further consultants had been appointed to assist the Coal Review.

"Boyds will examine historical operating data, mine plans, coal reserves, and other relevant information supplied by British Coal Corporation to develop an independent assessment of the future production costs of each of the 21 pits at different potential levels of output, within the context of British Coal's operations.

"Their conclusions will be based on an evaluation in respect of each mine of:

(i) the available coal reserve base;

(ii) near term capital requirements;

(iii) estimated future potential operating costs and likely costs under current mine plans.

"Boyds will also provide general technical consultancy to the DTI as required, including technical evaluation of evidence provided during the review period as necessary.

"Caminus will examine the short-term and longer-term markets for coal in the United Kingdom and elsewhere. They will consider the market opportunities available to British Coal both at its current prices and at lower prices, if these could be achieved, in the context of future energy markets more widely and of the likely future availability of energy supplies. Caminus will also, on request by DTI, examine the prospects for alternative new electricity generation options identified in the course of the review.

"Ernst & Young will consider British Coal's organisation and cost structure and advise on possible improvements to British Coal's competitiveness which could be achieved through changes in this area. They will not consider the technical aspects of British Coal's work, nor the competitiveness of individual pits.

"In addition to these studies, PIMS Associates Ltd have been appointed to provide an overview of British Coal's cost structure and productivity in relation to international comparators."

The following consultants' reports commissioned for the Review can be obtained from HMSO:

Independent analysis: 21 Closure Review Collieries, British Coal Corporation John T Boyd Company (ISBN 011 514990 2) £19.95

Markets for Coal Caminus Energy Limited (ISBN 0 11 514987 2) £14.50

The Boyds and Caminus Studies - Summary of main conclusions (ISBN 0 11 514991) £3.10

Review of Organisational Efficiency and Overhead Cost Structure of the mining activities of British Coal Corporation Ernst & Young (ISBN 0 11 514988 0) £8.50

British Coal: Benchmarking Overheads and Productivity PIMS Europe Ltd (ISBN 0 11 514989 9) £5.50

The Ernst & Young *Review of Magnox avoidable and unavoidable costs* report and supplementary report can be obtained from the DTI Energy library, 1 Palace Street, London SW1E 5HE (telephone 071 238 3042).

APPENDIX C

LIST OF THOSE SUBMITTING EVIDENCE TO THE REVIEW

Copies of individual pieces of evidence may be ordered from the DTI Library and Information Centre, 1 Palace Street, London SW1E 5HE (telephone 071 238 3042). A charge will be made to cover the cost of this service. The evidence may also be consulted, by appointment, at the 1 Palace Street Library, and also at the following libraries:

DTI Library and Information Centre
Ashdown House
123 Victoria Street
London SW1E 6RB

OFFER Library
Hagley House
Hagley Road
Birmingham B16 8QG

Scottish Office Library
St Andrew's House
Edinburgh EH1 3DH

Welsh Office
New Crown Buildings
Cathays Park
Cardiff CF1 3NQ

Department of Economic Development
Netherleigh
Massey Avenue
Belfast BT4 2JP

The full list of those submitting evidence to the Review follows. An asterisk indicates that all or part of a piece of evidence was submitted on a confidential basis.

Aberdeen Chamber of Commerce
Action Group on Northern Ireland Electricity Prices
Mr J M S Adams
AEA Technology
Alliance Gas Limited
AMCO Corporation plc

Amerada Hess Limited
Amoco (UK) Exploration Company
Mr J Amos
Anderson Group Limited
Anglo United plc
Antrim Coal Company Limited *
Mr R Anyon and Mr P Logue *
Apparel, Knitting and Textiles Alliance
Applied Energy Services Electric Limited
Architects and Engineers for Social Responsibility
ARCO British Limited
Mr D G Arundale
ASEA Brown Boveri *
Associated Electricity Supplies Limited *
Associated Octel Company Limited *
Association for the Conservation of Energy
Association of British Chambers of Commerce
Association of British Mining Equipment Companies
Association of Independent Electricity Producers
Association of Metropolitan Authorities
Babcock Energy Limited
Mr S Ball
Banks Development Division
Barnsley Metropolitan Borough Council
Bassetlaw District Council
Mr Roy Beggs, MP
Birmingham City Council
Mr A J Black
Blue Circle Industries Limited
Botham Engineering Limited
Bow Group Energy Standing Committee
BP BITOR Limited
BP Exploration Operating Company Limited
Mr F Bradbury
BRINDEX
British Alcan Aluminium plc
British Association of Colliery Management
British Ceramic Confederation
British Coal Corporation *
British Gas plc *
British Geological Survey
British Gypsum Limited
British Nuclear Forum
British Nuclear Fuels plc *
British Paper and Board Industry Federation
British Retail Consortium
British Rubber Manufacturers Association Limited
British Wind Energy Association

British Wind Energy Association (Scottish Branch)
Broadland District Council
Brown and Root Limited
Brunner Mond and Company Limited
Cairn Energy plc
Caledonian Mining Co Limited
Centre For Intermediate Mining Research Limited
Chamber of Coal Traders Limited
Chemical Industries Association
Chesterfield Borough Council
Mr J Chiswell Jones
Churches Energy Group
Citigen Limited
City of Nottingham Development Department
City of Wakefield Metropolitan District Council
Clackmannan District Council
Clay Colliery Company Limited
Clwyd County Council
Coal Advisory Service (Northern Ireland)
Coalfield Communities Campaign
Cobex Limited
Combined Heat and Power Association
Combined Power Systems Limited
Communist Party of Great Britain
Confederation of British Industry
Confederation of British Industry (Northern Ireland)
Confederation of UK Coal Producers
Conoco (UK) Limited
Consortium of Opposing Local Authorities
Convention of Scottish Local Authorities
Cooperative Wholesale Society Limited
Cory Environmental Limited
Council for National Parks
Council for the Protection of Rural England
Council of Churches for Britain and Ireland
Country Landowners Association
Countryside Commission
Countryside Council for Wales
County Planning Officers' Society
Mr H Cox
Co-Steel Inc
Cummins Diesel *
Currall Lewis & Martin Limited
Cytun Industrial & Economic Affairs Network
Mr Cynog Dafis, MP
Mr A C Day
Derbyshire County Council
Mr W Digby Worthy

Domestic Coal Consumers' Council
Doncaster Metropolitan Borough Council
Durham County Council
Dyfed County Council
E Gas Limited
Easington District Council
East Midlands Electricity Consumers' Committee
East Midlands Electricity plc *
Eastern Electricity plc
Eastern Region Electricity Consumers' Association
Electricity Consumers' Committee, Merseyside and North Wales
Electricity Consumers' Committee for London
Electricity Consumers' Committee, Southern Region
Electricity Pool of England and Wales
Electricity Supply Trade Union Council
Energy and Chemical Projects Limited
Energy Economic Engineering Limited
Energy Information Centre *
Energy Intensive Users Group and Major Energy Users Council
Energy Supply Company Ltd *
Engineering Consultancy Services Limited
English Nature
Enron Europe Limited *
Esso Exploration and Production UK Limited
Exergy Inc
Federation of Civil Engineering Contractors
Federation of Small Mines of Great Britain
Prof I Fells
Fenton Solid Fuels Limited
Fife Regional Council
Food and Drink Federation
Forest of Dean District Council
Foster Wheeler Energy Limited
Friends of the Earth
Galvanizers Association
Mr R Gardner
Gas Consumers Council
Gas Strategies
GEC Alsthom Limited
General Consumer Council for Northern Ireland
Mr F Gilbert
Mr A Glyn
Mr D F Godfrey
Government of the Commonwealth of Australia
Grampian Enterprise Limited
Grampian Regional Council
Greenpeace
Mr P A Gruber

H Leverton Limited *
Hamilton Oil Company Limited *
Harper Macleod Limited
Mr K Harrison
Mr J P Hart
Mr R E A Harvey
Mr G Hawkes
Highland Regional Council
Mr D Hopkinson
Mr R Horrocks
I & H Brown Limited
ICI Chemicals and Polymers Limited
Institute of Energy
Institution of Civil Engineers
Institution of Mining Electrical and Mechanical Engineers
Institution of Mining Engineers
Institution of Professionals, Managers and Specialists
Ivo Energy Limited
Mr R M Jervis
Johnson Matthey plc
Kelt UK Limited
Kingsnorth Developments Limited
LASMO North Sea plc
LE Energy
Leicester City Council
Mr A Lester
Mr Jim Lester, MP
Levack Civil Engineering
Lewis and Towers Limited
Liberal Democrats
Liebherr GB Limited
Mr and Mrs R K Lindsay
Prof N H Lipman
Prof Stephen Littlechild, Director General of Electricity Supply *
Mr H B Lloyd
Loadmaster Limited
London Electricity plc
Low Valleyfield Residents' Association
Mr F E Lynam
Lytham St Annes Methodist Circuit Social Responsibility Committee
Mansfield District Council
Manweb plc *
Marks and Spencer plc
Mr J I Mason
Mr G McAlpine, OBE
Mr W McMillan
Mechanical Handling Engineers' Association
MECO AFC Limited

Merz and McLellan Limited
Metropolitan Planning Officers' Society
Mid Glamorgan County Council
Midlands Electricity Consumers' Committee
Midlands Electricity plc
Midlands Electricity plc/Central Power
Miller Mining
Mrs G Millington
Mining Association of the United Kingdom
Mobil Gas Marketing (UK) Limited
Mobil North Sea Limited
Monktonhall Mineworkers Limited
Monument Oil and Gas plc *
National Association of Colliery Overmen Deputies and Shotfirers
National Association of Licensed Opencast Operators
National Association of Local Government Officers
National Consumer Council
National Engineering Construction Employers' Association
National Grid Company plc
National Network of Chaplains in the Electricity Supply Industry
National Network of Coal Industry Chaplains
National Power plc
National Rivers Authority
National Society for Clean Air and Environmental Protection
National Union of Mineworkers
Neighbourhood Energy Action
Newark and Sherwood District Council
Mr K Nicholson
Non-Fossil Purchasing Agency Limited
North Derbyshire Health Authority
North East Derbyshire District Council
North Eastern Region Electricity Consumers' Committee
North Nottinghamshire Training and Enterprise Council
North West Region Electricity Consumers' Committee
Northern Development Company
Northern Electric plc *
Northern Ireland Electricity plc
NORWEB *
Nottinghamshire Chamber of Commerce and Industry
Nottinghamshire Conservative Mining Constituency Associations
Nottinghamshire County Council
Nottinghamshire Rural Community Council
NSM plc
Nuclear Electric plc *
Nykomb Synergetics
O & K Orenstein and Koppel Limited
Offshore Contractors Council
Offshore Manufacturers and Constructors Association

OFGAS
Oil and Chemical Plant Constructors Association
Open University Energy and Environment Research Unit
Oxford Institute For Energy Studies
Mr D Papworth
Parkhill Estates Limited
Parliamentary Alternative Energy Group
Mr I J Pearce
Phillips Petroleum Company United Kingdom Limited
Point of Ayr Colliery Survival Committee
Pontefract Graders Limited
PowerGen plc *
Powys County Council
R J B Mining Limited
Rackwood Colliery Co Limited
Regional Studies Association
Religious Society of Friends
Mr J Reynolds *
Mr C Robinson
Rolls Royce plc
Mr G Rosam
Rotherham and District Trades Union Council
Rotherham Metropolitan Borough Council *
Royal Academy of Engineering
Royal Institution of Chartered Surveyors
Royal Institution of International Affairs
Royal Town Planning Institute
Rural England Versus Overhead Line Transmission Group
Rural Power Station Action Group
Safecom UEP Limited
Save the Moors From Opencast (SHAMROC)
Scottish Hydro Electric plc *
Scottish Natural Heritage
Scottish Northern Region Electricity Users' Sub-Committee
Scottish Nuclear Limited *
Scottish Power *
Scottish Trades Union Congress
Mr A T Seabridge *
Seeboard plc
Severn Tidal Power Group
Mr J K Shanklin
Shawater Limited
Sheerness Steel Company plc
Sheffield City Council
Shell UK Limited
Shepway Friends of the Earth
Shirebrook Traders Association
Mr A G Simmons

Mr G W Singleton
Skegness 2000
Slough Trading Estates Limited
Mr E M Smith
Solid Smokeless Fuels Federation
South Eastern Regional Electricity Consumers' Committee
South Wales Electricity plc *
South Wales Region Consumers' Committee
South Western Electricity plc
South Western Region Electricity Consumers' Committee
Southern Electric plc *
Southern Scotland Electricity Consumers' Committee
Stafordshire County Council
Standing Conference on Regional Policy in South Wales
Statoil Uk Limited
Taylor Woodrow Mining Division
Texaco Limited
Thames Power Services Limited
Town and Country Planning Association
Trades Union Congress
Trainload Freight
Transport and General Workers Union
Tyne and Wear Chamber of Commerce, Trade and Industry
United Kingdom Offshore Operators Association Limited
United Kingdom Onshore Operators Group
United Kingdom Petroleum Industry Association Limited
Union of Democratic Mineworkers
United Gas Company Limited
University of Sheffield Division of Adult Continuing Education
Viscosuisse Textured Yarns Limited
Wakefield and District Trade Union Council
Mr J F Walker
Wansbeck District Council
Ward Brothers Mining Division Limited
Mr K Watson
Watt Committee on Energy
Mr J Watt
WEFA Energy Group *
West Midlands Regional Forum of Local Authorities
Westoe Colliery Campaign Group
Wimpey Minerals Inc.
World Solar Power Foundation
Yorkshire Electricity Group plc *
Yorkshire Opencast Objectors
Yorkshire Region Electricity Consumers' Committee
Yorkshire Water Services Limited *
Young Group plc *

APPENDIX D

EMPLOYMENT FIGURES FOR PITS PROPOSED FOR CLOSURE IN OCTOBER 1992

TTWA	COLLIERY	UNEMPLOYMENT RATE at risk as in % of workforce (DEC 92)		COAL JOBS October 92 as % of workforce in employment (June 1991)
		Male	All	
NORTH EAST				
Sunderland	Easington Vane Tempest/ Seaham* Wearmouth+	19.8	14.1	2.2
South Tyneside	Westoe	28.2	19.7	2.6
NORTH WEST				
Wigan & St Helens	Parkside*	17.5	12.7	0.5
YORKSHIRE & HUMBERSIDE				
Wakefield & Dewsbury	Sharlston Frickley	15.6	11.2	1.6
Doncaster	Bentley Hatfield+ Markham Main* Rossington	18.5	14.0	2.7
Barnsley	Grimethorpe* Houghton Main*	18.7	13.5	2.0
Castleford & Pontefract	Prince of Wales+	15.9	11.7	1.3
Sheffield	Kiveton	17.0	12.5	0.3
Rotherham & Mexborough	Maltby+	20.8	15.2	1.4

+ pit placed on care and maintenance

* one of the 10 pits subject to British Coal consultation process

TTWA	COLLIERY	UNEMPLOYMENT RATE % of workforce (DEC 92)		COAL JOBS at risk as in October 92 as % of workforce in employment (June 1991)
		Male	All	
EAST MIDLANDS				
Alfreton & Ashfield	Silverhill*	12.8	9.3	1.3
Retford	Bevercotes	11.5	9.9	3.5
Mansfield	Bilsthorpe Clipstone Rufford Shirebrook	17.8	12.7	6.1
Nottingham	Cotgrave* Calverton	15.3	11.1	0.4
Chesterfield	Bolsover Markham	15.9	11.5	2.3
WEST MIDLANDS				
Stoke	Trentham* Silverdale	13.1	9.6	1.1
WALES				
Llanelli	Betws*	14.8	11.4	0.3
Merthyr & Rhymney	Taff Merthyr*	19.0	12.7	0.7
Shotton, Flint & Rhyl	Point of Ayr	11.4	8.9	0.6

* one of the 10 pits subject to British Coal consultation process

National average male unemployment was 14.2% (unadjusted) in December 1992.

National average all persons unemployment was 10.6% (unadjusted) in December 1992

Advanced Generation Cycles - new systems enabling coal to be used more efficiently for power generation with reduced environmentally harmful wastes and emissions.

Anthracite - a naturally smokeless high carbon coal, mostly used in specially built domestic and commercial boilers.

Assisted Area Status - areas in Great Britain designated as Development Areas or Intermediate Areas eligible for regional industrial assistance under Section 1 of the Industrial Development Act 1982.

Baseload - the lowest load continuously supplied by an electric system over a period of time; power stations which run on baseload operate continuously regardless of peaks and troughs in electricity demand.

Beach Price - the wholesale cost of gas delivered at the United Kingdom mainland coast.

Bituminous Coal - the main type of coal produced in the United Kingdom used for burning in power stations and a variety of industrial uses.

Calorific Value - calorific value measures the energy content of a fuel. The net calorific value is the total heat content of a quantity of fuel less the amount of heat required to evaporate the water content of the fuel. It is commonly expressed in gigajoules per tonne or therms per tonne.

CCGT - Combined Cycle Gas Turbine, typically fired by natural gas. CCGT plant use two types of turbine to drive electricity generators. The first turbine, similar to an aero-engine, uses gases from fuel combustion to drive the turbine directly. Thehot exhaust gases are then routed through a boiler before being discharged to the atmosphere. In this boiler the heat which would otherwise be wasted is used to raise steam which drives a second turbine, thus producing additional electricity from the same fuel.

Coking Coal - coal used in the iron and steel industry for making coke for use in iron smelting.

Combined Heat and Power - a method of generation under which heat produced by a power station as a by-product of electricity generation is wholly or partly used for either industrial processes or other heating purposes.

Decommissioning - the process by which plant is taken from closure to a state where the site is available for unrestricted alternative use.

Downstream - a term used in oil and gas operations to describe activities performed after a particular point in the chain which gets oil or gas from the ground to the consumer. The refinery is often taken as a point of reference and so oil product marketing would be a downstream activity, whereas drilling for oil would be an upstream activity.

Endurance Supply or Endurance Stocks - the coal stocks held at power stations in

pursuance of directions under section 34 of the Electricity Act 1989, which enable the generators to "endure", or continue the normal running of coal fired plant, for a specified period during interruptions in fuel supply.

Franchise Market - premises in the franchise market are those at which maximum demand is at or below the franchise limit, and which may only be supplied by their local REC. The franchise limit will be 1 MW until 30 March 1994, and 100 kW from 31 March 1994 to 30 March 1998, after which time all customers will be able to contract for supplies with any supplier.

Gigajoule - A joule is a unit of energy. One gigajoule equals 1 000 000 000 joules. One gigajoule would light a one bar electric fire for about 11 days.

Graded Coal - the coal preparation process sizes coal into: small, graded and large. Graded coal is coal whose size is between an upper and lower limit. Large coal is of a size above the upper limit.

Heavy Fuel Oil - a residue blend of fuels that is produced when crude oil is refined. Heavy fuel oils are used mainly for industrial applications such as power and heat, and in ship's bunkers for heating.

High Voltage System - a system of electric lines, known as the transmission system, with a voltage of 400 KV or 275 KV.

Land-fill Gas - land-fill gas is generated naturally by the decomposition of organic materials in land-fill waste disposal sites. There are three main ways of utilising land-fill gas: firing kilns and furnaces; fuelling engines and turbines for the production of electricity, and refining for the subsequent use as a chemical feedstock, pipeline quality gas or vehicle fuel.

Lignite - a type of coal with a low heat value and high moisture. There is no current production in the United Kingdom. Used as steam coal in Germany and elsewhere.

Load Factor - a measure of utilisation of a power station (or an interconnector). If a power station ran at full capacity for 6 months in a year, or 50% capacity for twelve months, its annual load factor would be 50%.

Low Voltage Network - a system of electric lines, known as the distribution system, with a voltage of 132 KV or below.

Merit Order - a principle by which generating capacity is ranked in such a way as to establish the order in which electricity is delivered or transferred to the total system (subject to other system needs).

Mid-Merit - at the middle of the merit order. Generally, generating sets which are likely to be called after baseload generation requirements have been met, but before those required only for peak periods.

Metallurgical Coal - another name for coking coal.

Natural Gas - gas (mainly methane, CH_4) originating from underground structures producing both liquid and gaseous hydrocarbons. Natural gas is gaseous at normal

temperature and pressure. It is used as a fuel and in producing a wide range of petrochemicals.

Offer Price - the price at which a generator is prepared to supply power to the system from a generating set.

Pit head Price - the price for coal at the colliery, not including the cost of transport to the customer.

Renewables - energy that occurs naturally and repeatedly in the environment and can be harnessed for human benefit.

Spot Price - the average price paid at any point in time for one-off (as opposed to regular contract) purchases of fuel. In the case of coal this includes purchases of one or more shiploads of coal, direct from exporting countries, as well as purchases of coal by the bargeload from Rotterdam stocks.

Steam Coal - coal used for heat raising in power stations and industrial markets. Coal is burned in a boiler and heats water, producing steam which may be used to drive electrical turbine generators.

Take or Pay - the volume of gas (or other commodity) that the supplier agrees to deliver and in general, the amount that the customer agrees to take or pay for.

Therm - a unit of energy; a one bar domestic electric fire uses one therm of energy every 29.3 hours.

Town Gas - gas manufactured from coke, coal or oil products.

Uplift Charges - the premium added to the electricity pool input price to cover the costs of reserve, unscheduled plant availability, forecasting errors, ancillary services and marginal plant adjustments. Almost the whole of uplift charges go in payment to the generators.

Vesting - the transfer on 31 March 1990 of the property, rights and liabilities of each member of the electricity supply industry to its successor company or companies.

Watt - A watt is a measurement of power, equal to one joule per second.

1 kilowatt (kW) = 1,000 watts
1 megawatt (MW) = 1,000 kW
1 gigawatt (GW) = 1,000 MW
1 terawatt (TW) = 1,000 GW

The generating capacity of power stations is conventionally measured in MWs or GWs. Defining a power station as "100 MW" means that the generating plant has a nominal maximum capability of producing 100 MW of electricity. One watt hour is equal to one watt of power produced or used for one hour. A one bar electric fire burning for one hour uses 1 000 watt-hours of electricity (one kilowatt-hour).

Conversion factors

In the calculations of coal burn in the electricity supply industry from 1993/94 onwards, one tonne of coal is assumed to have a net calorific value of 24 GJ unless otherwise stated.

2.4 TWh are assumed to be equivalent to 1 mtce.

List of abbreviations used

AEA	-	Atomic Energy Authority
AGR	-	Advanced gas-cooled reactor
BCE	-	British Coal Enterprise
BNFL	-	British Nuclear Fuels plc
CCGT	-	Combined cycle gas turbine
CEGB	-	Central Electricity Generating Board
CFD	-	Contract for differences
CHP	-	Combined heat and power
CO_2	-	Carbon dioxide
CRE	-	Coal Research Establishment
DGES	-	Director General of Electricity Supply
DTI	-	Department of Trade and Industry
EC	-	European Communities
EEC	-	European Economic Community
ECSC	-	European Coal and Steel Community
ECU	-	European Currency Unit
EdF	-	Electricité de France
EEO	-	Energy Efficiency Office
EP59	-	Energy Paper 59
ESI	-	Electricity supply industry
FGD	-	Flue gas desulphurisation
GATT	-	General Agreement on Tariffs and Trade
GJ	-	Gigajoule
GW	-	Gigawatt
GWh	-	Gigawatt hour
HMIP	-	Her Majesty's Inspectorate of Pollution
HMSO	-	Her Majesty's Stationery Office
HSC	-	Health and Safety Commission
IEA	-	International Energy Agency
IGCC	-	Integrated gasifier combined cycle
IPP	-	Independent Power Project
JACCS	-	Job and Career Change Scheme
kW	-	Kilowatt
kWh	-	Kilowatt hour
LCPD	-	Large Combustion Plant Directive
MASHAM	-	The Management and Administration of Safety and Health at Mines
MCIS	-	McCloskey Coal Information Services
MMC	-	Monopolies and Mergers Commission
mtC	-	Million tonnes of carbon
mtce	-	Million tonnes of coal equivalent
MW	-	Megawatt
NALGO	-	National Association of Local Government Officers
NFFO	-	Non fossil fuel obligation
NGC	-	National Grid Company plc
NIE	-	Northern Ireland Electricity plc
NO_x	-	Oxides of nitrogen

OFFER	-	Office of Electricity Regulation
OFGAS	-	Office of Gas Supply
PFBC	-	Pressurised fluidised bed combustion
PSP	-	Pool selling price
REAG	-	Renewable Energy Advisory Group
REC	-	Regional electricity company
RMPS	-	Redundant Mineworkers Payments Scheme
SERC	-	Science and Engineering Research Council
SO_2	-	Sulphur dioxide
TISC	-	House of Commons Trade and Industry Committee
TUC	-	Trades Union Congress
TTWA	-	Travel to work area
TWh	-	Terawatt hour
UKCS	-	United Kingdom Continental Shelf

Printed in the United Kingdom for HMSO
Dd 0509805 3/93 C70 51.1144

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