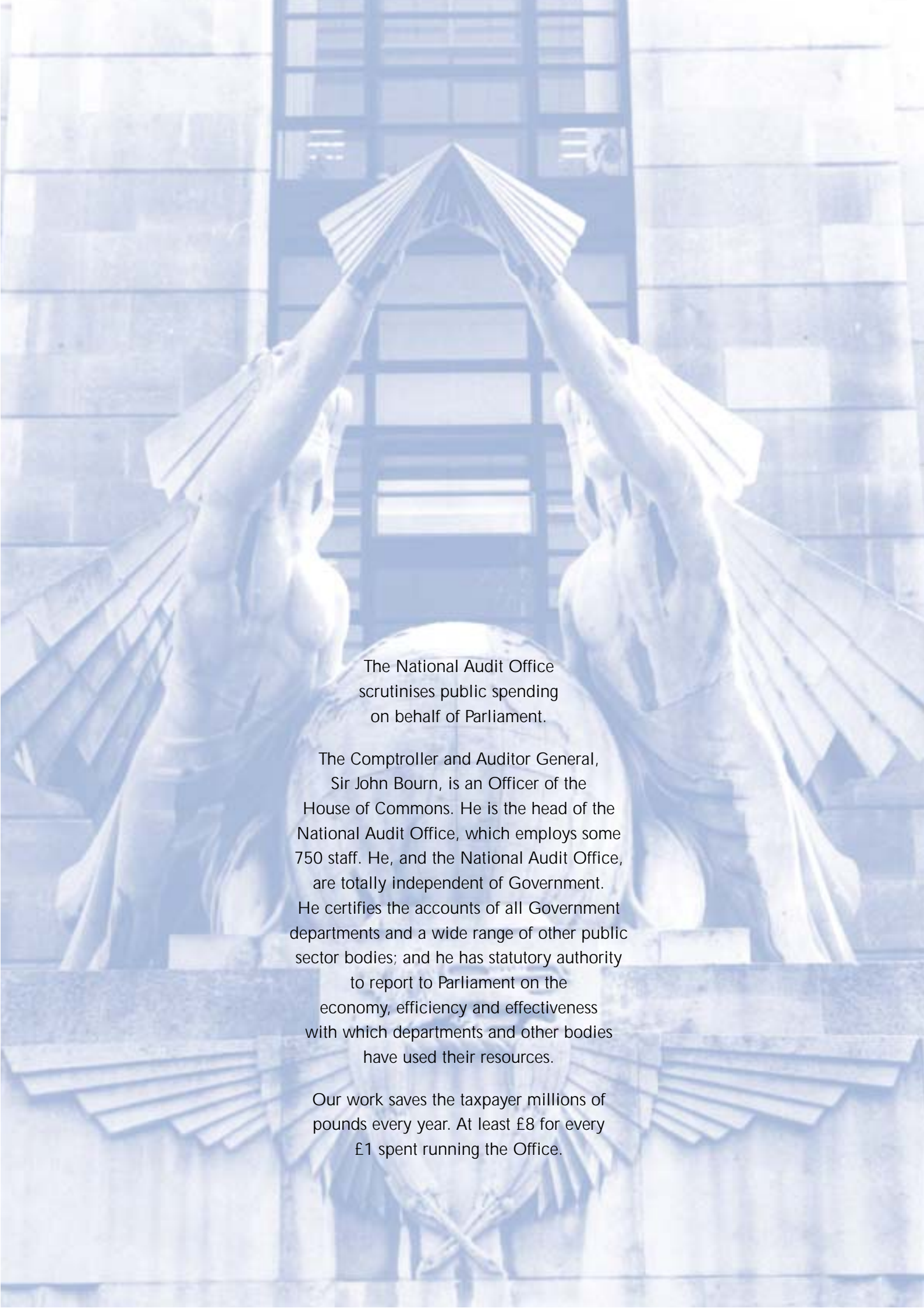


The New Electricity Trading Arrangements in England and Wales

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
HC 624 Session 2002-2003: 9 May 2003





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John Bourn
Comptroller and Auditor General

National Audit Office
22 April 2003

The National Audit Office study team consisted of:

John Ashcroft, Edward Humpherson, Peter Langham,
Hannah Rattray and Martin Taylor

This report can be found on the National Audit Office web site at www.nao.gov.uk

For further information about the National Audit Office please contact:

National Audit Office
Press Office
157-197 Buckingham Palace Road
Victoria
London
SW1W 9SP

Tel: 020 7798 7400

Email: enquiries@nao.gsi.gov.uk

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executive summary

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- 1 The Gas and Electricity Markets Authority are a non-ministerial government department known as the Office of Gas and Electricity Markets (Ofgem). Their primary statutory objective in relation to electricity is to protect the interests of electricity consumers, wherever appropriate by promoting effective competition, having regard to the need to secure that all reasonable demands for electricity are met and that the businesses concerned can finance their regulated activities¹. This report examines how Ofgem have, in pursuit of their objectives, taken action to extend competition in the wholesale market. The wholesale market allows participants to trade electricity and enables generators of electricity to sell their output to companies that supply retail electricity to consumers.
- 2 The electricity regulator² had only a limited role in the England and Wales wholesale electricity trading arrangements, known as the Pool, established when the electricity industry was restructured in 1990 and most of it then privatised. Customers and others had repeatedly criticised the Pool arrangements including that prices did not reflect falling input costs, the compulsory membership of the Pool and the slow pace of reform. In response to these concerns the Department of Trade and Industry (the Department) and the regulator became increasingly concerned that these arrangements were not functioning in a way that protected customers' interests. They therefore decided to review the trading arrangements which led to the implementation, in England and Wales, of a series of reforms known as the New Electricity Trading Arrangements (NETA).



¹ Section 13 of the Utilities Act 2000. Ofgem's objectives regarding the electricity market are set out more fully in Appendix 2.

² Until the Utilities Act 2000 came into force the electricity regulator was the Director General of Electricity Supply, supported by the Office of Electricity Regulation (OFFER). From January 1999 the Director General also headed the Office of Gas Regulation (OFGAS) and his two supporting offices were effectively merged to become Ofgem, a change that was given statutory sanction by the Utilities Act 2000, at which point the Director General became the Chairman of the Gas and Electricity Markets Authority.

- 3 Ofgem and the Department decided that the wholesale electricity market would protect consumers' interests better if it became more like any other trading market. The objectives for NETA are set out in Appendix 2. In essence the Department and Ofgem wanted arrangements that promoted competitive trading between generators and supply businesses. They considered that a decentralised market where most electricity would be sold through individual contracts and through organised markets such as power exchanges, with balancing arrangements to deal with close to real time fluctuations in supply and demand, would achieve their objectives by producing prices that would more closely reflect the underlying value of wholesale electricity. The balancing arrangements were designed to reward predictability and flexibility in generation and supply by allocating the costs of imbalance to the participants who caused them. The Department and Ofgem recognised that a market of this nature might adversely affect some generators who could not predict accurately when they would be generating electricity, or vary their output at short notice, such as some types of renewable generation (which contribute to other Government objectives), and sought to mitigate the effects through measures such as the Renewables Obligation³.
- 4 The Department and Ofgem implemented the new market-based arrangements in March 2001 at a cost of £39 million⁴. Ofgem estimated that, in total, businesses in the industry could incur costs of up to £580 million⁵ including in adapting their operating procedures and IT systems to the new arrangements, and that participants could additionally incur operating costs of £30 million a year. Ofgem and the Department considered that the previous arrangements led to a lessening of competition which resulted in excessive wholesale electricity prices and the Department estimated that NETA could, taken with other changes, lead to reductions of 10 per cent in final consumer prices. Ofgem agreed this was realistic.
- 5 This report examines what actually happened once NETA was implemented, both as an immediate consequence of NETA (Part 2) and as a consequence of the price falls associated with NETA (Part 3). It then sets out the challenges facing Ofgem if the successes of NETA are to be sustained (Part 4). Our methodology is summarised in Appendix 1.

Main Findings

- 6 **NETA has facilitated lower wholesale prices.** Wholesale prices fell by over 20 per cent between the introduction of NETA in March 2001 and October 2002 and by 40 per cent since NETA was proposed in 1998. Because NETA coincided with other major changes in the electricity market⁶ there are a range of views as to what proportion of the fall happened because of NETA. The new arrangements have made it harder for prices to be artificially inflated. While it is difficult to be certain about the cause of short-term changes in prices, it may be significant that the fall in wholesale prices has accelerated after the introduction of NETA, and hence it is reasonable to conclude that NETA has, at the very least, facilitated the fall in prices.

3 *The obligation placed on licensed electricity suppliers to deliver a specified fraction of their electricity from renewable sources.*

4 *Elexon are recovering £17 million from the electricity industry. The remaining costs have been recovered by means of the general levy on the gas and electricity industries which is used to offset the costs to Government of running Ofgem.*

5 *In the event the costs of closing the Pool were £40 million less than expected.*

6 *Other changes include falling fuel prices, an increasing margin of capacity over demand and increased competition.*

- 7 NETA is developing as a market largely as expected.** The wholesale electricity market now much more closely resembles other markets, for instance with company trading functions, price reporting, brokers and exchanges, which should help to ensure a fully competitive market in the longer term. Under NETA there has been active demand-side participation⁷ and there is scope for further participation which has the potential to increase the efficiency of the market. The trading institutions are however still developing, and further increases in the liquidity and transparency of the new wholesale markets and the extent of demand-side trading would make it clearer that the Department's and Ofgem's objectives have been achieved. Most importantly, NETA has also been associated with increased risk management by market participants as they have assumed additional risks, including those arising from their own actions, previously carried by the National Grid Company (NGC) as system operator⁸. For instance, there is a greater incentive for generators to maximise plant reliability which increases the security of supply.
- 8 Prices paid by industrial and commercial customers have fallen sharply since NETA was implemented. Consumers who switch supplier can see substantial reductions. However, prices that domestic consumers pay for electricity have not fallen much since NETA was implemented, although they have fallen broadly in line with the trend in suppliers' overall costs since 1998.** The prices that industrial and commercial consumers pay for electricity have fallen by 18 per cent since the start of NETA, and by 30 per cent since April 1998. Prices for domestic consumers have fallen little since the start of NETA but by 8-17 per cent since April 1998, reflecting the much higher costs of supplying domestic consumers which have been rising due to new environmental costs and the substantial costs of processing changes of supplier. Furthermore, suppliers may be reluctant to pass on falls in wholesale prices that they expect to be unsustainable because of the consumer resistance and brand damage involved in putting prices up again. Consumers who switch supplier can nonetheless reduce their bills by up to 22 per cent⁹, and the prices for customers who have switched have fallen by around 17 per cent, in Ofgem's view partly because suppliers anticipated the fall in wholesale prices up to two years before they happened. Prices charged to domestic consumers who have not switched supplier (62 per cent are with the supplier they used when the market opened in 1999) fell by 8 per cent, largely reflecting the caps Ofgem placed on supplier's prices until March 2002 which included an allowance for falling wholesale prices. Such consumers have therefore seen a more limited benefit from falling wholesale prices. At the same time the margins of some suppliers appear to have increased as the differential between their costs and some of the retail prices they charge has widened.

⁷ Demand-side participation involves the active involvement of purchasers and consumers of electricity in competitive bilateral trading, and can include generating economic value from offering flexibility and predictability to the system.

⁸ NGC recovers costs from participants via charges known as Balancing Services Use of System charges.

⁹ The largest saving available varies according to location and payment method. For customers paying by direct debit it ranges from 13 to 22 per cent.

- 9 Falling wholesale prices have contributed to the financial difficulties some companies are facing.** Sustained low prices have inevitably contributed to the worsening financial position of some generating companies - especially those companies which used mostly debt financing to acquire high cost generating plant, those with uneconomic long-term contracts, or those with expensive fuel sources. Furthermore, smaller generators and some companies owning combined heat and power plant¹⁰ have also reported difficulties in the new market conditions. Other market participants have taken over plant leading to some concentration in ownership. The Government have intervened to rescue British Energy, whose market share is up to 20 per cent of the England and Wales electricity generation market¹¹, for strategic reasons and because of their international treaty responsibilities for nuclear safety. The Government made a credit facility available to British Energy to a maximum of £650 million in September 2002 and at the end of November 2002 announced that they were prepared to extend this facility while a restructuring plan was agreed and implemented.
- 10 The detailed operation of NETA's balancing arrangements has been controversial for some market participants with less predictable output.** The balancing arrangements were designed to reward predictability and flexibility in generation and supply by allocating the costs of imbalance to the participants that caused them. Some market participants with less predictable output, for example some renewable generators and some combined heat and power operators, have argued that the operation of the balancing arrangements exposed them to disproportionately volatile and unfavourable prices. Ofgem consider this not to be the case, especially because the operation of the balancing arrangements has settled down as participants have gained experience. Also, the detailed rules have been amended on several occasions to better target costs. The controversy highlights the need for Ofgem to continue to communicate their position clearly.
- 11 NETA relies on market signals to ensure security of electricity supplies.** "Security of supply" in this context refers to the extent to which there is enough generation available to meet demand for electricity¹². Security of electricity supply is a key Government concern as it is vital for the functioning of a modern economy. In recent years, including since NETA was introduced in March 2001 until Autumn 2002, there has been an annual margin of generating capacity over expected demand of at least 20 per cent and as yet no risk to supply is in prospect. If however generating plant is withdrawn from the market faster than it is replaced the margin of supply over demand will reduce. The market should respond to this situation through rising prices, which should in turn encourage generators to return plant to the system, invest in new plant or new generators to enter the market. An issue surrounding the reliance on market signals is that, in some circumstances, price rises in the wholesale market might, if large and sustained for long enough, be reflected in prices paid by domestic consumers, and these price rises could be unacceptable to the Government of the day, leading them to impose a retail price cap. However, the Government clarified its future energy policy in the White Paper, which emphatically set out its determination not to intervene 'except in extreme circumstances, such as to avert, as a last resort, a potentially serious risk to safety'¹³.



¹⁰ Combined heat and power operators produce heat and electricity as part of the same process, often to support an industrial process such as a paper mill.

¹¹ Figures supplied by the Department of Trade and Industry (DTI).

¹² From the perspective of customers, however, it is the overall security of supply that is important, including disruptions caused by failures on the distribution and transmission networks and fuel supply disruptions to generators. These risks are outside the scope of this report.

¹³ Energy White Paper, paragraph 6.7.



- 12 The market based NETA arrangements are more costly than the central Pool arrangements.** Moving to a more market-based trading arrangement would have been costly for participants however the market was designed. Ofgem expected market participants to incur total costs of up to £580 million in implementing NETA over the first 5 years, and for participants to incur operating costs of £30 million a year. Participants have incurred costs such as recruiting new trading teams, investment in IT and bearing risks previously managed centrally by the NGC. Some types of costs may have increased less than expected and the IT systems for the Pool would have needed to be replaced in any case. We have been advised by ILEX Energy Consulting Limited (ILEX), on the basis of a detailed survey of a small cross-section of seven market participants, that NETA is more expensive than the previous arrangements, although the impact varies between different types of businesses.
- 13 There is a continuing though reduced risk that participants in NETA may manipulate prices to their advantage.** The centralised arrangements of the Pool involved a single reference price for wholesale electricity with additional payments for making capacity available. These arrangements carried with them a risk that some generators could manipulate the market and Ofgem consider that this risk materialised through much of the period of the Pool's operation (1990 to 2001) to the detriment of consumer interests. The decentralised markets which have emerged following NETA do not have a single reference price or capacity payments, and appear to be less prone to abuse by generators. There may however still be some risk of market abuse.
- 14 Ofgem make their regulatory decisions transparent and this will continue to be a vital part of their work.** Ofgem and the Department consulted extensively on NETA during its design and undertook a thorough process to set out the objectives of and design for NETA and to assess NETA against these objectives. Following NETA's implementation, Ofgem have undertaken a series of reviews of NETA. These published reviews have incorporated detailed and useful research. There is always the risk that the published summarised presentations of these reviews do not reflect fully the detailed research, and hence these presentations may expose Ofgem to criticism. The balancing arrangements remain a subject of controversy for some, and as a result Ofgem's presentation of their decisions will continue to be a vital part of their work.

Recommendations

15 Electricity has unusual characteristics compared to other commodities: it is virtually unstoreable and supply needs to match demand moment by moment. In addition, Government and the public attach high importance to a guaranteed supply of electricity at reasonable prices. Taken together, these factors mean that regulation of the electricity market in some form is likely to remain in place. Regulation should be transparent and accountable, and, in carrying out their statutory duties and taking forward the relevant recommendations of the Government's recent White Paper on energy policy¹⁴, we recommend that Ofgem should:

- **Keep under review why domestic consumers who have not switched supplier have benefited much less than other consumers from falling wholesale prices.** The apparent reluctance of many consumers to switch supplier may have dampened price competition, so enabling suppliers to charge up to 22 per cent more to consumers with their original supplier than they charge to attract new customers, and in some cases to widen their margins as wholesale prices have fallen. When they removed price caps in March 2002, Ofgem undertook to dedicate their resources to monitoring and investigation of gas and electricity companies. They should therefore continue to monitor suppliers' behaviour to determine whether there are good reasons why more of suppliers' cost reductions are not passed on to consumers who have chosen not to switch supplier.
- **Ensure efficiency in the administration of the balancing arrangements is met by ELEXON¹⁵, the company responsible for administering these arrangements.** The decentralisation of control entailed in moving from the Pool to NETA has increased the transaction costs of market participation. Ofgem themselves cannot influence the costs of trading in decentralised markets. However, through their oversight of the governance of the balancing arrangements they can help to ensure that the administration of the balancing arrangements by ELEXON is efficient.¹⁶
- **Continue to undertake detailed market surveillance of the wholesale market to detect any abuse of market power.** The design of NETA and the large number of market participants make less likely the types of market manipulation that Ofgem consider occurred under the Pool. There may still, however, be some risks of market abuse under NETA. Ofgem therefore need to maintain the priority given to their wholesale market surveillance activities.

¹⁴ DTI Energy White Paper, *Our energy future - creating a low carbon economy*, February 2003.

¹⁵ ELEXON is responsible for managing the provision of the necessary central systems and services to effect the balancing and imbalance settlement rules under NETA, and for managing the governance processes relating to those rules. ELEXON also supports the Balancing and Settlement Code Panel, a body of individuals that reflect expertise from a cross-section within the electricity industry (including consumers), that considers proposals for modifications to the trading rules.

¹⁶ Specifically through their role in approving modifications.

- **Report regularly on whether there are barriers that could prevent market participants responding to market signals to ensure security of supply.** NETA relies on companies making investment decisions on plant capacity on the basis of their assessments of future opportunities and forward price signals, to ensure that there is enough generation capacity to meet electricity demand. Ofgem are confident that there are sufficient signals to enable timely decisions by companies on the availability of generation capacity. Ongoing risks are monitored by a joint working group, the Joint Energy Security of Supply Working Group. There is however no guarantee that the response to market signals will always work as intended since it is possible that some factors, such as fear of government intervention, may mean that investors do not respond to market signals. As part of the recent White Paper on Energy Policy, Ofgem agreed to report every six months on the performance of the electricity and gas industries in delivering energy security¹⁷.
- **Develop further the way they articulate the potential impact of regulatory changes that they sponsor.** Since NETA was first proposed Ofgem have developed further their approach to appraising regulatory proposals and are committed to the Government's approach to regulatory impact assessment. The consequences of major regulatory changes can be wide-ranging, as NETA has shown. Ofgem should build on their approach to NETA, making use of regulatory impact assessments for forthcoming projects, and analysing the whole range of potential significant consequences. Their assessments should where appropriate set out the potential costs and benefits of the proposals, identify possible risks to the achievement of the intended benefits and evaluate alternative options for meeting regulatory objectives. The White Paper on Energy Policy reported that Ofgem has committed to producing regulatory impact assessments¹⁸.

¹⁷ DTI Energy White Paper, *Our energy future - creating a low carbon economy*, para 6.46.

¹⁸ DTI Energy White Paper, *Our energy future - creating a low carbon economy*, para 9.15.

Part 1

Introduction

The electricity market

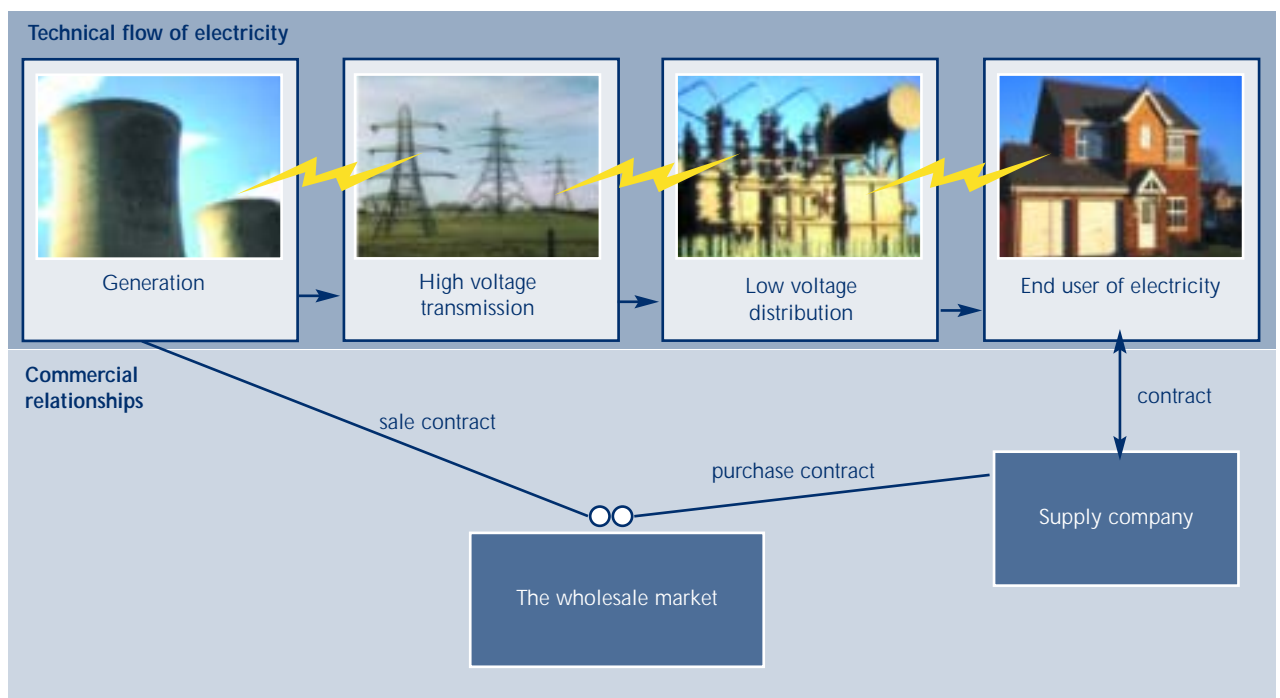
1.1 The electricity industry, as shown in **Figure 1**, consists of:

- generation (the production of electricity at power stations);
- transmission of electricity by high-voltage power lines using the National Grid;
- distribution (the transfer of electricity from the Grid to consumers); and
- supply (sale of electricity to final consumers, including industrial users and households).

1.2 There are various types of generating plant that operate in the electricity generation market. They are distinguished by the primary fuel they use to generate electricity. In the UK, principal fuels include gas, nuclear, coal, and oil. Hydro-electric power stations use water as their primary input. Other important categories of power station include combined heat and power stations, which produce heat and electricity from the same fuel in the same plant. This type of plant is most typically used as a power source in industrial processes.

1.3 The wholesale market links the generation and supply parts of the industry. In commercial terms, the wholesale market includes a variety of contractual relationships within and between generators and suppliers of electricity. When the electricity industry was restructured in 1990 a new arrangement, called the

1 The elements of the electricity industry



Electricity Pool of England and Wales (the Pool), was devised that facilitated these commercial relationships¹⁹. In essence, generators submitted offers into the Pool to provide wholesale supplies of electricity, and suppliers purchased electricity from it. The Pool was one of the first examples of a wholesale electricity market anywhere in the world. In technical terms, the arrangements for scheduling, dispatch, pricing and control in the Pool were highly centralised, and most of the risks associated with these activities were handled on a system-wide level by the system operator - the National Grid Company (NGC) - and the costs recovered from participants.

- 1.4 In 1990 there were three major power producers in England and Wales - National Power (which later split into Innogy and International Power), Powergen and Nuclear Electric²⁰, and around 80 per cent of the generating capacity was originally owned by the two non-nuclear generators. In 1994, after a statement by the Director General that he did not yet consider the generation market sufficiently competitive, and that he would make a reference to the Monopolies and Mergers Commission unless National Power and Powergen gave certain undertakings, the companies undertook to sell around 11 per cent of overall generating capacity within two years. In 1999 and 2000 the two generators were required to sell further plant as part of their undertakings for the acquisition of electricity supply businesses. These divestments together with new entry and plant exits meant that by the end of 2000, their combined market share had fallen to under 25 per cent, with British Energy having up to a further 20 per cent market share.²¹
- 1.5 By the time NETA was introduced, the concentration in the market following restructuring had given way to:
- a more diluted market structure with a number of new independent generators (known as independent power plants, or IPPs);
 - an increasing number of companies owning the type of power station that set the marginal²² price for electricity under the Pool, typically coal-fired power stations; and

- a move towards the integration of generation and supply with the creation of large companies owning both generation and supply arms. Some major generators have purchased supply operations and some major suppliers, such as Centrica, have acquired generation plant. There are six vertically-integrated companies in England and Wales: Innogy, London Electricity, Powergen (who purchased another integrated business, TXU Europe, in autumn 2002), Centrica, Scottish Power and Scottish and Southern Electricity.

- 1.6 In 1990, 12 Regional Electricity Companies were established in England and Wales with a monopoly of supply to customers in their areas. This statutory monopoly was gradually phased out, starting immediately with business customers²³ and culminating in May 1999 when all customers became eligible to choose their suppliers²⁴. In April 2002, Ofgem²⁵ considered that competition had developed to such an extent that it was able to lift price controls on the electricity supply market.

Electricity trading arrangements under the Pool

- 1.7 The Pool provided a set of rules defining how electricity in the market was to be traded. In essence, each day generators submitted to NGC a schedule of the availability of their power stations for each half hour of the following day, and the price at which they were prepared to generate. NGC would then rank these bids on a half-hour by half-hour basis in order of least expensive to most expensive. NGC would then compare the resulting "merit order" to its forecast of demand, and direct, or despatch, as many stations as necessary to meet demand²⁶. The price charged by the most expensive plant on the system in each half hour - the top of the merit order - determined the system marginal price (typically the largest part of the Pool price) for all electricity generated. The Pool therefore represented a compulsory mechanism to set the price for wholesale electricity and a centralised mechanism by which plant was dispatched.

19 The industry in Scotland was privatised separately and with different wholesale market arrangements. In Northern Ireland, the industry was also privatised separately, and is regulated by a separate regulator, the Office for the Regulation of Electricity & Gas.

20 Nuclear Electric was subsequently merged with Scottish Nuclear. It was split into British Energy, which owns the more modern nuclear power stations and was privatised in 1996, and Magnox Electric, which owned the older reactors. British Nuclear Fuels Limited now owns the older reactors.

21 Figures supplied by the Department for Trade and Industry.

22 This is the price of the highest offer to sell energy accepted by the system operator.

23 These were customers with peak loads of more than 1 megawatt of electricity.

24 National Audit Office, *Giving Domestic Customers a Choice of Electricity Supplier*, (HC 84, Session 2000-2001) examined the impact of electricity supply competition on domestic customers.

25 On 16 June 1999, the former regulatory offices, Ofgas and OFFER, were renamed the Office of Gas and Electricity Markets (Ofgem).

26 At privatisation plant was scheduled using a computer programme known as GOAL. The supergoal programme was developed and introduced subsequently.

- 1.8 In practice, 90 per cent of electricity was traded bilaterally²⁷, through a form of hedging contract (known as "contracts for differences") designed to limit participants' exposure to movements in the Pool price. Only around 10 per cent of electricity that went through the Pool was not hedged in this way. Some generators, including nuclear plant, bid in to the Pool in a way that ensured they were scheduled to run by NGC, typically by bidding at a low or zero price. In addition, generators with available capacity were paid a centrally calculated price for making that capacity available. These 'capacity payments' were set according to a complex formula.
- 1.9 During the 1990s, there had been increasing criticism of the Pool as a market mechanism for setting electricity prices, both from within Government and from other parties, including large industrial and commercial users of electricity and new entrants.
- 1.10 In OFFER's view, customers paid higher prices than necessary. This is because Pool prices remained broadly constant from 1991 onwards, despite a more competitive generation market structure, lower input fuel prices and reductions in the capital costs of generating plant.
- vi. promote competition in electricity markets, including by facilitating ease of entry and exit from such markets;
 - vii. avoid discrimination against particular energy sources; and
 - viii. be compatible with Government policies to achieve diverse, sustainable supplies of energy at competitive prices and with wider Government policy, including on environmental and social issues.
- 1.12 The first seven of these objectives were tightly focussed on the electricity market. The final objective, however, related to compatibility with wider policy and covers a broad range of energy objectives, including fuel poverty and environmental issues. In addition to these objectives, the Government stated that further consideration should be given to:
- security of electricity supplies both now and in the longer term;
 - prices that are transparent and ensure liquidity; and
 - appropriate consideration of Combined Heat and Power (CHP) generators, renewables generators and small embedded generators, Non-Fossil Fuel Obligation generators and Interconnectors.

Reform of the electricity trading arrangements

- 1.11 As a result, in October 1997 the Minister for Science, Energy and Industry invited OFFER to consider how the electricity trading arrangements might be revised. The main objectives of the review were to consider what changes in the electricity trading arrangements would best:
- i. meet the needs of customers with respect to price, choice, quality and security of supply;
 - ii. enable demand to be met efficiently and economically;
 - iii. enable costs and risks to be reduced and shared efficiently;
 - iv. provide for transparency in the operation of the pricing mechanism and the market generally;
 - v. respond flexibly to changing circumstances in future;
- 1.13 The Department recognised that NETA was primarily aimed at making the electricity markets more competitive, but at the same time they have also been pursuing the objective of encouraging renewables, through the introduction of support mechanisms such as the Renewables Obligation and capital grants. They carried out an environmental appraisal of NETA in 1999²⁸, which recognised that "some types of plant will be encouraged by (NETA) whilst others will not...it is likely that on balance the net effect of electricity price falls and the creation of a level playing field... will reduce the market value of renewables generation and the incentives to invest in new CHP, with a resulting detrimental environmental impact." The Department's appraisal considered that "the Government continues to have an objective to ensure that 10 per cent of electricity in the UK is supplied from renewable sources. The measures that it employs to achieve that goal will have to take full account of the expected market conditions, including the effect of the new electricity trading arrangements."

²⁷ OFFER, *Review of Electricity Trading Arrangements, Interim Conclusions, June 1998, page 19-20.*
²⁸ Ofgem/DTI *Conclusions Document, The New Electricity Trading Arrangements, October 1999, Appendix 5.*

Ofgem's solution: a commodity market that overcame the constraints of trading electricity

1.14 OFFER perceived a number of problems and weaknesses with the Pool including:

- a lack of competition in price setting;
- a relative lack of supplier pressure and of customer and demand side participation;
- the complexity of bidding and price setting;
- the limitations of the capacity payment mechanism²⁹; and
- inflexible rules and governance arrangements.

1.15 In response to the objectives listed in paragraph 1.11 on page 11, OFFER developed in 1998 a clear vision that the wholesale market should develop a more market-based system of trading. The Government endorsed this vision in a White Paper. These new arrangements would be based on bilateral trading between generators, suppliers, traders and customers. They would operate as far as possible like other commodity markets whilst, at the same time, making provision for the electricity system to be kept in physical balance at all times to maintain security and quality of supplies. It was also important that NETA as a commodity market should deliver outcomes compatible with wider government objectives. In terms of generation plant that helps Government meet environmental objectives, such as renewable and combined heat and power plant, Ofgem considered that the new arrangements would have a positive impact on some while others may be less well positioned, depending on the nature and predictability of their electricity output. The key features of the new set of arrangements that Ofgem and the Department wished to see are outlined in **Figure 2**.

1.16 Electricity differs from other commodities. Storing significant quantities of electricity is both difficult and costly. The electricity system needs to be balanced between supply and demand from moment to moment to maintain the system's stability, and as a result, the cost and price of electricity can, and usually does, vary significantly within a day. To maintain the electricity system in balance constantly requires the system operator to have access to flexible generation and/or supply.

2 The main proposed features of the new set of arrangements

- Forwards and futures markets, which would evolve in response to the requirements of participants and which would allow contracts for the sale and purchase of electricity to be struck up to several years ahead;
- Short-term power exchanges, also evolving in response to the requirements of participants, to give participants the opportunity to 'fine tune' their contract positions in a simple and accessible way;
- A balancing mechanism in which NGC as system operator accepts offers of and bids for electricity to enable it to balance the system; and
- A settlement process for charging participants whose contracts do not match their metered volumes of electricity and for recovering NGC's costs of balancing the system.

1.17 To address the unusual characteristics of electricity as a commodity, NETA has balancing arrangements including a Balancing Mechanism, whose purpose is to ensure that the electricity system stays in balance at all times. In essence, within the Balancing Mechanism, NGC instructs generators, suppliers or customers that have indicated their willingness to do so to deviate from their planned output or consumption at short notice, based on bids and offers submitted by such companies. Any participant whose actual output of or demand for electricity differs from what they have contracted for is deemed to be in "imbalance". The price at which these imbalances are settled is derived from the costs incurred by NGC in energy balancing³⁰. In this way, the balancing arrangements should reward flexible plant (which can make bids or offers into the Balancing Mechanism) and allocate the costs of dealing with imbalance to those who cause it (notably those participants whose physical position differs from their notified contract position).

²⁹ OFFER considered that the way that capacity payments were manipulated by generators with market power meant that they were simply seen as another area for gaming within the overall price received by those generators, rather than as a specific reward for making capacity available.

³⁰ NGC incurs costs in keeping the system in balance close to, and in, real time (known as energy balancing). It also has to ensure that the system remains within safe operating limits and that the pattern of generation and demand is consistent with any system constraints (known as system balancing).

Future reforms to the electricity market

1.18 Ofgem is working with the Department on a major programme of reform (the British Electricity Trading and Transmission Arrangements) to establish trading and transmission arrangements on a Britain-wide basis. Electricity is currently traded in Scotland on the basis of arrangements that date from privatisation. Ofgem consider that the reforms, which require primary legislation, will bring greater competition to the wholesale market in Scotland and bring greater competition to all customers in Great Britain. Separately, Ofgem have identified a number of issues with NGC's current arrangements for access to and charging for its transmission system. Ofgem have suggested that reform of these areas is important and that NGC or market participants need to propose necessary rule changes.

The Government's Energy White Paper

1.19 In February 2003, the Government published an Energy White Paper, entitled *Our energy future - creating a low carbon economy*. This White Paper focused on three challenges facing the UK's energy system: environmental change; the decline of the UK's indigenous energy supplies; and the need to update much of the UK's energy infrastructure. It sets out four goals for energy policy to: reduce carbon dioxide emissions by 60% by about 2050, with real progress by 2020; maintain the reliability of energy supplies; promote competitive markets in the UK and beyond; and ensure that every home is adequately and affordably heated. Liberalised and competitive energy markets will remain a cornerstone of energy policy. The White Paper considered the successes and impacts of NETA but did not propose any significant changes to the wholesale electricity market.

Scope and methodology of the NAO study

1.20 In undertaking our examination of NETA, we sought to address three issues:

- how did Ofgem and the Department anticipate that the design and implementation of NETA would deliver the Government's main objectives for the new trading arrangements?
- to what extent have these objectives been delivered? and
- what are the risks to these objectives, and where appropriate how are Ofgem addressing them?

1.21 In carrying out our examination, we reviewed evidence on prices in the wholesale and retail markets, examined key Ofgem/DTI documents, and interviewed a range of participants in the market. We commissioned advice from Europe Economics on the risks of moving from a centralised to a decentralised model of market operation and from ILEX on the costs to participants of operating under NETA. We also convened an Expert Panel to advise us on our findings, and we were supported throughout by expert advice from Professor Derek Bunn of the London Business School. Our methodology is set out in more detail in Appendix 1. We are grateful for the support we have received from Ofgem, the Department and the electricity industry throughout this process.



Part 2

The immediate consequences of NETA

The implementation and operation of NETA

- 2.1 Any major system change carries with it a significant risk of failure. There have been many examples within and outside government of major changes being implemented too quickly or ineffectively, with major failures in service delivery as a result. In comparison to these problems, the NETA project was broadly successful. It was a major programme of work and involved the development and trialling not only of new central IT systems by Ofgem and NGC, but also businesses that wished to participate directly under the new trading arrangements. The extensive trialling and testing of the NETA systems ensured that there was a seamless transfer to the new systems on 27 March 2001³¹. From the outset, security of supply has been maintained.
- 2.2 The costs of NETA were split between Ofgem and NGC/ELEXON, the balancing and settlements company. Their overall spend on the NETA project was some £39 million, against an original budget of £30 million³². Of the £39 million, £21.7 million was borne by Ofgem, who recover their costs through a levy on licensees³³. The remaining £17.3 million was incurred by NGC/ELEXON, and is being recovered from participants in NETA over a four-year period through ELEXON's charges.

- 2.3 NGC is responsible for managing the electricity system economically and efficiently. This means that it must ensure that the system is in balance at all times, and that the costs of doing so are minimised. The principal measure of its performance is known as 'System Operator costs'. In the first year of NETA operation NGC made progress in reducing the overall level of system operator costs to £366 million, given a deadband of £487-514 million³⁴. NGC's improved efficiency during the first year of NETA has enabled Ofgem to reduce their cost target by more than £30 million for the second year of NETA's operation³⁵.

Falling wholesale prices

- 2.4 Market conditions in the generation market have been characterised by increasing competition, particularly from 1995 onwards (paragraph 1.6). One measure of increasing competition is the level of concentration of ownership in the relevant industry. This can be measured by a statistic called the Herfindahl-Hirschman index which measures concentration in any given market³⁶. For its 2001 report that looked at AES and British Energy, the Competition Commission calculated that, in terms of capacity, this index had fallen from 2,200 to 1,170 from 1995-6 to 1999-00, reflecting a marked decrease in the concentration of ownership³⁷. This increased competition was associated with a fall in the price of wholesale electricity before NETA was implemented. **Figure 3 overleaf** shows Ofgem's calculation of 12 month average Pool Purchase Price from 1991 to 2001 showing a downward trend from the mid-1990s onwards.

31 Following a recognition that the original date for NETA to 'Go-Live' of 31 Oct 2000 (and a subsequent date of 21 Nov 2000) would not be achieved, Ofgem revised the NETA Programme Go Live date to 27 March 2001 which was met.

32 The increase in costs was due to the five-month delay in the implementation of NETA to allow for additional testing of participants' IT systems.

33 Under the Utilities Act 2000, OFGEM's operating costs are met from a levy on electricity and gas licence holders.

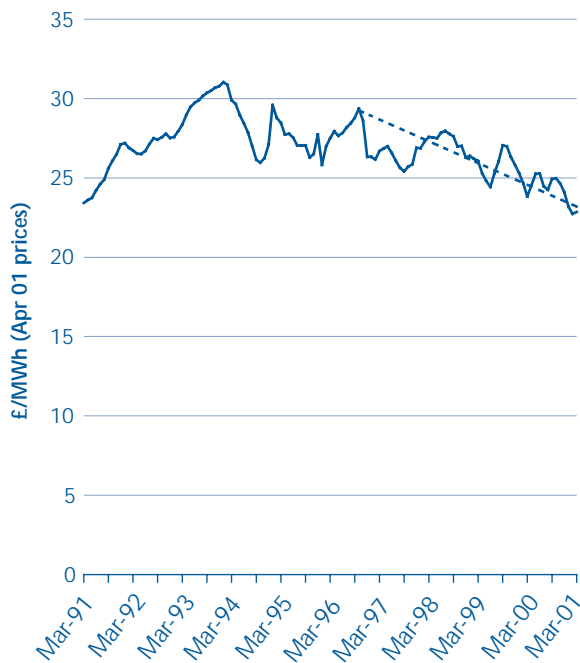
34 The deadband is the target range with a lower limit of £481 million and an upper limit of £511 million. Both these figures are in 2001/02 prices.

35 Ofgem, Review of the first year of NETA, July 2002, paragraphs 7.16 and 7.17.

36 So that a perfectly competitive market would have a value close to 1 and a fully monopolist market would have a value of 10,000. A figure over 1,800 is generally seen as denoting a high level of concentration within a market. In other market reviews, the OFT has calculated indices of 1,430 for the provision of banking services in the UK (February 2001), 1,980 for the supply of lager in Great Britain (2001), a range of 2,000 to 4,000 for the wholesaling and retailing of petrol in most local and regional markets within the UK (May 1998), and 2,700 to 3,000 (post-merger) for the supply of vitamin B2 and vitamin C in Europe (November 2000).

37 Competition Commission, AES and British Energy: A report made under section 12 of the Electricity Act 1989, January 2001, paragraphs 2.88-2.99.

3 Pool Purchase Price from 1991 to 2001



Source: Pool data, reported in Ofgem's one year review

- 2.5 There is no direct comparison between prices prevailing when the Pool operated and those under NETA. There are now a range of different prices available, depending on duration of the contract, time period covered and other factors. Nevertheless, prices appear to have fallen substantially since the start of NETA. Ofgem report that, since NETA's inception, prices for "baseload" electricity (the component of the power system load which is continuously present over a stated period) have fallen by 20 per cent, and prices at peak times have fallen by 27 per cent. Overall, they estimate that wholesale electricity prices have fallen around 40 per cent since 1998. They attribute the falls to NETA, alongside other factors such as falling fuel prices, a large margin of capacity over demand and increased competition in generation ownership³⁸.
- 2.6 It is difficult to estimate by exactly how much prices would have fallen had the Pool arrangements been continued and NETA not been introduced. Dr John Bower, of the Oxford Institute for Energy Studies, has undertaken a regression analysis to assess the impact of different factors on wholesale electricity prices³⁹. He concluded that most of the price fall during the period 1999 to 2002 was a result of other developments, including sale of plant, overcapacity, and lower fuel costs. More recent work from the University

of Hull considered two conflicting hypotheses: a "static view" that anticipation of NETA had little impact on wholesale prices; and a "dynamic view" that generators might have changed their bidding behaviour in advance of NETA⁴⁰. On the latter view, a substantial fraction of the price reductions can be attributed to NETA.

- 2.7 Ofgem consider that, while forward wholesale prices were falling in the latter half of the 1990s, prices in the Pool were artificially high. Their view is that anticipation of NETA caused forward prices to fall. They note that prices appeared to rise when the implementation of NETA was delayed. In conclusion, while it is difficult to be certain about the cause of short-term changes in prices, it may be significant that the fall in wholesale prices has accelerated after the introduction of NETA, and hence it is reasonable to conclude that NETA has, at the very least, facilitated the fall in prices.

NETA as a commodity market

- 2.8 In considering the development of NETA as a commodity market, we examined four aspects of commodity markets: liquidity; the development of exchanges, trading and price reporting; demand-side participation; and governance.

Liquidity of the wholesale electricity market

- 2.9 NETA sought to increase the liquidity in the wholesale electricity market. Liquidity relates to how quickly parties can complete transactions at a reasonable price and is a desirable feature of any market. In an electricity wholesale market that has reasonable liquidity, a generator or supplier ought to be able to buy or sell electricity at short notice. In this way, a participant that cannot meet its contractual obligations (for instance due to a technical fault or failure to forecast demand accurately) may be able to cover its obligations in the market.
- 2.10 Liquidity has increased since NETA was implemented. The volume of over-the-counter trades has increased by more than threefold and there are many more types of contract than under the Pool⁴¹. There are markets for trading up to several years ahead which provide some information on likely future prices. While liquidity in the market generally has increased under NETA, liquidity in the short term, or "within-day" appears less well developed. Ofgem found that this was the case in August 2001⁴² and in July 2002 reported that the traded volume on the largest of the exchanges (UKPX) had

³⁸ Ofgem Factsheet, *New Electricity Trading Arrangements (NETA) - One Year Review*, 24 July 2002.

³⁹ John Bower, *Why Did Electricity Prices Fall in England and Wales: Market Mechanism or Market Structure*, The Oxford Institute for Energy Studies, September 2002. The Oxford Institute for Energy Studies is a centre for advanced research into the social science aspects of energy. The views expressed in the report are the author's own.

⁴⁰ Joanne Evans and Richard Green, *Why did British electricity prices fall after 1998?*, Centre for Economic Policy, University of Hull Business School, December 2002.

⁴¹ Ofgem reports that the Heren European Daily Electricity Markets show that the number of contract types have increased from 138 in 2000/01 to 341 in 2001/02.

⁴² Ofgem, *Report to the DTI on the Review of the Initial Impact of NETA on smaller generators*, August 2001.

remained fairly stable for the first six months of 2001/02, before falling in the latter half of the year⁴³. And some Continental electricity markets appear to be more liquid⁴⁴.

2.11 Ofgem have identified two potential causes of the relative lack of short term liquidity:

- there may be increased availability of within-day bilateral contracts which circumvent the need for participants to use an exchange; and
- with greater experience, participants may be making more accurate and earlier forecasts of their requirements and therefore have less need to enter into short-term contracts.

2.12 As at Autumn 2002, some 95 per cent of all delivered electricity is covered by bilateral contracts between two parties, typically a generator and a supplier, or by brokers acting as intermediaries or through on-line trading platforms. Trading on power exchanges represents a further 1-2 per cent. The remainder of the electricity in the market (some 2-3 per cent) is traded under the balancing arrangements⁴⁵.

The development of exchanges, trading and price reporting

2.13 The decision was taken not to procure a power exchange and price reporters as part of NETA. Through greater contractual freedom and more competitive price setting arrangements, NETA was expected to lead to the development of forward and futures markets and short-term power exchanges in response to market participants' needs.⁴⁶ This has happened to the extent that under NETA there are:

- **power exchanges** which offer market participants the opportunity to trade using a screen-based, 24-hour trading system. Since the inception of NETA, two exchanges (UKPX and APX) have traded significant volumes of electricity⁴⁷. These volumes have been mostly for short term contracts traded close to delivery, and the active trading of futures contracts (a feature of other commodity markets) has not yet emerged. The overall volume traded on the exchanges, while significant, is less than on some other European power exchanges. Ofgem consider it is impossible to make meaningful comparisons of liquidity between markets which are so different.

- **price reporters**. Under the Pool, there was no generally recognised reporting of contract prices and there was relatively limited information available on contract volumes. Under NETA, however, three energy price reporting services have emerged (Heren, Platts and Petroleum Argus) who provide information to subscribers⁴⁸.

- **brokers**. There are also brokers who offer a range of financial energy products⁴⁹.

Demand-side participation

2.14 One of the objectives of NETA was to increase the role of the "demand-side". The demand-side covers the purchasers rather than generators of electricity, such as large industrial users, and electricity supply companies (and their customers). An active demand side is a normal feature of most commodity markets, and in the electricity market has two benefits: firstly, it can increase competitive pressure on generators; and secondly, it can help balance the system by reducing or increasing the use of electricity at short notice. Under NETA, suppliers and large industrial users help balance the system by providing balancing services, either through the Balancing Mechanism or, more commonly, bilateral Balancing Services contracts. For example, since the start of NETA, the demand side has provided between 5 per cent and 30 per cent of the Balancing Services contracts. In addition, the demand-side has participated in the Balancing Mechanism, representing 0.15 per cent of the offers accepted by the NGC to date. Ofgem have set up a Demand Side Working Group to consider the scope for encouraging greater participation.

Governance

2.15 The governance of the Pool was widely recognised as inadequate and cumbersome. In designing NETA, Ofgem and the Department sought to create governance arrangements that were sufficiently open and flexible to allow modifications to be made to the rules in a timely fashion as the market developed and which incorporated adequate representation of customer interests (for example, customer representatives can now raise modifications).

2.16 The Balancing and Settlement Code (BSC) provides the operating rules for the balancing arrangements. NGC, as the system operator, is responsible for maintaining the BSC through an independent arms-length company

⁴³ Ofgem, *Review of the first year of NETA, July 2002, paragraph 3.23.*

⁴⁴ Continental prompt markets with higher liquidity levels than the England and Wales market include the Nordic market, Germany and Holland.

⁴⁵ Figures as at autumn 2002.

⁴⁶ In addition, an industry initiative in anticipation of NETA was the development of a generic framework covering energy trading between counter-parties, known as the Grid Trade Master Agreement (GTMA). The GTMA has been accepted as the standard set of terms under which the majority of electricity forward trades take place.

⁴⁷ A third power exchange - IPE - ceased trading electricity contracts at the beginning of April 2002.

⁴⁸ All three were established prior to the introduction of NETA, with a background in reporting other energy commodities. In addition, some providers of financial information such as Reuters and Bloomberg provide power prices.

⁴⁹ In addition two on-line electronic markets were also introduced, however neither have continued trading. EnronOnline ceased trading in November 2001, and DynegyDirect was discontinued in June 2002, both as a consequence of parent company difficulties.

called the BSC Company, and known as ELEXON⁵⁰. All participants in the market, including generators, suppliers, traders and consumers are allowed to become BSC parties. Modifications may be proposed by any party to the Balancing and Settlement Code and by *energywatch*, the consumer body. These modifications are considered by a panel, which includes members appointed by the electricity industry, alongside independent members and consumer representatives. This panel makes recommendations to Ofgem on whether the modifications should be approved. Ofgem themselves have a central role under these governance arrangements, as they make final decisions on whether proposals to modify the rules should be accepted or rejected.⁵¹

2.17 The governance arrangements have allowed significant changes to be made to the BSC rules. In the first year of operation the BSC Panel received 72 modification proposals. During the first year of NETA a total of 46 proposals were put forward to Ofgem, which approved 18 and rejected 18. A further 10 were amalgamated or withdrawn⁵². Perhaps the most significant are the reduction of "Gate Closure" to one hour ahead of real time⁵³, and a series of changes to the calculation of imbalance prices. The new governance arrangements have also allowed the industry to respond quickly to urgent issues that have arisen - for example, modifications to imbalance cash-out prices in the first few weeks of NETA to more accurately reflect electricity balancing costs in imbalance prices, and also to deal with the problems surrounding the administration of parts of the Enron Group.

The electricity industry's increasing focus on risk management

2.18 Under the Pool, NGC was responsible both for instructing plants when to generate, and for forecasting demand on the electricity system. Under NETA, these responsibilities have been transferred to individual participants, and as a result, both generators and suppliers have an increased need for risk management. Suppliers have increased the resources they devote to forecasting demand and have steadily reduced the

margin of error in their forecasts. According to our discussions with participants, the industry benchmark for demand forecasting is now around a 2-3 per cent margin of error, compared with around 6 per cent at the start of NETA. As for generators, NGC figures showed that generators increased the availability of their plant during the first year of NETA's operation. The initial improvement may reflect improving plant reliability caused by their commercial exposure to commercially unfavourable imbalance payments if generators fail to meet their contractual commitments. This differed from the Pool where generators did not face these costs. NGC's provisional analysis of changes during the second year shows that availability has slightly reduced year on year. It is therefore evidently too early to be sure that there is a trend in either direction. Within the industry there has been a perception that another strategy adopted by generators may be to run their plant "part-loaded". Part-loading would allow the output of a generating plant to be varied upwards or downwards to cover failures or forecasting errors, and to take advantage of opportunities presented by the Balancing Mechanism. While part-loading plant could be economically efficient, it would however be less technically efficient and consequently may increase greenhouse gas emissions. In Ofgem's view, the potential misalignment between economic and technical efficiency would be resolved by introducing market mechanisms that enable pricing and trading of emissions⁵⁴. There is however no evidence that part-loading has shown a sustained increase in response to NETA.

2.19 As a result of NETA, some participants have set up specialised trading departments whose main role is to manage their risks, while other participants have also become more aware of the credit risk of counter-parties defaulting on contracts. While most of the larger participants that we spoke to considered that they were developing more sophisticated risk management anyway, they considered that NETA had accelerated the process, and had changed the culture of the industry from an engineering to a trading focus. This change was consistent with the overall objective to create trading arrangements closer to those available in other commodity markets.

⁵⁰ ELEXON is responsible for managing the provision of the necessary central systems and services to effect the balancing and imbalance settlement rules, and for managing the governance processes relating to those rules. ELEXON also supports the BSC Panel, which is a body of individuals that reflect expertise from a cross-section of the electricity industry, (including two independent persons and those appointed by NGC and *energywatch*, the consumer body, who can also appoint two people) that considers proposals for modifications to the trading rules.

⁵¹ In reaching decisions on proposed modifications, Ofgem have regard to their Statutory Objectives and general duties under Sections 3A to 3C of the Utilities Act 2000 which enables them to take a broader view of the proposed modification's impact on the industry than the objectives of the Codes/Statements. There are two other important elements to governance: the Connection and Use of System Code, and the Grid Code. Ofgem play a similar role under these codes. Ofgem's position in the governance arrangements for electricity are similar to their position in gas governance, under the Gas Network Code, that were put in place in 1996.

⁵² Since the start of NETA, there have additionally been a number of amendments and modifications to other Codes and Statements which are part of the wider governance framework of the electricity market.

⁵³ BSC Modification Proposal P12: "Reduction of Gate Closure from 3.5 hours to 1 hour" which allows market participants to trade out any potential imbalances that may arise from plant failures much closer to real time.

⁵⁴ Ofgem point out that although it is certainly the case that part-loading of plant will marginally reduce thermodynamic efficiency (and hence increase greenhouse emissions), generators only keep relatively modest amounts of capacity in such part loaded states, preferring to secure contractual sales for the bulk of their capacity, which they plan to operate at lowest cost (i.e. highest thermodynamic efficiency).

Part 3

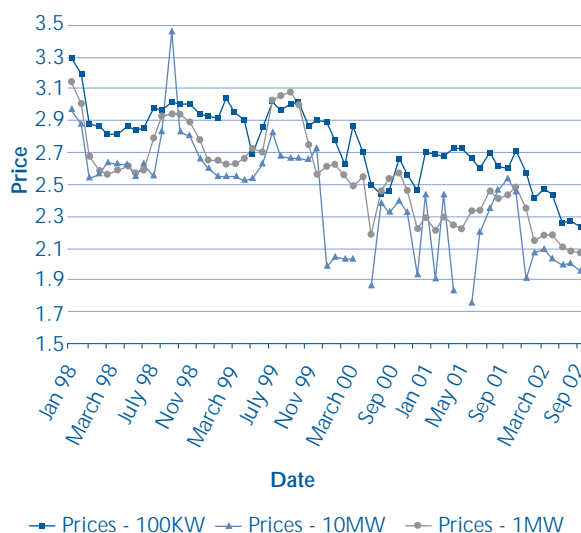
The consequences of price falls associated with NETA

Prices paid by consumers in England and Wales

Falls in prices paid by industrial and commercial consumers

3.1 The costs of supplying electricity to consumers include the costs of transmission, distribution and supply, as well as generation (paragraph 1.1). For most industrial customers, who use large volumes of electricity, the generation element comprises the larger part of the overall bill. We would therefore expect NETA to have a greater impact for industrial and commercial customers than for consumers who use lower volumes of electricity.

4 Prices paid by industrial and commercial customers



NOTE

This figure shows the prices paid by industrial and commercial customers in three bands, depending on the amount of electricity they consume.

Source: John Hall Associates data⁵⁶

3.2 Ofgem reported that electricity bills for most industrial and commercial customers have fallen by between 25 to 30 per cent (in real terms) between April 1998 to March 2002, and by 18 per cent since NETA was implemented. During the four years from April 1998, wholesale prices have fallen by around 40 per cent (paragraph 2.5)⁵⁵. Representatives of these customers confirmed to us that they had seen large falls in their electricity costs. This sector is in general likely to be more price sensitive than the domestic sector and appears to have taken advantage of the reductions in the wholesale price of electricity to negotiate kept prices with suppliers (Figure 4). In addition, Ofgem consider that competition in this sector is more strongly developed as it was opened up earlier than the domestic sector.

Prices paid by domestic consumers

3.3 Our report on electricity competition noted Ofgem's view that reform of the wholesale market was necessary before customers could realise the savings possible from competition. These reforms would make the wholesale market more efficient and put significant downward pressure on prices⁵⁷. The breakdown of a typical domestic customer's bill shows that generation costs currently represent some 40 per cent of the total bill, although the figure was nearer 50 per cent when competition was introduced⁵⁸ (Figure 5).⁵⁹ On this basis, if all wholesale price movements were to be passed through directly to domestic customers, the 40 per cent fall in wholesale prices over the four years before and since the introduction of NETA should be accompanied by a fall of around 10-15 per cent in domestic bills, or £25-£38 pounds off the average domestic bill of £250. This would be consistent with a forecast that Ofgem made in July 1999 that, on the basis of some specified assumptions, the impact of NETA could be a 14 per cent fall in prices for a domestic consumer.⁶⁰

55 Ofgem report that even allowing for the Climate Change Levy prices for large customers had still fallen significantly. Ofgem, Review of the first year of NETA, July 2002, paragraph 8.9.

56 The figure shows energy only prices at Grid Supply Point which equates to energy cost plus transmission losses.

57 Ofgem, Review of the first year of NETA, July 2002, paragraph 2.31.

58 Competition was introduced gradually into the domestic market culminating in May 1999 when all customers became eligible to choose their suppliers.

59 The proportion of the costs of supplying electricity to customers obviously varies with the prices of the different components, and the reduction in prices since NETA was implemented, coupled with the rising costs of supply, have reduced the proportion of costs attributable to generation from nearly 50 per cent when NETA was implemented.

60 Ofgem, The New Electricity Trading Arrangements, July 1999.

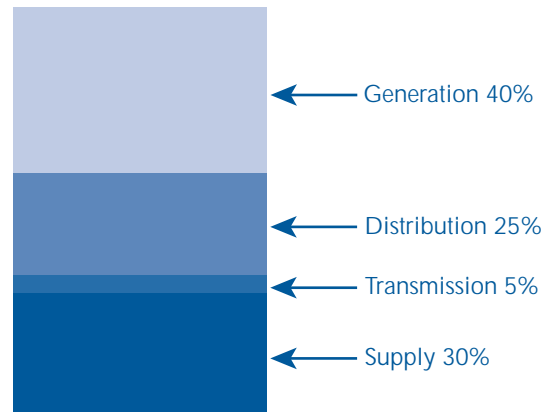
3.4 The large falls in wholesale electricity prices have been accompanied by changes since 1998 in the other costs involved in supplying domestic consumers, which might offset the effect on prices:

- Suppliers have passed on to customers new environmental costs arising from the Renewables Obligation and Energy Efficiency Commitment. These have been equivalent to an additional 2 per cent on domestic bills.
- Suppliers' costs appear to have risen by 20-40 per cent⁶¹ as a result of costs that were not present prior to the introduction of competition in electricity supply. This increase is equivalent to an increase in the average consumer's bill of between 5 and 10 per cent. These costs include: handling transfers, customer acquisition and brand building costs, increased bad debt since customers gained the ability to switch, higher depreciation charges on upgraded IT systems to deal with competition and the higher costs of customer care. Most of these costs are attributable to the introduction of competition and bring benefits to consumers who have taken advantage of competition. Ofgem consider that some suppliers have controlled these costs much more than others.
- On the other hand, Ofgem estimate that suppliers have benefited from a reduction in transmission and distribution charges of some 9 per cent.

3.5 Furthermore, most suppliers have not seen the prices they pay for wholesale electricity fall as much as market prices might suggest. Until recently, suppliers have typically set domestic tariffs once a year, and contracted with generators on the expectation that their customers' requirements will change only slowly. Consequently, some suppliers have entered into longer term contracts with generators at prices which have yet to fall, delaying the reduction of supplier's costs. Ofgem estimate that these longer-term contracts represent around a third of the average supplier's energy costs.⁶²

3.6 Taking all these factors into consideration, Ofgem estimate that suppliers' costs may have fallen by between 8 and 17 per cent (in real terms) since 1998. Ofgem do not have figures for the period since April 2001 and in any case consider that a longer timeframe is needed to assess the effect of cost changes on the market, for instance because suppliers tend to change their prices only once a year.

5 Breakdown of a typical domestic electricity bill



3.7 We examined the extent to which the reduced costs had been passed on to domestic consumers. There are two distinct sets of prices paid by domestic consumers - those paid by consumers who are supplied by the incumbent supplier (that is the supplier which had a monopoly prior to the introduction of competition in May 1999), and those paid by consumers who have switched to another supplier. Our report on the introduction of electricity competition⁶³ showed that, in June 2000, customers could reduce their bills by up to 13 per cent by changing away from the incumbent supplier. In relation to consumers who have switched, our analysis, along with Ofgem figures, shows that:

- There is still a significant incentive for customers to switch from the incumbent supplier. The savings available vary depending on geographical location and payment method⁶⁴. Ofgem figures show that consumers could obtain savings of between 8 and 22 per cent by switching to the cheapest available supplier. For consumers (with medium consumption) paying bills by cheque quarterly in arrears (standard credit) the best saving averages 14 per cent. For consumers paying by direct debit it averages 16 per cent. For consumers with a prepayment meter it averages 10 per cent. The savings on offer have therefore increased slightly since NETA was implemented.

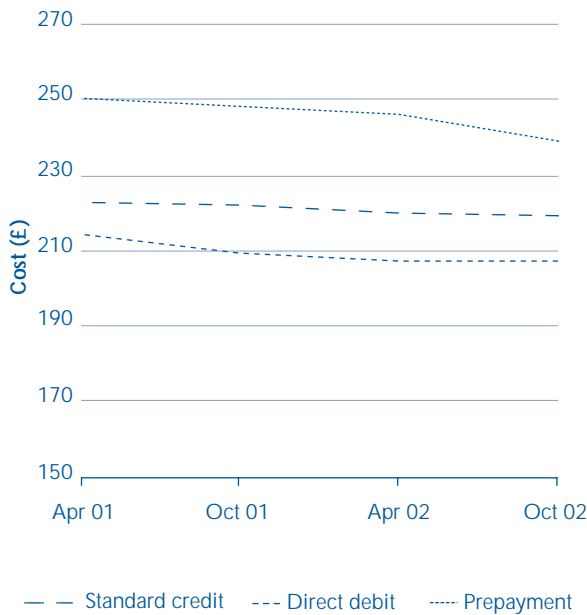
⁶¹ The figures for increases in suppliers' costs are based on unaudited information that Ofgem have obtained from suppliers and should therefore be treated with some caution.

⁶² Ofgem, *Electricity supply competition: an Ofgem occasional paper, December 2002, summary*.

⁶³ National Audit Office, *Giving Domestic Customers a Choice of Electricity Supplier (HC 84, Session 2000-2001)*.

⁶⁴ All figures given in this paragraph relate to October 2002.

6 Summary of cheapest supplier's tariffs



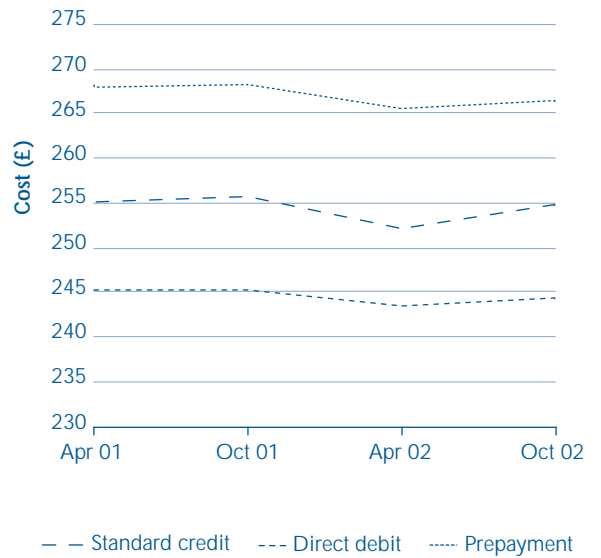
Source: NAO analysis

- Since NETA was implemented in March 2001, the proportion of domestic customers who use a supplier other than the incumbent has gone up from 25 per cent to 38 per cent of domestic customers⁶⁵.
- There have been modest reductions in the bills of consumers who switched away from the incumbent supplier before NETA was implemented. For instance, our analysis shows that the bills of consumers who are with the cheapest supplier in each area have fallen by 2 per cent if they are on standard credit, by some 3 per cent if they pay by direct debit and some 4 per cent if they use a prepayment meter (Figure 6).⁶⁶ Ofgem have obtained a figure of an average 2 per cent reduction between June 2001 and June 2002⁶⁷. These consumers may, however, have seen much more benefit from falling wholesale prices because Ofgem believe that suppliers anticipated these falls when they cut their prices at the time competition was introduced.

3.8 For consumers who remain with the incumbent supplier, our analysis shows that:

- There has been little reduction in their bills since April 2001 (Figure 7). Ofgem have obtained a figure of an average 1 per cent reduction between June 2001 and June 2002.

7 Summary of host supplier's tariffs



Source: NAO analysis

- Their bills have however, fallen by around 8 per cent since 1998 when Ofgem and the Department took the decision to go ahead with NETA. Until March 2002 the prices that suppliers could charge was capped by Ofgem. Our report on the introduction of electricity competition found that nearly all the 7.8 per cent reduction in prices at that stage could be attributed to a reduction in price controls made in 2000, and that it was highly probable that they would have made these savings in the absence of retail competition. A substantial justification for Ofgem reducing the price caps was the expectation of continuing falls in the wholesale cost of electricity, so that these consumers obtained some benefit from the downward momentum in wholesale prices evident in 2000.
- While little of the fall in wholesale prices appears to have reached these consumers in the form of price cuts, the fall has offset the rises in other types of costs, so far as these are relevant to consumers who have not switched, and may therefore have enabled suppliers to absorb these cost increases without raising their prices. Furthermore, consumers who take advantage of dual fuel deals (that is covering both electricity and gas) offered by their incumbent supplier can reduce their overall energy bill significantly, and the fall in wholesale electricity prices may have enabled this saving.

⁶⁵ This is the October 2002 figure for England and Wales. The equivalent figure for Great Britain including Scotland is 36 per cent.

⁶⁶ These figures, and those in the rest of this part of the report, have been calculated in real terms, that is they are adjusted for inflation.

⁶⁷ Ofgem, Review of the first year of NETA, July 2002, paragraph 8.21.

- 3.9 Over the period from 1998 to 2002, therefore, consumers who have switched supplier have clearly gained from falling wholesale prices while the 62 per cent who are supplied by the former incumbent supplier have seen a more limited benefit. Much of the benefit appears to have predated NETA leading *energywatch* publicly to flag up the apparent disparity between the trend in wholesale and retail prices since April 2001. Since July 2002, *energywatch* has also been calling on Ofgem to investigate why suppliers' margins have increased.
- 3.10 Ofgem recognise that electricity suppliers' profit margins are currently higher than historic levels. Ofgem note, however, that suppliers may smooth the impact on end users of fluctuations in wholesale costs through accepting variations in their margins over time. Ofgem consider that the extent of linkage between gas and electricity markets is significant. Suppliers offer both fuels to their customers through dual fuel offers. Ofgem consider that the margin on both fuels may provide a mechanism for providing customers with price stability. They point to the fact that whilst margins are currently higher on electricity than historical levels, these stronger margins for electricity have helped suppliers to avoid passing on to customers the brunt of large increases in wholesale gas costs since 2000. For all these reasons, Ofgem takes the view that snap-shot analysis of suppliers' margins is not appropriate.⁶⁸
- 3.11 Ofgem believe that the market is continuing to mature, but in the meantime are continuing to monitor its development closely. In a competitive market, suppliers may target the savings they offer to attract customers away from their existing suppliers. This means that more consumers could secure lower electricity bills if they switched supplier. But there is a degree of customer inertia, with over 60 per cent of domestic electricity customers not switching away from their incumbent supplier. For this reason Ofgem recommend strongly that customers switch to gain the full benefits of competition. So long as the proportion of customers still with their incumbent supplier remains relatively high, the competitive pressures on suppliers to reduce the prices they pay may be limited. Ofgem consider that there is some evidence of competition at work in that incumbent suppliers who keep the prices for their incumbent customers at a significantly higher level than their competitors have steadily lost customers. Ofgem are, however, also directing a large part of their monitoring resources to examining the supply offerings of the former incumbents with a view to determining whether there are aspects of anti-competitive behaviour.

The problems experienced by producers of electricity

Over-optimistic investment decisions

- 3.12 In the late 1990s, a significant amount of investment in new generation took place and new entrants also bought existing plant. Analysts estimate that bank and bond investors invested up to £10 billion. As a result, in March 2001 the annual margin of supply over average peak demand was estimated to be over 25 per cent, implying a degree of over-capacity in the market. The Pool tended to be a benign environment for investors in generating plant. For example, prices included a "capacity payment", which generators received for declaring themselves available to NGC for generating electricity. And the detailed mechanics of the Pool ensured that all generators received the price obtained by the most expensive plant used by NGC.⁶⁹
- 3.13 Our Expert Panel advised us that NETA is now behaving like a normal market where supply comfortably exceeds demand: prices are being driven down. Investment decisions taken in the 1990s appear with hindsight to have been based on overly-optimistic assumptions about future prices. Where, as was often the case, the investments were funded through fixed interest securities, the plant may no longer earn sufficient revenue to cover interest payments.

Problems for some electricity companies

- 3.14 The available evidence shows that a range of participants are encountering financial difficulties consistent with the view that some business decisions made in the late 1990s turned out to be based on overly-optimistic assumptions. In particular:
- Several businesses have withdrawn plant from the market for commercial reasons pending higher prices. Such plant could potentially re-enter the market if prices rise. Ofgem reported in September 2002 that around 6-7 per cent of total capacity (4.5 gigawatts⁷⁰) of capacity had been mothballed.
 - In September 2002 British Energy, the nuclear generation company, approached the Government for an emergency loan to allow the company to keep trading while a financial restructuring took place. On 9th September, the Government made available a temporary loan of £410m, and, on 26th September, after a further request from the company, the Government extended the loan facility until 29th November and increased the available amount to £650m. In late November 2002, the

68 *Ofgem, Review of the first year of NETA, July 2002, paragraphs 3.19 to 3.24.*

69 *In practice, generators agreed bilateral contracts with a strike price based on but not identical to the Pool for much of their output.*

70 *A gigawatt is a unit of electric power equal to one billion watts, or one thousand megawatts, enough power to supply the needs of a medium sized city.*

Government announced the extension of the loan facilities until 9th March 2003, and said it was prepared to continue to fund British Energy's operations while the restructuring plan was agreed and implemented. On 7th March 2003, the Government announced all outstanding amounts under the facility had been repaid by British Energy, and the facility was being extended on a contingency basis and reduced to £200 million.

- Other participants in the industry have reported credit problems. For instance, TXU Europe warned that it was facing bankruptcy before selling its UK business to Powergen in October 2002. Linked to this, there have been concerns about the financial position of the US-owned AES Drax plant, the UK's largest coal-fired power station, with whom TXU had a long-term contractual relationship. Ofgem consider that the reported problems reflect not only the market conditions in England and Wales but also management decisions and the financial position of parent companies.

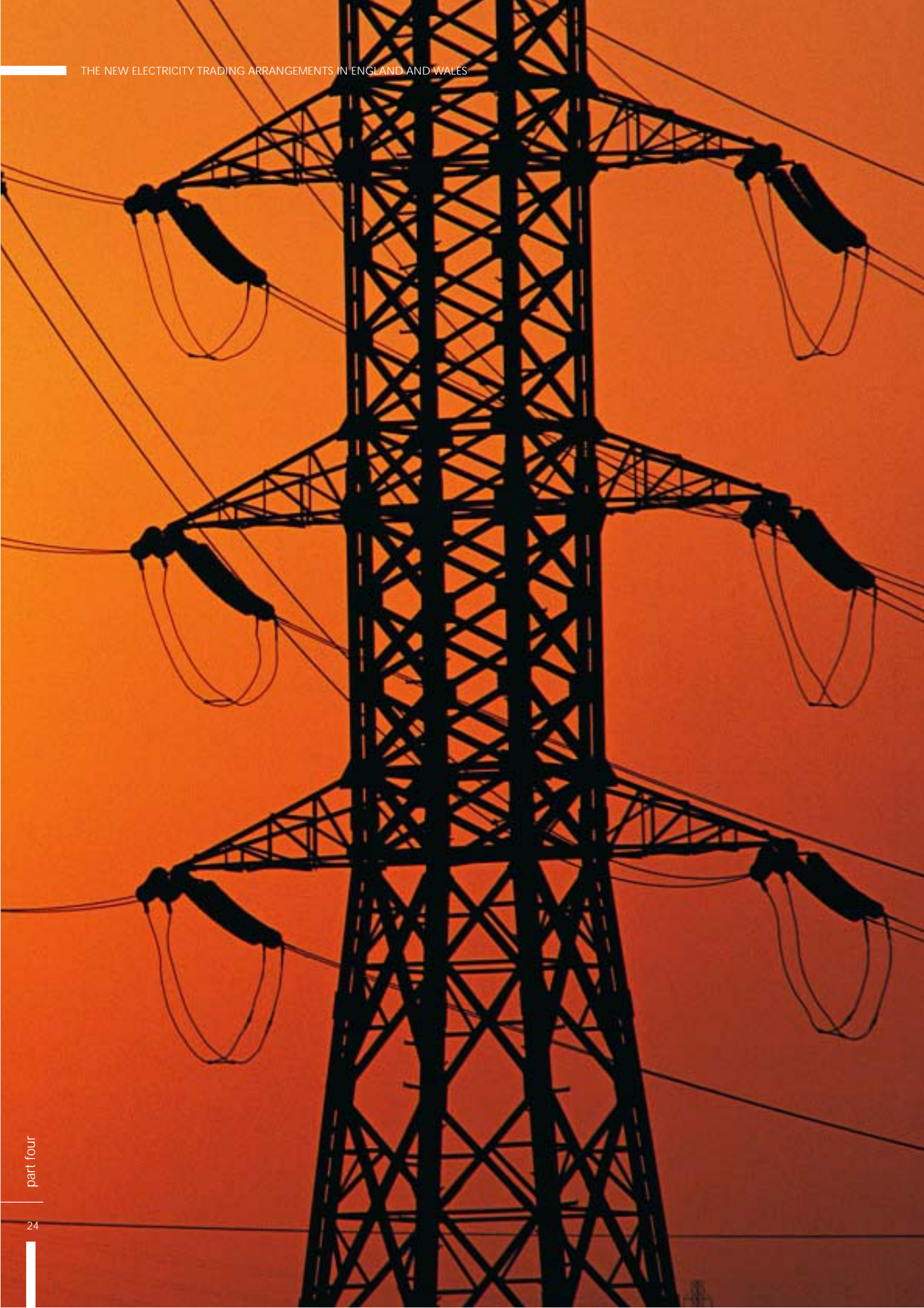
NETA's impact on different types of generating plant

- 3.15 One of NETA's intentions was to reward predictability and flexibility of generating plant because these qualities are associated with efficiency and security of supply. Ofgem and the Department considered that, under the Pool, the benefits to the system of flexible capacity and costs of unpredictability were not identified and allocated as they would be in a normal competitive market. Instead the costs that NGC incurred to keep the system in balance were spread across market participants equally.
- 3.16 They therefore sought through NETA to provide incentives that rewarded predictability and flexibility. NETA has delivered these incentives. A **predictable** generator can enter into contracts for all its expected output of electricity. It will therefore not be in imbalance, and hence will avoid exposure to potentially unfavourable imbalance prices. Similarly, a **flexible** generator, that can vary its output upwards (by increasing generation) or downwards (by reducing it) can submit bids and offers into the balancing mechanism and, when accepted by NGC, obtain more attractive prices.
- 3.17 The strong incentives for predictability should encourage generators to make their plant more reliable (see paragraph 2.18). Some types of generation are, however, inherently less predictable - such as wind generation⁷¹. Combined heat and power plants have an intrinsically predictable output. However these plants are often primarily used to power industrial processes, and electricity is supplied to the Grid or to a local supplier as, essentially, a by-product of an industrial process, and hence electricity output can be less predictable. Both these types of plant (wind, and combined heat and power) help contribute to the Government's environmental objectives. Owners of these types of plant have argued that the costs they incur through being unpredictable have been disproportionate. Their concerns arise from the way imbalance prices are calculated through the detailed workings of the balancing arrangements. At the outset of NETA, imbalance prices were high and volatile.
- 3.18 There has been a vigorous controversy within the electricity industry as to whether costs incurred by less predictable generators are disproportionate. Some owners of renewable plant and combined heat and power plant consider that the costs they incur for their inherent unpredictability, or in the case of combined heat and power plant, for operating in this fashion as a by-product of an industrial process, are excessive, and outweigh the true costs they impose on the system by being unpredictable. They therefore argue that imbalance prices are penal. In addition, smaller generators argue that they have no practical means to manage the imbalance risk to which they are exposed, and that they do not have proper access to wholesale markets⁷². Ofgem disagree. In their view the imbalance prices reflect the costs incurred by NGC in balancing the system. They also observe that the Government has provided subsidies to renewable generators and to combined heat and power plant. In this sense, Ofgem consider that NETA has been instrumental in removing the cross-subsidy that existed under the Pool for less predictable forms of generation, and in their place the Government has introduced explicit subsidies for the forms of generation it wishes to encourage to meet their environmental objectives.
- 3.19 In any event, over the first 18 months of operation the volatility of imbalance prices has reduced. The difference between the imbalance price for shortages and excesses of electricity has also reduced⁷³. This improvement reflects NGC's and other participants' increasing experience of operating under the balancing arrangements, and in addition, some modifications to pricing rules have significantly reduced volatility. Finally, the position of many "unpredictable" generators has improved now that the time for final notification has reduced from 3½ hours ahead of real time to only 1 hour ahead, because such generators are more able to predict their output within the shorter time frame.

71 Although Ofgem have pointed out that wind generation, at the current gate closure of one hour before real time, is relatively predictable.

72 For example, see *Slough Heat and Power, Response to the Government's Energy Review, September 2000*; and reports commissioned by *Slough Heat and Power into the impact of NETA on combined heat and power plants*.

73 The average difference between the System Buy Price (for shortages of electricity) and System Sell Price has reduced from £70 per MWh to £22 per MWh.



Part 4

Regulatory challenges arising from NETA

4.1 Ofgem and the Department are responsible for protecting the interests of consumers of electricity. NETA was intended to increase the effectiveness of the wholesale element of this market for this purpose. Any market needs to meet four criteria to operate effectively:

- clear signals to investors about the most appropriate time to enter and to exit the market. In the electricity market, with its requirements to ensure continued security of supply, this is especially important;
- transaction costs that are not excessive;
- no abuse of market power by any participant; and
- a clear framework for the implementation and evaluation of regulatory/government initiatives.

4.2 This part of the report examines how the market under NETA measures against these criteria, in order to identify key challenges facing Ofgem and the Department.

Continued security of supply

4.3 Because of electricity's importance to the economy, and the technical difficulties of storing electricity, Government and Ofgem attach great importance to ensuring a continued supply of electricity, generally described as "security of supply". The Pool arrangements sought to deliver long-term security of supply through a mechanism known as capacity payments. The essence of these arrangements was that generators were paid a centrally calculated price, calculated each day by reference to circumstances on that day, for making capacity available, and that these capacity payments were designed to provide some confidence to new entrants to the generation market that they would be able to recover their fixed costs. Capacity payments therefore represented an administered mechanism for encouraging continued security of supply. The payments were however vulnerable to market manipulation and,

perversely, could increase when available capacity was increasing, notably during the last year of the Pool. So although security of supply was maintained in both short and long term, there was no evidence that this was due to capacity payments.

4.4 There is no equivalent to Pool capacity payments in NETA. On a day-to-day basis, supply of and demand for electricity are balanced through the balancing arrangements. Over the longer term, the market relies on price signals to secure sufficient capacity, along with an obligation upon suppliers to ensure continuity of supply for their customers. Ofgem consider that companies making investment decisions on the basis of their own demand and supply forecasts and business opportunities together with forward price signals (which extend at least two years into the future) should ensure that investment occurs to meet demand. Similarly, as at present, when there is excess capacity, the resulting low prices should encourage generators to withdraw plant from the market. Companies that invested in new plant and purchased existing plant in the late 1990s on the basis of the prices then obtainable have suffered from the fall in wholesale prices, although some of this fall was widely predicted from 1998.

4.5 During the first 21 months of NETA, the consensus in the electricity industry has been that there is no imminent problem with security of supply. There has been sufficient generation capacity to meet all demands for electricity reflecting the comfortable margin of supply over demand and some potential for rapid demand side response to balance supply and demand also exists (paragraph 2.14). In recent years, including since NETA was introduced in March 2001, there has been an annual margin of generating capacity over expected demand of at least 20 per cent and as yet no risk to supply is in prospect.⁷⁴

⁷⁴ DTI Memorandum to the Trade and Industry Select Committee on Security of Supply, paragraph 2.8. The Committee's report *Security of Energy Supply* (Second Report, Session 2001-02) was published in January 2002.

4.6 NGC's licence requires it to assess probable electricity demand and known and potential generating capacity over a seven year period ("the Seven Year Statement"). The statement is necessarily provisional, in that it cannot take into account future commercial decisions to close or to invest in new generating plant, but provides a set of estimates, based on available information, of the possible future margin of supply over demand. The statement that NGC prepared in January 2003 calculated that the generating capacity margins over the period to 2008-09 could remain in excess of 18 per cent, taking into account the likely withdrawal and mothballing of older plant and assuming that all new plant with consents are constructed.⁷⁵

4.7 There are, however, some inevitable uncertainties around these assumptions:

- continued low prices coupled with the financial difficulties of some generating companies may result in more plant than expected being mothballed or closed.
- low prices may discourage operators from building new plant.

On the other hand:

- plant that is mothballed and hence excluded from the statement might be returned to service.
- a major expansion in the amount of energy generated from renewable sources, supported by a subsidy funded by consumers, has the potential to increase available capacity.

4.8 There are some indications from recent NGC estimates that the plant margin is starting to drop below the 20 per cent benchmark that the Department consider to be a healthy level. Ofgem however consider that this 20 per cent figure should not be regarded as firm, since it does not capture the possibility of increased demand-side response and because any capacity margin needs to respond to particular market circumstances. Nor is it clear how far the margin would have to fall before security is jeopardised. NETA has probably reduced the margin needed, which would itself be a major achievement. It provides new openings for customers to reduce demand if they are paid to do so, gives greater rewards to plant that is called in at short notice and has given incentives for making plant more reliable. In any case, NETA is intended to produce prices that rise when there is a shortage of plant to meet demand.

4.9 Professor Bunn, our expert advisor for this study, has observed that many capital intensive and commodity markets demonstrate a cyclicity of prices. Periods of high prices, which encourage new investment by existing and new participants, tend to be followed by periods of falling and lower prices, as competition increases. These lower prices in turn induce participants to exit the market, and hence raise prices again. Ofgem however point out that:

- price variations typically reflect temporary variations in underlying supply and demand, in which case they are no more than an indication that the market is working effectively, and
- longer term contract prices are much less variable, and such contracts provide a means of hedging price risk. Ofgem do not know of any evidence that commodity prices, including electricity, exhibit regular and substantial cyclical patterns. Nor is this to be expected, since the taking of profitable opportunities for trade can be expected heavily to damp any such patterns that might emerge.

4.10 NETA was designed on the basis that market signals can ensure security of supply. Investors may not be confident that higher prices will be sustained for long enough or that total revenues will be sufficient to provide a reasonable return, especially if they are afraid of government intervention. Such intervention could occur to help achieve the Government's wider objectives. For instance, the Government may be obliged to intervene to support some types of plant, such as nuclear, to meet safety and diversity of supply objectives, or might respond to high retail prices by imposing a cap on retail prices. As noted in paragraph 3.14, they recently provided a loan facility to British Energy. Alternatively they may prefer to maintain the current preference for market-based signals and only limited intervention. So long as there is a risk of government intervention and hence uncertainty, investors may be reluctant to invest. The Government clarified its future energy policy in the White Paper, which emphatically set out its determination not to intervene 'except in extreme circumstances, such as to avert, as a last resort, a potentially serious risk to safety'.⁷⁶

4.11 In any case, recent volatility in the industry may mean that in future investors will require higher returns - and hence higher prices - for the perceived risks of investing in this market. The incentives for investment in renewable plant are different. Here, the Renewables Obligation supplements the market price and this is designed to affect investors' willingness to invest⁷⁷. The support given by, and cost to consumers of, the Obligation is likely to rise to £780 million each year by 2010 to enable sufficient new plant to be constructed to meet the Government's environmental commitments.

⁷⁵ *The NGC Seven Year Statement Update of January 2003 assesses the projected plant margin taking account of changes in Generation Capacity for Large Power Stations and uses customer-based demand forecasts. It gives figures for plant margin of 20.7% in 2002/03, 19.4% in 2003/04, rising to 21.9% in 2005/06 but falling to 18.6% by 2008/09. NGC, 7 Year Statement, Document Library, National Grid, www.nationalgrid.com/uk.*

⁷⁶ *Energy White Paper, paragraph 6.7.*

⁷⁷ *Electricity produced by combined heat and power plants also has a supplement.*

4.12 The Government's Energy White Paper has recently considered the risks to security of supply. It pointed out that, although the plant margin has declined recently, this has been partly due to mothballing plant which could be returned to service quickly and more cheaply than new build if required. It also concluded that there was no case for the reintroduction of capacity payments, or similar mechanisms, in the UK. The Government undertook to continue to monitor security of supply through the DTI/Ofgem Joint Energy Security of Supply Working Group, and, in the White Paper, Ofgem agreed to report every six months on the performance of the electricity and gas industries in delivering energy security.

Transaction costs

4.13 Prior to the implementation of NETA, Ofgem estimated the total costs⁷⁸ of participating under NETA, both in terms of the set-up costs and operating costs. They estimated that these costs could amount to between £136 million and £146 million a year for the first five years, and £30 million a year thereafter. Ofgem considered that these estimates were likely to overstate the costs, because they did not take into account any costs that would be saved by switching from the Pool to NETA, nor any costs that would have been incurred regardless of the change in trading arrangements.

4.14 To identify in more detail the impact of NETA on transaction costs, we commissioned a study from ILEX. This work is based on an in-depth survey of a small number of representative market participants, moderated by the comments of a different group of participants. Based as it is on seven companies, it may not give the full picture. Nevertheless, the study provides indicators of the areas in which participants have incurred costs related to NETA. The ILEX study identified four main areas of categories of cost under NETA:

- one-off costs of transition from the Pool to NETA⁷⁹;
- initial costs faced by existing participants and by new entrants starting business under NETA, as compared to the costs of entering the market under the Pool;
- the annual additional cost of operating under NETA compared to the Pool; and
- other costs and savings arising from NETA.

4.15 Ofgem consider that the ILEX work is based on a very small sample of seven respondents, and as a consequence statistically valid conclusions cannot be drawn from it.

4.16 ILEX found that one of the main costs of transition to NETA for all types of respondent related to the costs associated with the re-negotiation of contracts. The pre-existing contracts were written around the structure of trading under the Pool and had to be revised significantly to reflect the changed trading environment. Respondents reported that the additional costs of re-negotiation ranged from £35,000 to £1,750,000⁸⁰. Although these costs are one-off costs in relation to NETA, ILEX considered that further changes to the trading and transmission arrangements could similarly affect existing contractual arrangements and could well cause costs to be incurred.

4.17 ILEX separately identified the additional costs faced by both existing and new entrants in setting up systems to operate in the NETA market. These costs, mainly associated with improving and replacing IT systems, are required to support the move to much closer to real-time trading, demand forecasting, notification and settlement processes. Market participants need to process a much greater volume of information, and communicate with central agents on a much more regular basis. In the case of one of the larger participants in the survey, they responded that their one-off costs in this area were up to £21 million.⁸¹ Ofgem consider that any move to more market-based systems would impose additional costs, and consider that it is misleading to imply that all of the £21 million was to do with NETA, as opposed to any other system replacing the Pool.

4.18 In addition, the ILEX survey found that the on-going costs of managing supply and settlement costs are higher under NETA. These were mainly attributable to the fact that NETA requires much more accurate demand-forecasting by suppliers resulting in significant investment in IT and additional staff⁸² and daily settlement reporting by individual participants that are a feature of operating under NETA. Our consultants concluded, however, that the on-going costs of monitoring regulatory change and responding to it had not increased significantly under NETA.

⁷⁸ Based on a survey of over 100 participants.

⁷⁹ These costs were only incurred by existing market participants, and not by new entrants since the start of NETA.

⁸⁰ The larger figure of £1,750,000 involves a participant which had spent a significant amount renegotiating a particularly complicated contract.

⁸¹ ILEX commented that since not all of the participants were successful in breaking down transition costs and entry set-up costs, it is likely that the figure of £21 million could largely be attributed to entry costs.

⁸² The additional costs reported by respondents in this area ranged from £50,000 to £370,000.

4.19 ILEX considered that the additional costs of doing business under NETA might not be material relative to the total cost of generation, trading and supply. There have, however, been increases in the costs of doing business in some areas by a range of market participants, notably one-off costs incurred during the transition and set-up phase for existing participants and new entrants. From ILEX's findings, it is not possible to state categorically the additional costs of operating under NETA, as it depends on the type of participant, their size, and a number of other factors, including the extent to which participants undertake risk management functions in-house or contract them out to specialist providers of risk management services. All of the industry participants we interviewed in the course of this study confirmed to us that costs of operating under NETA were higher than under the Pool.

4.20 Ofgem consider that any move to more market-based systems would have imposed additional costs and therefore that a proportion of the risk management costs that participants incurred was not directly a consequence of NETA but rather a consequence of the introduction of competition in supply and increased competition in generation.

The risk of abuse of market power

4.21 "Market abuse" refers to the ability to abuse substantial market power to bring about, independently of any changes in market demand or cost conditions, a substantial change in prices or to otherwise distort competition. Europe Economics, who advised us on the risks of market abuse, concluded that NETA had reduced the risks of market abuse that arose under the Pool. This was because the previous Pool price was easier for individual participants to manipulate than the range of prices that have emerged under NETA. Ofgem consider that this risk did in fact materialise under the Pool and that on a number of occasions market manipulation took place⁸³.

4.22 While Ofgem and Europe Economics consider that the risk of market manipulation is lower than under the Pool, they both consider that the risk has not disappeared completely. Ofgem have continued to monitor market behaviour under NETA. In 2000, they sought to introduce a Market Abuse condition into the licences of certain generating companies. The introduction of this licence condition was in addition to Ofgem's concurrent powers under the Competition Act 1998. The Market Abuse licence condition was accepted by most generating companies, but it was withdrawn by Ofgem after two companies appealed to the Competition Commission and the Commission ruled in favour of those companies. The Financial Services Authority (FSA) also has a market

abuse regime which extends to the trading of electricity contracts on power exchanges. Ofgem and the FSA have a concordat in place, and are able to exchange information during any market abuse investigation.

4.23 There have been concerns raised within the industry about the increasing vertical integration of the electricity market between generation and supply. Ofgem's view is that vertical integration between generation and supply does not inherently raise any difficulties. However, it could become a potential problem if there is market power in one or both of the activities which could lead to a situation of a company using its market power in one activity to reduce competition in another, to the potential detriment of consumers. Europe Economics, in advising us on these risks, put forward one scenario of the consequences of market power in short term electricity generation. They considered the exercise of market power by vertically integrated operators might act against the interests of independent operators. In their scenario, independent generators or suppliers may need to enter into short term contracts to cover unexpected changes in supply or demand. But, as a consequence of market power in short term generation, they might not in all circumstances be able to obtain such contracts at a fair price. By contrast, a vertically integrated company may be able to cover its risks fairly quickly and cheaply.

4.24 Ofgem will keep this issue under review as part of their monitoring of behaviour in the wholesale electricity market, using the concurrent powers conferred on them by the Competition Act.

The transparency of Ofgem's regulatory decisions

The relationship between Ofgem and the Department

4.25 Ofgem are an independent regulator, with objectives enshrined in statute and operating at arms length from Government. In the words of Ofgem's Chief Executive, this means that they can "establish a longer-term framework different from that dictated by shorter term political priorities" and that, if the system of independent regulation is working, "it is inevitable in all but the most fortunate of coincidences that there will be friction" between Ofgem and the Government.⁸⁴ In particular, even though under the Utilities Act, Ofgem and the Secretary of State for Trade and Industry share the same objectives, there is potential for tension between Ofgem's statutory objectives and targets and the current objectives of the Department of Trade and Industry (Figure 8).

⁸³ Ofgem conducted a number of investigations of alleged abuse throughout the period of the Pool's operation.

⁸⁴ For an illuminating discussion of this tension, see the speech given by Ofgem's Chief Executive to the Regulatory Policy Institute, "Why do differences arise and how should they be resolved" on 6 November 2002.

8 Departmental and Ofgem objectives

The Department's Public Services Agreement targets	Ofgem's statutory objectives	Ofgem's Corporate Themes
<ul style="list-style-type: none"> ■ Ensure competitive gas and electricity prices in the lower half of the EU/G7 basket, while achieving security of supply and social and environmental objectives ■ Improve the environment and the sustainable use of natural resources, including by reducing greenhouse gas emissions by 12.5 per cent from 1990 levels and moving towards a 20 per cent reduction in CO² emissions by 2010. (Joint target with DEFRA). 	<p>Ofgem's principal objective is protecting consumers by promoting effective competition where appropriate.</p> <p>In meeting this principal objective Ofgem must have regard to:</p> <ul style="list-style-type: none"> ■ Ensuring all reasonable demands for electricity are met ■ Securing that licence holders are able to finance their obligations ■ The interests of special customers including the sick and disabled, the elderly, those on low income and those in rural areas ■ Ofgem may have regard to the interests of other utility consumers <p>Subject to the principal objective Ofgem is required to:</p> <ul style="list-style-type: none"> ■ Promote efficiency and economy ■ Protect the public from dangers ■ Secure long term energy supply ■ And have regard to the effect on the environment of: generation, transmission and distribution. <p>Ofgem is also required to have regard to the social and environmental guidance issued by the Secretary of State.</p>	<ul style="list-style-type: none"> ■ Making competitive markets work effectively; ■ Regulating monopoly businesses intelligently; ■ Securing Britain's gas and electricity supplies; ■ Meeting Ofgem's social and environmental responsibilities; ■ Developing Ofgem's effectiveness and efficiency.

4.26 Ofgem's independent role means that it is important that they set out clearly how they have made their decisions and their impact. NETA has also been subject to extensive criticism. The remainder of this report highlights three areas in which Ofgem have sought to be transparent and rigorous in the way they decide on regulatory initiatives.

Ofgem's use of cost-benefit analysis

4.27 At the time of the decision to proceed with NETA, there was no formal requirement on regulators to undertake Regulatory Impact Assessments (RIAs). Such assessments have been necessary since 1997 for new legislation with an impact on business, but can be prepared when non-legislative action is contemplated that may affect business. In summer 2001, the Better Regulation Task Force prepared a report on Economic Regulators⁸⁵, including Ofgem, which recommended that such regulators should produce assessments of costs and benefits for proposals with a significant impact on business activity. The Government agreed with this recommendation in February 2002. And in the recent

White Paper on Energy Policy, Ofgem agreed to undertake regulatory impact assessments for all significant new policies in future.

4.28 The purpose of a RIA is to explain the objectives of the proposal, the risks to be addressed, and the options for delivering the objectives. It should make transparent the expected costs and benefits of the options for different bodies involved⁸⁶. The main elements of an RIA are set out in **Figure 9 overleaf**.

4.29 Although not at that time required to prepare a regulatory impact assessment, Ofgem undertook extensive analysis of the potential impact of NETA. During 1998, they considered alternative options for achieving their objectives in detail, drawing on overseas experience. These options were drawn together in a consultation document issued in July 1999 and a further document drawing in the results of consultation in October 1999⁸⁷. They assessed the likely costs that participants would incur under NETA (see paragraph 4.13 above) but were unable to determine what proportion of these costs would have been incurred even if NETA had not been introduced.

85 The Better Regulation Task Force: "Economic Regulators", July 2001.
 86 National Audit Office, Better Regulation - Making Good Use of Regulatory Impact Assessments (HC329, 2001-02), Glossary.
 87 In their Regulatory Impact Assessment on the Gas and Electricity Bill (later the Utilities Act 2000), the Department provided a one paragraph summary of the material on costs and benefits set out in Ofgem's July 1999 document.

9 What a regulatory impact assessment is expected to cover

Purpose and intended effect	Identifies the objectives of the regulatory proposal
Risks	Assesses the risks that the proposed regulations are addressing
Benefits	Identifies the benefits of each option including the "do nothing " option
Costs	Looks at all costs including indirect costs
Securing compliance	Identifies options for action
Impact on small business	Using advice from the Small Business Service
Public consultation	Takes the views of those affected, and is clear about assumptions and options for discussion
Monitoring and evaluation	Establishes criteria for monitoring and evaluation
Recommendation	Summarises and makes recommendations to Ministers, having regard to the views expressed in public consultation

Source: National Audit Office, *Better Regulation: Making Good Use of Regulatory Impact Assessments*, HC329, Session 2001-02, Figure 2

4.30 Ofgem's documents set out clearly the expected benefits in terms of clearer incentives and more effective markets. Their published analysis noted that, if wholesale prices were reduced to the costs for new entrants to the generation market, the benefits could be of the order of £1.5 billion per annum. Ofgem did not, however, make an assessment of what could happen to prices in the absence of NETA (or if other options were adopted). Ofgem consider that any such forecast would have been fraught with difficulty, particularly since they considered that the Pool was prone to manipulation. The absence of this baseline has contributed to the subsequent debate about the impact that NETA has had on prices.

4.31 Ofgem's approach to the likely outcomes of NETA involved monitoring forward prices and other market information. They considered that this provided the most reliable information on outcomes and that any sensitivity testing would have been spurious. In our view, sensitivity testing which set out a base case for future electricity prices, along with upside and downside scenarios, would improve the quality of impact assessments for major proposals such as NETA.

4.32 Ofgem sought to set out clearly and succinctly the expected impact of their proposals. They undertook most of the elements of a regulatory impact assessment. But they did not bring this work together in a single document, and they could have undertaken more sensitivity testing.

Ofgem's use of consultation

4.33 A key part of regulatory accountability is obtaining the views of those affected by regulatory proposals in advance through consultation. Ofgem consult extensively, and, through their role in governance, they have accepted the industry consensus on key issues, for example by accepting a modification proposal to shorten the period to gate closure⁸⁸ and changes to the pricing of contractual imbalances. Ofgem adopted this consultative approach during the development and introduction of NETA. This involved large and well attended seminars and workshops, publications of key consultation documents and of work done to date, as well as widespread use of the Internet.

⁸⁸ So that instead of requiring the provision of final contractual and physical information to ELEXON and NGC respectively 3½ hours ahead of real time, this information can be provided only an hour ahead of real time.

10 Ofgem reviews

Review	Date of final report
NETA - A review of the first three months	August 2001
Review of the impact of NETA on smaller generators	August 2001
Response to the Performance and Innovation Unit Energy Policy Review	October 2001
Report to the DTI of the Consolidation Working Group	February 2002
The review of the first year of NETA	July 2002
Response to the Government's Consultation on Energy Policy	August 2002
Demand Side Working Group	Ongoing

4.34 Ofgem play a key role in the governance of the balancing arrangements (paragraph 2.16). Some industry participants reported to us their perception that, in considering whether to approve amendments to the balancing arrangements, Ofgem have drawn 'lines in the sand' on certain issues. This perception highlights an important regulatory issue. Ofgem have a role to ensure that changes to the balancing arrangements are consistent with their statutory objectives. This role is important to ensure that modifications made to the arrangements are appropriate. Ofgem also wish to allow industry participants as much freedom to develop the wider trading arrangements as possible, so as to avoid unnecessary regulatory intervention. In particular, they wish to keep the central balancing arrangements to a minimum. The balance between these two factors - ensuring that balancing arrangements do not change inappropriately and minimising the role of the regulator - may shift over time. However, given the monopoly characteristics of the market for electricity balancing, Ofgem cannot perceive a situation in which they would be able to withdraw entirely from their role in approving amendments to the balancing arrangements.

Ofgem's use of evaluations and reviews

4.35 Ofgem have carried out a number of reviews of NETA, and have contributed to wider debates on energy policy, including the report by the Performance and Innovation Unit, and the Government's own Energy review. **Figure 10** sets out the main reviews.

4.36 Regulatory impact assessment, if used well, obliges regulators to think carefully about what they are trying to achieve and the best way of doing so. But, like any forecasting exercise, it cannot predict the outcome with complete certainty. To look at outcomes some form of ex-post review is needed and the evaluation of major projects after implementation is an important part of regulatory accountability. But in such reviews there is always a tension between thorough and detailed analysis on one hand and on the other the need to summarise conclusions and present them succinctly in the public domain. The one year review was therefore a key commitment for Ofgem. Ofgem published the one year review in July 2002.

Appendix 1

Methodology of the National Audit Office's examination

Scope

- 1 In the course of our examination of NETA, we sought to research three issues:
 - How did Ofgem anticipate that the design and implementation of NETA would deliver the Government's main objectives for the new trading arrangements?
 - To what extent have these objectives been delivered?
 - What are the risks to these objectives, and where appropriate how are Ofgem addressing them?

Collection of information

- 2 We reviewed Ofgem documents setting out the design and objectives for NETA and the reviews and analysis Ofgem have produced following the implementation of NETA. We also held extensive discussions with Ofgem staff.

Analysis of prices

- 3 We reviewed published evidence, including academic articles and Ofgem's reviews, on the movements in wholesale prices before and after the implementation of NETA. We also obtained and analysed information on the movement of retail prices, both for industrial and commercial consumers and for retail consumers.

Specialist advice

- 4 We commissioned two pieces of specialist advice. From Europe Economics, we commissioned a paper on the risks arising from the shift from a centralised to a decentralised model of market operation under NETA. From ILEX, we commissioned a piece of work on the probable costs of participating in the wholesale market under NETA compared to the Pool.

Consulting stakeholders

- 5 We held preliminary discussions with Ofgem and with companies in the electricity industry to identify the issues that our study should address. In the course of the study we held discussions with a wide range of market participants, including large and small generation companies, supply companies, vertically integrated companies, and representatives of market intermediaries such as a consolidator, a broker and a power exchange. Finally, we held a stakeholder group to assist us and ILEX reach conclusions about the costs of participating in the wholesale market.

Expert Panel

- 6 We invited experts in the electricity industry and regulation to sit on an expert panel to provide advice and guidance on our emerging findings. The following were members of the Panel:

Malcolm Taylor - Association of Electricity Producers

Dorcas Batstone - ELEXON Ltd.

Mike Calviou - NGC

Ian Fletcher - The Cabinet Office, formerly of the Department of Trade and Industry

Ted Morris - The Financial Services Authority

Peter Atherton - Schroder Saloman Smith Barney

Peter Culham - The Office of Telecommunications

We were also assisted throughout by advice from Professor Derek Bunn of the London Business School, an expert in the economics of the electricity industry.

Appendix 2

Ofgem's statutory objectives and the objectives for NETA

Ofgem's statutory objectives

Ofgem's principal objective is protecting consumers by promoting effective competition where appropriate.

In meeting this principal objective Ofgem must have regard to:

- ensuring all reasonable demands for electricity are met;
- securing that licence holders are able to finance their obligations;
- the interests of special customers including the sick and disabled, the elderly, those on low income and those in rural areas; and
- Ofgem may have regard to the interests of other utility consumers.

Subject to the principal objective Ofgem is required to:

- promote efficiency and economy;
- protect the public from dangers;
- secure long term energy supply; and
- have regard to the effect on the environment of: generation, transmission and distribution.

Ofgem is also required to have regard to the social and environmental guidance issued by the Secretary of State.

The objectives for the New Electricity Trading Arrangements

The main objectives of NETA were to consider whether, and if so what, changes in the electricity trading arrangements would best:

- meet the needs of customers with respect to price, choice, quality and security of supply;
- enable demand to be met efficiently and economically;
- enable costs and risks to be reduced and shared efficiently;
- provide for transparency in the operation of the pricing mechanism and the market generally;
- to respond flexibly to changing circumstances in future;
- promote competition in electricity markets, including by facilitating ease of entry and exit from such markets;
- avoid discrimination against particular energy sources; and
- be compatible with Government policies to achieve diverse, sustainable supplies of energy at competitive prices and with wider Government policy, including on environmental and social issues.

Glossary

Balancing Mechanism	Electricity cannot be stored and has to be kept in balance on a second by second basis by the National Grid Company (NGC). NGC operates a balancing mechanism to ensure system security. The Balancing Mechanism provides a basis whereby NGC, as system operator, can accept offers of electricity and bids for electricity at very short notice.
Balancing services	To assist it in balancing the system, NGC makes use of a range of balancing services including: <ul style="list-style-type: none"> (a) contracted balancing services such as frequency response, reserve, reactive power and black start. These are typically in option contract format; (b) forward energy contracts; and (c) offers and bids in the Balancing Mechanism.
Baseload	The minimum load experienced by an electric utility system over a given period of time.
Better Regulation Task Force	The Better Regulation Task Force was established in September 1997 to advise the Government on action which improves the effectiveness and credibility of government regulation by ensuring that it is necessary, fair and affordable, and simple to understand and administer, taking particular account of the needs of small businesses and ordinary people. In July 2001, the Better Regulation Task Force issued a report on Economic Regulators. The Government's response was published in February 2002.
Bids and offers	In the Balancing Mechanism the system operator accepts bids and offers to balance the system. 'Bids' for electricity represent generation reductions and demand increases; whilst 'offers' of electricity represent generation increases and demand reductions. The system operator may also need to accept bids and offers to maintain the quality of supply and at different locations to overcome transmission constraints.
BSC (Balancing and Settlement Code) Panel	The BSC Panel in conjunction with ELEXON (see below) manages the rules and governance of the Balancing Mechanism and Settlement process as contained within the Balancing and Settlement Code which includes the implementation of the Modification Procedures.
Capacity payments	Under the Pool, a payment received by generators that were available to generate electricity. It was calculated on the basis of the relationship of declared generating capacity to demand. When capacity was significantly higher than demand, the capacity payment would tend to be low; and when demand was close to available capacity it would tend to be higher.
Climate Change Levy	The Climate Change Levy was introduced from 1 April 2001, and has been payable on the use of energy by all non-domestic customers throughout the UK. Renewable generation is exempt from the Levy, and it was announced in the 2002 Budget Statement that 'good quality' Combined Heat and Power plant would also be exempt.

Combined heat and power (CHP)	A Combined Heat and Power plant generates usable heat (often in the form of steam) and power (usually electricity) in a single process. CHP plant are often associated with large industrial process which require both heat and power, such as a paper mill. Because both heat and power are produced from the same fuel, CHP can be more fuel efficient than many other forms of generation.
Competition Commission	The Competition Commission is an independent public body established by the Competition Act 1998. The Commission has two distinct functions. The Commission's Appeal Tribunals hear appeals against decisions of the Director General of Fair Trading and the economic regulators of utilities. The Commission's reporting side conducts inquiries into merger, monopoly and regulatory references. Where references are made by regulators, they may concern, for example, the desirability of including price controls in licences.
Connection and Use of System Code	This is a code, with which licence holders must comply, which sets down the terms and conditions in relation to connection and use of the transmission system. It also covers mandatory balancing services.
Consolidation	Consolidation is a process that reduces exposure to NETA's dual imbalance cash-out prices. A consolidator is a BSC Party who will act on behalf of a licence-exempt generator. The benefit of consolidation arises because individual market participants may have fully or partially off-setting imbalances, such that if their imbalance positions are combined the net exposure to imbalance prices is reduced.
Demand-side	The demand-side represents the users of electricity, that is the suppliers, and ultimately the customers (domestic and non-domestic).
Dispatch	This refers to the decision as to when a generating unit is set to operate and send its power down the wires to the system.
Distribution	The system of wires and switches and transformers that serve neighbourhoods and businesses. A distribution system reduces or downgrades voltage from high voltage transmission lines to a level that can be used in homes or businesses.
Diversity	Having primary or secondary energy provided by a range of fuels or sources of fuel.
ELEXON	ELEXON is a non-profit making organisation responsible for managing the provision of the necessary central systems and services to effect the rules for balancing and settlement contained in the Balancing and Settlement Code, and for managing the governance provisions within that Code.
<i>energywatch</i>	<i>energywatch</i> is the independent watchdog that represents the interests of all gas and electricity consumers. They receive a grant from the Department which is derived from the licence fee that energy companies have to pay to the government.
Flexibility	Flexibility refers to a participant being able to make more power available to the system (by increasing generation/reducing demand) or make less power available to the system (by reducing generation or increasing demand) at short notice.
Gate closure	Gate Closure is the final point at which BSC participants can notify either contract positions to ELEXON or physical notifications to the system operator. After Gate Closure, NGC use the Balancing Mechanism to enable them to keep the system in balance in real time by adjusting levels of generation and demand using Bids and Offers submitted.
Generators	The term generator is used to refer to either a machine for generating electricity or a company that generates electricity. Usually the meaning is clear from the context.

Governance	The framework of rules, codes and statements that govern the way the wholesale market and its key institutions operate, including the calculation and settlement of imbalance through the Balancing and Settlement Code Panel, and the Connection and Use of System Code Panel.
Herfindahl-Hirschman Index	An index which calculates the extent to which an industry is dominated by a small number of large companies. The index is calculated by the sum of the squares of the market shares of each firm in the industry. An industry with one, monopolistic, company would have an index value of 10,000 (100% x 100%). An industry which has a very large number of firms, each of which has a 1 per cent market share, would have a value of 100.
Imbalance	The difference between the stated contractual position of a participant in the market, in terms of electricity volumes sold or purchased, and actual output or demand, as measured by metered volumes.
Incumbent supplier	The incumbent supplier to a domestic or small industrial consumer is the company which held, at privatisation, a regional monopoly over supply as a Regional Electricity Company.
Liquidity	Liquidity relates to how quickly parties can complete transactions at a reasonable price and is a desirable feature of any market.
NGC (the National Grid Company)	NGC owns, maintains and operates the high-voltage electricity transmission system in England and Wales, balancing supply with demand 24 hours a day.
Peak demand (also known as Spot Peak Demand)	The volume of electricity used at the point with the highest demand in any given day. Electricity usage at this time can be up to 54 Gigawatts.
Performance and Innovation Unit (PIU)	The Performance and Innovation Unit (PIU), which was created by the Prime Minister on 28 July 1998, aimed to improve the capacity of government to address strategic, cross-cutting issues and promote innovation in the development of policy and in the delivery of the Government's objectives. It sought to address issues that cross public sector institutional boundaries on a project basis. On 22 July 2002 it was merged with the Prime Minister's Forward Strategy Unit, and part of the Policy Studies Directorate of the Centre for Management and Policy Studies to form the Strategy Unit.
Plant Margin	<p>Plant margin is calculated through the formula: $\frac{\text{Installed Capacity} - \text{Peak Demand}}{\text{Peak Demand}}$, expressed as a percentage.</p> <p>It shows the margin of available generating plant over expected peak electricity demand.</p>
Power exchanges	Power exchanges bring together buyers and sellers of electricity, allowing them to trade anonymously and on the basis of transparent information. They operate in an analogous way to automated share and option dealing exchanges.
Predictability	In the context of NETA, predictability refers to the extent to which a generator of electricity can forecast, ahead of time, the likely output from its generating plant, and a supplier can forecast the likely demand for electricity from its customers.
Price reporters	Companies who report the price of electricity trades publicly, based on their confidential discussions with traders of electricity.
Renewable energy	Energy that is generated from sources that do not deplete over time. Examples include hydroelectric and wind power.

Renewables Obligation	The obligation placed on licensed electricity suppliers to deliver a specified fraction of their electricity from renewable sources or pay a penalty to Ofgem.
Scheduling	Under the Pool, the activity undertaken by NGC (see above) to choose which plant should operate at any given time.
Security of supply	Ensuring that the overall balance of supply of and demand for electricity, both now and into the future, can be maintained without involuntary demand reductions. (This definition excludes local problems caused by Transmission or Distribution failures).
Settlement	The payment of outstanding amounts under contractual agreements. In the context of NETA, it refers to the payment by participants of any residual imbalances between their notified output/demand and actual output/demand.
Supply	The selling of electricity to customers. The process includes wholesale purchasing, marketing, reading meters, billing, processing payments and dealing with enquiries from customers.
System buy price/system sell price	The prices at which contractual imbalances (see <i>imbalance</i> on previous page) are settled (see <i>settlement</i> above). Where a participant generates more electricity than it has contracted for, the imbalance is settled at the system sell price. Where a participant generates less electricity than contracted, the imbalance is settled at the system buy price. Conversely, where a supplier takes less electricity than contracted for, the imbalance is settled at system sell price, and where it takes more, the imbalance is settled at the system buy price.
The Grid	The national high voltage transmission network. It is owned and operated by NGC.
The Pool	The Electricity Pool of England and Wales was the wholesale market mechanism in operation between 1990 and 2001. In most respects it was a more centralised way of operating the market than that brought in through NETA.
Transmission	The transfer of electricity at high voltages from the point of generation to the companies responsible for distribution to end users. High voltages are used to increase capacity and minimise losses.
Vertically-integrated business	A business which owns both <i>generation</i> and <i>supply</i> operations and whose generation and supply activities are of broadly comparable size.