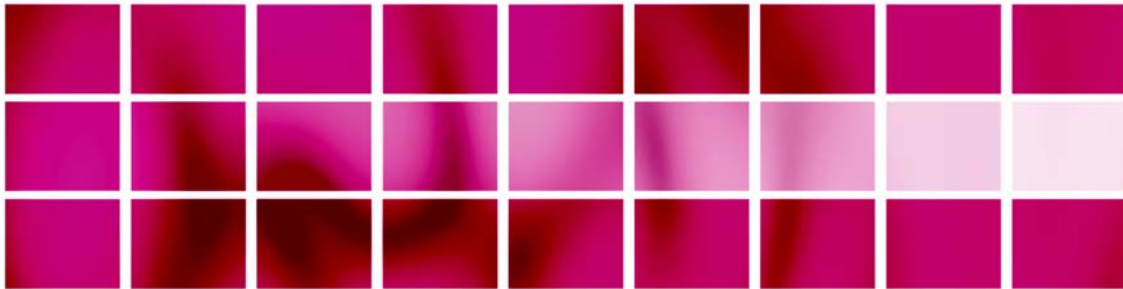


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**PRIVATISATION OF PUBLIC SERVICES AND THE IMPACT ON
QUALITY, EMPLOYMENT AND PRODUCTIVITY (PIQUE)**

***Liberalisation, privatisation and regulation
in the UK electricity sector***

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Country report on liberalisation and privatisation processes and forms of
regulation

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1. *MARKET STRUCTURE BEFORE PRIVATISATION AND LIBERALISATION*

1.1. *Market structure before privatisation and liberalisation*

The electricity sector in the UK consists of four elements – generation, transmission, distribution and supply. It also had three distinct geographical areas – England and Wales, Scotland and Northern Ireland. Before privatisation and liberalisation the nationalised Central Electricity Generating Board, including the National Grid, were responsible for generation and transmission in England and Wales. There were 12 regional bodies – the Area Boards – that dealt with distribution and supply. In contrast there was full vertical integration in Scotland and Northern Ireland through the nationalised North of Scotland Hydro-Electric Board, South of Scotland Electricity Board and Northern Ireland Electricity Board. In England and Wales the Electricity Council, established in 1957, played an important co-ordinating role in the industry, bringing together directors from the Central Electricity Generating Board and the regional boards and was the industry forum for discussing policy issues and was the main way that the industry provided input to the Department of Energy.

There were, and still are, connectors between Scotland and England and Northern Ireland and Scotland but essentially the three electricity transmission systems operated completely separately. It is only in recent years that the connector to Scotland has been upgraded in order to create a single transmission network across Britain with a single electricity pool operational from April 2005.

These nationalised institutions dominated the industry across the UK both to major industry users as well as domestic customers. The only exceptions were the small number of private concerns, usually very large energy users, such as the Alcan aluminium company who had invested in their own power plants to provide power directly to their manufacturing facilities. This structure was established in 1948 when the industry was nationalised. Before the Second World War electricity was generated and supplied by a mixture of private and municipal power companies with over 300 companies involved in electricity supply and most of the generating plant with low capacity – on average 30MW compared to the 1,000-2,000MW power stations of today.

Table 1: Market structure

	Before the process of privatisation and liberalisation	Immediately after privatisation	Latest situation following further liberalisation/ restructuring
Generation	Central Electricity Generating Board (CEGB) South of Scotland Electricity Board (SSEB) North of Scotland Hydro-Electric Board (NSHEB) Northern Ireland Electricity Board	National Power PowerGen Nuclear Electric (publicly owned until 1996 when privatised as British Energy) Scottish Hydro-Electric Scottish Power Northern Ireland Electricity (privatised in 1992)	10 companies have 80% of generating capacity with rest share among 40 other companies British Energy (partly privatised in 1996), Powergen, ScottishPower, EDF Energy, Scottish & Southern, British Nuclear Fuels (publicly owned), Centrica, Drax, International Power, Npower
Transmission	CEGB SSEB NSHEB NIEB	National Grid Company Scottish Hydro-Electric Scottish Power Northern Ireland Electricity	National Grid Transco ScottishPower Scottish & Southern Northern Ireland Electricity (Viridian)
Distribution	12 Area Boards in England and Wales SSEB NSHEB NIEB	12 Regional Electricity Companies in England and Wales ¹ Scottish Hydro-Electric Scottish Power Northern Ireland Electricity	Seven companies now run the 14 distribution networks in England, Scotland and Wales EDF Energy, ScottishPower, Scottish & Southern, Central Networks, Western Power Distribution, CE Electric, United Utilities
Supply	12 Area Boards in England and Wales SSEB NSHEB NIEB	12 Regional Electricity Companies in England and Wales Scottish Hydro-Electric Scottish Power Northern Ireland Electricity	Over 70 licensed suppliers but market dominated by six companies EDF Energy, Npower, ScottishPower Scottish & Southern Powergen, Centrica

¹ The 12 companies were: London Electricity, Eastern Electricity, Seeboard, SWEB, SWALEC, Manweb, Southern Electric, Norweb, Yorkshire Electricity, Northern Electricity, East Midlands Electricity and Midlands Electricity.

1.2. Steps and processes of privatisation and liberalisation

Changes to the UK electricity sector have come in several stages as the Conservative governments of the 1980s and 1990s first introduced some liberalisation into the industry then restructured and privatised it. There then followed further stages of reorganisation and liberalisation both under the Conservative governments up to 1997 and then the Labour governments that have been in power since 1997. Along the way governments have had to make a series of decisions about how the structure of the industry affected the level of competition and the speed at which supply to consumers, large and small, would be open to full competition.

1.2.1. Privatisation and ownership

The preparations for privatisation were begun in the late 1980s with the generating companies and regional electricity companies in England and Wales and vertically integrated companies in Scotland were sold off between 1990 and 1992. Privatisation of the Northern Ireland supply industry followed in 1993 (the four power stations there had already been sold off) and eventually the nuclear part of the industry was floated on the stock market in 1996 as British Energy. The National Grid company was jointly owned by the regional electricity companies until 1995 when it was floated on the Stock Exchange. This means that almost the entire electricity industry is in private hands. The only exceptions are local authority shareholdings in a small number of combined heat and power plants.

The government retained golden shares in the privatised companies. This meant that investors could acquire significant shareholdings in electricity companies but would not be able to gain a controlling interest. These golden shares were withdrawn in 1995 leading to a swathe of takeovers across the sector. US-owned companies dominated the first wave of takeover activity buying up several regional electricity companies (see Appendix 1) while also acquiring generating capacity. However, most of these companies had badly misjudged prospects in the UK electricity market and either sold up or wrote off their investments. For companies like Enron and TXU, UK investments left them financially overstretched and contributed to the collapse of the US parent company.

1.2.2. Liberalisation and market structure

Liberalisation of the industry actually began before privatisation and a number of initiatives were taken after privatisation to continue and deepen the process. The first initiative on liberalisation came in the 1983 Energy Act that removed the requirement that only Area Boards could supply electricity. The Act imposed on the Area Boards the duty to buy electricity on “fair terms” from a private generator or supplier and allow it to use the transmission and distribution system. The 1983 Act had a very limited impact with only a small number of private companies entering the market.

In the lead up to privatisation the main challenge for the Conservative government was to reorganise the industry in a way that would create real competition. There were limits to this as the transmission and distribution elements of supplying electricity are natural monopolies and cannot be effectively subject to market forces by establishing competing networks. So it has only been in generation and supply that it has really been possible to attempt to create real markets and competition, although price regulation was used until the markets were deemed to be fully competitive. Price regulation was ended in the retail supply market in 2002. The pricing structures in transmission and distribution continue to be subject to price controls by the industry regulator, Ofgem (see page 14).

The Conservative government had privatised British Gas, the nationalised gas supply company in 1986 but there had been widespread criticism of leaving it with a monopoly position within the sector. The government, therefore, planned to restructure the electricity industry to try to create conditions to make it easier for new entrants to be able to compete with the privatised generators. This resulted in the former CEGB's power stations being divided up between Nuclear Electric, Powergen and National Power. Nuclear Electric remained publicly owned and took over the nuclear power stations that accounted for about 14% of generating capacity. The remaining capacity in England and Wales was shared between National Power (52%) and Powergen (34%).

In fact, the government had intended to sell off the nuclear power stations. It planned to create a large company that would be able to cover the significant investment risks in the nuclear industry and so settled on a duopoly as a way of ensuring there was at least one major company capable of competing with the main electricity company. However, before privatisation, but too late to make major changes to the companies' structures, the government decided to hold the nuclear power stations back from privatisation completely.

With the regional boards the decision was to create companies based on the same structure and privatise them in that form as regional electricity supply companies with competition initially through "yardstick" competition. This meant that sales, profits, investment and pricing could be compared across the companies without their being initially any actual direct competition. The approach in Scotland was different and the vertically integrated duopolies were sold off without any changes to their structure.

To begin with National Power and Powergen were allowed to supply electricity directly to larger consumers while the regional electricity companies were allowed to invest in generating capacity. This seemed a compromise solution to begin creating competition in the industry as there was little likelihood that a new generating company would be able to enter the market and challenge the position of the two generators who commanded such a large market share.

By 1996 National Power and Powergen were required to sell off some of their generating capacity that was in fact purchased by the largest regional electricity company, Eastern Electric. This was permitted even though it meant Eastern exceeded the previous limit of only obtaining 15% of its power from its own generating capacity.

This breach of the retail/generating limit was then followed by Scottish Power when it acquired the regional electricity company based Manchester and the North West of England, Manweb.

A later attempt by the two generators to buy retail companies was rejected by the Conservative government of the day, backed by the industry regulator. However, in 1998 the Labour government that had been elected the previous year decided to allow the generators to buy retail providers as long as they sold off more of their generating capacity. This decision allowed a much greater degree of integration across the whole industry. This combined with considerable takeover activity by US and then European-owned power companies means that none of the companies operating in 2006 have the same operating structure as those immediately following privatisation in 1989 and the early 1990s.

The 12 regional electricity companies in England and Wales had gone through a major process of takeover and merger in the mid-1990s following the government's decision to withdraw its "golden shares" in the companies. Within two years all but one company had been takeover with US companies initially in the forefront.

The regional electricity companies ran regional distribution networks as well as supplying electricity directly to consumers. The industry regulator was concerned that companies were using their effective regional monopolies on distribution to subsidise their retail activities. In 1997 the companies were required to effect a complete separation their distribution and retail businesses although they could still continue to own both operations. This produced another burst of buying and selling in the industry. Seven companies now control the 14 distribution networks of England, Wales and Scotland.

1.2.3. Setting and controlling electricity prices

There are four elements to the price of electricity charged to the final consumer. There are the wholesale prices charged by the generators, the prices charged by the National Grid company for use of the national transmission network, the prices charged by the owners of the regional distribution networks and finally the prices charged by the supply companies to final consumers.

From the outset it was acknowledged that the transmission and distribution networks were natural monopolies and so these prices would have to be controlled through regulation. In contrast, competition was intended to be the main mechanism for setting wholesale and retail prices. In practice, it proved very difficult to establish a fully functioning wholesale market in electricity. In the retail market customers benefited for several years from falling prices and since 1999 millions of domestic customers have taken the opportunity to switch companies. However, the most recent trend has seen a sharp increase in prices and evidence of the operation of the domestic market raises serious questions about the extent to which consumers are guided by price. The wholesale and retail markets are examined in more detail in the next two sections.

1.2.4. *The wholesale market for electricity*

It was the Conservative government's intention to create a real wholesale market for electricity with the generating companies selling their output at changing prices in response to the demands of the regional electricity companies and any new entrants on the supply side. The challenge was to do something that had not been attempted anywhere else in the world and the initial structure – the Electricity Pool of England and Wales – proved not to be a long-term solution. The Pool only operated in England and Wales because the connector to Scotland didn't have enough capacity to allow there to be an efficient flow of electricity between the countries for the Pool to work effectively. This would only change in 2005 (see below).

The Pool worked on the basis of bids from the generating companies setting the price at which they would sell electricity in 48 half-hourly blocks over a 24-hour period. These bids were set 24 hours in advance. The system was run by the National Grid company which entered the bids into a specially designed programme ("Goal") which also forecast levels of demand for the following 24 hours. The bids were then ranked by price and the last unit required to meet demand set the clearing price for the system.

Two main problems emerged in the way the Pool operated in practice. The first was the scope for the generating companies to restrict supply and therefore push up the price of wholesale electricity. This was certainly a main worry in the opening years when National Power and Powergen were by far the dominant players in the market. By 1994 growing concerns about price manipulation led the regulator to require the two companies to sell some of the generating capacity to reduce their market share. They were also obliged to keep the average Pool price at or below a certain level for the following two years. The second problem with the Pool was the extensive use of what were called contract for differences, which effectively meant that the generators and regional electricity supply companies, could sidestep the Pool. These contracts were long-term, bilateral agreements between a generator and electricity supply company which were a way of hedging against the fluctuating pool price. One estimate (Thomas, 2005) suggests that less than 5% of electricity sales took place at Pool or Pool-related terms.

In 1997 the government decided that a major reform of the market was needed, however, development and practical implementation of the New Electricity Trading Arrangements (NETA) proved difficult and the system didn't become operational until 2001. In the meantime Offer continued to try to prevent the large generating companies from abusing their market position. By 2000 there were eight leading generating companies and Offer introduced an amendment to their licences, a Market Abuse Limitation Clause, which required them to commit themselves not to indulge in "abuse of substantial market power in the setting of wholesale electricity prices." In the same year the regulator used the clause to oblige the US-owned Edison Mission to bring back 500MW of generating capacity into service that it had mothballed earlier in 2000. Offer claimed that the withdrawal of the plant had led to a 10% increase in the Pool price. In the end Offer was prevented from maintaining the Market Abuse Limitation Clause

following a legal challenge by two electricity companies and a ruling from the Competition Commission (Bower 2003).

The government did not expect more than around 10% of electricity trades to go through NETA and confidential, bilateral contracts continue between generators and suppliers continue to be the dominant market mechanism. In fact, some estimates (Thomas, 2005) put the percentage of power actually traded through NETA much lower – even as low as 1%. However, following the introduction of NETA wholesale prices did fall by around 40% posing a real challenge to the generating companies. Restructuring of the industry followed with further integration of generating and supply. The next key development was the expansion of NETA into the British Electricity Transmission and Trading Arrangements (BETTA) in 2005, bringing Scotland into the market for the first time.

1.2.5. The retail market for electricity

The retail market for electricity was opened up in three stages with only major users, around 5,000 mainly industrial operations consuming more than 1MW a year, allowed to choose their supplier initially on privatisation of the industry in 1990. In 1994 the open market was extended to some 50,000 users with a 100kW annual demand and finally opened up to all 26 million domestic consumers in 1999. Until 2005 when electricity producers were hit by the soaring cost of gas, electricity prices had fallen significantly since privatisation. And despite the recent increases prices are still lower in real terms than before 1990, although commercial users have benefited from sharper falls than domestic customers. For example, from the full opening of the market in 1998 to 2005 domestic consumers saw prices fall by between 8% and 17%. During the same period industrial and commercial users benefited from a 30% fall in prices.

Since 1998 large numbers of domestic customers have taken the opportunity to switch suppliers to get a cheaper deal on their electricity, often combining this with gas supply as well. However, companies have been hit with substantial fines for mis-selling. This was a particular problem in the first few years after the market opening but even as late as 2004 companies like Powergen (£700,000), Scottish Power (£200,000) and Npower (£200,000) have been hit with fines for unfair practices.

The European Commission argues that a switching rate of 15%-20% is needed to indicate a market that is working and delivering some benefit to consumers. The UK market has certainly seen this level of switching in some of the years since 1998. Figures from Ofgem indicate that at least 48% of domestic consumers have switched supplier at least once and monthly average switching over the last two years has topped 300,000 a month with a surge above 500,000 in the early months of 2006 as consumers began to respond to the increase in prices by some companies. However, studies of price developments and consumer behaviour reveal that switching does not necessarily produce the savings that might be expected. The large number of different tariffs and constantly changing prices mean that consumers have to keep an almost constant watch to get the best deals. This is certainly possible through a number of commercial price

comparison websites as well as the service run by the official consumer watchdog, Energywatch. One indication that the market is not working quite as expected is the success of Centrica, the former British Gas company, in being the only new supplier to win a significant share of the electricity retail market. Centrica has clearly benefited from its reputation linked to British Gas as the company's electricity prices are among the highest in the consumer market. Furthermore, a study of 400 consumers (Waddams-Price, 2004 quoted in Thomas 2005) found that after switching suppliers 42% ended up paying more, 14% were paying the same and only 44% actually made savings.

1.3. Current market structure

1.3.1. Generation

Fifty-two companies now own power stations across the UK although many of these are small with relatively low capacity. The 10 biggest generating companies own about 80% of the total UK capacity of 77,500MW. The two main generating companies in England and Wales that were privatised in 1990 are no longer independent companies. Powergen is owned by the E.ON group while National Power was split in two and its assets divided up between Npower (now owned by RWE) and International Power. The two Scottish integrated companies remain independent but have acquired regional electricity companies operating in England and Wales.

Table 2: Main electricity generating companies

Company	Capacity (MW)	Percentage of total UK capacity
British Energy	11,551	15
Npower (RWE, Germany)	9,886	13
Powergen (E.ON, Germany)	9,154	12
Scottish & Southern	7,852	10
ScottishPower	6,137	8
EDF Energy (EdF, France)	4,820	6
Drax	3,945	5
Centrica	3,139	4
International Power	2,756	4
BNFL*	2,312	3

* The nationalised BNFL runs four nuclear power stations which are all due for decommissioning over the next four years.

1.3.2. Transmission

This is now operated in England and Wales by National Grid, the company that resulted from the merger of the National Grid Co. responsible for the electricity network and Transco, formerly part of British Gas, which is responsible for the gas pipeline distribution network. National Grid is quoted on the UK stock exchange and has expanded into other areas, notably gas and electricity distribution in the North East of the United States. In Scotland subsidiaries of ScottishPower (SP Transmission) and Scottish and Southern (Scottish Hydro-Electric Transmission) are responsible for transmission.

1.3.3. Distribution

The 12 distribution networks in England and Wales are now run by seven companies as summarised in the tables below. The regional networks in Scotland continue to be run by the two vertically integrated Scottish firms, Scottish Power and Scottish and Southern. Four of these companies, Scottish and Southern, Scottish Power, EDF Energy and E.ON also own generating and retail operations.

Table 3: Ownership of the regional distribution network

Regional distribution network	Now owned by
Eastern	EDF Energy (EDF, France)
East Midlands	Central Networks (E.ON, Germany)
London	EDF Energy (EDF, France)
MANWEB (Manchester and North Wales)	Scottish Power
Midlands	Central Networks (E.ON, Germany)
Northern	CE Electric (MidAmerican, US)
NORWEB (North West)	United Utilities
SEEBOARD (South East)	EDF Energy (EDF, France)
Southern	Scottish & Southern
SWALEC (South Wales)	Western Power Distribution (PPL, US)
SWEB (South West)	Western Power Distribution (PPL, US)
Yorkshire	CE Electric (MidAmerican, US)

1.3.4. Supply

The number of electricity supply companies has increased significantly with new companies entering the market and a series of takeovers and mergers affecting the original regional electricity companies that were sold off in 1991. There are now over 70 companies with licences to supply electricity to domestic and/or non-domestic consumers in contrast to the 12 regional electricity companies and two Scottish

companies that were privatised in 1990-1991. However, the market is completely dominated by six companies with many of the licensed operators acting simply as agents for the main companies. The table below shows the recent development in the market share of companies in the domestic market.

Table 4: Domestic Retail Electricity Percentage Market Shares December 2002-March 2006

Group	12/02	6/03	12/03	6/04	12/04	6/05	3/06
BGT (Centrica)	22	23	24	24	23	22	22
Powergen (E.ON)	22	22	21	21	21	21	20
SSE (Scottish & Southern)	13	14	14	15	15	16	16
npower (RWE)	16	16	15	15	15	15	15
EDF Energy (EDF)	15	15	14	14	13	13	13
Scottish Power	10	10	11	12	13	13	13
Others	0	1	1	0	0	1	0

Source: Electricity distribution companies, as reported in Domestic Retail Market Report, Office of Gas and Electricity Markets, March 2006

2. REGULATION

2.1. Before privatisation and liberalisation

The main mechanism of control of the nationalised industry between 1948 and 1990 was through government and parliament. Government would establish the general operating rules and requirements of the industry that would be laid down in legislation and parliament would have a role in monitoring the industry and how the extent to which it was complying with those rules and meeting those requirements. From 1957 the Electricity Council was the body that oversaw the whole electricity supply industry in England and Wales taking more of an active co-ordinating role than its predecessor the British Electricity Authority. Its main duty was as a co-ordinating body and link to government to maintain “an efficient co-ordinated and economical system of supply.” It had to prepare an annual report and accounts for the whole industry to be submitted to parliament.

Although operating under the Electricity Council the Area Boards had their own statutory duties to:

- promote the use of all economical methods of generating, transmitting and distributing electricity;

- secure, so far as practicable, the development, extension to rural areas and cheapening of supplies of electricity;
- avoid undue preference in the provision of such supplies;
- promote the standardisation of systems of supply and types of electrical fittings and
- promote the health, safety and welfare of their employees.

Consumer interests were represented by 12 area consultative councils whose chair was ex-officio on Area Board. Council members represented local authorities and other interest groups – industry, agriculture, and consumers in general. There was also a national Electricity Consumers Council with representation on the Electricity Council.

The approach to control and regulation is considered in the section on the role of government but in general terms the post-war priorities were set as needing to expand capacity to meet increasing demand and extend electricity networks to reach all communities. With those overriding aims and the emphasis on welfare efficiency the industry was characterised by central investment planning and price setting based on a “cost-plus” formula. Regulation of the industry in the form of Treasury monitoring and assessment of major investment projects followed in the 1960s as governments became more concerned about controlling public spending (see page 16).

The government-appointed Monopolies and Mergers Commission (now the Competition Commission) also had powers to report on the activities of the nationalised industries and to assess whether they were operating efficiently and effectively.

Table 5: Instruments of Regulation

	Before privatisation /liberalisation	During liberalisation	After privatisation /liberalisation
Generation	Price and investment regulation (DTI) and monitoring by Parliamentary Select Committee Competition regulation by the Office of Fair Trading (OFT) and Monopolies and Mergers Commission (now Competition Commission (CC))	Generation Licences Competition (OFT and CC) Marketing opening Legal unbundling	Generation Licences Competition (OFT and CC)
Transmission		Transmission Licence Price control Competition (OFT and CC) Legal unbundling	Transmission Licence Price control Competition (OFT and CC)
Distribution		Distribution Licences* Price control Competition (OFT and CC) Legal unbundling	Distribution Licences* Price control Competition (OFT and CC)
Supply		Supply Licences Competition (OFT and CC) Market opening	Supply Licences Competition (OFT and CC)

* The Utilities Act 2000, implemented in 2001 required the separation of distribution and supply operations and so introduced separate distribution and supply licences.

Both before and after liberalisation and privatisation the electricity industry has been specifically regulated by government departments (Department of Trade and Industry and Department of Environment, Food and Rural Affairs) and/or government agencies (Environment Agency, Scottish Environmental Protection Agency, Health and Safety Commission/Executive) in terms of its environmental impact, health and safety and nuclear safety.

2.2. *Following privatisation*

In the lead up to privatisation the Conservative government acknowledged that key parts of the industry – the national transmission and regional distribution networks – were natural monopolies and that there was no point in trying to create competing networks. It was also not possible to open up the retail end of the industry immediately to full competition as the technical and administrative processes could not be put in place in time. Therefore, in line with the regulatory bodies established to control prices set by the privatised telecom and gas utilities (British Telecom in 1984 and British Gas in 1986), a new regulator was established by the Electricity Act of 1989 – the Director General of Electricity Supplies (DGES) who had the support of the Office of Electricity Regulation (Offer).

The main responsibility of the DGES, who was appointed for a five-year term by the government, was to promote competition within the industry. Offer took on around 220 staff around half of whom worked on consumer representation. Again in line with practice in the telecom and gas industries, Offer adopted an “RPI-X” formula to control transmission and distribution prices. This meant that the National Grid company and the regional electricity companies could only increase their prices in line with inflation (RPI – the retail price index) less an amount, X, set by the regulator. For example, the X factor for transmission prices was initially set at 0% for 1991 and 1992 and then increased to 3% for the period 1993 to 1996. This meant that for each year during that four-year period transmission prices could rise no more than 3% below the rate of inflation. In fact, inflation was below 3% for three of those four years and so transmission prices had to be cut.

The idea of this formula was to encourage companies to improve efficiency and cut costs and it was initially felt that this form of price regulation would be enough to produce the right balance of productivity gains from a combination of restructuring and reorganisation and new investment. However, the regulators in both the gas and electricity industries came to the conclusion that price regulation was inadequate for the highly capital-intensive energy sector and that the formula had to be revised to take account of the level of investments being made by the companies. From 1995 the X factor in the electricity industry was set on the basis of the rate of return on investments and this had a significant and immediate impact on prices.

Takeovers and mergers in the energy sector meant that by the end of the 1990s many companies were supplying both gas and electricity to consumers. This was one reason

for the provision in the Utilities Act of 2000 to merge the gas and electricity regulators to form Ofgem – the Office of Gas and Electricity Markets along with its governing body, the Gas and Electricity Markets Authority (GEMA). GEMA members are appointed by the government and they determine strategy, take all major decisions and set policy priorities.

Ofgem's main priority is to protect consumers by promoting competition and regulating the monopoly companies – the national transmission and regional distribution grids. It is funded by the energy companies who are licensed to run the gas and electricity infrastructure. In regulating the two sectors, Ofgem has to take account of the need to ensure adequate investment in the networks. It is also required to help gas and electricity markets and industry achieve environmental improvements as efficiently as possible and take account of the needs of vulnerable customers, particularly older people, those with disabilities and on low incomes.

The licenses issued by Ofgem for the different levels of electricity company set out a range of requirements for each company to meet with a common element being a duty to supply the regulator with the information necessary for it to carry out its responsibilities. For the generating companies, for example, this includes a duty to provide information so that Ofgem is in a position to decide whether or not the company has attempted to distort market prices by withdrawing generating plant from operation. Other elements common to some of the licences are requirements not to discriminate among customers. So generators must not discriminate among the customers they supply to and National Grid/Transco must not discriminate in giving companies access to the national grid.

Ofgem conducts investigations of companies that it believes may be breaking the terms of their licence conditions, acting anti-competitively or breaching consumer protection law (Competition Act 1998 and Enterprise Act 2002). Ofgem can also investigate and apply sanctions where a company is found to be in breach of other requirements and standards of performance as laid down by the Electricity Act 1989 and Utilities Act 2000. Should the Authority find that a licence breach or Competition Act infringement has occurred, it has the power to impose large financial penalties, of up to 10% per cent of turnover. In the case of licence breach the 10% applies to the turnover of the company holding the licence whereas with an infringement of the Competition Act the UK group turnover is taken into account. Ofgem has undertaken a number of official investigations of companies over the last four years most of which end with the companies making an undertaking to review and change the practices in question. For example, in 2005 SP Manweb (part of Scottish Power) a distribution network operator was found to be discriminating in the provision of connection services against companies that weren't part of the Scottish Power group. Ofgem accepted a commitment from the company to end this practice. The most recent financial penalty was £700,000 imposed on Powergen in August 2004 for the way it had objected to its customers switching to another supplier. Earlier that year Npower and Scottish Power had both been fined £200,000 each for the same behaviour.

However, if consumers or industry groups believe that electricity companies are acting in an anti-competitive way then they can go to the Office of Fair Trading (OFT) rather than Ofgem. One reason for doing this is that the OFT has far greater powers than Ofgem. If OFT is satisfied that a company is harming consumer interests it can take immediate action to order the company to change its behaviour and can instigate a criminal investigation with the ultimate sanction of prison sentences for individuals held responsible for a company's actions (Bowyer 2003).

Electricity distribution companies have a number of performance standards to meet in relation to maintaining supplies, repairing faults and responding to customer complaints. These standards are laid down in parliamentary regulations (latest revisions in 2005) and monitored by Ofgem which can also propose amendments to the regulations. The standards set specific times by which companies must deal with or respond to customer enquiries, complaints or problems of supply and consumers receive compensation if targets are missed. For example, if a company fails to restore supplies after a fault within 18 hours then a domestic customer is entitled to £50 in compensation while a non-domestic consumer is entitled to £100. Companies are also assessed against performance targets, such as their ability to maintain uninterrupted supplies. Ofgem reports on company performance in an annual quality of service report.

Another major change implemented by the Utilities Act 2000 was the setting up of a separate watchdog Energywatch, to represent consumers independently of Ofgem and to make representations to Ofgem on the behalf of consumers. The body is government funded and the chair reports to the Department of Trade and Industry.

Energywatch provides a price comparison service so that consumers can try to work out if they are getting the cheapest electricity and/or gas. It also deals with a range of specific consumer issues such as incorrect bills and other complaints about quality of service. It seeks to do this primarily by taking up issues with the companies themselves. . If it has evidence that there are more fundamental problems for consumers that might be related to the structure of the electricity market then it can take these up with the regulator, Ofgem or with the Office of Fair Trading. Energywatch's most recent major case which Ofgem investigated was a general claim, although based on detailed and specific evidence, that domestic customers were being provided with an inadequate billing service by retail electricity companies, with large numbers of customers reporting incorrect bills and problems in resolving disputes with their electricity company. Although Ofgem did not find that this was a fundamental issue relating to market structure or organisation it did make a number of recommendations about how companies should deal with the issue including the writing off of bills that are more than a year old, the setting up of an ombudsman to deal with billing complaints and a call for companies to review their contracts to make sure they are fair. Ofgem said these recommendations would be imposed on companies if they did not voluntarily reform their billing practices (Energywatch 2005-2006)

3. *ACTORS AND OWNERSHIP*

The table below sets out the change in ownership following privatisation and liberalisation with no company left untouched by takeovers and mergers. Even National Grid which continues to run the electricity transmission system has diversified into gas distribution, acquired gas and electricity distribution operations in the USA and has interests in other areas such as telecommunications and gas importation.

The two generating companies that were privatised in 1991 have diversified into the retail supply sector and have had to sell off some of the generating capacity to help boost competition within the generating market. Powergen is now owned by E.ON the energy company headquartered in Germany and quoted on the German stock exchange. National Power was broken up and its successor companies are now effectively Npower, owned by the German utility RWE (quoted on the German stock exchange) and International Power which is quoted on the UK stock exchange but which now has more of its business overseas than in the UK. The other main generating company which was privatised in 1996 is British Energy, leaving just a small number of older nuclear power stations in public ownership and run by the BNFL nationalised industry which is now mainly a nuclear decommissioning company and which will close down its remaining nuclear plants over the next four years. British Energy is quoted on the UK stock exchange but there are several financial institutions with significant shareholdings, with three Amvescap, Deutsche Bank and Barclays owning over 30% of the shares between them. The company underwent a major financial restructuring in 2005. There have been a significant number of new entrants into the generating market but most of those which have stayed the course are the electricity supply companies that have diversified and themselves been taken over. The US firms which acquired existing plant or invested in new plant have now mostly sold up and the only significant company to establish itself in the generating sector is Centrica, the former British Gas.

The distribution and supply companies have seen considerable takeover and merger activity with a first wave of takeovers coming from US companies in the mid-1990s. However, most of these found themselves unprepared for the competitive environment in the UK and ended up selling up their retail interests. The only significant US interests in UK electricity now are the two companies, PPL and MidAmerican, which own and run two regional distribution networks each through their UK subsidiaries Western Power Distribution and CE Electric.

None of the 12 regional electricity companies in England and Wales have remained as independent companies. They are now either owned by the French and German companies, EDF, RWE and E.ON or by either of the two integrated Scottish companies, Scottish Power and Scottish and Southern. Again it is Centrica operating under the name British Gas Trading which has been the only new company to establish a significant presence in the retail market without having taken over an existing electricity company.

The scale of restructuring and reorganisation, including diversification into gas supply and distribution and other new areas of business, and the extent of takeover and merger activity means that tracking levels of UK employment in specific companies over the long term is a considerable challenge. At a sectoral level, figures from the official National Statistics agency show a fall in total employment from 144,000 in 1990 to 69,000 in 2005. The main six companies today in terms of UK employment are E.ON UK (Powergen and Central Networks with 13,000 employees), Scottish and Southern (11,700 with 6,300 in power systems, generation and supply), EDF Energy (11,000), Scottish Power (8,900), Npower (8,500).

Table 6: Actors

	Before privatisation	Now
Generation	Nationalised monopoly: CEGB (England & Wales) SSEB (Scotland) NSHEB (Scotland) NIEB (N.Ireland)	10 generating companies have 80% of generating capacity: BNFL (nationalised industry), British Energy (65% shares still held by UK government), Centrica, Drax Power, EDF Energy (EDF, France), International Power, Npower (RWE, Germany), PowerGen (E.ON, Germany), Scottish & Southern, Scottish Power Apart from these companies and their various subsidiaries there are 48 others with licences to generate electricity but which account for a very small share of the UK market.
Transmission	Nationalised monopoly: CEGB (England & Wales) SSEB (Scotland) NSHEB (Scotland) NIEB (N.Ireland)	National Grid Transco, Scottish & Southern, Scottish Power, Northern Ireland Electricity (Viridian Group)
Distribution	Nationalised monopoly: 12 Area Boards in England and Wales SSEB (Scotland) NSHEB (Scotland) NIEB (N.Ireland)	The 14 distribution networks in England, Wales and Scotland are now run by seven companies: CE Electric (MidAmerican, US), EDF Energy (EDF, France), Central Networks (E.ON, Germany), Scottish & Southern, Scottish Power, United Utilities, Western Power Distribution (PPL, US) Distribution in Northern Ireland is run by Northern Ireland Electricity (Viridian Group)
Supply	Nationalised monopoly: 12 Area Boards in England and Wales SSEB (Scotland) NSHEB (Scotland) NIEB (N.Ireland)	There are 77 companies with a licence to supply domestic and non-domestic (or non-domestic only) electricity users and at least 25 of these are subsidiaries of the big seven companies: British Energy, Centrica, EDF Energy (EDF, France), Npower (RWE, Germany), Powergen (E.ON, Germany), ScottishPower, Scottish & Southern

Notes: CEGB: Central Electricity Generating Board; SSEB South of Scotland Electricity Board; NSHEB North of Scotland Hydro-Electric Board; NIEB Northern Ireland Electricity Board.
The companies listed in the right hand column are all UK stock exchange listed companies unless ultimately owned by the UK government or by an overseas company and these details are given in brackets.

4. *ROLE OF GOVERNMENT AND OTHER STAKEHOLDERS*

4.1. *Role of government*

4.1.1. *Before liberalisation and privatisation*

Evidently the role of the UK government was central in first carrying out the post-war nationalisation of the industry (Labour 1945-51) and then setting the framework of the for how the industry would operate under public ownership (Conservative and Labour governments up to 1990). The Labour government of the immediate post-war period (1945-51) carried a number of major nationalisations as well as setting up the National Health Service. The overarching aims of the government combined a desire to improve efficiency and living standards across the country with a clear focus on establishing a welfare state that would ensure delivery of essential services to all citizens. This was also the rationale for electricity nationalisation. Electricity had come to be seen as an essential service and nationalisation was a way of rationalising the sector and taking measures to ensure security of supply and provision of electricity even to the remoter rural communities.

The role that the subsequent Conservative and Labour governments played was then central to how the industry performed as they set the main parameters within which the industry had to operate. Initially the guidance to the industry was to invest in new plant and meet demand while overall breaking even. With investment available at advantageous rates to nationalised industries this helped ensure a rapid expansion of generating capacity through the 1950s and early 1960s. However, by the beginning of the 1960s the financial impact of the nationalised industries were coming under closer scrutiny from the Treasury as governments, both Conservative and Labour, became more conscious of the need to control public sector spending and in particular the public sector borrowing requirement which was affected by the level of borrowing of the nationalised industries.

In the early 1960s the government put forward the notion of a required rate of return to be achieved by nationalised industries on their investment projects and this was further developed in 1967 with a requirement to evaluate investment projects before they were undertaken by applying a test discount rate. The electricity industry then, in line with other nationalised industries, thus became subject to government control based more on concerns about public finance and macroeconomic policy than questions of welfare efficiency.

Apart from the specific questions of how nationalised industries in general and the electricity industry in particular should operate, broader government energy policy and political issues also had major influences on the electricity industry. In terms of energy policy the government's commitment to the coal mining industry, another of the major post-war nationalisations, and its decision to develop a nuclear power industry in the

mid-1950s had direct effects on the costs and scale of electricity generation. UK produced coal was the main source of fuel for the electricity right up until privatisation in 1990. Coal still accounted for 70% of electricity generation in 1990 but fell to only 33% over the following decade.

4.1.2. *During and after privatisation and liberalisation*

It was the Conservative government elected in 1987 (Margaret Thatcher's third and final period as prime minister since her election victory of 1979) that was directly responsible for the privatisation of the industry. Subsequent Conservative governments under John Major (1990-1992, 1992-1997) and then Labour administrations under Tony Blair (1997-2001, 2001-2004 and 2004 to date) all made decisions which affected how the industry operated and was regulated.

The Thatcher government in power in the lead up to privatisation made the key decisions about the structure of the industry, the form and main content of the regulatory environment and how and when the retail market would be open to competition. As with previous privatisations the primary impetus for the Conservative government was a perceived need to reduce state involvement in industry, to cut back public spending and to enable the extension of the market and profit-making in general. For the Conservatives there was also the assumption that while some regulation would be necessary in terms of controlling the monopolies in national transmission and regional distribution, competition in the industry would operate effectively and allow companies to make long-term investment decisions that would ensure security of supply.

There were no practical examples anywhere else in the world of electricity privatisation or the establishing of open markets in the sector for the Conservatives to follow. The 1988 white paper, *Privatising Electricity*, on privatisation of the industry in England and Wales did not actually provide much detail on the proposed structure of the industry after privatisation. Furthermore, as already noted, the Conservatives had to make a substantial last minute revision to their plans when they decided that the risks associated with nuclear generating plant might put investors off and so privatisation of that part of the industry was postponed.

The role of government changed following privatisation with the setting up of the industry regulator – initially Offer and then Ofgem. The government sets the overall aims and responsibilities of the regulator and so clearly has a major role in determining how the industry operates even if it is down to Ofgem to interpret and implement those aims and responsibilities. However, the experimental nature of the newly privatised industry also meant that significant government intervention was needed in order to address perceived failings in the wholesale and retail markets or to develop or revise key areas of policy such as removing restrictions on takeovers and mergers and preventing but then allowing companies to become integrated generators and retailers.

The new Labour government in 1997 decided to take a more interventionist role in the sector and with two key decisions rejected advice from Offer. The first was in deciding to go ahead with the new electricity pool arrangement (NETA). Offer's view was that the time and resources required to develop a new system were not warranted because of what it predicted would be a very limited impact on competition. The second decision came in 1998 when the government imposed a moratorium on building new gas-fired plant which Offer saw as interfering in companies' investment decision making and undermining companies' ability to compete.

The most recent policy-related development which is likely to have a significant impact on the electricity industry is the government's energy review which has particularly focused on environmental issues and which says: "... we are proposing to look at how we can radically transform the role of energy supply companies so that they have strong incentives to work with their customers to get more out of the energy we use in our homes, rather than simply selling more energy." The review also considers long-term investment requirements and clearly suggests both that the government will play an important role in the debate over how best to meet future energy needs and that the industry itself cannot be left to make those key investment decisions on its own: "Power station investments are long term and we need to have in place the right framework to incentivise those investment decisions to be made at the right time and to limit carbon emissions, helping us lock in substantial carbon savings for years to come."

Two other crucial areas of the energy review which have a direct impact on the electricity are government plans for supporting renewable energy options and the future for nuclear energy production. The Utilities Act 2000 introduced the Renewables Obligation which requires all licensed electricity suppliers to buy a certain percentage of their electricity from renewable sources such as wind and wave power. This percentage is set to reach 15% by 2015-2016 but the government is now considering increasing this to up to 20%.

On nuclear power the government's energy review reports says that: "It will be for the private sector to initiate, fund, construct and operate new nuclear plants and to cover the full cost of decommissioning and their full share of long-term waste management costs. But in view of the potential benefits for our public policy goals, the government proposes to address potential barriers to new nuclear build." The government has got the Health and Safety Executive working on safety guidance on new build nuclear plants while it appointed a Committee on Radioactive Waste Management whose recommendations will inform the government's decision on how to deal with long-term radioactive waste management.

4.1.3. Devolution

With devolved governments in Scotland and Wales there is now a more decentralised debate over energy matters, particularly those linked to energy saving initiatives and climate change. For example, at the beginning of 2006 the Scottish Executive published a detailed report on energy use in Scotland, the first for over 10 years. The aim of the

study was to provide the Executive with comprehensive information so that it could develop its own policies on reducing carbon emissions as well as provide input into overall UK policies on the environment and climate change.

4.2. *Other stakeholders*

4.2.1. *Employees and trade unions*

During the post-war years trade unions in the electricity industry, as in most other nationalised sectors, were able to benefit from a more positive approach to industrial relations than in the private sector. In electricity collective bargaining was carried out at sector level and levels of unionisation were high. Employees also benefited from some of the highest pay rates and best conditions of any industry.

By the end of the 1980s the Conservatives had carried out a number of major privatisations of formerly nationalised industries beginning with British Telecom in 1984 and followed two years later by British Gas. Although the trade union movement maintained its political opposition to privatisation and campaigned and lobbied against, there was no significant resistance in the form of industrial action. This was the case also with electricity. Employees were affected by restructuring although in most cases, and in particular in the electricity industry this was carried out through major schemes of early retirement and voluntary redundancy.

And again, as with earlier privatisations employees were entitled to buy shares at a substantial discount. In order to ensure successful stock market flotations most of the Conservative governments' privatisation were underpriced. This meant that many thousands of individuals, employees and small shareholders were able to make a quick profit by selling up quickly to investment institutions.

One of the main challenges for the trade unions in the privatised industry was dealing with the decentralisation of collective bargaining to company level and in some cases to even lower levels of organisation. This provided some opportunities for management to undermine union organisation and there were two significant cases of union derecognition (at United Utilities and a London Electricity call centre) where the unions have only won back recognition in the last five years. Levels of unionisation have fallen back since privatisation with trade union density in the utilities now less than 50% (47.9% in 2005) compared to over 75% in 1990.

While pay and conditions for many workers in the industry remain good relative to other industries, particularly where skills shortages are keeping wages high. However, things are more difficult for groups of workers vulnerable to outsourcing. Although outsourcing affects a wide range of different activities, call centre operations are the most vulnerable as they face competition from offshore call centres such as those in India which are able substantially to undercut UK call centres in terms of salary costs.

One current challenge for the industry is skills shortages and the impact of an ageing workforce. Here the evidence is that decentralisation of the industry has devolved investment in training to company level leaving it exposed to short-term cost saving pressures.

4.2.2. Consumers

Since 2001 domestic consumers have been represented by Energywatch, the watchdog set up by the Utilities Act 2000 which assumed some of the responsibilities for consumer protection that had previously been carried out by the Offer regulatory body that became Ofgem following the 2000 Act. Although Energywatch has been provided information and advice to small businesses since 2004 it does not have a clear responsibility to represent their interests. Larger users have had their own voluntary consumer body, MEUC, since 1987 which has since been expanded to cover other utilities and there is a further large users lobbying organisation, the Energy Intensive Users Group which brings together a small number of industries, like steel, glass, concrete with very high energy demands.

5. CONCLUSION

The UK has led the way in the privatisation of the electricity sector across the world and not just within Europe. It now has an entirely privately-owned industry with all consumers free to switch their supplier and with the regulated monopolistic elements of the sector – transmission and distribution – operating separately from generation and supply. Therefore any assessment of trends on employment, productivity and quality of service in the UK will be important in evaluating the combined effects of full-blown privatisation and liberalisation. There is no doubt that there has been a major transformation of the sector, its employment, industrial relations, pricing and impact on the environment. Between 1990 and 2005 the industry delivered significant price cuts to consumers, although the most recent trend is for higher prices as a result of the major switch to long-term gas contracts in the 1990s. The massive shift from coal-burning power stations to gas-fired plant also produced a significant fall in the industry's carbon emissions. The questions that the next stages of research need to answer is the extent to which the processes of privatisation and liberalisation have contributed to changes in employment, productivity and quality of service and can respond to the long-term challenges of security of supply and climate change.

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