Theory and practice of governance of the British electricity industry

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Abstract
This paper reviews the theory and practice of governance of the British electricity industry since its reform in 1990. It shows that the promise that regulation would be 'light' has not been fulfilled and regulation is now a dominant influence on the policies of the electricity companies. A key element of the new system was the use of incentive regulation to set the prices for monopoly activities. This was meant to be cheaper and simpler than rate-of-return regulation, providing stronger incentives for the companies to reduce their costs. However, incentive regulation methodology has evolved and now differs little from rate-of-return regulation. Regulatory interventions have frequently been necessary in the generation market to prevent abuse of market power. The structure of the generation market is now highly competitive and the market mechanisms have been reformed, but it remains to be seen whether this will be sufficient to make generation truly competitive. The regulator has been successful in completing the corporate separation of monopoly activities from competitive activities, but it now seems likely that generation and retail supply will be allowed to integrate. This will provide a more secure environment for new investment, but at the expense of competition in generation.
Introduction

In 1990, the British government reformed the British electricity supply industry adopting a structure that has come to be known as the 'British Model'. One element of the British Model was the establishment of new regulatory bodies and mechanisms to replace the less formal governance arrangements. This paper examines how the governance of the reformed British electricity industry has developed.

There are now seven main areas of governance for the electricity industry in Britain.
1 Prices for monopoly services
2 Markets
3 Industry structure, including mergers and take-overs
4 Reliability standards
5 Representation of consumers and consumer complaints
6 Environmental impacts
7 Strategic national decisions.

This paper concentrates on the first three areas. As the reference point, we use papers by Littlechild written before the reforms took place. He was one of the architects of the regulatory system for British privatized utilities, and served as the electricity industry regulator from 1990 to 1999. We examine his views when the regulatory system was designed (Beesley and Littlechild 1983) and shortly before he was appointed regulator (Beesley and Littlechild 1989). The paper also reviews the changes to the regulatory system introduced by the Labour government after its election in 1997. These are enshrined in two pieces of legislation: the Competition Act of 1998, which came into force in March 2000, and the Utilities Bill, which was passed in July 2000.

The 1990 reforms and the current status of the industry

We define first what the reforms included and how they were implemented. Five major changes, most of which were implemented on 1 April 1990, were made.
1 Privatization The nationally owned industry was sold to private investors.

There are three electricity systems in the United Kingdom. The system described is the largest covering England and Wales. The Scottish system is connected to England and Wales and was privatized in 1992, also with little scope for competition. The Regulator for England and Wales also covers Scotland, while Ofgem regulates the electricity and gas industries in Northern Ireland.

For an account of his current views on regulation, see Littlechild (2000).
2 **De-integration** The industry was divided into four activities: generation, high-voltage transmission, low-voltage distribution, and supply to final consumers.³

3 **Introduction of competition to supply** All final consumers were to be allowed to choose their electricity supplier.

4 **Introduction of competition to generation** Central planning of the generation sector was abandoned, barriers to entry for new generation companies removed, and plant dispatching was to be set by competitive means, the Power Pool.

5 **Re-regulation** Prices for activities categorized as monopolies were to be set by a regulator using a 'price cap' formula. Prices for competitive activities were to be set by the market, but under the scrutiny of the regulator.

However, these changes could not all be fully implemented immediately and the system has continued to develop, not always in the direction originally intended.

**Privatization**

Most of the industry was privatized in 1990/91. The main problem was the attempt to privatize the nuclear power plants (MacKerron 1996). It was hoped this could be accomplished by splitting the generation assets between only two companies (National Power and PowerGen), the larger of which (National Power, with 70% of the assets) would have the economic and technical strength to meet the special demands that nuclear power plants impose. This plan proved infeasible, the nuclear plants were withdrawn and placed in a new state-owned company (Nuclear Electric). The performance of the nuclear power plants improved markedly after 1990 and it was possible to privatize 70% of the nuclear capacity (British Energy) in 1996, leaving the oldest plants in public ownership (Magnox Electric). This had important consequences for the reforms. A consumer subsidy, the fossil fuel levy, 10% of consumer bills, was introduced to keep Nuclear Electric solvent, initially accounting for about half its income.⁴ Only two competing generation companies were set up (the nuclear company was a price-taker), and, since 1990, there has been

³ Generation and transmission are familiar as separate activities, but defining distribution and supply as separate activities was novel. Distribution covers the operation of the local low-voltage network and is regarded as a monopoly. A supply company purchases electricity from the wholesale market and retails it to final consumers. The supply activity is potentially competitive.

⁴ The fossil fuel levy was judged a state aid by the European Commission. Permission was granted only till 1998 to levy a charge on consumers for generation sources that did not use fossil fuels (Mitchell 1995).
considerable regulatory activity to make the generation market more competitive.

Restructuring
The main existing company, the Central Electricity Generating Board, was split into three generation companies and a transmission company, the NGC (National Grid Company). The 12 existing distribution companies were privatized intact as REC (regional electricity companies) and given a single licence: the Public Electricity Supply licence to cover both distribution and supply. Only an accounting separation between their distribution and supply businesses was required. Since then, there has been a continual restructuring of the sector.

Competition in generation
Transitional arrangements including those to protect the British coal and nuclear industries meant that the Pool did not play a significant role in setting the wholesale electricity price from 1990 to 1998. It was found to be unreliable in operation, and, in 1997, it was decided it should be replaced even before the transitional arrangements expired. The new market design, the NETA (New Electricity Trading Arrangements) was introduced in March 2001.

Competition in supply
Consumer competition was phased in over a decade. The 5000 largest consumers (30% of the market) were given choice in 1990, a further 45 000 consumers (20%) were given choice in 1994, and, from 1999, all consumers could choose their supplier.

Re-regulation
Government claimed the new regulatory system would be cheap and would not be a strong influence on decision-making in the industry. It would be very different from rate-of-return regulation as practised in the US, which was presented as expensive, time-consuming, and interfering too much in commercial decisions. These predictions have proved wrong, and managing relations with the regulator is now the key strategic concern for regulated companies.

Reliability, consumer representation, environmental regulation, and national strategy
Before describing in detail regulation of monopolies, markets, and industry structure, it is useful to comment briefly on the other four areas of governance.
Reliability standards
When electricity was privatized, there was concern that system reliability should not be jeopardized. Performance standards for the overall reliability of the system were set for the companies. Consumers who receive poor service, such as failure to meet an appointment, receive compensation. These measures seem to have been successful in maintaining or improving the high standards in the industry.\(^5\)

Consumer representation
Unlike gas, for which the pre-existing Gas Consumer Council undertook consumer representation, organizations appointed by Ofgem (Office of Electricity Regulation) were introduced. In the government’s 1997 review of regulation, it was decided that the independent consumer council system was more effective and a new GECC (Gas and Electricity Consumer Council) independent of the regulatory bodies was set up in December 1999, although by early 2001, it was still not fully operational.

Environmental regulation
The Environment Agency carries out environmental regulation, and, since privatization, the environmental impact of the industry has generally been reduced. However, this has come about because of the substitution of gas for coal as a generation fuel, a switch driven largely by market forces and requiring no intervention in the market. It remains to be seen what will happen if achieving environmental objectives conflicts with minimizing generation costs.

Strategic decisions
One of the objectives of privatization was to avoid political intervention in the commercial decisions of the electricity industry. For the first 6 years, the belief that political interference could be avoided seemed to be borne out. The political interventions that did occur resulted mainly from attempts to protect the British coal and nuclear industries. However, since the election of the Labour government in 1997, energy policy with its traditional agenda balancing economic efficiency with social equity, security of supply, and environmental protection seems to be re-emerging. For example, a review of power station fuel sources was carried out and restrictions on building new gas-fired power plants were imposed. Some (Newbery 1998) view this as the Labour party exhibiting its interventionist tendencies,

\(^5\) For a review of the performance of the network companies, see Ofgem (2000a).
while others (Helm 1999) regard it as inevitable, especially given the growing importance of the environmental agenda.

**The regulatory bodies**

The key institutions in the economic regulation of the electricity industry have been the DGES (Director General of Electricity Supply), assisted by Offer and the relevant government minister, from 1992 onwards, the minister for the DTI (Department of Trade and Industry). Two other regulatory bodies, the Competition Commission and the DGFT (Director General of Fair Trading), assisted by the OFT (Office of Fair Trading) have an important role.

**Director General of Electricity Supply**

The example set by the privatization of telecoms and gas was followed. Regulatory responsibility was given to one person, the DGES, with the assistance of Offer. By 1998/99, Offer employed 250 people and had a budget of 24 million pounds funded by the licensed electricity companies. The staffing level increased only marginally over the 10 years following privatization. As a result of the government’s regulatory review of 1997, there were changes to the regulatory system, under new legislation, the Utilities Bill, passed in July 2000. The gas and electricity industries were converging at all points in the value chain and it was believed that effective regulation would be facilitated by creating a body that regulated both industries. The gas and electricity regulatory staffs were combined to form the Ofgem (Office of Gas and Electricity Markets) and the DGGS (Director General of Gas Supply), appointed in September 1998, was appointed DGES in January 1999. The budget for Ofgem was about 50 million pounds in 2000, although this figure was inflated by the costs of the introduction of NETA and of merging Offer with the Ofgas (Office of Gas Supply).

The government believed that a single regulator was not appropriate and that a primary duty to promote competition did not put sufficient emphasis on the interests of consumers. The Gas and Electricity Markets Authority (hereafter, the Authority), comprising five executive and five non-executive directors, was set up in December 2000 to replace the Director Generals. The Authority inherited the powers of the DGES and the DGGS, and has responsibility for strategy and policy. Ofgem is responsible for day-to-day decisions. The DGES and the DGGS became the chief executive of Ofgem and the managing director of the Authority. The primary duty of the Authority is to protect the interests of consumers. The creation of the GECC will result in a transfer of about 120 staff from Ofgem to the GECC, leaving Ofgem with a staff of about 300.
The Secretary of State

The DGES shares his duties with the government minister. The minister appoints him and can dismiss him in certain circumstances. There is no evidence that ministers have intervened to any significant extent in the DGES’s decision-making. However, the minister has not always followed advice given by the regulator, for example, on take-overs. The DTI has played a more strategic role since the election of the Labour government in 1997 through an Energy Utilities Directorate. This body (or predecessors) led a number of electricity industry reviews, including those on regulation, power station fuels, and renewables (Department of Trade and Industry 1998a, 1998b, and 1999).

The Competition Commission

The Competition Commission (formerly Monopolies and Mergers Commission or MMC) is a long established body that investigates mergers and examines the competitiveness of markets. In August 2000, there were 39 commissioners and from these a panel, typically of 5, is set up for each investigation. It operates in response to a request by the relevant government minister and produces a report that determines whether the merger or the market reviewed operates ‘against the public interest’. If it produces such a finding, it has wide discretion about the remedies it can suggest. Its report is submitted to the minister, who may choose not to follow its recommendations. In such cases a justification must be provided. The privatization of the utilities saw an expansion of the MMC’s role. If a company does not agree to an ‘X’ factor proposed by a regulator, it can ask the MMC to carry out an investigation and make recommendations about the value of ‘X’. Even in these cases, the final arbiter is not clear. A dispute between the DGGS and British Gas about how the recommendations of an MMC inquiry would be implemented was settled by negotiation. The Northern Ireland Regulator refused to implement one of the findings of an MMC inquiry, but was overruled in the Court of Appeal (Ofreg 1997; Power UK 1998). In 1999, the MMC was renamed the Competition Commission, and an Appeals Tribunal was set up to deal with appeals against the decisions of regulatory bodies.

Director General of Fair Trading and Office of Fair Traning

The OFT’s duty is to guard the interest of consumers in competitive markets. It has not often been active with the utilities but it carried

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*See utility week Ofgas price cap move sidesteps MMC report 25 July 1997, p. 5 and Utility Week Agreement reached on revenue cap row 17 October 1997, p. 6.*
out investigations that led to the decision to restructure the privatized British gas industry (Office of Fair Trading 1991). The Competition Act of 1998 gives new concurrent powers to Ofgem and the OFT, which Ofgem will apply. The main provisions prohibit the operation of cartels and the abuse of dominant market positions (OFT 2001). The Act gives Ofgem powers to levy fines of up to 10% of 3 years’ turnover on companies found in breach of the Act.

To see how these bodies interact, it is useful to see how take-over bids for RECs have been handled. In September 1995, PowerGen placed a bid for Midlands Electricity followed within a week by a bid by National Power for Southern Electric. These bids raised issues about the extent to which integration of generation and supply should be allowed. There was an expectation that the bids would be allowed because earlier decisions had implied integration was acceptable. Scottish Power had been allowed to take over an REC in September 1995 and another REC was buying a large volume of power plant from National Power and PowerGen at the time. However, the minister, following advice from the DGES and the DGFT, referred the bids to the MMC in November 1995. The MMC’s reports, submitted in April 1996, concluded that the take-overs would be against the public interest but would be acceptable provided conditions (not expected to have proved onerous) were met. The MMC verdict, made by a five-member panel, was not unanimous, and a report by the disserter was published along the majority reports (MMC 1996a, 1996b). Another member of the MMC, not on this board, resigned from the MMC in protest at its conclusions. The minister decided not to allow the take-overs (Bailey 1996). His grounds were that vertical integration was not wrong, but that until markets were more fully developed, the take-overs would harm competition. The minister has not always followed advice from regulators on referrals to the MMC. In November 1995, the minister chose not to refer a bid by North West Water for an REC to the MMC, counter to the advice given by the DGFT (Financial Times Power in Europe 1995).

Regulation of monopoly services

Results of regulation

Since 1990, there have been five elements to electricity bills in Britain. The market sets the price for the largest element of the bill—generation. The regulator sets the charges for use of the transmission and distribution networks, while government sets the nuclear subsidy, which is now very small and is only used to subsidize renewables. The regulator also sets the charge for supply to small consumers until
Table 1 Movement in small consumer bills: 1990–98

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<tbody>
<tr>
<td>Typical bill (1990=100)</td>
<td>100.0</td>
<td>107.0</td>
<td>105.0</td>
<td>103.5</td>
<td>97.7</td>
<td>89.5</td>
<td>87.2</td>
<td>81.8</td>
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<tr>
<td>Distribution</td>
<td>25.0</td>
<td>25.2</td>
<td>25.4</td>
<td>25.6</td>
<td>25.8</td>
<td>22.2</td>
<td>19.3</td>
<td>18.7</td>
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<tr>
<td>Supply</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>5.9</td>
<td>5.8</td>
<td>5.6</td>
<td>5.5</td>
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<tr>
<td>Transmission</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>4.8</td>
<td>4.7</td>
<td>4.6</td>
<td>4.4</td>
<td>3.5</td>
</tr>
<tr>
<td>Total monopoly charges</td>
<td>36.0</td>
<td>36.2</td>
<td>36.4</td>
<td>36.4</td>
<td>36.4</td>
<td>32.6</td>
<td>29.3</td>
<td>27.7</td>
</tr>
<tr>
<td>Fossil fuel levy</td>
<td>10.6</td>
<td>11.8</td>
<td>11.6</td>
<td>10.3</td>
<td>9.8</td>
<td>8.9</td>
<td>8.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Total regulated charge</td>
<td>46.6</td>
<td>48.0</td>
<td>48.0</td>
<td>46.7</td>
<td>46.2</td>
<td>41.5</td>
<td>38.0</td>
<td>29.5</td>
</tr>
<tr>
<td>Generation</td>
<td>53.4</td>
<td>59.0</td>
<td>57.0</td>
<td>56.8</td>
<td>51.5</td>
<td>46.0</td>
<td>49.2</td>
<td>52.3</td>
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</table>

(Typical bill – regulated charge)

**Note** The figures shown are index numbers set so that the total bill in 1990/91 is 100. The distribution charges apply to the Seaboard area of England. Charges for distribution in other areas vary somewhat.

**Source** Author’s calculations

1999 when small consumers were allowed to choose. There are some restrictions on the prices the incumbent suppliers (but not new entrants) can charge, expected to be removed in 2002, after which the market will set this charge.

Two main features emerge from an analysis of prices for small consumers (Table 1). First, the government’s regulatory settlement in 1990 resulted in the price of the monopoly services increasing marginally over the first 5 years. Since then, the regulator has clawed back the lost ground with large, one-off reductions 1995–98. Second, the effective removal of the nuclear subsidy in 1997 was the main factor behind the reduction in prices since 1990. Overall, real prices set by the regulatory authorities fell by about 40% in the 8 years after privatization.

**The methodology in theory and practice**

The system for setting prices of monopoly services in the British electricity sector is known as incentive regulation, or ‘RPI–X’. Under this system, the price of a monopoly service is allowed to increase by the rate of inflation (RPI is the retail price index) minus ‘X’. This was proposed by Littlechild and adopted by the government of the United Kingdom as the way to regulate prices in the privatized telecoms industry (Littlechild 1983). Beesley and Littlechild (1983, p.20) claimed

7 There are various ways the ‘X’ factor can be applied, for example, to the prices charged or to the income per unit of output. These differences can have significant implications for companies, but for these purposes, it can be assumed that the ‘X’ factor determines the movement of prices.
The level of X would, in practice, be the outcome of bargaining between [the utility] and the Government; an exhaustive costing exercise is not called for. The purpose of the constraint is to reassure customers of monopoly services that their situation will not get worse under privatisation. It 'holds the fort' until competition arrives, and is inappropriate if competition is not expected to emerge. It is a temporary safeguard, not a permanent method of control. The one-off nature of the restriction is precisely what preserves the firm's incentive to be efficient, because the firm keeps any gains beyond the specified level. Repeated cost-plus audits would destroy this incentive and moreover encourage 'nannyish' attitudes towards the industry.8

Companies would be able to find their own way to achieve the performance standards that were required of them. If they could meet them more cheaply than was implied by the 'X' factor, they could keep the savings, if not, any extra costs would come out of profits. The implication appears to be that either all activities could become competitive and that the 'X' factor should not be adjusted once set. There is no mention of any role for a sector regulator in setting prices, indeed, they advocate strong pro-competition policy and use of the courts as a more efficient way of solving disputes. They criticize the procedures involving the MMC, the OFT, and the Secretary of State as not being strong enough or speedy enough.

By 1989, practice with RPI–X was significantly different to this early vision. The 'X' factor was set for about 5 years, initially by the government but subsequently by a sector regulator, allowing firms to make long-term investment plans, but allowing the sector regulator to tune the 'X' factors to maintain tough but fair pressure on the regulated companies. Beesley and Littlechild (1989, p.471) still seemed to believe that regulation need only be temporary (they repeat that 'the aim is “to hold the fort” until competition arrives'). Despite this divergence from his vision of regulation of privatized industries, Littlechild seemed to have no problem in accepting a role that he had earlier appeared to dismiss as that of a government 'nanny' (Beesley and Littlechild 1983, p.20). In the decade after privatization, there was no sign that distribution and transmission could be treated as anything other than a monopoly, yet he did not act on his earlier suggestion that 'RPI–X' was inappropriate if competition was not expected to emerge.

8It is not clear from the text whether Beesley and Littlechild then assumed that all activities could become competitive or that for activities for which competition was not feasible, another form of regulation should be chosen.
The government set the initial ‘X’ factors for the electricity industry, and the distribution companies were allowed to increase their real prices for the 5 years after 1990 by up to 10%. The government explained that these price increases were needed to clear a backlog of investment needs. The high profits made by the RECs in this period suggest this need did not exist. Beesley and Littlechild (1989, p.457) recognized that wider considerations were at work in setting the initial ‘X’ factors. For example, the generous initial ‘X’ factors were a strong influence in increasing the sale price of the companies.

To see how ‘X’ factors are set, we examine the electricity distribution price review, which will apply from 2000 to 2005. The consultation process started in February 1998 with a paper reviewing the regulatory work programme, including the distribution price review, for the following two years (Offer 1998a). This was followed in July by a more detailed review of the considerations that would be included in the price review (Offer 1998b). In December, the regulator issued a paper reviewing the business plans of the distribution companies (Offer 1998c). In May 1999, the regulator published another paper setting out much of the data on which the price control would be determined (Ofgem 1999a), and, in August, he published draft proposals (Ofgem 1999b). After consultations, the proposals were updated in October (Ofgem 1999c) and final proposals published in December (Ofgem 1999d). The companies accepted them and they were implemented in April 2000.

The main determinants of ‘X’ are operating expenditure, capital expenditure, value of the asset base, and allowed rate of return on assets. The review of transmission prices (Ofgem 1999e, p.23) states

\textit{NGC’s present price control was set so that the net present value of its allowed revenues over the period of the price control is equal to the net present value of three elements: forecast efficient operating expenditure; depreciation; and a reasonable return on NGC’s regulatory value.}

\textit{Depreciation is a function of: the opening regulatory value; the remaining asset lives of the assets which comprise this regulatory value; and efficient levels of capital expenditure which NGC is expected to incur during the price control period.}

These are the constituents of rate-of-return regulation. The main difference is how capital expenditure is treated. British incentive regulation approves capital investment in advance, while rate-of-return regulation of the US approves it retrospectively. In the US, utilities invest in assets and when they are complete, the regulator assesses whether they are ‘used and useful’ and the investment
‘prudently incurred’. Rate-of-return regulation is criticized because it can lead to ‘gold-plating’. Utilities undertake too much capital expenditure because increasing the value of the asset base increases the level of profit it is allowed to make. However, this appears to be a matter of practice rather than methodology. If utilities invest too much, rate-of-return regulation allows regulators to prevent them from adding the excess expenditure to their rate base, effectively deducting excess expenditure from profits.

Under British regulation, utilities present 5- and 10-year investment programmes to the regulator. The regulator agrees a total investment need over the period. This is used in the calculation of the ‘X’ factor. The risk of gold-plating is still there. Far from allowing companies to determine independently what investments they should make, the British system requires them to negotiate with the regulator to get de facto prior approval for investments. There have been no detailed procedures to monitor whether the investments take place and to assess whether they were really worthwhile. Regulated companies have always invested less than they projected to the regulator arguing that the investments made had been rendered unnecessary by efficiency improvements. Some of the investments made have been of dubious value. It seems likely that as experience of utilities inflating their investment needs grows, British regulators are increasingly adopting more formal means to monitor investment programmes. Indeed, in 1999, Ofgem carried out an investigation into why the gas distribution company had invested significantly less than it forecast (Ofgem 1999f).

The DGES has criticized the interval between determinations of the ‘X’ factor, suggesting that the 5-year interval puts too much emphasis on a single process (Ofgem 1999a, p.19). The regulator for gas and electricity for Northern Ireland, Douglas McIldoon, was critical of the RPI–X methodology. He described the RPI–X mechanism as ‘exceptionally crude’ and suggested that ‘As the scope for efficiency gains in the company’s operating costs declines, Capex will become the key factor in shaping the next Transmission and Distribution price control’ (Ofreg 1998, p.4).

Examination of the transmission review shows that regulatory methods are getting more complex. There is no longer a single ‘X’ factor to cover all NGC’s activities; some of its activities are regulated explicitly by rate-of-return regulation. There is a different rate of return allowed for investments made before and after privatization, and, for some of its activities, there are incentive schemes in which savings made by bettering the target performance level are shared between consumers and the NGC.
Overall, RPI-X regulation is still evolving in Britain, but it seems unlikely that it will fulfil the promise that it would provide stronger incentives for efficiency improvements than rate-of-return regulation, while still being cheaper and simpler.

**Regulation of markets**

The real departure in regulation with the British Model was that the regulator did not set prices for generation and retail supply to final consumers. Beesley and Littlechild were sceptical about the need for extensive regulation of competitive markets. Nevertheless, they recommended that a highly fragmented market be created rather than waiting for the market to develop by itself. There was little suggestion that once established, markets would need regulatory oversight. They stated (Beesley and Littlechild 1983, p.19)

*Competition is the most important mechanism for maximising consumer benefits, and for limiting monopoly power. Its essence is rivalry and the freedom to enter a market. What counts is the existence of competitive threats, from potential as well as existing competitors. The aim is not so-called ‘perfect’ competition . . . Where there are very few existing outside competitors, or none at all, the starting structure should be designed to create effective competition. When in doubt, smaller rather than larger successor companies should be created.*

**The wholesale market**

Despite his belief that regulation of markets was not needed, Littlechild intervened frequently in the wholesale market. The government split generation among only two privatized companies. Contracts and conditions imposed by the government in 1990 to give transitional protection to the British coal and nuclear industries meant that for the first 3 years, the conditions for more than 90% of the RECs’ wholesale purchases were pre-set by government-imposed contracts. The transitional measures for coal were re-negotiated in 1993 for a further 5 years at about half the volume of coal previously contracted, and the nuclear protection continued until 1997. The output of new plant ordered by the RECs was fully contracted to the owners, so, from 1993 to 1998, about 90% of the market was not open to competition.

It is not surprising that with little liquidity in the Pool and only two companies bidding seriously, prices showed signs of being manipulated by the two dominant generators. The regulator required the two large companies to bid their plant such that the average Pool price
was below a specified level over the period 1994–96 and he forced them to sell about 15% of their capacity to new entrants in 1996.

In 1997, the regulator was still not satisfied, still blaming the large generators despite their market share being half what it was in 1990. He required them to sell about a third of their remaining capacity to new entrants. He conducted a review of the Pool, the result of which was that a new design of market, the New Electricity Trading Arrangements, was implemented in March 2001. Littlechild's replacement, Callum McCarthy, was not satisfied that Pool prices were being set fairly, and, in January 2000, he proposed an new licence condition for generators that would require them to undertake not to indulge in 'abuse of substantial market power in the setting of wholesale prices for electricity' (Ofgem 2000b). Two of the seven companies to which the condition would apply refused to accept it, and McCarthy referred the matter to the Competition Commission. In December, the Competition Commission ruled against the regulator and the condition was withdrawn. It is not clear why McCarthy felt this clause was necessary. Under the 1998 Competition Act, he had powers to impose heavy fines on companies indulging in such practices. It also showed a lack of faith that NETA would overcome the deficiencies of the Pool. It remains to be seen whether NETA and the more fragmented generation market will mean that regulatory intervention in the generation market will die away.

The retail market
The main activity for the regulator in the retail market has been coordinating its phased opening. In both 1994 and 1998, things did not go smoothly. In 1994, when 45 000 additional large consumers were given choice of supplier, the systems were in chaos for about 18 months after the opening of the market. However, medium and large consumers are now using the market effectively to shop for cheaper power.

The systems necessary to allow competition for small consumers proved complex and expensive and delayed market opening by a year. Consumers will have to pay an additional 30 pounds in the first 5 years for these systems whether or not they switch supplier. However, the much bigger issues concern the consequences on industry structure of liberalization and the apparent reluctance of small consumers to treat electricity as a normal purchase.

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9 This figure is based on total costs of building and operating the IT systems over 5 years that will be passed on to consumers of 726 million pounds divided between about 25 million consumers (see House of Commons Trade and Industry Committee 1998).
Table 2  Regional Electricity Company purchase costs: 1996/97

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<th></th>
<th>Average price (p/kWh)</th>
<th>Quantity (TWh)</th>
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<td>Franchise consumers</td>
<td></td>
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<tr>
<td>Coal contracts</td>
<td>3.92</td>
<td>71.7</td>
</tr>
<tr>
<td>Independent power producer contracts</td>
<td>3.84</td>
<td>28.9</td>
</tr>
<tr>
<td>Other contracts</td>
<td>3.71</td>
<td>34.3</td>
</tr>
<tr>
<td>Average franchise purchase costs</td>
<td>3.85</td>
<td>134.9</td>
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<tr>
<td>Non-franchise purchase costs</td>
<td>3.00</td>
<td>80.4</td>
</tr>
<tr>
<td>Average total purchase costs</td>
<td>3.54</td>
<td>215.2</td>
</tr>
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</table>

Source Offer (1997)

In 1997, the regulator published data showing that supply companies were allocating their cheapest power purchases to large consumers (Table 2). It is not clear how he reconciled this with the licence requirement that suppliers should not to discriminate or show undue preference between consumers or classes of consumer. He apparently believed that allowing small consumers to choose would solve this problem—companies that charged too much would lose their market share. However, if residential consumers do not change frequently to the cheapest supplier, the suppliers will treat them as captive and continue to discriminate against them. So far, the main beneficiary of consumer switching has been the main gas supply company, British Gas, even though in most areas, it is one of the most expensive of the available suppliers. The other companies that are trying to build market share in supply have done so by acquiring existing supply businesses. This mirrors experience in gas where the only companies to have significant success in winning residential gas consumers from British Gas were the local electricity companies. It seems consumers are only comfortable buying such an important service from a supplier they know and trust.

An important issue is how to ensure that new entrants do not target the most attractive consumers, rich households with high bills, leaving poor consumers with an expensive service. The better the market works (as measured by switching rates), the more this issue will arise as companies will have a stronger incentive to cherry-pick. There are no systematic checks in place to ensure companies are behaving equitably. The regulator has proposed that the ‘non-discrimination’ clauses in supply licences be scrapped and that reliance be placed on the 1998 Competition Act (Ofgem 2000c).
It may be that, if it is perceived that small consumers in general and the poorest consumers in particular are doing poorly from the opening of the market, the pressure for regulatory oversight of the retail market will increase rather than decrease.

**Industry structure and take-overs**

The implication of Beesley and Littlechild's statements on competition was that the priority was to provide a structure that allowed free entry to the market. Take-overs and mergers in the competitive parts of the market were a healthy sign of market disciplines being exerted and were of little concern as long the entry barriers were low enough to maintain a realistic threat of competition.

**Structure**

The ideal structure given the existence of two monopolies and two areas where competition could occur is an industry with four sets of companies, each set operating in only one sector of the market. For competitive activities, there should be a large enough field of companies to give confidence of competitive behaviour. Competitive activities should be separated from monopoly activities to ensure that access to the network is provided on non-discriminatory terms. The creation of separate wholesale and retail markets was to reduce barriers to entry for new generation and supply companies. If generation and supply were largely integrated, it would be difficult for new generation or supply companies to enter.

This ideal could not be met in 1990, mainly because of practical difficulties, such as establishing a large number of new companies with strong enough credentials for investors to be willing to buy them. The grid was seen as a key resource to ensure security of supply and that competition between generators was fair. The government gave the grid to the RECs, but with limits on the extent to which they could influence its policies. This seemed to offer the prospect of non-discriminatory access, while also giving the NGC some financial backing to ensure that its investment needs could be met. In 1995, the regulator required the RECs to sell their shares in the NGC. This was primarily to give the NGC greater financial autonomy. There was no suggestion that the RECs could have used their ownership of the grid to any unfair competitive advantage. The distribution and supply businesses were both owned by the RECs. The conflict between a company owning a monopoly network and supplying competitive services using this network was handled by requiring the RECs to give non-discriminatory access to their networks and to keep separate accounts for distribution and supply.
In 1997, as the opening of the retail market for small consumers neared, the regulator became concerned that the overlap between distribution and supply was allowing the RECs to cross-subsidize their supply businesses from distribution. As a result, the RECs now have separate distribution and supply licences and Ofgem has required that there be a full managerial and operational separation between distribution and supply, although they may still be under common ownership. The separation of the monopoly networks from the competitive businesses is now, therefore, largely complete.

The issue of how far ownership of generation and supply should overlap is complex. The creation of a wholesale market implied there should be some separation between generation and supply to allow new generation companies into the market. If vertically integrated companies dominated, little power would be traded in the Pool. New entrants would not only have to generate at competitive prices, they would also have to find final consumers to buy their power, a daunting requirement. However, the required separation was not complete. Generators were able to compete in the supply market for large final consumers up to a specified market share (7% in any REC territory, later increased to 16%). The RECs were allowed to obtain the equivalent of up to 15% of their peak demand from plants they owned.

The position on vertical integration of generation and supply was clouded further in 1996 when bids by the two large generation companies for RECs were blocked (see section on the regulated bodies). In 1998, there was renewed pressure to allow vertical integration. The prospect of a very tough regulatory settlement for the distribution business in 2000 meant that most of the American owners were keen to sell their RECs. The decision to enforce a split between the RECs’ distribution and supply businesses meant other RECs were open to offers for their supply businesses. With no scope for cross-subsidies between distribution and supply, and the loss of their monopoly in supply to the residential sector, RECs no longer had any incentive to retain distribution and supply in the same business. The end of the monopoly on supply to residential consumers also meant that supply companies were reluctant to sign power purchase deals of more than a year, making generation an even more risky business. Generators were, therefore, prepared to pay a high price for a supply business, typically 150–200 pounds per consumer acquired, to give them more market assurance. This time the pressure was not resisted, and, in 1998, PowerGen took over an REC while National Power bought a supply business. The ‘price’ for government allowing this was that National Power and PowerGen would sell some of their generation plant to new entrants. By spring 2001, companies that had large
generation businesses owned 12 out of 14 of the privatized supply businesses in Britain.¹⁰

The main problem in retaining a separation between generation and supply is the fragility of a supply business. A supply business has few tangible assets other than the loyalty of its consumers. It is a very small business, five per cent or less of a typical bill and it is difficult to build customer loyalty by product differentiation. Supply only makes business sense if integrated with generation or with a basket of other network-delivered services such as gas, water, and telecoms—so-called multi-utilities. Two attempts to build a multi-utility around an REC have failed. British Gas, taking advantage of its powerful brand name, may prove more successful selling electricity, gas, and telecoms, but this may be the exception, if consumers are only prepared to switch if it is to a trusted company they have dealt with before.

**Mergers and take-overs**

The logic of privatization and liberalization was to minimize government involvement in electricity. The threat of take-over would be an important discipline on companies. However, the public was concerned that key public services would be taken over by foreign companies with no commitment to provide reliable services. The electricity companies were, therefore, privatized with Golden Shares giving the government right of veto over any proposed take-overs. As a result, there was an expectation that the privatized companies would continue to be independent. However, the Golden Shares in the RECs expired in March 1995. All were soon subject to take-over bids, the main bidders being British generation companies, electric utilities from the United States, and privatized British water companies (see Table 3). The government intervened to block the bids placed by PowerGen and National Power. American utilities took over seven of the RECs with little public concern. There were, perhaps, two main factors behind this indifference to foreign ownership. First, the British public was resigned to key industries being taken over by foreign companies; for example, all large-scale car manufacture was by then in foreign ownership. Second, experience with private ownership had made it clear that the first priority of the privatized companies was profits, not public service, and it made little difference whether the shareholders were British or foreign.

¹⁰ By 2000, it was clear that the Scottish market will be integrated into that of England and Wales so it makes sense to see Great Britain as one market with 14 territories, including 2 from Scotland.
Table 3 Take-overs and mergers for the REC (Regional Electricity Company)

<table>
<thead>
<tr>
<th>REC</th>
<th>Take-overs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Distribution</td>
<td>Hanson 7/95 Multinational US utility (D) TXU 2/98 London 12/99</td>
</tr>
<tr>
<td>Eastern Supply</td>
<td>Hanson 7/95 Multinational US utility Energy Gr 1/97 TXU 2/98</td>
</tr>
<tr>
<td>Manweb</td>
<td>Scot. Power 7/95 UK generator</td>
</tr>
<tr>
<td>Midlands Dist</td>
<td>Avon En 5/96 US utilities (M)</td>
</tr>
<tr>
<td>Northern</td>
<td>CalEnergy, 12/96 US utility</td>
</tr>
<tr>
<td>Norweb Dist</td>
<td>NW Water 9/95 UK water co</td>
</tr>
<tr>
<td>Norweb Supply</td>
<td>NW Water 9/95 UK water co TXU, 7/98</td>
</tr>
<tr>
<td>Seeboard</td>
<td>Cen &amp; SW 11/95 US utility</td>
</tr>
<tr>
<td>Southern</td>
<td>Scottish Hydro 9/98 UK generator (M)</td>
</tr>
<tr>
<td>Swalec Dist</td>
<td>Welsh W 12/95 UK water co Western Power Dist 8/00 US utility</td>
</tr>
<tr>
<td>Swalec Supply</td>
<td>Welsh W 12/95 UK water co British Energy 6/99 UK generator</td>
</tr>
<tr>
<td>Sweb Dist</td>
<td>Southern Co 7/95 US utility</td>
</tr>
<tr>
<td>Sweb Supply</td>
<td>Southern Co 7/95 US utility EDF 6/99 French utility</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>Yorkshire Holdings US utilities Innogy 3/01 UK generator</td>
</tr>
</tbody>
</table>

Notes
1. Changes marked ‘M’ are mergers, ‘MM’ management mergers, and ‘D’ de-mergers.
2. Avon Energy was a consortium of two US utilities, GPU and Cinergy, but in 1999, GPU bought out Cinergy. The Midland distribution business is now branded GPU Power UK.
3. The Southern Co sold 51% of its holding in Sweb to Pennsylvania Power and Light. The SWEB distribution business trades as Western Power Distributor.
5. Yorkshire Holdings is a consortium of American Electric Power and Public Service of Colorado.
6. Central and South West Corporation has been taken over by American Electric Power.
7. The merged Scottish Hydroelectric and Southern Electric trades as Scottish and Southern Electric.
8. Innogy is the de-merged UK business of National Power.
By 1996, the role of Golden Shares was unclear. An indefinite Golden Share was taken in NGC in 1995 when it was sold by the RECs, and the government invoked the Golden Share in 1996 when a United States' utility tried to buy National Power. However, the privatized nuclear company, British Energy, arguably a more strategic asset than a fossil fuel generator, was only given 10-year Golden Share protection when sold in 1996. It may be that the use of Golden Shares will be ruled in contravention of the European Union Treaty of Rome, and there is little sign that the government now has any appetite to use them to protect privately owned companies.

An important current issue is the fate of the distribution businesses and the pressure for mergers. London and Eastern have set up a joint management structure for their adjoining regions, although ownership will remain separate and the owner of the South West region has purchased the adjoining South Wales region. It might be expected that economies of scales could be achieved by such mergers, but at the cost of loss of regulatory comparators. The ability to compare the performance of a number of companies carrying out the same task, distribution, was claimed by Beesley and Littlechild (1989, p.471) as an important tool for the regulatory authorities.

**Conclusions**

The provisions of the 1990 reforms to the British electricity industry took a decade to implement and the industry is still changing rapidly and unpredictably. One of the main elements of the reforms was a more formal system of regulation, the heart of which was the appointment of one person with responsibilities to regulate economic aspects of the industry. His tasks included setting monopoly prices, monitoring the competitive markets and commenting on industry structure issues. A key promise was that the regulator's influence on the industry would be 'light' and that as competition took hold, the need for a regulator would disappear altogether. This forecast has been proved wrong and the workload of the regulator appears to be increasing.

The forecast that regulation would be simple was based on the use of the RPI–X formula to set monopoly prices. Under this method, the real price paid for monopoly services would fall by 'X' per cent a year. It seemed that the regulator merely had to choose a value of 'X' that would put strong, but reasonable, pressure on companies to increase their efficiency. In practice, the elements required to determine 'X' are the same as are required for rate-of-return regulation, a form of regulation previously scorned by the government and Littlechild. These elements are the operating costs, the value of the
assets owned, new investment needs, and a fair rate of return on investment. The main difference is that RPI-X requires the regulator to pre-approve investment programmes and, far from allowing the companies to make independent decisions, it forces the regulator effectively to pre-approve investment decisions.

Littlechild did not act in accord with his stated belief that, provided markets were 'contestable', a 'perfect' market structure market was not required. He intervened continually in the wholesale electricity market, capping prices and forcing asset sales. Indeed, at his instigation, the wholesale electricity market is currently being totally redesigned. In the retail market, now that competition has been extended to all consumers, it may be that there will be more rather than less need for regulatory intervention. The political reality may be that, whether or not the market would, left to itself, resolve market imperfections, the time needed for this to occur is too long.

The ideal industry structure, a fully de-integrated structure with separate sets of companies operating in the four component parts of the industry has only been partially achieved. The monopolies are now separate from competitive activities and fair access to the infrastructure has been achieved. However, generation and supply are integrating and it seems that the market will become dominated by a small number of companies, primarily supplying their consumers from their own power stations. This is a logical way for companies to deal with the high risk that the generation and supply businesses both involve, but it means that competition in generation is much less intense and barriers to entry in generation are high. If the number of companies is allowed to get too small the electricity market could become an oligopoly.

The hope among some politicians that the reforms would create strong companies to compete for Britain in world markets has not been fulfilled. A major factor behind this failure has been the regulator’s policies to reduce the market power of the two large generation companies by forcing them to sell a large proportion of their power plants to new entrants. The market share of National Power and PowerGen is now little more than a quarter of what it was 10 years ago and National Power has had to split itself into two parts, a United Kingdom business and a foreign business, to survive.

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