HARVARD ELECTRICITY POLICY GROUP

Special Seminar with Stephen Littlechild/OFFER,

"RECENT DEVELOPMENTS IN ELECTRICITY COMPETITION AND REGULATION IN THE UNITED KINGDOM"

Harvard University
Friday, April 22, 1994

MEETING SUMMARY

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1 WELCOME AND INTRODUCTION

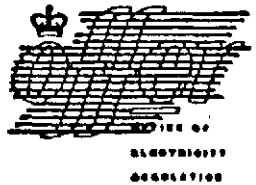
Professor William Hogan opened the meeting and introduced the Seminar speaker, Professor Stephen Littlechild, who serves as the United Kingdom's Director General of Electricity Supply at the Office of Electricity Regulation (OFFER). Professor Littlechild has a long and distinguished career as an economist and has written widely on economic regulation and on the design and application of price caps, in particular. At OFFER, he has overseen the process of putting many such ideas into practice in United Kingdom's electricity supply industry.

The Seminar focused on evolving developments regarding reform and market operations within the United Kingdom's electricity supply industry. In past Seminars of the Harvard Electricity Policy Group (HEPG), the British experience has served as an important and instructive example of a competitive model. Hogan noted that the relevance of the British model for the future evolution of the U.S. electricity industry has become all the more acute

in the wake of this week's proposals from the California Public Utilities Commission on retail wheeling. These proposals carry explicit and implicit references to the experience gained in the United Kingdom since privatization. Thus, the impact of the British experience clearly continues to be felt here in the United States and elsewhere around the world.

2 PRESENTATION OF STEPHEN LITTLECHILD

(See pages 3-16.)



RECENT DEVELOPMENTS IN COMPETITION AND REGULATION IN ELECTRICITY MARKETS IN THE UNITED KINGDOM

PROFESSOR STEPHEN C. LITTLECHILD

DIRECTOR GENERAL, ELECTRICITY SUPPLY
OFFICE OF ELECTRICITY REGULATION
U.K.

April 1994

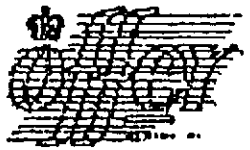
THE NEW ELECTRICITY INDUSTRY IN BRITAIN
(FROM 1 APRIL 1990)

- Separation of transmission
- Generation split into 3 companies
- Competition in generation
- Competition in supply
- Pool created
- Regulation by OFFER

ELECTRICITY REGULATION IN BRITAIN

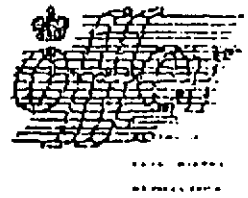
- Industry: 61 licensees, 60 GW, 270 TWh, 25m customers
- OFFER: 222 staff, 14 regional offices £10m budget
- 14 Consumers' Committees
- Cost of regulation: 40p per customer
- Licence Fee: 0.9p per MWh

STATUTORY DUTIES

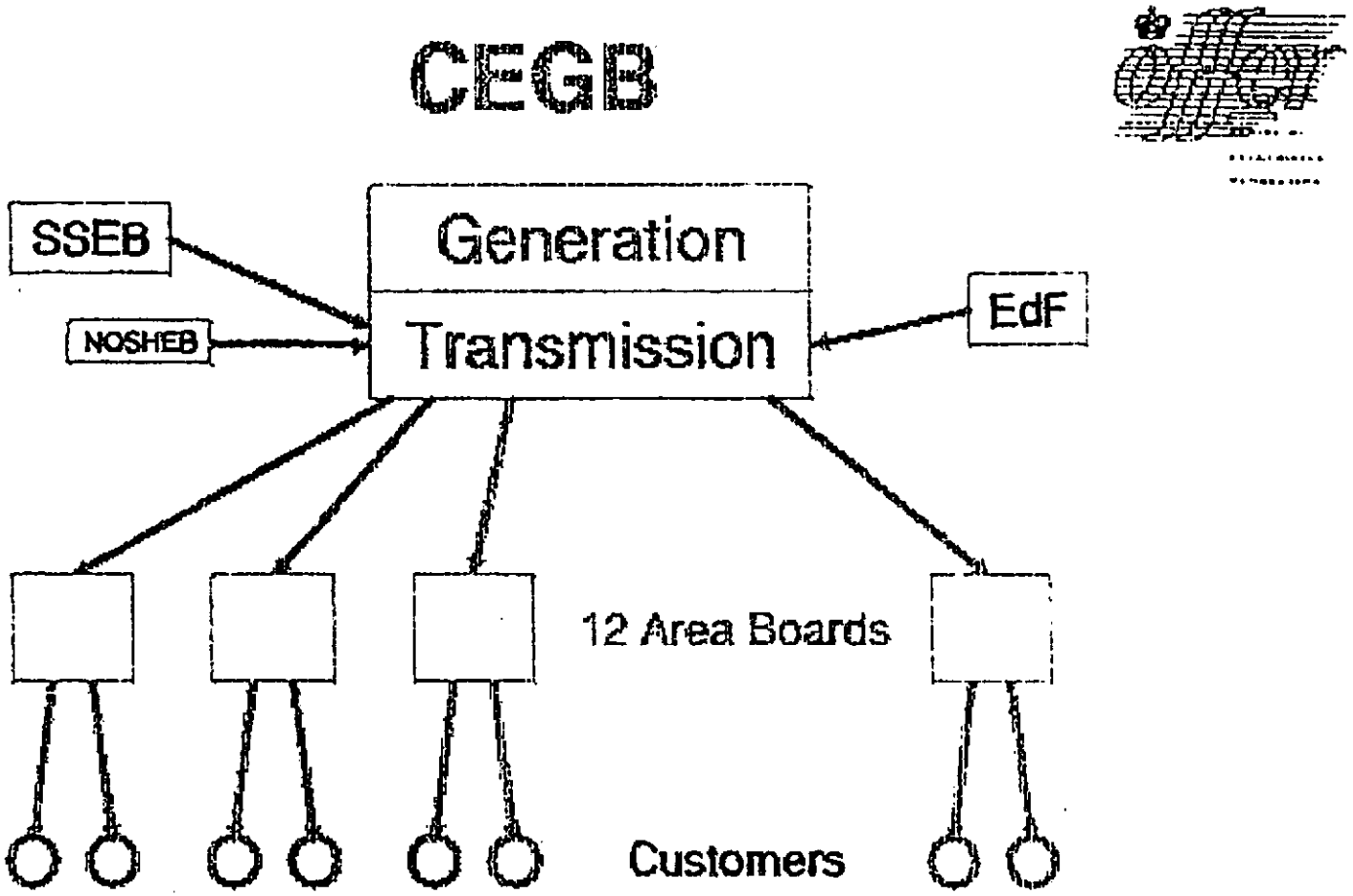


- To secure all reasonable demands are satisfied
- To secure that licensees can finance licenced activities
- To promote competition in generation and supply
- To protect interests of customers in respect of:
  - Prices
  - Continuity of supply
  - Quality of supply

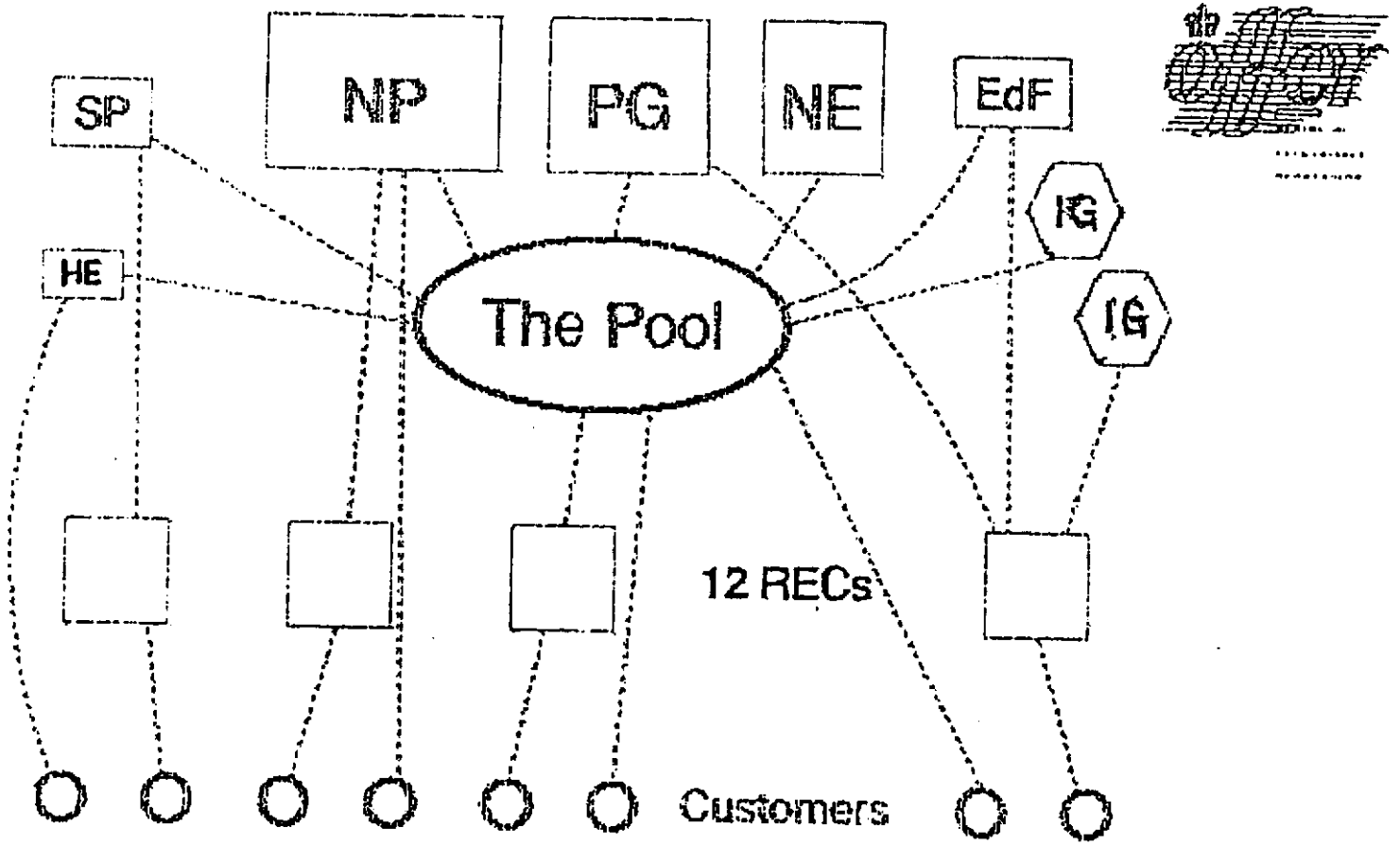
SUMMARY OF DIRECTOR'S DUTIES



- To protect electricity customers
- To promote competition

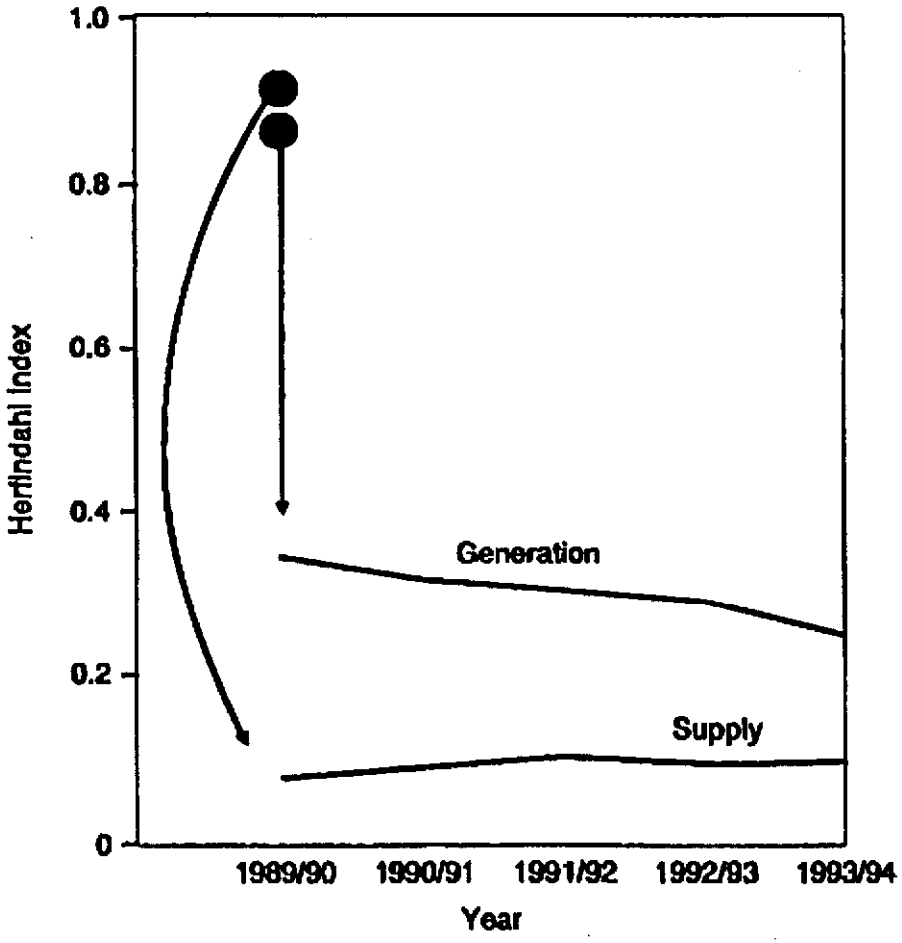


Electricity Industry before Vesting:
structure, physical flows and customer relationships



Electricity Industry after Vesting:
illustrating customer relationships

COMPETITION AS MEASURED BY HERFINDAHL
- GENERATION AND SUPPLY



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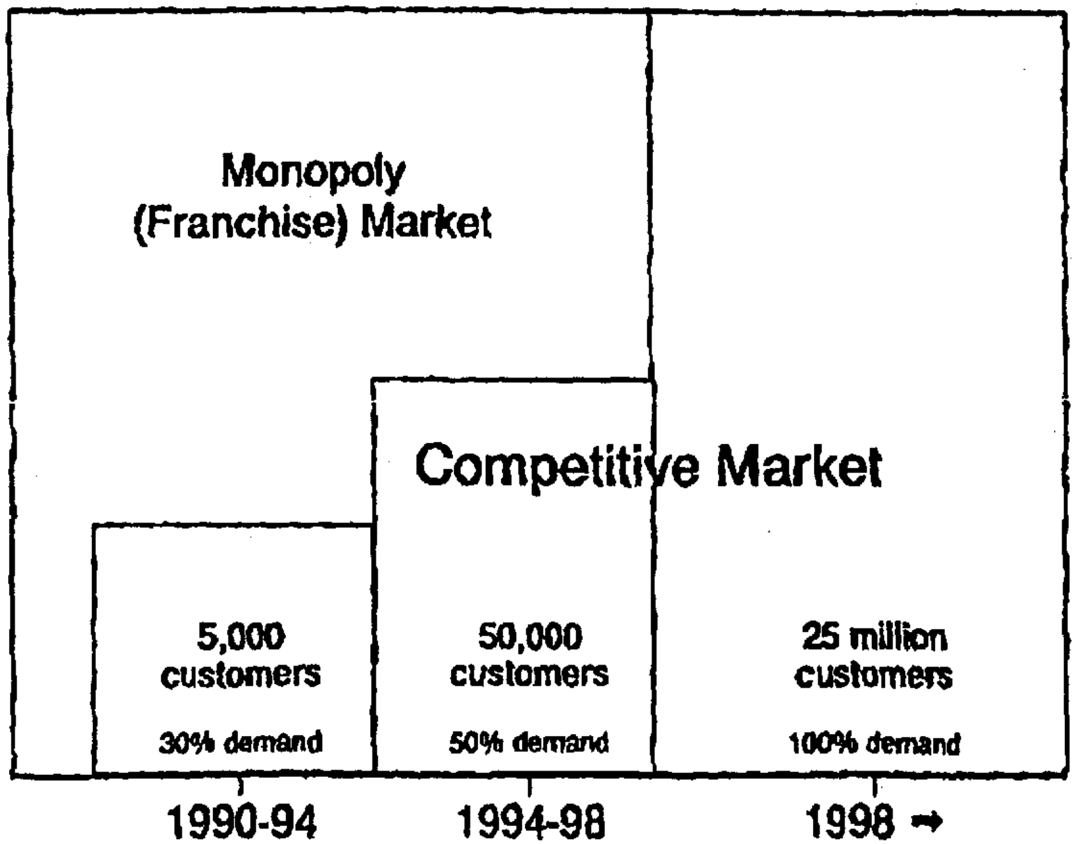
EXPANDING SCOPE OF COMPETITIVE MARKET

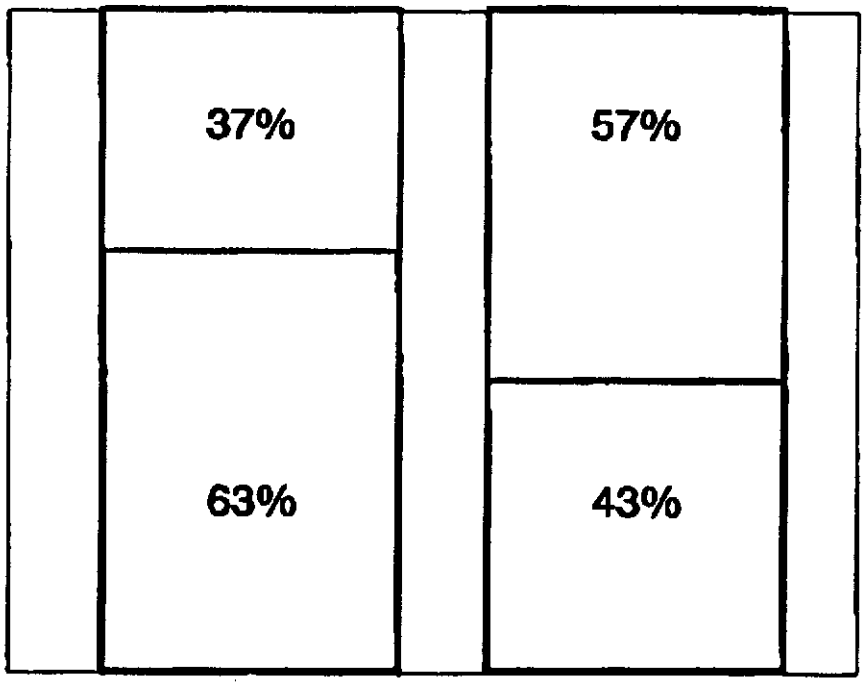


COMPETITION IN GENERATION

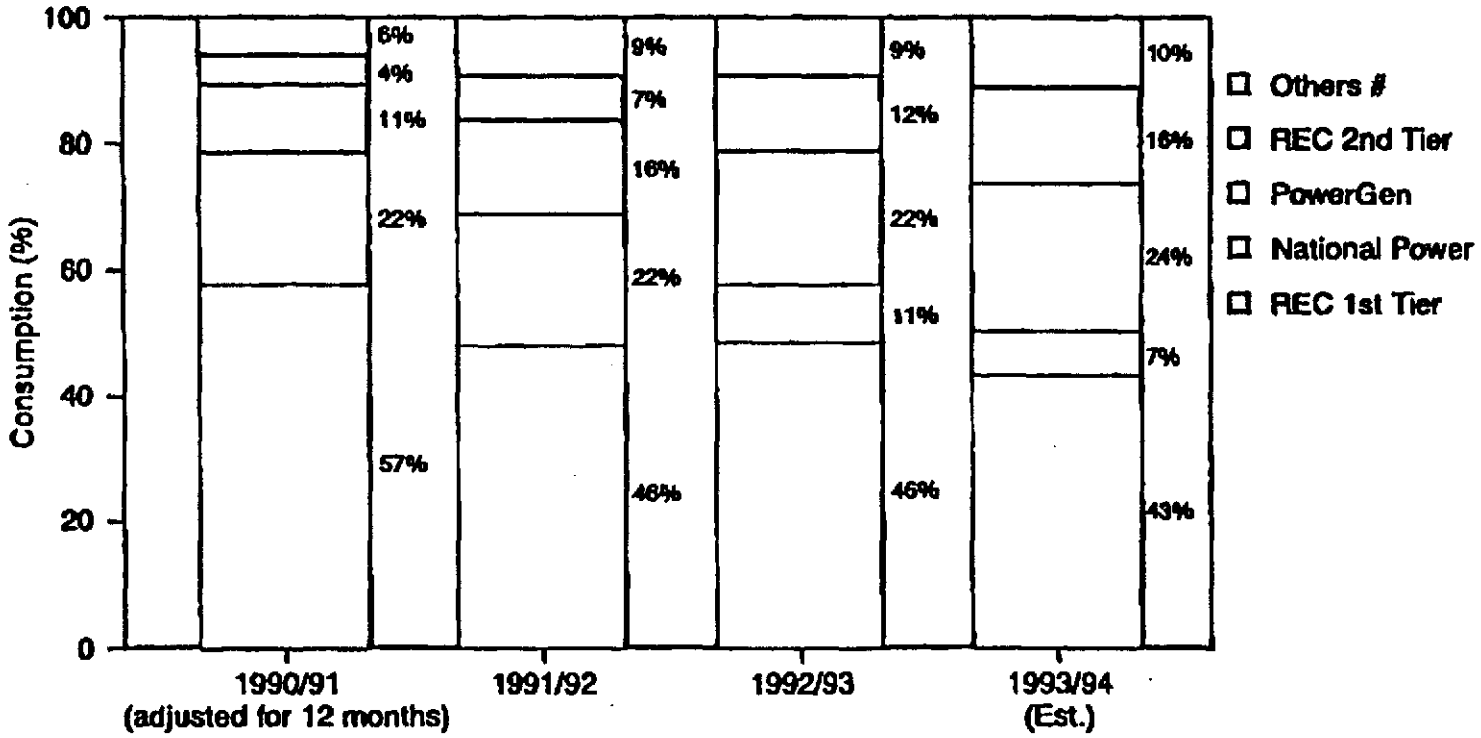
Nuclear Electric	16% →	23%
Other existing competitors	6% →	10%
New entrants	0% →	6%
NP	48% →	35%
PG	30% →	26%

(Changing market shares from 1989/90 to 1993/4)

COMPETITION IN SUPPLY
1 MW MARKET 1993/94



CHANGING MARKET SHARES IN THE OVER 1 MW MARKET: CONSUMPTION

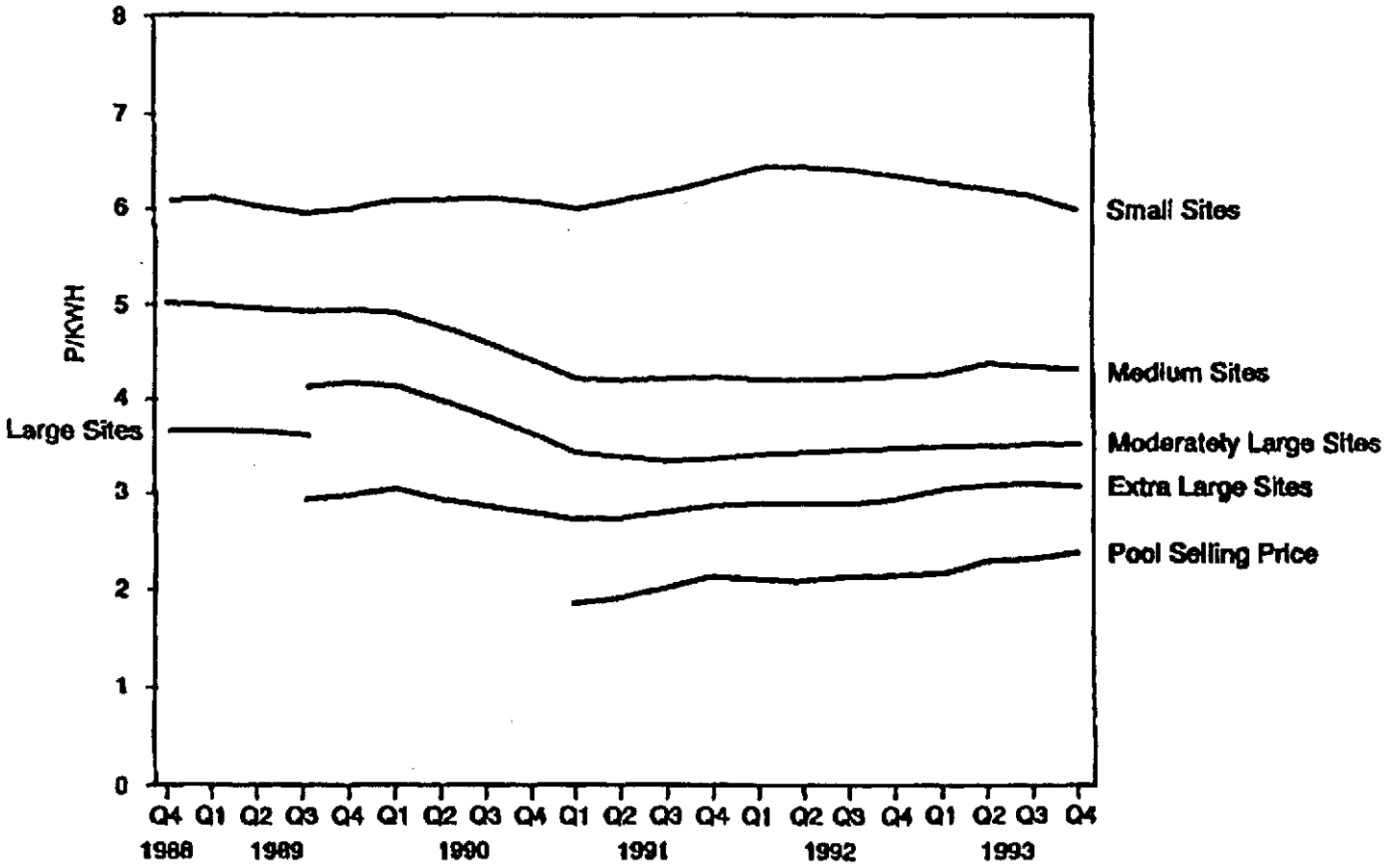


Total Consumption (Twh)	68.4	68.2	70.0	67.8

ScottishPower, Hydro-Electric and independent suppliers

REAL (1990) POOL AND ELECTRICITY PRICES TO MANUFACTURING SITES

FOUR QUARTER MOVING AVERAGES DEFLATED BY THE RPI



3 DISCUSSION

3.1 Evolution of industry structure

The present structure of the generating industry in which two suppliers, National Power and Power Gen, are dominant is not the artifact of any single design decision. Rather, it is the resultant of a number of forces over time. Originally, the Government wished to privatize the entire generating industry including nuclear plants, thus exposing the entire industry to competition. Since a company with predominantly nuclear generating assets would not be attractive to the market because of its high costs and risks, these generators had to be packaged for privatization with non-nuclear assets. How much non-nuclear capacity would be necessary? The Government decided that a company the size of National Power *(plus* the nuclear stations) would be adequate. As for the remaining non-nuclear assets (amounting to some 30% of the market), it decided that the goal of competition would be best served by consolidating them within one firm to act as a counterweight to National Power. Ultimately, however, the Government became convinced that the nuclear assets would still be all too "visible" to investors; thus, these were moved into a separate nuclear company which was not to be privatized. It is now more widely accepted that a *greater* number of smaller companies would have produced a more competitive marketplace.

As a partial remedy to enhance competition, OFFER proposed--and the companies accepted--that some 6,000 MW of capacity presently owned by National Power or Power Gen be sold to other parties. This figure does not enjoy any particular claim of being an optimal reduction in size for the dominant companies; it was recommended by OFFER as a plausible amount that would have appreciable competitive ramifications. The only restriction contained

in the undertaking is that the capacity be coal- or oil-fired. Such units run as mid-merit and peaking capacity and have the potential to set system marginal price much of the time. For the sale to be feasible, OFFER thought it essential to allow potential buyers to express their interests; the most sensible process was simply to let the buyers and sellers discuss the terms. The expected salutary effect on competition in generation does not depend on the choice of particular plants which are ultimately sold.

A number of international companies have expressed interest in capacity swaps rather than paying cash. Such offers appear to be interesting options for the generators.

3.2 The competitive transition

On the question of whether competition in generation or competition in distribution should come first, the view was expressed that the fundamental characteristic which underlies competitive markets is *customer choice,* in this case meaning choice of supply company. The prospect of customers choosing the best deal available drives every other aspect of competition, including competition in generation: it induces the retail supply company (which may be the distribution company) to buy at lower prices and increase its own efficiency.

3.3 *Pool pricing policy*

The Pool price has gone up in real as well as in nominal terms. As the charts from the presentation show, while most final prices (in particular those facing large customers) have come down somewhat, the Pool price has risen. This state of affairs is due in part to the fact that the Pool price didn't reflect the total price of electricity to customers because it didn't

reflect the initial contracts for differences. Thus, the Pool price is *not* the ultimate price which generators receive. Particularly during the first three years after vesting, the Pool price bore little resemblance to the price paid to generators, since this price was locked in by contracts with regional electricity companies (RECs) at vesting time which accounted for most of their output. Initial contracts for the vast majority of trades were concluded at prices significantly higher than the Pool price turned out to be. This discrepancy was due in part to the Government's desire to protect the coal industry; consequently, contracts were signed at higher prices than could be sustained in the market. As a result, the Pool was less crucial to the generators at the outset of privatization. Thus, it was less important at the time to have a high Pool price. The initial year of the Pool's operation did not reflect a fully competitive market.

One of the major complaints of the generators has been that they have borne the brunt of criticism arising from (some) customers' higher rates, and that the RECs have, in many cases, raised their charges at the same time that generators have *lowered* their contract prices to RECs (albeit due to lower coal prices to some extent).

3.4 Bidding in the Pool

One participant noted that generators' bidding *strategies* are fundamentally unobservable. It was asked whether OFFER would be satisfied if price realizations were at acceptable levels, since these prices and the bids themselves are the only observable quantities in this context. If it were of interest in promoting competition, generators could be asked to reveal the instructions which they give to their employees who actually submit the bids, but it is not clear that this would add much.

Another participant inquired about the *selling* price in the pool: bidders are paid the system marginal price. At present there are but few possibilities for buyers to make bids to express their demand for power from the pool. The pool is, in this sense, a one-sided market: generators bid in their availability, but the National Grid Company (NGC) makes *forecasts of* demand--buyers do not articulate their willingness to pay in the form of a bid. With OFFER's encouragement, the Pool adopted a trial policy some four months ago of allowing a few large customers to bid a price above which they would be willing to curtail a portion of their electric demand. At present, eight companies (average amount *of* potentially curtailed demand--65 MW) avail themselves of this "demand side bidding" system. On occasion, the buyers have actually set the Pool price. At times, such customer bidding appears to have reduced prices, but may have caused price spikes at other times.

In this demand side bidding system, there is no assurance that customers who bid will actually load the system to the amount which they bid. Customer bidding* could thus be used strategically to lower prices. Just for "being there" and bidding, customers bidding supply are compensated for the value of their capacity in maintaining reserve margins.

3.5 Does the existence of the Pool create distortionary effects?

One participant asked whether the existence of the Pool as an institution created a *distortion* insofar as it might constrain the ability *of* any user to negotiate the best possible arrangement with a supplier. It is the case, *of* course, that the selling price which a company is willing to offer a customer will depend on what it can get by selling its services elsewhere. A customer could not expect, therefore, to get a better deal than a generator could strike for

itself by selling into the Pool, except to the extent that a contract with that customer would offer some certainty in its terms not found when selling to the Pool.

Some of the larger customers in the country complain that the Pool is a "soft option" and offers generators too good a deal. The Pool does provide a mechanism for smaller customers--or their distribution companies on their behalf--to come together in order to reap scale economies. From this perspective, generators themselves might, in fact, be expected to receive *lower* profits because of the operation of the Pool. The Pool confers the advantage of a better informed, more efficient market.

3.6 Terms of contract and risk allocation

One participant observed that a conventional assumption of both regulators and utilities in the United States is that customers are best served by the stability and predictability afforded by utilities' practice of building and rate-basing their own facilities or, alternatively, by signing long-term contracts with third-party generators. Some have taken the view that sufficient generation resources would not be built in the absence of long-term contracts.

This predisposition toward long-term arrangements has been observed in the United Kingdom as well. Independent power projects presently under construction, for example, typically rest on the strength of 15 year contracts between independent generating companies and RECs. Note that the RECs only have a certainty of (some) customers for another four years, after which *all* customers will have access to competitive suppliers and to the Pool. National Power, Power Gen, and Scottish companies are building plants without specific contracts, thereby assuming 100% of the risk themselves. Six- to eight-year contracts have also

been discussed by some RECs. In general, the range of contractual frameworks considered within the industry appears to be growing richer over time. For example, the Pool offers a daily market; forward markets exist on the order of a few days to three to six months, and contracts ranging from two to six years offered by Nuclear Electric. It does not seem likely that financial markets are going to continue to insist on fifteen-year contracts to support plant financing.

3.7 *Obligation to serve and incentives for investment*

Another participant asked whether the electricity industry was headed toward a regime under which there would be no obligation to serve. Under such an arrangement, the Government would be faced with two polar policy choices: (1) It could keep its distance from the industry, allowing possible shortages to arise and relying on the price mechanism to send the right signals, or (2) It could step back in with some form of additional regulation if plants don't seem to get built. How would the Government decide what the appropriate response would be?

Overall, worries about obligation to serve are not as acute today as people five years ago expected that they would be. At that time, great concern was voiced that plants would not get built because of the financial risks. The "thickness" of the contract market which is developing, however, is increasing: information on prices which the market expects to apply in the next few days, months, and years is increasing in abundance and quality. Moreover, the time required to build a new plant is less than two years. On the whole it is expected that, if signs point to inadequate future capacity, producers will be motivated to build additional plants.

3.8 Transmission and ancillary services

The provision of ancillary services has benefited from increasing competition. The NGC, for example, is soliciting bids from generators to provide certain ancillary services; it is also soliciting bids for load reduction, which can serve the same end. Several large companies are getting paid for offering facilities for load reduction to the grid, quite apart from bidding into the Pool.

Although reform does not appear to be presently worthwhile, there is future scope for more accurate, cost-reflective pricing of transmission. Transmission outages are currently spread across all customers. If customers in areas in which transmission outages occur had to pay the full cost of the outage, much stronger incentives would be created for reducing load precisely where such reductions are needed.

3.9 The regulatory process

The United Kingdom lacks the formal restrictions on regulators' administrative practices found in many parts of the United States. For example, they are not subject to any restrictions on meeting representatives from the industry at any time, and can do so alone or accompanied by others. There is no requirement to hold formal hearings. Clearly, the regulatory process would tend to be more expeditious under such conditions. Some observers, however, have called for a system with more formal controls to allow for greater transparency and public scrutiny.

There are, of course, due process constraints on regulators' activities. Furthermore, their formal powers to compel are few. As a rule, the most which they can do is to *propose*

changes to companies; no company is forced to accept a price control change proposed by them.' If a company refuses such a proposed change, the regulator can refer them to the Monopolies and Mergers Commission (MMC) for investigation.

Like other regulatory bodies, OFFER is very conscious of the need to explain clearly what it is doing. In dealing with companies in the industry, communication is typically in the spirit of "Look, this is what I'm thinking of--what do you have to say about it?" or "Here are some issues coming under discussion. Please give me your opinion as to what you think about these points." Reviews of interested parties have been solicited on all price controls, and details of possible licence changes are publicized in advance in the interest of soliciting comment. In the event of licence changes, once companies accept the proposed change but before the change is actually made, a formal statement has to be issued so that people may register any comments. Statements which accompany decisions explain what was done and why. Thus, while there are few formal restrictions governing OFFER's behavior, there is a far-reaching appreciation of the merits of due process.

3.10 Regulatory reform

One participant mentioned that the ongoing review of REC pricing may well produce calls for a ratcheting down of the reference price for distribution charges. Such a move has obvious implications for the incentive effects of price caps.

Price caps have generally been viewed as superior to profit caps based on the United Kingdom's experience. In its simplest incarnation, the formula for the price cap at time t is

'They can, however, issue binding determinations in the context of certain pricing disputes.

ESTIMATES OF PRICE CHANGES 1989/90 TO 1993/94

	Nominal Change	Real Change
Small sites	+ 6.5%	- 1.5%
Medium sites	+ 2.3%	- 10.0%
Mod. large sites	+ 3.0%	- 10.9%
Extra large sites	+ 23.7%	+ 3.3%

$$P_t = P_o - (RPI — x),$$

where

P_o = reference price;
RPI = retail price index;
x = real price decrement.

Reviews of the price cap mechanism by OFFER encompass an evaluation not only of the magnitude of x, but also that of P_o. The basis for assessing both quantities includes needed revenues and the likely costs which the company faces. For a given net revenue requirement, there are different pairs of values for P_o and x which will yield this.

If customers face price increases, they may prefer that the introduction of such increases be staggered over time. In contrast, customers may prefer to see price decreases all at once rather than meted out into the future. For a given net present value, one does need to consider, however, the overall way in which such pricing policy decisions shape investors' perceptions and expectations.

A participant summarized his impression that the most significant sources of savings have been due to increases in nuclear availability, significant personnel reductions, and lower coal costs. Nonetheless, prices have remained relatively stable. Apparently, some appreciable increases in earnings have occurred. The participant inquired whether a standard such as a range of reasonability is applied to determine the acceptability of profits or of costs.

Earnings of generators have indeed increased. When OFFER has intervened, it has done so not because *profits,* per se, were too high but because the prices being charged could not, in OFFER's opinion, be defended. In proposing new prices, OFFER took profits, among other things, into account. In particular, the focus was on what level of profits companies needed to induce investors to provide capital. In the ongoing reviews of the RECs, their

current profit levels and likely future profits are a central concern.

One participant inquired whether there might be some role for "U.S.-style" regulation in the electricity sector of the United Kingdom. In discussions of alternative regulatory frameworks, most observers in the United Kingdom were keen to avoid what was perceived as highly legalized proceedings and the more intrusive regulation (eg, investment plans and detailed oversight of operating arrangements) established in the United States. In the early days, the phrase "regulation with a light rein" gained currency.

Regarding possible regulatory reforms, two strains of criticism have shaped the debate. On the one hand, customer groups object that prices and profits are too high and call for more interventionist regulation. On the other, generators complain that regulators are stepping in too much and argue that regulators should do less. Given this situation, there may be good reason to believe that the regulatory balance may be about right.

The chief executive of National Power, John Baker, suggested recently in the *Financial Times* that the replacement of the single regulator with a regulatory *commission* would be an advantageous institutional reform. The relative merits of these two options depend on what one is seeking to achieve through regulation. If one desires a *more stable* regulatory environment (as large incumbent companies might), then a commission might well be the best choice. Under a commission, policy is likely to be more stable because more than a single person must be persuaded that reforms are called for. Conversely, if one takes the view that privatization sought to create a. competitive electricity industry, but could not do so overnight, then it would be essential for the regulator to be able to vigorously promote competition. A single regulator would be able to meet this requirement most readily.

3. 11 Distributional impacts of privatization

Regarding the distribution of benefits from privatization among various parties, eg, generators, distribution companies, customers, and shareholders, there is no doubt that companies and hence their shareholders have all received very significant benefits from privatization. In addition, most of the large customers have benefited, and many medium-sized companies are benefiting now. On the whole, an increasing number of customers are better off.

3.12 The future of Nuclear Electric

At the time of privatization, the possibility of having separate nuclear companies was considered. The Government ultimately concluded, however, that this arrangement would only compound the problems anticipated in privatizing nuclear assets, and hence that it was best for these assets to remain within a single entity. Today, this question is, in principle, open for debate, particularly should a substantial privatization of nuclear generating assets take place. Nuclear Electric itself has made clear that it wishes to be privatized. It is seeking to become financially viable without the nuclear levy, which is, in any event, scheduled to be terminated.

Discussion of a possible division of Nuclear Electric is fueled, in part, by recent changes in Nuclear Electric's market share. In the future, depending on what kind of plant is ultimately sold by National Power and Power Gen, it is plausible that Nuclear Electric at 25% or more market share (which it is approaching) would be the largest company. The advantage of creating more than one nuclear company would be a more competitive environment and the ability to compare companies' performance. On the other hand, there maybe some costs

associated with running a nuclear company that would be increased if two companies were coexisting. Scottish Nuclear has two plants in Scotland; it does not currently operate in England and Wales. There could be an advantage in giving them a bigger presence in England and Wales. Clearly, the structure of the nuclear industry will be a subject of debate over the next few years as the future of nuclear power itself is considered.

3.13 Competition in the European electricity industry

Some four years ago, when the first White Paper on electricity privatization was released, some people said, "What a wonderful experiment, I'm glad someone else is running it! Let's watch and see what happens." Generally, there was more enthusiasm for introducing such reforms among officials of the European Community itself than there was in the member states. In the meantime, the Community's aims have become more modest, focusing instead on securing access to transmission networks. One speaker indicated that a change in the attitudes of individual countries' representatives compared to a few years ago is palpable. As but one anecdotal indication of such a trend, *everyone at a* recent European conference on electricity policy was in favor of competition. One French delegate at the conference argued that, not only ought there to be competition; it must be the regulator's duty to *promote* competition. Increasingly, competition--that is, not only competition in generation but competition in supply as well--is taken for granted in electricity policy discussions in Europe today. Moreover, the focus of debate is shifting to the details of implementation and of how to sustain a competitive environment. Thus, the British model has attracted increasing interest in continental Europe as well as in other regions (eg, Latin America) of the globe.

4 CLOSING REMARKS

In closing, Professor Littlechild was asked for his summary evaluation of the United Kingdom's nationwide "experiment" with privatization which has attracted so much interest. Three alternative frames of reference for evaluation were suggested by the questioner:

- The status quo ante, before privatization.
- The path chosen by the United Kingdom, ie, trying to promote competition and fixing problems as they arise.
- Some other path that, based on experience since privatization, he wishes had been tried as an alternative.

On the whole, Professor Littlechild suggested that the path followed by the government was about right, bearing in mind what was practical and the various constraints involved. Nonetheless, some shortcomings have been identified and are being addressed by OFFER:

> The existence of only three major generating companies has been somewhat of a problem. If one had been able to create a greater number of companies initially, this would have forestalled or removed some difficulties.
>
> If the distribution price control had been set fora rather shorter period instead of for five years, or, alternatively, if it had been somewhat tighter than it was, there would have been fewer instances of distribution companies reaping high profits. Some of the initial contracts have caused difficulties as well, in that there has been a decoupling between the initial contracts and the way that the Pool price, for example, has developed.

While important, these difficulties should not obscure the main conclusion that privatization

was the right decision and that the chosen path was the way to go. In generalizing the United Kingdom's experience to other contexts, different considerations would need to be taken into account. Thus, other countries, or states for that matter, won't necessarily want to do exactly as was done in the United Kingdom. Rather than adopting the British solution wholesale within other contexts, Littlechild suggested that considerations such as the following would require study and debate: whether a pool modeled on the British system--or some variant--needs to be created, whether companies ought to be broken up, whether transmission should be separated from generation, and what sort of arrangements, if any, need to be made in light of the fact that one may have a high cost coal industry or that nuclear power may be--at least for the moment--not economic.