Surrey Energy Economics Centre

PROSPECTS FOR INDEPENDENT POWER GENERATION

by

S Andrews, J F Harris, R Morgan
and C Robinson

SEEDS 48 December 1989

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by Colin Robinson, University of Surrey

Introduction

Electricity supply is by far the most complicated industry the government has so far attempted to privatise. For over forty years the industry has been in state hands, dominated for most of the time by a single generator in England and Wales. There have been several minor changes of structure and of name of the public corporations which run the industry. But, despite occasional suggestions for reform (mainly in the direction of greater centralisation[1]), there has been no substantial alteration in the industry's structure.

Privatising such an industry was bound to be difficult. Its long-established monopoly of electricity supply (which, in practice, pre-dates nationalisation) gave it a monopoly of information about the technology and the management of electricity generation, transmission and distribution in British conditions. That information monopoly has been a very significant determinant of the privatisation scheme (which may still not be in its final form) since government has had to rely on information provided by the industry. Putting it in the most basic terms, a government which has expressed itself so concerned to 'keep the lights on' has been very reluctant to take actions which the industry claims might make them go off.

In dealing with this difficult industry the government has, at least until recently, paid little regard to outside advice. There were three crucial areas where it seems to me it neglected advice and thereby caused itself unnecessary trouble and political embarrassment.

First, it attempted to privatise all nuclear plant despite the obvious problems that would cause with the flotation: in a last-minute conversion it had to pull out Magnox plant and, despite protestations to the contrary, it may yet take out the AGRs and even reconsider its desire for a 'small family' of PWRs. Second, it proceeded with electricity privatisation without linking it with coal privatisation: the dangers of that course of action are now becoming apparent as British Coal argues that it must not be broken up because the power of the major generators requires a single coal corporation with countervailing power. Third, it established a duopoly in generation rather than a larger number of generators.

The duopolistic structure of generation is my starting point today. Industrial economists are no longer so concerned with industrial structure as they were in the days

when students were taught primarily about the structure-conduct-performance paradigm. Philip Andrews was one of the first to point out[2] that, because of the force of potential competition, industries which appear to have monopolistic structures do not always behave like monopolists nor are they necessarily welfare-reducing. Austrian economists have never been too concerned about structures which appear monopolistic because they could see the scope, over time, for entry which would compete away 'excess' profits. More recently, contestable market theory has emphasised the importance of the absence of barriers both to entry to and exit from an industry (so that firms can both enter the industry and salvage capital costs if they choose to exit). So structure is not all-important. Provided there is reasonable freedom to enter an industry competitive behaviour is likely to be the result.

In the case of the new electricity supply industry, I want to examine the significance of structure and the extent to which the market is actually likely to be contested. The issue is a particularly important one. If there are serious barriers to entry into power generation, although in the privatised industry almost everything will apparently change, in practice everything will remain much the same.

The Privatisation Proposals

I begin with the briefest sketch of the privatisation proposals as they now stand[3]. I will assume, except where I say otherwise, that the proposals are not changed again and that privatisation takes place: neither is certain.

The CEGB will be divided into two generators and a transmission company. The original plan was for a 70:30 split of generating capacity between National Power and PowerGen, the former having the doubtful privilege of taking all existing and planned nuclear plant. Now that Magnox reactors are to be excluded from privatisation, the division will be nearer 65:35, though National Power may have a management contract for Magnox. NP could shrink still further if the government reaches the conclusion that the English and Welsh AGRs should also remain in the public sector. Long distance transmission of electricity will be in the hands of a third new company formed from the CEGB (the National Grid Company) which will also take over pumped storage capacity in Wales and the interconnectors which permit imports from France and Scotland.

The government's expressed intention is to reduce generator dominance of the industry, moving away from the 'cost-plus' arrangements which, in general, have allowed the CEGB and the rest of the industry to pass on to consumers any costs they incur. A principal aim of the privatisation scheme is to give electricity distributors much more influence than they have had under nationalisation. Distribution will be the responsibility of twelve supply companies, each based on an existing Area Board; they will, however,

have much more extensive duties than the Area Boards which have had to purchase their electricity from the CEGB and to pay whatever it charged them. The new area distributors will be able to contract for electricity with the two major generators, with other private generators, and with France and Scotland (which both have surplus capacity). The distributors will also be able to build their own generating capacity up to a limit of 15 per cent of their contracted capacity. Although the distributors will inherit the distribution systems in their areas, they will not have statutory monopolies to supply electricity in those areas. In principle, consumers will be able to contract for supplies with other distributors or (in the case of large customers) direct with generators, using the local distribution network to convey their supply.

In Scotland[4], unlike England and Wales, the industry will continue to be in the hands of two vertically integrated companies - one in the north (based on the NSHEB) with a high proportion of hydro-electricity capacity and a much larger company in the south (formed from the SSEB) with a large nuclear component. There will be some reallocation of generating capacity among the two companies and the Scottish nuclear stations (which supply over 50 per cent of Scottish electricity) will after privatisation be jointly owned by the two companies. The rest of this paper concentrates on the privatisation scheme for England and Wales.

The industry will be 'regulated' after privatisation by the Director General of Electricity Supply who will supervise most of its activities. Price regulation will take a similar form to that for other recently privatised industries, using an RPI-X+Y price formula for prices charged to smaller consumers (where RPI is the change in the retail price index, X is a percentage deduction from that change designed to squeeze the industry's costs and Y is a percentage addition for costs which can automatically be passed on).

Economic Issues in Privatising Electricity Supply

Some of the major problems in electricity privatisation arise from the 'natural monopoly' characteristics of parts of the industry[5]. The nationalised esi is an umbrella for a number of different activities, some of which for efficiency reasons should be organised competitively, whereas others have natural monopoly elements which make them more suited to a sole supplier.

Generation is by far the biggest activity, accounting for around 80 per cent of the present industry's costs. Though it has been a monopoly under nationalisation, there is no economic reason why that should be so. By turning it into a competitive activity it is, in principle, possible to achieve gains in productive efficiency (lower total costs) and in allocative efficiency (prices which are in closer alignment with those lower costs than they

are now). Taking a more 'Austrian' view - that is, considering competition as a dynamic process of discovery - one might reasonably expect the introduction of competition to provide a spur to entrepreneurship, innovation and technological progress. One of the government's main expressed aims in privatising electricity supply is to inject competition into generation, in an attempt to realise these potential gains.

The other principal activity of the nationalised esi, apart from appliance sales and electrical contracting where it already works in competition with the private sector, is the transportation of electricity to where it is needed, both over long distances (transmission) and over shorter distances (distribution). Since there appear to be efficiency advantages in having only one network of wires, transmission and distribution have natural monopoly characteristics. Although the retailing of electricity is not itself a natural monopoly activity, and hopefully one day it will become competitive, ownership of the national transmission system or a local distribution network places substantial monopoly power in the hands of the owner. Consequently, there is need for a means of consumer protection against monopolistic exploitation.

State ownership is one option: even though it is not in favour because of British experience with nationalisation, it would have been possible to leave the natural monopoly elements of the esi in the hands of public corporations. The alternative, which the present government has adopted, is to privatise the natural monopolies but to regulate them. The National Grid Company and the electricity distributors will be obliged to allow use of their wires by third parties, their charges will be regulated and, as explained above, there will also be price regulation to protect consumers. Instead of the supervision by Ministers and civil servants which occurs under nationalisation - which is exercised by such 'backdoor' methods as placing pressure on senior executives of the industry - the intention is to have more open and explicit regulation in which the rules of the game will presumably be clearer and operated much more in public.

Gains from Privatisation?

An old-fashioned welfare economist might imagine that governments embark on privatisation in order to maximise social welfare. Anyone who does hold such beliefs must be completely baffled by the present government's privatisation programme. In practice, the way in which state corporations have been privatised can be explained only by public choice theory. Plainly, governments have many aims other than simply realising potential efficiency benefits for the community at large; thus they must be expected to place a high premium on forms of privatisation which they believe will yield extra votes. Consequently, macro-economic objectives such as revenue-raising to reduce public borrowing appear to have dominated some past privatisation schemes (such as British Gas) and encouraging wider share ownership is another popular political objective.

However, whatever the political calculus may dictate, the prime aim of privatisation should be to improve social welfare and the principal means to that end is market liberalisation so as to realise the social benefits which greater competition can bring. The generic problems of the nationalised industries appear to result not so much from their being state-owned as from most of them being monopolies; consequently, they are unresponsive to consumers' needs, lack entrepreneurship and are slow to innovate. Although ownership does to some extent matter - productive efficiency may be enhanced by substituting private shareholders for the state - in practice governments seem unwilling to expose newly privatised corporations to the market for corporate control. If it is difficult or even impossible for them to be taken over, there may be no more pressure on management under private ownership than when they were nationalised.

Most of the failings of the state corporation should be remediable via the introduction of competition into their product markets. Privatisation may or may not be necessary to attain that end: sometimes freeing entry to an industry is sufficient. If a market can be made contestable, existing producers will behave competitively because of the force of actual and potential competition. But there are cases in which only by privatisation can significant competition be introduced; that is probably true of the esi where the incumbent generator has been so strong that past efforts to free entry have not produced any entrants.

Whether there is genuine competition in electricity supply is a function primarily of whether there is competition in generation to provide efficiency pressures in the sector of the industry where most costs are incurred and where there is most scope for competitive activity. It is no exaggeration to say that the success of failure of the government's privatisation scheme rests primarily on whether or not it stimulates competition in generation. If it does not, distributors and larger consumers will have only a limited choice of sources of supply. Moreover, in the absence of competition to protect consumers, an excessive weight will rest on the industry regulator who will have to try to supervise all the activities of a very complex industry in an effort to avoid consumer exploitation.

Thus a liberal scheme of privatisation is essential if there are to be net social benefits. In the absence of such a scheme, what will emerge will be a variant of the cost-plus industry which existed under nationalisation. All the costs of more thorough-going change will be incurred but there will be few, if any benefits. In other words, it would probably have been better to have left the industry as it was or to have attempted to make state ownership work better (for example, by having it supervised by a regulatory body rather than by politicians and civil servants).

Competing Generators?

A number of commentators suggested before the privatisation scheme was announced that the CEGB would need to be divided from the beginning into five, six or even more generators if there was to be genuine competition in generation[6]. Instead, the Government decided to establish a duopoly (National Power and PowerGen) in generation in England and Wales but to provide conditions which, it hopes, will encourage other generators subsequently to enter the market. It also hopes that electricity imports, from Scotland and France, will increase. In a paper written in March 1988 which commented on the White Paper proposals[7], I gave some reasons why the government's scheme as it then stood seemed incapable of injecting significant competition in the foreseeable future. Essentially my case was that the government's scheme provided neither for an initial competitive structure nor for a market which newcomers could readily contest.

Briefly, I pointed to the strong incentive to collude (either explicitly or implicitly) which always exists in duopoly. Both companies know that, by suppressing competition, they can gain at the consumers' expense. Because the market demand for electricity is highly inelastic with respect to price, two very large generators acting in concert can each be much better off than if they indulge in price competition. Of course, they may well choose not to make large profits because to do so would make them conspicuous; a quiet life at the consumers' expense is a more likely outcome.

Moreover, it seemed that an anti-competitive effect would arise from entrusting National Power with existing nuclear stations and with the future nuclear programme and forcing distributors to take a specified proportion of 'non-fossil fuel' electricity. Plainly, despite the White Paper's insistence that the privatised industry will be free from government interference and protected from 'fluctuating political pressures', government will have the power to insist that distributors take such quantities of non-fossil fuel energy as it wishes. Moreover, there are bound to be suspicions about the subsidisation of nuclear power and about political fixes between the government and National Power. NP will, in effect, only be partly privatised and will suffer from the same confusion of management objectives which has been common in British nationalised industries in the past; it will not know whether it is supposed to be pursuing commercial or 'public service' objectives. One of the advantage of privatisation is supposed to be that it avoids such confusion.

Such structural problems might not have mattered greatly if newcomers could easily have entered to rival the incumbents. But it seemed to me at the time of the White Paper that entry would be rather difficult. The two big generators - with a common managerial origin in a dominant single generator - had too many advantages. For example, flotation would probably give them assets at well below replacement cost, a high

proportion of their costs would be sunk and they would have large supply systems within which cross-subsidisation would be very hard to detect. Moreover, some of the more likely large entrants - such as power plant manufacturers - had for many years been supported by the CEGB and would still depend on the big new generators for business.

Thus, any new competition would probably stem mainly from increased imports from Scotland (with increased surplus capacity) and France rather than from new 'independent' generators. Such competition could have been stimulated by limited market liberalisation even if the esi had not been privatised.

A Protected Market for the Existing Industry?

Potential entrants to generation have been at a particular disadvantage in the long transitional period during which members of the existing industry have been trying to agree among themselves on a system of contracts and on methods of operation. During this period, would-be entrants have had to try to find sites and raise finance without having any contracts. The two big generators already have systems comprising a mix of power stations and they can much more readily raise finance.

Indeed, during the summer of 1989, potential new generators must have wondered whether they would ever be able to enter the industry. At that time, it seems that the existing industry was discussing ways and means of fixing the post-privatisation market in its own favour. I do not blame the industry for that. Any blame lies clearly with the government whose scheme to divide the CEGB into only two generators provided an incentive to collude. Furthermore, the government, which appears only belatedly to have realised how complex electricity privatisation is, seems to have imposed severe time pressures on the industry.

After a period in which National Power and PowerGen had evidently been trying to make direct sales agreements with larger consumers previously served by the distributors, the existing industry apparently formulated a plan which would control such aberrant tendencies to compete. The industry's proposal, according to newspaper reports[8], would have given the distributors a monopoly of serving all consumers with loads of up to 1MW (roughly 70 per cent of the market). National Power and PowerGen would have been able to bid for half of the other 30 per cent; in exchange for such restraint, they would have been given long term contracts with the distributors which would have allowed them to recover all their costs. The other half of the non-captive market (15 per cent of the total) would presumably have been open not only to new generators but to distributors supplying power either bought-in or generated in their own plant. Assuming the scheme to have been accurately reported, its adoption would have virtually excluded new generators and would have resulted in the outcome about which

I expressed fears earlier - a variant of the cost-plus industry which existed under nationalisation. Whatever label one puts on the proposal, it can hardly be 'competition'. By definition, if an industry is carving up the market between its existing members and deciding on the periphery of newcomers it is prepared to tolerate, the market is not competitive. There is no genuine contest for the market since entry is limited by the incumbents.

It is sometimes claimed that a genuinely competitive market is hard to establish in electricity supply. It is suggested that long term contracts and some form of managed market are required, inter alia, because of the need to provide a secure supply for consumers, to avoid 'unfair' competition for those companies which are committed to provide secure supplies and to ensure the stability of the transmission and distribution systems.

Because of the information monopoly, it is hard to judge the validity of such claims. But I suspect they are much exaggerated. After all, other capital-intensive industries manage without the closely-specified long term contracts which British electricity suppliers sometimes appear to be seeking. Major oil companies, for example, continue to invest in very long term projects such as exploring for and developing new oilfields even though meaningful long term contracts (including both prices and quantities) are virtually unknown in the crude oil market now that crude oil prices are almost invariably related to going market prices. As for supply security, which seems to be such an issue, there is surely considerable scope for giving consumers choices between different security levels (matched by different prices) rather than imposing on them high-cost security dictated from the centre and backed by large amounts of surplus capacity.

In any case, the logical conclusion of the 'managed market' hypothesis is that privatisation of the esi is pointless. If the benefits arise primarily from liberalisation of product markets rather than from a change in ownership and if market liberalisation cannot be achieved, it would be better to try to make the existing state-owned industry work better.

An Improved Deal for New Generators?

Until recently, it seemed that for all the discussions within the existing industry and with the Energy Department, virtually no progress was being made with liberalising electricity supply. The industry, equipped with its near-monopoly of information and having been provided by the government with a strong incentive to collude, was responding in entirely predictable manner. Eighteen months after publication of a White Paper which contained a muddled scheme to privatise electricity, muddle and confusion

of fossil fuel plant which is evidently to be on long term contract is to be divided among these two 'competing' companies.

Distributors appear to be treated more generously than National Power and PowerGen, even though distributors will be allowed to integrate backwards into generation so that they may turn out to be quite large generators in their own rights. Their sales seem not to be limited upwards but downwards since they have a guaranteed market among smaller consumers. Given this large captive consumer base, along with other incumbent advantage, distributors - using either own generation or bought-in power - might make entry difficult for would-be new generators.

Among further oddities is the concept of a 'lifetime' contract for a nuclear power plant. Does it mean that nuclear plant operators will be able to pass their costs on for as long as they choose to operate their plant (bearing in mind that there will be a nuclear levy to offset the excess costs of nuclear versus fossil-generated electricity)?

Prospects for the Independents

Although details of the scheme are lacking, if I understand it correctly there seems little prospect of serious competition in generation in the first four years. Distributors will supply at least 70 per cent of the market; the two big generators will take another 15 per cent; and new entrants will have to fight it out for the other 15 per cent with distributors which may well have recently invested in new generating plant of their own. As I have explained already, potential new entrants will suffer disadvantages in trying to compete against the incumbents. Moreover, because of all the uncertainty which has so far surrounded (and indeed still surrounds) the terms of entry to the industry, they have had little time to gear themselves up for entry. Presumably some of the well-publicised large schemes (some of which are joint ventures with the big generators) will go ahead, but the outlook for consumers hardly looks bright in the early years of privatisation.

Beginning with the next four-year period, however, there is a better prospect of competition. Quite small consumers (100kW) can be supplied direct and new generators should have had time to prepare for entry. A limit (albeit by then raised to 25 per cent) will remain on the combined market share of the two big generators. Although such constraints are generally objectionable, one must remember in this case how imperfect is the starting point. I appreciate the irritation of larger consumers who would like to take more from National Power and PowerGen. But, given that the Government was sufficiently misguided to start the privatised generating industry off with a duopoly structure which makes genuine competition between the two big generators improbable, there is a high premium on schemes which will stimulate entry to the industry. Seen in that light, the limit may be necessary to encourage entry by offsetting the inherent

disadvantages from which would-be entrants suffer. At this stage, it is very important to modify an ill-judged privatisation scheme so that competition does eventually appear and something is salvaged for consumers.

Conclusions

People are very ingenious and, once even a small chink appears in a previously monopolised market, they will try to enter. I hope so, because I repeat that privatisation will have been essentially a waste of time if they do not. Both the technology of generation and environmental pressures now favour smaller scale generation so that scale barriers (if they ever really existed) are now of relatively minor consequence. Maybe potential entrants to the industry are indeed sufficiently ingenious that they will be able to circumvent the various obstacles which have ben placed in their way so that in the course of time competition will develop. They will also, of course, have to be willing to accept the political risk that a change of government might leave them high and dry.

Privatisation should result in the entry into an industry of new people, new ideas and better ways of doing things. It is extremely unfortunate that the industry spent so long on the wrong track before the present scheme was produced. Would-be independent generators have lost a great deal of time and it will be all the longer before any gains from competition appear.

For two or more years I have expressed doubts whether electricity privatisation, in the form proposed by the Government, would produce any benefits for consumers. Whether it will or not still hang in the balance. But there are some signs of last-minutes repentance. The latest proposals, though imperfect and showing signs of haste, may salvage something from an ill-devised privatisation plan. They will protect new generators for a period from National Power and PowerGen though, because there do not appear to be any limits on sales by distributors, the distributors will also effectively enjoy protection and their market power may deter potential generators. It is hardly the kind of scheme which one would have expected from a Government ostensibly dedicated to the introduction of competition. But it does at least recognise the difficulty of entering generation and make some attempt to deal with it.

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THE IMPORTANCE OF ENCOURAGING INDEPENDENT GENERATORS IN THE PRIVATISED ELECTRICITY SUPPLY INDUSTRY.

J F Harris, Chairman of East Midlands Electricity

In his paper, Professor Robinson has admirably reviewed the structure of the electricity supply industry under privatisation. It is a structure that I welcome. The future is a future that I welcome.

Of overriding importance in that future is the encouragement of independent power producers. It is by such encouragement that we shall move towards the kind of competitive environment that will, I believe, ensure that our customers are better served. This has not been a snap decision. Many of us who have spent all our working lives in the industry have long held the view that change was needed.

The changes that will come about in 1990 will, I believe, ensure that the customer is the ultimate winner. The customer, more than ever before, can look forward to an industry that will have their interests foremost in its mind.

Since the creation in 1948 of the present structure, the industry has been based essentially on federal lines. If I can draw an analogy with the structure of universities - and why not, we are here, after all, at the invitation of the University of Surrey - the electricity supply industry has operated very much on campus lines. Individual departments have fulfilled their specialist functions within the guidelines and control of a central organising body.

I am not suggesting this as a recipe for the University of Surrey but my industry must break away from such a structure. Our individual departments - the CEGB, the Electricity Council, the 12 area distribution boards - can no longer operate as they have done for the past 40 years.

The time has come for the status quo to end. The campus - the federal structure - must be disbanded. We must, and I am pleased to say will, be given the opportunity to forge ahead as stand-alone companies and organisations each committed to the long-term health of the industry and hence the interests of our customers. If we fail to serve the customer well, the industry will decline. Those who say that after privatisation we shall only be interested in making profits - a fast buck - really do not understand business.

We may, as yet, have had little competition within the industry but let no one believe that electricity has been one that has enjoyed a monopoly position. In the energy

market, fierce competition with gas, oil and coal has existed for many years. Only by introducing professional and effective marketing resources into our industry have we survived and established a reasonable share of this expanding market.

We are committed to the vigorous marketing of electricity. We understand that we must discover what the needs are of our customers. We understand that there must be cost-effective research to improve existing applications of electricity and find new ones. We understand that we must go out into the market place and tell our potential customers of the benefits of choosing the electric solution.

It is our aim to increase our slice of the national energy cake. We do not wish to see the total size of the cake increased - quite the reverse - we want to market electricity as the efficient energy source - but we wish to increase electricity's share of the cake. But if, after thorough investigation, we cannot convince ourselves that increased use of electricity will offer our customer overall savings, we will not try to convince them.

Electricity represents only 15% of the UK energy market but by the middle of the nineties, we would like to see this increased. Having satisfied customers that electricity is the right choice for them, we must convince them that supplies will be at the lowest cost possible.

This brings me to the main thrust of my paper - to the question of generation and the part that we believe medium-scale generation projects can play in encouraging further downward pressure on electricity prices.

Essentially in this country, electricity generation has, up to now, meant large-scale coal-fired plant. The Trent Valley - megawatt valley - is the image that most people have of generation. It may be their image but it should not be their vision. Let me tell you that the wind of change is blowing strongly though not perhaps as strongly as it might.

Those not familiar with the electricity supply industry may find it difficult to believe that for the past 40 years since nationalisation, the organisations who have had the job of serving the customer have had relatively little direct control over the vast proportion of their costs. Around 80 per cent of customers' electricity bills is incurred by the original cost of generating electricity of which more than half is the cost of fuel. Privatisation should present a useful opportunity for bringing competitive pressure to bear.

I believe the problems go back to 1947 with the creation of the British Electricity Authority, the forerunner of the Central Electricity Generating Board. This resulted, in part, in the industry being dominated by engineering and production considerations rather than the influences of market forces.

In spite of a single cost plus producer of electricity, the staff in the industry can take great credit for their efforts since nationalisation. Over the last six years electricity prices have reduced in real terms by 14 per cent for our industrial customers and by 11 per cent for domestic supplies.

In part this has been achieved by cost reductions within East Midlands Electricity but it is mainly due to the tremendous efforts of British Coal. I only wish we had seen similar reductions in costs from generators. Perhaps the simple act of introducing contracts between generators and suppliers will bring about reductions in generating costs.

Against this background of cost plus production, I have for many years firmly believed that my industry was in need of restructuring wherever its future lay - public or private. The structure proposed by the Government on privatisation will ensure that the electricity supply industry does take advantage of the opportunities open to it and by so doing encourage moves towards lower electricity prices, in real terms, to the customer. We shall for the first time in 40 years develop a competitive market, in both generation and supply, that will pay more heed to market forces as the only means of "growing the business".

In generation, I believe it would be inappropriate for one effective monopoly to be entirely replaced by a duopoly - National Power and PowerGen. And we will have failed in the objective of introducing competition into the electricity supply industry if, say five years on, the duopoly has effectively secured the total market. That will not produce the competitive edge necessary to lower prices in real terms.

From the early days in the privatisation debate it seemed clear that there were great benefits to be gained if sections of the industry took an active role in promoting competition in generation within the industry - benefits that are borne out of taking advantage of the technological opportunities that now exist for the generation of electricity.

Whereas there may have been some in the industry who took a "wait and see" attitude, ours was that if we were to purchase supplies wisely we must become better informed about "the generation game".

We cannot entertain a situation whereby the long-term purchase agreements we will need to enter into are negotiated from a basis of ignorance. We - the purchasers - are the people who serve the customer. We must be in position to ensure that the efficiency of generation plant is maximised. We must question from a platform of knowledge and confidence. We must be able to guarantee that when a generator says his plant is operating at optimum efficiency, that we - the people buying the electricity - are not in fact paying a high price for gullibility and ignorance. How are we - who are at present the retailers of electricity - to be in this position if we don't make a conscious effort to learn?

We will gain knowledge and confidence in "the generation game" by becoming one of the players not by remaining on the touchline. It is for this reason that East Midlands Electricity has seen itself as a catalyst in developing medium-scale generation projects.

The development of a sound competitive foundation for generation based on a range of fuels, technologies and capacities will, we believe, begin the process of ensuring a downward pressure on electricity prices. Generators will have to become more efficient than at present and to do so will have to maximise the benefits of long-term economic performance and availability as well as take advantage of short term construction times and low operating costs.

While there will remain the need for large scale coal and nuclear plant, there will be increasing emphasis placed on the new environmentally acceptable technologies of fluidised bed combustion of coal and on combined cycle gas turbines. Environmental concerns are quite rightly important issues. We wish to promote the East Midlands region that we serve not desecrate it. We are involved with urban development projects. We route overhead cables so as to avoid undue intrusion into sensitive areas or we lay cables underground where alternative routing is impracticable. Clearly then any generation projects with which we are involved must also be environmentally friendly. The technologies available today are both environmentally friendly and well proven overseas. Some would say that Britain should not have waited until now before considering their introduction. Big is certainly not always beautiful in power plant construction.

These points are central to the involvement by East Midlands Electricity in independent generation projects.

Let me make it quite clear, we believe that we must invest in proven technology - tried and tested generation schemes which have demonstrated that they are viable. We do not consider it appropriate - nor are we prepared to - act as guinea pigs for pure research. We are in the business of finding the best ways to serve our customers and by so doing provide our shareholders with a profitable rate of return.

It came as something of a shock to those who had no awareness of the international market and had been brought up to regard the gas turbine as a quick but costly expedient to go to other countries and find gas turbines operating as the only source of power. Used in the 60s and 70s for peak lopping there have been considerable advances in the technology. Operating temperatures have increased from 1010 °C to 1260 °C thus improving efficiency from around 20 per cent to around 35 per cent. By passing the hot exhaust gas from a simple - open - cycle through a heat exchanger to produce steam, a steam turbine can be added to boost overall thermal efficiency of the plant to better than 45 per cent.

This combined cycle technology is already in use worldwide with power stations as large as 2000 MW and there are many at around 300 MW. We have looked with interest at this technology and at Corby we are in partnership with Hawker Siddeley Power Engineering for a 350 MW combined cycle gas turbine project.

The General Electric Frame 9 plant proposed for Corby is already in use in West Germany, Ireland, Malaysia, Japan and Pakistan and is becoming the world standard in combined cycle gas turbine technology.

The benefits of combined cycle turbines for power generation are well-known:

- their high conversion efficiencies of around 42 to 48 per cent,
- construction within a short timescale; in the order of 30 months - thus allowing the high planning margins currently in force to be reduced.

At the proposed output of 350 MW, the Corby plant would generate sufficient electricity to supply a demand equal to that of Kettering, Corby and Northampton - something like 300,000 people.

Combined cycle gas turbine generators are among the most environmentally sound methods available for the generation of electricity.

Gas turbine technology is not the only "new" technology that I believe we should have taken advantage of before now.

Worldwide, today's coal-fired plants represent a considerable move away from the traditional large-scale power stations. Circulating fluidised bed combustion of coal is yet another technology that has been shown to have an important role to play in the international power scene. With plant already in existence in Western Europe and the USA, we are able once more to see plant that is operating to the benefit of customers.

As with our gas proposal, we do not wish to carry a coal project forward in isolation.

Our partners here are British Coal and a most promising site has been identified at Bilsthorpe in North Nottinghamshire. This will be a pit-head power station with a direct feed of long-term, secure supplies of run-of-mine coal. Circulating fluidised bed combustion of coal, with its levels of SOx and NOx emissions well below any proposed legislation, is therefore highly attractive.

Our analysis of CFB worldwide, including the States, suggest that the optimum size is around 150 MW.

We shall continue to investigate which options available to us from a plant manufacturers point of view would best serve our needs and those of our customers.

We have been closely following the development by British Coal of pressurised fluidised bed combustion and coal gasification techniques at Grimethorpe. We welcomed the announcement in August by the Secretary of State for Energy that the Government would provide up to £8 million towards the cost of the programme.

Our current close association with British Coal is something I wish to see continue and I hope that customers of East Midlands Electricity can begin to reap the benefits - in the mid 1990s - of the already established modern coal technology and that they can look forward to yet further benefits as the present development work bears fruit.

New generating companies are already demonstrating that they can assist in achieving a downward pressure on prices. They have shown that today's electricity prices are not competitive and they must be assisted in establishing themselves in the market place.

A detailed analysis of the Bulk Supply Tariff has convinced us that electricity generation in the UK is not operating at the lowest cost per unit that is possible from the present portfolio of generating plant.

The present power system is certainly sub-optimal with too many large power plants having to operate on two shifting regimes. The load duration curve clearly shows the need to establish small and medium-scale plant including peak lopping stations. It will be most surprising if any large power stations (ie 2000 MW's) will be required until the end of the century.

But our belief in competition is not confined to generation.

We accept that we cannot have competition in generation without competition in supply. It is true that Public Electricity Suppliers - PESs - will own the wires. And for Mrs Jones down the road there will be no real choice. A monopoly will remain and her interests and those of the other 1.9 million domestic customers within East Midlands Electricity will be looked after by a regulatory framework that essentially controls the price of electricity to the customer rather than the means by which the service is provided.

In the supply business - the power rather than the wires - public electricity suppliers will be in direct competition with those with a second tier licence. These may be generators or new suppliers who are not generators. They will all have the opportunity to use our wires to supply electricity directly to specific premises or sets of premises.

As you are no doubt aware from the many recent reports, total competition in electricity supply will not come about immediately. After much negotiation, I believe the Government and the industry have come up with a formula for the introduction of supply competition which will be equitable and effective and is in the best interests of the customer. You may be asking why this initial restraint on supply competition was necessary. Competition will come about through privatisation and it is therefore necessary to achieve the successful flotation of all the new distribution companies.

You cannot wave a magic wand and achieve 100% competition overnight; a single producer operating in a public sector monopolistic way cannot be allowed to become a private monopolist. If that happened the problems you have all seen in British Gas would be repeated in an even more unacceptable manner. A further reason is that we have a long-term commitment to our customers.

They not only require competitive prices but prices which are stable. Unbridled competition on Day 1 would have brought with it price volatility and uncertainty on a scale which would have been unwelcome for both our shareholders and our customers. In the uncertain environment which would arise from an immediate free for all, there would be no long-term contracts between suppliers and generators.

The necessary capital investment in new plant would be extremely difficult to come by and there would be an effective barrier to the entry into the market of independent generators as a result of the risk associated with long-term investment in a volatile market.

There are parallels as I mentioned with British Gas and British Telecom where a phased introduction of competition has been effected by the combination of rolling back

licences, actions of the regulator and, in the case of British Telecom, referral to the Monopolies and Mergers Commission.

Competition in electricity supply will initially be limited to the larger customers with maximum demand of 1MW or more. Although the number of customers involved is small, they represent a significant proportion of the industry's sales. 5000 customers throughout England and Wales, 470 being in East Midlands Electricity.

After four years, the freedom of competition will be extended to a much larger number of customers - those with a maximum demand of 100kW or more.

Then all but our smallest industrial and commercial customers will have genuine freedom of choice in electricity supply.

Finally, just eight years from the most fundamental of changes to effect an industry which is vital to every aspect of our economic life, there will be no restriction and customers will be free to purchase electricity from any registered public electricity supplier - a world first.

The process of regulation will ensure that the cost of using our wires will be transparent and no greater than we charge ourselves. I believe that within the contractual arrangements now determined, there will be no shortage of companies wishing to supply electricity through our wires. In fact, such competition has already begun with National Power and PowerGen making informal approaches to major customers. Knowing the generation game is one thing but knowing how to look after customers on a long term basis is quite another matter. I am sure there will be many who will try to poach our larger customers but I feel they will have a tough time convincing them that they can supply not only the electricity but also the full "before, during and after" sales service that can - and is - provided by the local public electricity supplier.

We know our customers. We know their needs. We should do, we have been dealing with our local customers for 40 years. Equally the CEGB understand the generation game but the objective of privatisation will be lost if the duopoly continues to retain the exclusive access to the generation market.

Through a responsible encouragement of sound generation projects, a clear understanding of both distribution and generation, and a firm commitment to further improving the service that we - East Midlands Electricity - give, the customer will indeed be the winner.

PROSPECTS FOR INDEPENDENT GENERATORS
Obstacles to Independent Generation in the UK

by Stephen Andrews
Director, Association of Independent Electricity Producers

Introduction

Independent power producers do not presently supply any great amount of electricity in the UK. The reason for this is partly historical - until the 1983 Energy Act it was not possible for companies to generate electricity as a main business - and partly, commercial. Electricity has been provided relatively cheaply and major industrial processes, which produced electricity as a by-product, have been in decline. The prospects for independents under the Electricity Act 1989 should have been more promising, but following the Government's recent announcement about the transition to full competition, are now uncertain. This paper examines the recent history and present status of independent generation in the UK and the opportunities and obstacles in the future.

Energy Act 1983

The 1983 Energy Act was designed to open electricity generation to competition and required the Area Boards to publish tariffs for the purchase of electricity by them on terms which:

> "a) will not increase the price payable by customers of the Board for electricity supplied to them by the Board, and
>
> b) will reflect the costs that would have been incurred by the Board but for that purchase."

In addition, the Act required both the CEGB and the Area Boards to allow access and publish terms for the use of the system for the common carriage of electricity.

The legislation did not succeed in its aim and, in fact, the proportion of independently-generated electricity has declined even further. In addition to the failure of the Act to stimulate new generation, there has been a major deterioration in Britain's manufacturing base, with those industries who traditionally generated their own electricity suffering most.

In interpreting its response to the legislation, the NESI moved to protect its position as a monopoly supplier of electricity by re-defining its "unavoidable costs" in the main industry tariff, the Bulk Supply Tariff, or BST. A new element of fixed charge

was introduced into the BST by the CEGB, called the Non-Marginal Energy Charge. In 1983, the fixed charge represented just 1% of the BST income, but rose dramatically - to 30% in 1988/9. These fixed charges represent "unavoidable costs" to the Area Boards, and hence, limit the price that can be paid to independent generators to some 70% of that paid to the CEGB at its major supply points. As a result, the average cost of a unit of electricity bought on the BST by an Area Board from the CEGB is 3.52p/kWh. The avoidable unit price is 2.68p, and the average price paid to independent generators is 2.43p/kWh. The Use of System charges for wheeling power over the supply lines were also prohibitive and not properly cost reflective, being based on a notional path approach.

In addition to discrimination over purchase tariffs, independents faced a further hurdle in their local authority rates payments. Because the NESI is rated by a national formula, but each independent generating station is rated separately, independent generators pay between ten and forty times the rates of NESI stations. This was particularly onerous for renewable energy generators, who have low load factors and are assessed on the capital value of the equipment.

The Association of Independent Electricity Producers

The AIEP was formed in 1987 to represent all independent generators and supporting companies in order to achieve fair terms for competition. It now has 91 members and affiliated organisations. In our first year, we gave well received evidence to both the Select Committee of Energy and Price Waterhouse on the structure and level of the purchase tariffs and use of system. Whilst having no particular views on privatisation, the AIEP welcomed the Electricity Bill as an opportunity to correct the faults of the 1983 Energy Act. In particular, we welcomed the duties on the transmission company and the Director of Electricity Regulation to facilitate and promote competition respectively. We were, however, critical of the vertical integration of the Scottish Boards.

The Electricity Act and competition

The Government's White Paper "Privatising Electricity" published in February 1988 and the consequent Electricity Act foresaw a strongly competitive electricity supply industry following privatisation. In addition to creating two large competing generators, PowerGen and National Power, the Act allows the new distribution companies to generate up to 15% of their own load. The National Grid is separated out from the generating companies, access to the transmission and distribution systems is to be open and equitable, and the National Grid Company is given a new duty to facilitate competition.

The new structure was designed to allow opportunities for independent generators to come on to the system. There were problems, however:

i) The size of National Power, retained to make it a viable nuclear power station operator, meant that it would dwarf any other generating company. Splitting off only one other generator, led to fears of a total monopoly being replaced by a cosy duopoly.

ii) National Power and PowerGen, as successors to the incumbent monopoly generator, own all potential power station sites. These hundred or so sites have, by definition, good electrical connections, access to cooling water, few likely planning problems, and are therefore of great value to any intending generator. Before the new structure of the industry was agreed, the CEGB had issued a list of a number of its old stations and sites which it was putting up for sale. The list was hastily withdrawn once it was clear that privatisation would go ahead. The sale of only one of these sites had progressed far enough for the independent project to reach fruition. The sale of electricity to Norweb from Roosecote Power Station, owned and operated by Lakeland Power, with its new 210MW gas-fired generation, was announced on 24 October. The remaining sites may be developed by National Power or PowerGen, but are only accessible to independents through compulsory purchase orders.

iii) The best opportunity for independent generators clearly lay in the need for new capacity forecast by the CEGB to occur in the mid-90s. This was based on aggregate information supplied by the Area Boards *before* they had the obligation to supply, and indicated a strong continuing growth in the commercial sector, which in view of the current economic forecast and saturation effects in this sector, must now be addressed with caution. It should not therefore be assumed that any shortfall will be instantly translated into contracts for new capacity. Instead, load management and own-generation could be properly rewarded at the expense of new built capacity.

The emergence of new generation technologies, allowing for shorter construction times - of as little as thirty months - and the existing surfeit of fossil base-load capacity, means that the distribution boards can postpone decisions about the need for major new plant on the system for several years. This problem is exacerbated by the amount of planned new nuclear capacity for which the distribution companies are obliged to contract.

In addition, National Power and PowerGen will be released from their burn British Coal policy, and a significant amount of oil-fired generation plant will be brought back into full service.

In the new competitive environment, it is also likely that National Power and PowerGen will view more favourably the possibility of refurbishing existing stations, rather than building from scratch.

iv) Because of their size, National Power and PowerGen are in a position to get involved in speculative building - starting to construct new plant before having a contract for either the capacity or the energy. No emergent generator could afford, nor would be lent money, to operate in this way. The effect of this must be to depress the perceived price, and the opportunities, for independent generators.

These were the problems at the outset of privatisation! In late September 1989, in spite of over a year's negotiations, the distribution companies and generators were unable to reach agreement about how to protect both their sets of interests while still working within a truly competitive environment. In order to be able to privatise the electricity supply industry before the next election, the government agreed to a compromise put forward by the ESI which limits the degree of risk that both generating companies and distribution boards would have been exposed to under its original proposals.

Understandably, the generators wanted long-term contracts for all of their power stations. The distribution boards, on the other hand, were unwilling to sign long-term contracts whilst there was a possibility of the two generating companies, with surplus capacity on their books, stealing their most profitable customers and thereby leaving them with stranded capacity.

The transitional arrangements

Under the new arrangements, distribution companies will contract for 12GW of fossil stations for between four and eight years. They will also enter into lifetime contracts for 8.5GW of nuclear generation. In exchange for this, the distribution companies obtained a 1MW "franchise" - for which read "monopoly" - for four years, dropping to 100kW for a further four years. In addition, National Power and PowerGen are to be limited to competing for 15% of the total installed load for four years in each of the distribution company areas, rising to 25% for the next four years. The 1MW franchise represents 70% of the total installed load. Any further power requirements will be bought by the distribution companies in a new "unified pool", where both capacity and energy can be traded.

The effects of the new arrangement on independents

Power sold from the fossil stations under the protected 12GW long-term contracts arrangements will have initial status and therefore pass-through of costs. Independents, however, competing at a later stage, are likely to be at the margins where there will be tight competition and keen prices.

Most importantly, independents have lost the opportunity to address the 1MW franchised market, thereby having closed to them a profitable market for amalgamated supplies. At the same time, the generators have lost any leverage they would have had in any negotiations to sell their power to a distribution company.

However, it is not all bad news. Around 5GW of new generation is being planned by independents in conjunction with distribution companies.

To help support independents, who are hampered in their ability to offer 'firm' capacity because they do not have a portfolio of plant to back-up their main supply, the government is considering placing a requirement on National Power and PowerGen to form an 'insurance market'. This would require the two large generators to supply an independents' pool, to provide electricity when their plant is down.

A smaller but significant opportunity exists for developers who wish to generate from renewable energy and qualify for the special obligation which will be announced in the coming years. The price of this electricity, although competitive, will be higher than the price of fossil fuel electricity.

Nor should we forget the psychological advantage that independents have over National Power and PowerGen. Having felt themselves to be held over a barrel by the CEGB for many a year, there is nothing the distribution boards would like more than to buy their power from independents. And the same is true of industrial customers who do not want to buy from the boards.

The potential market for independents with industrialists may be enhanced by the clause in the Act which prevents discriminatory deals, such as the QUICS scheme, continuing. This may mean an increase of 15-20% in electricity costs for intensive electricity users. One of the problems in this market, however, is that at the present time, with so much uncertainty surrounding commercial choices, Major Energy Users will be unwilling to commit themselves to the long contactual terms that are needed for independents to finance construction.

Unfortunately, generators still have no information on the Use of System charges for either the grid or the distribution system. This hampers negotiations between industrial users and independents.

Major competition may well come, inadvertently, from own-generation. In its attempt to protect nuclear power by requiring all fossil generators, first-tier and second-tier suppliers to pay a levy towards the cost of maintaining nuclear generation, the government has given renewed impetus to industry to start generating its own electricity, however reluctant they may be. This way, industry avoids paying the levy - which could be up to 1p a unit - and recoups its losses on the QUICS scheme.

SUMMARY OF TALK ON 'PROSPECTS FOR "INDEPENDENT" POWER GENERATION'

by Rhodri Morgan,
Labour Front Bench Spokesman on Electricity

1. New Technology is point downwards in scale, price and optimum size away from the classic 2000 MW to 200-300 MW power stations. They are available off the shelf and follow the peaks of demand far better.

2. 200 MW power stations can be located within towns, giving greater possibility of adding hot water networks to use the so-called waste heat and raising energy efficiency from 37% to 75%

3. This perhaps points the way to municipal generation user-supplier consortium generation, auto generation and other moves away from CEGB monopoly powers, regardless of privatisation.

4. 'Independent' might not therefore mean classic private power generation utility companies - since they don't exist today, can you form them out of banks, constructors, contractors, etc or are they more likely to come from other public sector origin 'bodies', ie local authorities, Area Boards, British Coal?

5. 'Independent' Power Generation might actually also include 'toll processing' of specific blocks of marginally-priced coal, very similar to the QUICS scheme, but this time 'coal-by-wire' sold by BC to big base-load consumers.

6. Contracts for direct or second tier supply are likely to be fuel supplier dominated, not truly independent. If there are going to be independent power station operators, they will want to spread the customer load, ie sell to the Area Boards. Too risky otherwise. Maybe generate in consortium with Area Boards.

7. The big stumbling block is still going to be life of station contracts and 'take or pay' percentages in the value and shape of the contract. Who in the end is going to get bank finance for anything other than a 'take or pay' virtual lifetime contract for all the capital costs?

8. What then is fair competition between National Power and PowerGen and incoming independents? What is a level playing field?

9. Now that we are in general agreement that even England and Wales, let alone Scotland has a surplus of base load capacity, getting 'take or pay' contracts to satisfy the bankers to see mainly peak-load power is a very tricky equation to get right.