

Viewpoint

The Seven Brothers

Steve Thomas*

Public Service International Research Unit, School of Computing and Mathematics, University of Greenwich, 30 Park Row, London SE10 9LS, UK

1. Introduction

In 1975, Anthony Sampson wrote a book, 'The Seven Sisters', which documented how seven huge oil companies had come to dominate the world oil market (Sampson, 1975). Before long, a follow-up book might recount the rise of 'The Seven Brothers', seven major corporations, all based in mainland Europe, that will dominate world markets for network-delivered services, mainly electricity, but also perhaps gas and water. Ironically, the trigger that is allowing this new 'club' to emerge is the European Union Directives on electricity of 1996 (and the similar Gas Directive of 1998), measures designed to break up monopolies and create competitive markets. The emergence of Seven Brothers raises a number of issues:

- How did these companies achieve this position?
- Why are no US or British companies in the list?
- Can these European companies penetrate markets outside Europe? and
- What are the dangers of this level of concentration?

2. The Seven Sisters

The Seven Sisters were Exxon, Shell, BP, Gulf, Texaco, Mobil and Chevron. Mergers and takeovers, particularly from 1998 to 2001 strengthened the grip of these companies so that the 'Seven' became the 'Four'. The first of the Sisters to fall was Gulf, taken over by Chevron in 1984. Exxon and Mobil merged in 1998 to become the largest oil company, with Shell in second place (see Table 1). BP took over three other important oil companies, Amoco, Arco and Burmah-Castrol in 1998–2000 to take third place, while Chevron and Texaco merged in 2001 to become the number four company. A new European grouping created from the merger of two French oil companies, Total and Elf, and the Belgian company, Fina, created a fifth world power. Two large US companies, Conoco and Phillips merged

in 2002 to form the sixth largest company. There is then a drop in size to the Italian company, ENI and the Spanish company, Repsol. As in 1975, the top three companies are in a different league to the others.

3. Who will the Seven Brothers be?

It would probably have been inconceivable a decade ago that the world's anti-trust authorities would have allowed the recent wave of oil company mergers, but the new tolerance for highly concentrated markets may have been one of the factors that opened the way for the Seven Brothers. Unless the European Union develops an appetite to take on corporate interests, these companies will soon dominate European and perhaps world markets for network-supplied energy services. Unlike the Seven Sisters, which were controlled mainly by Anglo-American interests, the Seven Brothers are more likely to be based on the European mainland (see Tables 2 and 3).

There are still many battles to be fought before the final identity of these leviathans is clear, but as with the Seven Sisters, there is already an elite selection of three companies at the top of the table. Electricite de France (EDF) is state owned and is the world's largest utility by any measure. It was an early mover in expanding outside its home territory and has already made important acquisitions in the UK, Germany, Italy and Sweden as well as outside Europe, especially in Brazil. RWE and E.ON of Germany were much later into the fray and are only now beginning to make acquisitions in electricity outside Germany, but their ambitions are now clear and their vast resources are more than adequate to fund these ambitions.

Vattenfall of Sweden is publicly owned and is the largest utility in the Nordic region. It is a surprising candidate given its relatively small size, but its acquisitions in Germany in the past year or two put it in the top league. Endesa of Spain, formerly state owned but now privatised, was an early mover outside Europe and as Southern European companies come up for sale, it will be a strong bidder.

*Tel.: +44-208-331-9056; fax: +44-208-331-8665.

E-mail address: stephen.thomas@gre.ac.uk (S. Thomas).

Table 1
The world's major oil companies

	Turnover 2001 (\$bn)	Reserves (BBOE)	Production (MMBOED)	Refinery cap (MBPD)
Exxon–Mobil	213	20.7	4.3	5580
Royal Dutch Shell	177	19.1	3.6	4230
BP	175	15.0	3.2	2790
Chevron Texaco	106	11.6	2.8	2850
TotalFinaElf	95	10.4	2.2	2540
ConocoPhillips	67	8.7	1.7	2668
ENI	44	6.7	1.2	a
Repsol	40	4.8	1.0	a

Source: Annual Reports and Accounts and 'ConocoPhillips: A new international major' Presentation by ConocoPhillips (<http://www.conoco.com/investor/cp/analystpresentation.pdf>).

Notes: (1) BBOE = billion barrels of oil equivalent, MMBOED = million barrels of oil equivalent per day, MBPD = million barrels per day. (2) Turnover figures for TotalFinaElf, ENI and Repsol are converted at an exchange rate of \$1 = €1.1.

Table 2
Presence of the brothers in the electricity markets of the European Union

	UK	Germany	Spain	Italy	Sweden	Netherlands	Finland
EDF	London Electric SWEB (retail) Eastern (dist) 4.8 GW generation	EnBW (34)	Hidrocantabrico (33)	Italenergia (18) Eurogen	Graninge (53)		
E.ON	Powergen	X	Union Fenosa (5)		Sydskraft (29) Graninge (13)	EZH	Espoon Sakho (34)
RWE	Innogy	X					
Endesa			X	Elettrogen			
ENEL			Viesgo	X			
Vattenfall		BEWAG (90) HEW (99) VEAG (81)			X		
Fortum					Birka		X
EDP			Hidrocantabrico (38)				
Suez				ACEA (40)		EPON	

Notes: (1) In France, Ireland, Greece, Belgium, Portugal, Luxembourg, and Denmark, there has been limited international entry so far. (2) EDF's holdings in Hidrocantabrico and Italenergia are through its subsidiary, EnBW. A subsidiary of Italenergia, Edipower, led the consortium that bought Eurogen. (3) Iberdrola has yet to make any major acquisitions in the European Union countries. (4) Companies' activities in their home markets (marked X) are not listed. Figures in brackets represent percentage ownership for companies not wholly owned.

The other contenders, either intact or as part of a new combination are ENEL of Italy, Tractebel (formerly Belgian but now part of the French-owned Suez), Fortum (Finland, formerly IVO but now merged with the national oil company Neste), Statkraft (Norway), Iberdrola (Spain), EDP (Portugal) and the Verbund (Austria). ENEL is amongst the largest of the world's utilities but it is being privatised and it is not clear yet how much further it will be broken up. Its strategic position does not yet seem coherent and, like the

privatised UK utilities, regulatory action to reduce its market power in its home market may mean that it is not able to capitalise on its current strong position. Suez has the financial resources, already being a major force in water industries worldwide, but its electricity base in European, the Belgian market where Electrabel, which it controls through its ownership of 42 per cent of the stock, has a near monopoly, may be vulnerable if the Belgian authorities choose to adopt an aggressive stance on competition. The other companies may not have the

Table 3
Summary of activities of the large electricity companies in 2000

	Total sales revenue (bn €)	Elec sales revenue (bn €)	Global elec output (TWh)	Global elec sales (TWh)	Employees total (th)	Employees elec (th)
EDF ^a	34	n/a	469	n/a	157	n/a
E.ON	93	13	124	211	187	34
RWE	63	12	138	255	170	60 ^b
Endesa ^c	11	n/a	165	153	29	n/a
ENEL ^d	25	n/a	183	223	73	n/a
Vattenfall ^e	4 (11)	n/a	84 (156)	83 (179)	13 (42)	n/a
Iberdrola ^f	7	n/a	n/a	n/a	11	n/a
Suez ^g	35	20	n/a	n/a	173	n/a
EDP	4	n/a	25	34	13	10
Fortum	11	2	40	51	16	3

^aEDF's only substantial activity is in the electricity sector.

^bRWE does not publish a separate figure for its electricity workforce. The figure shown is for the energy division which includes their gas business.

^cEndesa does not publish separate sales revenue and employment figures for its electricity activities, but other activities represent only a small proportion of its total sales.

^dIn 2000, ENEL's only substantial activity was in electricity.

^eThe bracketed figures for Vattenfall represent estimates for the group if its German acquisitions had been included. Separate figures for electricity revenue and employment are not produced.

^fIberdrola does not produce electricity output, sales figures that include its foreign activities, nor does it produce figures for the electricity sector alone, although this represents its main activity.

^gIn the Suez accounts, the Tractebel Energy division figures cover electricity and gas. Suez does not publish figures of employment in its energy division, nor does it publish figures on its electricity sales and output.

Source: Annual Report and Accounts.

scale or resources to compete yet, but mergers or alliances could yet take them into the top division. For example, Iberdrola has had alliances with EDP, Repsol, the Spanish oil company, ENI, the Italian oil company and Gas Natural, the Spanish gas company. In April 2002, it was rumoured that Fortum and Statkraft would merge. If such alliances were made, the resulting group could have the strength to compete in global markets.

Within this elite group, a range of strategies are being followed. At one extreme, EDF (because of legal restrictions) is still a pure electricity company at least in France, although it is examining ways to enter the gas market. At the other extreme, RWE, Suez and E.ON appear to be targeting the full range of network services. In between, the other companies are beginning to move into gas as well as electricity.

4. Changes in Germany

The recent structural changes to the electricity industry in Germany illustrate the changes graphically. In the past, the structure of the German electricity sector has seemed mind-bogglingly complicated. More than 1000 companies were involved in the electricity industry, some electricity-generation-only companies, some only distributors of electricity and some vertically integrated from generation to retail supply. Some companies were locally owned, such as the 'Stadtwerke', while others were privately owned. However, the reality was that the

industry was controlled by the nine companies that dominated generation, and owned and operated the high voltage transmission system for their franchise region. Of these nine, RWE and PreussenElektra (part of the VEBA group) were by far the largest with Bayernwerk (part of the VIAG group) also a strong presence. In the monopoly situation, these companies could all peacefully co-exist making comfortable profits. Any expansion outside their franchise areas by taking over existing companies in Germany was politically contentious (although not impossible), while the prospects of moving outside Germany in electricity were negligible.

The German utilities fought the imposition of the Electricity Directive, but they received less support from the federal government than they expected and had to accept its imposition, albeit in a weakened form. They have so far been allowed to retain control over their transmission networks and no sector-specific regulator has yet been appointed. Regulation is currently carried out by self-regulation, overseen by the Federal Cartel Office (FCO), an organisation with only a handful of staff specialising in electricity, with some oversight by the authorities in the Länder.

The prospect of liberalisation through introduction of competition in generation and retail supply was a challenge and an opportunity to the companies. Competition threatened to disrupt their cosy position, but the abolition of local monopolies meant that they could contemplate expanding outside their region and

outside Germany. The FCO was thought to be unhappy at the prospect of having to regulate the large number of companies that existed then and was prepared to tolerate consolidation of the sector into four main companies to make its job manageable. Things moved rapidly. In the 2 years from autumn 1999 the nine companies (with three dominant ones) were transformed into four companies, two huge ones (E.ON and RWE) and two other companies (EnBW and Vattenfall Europe) competing on a national scale.

PreussenElektra, the second largest company, led the charge when its parent, VEBA, took over VIAG, parent of the third largest company, Bayernwerk to form E.ON. RWE, the largest, followed with its merger with another of the big nine, VEW. Two more companies, Badenwerk and EVS had merged in 1997 and are now controlled by the French nationally owned electric utility, EDF. The three remaining companies, BEWAG (Berlin), HEW (Hamburg) and VEAG (most of the former GDR) are now controlled by the Swedish nationally owned utility, Vattenfall. In January 2002, Vattenfall consolidated these four companies into Vattenfall Europe.

Beneath the top layer of companies, there has also been considerable merger and acquisition activity by the big four. A particular target has been the Stadtwerke that distribute to final consumers. Acquiring such companies will allow the big four to integrate from generation to retail supply, a strategy that will insulate them from having to compete in wholesale markets.

RWE and E.ON are now also diversifying geographically and into other services to buttress their position. RWE has been active in the gas and water sector. In gas, it took a dominant position in the Czech market in 2002 and in water, it has taken over Thames Water (UK) in 2000 to become the third largest international water company. Its first major international acquisition in electricity was Innogy (the demerged UK operation of National Power) in March 2002. E.ON has taken over the main German gas company, Ruhrgas, and has bought major electricity companies in the UK and the Netherlands.

5. What is the Electricity Directive trying to achieve?

Despite the theoretical advantages of a monopoly system for the electricity industry and its excellent record since World War 2 in providing reliable and affordable electricity supplies, there was increasing criticism of the old system in the 1980s (see Table 4). The Electricity Directive attempted to address these criticisms and is based on the structure Britain tried to implement in 1990 when it reformed its electricity industry. The main elements of the 'British Model' were:

- Creation of a wholesale electricity market;
- allowing final consumers to choose their retail supplier of electricity; and
- opening up the network to third party access (TPA) so that all retail and wholesale electricity suppliers competed on equal terms.

Table 4
Models of electricity systems

	Ideal	Reality
Monopoly system	<p>Economies of scale minimise costs</p> <p>Avoidance of wasteful duplication of facilities</p> <p>Ability to achieve wider environmental, social and macro-economic objectives</p> <p>Public accountability</p>	<p>Lack of control over costs with consumers left to foot the bill</p> <p>Over-investment to minimise any risk of power shortages</p> <p>Social and economic measures became fossilised and cease to serve useful purposes. Disruptive government interference</p> <p>Technical dominance of utilities makes it difficult for their judgements to be questioned</p>
Competitive model	<p>De-integration and atomistic competition in wholesale and retail markets forces prices down to the long-run marginal cost. Competition is a 'free good'</p> <p>Supply and demand balance because over-investment avoided as a result of market discipline</p> <p>Investment risk borne by investors, not consumers</p> <p>Shareholders exert financial discipline</p> <p>Indigenous fuel and equipment industries are forced to become competitive</p> <p>Social and environment policy objectives are decided by central government, not utilities and paid for by taxpayers not consumers</p>	<p>Vertically integrated oligopolies give an illusion of competition. Creating markets require huge investment by consumers in software and high running costs</p> <p>'Hog cycles' of over- and under-investment lead to wasted investment and mean security of supply is put at risk</p> <p>Oligopoly powers mean extra costs still land on consumers</p> <p>Shareholder profits come before public service</p> <p>Indigenous capabilities are lost, and fuel and equipment are supplied by a handful of multinational companies</p> <p>Poor consumers are discriminated against by suppliers and meeting environmental objectives becomes difficult</p>

Implicit in these basic elements are three further conditions:

- To ensure that there is fair access to the networks, they should be owned by companies that do not compete in retail or wholesale electricity markets;
- to prevent abuse of their monopoly position, the charges levied by the network companies should be set by an independent sector regulator; and
- to ensure the wholesale electricity market is the primary factor in the setting of wholesale electricity prices, vertical integration of generation and retail supply should be minimised.

In practice, the system implemented in Britain has never conformed with this model. The one area where there has been unequivocal success is in separating network activities from competitive activities and ensuring access to the network has not been an issue. The National Grid Company (that owns the transmission system) is fully independent, while the owners of the local distribution networks are now required to make a rigorous separation of network activities from commercial activities.

The wholesale electricity market has consistently proved problematic and half-hourly markets have never been the primary price-setting mechanism in the way that was envisaged. For the first 8 years, this was largely because wholesale electricity prices were set by long-term confidential contracts imposed by government. Now, it is the trend to vertical integration of generation and retail supply that is thwarting this objective. Of the 14 retail supply businesses that were privatised in Britain in 1990, are all now in the hands of a generation company. This form of vertical integration makes good business sense reducing generators' exposure to an unpredictable wholesale electricity market, but it means that the wholesale electricity market will tend to be bypassed with generators generating power to supply to their own final consumers. In other countries that have copied the British Model, such as Argentina and Colombia, this form of vertical integration is illegal.

Introducing retail competition has been equally problematic. Large consumers have so far done well using their resources and negotiating skills to get a good deal from retail competition. However, small consumers, who have been able to choose supplier since 1998, are confronted with bewildering packages of services and lack the resources or interest to exploit the market. As a result, the differential between the prices paid by small and large consumers is widening significantly. Between January 1999 and January 2002, the price paid by residential consumers for the unregulated part of their bill rose by 5 per cent. In the same period, the price paid by large industrial consumers fell by nearly 20 per cent (Power UK, 2002a). Creating wholesale and retail

markets has cost consumers dear. Developing the systems to allow retail competition for small consumers cost them about £730m (Offer, 1997), while the newly redesigned wholesale market (NETA) is rumoured to have cost in excess of £600m. Running costs are also high, the Balancing Market element of NETA alone costs £80m per year to run (Power UK, 2002b).

So while British experience is frequently held up as an example to the rest of the world, the British Model has not been implemented in Britain, let alone been proven. One response from countries trying to implement the British Model would be to simply try harder to make it work. Disallow vertical integration of generation and supply, force the companies to buy most of their power on half-hourly markets and step up pressure on consumers to shop around. But this sounds dangerously close to describing the California Model that failed so disastrously in 2001.

This raises the question, is a wholesale electricity market sustainable and if it is, is it preferable to a regulated monopoly? If a wholesale electricity market cannot be implemented, the other reforms make little sense. In today's pro-competition climate, many advocates of liberalisation will not even acknowledge these as legitimate questions. For them, if a market is apparently technically feasible, it will inevitably be preferable to a regulated monopoly.

In the short term, a wholesale electricity system that is not a monopoly is feasible, as has been demonstrated by the NordPool, which covers Norway, Sweden, Finland and Denmark, and by Britain. However, in California and Brazil, serious under-investment in new capacity led to a near collapse of their electricity systems, raising doubts about the sustainability of markets. It will do no service to consumers if liberalisation creates a market that is competitive in the short term, but is too risky to justify investment in new generating capacity being undertaken. NordPool has been able to survive so far with little new generation investment because of a combination of low demand growth and a surplus of capacity before liberalisation. In Britain, there has been over-investment, largely because the market has failed so far to force prices down to their long-run marginal level.

The idea that a market, even if it is sustainable, might not be preferable to a regulated monopoly is an even more heretical proposition. Advocates of competition seem to implicitly assume that competition is either a free good, or the costs are so small as to be inevitably swamped by the benefits of competition. Blatantly, competition is not a free good in this sector. In Britain, consumers have paid well over £1.5bn to create wholesale and retail markets. There are other less obvious costs. The inevitable consequence of competition is risk to investment and that translates into significantly increased required rates of return on capital. The

National Grid Company in Britain survives on an allowed real rate of return on investment of about 6 per cent, because its investments are seen as low risk. However, investments in new power stations in Britain, because they are high-risk, are expected to make a real rate of return of 15 per cent, whereas in a regulated monopoly, 6 per cent would presumably be adequate. In a capital-intensive industry like electricity, such a discrepancy is bound to impose an additional cost on consumers. Whether the benefits of competition forcing down prices will be sufficient to pay the high costs of introducing competition is far from clear. If it is not proven that a competitive electricity industry is both sustainable and desirable, policies to force the emergence of a European market would be misguided.

From the consumers' perspective, what may emerge if competition is pursued and no action is taken to prevent over-concentration in electricity, is an industry with a cosmetic veneer of competition, but strong suspicions that, like the oil industry, all is not as competitive as it seems. If wholesale markets fail to deliver reliable cheap electricity, governments will be obliged to step in to reduce the riskiness of investment in new capacity, transferring risk back to consumers. As the companies develop their strategic skills, regulators will find it increasingly difficult to see behind the veneer of competition to determine whether the industry is as competitive as it should be. One advantage to consumers of an integrated pseudo-competitive model over a de-integrated competitive model is that companies will have an incentive to invest in sufficient capacity to ensure their own consumers are not cut off.

6. How did the Seven Brothers achieve this position?

There are two sides to this question. Why did the political authorities, who at the same time were implementing measures aimed at promoting competition, allow this concentration to happen? And where did the companies get the resources to indulge in this shopping spree?

6.1. Political factors

6.1.1. National Governments

The first question needs to be divided into the attitudes of the national governments and the attitude of the European Commission (EC). For the national governments, the key factor is that the companies generally had dominant positions in their home countries and were seen as future 'national champions'. EDF, ENEL and EDP were nationally owned companies that were effective national monopolies. Endesa, Vattenfall and Fortum were also nationally owned and were the

dominant players in their home countries. Iberdrola was the number two company in Spain. RWE and E.ON were the strongest companies in Germany, while Suez achieved much of its strength in the electricity sector taking a controlling stake in Electrabel, the dominant company in Belgium. Most of the countries of the European Union did not actively seek to create a national electricity market. Only for the UK, Portugal, Sweden, Finland and perhaps the Netherlands could it be argued that the governments enthusiastically pushed for the implementation of the EU Electricity Directive. The other governments simply followed the letter of the Directive and had no real commitment to creating a competitive electricity market.

Politicians in European Union countries were also perhaps aware of experience in Britain following privatisation there. Throughout the British privatisation programme, there had always been a tension between those that wanted privatisation to create strong British companies that could compete in world markets, and those that wanted to create competitive markets for utility services in Britain. Reconciling these two aims was always going to be a difficult and probably impossible balancing act and those that favoured competition seem to have won. It would be hard to argue that any of the privatised British companies has become a major world player. British Gas and British Telecom have not become powerful international forces. In electricity, the companies that have done best were those that were shielded from the market by monopoly (or pseudo-monopoly) powers, such as National Grid Company and Scottish Power. Ironically, the smashing up of the powerful players in Britain, like National Power, Powergen and British Gas, has arguably failed to produce a market that is competitive enough to benefit either gas or electricity consumers. In most other European countries, when the choice between a competitive national electricity market and nurturing a national champion became clear, the priority seems to have been protecting national champions. Only the Netherlands has conspicuously followed the British example of making competition the priority, with the result that much of its electricity industry quickly fell into foreign hands.

6.1.2. The EC

The stance of the EC is harder to explain. When the Directive was passed in 1996, it might have still been possible for EC officials to foresee a Europe-wide electricity market based on an untarnished version of the British Model. Power would be bought and sold through highly competitive wholesale markets, all consumers would force prices down by shopping around for the cheapest deal and a large field of competing companies would replace local or national monopolies.

This now appears naïve nonsense. The industry is concentrating down to a handful of players and wholesale markets are being bypassed by vertical integration of generation and retail supply. While owning the infrastructure is a crude but effective way to keep out competition, as British experience has shown, companies with enough market power do not need such a prop to dominate the industry. EDF, RWE and E.ON will probably cling on to ownership of their networks for as long as possible, but taking away the network from them will not by itself remove their market power. It is also becoming blatantly obvious that if other important policy objectives are to be met, such as environmental, social and strategic security objectives, market mechanisms will have to be further compromised. So why is the EC behaving as if all is going well and what is needed is one last push to open retail markets to competition and open networks to TPA?

There are a number of factors that help explain the EC's position:

- There are those whose belief in markets is so strong that no amount of empirical evidence will convince them a market solution is not the answer;
- the EC enjoys the kudos it receives from 'breaking up monopolies', 'removing trade barriers' and 'giving consumers choice': empty phrases, but they have good public relations value; and
- a long-standing desire to break the power of nationally owned monopolies, which it sees as bastions of restrictive practices.

However, the most worrying factor is that some EC officials acknowledge that the electricity industry is moving rapidly to a structure dominated by a handful of giants. They believe that they have the resources, the skills and the political power to control the situation and ensure that the industry, despite its concentration, does behave competitively. Where is the evidence to back this belief?

6.2. Financial factors

The source of the funds used for acquisitions varies between companies, but it would be hard to argue that their strength came because they had out-competed the opposition. EDF was one of the first movers, making acquisitions in Latin America and Sweden in the mid-90s. Since 1992, when EDF International was created to expand its businesses, government has sanctioned borrowing on the international market to finance international acquisitions. It can also use the vast provisions made by French consumers for the decommissioning of its nuclear power plants. These provisions are not segregated from the rest of the company's business and EDF is free to invest them. Vattenfall has

not enjoyed such support from central government nor does it have access to the Swedish nuclear decommissioning funds. It had to sell bonds to finance its German acquisitions.

Like EDF, E.ON and RWE are allowed to use funds collected from consumers to decommission their nuclear power plants to pay for their acquisitions. Endesa and Iberdrola claimed large amounts of money from public funds for decisions related to their nuclear plants. In 1995, they were compensated for the government decision of 1984 to abandon work on several nuclear power plants. With the implementation of the Electricity Directive, they claimed that their nuclear power plants would be 'stranded' (they would not make the profit expected) by the introduction of competition and they should be compensated for the lost profits. For the 1995 decision, because the income was backed by government guarantees, the income they would receive over a period of several years could be capitalised as a lump sum of billions of dollars by selling bonds. This gave them ample resources for a shopping spree, much of which took place in Latin America. The 'stranded assets' decision will yield them a substantial flow of income. Endesa and Iberdrola do not have access to Spanish decommissioning funds.

7. Why are no US or British companies in the Seven?

Economic theory, the advantage of the 'early mover', would suggest that British companies should have been able to use their early experience of markets to give them an advantage as the European markets opened up. Equally, most would expect that the sheer economic power of giant US corporations would be difficult to resist.

As argued above, the electricity companies in Britain were victims of the political and regulatory desire to be seen to be creating a competitive industry. In all, 17 companies, two generators, one transmission company, 12 distribution companies and two integrated Scottish companies were privatised in 1990. All were protected from takeover by government Golden Shares, although the protection for the 12 regional distribution companies ran out in 1995. The distribution companies were probably individually too small to have had an impact outside the UK and as soon as government protection from takeover was removed, the only question was how quickly they would be taken over. The two more likely candidates to become world players were National Power and Powergen, the two privatised generation companies, which in 1990 had between them a market share of about 80 per cent in power generation. As a result of regulatory policies to strip them of their market power, by 1998, these two companies were shadows of the companies created a decade before, their market

share being about a third of what it had been in 1990. By 2001, National Power had had to split itself into a UK company (Innogy) and an international company (IPG) just to survive and Powergen was taken over by E.ON. In March 2002, Innogy was taken over by RWE.

The main buyers of the distribution companies were US companies who at one point owned seven of them. At the time, their move into Britain was seen by some as the harbinger for a global expansion. However, the fear that these companies represented the electrical equivalent of Nike or Coca Cola was misplaced. The American buyers can be divided into two groups: the traditional electric utilities with a franchise base in the USA (the companies that bought six out of seven of the British distribution companies were in this category), and new companies set up mainly in the 1980s.

Traditional US utilities are much smaller than most people would expect. Since the 1930s, US electric utilities have been heavily restricted by law in where they were allowed to operate. Most could operate in only one state while a handful of holding companies were licensed that could operate in several states but were hamstrung by severe financial reporting requirements. These measures were introduced in the 1935 Public Utilities Holding Company Act (PUHCA) to prevent a recurrence of the situation in the 1930s when the electricity industry came close to financial collapse because of its domination by a handful of holding companies that siphoned profits from the holding companies to the parent company. These restrictions were eased in the 1992 Energy Policy Act and the utilities began to investigate moving into new markets. So when the UK regional distribution companies came up for sale in 1995, US utilities were at the head of the queue. Many changed their names to give them a modern feel. Mid-South Utilities became Entergy, Houston Power & Light became Reliant, and Public Service of Colorado became New Centuries Energy and merged with Northern States Power to become the NRG division of Xcel Energy. Southern Company spun off its businesses in non-franchise markets as Mirant in April 2001, and Southern California Edison operates as Mission Edison outside California. But beneath these cosmetic changes, these companies' understanding of electricity liberalisation and how to do business outside the USA often seems to have been poor.

In many cases, the US utilities were little bigger than the companies they took over and, from their actions, it seems they had few other objectives than to make quick easy money exploiting the still immature British regulatory system. Whatever else their failings, they seem to have been successful in achieving this, making good profits and selling the companies at a handsome

profit. Some tried to move into Europe and Latin America but quickly found life was not as simple as they thought. Reliant was one of the first foreign investors in Brazil, buying a distribution company, Light, in consortium with EDF and AES. In 1999, it decided to sell its Latin American interests to concentrate on the US and European markets and bought one of the three main Dutch generation companies, UNA in 1999. By December 2001, disillusioned by low prices, it was looking for a buyer for UNA at a substantial discount to the price it had paid 2 years before. The Southern Company took a stake in the Berlin utility BEWAG in 1997 but was out-manoeuvred by Vattenfall and its successor, Mirant, withdrew completely from the German market in 2001. In 2002, NRG announced that it was putting its investments in Europe, Latin America and Asia-Pacific up for sale.

Most of the traditional utilities have sold their interests in Britain or are concentrating on monopoly network activities. For example, Mirant has sold its retail electricity supply business in Britain and now operates two of the regional distribution networks. Like the British companies in the 1990s, traditional US utilities are finding that the immediate priority is to defend their home markets from the impact of competition and also from the fallout from the Enron collapse. Californian utilities such as Pacific Gas & Electric and Southern Californian Edison, which were brought to the point of bankruptcy by the opening up of the market there, can testify that this is not a task that should be neglected. There are interesting parallels with the waste management industry where US companies expanded rapidly in the 1990s, but have now largely retreated back to the USA, leaving European groups to dominate the field.

New companies, such as AES, Calpine, Dynegy and Enron were more innovative in their thinking. For them, there was no need for the 'comfort blanket' of owning large networks. The name of the game was arbitrage and commodities trading sometimes through ownership of power plants (e.g. AES) and sometimes just from trading in markets (e.g. Enron).¹ Some of the traditional utilities, such as TXU and AEP have also begun to follow this path, selling their network assets in order to concentrate on trading, but the results are far from convincing yet. The collapse of Enron has left a taint on all these companies and raises the possibility that while there might be money to be made in the short run, their businesses lack the solid base of low-risk business that the traditional utilities have to make this option a viable long-term choice.

¹Enron was not always consistent in its strategy of not buying infrastructure and bought the UK water company, Wessex Water, as a basis for a global water company, Azurix. The Azurix business had little success.

8. Can the European companies succeed outside Western Europe?

While the Seven Brothers seem to be on course to dominate Western Europe, they will only emulate the Seven Sisters if they can control markets outside Europe. At present, North America, a market bigger than the whole of Western Europe, must be the obvious target, with Latin America, Eastern Europe and the Asia-Pacific as additional options. The trailblazers in North America were the British companies, Powergen, Scottish Power, British Energy and National Grid. In 1999, Scottish Power took over the large Western utility, Pacificorp, itself weakened by a failed take-over attempt in Britain. This was a bold move that, at first, was successful, but the fallout from the California power problems has cost Pacificorp dear. Powergen tried to negotiate a merger with Houston Industries in 1998 but this broke down and in 2000, it took over LG&E, a medium-size US utility based in Kentucky. It may be that E.ON saw Powergen's ownership of LG&E as its entry card to the USA. British Energy formed a joint venture with PECO (which later merged with Commonwealth Edison to become Exelon) to buy and operate old nuclear power plants in North America. After initial success acquiring three plants, the market in the USA dried up and British Energy has its hands full trying to stay afloat in the British market. National Grid has made a series of acquisitions in New England and it is now the main transmission operator in Massachusetts, Rhode Island and New Hampshire.

However, the test will come if and when the larger European companies begin to expand into the USA. Will it be politically acceptable for the US government to allow the takeover of a significant proportion of the US electricity industry, previously always seen as a key strategic industry, by foreign investors? Opposition will be strong from the US utilities who will point to the barriers for them to invest in countries such as France and Germany. The publicly owned companies, EDF and Vattenfall, will find it particularly difficult to avoid the accusation that their operations in the USA would be unfairly supported by their national governments.

In Latin America, Endesa, Iberdrola, EDP and EDF have led the way. However, the combination of power shortages in Brazil and the financial collapse of Argentina in December 2001 has illustrated the risks inherent in operating in such markets. In Brazil, the power shortages of 2001 may lead to a return to a more regulated, centrally planned system restricting profits and ending further privatisation. The collapse of the Argentine Peso and economic recession there will also make it difficult to maintain profits and may 'infect' other Latin American economies such as Chile, where Endesa in particular is heavily exposed.

Eastern Europe is also problematic due to a combination of limited demand growth and a need for heavy investment to reduce the environmental impact of generation. The larger Pacific Rim countries have been slow to privatise their large utilities and most foreign investment has been channelled into new independent power producers (IPPs) to meet growing demand. The 1997 collapse of East Asian economies was a graphic warning of the risks of doing business in that region.

There has been speculation that oil companies would move into the electricity sector and downstream in gas. They have benefited strongly from liberalisation, which has resulted in a massive switch in power station fuel away from coal and nuclear to gas, providing a profitable new market for a commodity that in the past has not always been easy to sell. However, so far, they have restricted themselves to acquiring a few power plants and to selling gas directly to large final consumers. In the gas sector, Shell and Exxon were willing to sell their share of the dominant German gas company, Ruhrgas, to E.ON and it may be that the oil companies will judge that the skills needed, the risks inherent and the profits on offer are not sufficient, at least at this stage, to justify moving into closer contact with small consumers.

9. Does this level of concentration matter?

The process of concentration in the European electricity industry is far from over. In the next year or two, the Seven Brothers are likely to make important new acquisitions. In Spain, the proposed merger between Endesa and Iberdrola, shelved in 2000, could re-emerge or Iberdrola could be bought by another of the Brothers and there is frequent speculation about a takeover of Union Fenosa, the third largest company. In Italy, the third of the generation companies spun off from ENEL, Interpower, is scheduled to be sold in 2002, while ENEL will be desperate to start making foreign acquisitions. In the UK, Seeboard (one of the 12 privatised distribution companies) was sold in June 2002 to EDF. In the Netherlands, the US utility, Reliant is expected to sell its recently acquired UNA generation business. The remaining smaller companies will inevitably make mistakes on occasions and these will leave them vulnerable to takeover by the dominant groups.

The vision behind the Electricity Directive was the creation of a single European electricity market. The argument from governments reluctant to break up their national champions is that Europe must increasingly be seen as one market and the relevant measure is not how many companies are active in their national market, but how many companies are active in the European market. If seven companies were competing against each other in a single European electricity market, even

if the model was structure was not pure British Model, they would argue that that is ample to ensure that competition is vigorous and that consumers will get real choice.

However, at present what is emerging is a Europe divided into three main strata, North, Central and South each dominated by vertically integrated oligopolies made up of the three or four existing dominant companies. The Central stratum includes France and Germany and is the centre of gravity of the European electricity business. It is dominated by the three strongest companies, EDF, RWE and E.ON. The German and French governments show little sign of taking the measures necessary to force these companies to face real competition in their home markets. No doubt there will be token new entrants in the national markets, but, for example, EDF will know that it will make little sense for it to start a price war in Germany.

In Northern Europe, there is already one international market, but the three 'national champions' Vattenfall, Fortum and Statkraft, are strengthening, not weakening their positions and if two of these companies merged, it would provide a stronger base from which to expand outside the region. In the South, the main markets will be the separate Italian and Spanish markets, the latter incorporating Portugal. Endesa, EDP, ENEL and Iberdrola will continue to dominate these markets and, as in the Central Strata, will have no incentive to compete hard against each other. In all three regions, the 'Brothers' are taking over local retail supply companies to minimise their exposure to the wholesale electricity market. Regulatory pressure to break up monopolies in, for example, Italy and Spain, seems to be resulting in little more than asset exchanges. Endesa bought Elettrogen from ENEL in Italy while ENEL bought Viesgo from Endesa in Spain. The Big Three, EDF, RWE and E.ON are beginning to move North and South and have the resources to swallow one or more of the dominant players in those regions if they get the chance.

In this grander scheme of things, the rest of Western Europe is something of a sideshow. Britain is a significant size market and companies can be bought and sold far more easily than in mainland Europe, but its island status means that a presence in Britain has limited strategic value. The Benelux countries might prove a nice niche for Suez, exploiting the scope for trade between the Nordic and Central markets, while the Verbund could exploit a similar niche between Eastern and Western Europe.

10. Conclusions

The *laissez faire* attitude to company mergers and takeovers has led to concentration in many global markets so that only a handful of significant players

control them. In some cases, such as aircraft manufacture, there are plausible arguments that the need for special skills, huge investments in product development and scale economies necessitate such market concentration. However, in others, such as fast food and clothing, market concentration seems to be the result simply of the marketing power of the large players. The liberalisation of the electricity industry has opened up the possibility that the electricity industry will become similarly concentrated. While the electricity industry is not as technologically simple as making burgers, it certainly does not require 'rocket science'. Most countries in the world had developed the technical capability to operate a reliable electricity system provided they were well managed and given sufficient financial resources.

The newly emerging electricity giants speak frequently of critical mass and, for example, the need to supply at least 5 million consumers to achieve scale economies. They also justify their moves into gas and water as exploiting synergies. However, there is little analytical evidence that synergies and scale economies are large enough to have much impact on consumer bills. The more plausible, but less respectable explanation is that the larger the companies become, the less competitive the market will be and this is what drives mergers and acquisitions.

However, the electric utilities are still immature companies in terms of their commercial expertise. In many cases, their strategic policy seems so far to have been based on little more than bidding for what was available. Apart from their technical skills, two of the strengths of the oil companies, honed over many decades, are their abilities to deal with risk and to operate in difficult political environments. The oil majors are probably no less prone to error than other types of company, but when they do make errors, there are seldom significant long-term repercussions on the profitability of the company as a whole. The electricity companies, which until recently had no need for such skills, do not have them yet. However, if they are allowed to continue to expand in Europe and they retain their privileged position in home markets, they will acquire these skills, and will try to use them as the springboard for a wider domination of the world's electricity markets.

In theory, the public monopoly model and the competitive model both have strong advantages (see Table 4). The reality may prove to be that realising the theoretical advantages of the competitive model will be at least as difficult as realising those of the public monopoly model. History may judge that we would have been better advised trying to address the problems with the existing model, which despite its faults did deliver a reliable supply of electricity at affordable prices to all consumers. There is still time for policy makers to prevent an unhealthy domination of world or European

electricity industries by Seven (or perhaps only Three) Brothers. This will require a less romanticised assessment of what competition can achieve. Turning the clock back to the days of national and regional monopolies is not an option for most countries now. The challenge will be to develop a new organisational model for the industry that has the advantages of control that the old centralised systems had, but that does not suffer from its stifling inflexibilities.

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The seven brothers also decided that since number seven was such a grand number, every aspect of the town should be centered on that magnificent prime number. For instance, the town would be build with seven streets, 77 houses, 777 trees, and their goal was to eventually have 7,777 inhabitants. Now, each of the seven brothers was assigned to a task to begin building the town.