

Electricity liberalisation in Europe—how competitive will it be?

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Abstract

All the countries of Western Europe have taken steps to liberalise their electricity industries. Large consumers in every country can choose their electricity supplier, and in some countries, this choice has been extended to every consumer. The European Union has decided that from 2007 at the latest, all customers will be able to choose their electricity supplier. A number of large European electricity companies have been responding to this changing environment by merging with electricity companies in other countries. This means that while some national markets may not look unduly concentrated, concentration at the European level has been growing. This paper addresses the reasons for this, and asks whether the resulting industry structure will be sufficiently competitive to deliver gains from liberalisation.

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1. Introduction

Why are some industries regulated by governments? Typically, when regulation is first adopted, it required enough people (or enough influential people) to believe that the results would be better than the results of an unregulated market. What do we mean by better? Welfare economics suggests that policy should usually aim to maximize the sum of consumer and producer welfare, while the public interest theory of regulation implies that regulatory decisions are generally taken to further such an objective. In the modern economic literature, Stigler (1971) pointed out that many regulatory decisions are actually taken in the interests of the regulated firms, and that firms themselves actually press for regulation if they believe that it offers a better prospect of “reasonable” profits than the struggle of a competitive market. He was not actually the first to make this point, since Chadwick (1859) gives the example of bakers in the suburbs of Paris, who organized a petition asking to be regulated. Free entry

had produced the textbook result of minimal profits, and the bakers were willing to accept a scheme of price regulation in return for a restriction on the number of bakeries permitted to operate—they even volunteered to raise the funds necessary to buy out the bakeries that would be closed under the scheme.

Why are some formerly regulated industries deregulated? Again, the standard answer is that enough influential people come to believe that deregulation will produce better results than continued regulation—either because of genuine changes in the industry’s environment or technology, or because of a change in beliefs about economic policy. It is undeniable that some movements’ towards deregulation have been imposed from outside the industries concerned, and a good example concerns the deregulation of the electricity industry in England and Wales at the end of the 1980s. When Mrs. Thatcher won her third election, in 1987, the Conservative manifesto contained a pledge to privatise the electricity industry, but no details of how it would be done, and she left that up to her Energy Secretary, Cecil Parkinson. When he started talking to the head of the Central Electricity Generating Board (CEGB), it was clear that the latter pictured a monolithic industry,

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privatised as a whole, with the CEGB at its head. The two previous utility privatisations, of British Telecom and British Gas, had involved the sale of incumbent monopolies with only token competition, and the electricity industry was reportedly content to follow in this tradition. The heads of the dozen Area Electricity Boards, responsible for distribution, also apparently favoured a vertically integrated structure for the privatisation, although they saw generation at the bottom, not the top, of the pyramid! Mr. Parkinson, however, wanted to cement his reputation with a more imaginative privatisation than before, and listened to outside advisors who advocated breaking up the CEGB and introducing real competition into the industry (Henney, 1994).

Over the next few years, this radical policy of deregulation was adopted, and came to be seen as a success. In Norway, too, the electricity industry was liberalised, and the country's wholesale markets expanded to cover Sweden and then Finland. The European Commission took an interest, and started to prepare an EU-wide policy of electricity liberalisation. Directive 96/92/EC, which came into force in February 1997, required all Member States to open their electricity markets to competition in stages, so that consumers taking 33% of their national electricity demand would have a choice of supplier by February 2003. Third parties had to be given access to the electricity grid to make this possible, and a measure of unbundling between the grid and the newly competitive sectors of the industry was required to create a level playing field.

It would be patently false to claim that this deregulation was solely or mainly pursued at the behest of the electricity industry. Some companies may have been in favour of deregulation, but a number of EU governments sought to delay or water down the process, and governmental reluctance was often associated with an existing industry structure that was incompatible with the proposals for liberalisation. The most obvious example is that of France, which pressed for the Directive to include a "Single Buyer" model, in which a nation-wide organisation would buy power from generators and then make it available for retailers, alongside the Third Party Access models intended to allow normal wholesale transactions between generators and retailers. France had (and has) a dominant, state-owned, electricity company, *Electricité de France*, and the Single Buyer model would probably have preserved this dominance, at least if adopted in the form which the French government had argued for. In practice, the European Commission amended the proposal until it would have had the same effects as regulated Third Party Access, and the French duly adopted regulated Third Party Access when the Directive was eventually incorporated into French law.

While we should not claim that electricity deregulation in Europe was adopted at the request of the electricity industry, we should not forget all the lessons of the interest group theory of regulation, either. We can be confident that the major firms in the electricity industry, once they realised that deregulation was definitely coming, will have been taking actions to influence its form, and to prepare for its effects. In Germany, for example, the entire electricity market was rapidly opened to competition, but the Germans adopted a system of negotiated, rather than regulated, Third Party Access. Since the networks will remain natural monopolies for the foreseeable future, the choice of negotiated Third Party Access gave the companies an opportunity to shift the industry's profits into a segment that should remain immune from competition.

The other lesson is that firms will always react to their environment, and if they cannot influence their market's rules, they may try to influence its structure. Over the last few years, Europe has seen an unprecedented wave of cross-border mergers in electricity, as companies have prepared for electricity deregulation. Over the last five years, the share of the top five firms in the EU has risen from 49% to 58%.

This paper looks at that process, and its implications. The next section sets out the requirements for successful deregulation in the electricity industry, and analyses the problems that can be caused by market power. Section 3 discusses the trends in concentration and integration in the electricity industry in England and Wales, one of the first to be deregulated. Section 4 looks at the increasing trend towards horizontal integration in Europe, and asks whether the trends have gone so far as to endanger the goals of the deregulation. Section 5 concludes.

2. Electricity deregulation and its requirements

We traditionally identified three segments in the electricity industry: generation, (high-voltage) transmission, and (low-voltage) distribution, which included the retailing activity of actually dealing with customers. When the competitive approach began to spread, a fourth segment was added, as retailing, or supply, was separated from distribution. Transmission and distribution are natural monopolies, and the direct impact of deregulation on these segments has been limited.¹ Generation and supply, however, are potentially competitive activities, and have been opened up.

¹They have had to adjust their way of working to interact with the deregulated segments, of course, and a few countries have introduced "merchant transmission", allowing others to build new lines that fill gaps in the incumbent's network, but transmission and distribution do not generally face direct competition as a result of deregulation.

Competition in generation requires that the new generators can have access to the transmission system, and can find a market for their power. This might be a formal wholesale market, or they might simply sell through bilateral contracts. Since the generator will almost never produce exactly the amount of power required by its customers, however, the transmission system operator must be ready to absorb a surplus or make up a deficit. If the system operator is also the owner of a competing generating company, however, it is likely to have an incentive to discriminate against the entrants. In its simplest form, this would just involve charging a high price to access the grid, which would not affect the overall profitability of generation and transmission combined, but might make the entrant generator unprofitable. The obvious remedy for this is to regulate transmission charges, and to ensure that the transmission segment is at least functionally separate from the rest of the organisation, with separate accounts, so that its profitability can be audited.

However, such functional separation may not be enough for truly fair competition. The system operator might always be tempted to favour its own generators over rivals, and it would often be impossible to tell whether this had in fact happened. Running a transmission system is a complex process involving a lot of judgment, and there are few auditable rules that say exactly when it becomes unacceptably risky to allow all generators to continue with their planned output decisions. The only way to ensure that the transmission operator is not tempted to favour its own generators is to prohibit it from owning any, introducing legal separation. In England and Wales, the National Grid Company owns and operates the transmission network, and does not own any generation, whereas in the US, several Independent System Operators have been set up to control transmission assets owned by other, frequently integrated, firms.

Competition in supply is less vulnerable to “technical” discrimination, since distribution networks are generally operated as a passive conduit from the transmission system to the final customer. While large customers may have connections to the grid that can be individually switched, if small customers are allowed to choose their supplier, they will inevitably receive the same standard of distribution service as others in their neighbourhood. The main obstacle to having competition to supply small consumers is the difficulty of keeping track of their purchases, especially if the cost of electricity varies significantly over the course of the day. The usual answer is to set up a system of profiling, so that the cost of the power taken by any one consumer is assumed equal to the average cost of power taken by consumers of that class. It is not really necessary to separate distribution from supply (although some English companies did so voluntarily, and the British

government is now compelling functional separation) as long as all suppliers, including the incumbent, have to pay the same distribution charges. Once again, these should not be excessive, and regulation is the usual way of ensuring this.

Provided that these technical requirements are met, competition in supply to large customers is relatively easy to establish. Most large electricity consumers are spending what they consider to be significant amounts of money on power, and so they are willing to shop around for the best deal, or to employ a specialist agent to do so on their behalf. Incumbent suppliers may start with a market share of 100%, but this can rapidly fall, even if they adopt a strategy of remaining competitive on price with their rivals. Some supply companies may adopt the broader strategy of providing energy services, including advice on energy efficiency measures (or even their installation) as a way of adding value. Large customers are generally well-informed, and since they can be safely left to protect themselves against exploitation by shopping around, it is feasible to deregulate the prices that they have to pay, either when, or soon after, the market is opened.

Competition to supply small customers is much harder to establish. The amount of money involved per customer is far smaller, reducing the incentive to entrants to come in to the industry. Most customers have little interest in their electricity bills, and so suppliers must follow more active marketing strategies if they are to win market share. Even so, few customers are likely to switch away from the incumbent unless quite large savings are on offer. That either implies that the entrant must have much lower costs than the incumbent, or that the incumbent is allowed to charge a price well above its costs. In England and Wales, a legacy of expensive power purchase contracts did mean that the average costs of the incumbent suppliers were higher than the marginal cost of selling to new customers (even though the companies doing that selling were mostly incumbents in other areas), but the regulator did not force the incumbents’ prices to fall as fast as their costs did. This created enough headroom for the competing suppliers to attract and keep two-fifths of all electricity consumers, but has not protected the three-fifths who are still with the incumbent. Price regulation has now been lifted from electricity supply (though not the transmission and distribution charges) in Great Britain, and there are concerns that further falls in wholesale prices have not been passed on to small consumers. Price dispersion is quite high in Norway, and switching low, while few consumers in Germany have changed their supplier. Overall, supply competition has not yet proved itself an effective way of limiting prices to small consumers.

Generation represents a much higher proportion of the industry’s costs than supply, and it is here that we

might expect the greatest potential for efficiency gains. Both sides of the market contain large, well-informed, players with a lot to gain from efficient decision-making. The transaction costs involved in setting up a wholesale electricity market need not be excessive in relation to the potential benefits. Those benefits should come from more efficient operation, as the profit motive encourages firms to find better ways of running themselves, and from better investment decisions. Of the two, the investment decision has the potential both for greater savings and for greater losses. Building the wrong sort of power plant, or the wrong amount of capacity, is expensive, and the hope of deregulation is that companies will be given the right financial incentives to make the right decisions. However, if the market for power plant investment is characterised by herd-like behaviour and cycles of alternately excessive and inadequate investment, then the wrong decisions may be made.

The greatest obstacle to benefits from competition in generation is market power. In most markets, the possibility of storage, substitution to alternative products, and the threat of entry can give some protection to consumers, even if there may be few sellers in the short term. Electricity cannot be stored, it has no substitute in many of its uses, and it is produced in capital-intensive power stations with long planning and construction times. The normal protections therefore fail to apply. At peak times, the margin of spare capacity on most electric systems will generally be less than the size of the largest generating company. This means that the largest company will be “pivotal” at those times, for demand cannot be met without using some of its plants. It can ask any legal price that it wishes for the output from those plants, and the grid operator will be forced to pay that price or cut off some consumers.

There are some limits to this market power, of course. The requirement that the price is legal can be an important one, since some US markets have formal bid caps, limiting the amount that any station can bid, while European Law prohibits the abuse of a dominant position. Note that if the margin of spare capacity is low enough, however, a number of quite small generators can each be pivotal, without reaching the market shares that European Law associates with dominance. The British regulator attempted to fill this gap by introducing a market abuse licence condition²

that would have prohibited the abuse of a position of substantial market power, and would have applied to companies with a market share of only eight percent – well below the EU’s threshold. If the generators have sold much of their power under contract at fixed prices, they have much less incentive to raise the spot price that they receive for the remainder (Newbery, 1998; Green, 1999), although higher spot prices can of course influence the price that they receive for their next set of contracts. In the medium term, entry is a genuine threat, and generators need to consider whether an era of high prices will encourage so much entry that they destroy their long-term profitability.

However, one obstacle to entry is vertical integration. Consider a supplier that is integrated backwards into generation, but also trades in the wholesale market. In a static model, a large vertically integrated firm will have incentives to manipulate the wholesale price, that depend on whether it is a net buyer or net seller. The net seller will want to raise the wholesale price, bidding above cost with its power stations, while the net buyer will want to reduce the price, possibly selling below cost from its own stations, since this will have a greater impact on the firm’s overall purchase costs than on the profits from its stations. However, to the extent that the unintegrated generator or supplier would have a greater incentive to manipulate prices (since its net sales or purchases would equal its gross trades), there can be a short-term gain to integration. The real costs lie in the long term. If the integrated firm prefers self-dealing to trading on an open market, liquidity in the open market will suffer. This will penalise non-integrated competitors in the short term, and make entry harder in the long term. Successful entry into generation requires either a long-term power purchase agreement, together with associated contracts which allow the generator to lock in all the main financial parameters (fuel cost, selling price, financing cost) and enter at low risk with project finance, or a liquid market in which a “merchant generator” can feel confident of selling its power at a reasonable price. If there are few non-integrated buyers willing to sign a long-term power purchase agreement, and the spot market is also illiquid (and potentially volatile) it is unlikely that many investors will want to accept the risk of building a new power station, with its large sunk costs. There will still be some price at which entry supported by a well-financed parent company becomes viable, but it is likely to be well above the levels expected in a more competitive market.

In an interconnected market, entry can come from foreign generators as well as from newly built plants, and can therefore take place rather more quickly, and without the risks of building new plant. The main constraints here are from the nature of the transmission system, since most of the grids in Europe were built to meet national needs, with rather weak connections to

²All large UK generators must have a licence, which sets out their legal obligations (such as obeying the industry’s operational codes, and providing information to the regulator). The licences can also contain measures to affect their conduct, such as the price control clauses contained in the licences of distribution and transmission companies. The market abuse licence condition was accepted by six of the eight generators that the regulator wished it to cover, but the remaining two appealed against its insertion, and the Competition Commission, the UK’s competition court, ruled that the condition was not necessary in their cases. The regulator then withdrew it from the other six licences.

surrounding countries, limiting the amount of power that can be traded internationally. The physics of electricity transmission also implies that companies may be able to take actions—often counter-intuitive ones—that increase the impact of these constraints and enhance their market power.³ However, the transmission systems are being strengthened (which can be as much a case of better operating procedures to ensure that the most is made of the available capacity, as of building new lines) and international trade in Europe is currently increasing.

The other obstacle to competition from abroad, however, is a behavioural one. The theory of multi-market contact (Bernheim and Whinston, 1990) implies that when companies meet in several markets, this can increase the probability of successful collusion, compared to a situation in which the firms only meet in one place. The key condition is that the markets must not be identical from the point of view of the firms—if they were, we could simply “scale up” the analysis of a single market. If the markets differ in ways that affect the profitability of collusion, however, then there can be important effects. Firms will be able to collude if the short-term gain from expanding output is less than the cost of a subsequent price war. In some markets, this condition will be easily met and collusion is sustainable, while other markets would be unable to sustain collusion, in isolation. If the two markets are considered together, however, then the cost of a price war in *both* markets simultaneously could outweigh the short-term gains from expanding output. The “spare” market power from the market where collusion is easily sustainable is effectively transferred to the second market. Fernandez and Marin (1998) show that the amount of spare market power can be increased if the price which firms attempt to sustain in the “easily collusive” market is reduced, and this will raise the price that can be sustained in the other markets by more than enough to raise profits overall.

To sum up, while liberalisation in the electricity industry has the potential to create significant efficiency gains, and to pass them on to consumers, we should be worried about the potential for market power in generation. This potential will be greatest where companies are large relative to the amount of spare capacity. Even where the amount of spare capacity seems sufficient, tacitly collusive outcomes are a real possibility, and made more likely if the companies involved meet in a number of separate markets. In the next sections, we will see that many European electricity

companies have been engaged in mergers that will have precisely that effect.

3. Vertical integration in England and Wales

Traditionally, electricity companies in Europe were regional or national. Some were vertically integrated, but there were many distribution-only utilities (often at the municipal level), so that most of the larger firms were net generators. These net generators sold power to other utilities under contract or tariff arrangements, rather than through markets. Where power flowed across national boundaries, it was frequently on a “split-savings” basis, priced at the average of the calculated marginal cost of the two systems involved. There was little reason for firms to integrate across borders, or increase the integration between generation and supply.

This has changed since the start of electricity market liberalisation. The first liberalisation in Europe was in England and Wales in 1990. Generation had long been separated from distribution and supply, and the restructuring largely continued this separation, while allowing limited integration by both the major generators and the Regional Electricity Companies (RECs). The RECs were also granted ownership of the National Grid Company, in part because the government’s financial advisors believed that a transmission-only electricity company would be too exotic to float on the stock market, with a holding company structure designed to stop the RECs influencing its decisions. As soon as NGC had a reasonable track record, and the RECs wanted to de-merge it, the government and the regulator were happy for them to do so. Competition in supply was opened up in stages, and at first the major generators were allowed jointly to sell directly to 15% of the demand in each RECs’ area. This represented half of the competitive market, at the national level, although some RECs had a much larger share of eligible customers. The major generators were soon recognised to be offering the lowest prices, and customers who were unable to obtain these prices because the generators had reached their direct sales limits complained. The limits were twice increased, and abolished in 1992. Fig. 1 shows the industry’s structure in 1990, with a very concentrated generation sector, and a large number of regional suppliers. While supply appears fragmented, within each area, the local REC had a market share of around four-fifths, since 70% of the market was still a franchise monopoly.

The RECs were allowed to integrate into generation, but their ownership stakes were limited to between 400 MW and 1000 MW, set at approximately 15% of the maximum demand in each REC’s area. A REC which reached its limit with plant running at base load might

³Gilbert et al. (2004), for example, show that a company might wish to exploit market power by *increasing* its output, the opposite of what we would normally take to be anti-competitive behaviour, if this creates congestion on a link and hence separates two markets, allowing the company to benefit from higher prices in (at least) one of them.

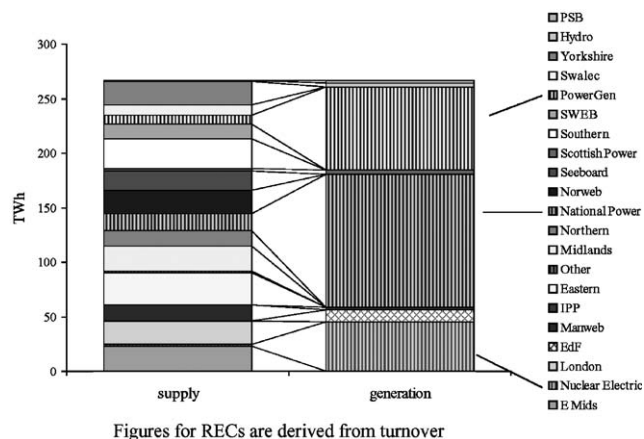


Fig. 1. Supply and Generation in E&W, 1990/1.

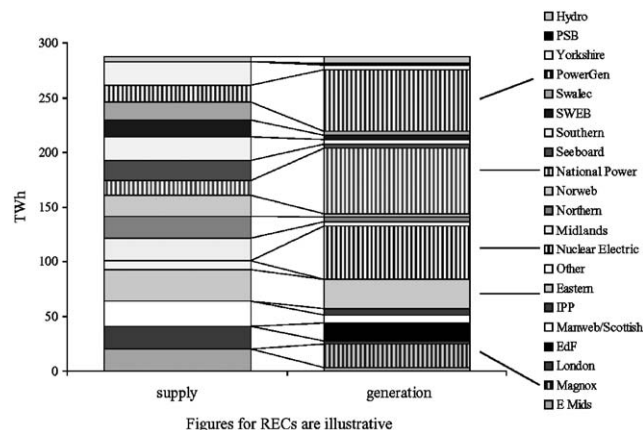


Fig. 2. Supply and Generation in E&W, 1997/8.

generate enough power for a quarter of the sales in its area, or roughly half the power sold to small consumers. The price controls that applied between 1990 and 1998 allowed the REC to pass on the cost of buying power from its own plant to its small consumers. This was subject to an “economic purchasing” condition that required the RECs to demonstrate that they were buying at “the best effective price reasonably obtainable having regard to the sources available”, but the RECs were able to cite the unattractive prices with which the major generators had opened their negotiations for future sales, and justify prices that, with hindsight, look expensive.

One REC took essentially no interest in generation; most took stakes in one or two new power stations, and Eastern, the largest, built two stations and took a stake in a third, using 83% of its limit by 1995 (Offer, 1994). By that time, the regulator had persuaded the two major generators to divest 6 GW of plant in order to reduce their market power and avoid a reference to the Monopolies and Mergers Commission (which might have resulted in a worse fate). Eastern was one of a number of interested bidders, but the own-generation limit would have prohibited it from acquiring the plant. The regulator consulted on relaxing the limit, and eventually agreed that a REC could own additional stations, provided that it did not sell the power from those stations to small customers in its own area, those at most risk of exploitation. Effectively, the hope was that as more RECs chose to exceed the own-generation limits, they would all be forced to buy power for their small customers in the open market, and would be unable to charge an excessive price for sales from their own stations, since this would have to be passed on to large customers willing and able to seek out the lowest prices. This should have eliminated the worst effects of vertical integration, although entry by non-integrated firms could still have been made harder if the vertically integrated firms took too great a share of the

market.⁴ Eastern was duly allowed to lease the 6 GW of plant from National Power and PowerGen.

At the same time that Eastern was trying to integrate backwards, National Power and PowerGen both bid to acquire RECs, in September 1995. The bids were referred to the Monopolies and Mergers Commission (MMC), which found that they might be expected to act against the public interest if they proceeded without safeguards (Monopolies and Mergers Commission, 1996a, b). Most members of the group which produced the report believed that the bids could go ahead subject to safeguards such as restrictions on the transfer of information about wholesale contracts, and the divestiture of the RECs' stakes in independent power stations. One member, however, issued a minority report, arguing that competition in the industry was still under-developed, and allowing vertical integration on this scale would impede entry to a dangerous extent. The final decision rested with a government minister,⁵ and he blocked the mergers. By 1998, therefore, generation in England and Wales was still fairly concentrated, but there was little vertical integration, as shown in Fig. 2.

That changed in the following few years. The government determined to increase competition in generation with further plant divestitures, and the major generators were able to get permission to buy a REC and a REC's supply business in return. The divested stations were sold to US utilities without significant

⁴In practice, the restriction on electricity purchase would eventually prove unenforceable, as the companies were not required to keep separate contract portfolios for large and small customers within their own areas, and perhaps unnecessary, as competition grew, and so Ofgem have now dropped it (Ofgem, 2003).

⁵If the Monopolies and Mergers Commission reports that a merger may be expected to act against the public interest, the final decision on whether or not to allow it, and what conditions to impose, is taken by the Cabinet Minister for Trade and Industry, who at the time had adopted the Victorian title of President of the Board of Trade.

supply interests in the UK, but the generators went on to sell further stations, and some of these were sold to UK-based suppliers. Electricité de France had bought London Electricity in 1998, and bought the 2 GW Cottam power station from PowerGen in 2000. EdF had also acquired the SWEB supply business, in the South West of England, and supplied power over the cross-channel interconnector. Scottish Power, which was vertically integrated in its home market, had bought an English REC, Manweb, in 1995, and bought the Rye House gas-fired power station from PowerGen. National Power bought Yorkshire Electricity, and then swapped its distribution business for Northern Electric's supply business. By this time, the largest generation company was British Energy, the privatised nuclear generator, which had attempted to increase its vertical integration by buying the Swalec supply business in South Wales, but had sold it on to Scottish and Southern Energy (another combination of a REC and an integrated Scottish company) once it was apparent that the company would be unable to acquire the economies of scale believed necessary to compete in supply.

This desire for economies of scale meant that by the beginning of 2002 there were just seven large suppliers in the domestic market: Innogy (the UK arm demerged from National Power), PowerGen, TXU (Eastern had taken on its US parent's name), London Electricity, Scottish Power, Scottish & Southern Energy and Centrica (the former British Gas). The one remaining independent REC, Seeboard, was to be bought later in the year by London. Generation was now more fragmented than supply, and some of the larger generators were actually net buyers.

A combination of fragmented generation, excess capacity, vertical integration and a new set of trading rules produced much lower wholesale prices from late 2000 onwards, and several generators faced severe financial problems. British Energy has had to be bailed out by the government, and TXU Europe had to be placed in administration—although a net supplier in physical terms, its contractual commitments left it exposed to the fall in wholesale prices. TXU's power stations and supply business were bought by PowerGen in October 2002, further increasing concentration in supply. E.ON of Germany had successfully bid for PowerGen in October 2001, while Innogy was acquired by RWE in May 2002.

In mid-2003, Great Britain thus had six large electricity suppliers (Fig. 3), all vertically integrated and half of them foreign-owned, with little prospect of new entry to the market to sell to domestic consumers, given the costs of setting up a large-scale supply business. The industrial and commercial market is potentially more contestable, but this depends on access to generation, and many of the remaining independent

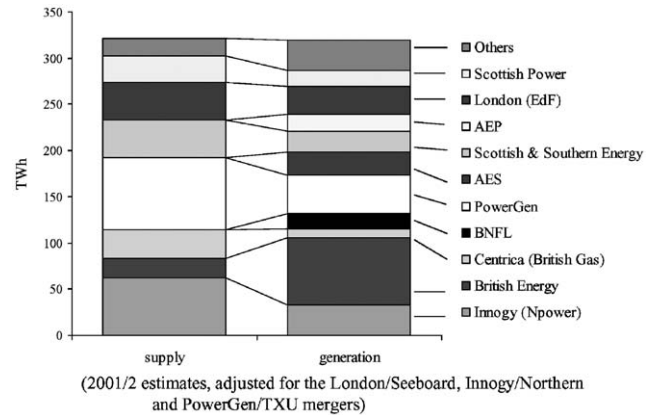


Fig. 3. Supply and Generation in Great Britain, 2003.

generators are suffering financial problems that could lead to their take over by the integrated groups.

Could six groups be enough for effective competition? There have been complaints that reductions in wholesale prices have not been passed on to domestic consumers (e.g. [Energywatch, 2002](#)), although the regulator has calculated that the reductions in prices between 1998 and 2002 are close to those in overall costs ([Ofgem, 2002](#)). It is certainly the case that consumers can save more than 10% of the average bill by switching supplier, but the incumbents need prices that exceed their marginal costs if they are to recover their fixed costs, and entrants might be willing to sell at close to marginal cost. The open question is whether future cost reductions would be passed on to consumers, or whether the incumbents would be willing to accept a slightly higher loss of market share in order to preserve their margins.

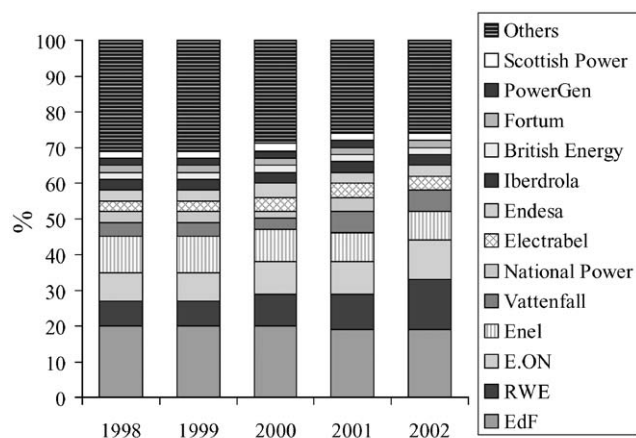
4. Horizontal integration in Europe

The pattern of electricity company mergers on the continent of Europe has been rather different from that in England and Wales, reflecting a different starting point. Many companies already had a high degree of vertical integration, and some had large shares of their national markets. For the most part, national regulators were concerned to avoid further concentration within a national market, although there have been some marked exceptions. For example, while Endesa, Spain's largest electricity firm, was being privatised, the Spanish government allowed it to raise its market share of generation from 37% to 50% by taking over two smaller firms, Sevillana and Fecsa ([Regibeau, 1999](#)). Some governments have taken steps to break up their larger firms, however, such as the Italian government's requirement that ENEL should sell 15 GW, or 25% of its capacity, as part of the liberalisation process.

With limited prospects for growth in their national markets, Europe's larger electricity companies have

mostly sought to acquire firms in other markets. Electricité de France has been particularly noticeable in this regard, perhaps because it is already Europe's largest electricity company, and, as a state-owned company, is itself immune from take-over. EdF has acquired the Regional Electricity Company London Electricity in the UK, and through it, a second REC (Seaboard), the supply business of a third (SWEB), and a number of power stations. In Germany, EdF took a 34.5% stake in EnBW, then the third-largest utility in the country, which has also been involved in a series of mergers. In return, the European Commission forced EdF to sell 6 GW of "virtual" capacity, to increase the amount of competition within the French electricity market. In Sweden, EdF took a 36% stake in Gräninge, and agreed to co-ordinate its voting with the founder's family, gaining control of the country's fourth largest electricity company (albeit one with a market share of only 4%). In Italy, EdF is a member of the Italennergia consortium, owner of Edison, the country's second-largest electricity company. In Austria, EdF acquired joint control, with the regional government, of Estag, a holding company owning a regional power company, and gas and heat distribution companies. This list, drawn from Codognet et al. (2002), is deliberately not exhaustive, and the original source is strongly recommended for further information. Fig. 4 shows the effect of these mergers, and the others discussed below, on market shares within Europe.

RWE, Germany's largest electricity company, has taken over Innogy, which inherited almost all the UK-based assets of National Power when that company split itself in two in 2000. In Austria, RWE has taken a controlling minority stake in the regional utility Kelag, while in Portugal, it is now the 100% owner of the Tapada power plant. It has acquired 90% of the shares in the Dutch electricity and gas supplier OBRAGAS, and taken a 25% stake in the small Italian generator Elettra.



Source: adapted from Codognet et al, 2002

Fig. 4. Market shares in European Electricity.

Vattenfall is Sweden's largest electric utility, with a 40% market share, and has been actively buying other companies in the Nordic market, including Oslo Energi, the distributor for Norway's capital. In Germany, Vattenfall has acquired HEW and VEAG, the large utilities for Hamburg and for much of the former East Germany, and Bewag, the distribution company for Berlin. These have been combined into a single group, Vattenfall Europe, which is now the third-largest electricity company in Germany.

Endesa of Spain has acquired a 30% stake in SNET, a generator with 2.5% of the French market, and holds 51% of the shares in the consortium which owns Elettrogen, one of the companies divested by Enel, with 7% of Italian generation. Endesa also attempted to buy two Dutch distribution utilities, but failed to win regulatory approval by the deadline that it had set, and the deals lapsed.

A 1999 merger between VEBA, owner of Bayernwerk, and VEAG, owner of PreussenElektra, created E.ON, Germany's second-largest electric utility. E.ON has since been involved in mergers in Sweden, buying 60% of Sydkraft, the second-largest power group; in the Netherlands, buying EZH, the smallest of the country's four generators, with a 14% market share; and in the UK, buying PowerGen, now a large integrated utility. In July 2001, E.ON started building a stake in Ruhrgas, Germany's largest gas utility, which was responsible for 60% of the long distance gas transmission in the country, and soon acquired control. The Federal Cartel Office blocked the take-over in January 2002, but this was over-ruled by the Federal government in July. A number of other companies initiated court action against the take-over and obtained an injunction, but withdrew their objections in February 2003, apparently in return for a programme of disposals by E.ON and Ruhrgas, which seem likely to benefit the objectors.

This merger does raise serious concerns over competition, because gas is the fuel of choice for entrants into most markets. If the heart of Europe's gas grid is controlled by an electricity company, it will have an obvious incentive to over-charge or obstruct rival generators. The best remedy for these concerns is structural separation—if the grids are owned by companies with an incentive to discriminate between users, then very careful and transparent regulation is required. E.ON and Ruhrgas had accepted a government request to divest the gas network to a legally separate company by 2004, although "network access conditions in Germany ... have not yet reached the appropriate standards for transparency or non-discriminatory third party access" (McCarthy, 2003). Even so, the combined company's market share in electricity and in gas trading raises serious concerns over market power. It is interesting to speculate whether the European Commission would also have allowed the merger to proceed.

Under the EU merger regulation, the merger was considered by the German government, since both companies had two-thirds of their turnover in that country at that time the merger was notified. If E.ON's merger with PowerGen had been completed at that time, less than two-thirds of its turnover would have been within Germany, and the European Commission would have been responsible for considering the merger, instead. The Commission might have taken a more robust line than the German government.

Other companies, not mentioned here, have also been involved in cross-border mergers. The pattern is clear—Europe's larger electricity companies have been growing larger, acquiring footholds in new markets. These footholds could be used to compete aggressively across Europe, but the relatively limited number of really large companies, and the theory of multi-market contact, suggest a more worrying alternative, that the European electricity industry would become dominated by a few firms with little incentive to compete.

5. Conclusions

One of the basic principles of economics is that people and companies respond to incentives. In other words, they respond to their economic environment, and when that environment changes, we can expect them to change their behaviour. In general, companies facing competition can expect greater profits, and an easier life, the larger they are in relation to their industry. If a formerly regulated industry is liberalised, the increase in competition raises the rewards to size. Mergers are generally the easiest way to make a company larger, especially if some regional and municipal governments are finding it newly politically acceptable to sell the utilities that they have long owned.

This paper has shown how the electricity industry of England and Wales, initially restructured with almost no vertical integration, has become increasingly vertically integrated. Many European electricity companies were already vertically integrated at the time when restructuring started, and national regulators prevented them from growing in their home markets. Their reaction to the liberalisation has frequently been to expand across national borders. As a result, the European electricity industry is becoming increasingly concentrated.

It is probably better to describe it as an industry than as a “market”—the links between national markets are currently too weak, in most cases, for us to talk of a European market. In time, transmission links may be strengthened, and the trading infrastructure created, to allow a more European market. The more integrated the market becomes, the less we need to worry about concentration within any one country, provided that

concentration at the European level remains low. But at present, the markets are mostly national, albeit with an increasing amount of international power flows. If European concentration continues to increase, and the same few companies are operating in each of the national markets, then they may lose the incentive to compete too actively with each other.

Large consumers need that active competition to benefit from having access to the electricity market. They do have the incentive and the ability to shop around, and so competition can be a more effective protection than regulation. Some small consumers also shop around, and obtain lower prices in a competitive market, but many others have not done so, and have not been well protected by the decision to liberalise their markets. These consumers would almost certainly have been better off if market opening, with all its transactions costs, had been replaced by a tougher system of price regulation to pass through the purchase cost savings from a competitive wholesale market. If the wholesale market is characterised by tacit collusion, however, there may be few savings to pass on.

At the moment, Europe probably does have enough separate electricity companies to provide genuine competition in most of its national markets. However, the larger companies have a significant economic incentive to change that, and are likely to seek further mergers. If European electricity liberalisation is to work in favour of consumers rather than producers, the competition authorities will need to be vigilant.

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