

# Recent evidence on the impact of electricity liberalisation on consumer prices

by

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**13. REFERENCES ..... 22****1. Introduction**

One of the primary justifications for the introduction of the EU's Electricity Directive was that it would reduce prices for consumers. In the autumn of 2005, a number of pieces of analysis on consumer electricity prices since electricity liberalisation were introduced. These included:

- Analyses by KEMA (KEMA, 2005) on behalf of EURELECTRIC (EURELECTRIC, 2005);
- The European Commission Competition Directorate (European Commission, 2005a and European Commission, 2006);
- The European Commission TREN Directorate (European Commission, 2005b);
- The International Energy Agency (International Energy Agency, 2005);
- Professor Leprich of Saarbrücken University and analysis using this by the MEP Claude Turmes; and
- European Commission report on services of general interest (European Commission, 2005c).

This paper reviews the evidence and interpretation provided in these documents and also looks at evidence on the liberalisation of electricity from the USA reported by the Carnegie Mellon Electricity Industry Center (Carnegie Mellon, 2005) and others.

These reports are based largely on the period before big price increases in fossil fuels began to be passed through to electricity consumers as large price rises. In some respects, the period up till then had been relatively advantageous to electricity reforms. Fossil fuel prices had been stable and a cushion of surplus generating capacity existed which meant that the new model was not properly tested. The liberalised markets must be effective not only in benign circumstances, they must also be able to cope with the difficult conditions now being experienced. If the new model does not stimulate enough investment to ensure secure supplies, or if high fossil fuel prices are used by companies as an excuse to raise prices far more than costs justify, the markets will have failed.

There are doubts about the ability of the liberalised model to cope with the range of circumstances it will face and there are serious problems with the markets created as the Commission itself acknowledges (in the Competition Commission Inquiry, see below). It is difficult to understand how the Energy Ministers of the European Union can, in their press release of March 14, 2006, justify recommending that the European Council 'Develop a strategy for exporting the internal energy market approach to neighbouring countries'.<sup>1</sup>

**2. Factors in electricity price comparisons****2.1. Determinants of electricity prices**

A long-standing objective of the European Commission has been to create a Single Market in electricity across the European Union. Creating a market is not a worthwhile objective in itself, especially for a standard product like electricity. It was the promise that replacing monopolies by a competitive market would increase the electricity industry's efficiency that was the driving force behind the passing of the European Union's Electricity Directives of 1996 and 2003. The Directives required the introduction of wholesale and retail competition into the electricity industry.

Intuitively, it might be expected that this increased efficiency would be reflected in lower electricity prices and many analyses of the impact of the Directives have tried to show a connection between the introduction of the Directive and reductions in electricity prices.

All things being equal, if competition leads to higher efficiency, which in turn leads to lower prices, this would be a good outcome of the reforms. However, the impact of liberalisation is potentially much wider than just on prices. If reforms lead to a reduction in investment to below the levels that

<sup>1</sup> [http://ue.eu.int/ueDocs/cms\\_Data/docs/pressData/en/trans/88787.pdf](http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/trans/88787.pdf)

are needed to sustain a reliable supply of electricity, or if the reforms lead to unacceptable outcomes from an environmental perspective, they cannot be justified even if, in the short-term, prices are lower. Equally, if the impact on social equity is adverse, for example, through higher relative prices for poor consumers and higher disconnection rates, the outcome of the reforms might not be acceptable. In looking at movements in prices, it is therefore important to determine whether any price reductions resulting from introduction of competition are sustainable from an economic and an environmental point of view and are acceptable from a broader societal perspective.

However, while efficiency is clearly an important factor, there are several other factors of comparable importance in determining the consumer price of electricity. These include:

- Input fuel prices and technology used;
- Environmental requirements;
- Cost of capital;
- Ownership and required level of profitability; and
- Level of taxation.

#### **2.1.1. Input fuel prices and technology used**

For fossil fuel power stations, the cost of fuel is generally the largest element of the generation cost, often accounting for more than half the total generation cost. Fossil fuels are generally bought and sold on global (coal and oil) or regional (gas) markets linked to spot markets in which prices are frequently volatile. The price of these fuels tends to move together and a rise in the price of oil will tend to lead to increases in the price of coal and gas. In the past utilities have tried to mitigate the price volatility that this brings by buying fuel on long-term contracts under prices which have limited links to prevailing spot prices. This may result in prices paid being higher than the spot price at times while at other times, the long-term contract price will be lower.

In an efficient free market, long-term contracts might not be sustainable. Companies that buy under long-term contracts might do well when spot fuel prices are high, but they may go out of business when spot prices are low and they have to sell their output at a loss.

Similarly, utilities using sources with high initial costs but low running costs, such as nuclear power, hydroelectric power and renewables such as wind power and solar power may also suffer from a lack of flexibility in their costs. For example, British Energy, the privatised British nuclear power generation company, prospered in the late 1990s and from 2004 onwards when electricity prices were high but was essentially bankrupted by low prices in 2001-2003 and only survived because of massive public subsidies and guarantees provided by the British government.

#### **2.1.2. Cost of capital**

One of the main costs for the electricity industry is the capital cost of the equipment used, especially power stations. The cost of capital (based on the interest rate) is therefore an important element in the price of electricity. The cost of capital depends on the perceived risk to the lender of lending money to the electricity company, which in turn depends on the specific economic risk of the investment and the credit rating of the company. Under the old monopoly model, investment risk was largely borne by consumers who generally paid whatever costs were incurred so the risk to the electric utility was low. The credit rating of publicly owned companies is generally higher than that of privately owned companies and hence the cost of borrowing lower, because publicly owned companies are often backed by government. All things being equal, a lower cost of borrowing will result in lower electricity prices.

#### **2.1.3. Ownership and required level of profitability**

Investor-owned utilities can only survive if their profitability is comparable to that of similar companies so in the long run, investor owned utilities must make a commercial rate of return. Other forms of ownership, such as local or national public ownership, co-operatives and not-for-profit companies place less stringent requirements on profitability. For example, for a nationally owned company, providing a stably priced affordable and reliable supply of power may be a higher priority

than making a full commercial rate of return. Cooperatives may similarly place a higher priority on obtaining an affordable supply of electricity for their members at prices which they can control than on making profits.

#### **2.1.4. Environmental requirements**

The generation of electricity can often lead to the production of substances that raise environmental issues, such as acid gases, greenhouse gases and radioactive waste and even apparently renewable sources such as large-scale hydro and solar photovoltaic cells (in production and disposal) could lead to significant environmental impacts. The extent of the measures that the environmental regulatory bodies impose to deal with these substances will influence the cost of generating power. The new carbon trading regime will also tend to increase the cost of fossil fuel-based options.

#### **2.1.5. Taxation**

Clearly, if the objective is to examine industry efficiency, taxation, which varies from country to country and through time, should be discounted

#### **2.1.6. Currency**

For international comparisons of electricity prices, care must be taken to avoid distortions due to currency fluctuations. For the European Union, the problem has been reduced by the introduction of the Euro to most EU countries, but some countries still have their own currencies which fluctuate in value against the Euro. For example, the value of the Euro against sterling has fluctuated since 1999 for 0.59 to 0.71, a range of about 20 per cent. A fall in the value of a currency will lead to an apparent reduction in the price of electricity in a given country compared to other countries with no real change in efficiency.

#### **2.1.7. Summary**

The factors listed above could all have a significant impact on electricity prices. Any analysis of price movements through time, or from country to country should take account of these factors. An analysis of price movements or international comparisons of prices that attribute reductions in prices to the impact of liberalisation without correcting for the impact of changes in these factors cannot be regarded as valid.

## **2.2. Costs of competition**

It is plausible that replacing a monopoly with a competitive market will induce an increase in the rate of efficiency improvements but it should not be overlooked that, for a century, the monopoly structure delivered consistent improvements in the efficiency of the electricity industry. Indeed, one of the justifications for the monopoly structure was that it would minimise costs. It would avoid wasteful duplication of facilities, allow centralised planning to optimise the size and configuration of the electricity system and maximise economies of scale within the electricity companies. It was also seen as the best way to ensure a reliable supply of electricity. From a societal point of view, even if electricity prices are reduced by liberalisation, if reliability is damaged, there could be a significant cost to society that far outweighs any gains from lower prices

In addition competition brings with it its own additional costs that would not arise in a regulated monopoly and these must be set against any assumed efficiency improvements. These include:

- A higher risk premium on investment;
- Costs of building the software for and operating wholesale and retail markets;
- Marketing costs for competing companies;
- Increased capacity need in transmission networks; and
- Loss of scale economies.

#### **2.2.1. Risk premium on investment**

Investment in electricity system equipment has always been economically risky because of the technologically challenging nature of the business and because of uncertainties about demand and fuel prices (a change in world fuel prices could make a power plant obsolescent). This risk was

borne in the past by consumers as electric utilities were generally able to pass on to consumers any costs they incurred. One of the promises of liberalisation was that this risk would be transferred to the owners of the electric utility, who would thus have a stronger motive to ensure that costs were controlled and unnecessary investments were not undertaken. It is not clear how far this 'commercial discipline' will improve decision-making on investments.

Against this extra commercial discipline, competition introduces additional commercial risks, for example that a competing generation company will lose market share to a rival. Overall, it is far from clear that the commercial discipline competition might impose will outweigh the additional commercial risks competition imposes.

If shareholders are to take on the risk previously held by consumers, they will have to be paid for this and, ultimately, it must be consumers that pay the cost. The cost is reflected in much higher cost of capital. For example, in a monopoly system, the real cost of capital was typically 5-8 per cent, whereas in a competitive system, the real cost of capital might be 15 per cent or more.

#### **2.2.2. Costs of markets**

Because of the particular characteristics of electricity, such as the need for the supply and demand to balance at all times, the design of markets is extremely complex and the running costs high. For example, designing and operating the retail market in the UK cost consumers €1.3bn over the first nine years, while the design and operation of the UK wholesale electricity market cost a similar sum. Many of these costs are running costs, not one-off start-up costs.

#### **2.2.3. Marketing costs**

Competing companies are highly unlikely to win new consumers if they do not advertise and promote their company, for example through door-to-door or telephone sales. Because electricity is a standard product, companies cannot offer consumers a 'better' product and must compete mainly on price. The cost of acquiring new small consumers is expected to be in the range €70 for an individual consumer acquired by marketing to €300 where consumers are acquired by corporate takeover of an existing retail company.<sup>2</sup> The scale of these costs is illustrated by the fact that in 1990, prior to the opening of the UK electricity market for retail competition for small consumers, the retail element of the bill represented about 5 per cent of a typical electricity bill. In 2005, these costs were estimated to make up about 30 per cent of the electricity price.<sup>3</sup> This increase in price of the supply element may give greater scope for retailers to compete against each other but the increase in the retail element does reflect major additional costs (marketing, cost of switching etc) that consumers will have to pay for. While switching may prevent exploitation from unjustifiably high retail components to the bill, it will increase costs for all consumers so even if small consumers do switch sufficiently often to prevent exploitation, they will increase costs to all consumers by doing so.

#### **2.2.4. Increased capacity in transmission networks**

It is increasingly clear that a pre-condition for wholesale electricity competition is that transmission networks have to have a much higher capacity, to accommodate a wide range of combinations of power plants. Any possibility of network 'congestion' is likely to be exploited by competing generators who can claim compensation if they are not able to be dispatched. Under a monopoly regime, the transmission system can be designed to accommodate just the 'optimal' mix of power plants. Extending networks, especially cross-border links can be expensive and can have environmental impacts through disturbance of remote areas.

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<sup>2</sup> Consumers that switch once are more likely to switch again and so have lower value than consumers acquired by takeover, many of whom will never switch supplier.

<sup>3</sup> See

[http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/12914\\_energypricespdate\\_nov05.pdf?wtfrom=/ofgem/press/fact-sheets.jsp](http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/12914_energypricespdate_nov05.pdf?wtfrom=/ofgem/press/fact-sheets.jsp)

### **2.2.5. Loss of scale economies**

Historically, it has always been assumed that there would be significant scale economies in the electricity industry, for example in acquiring the skills to use challenging technologies and in buying equipment. If the industry is fragmented to create a field of competing companies and to unbundle the networks from the competitive activities, these scale economies will be lost.

### **2.3. Other factors**

Competition might also drive prices down to unsustainable levels. Electricity is a standard product with little apparent scope for product differentiation and brand loyalty: consumers receiving their electricity from the grid cannot get 'better' electricity by switching supplier. According to economic theory, for a standard product such as electricity, prices will be driven towards the short-run marginal cost of electricity. Where there is sufficient generating capacity to meet demand, the cost will be low, too low to provide any incentive to the market to stimulate the construction of new capacity. However, if capacity is tight, prices will increase steeply because the short-run demand for electricity is inelastic and consumers cannot easily reduce their demand in response to high prices. For many consumers, stable and predictable electricity prices might be preferable to prices which, on average, may be slightly lower, but which are volatile and unpredictable.

It should also be remembered that the Directives only partly opened the industry to competition. Of the four main elements in the price of electricity, only two have been opened to competition, generation and retail, while distribution and transmission will remain regulated monopolies for the foreseeable future. Typically, in a monopoly system, the cost of generation represents around 50-60 per cent of the final price of electricity, the retail cost is 5-10 per cent, while distribution is about 25-30 per cent and transmission is about 5 per cent. These percentages vary from country to country (according, for example, to geographical and technical characteristics) and between consumer classes (the retail and network elements are much smaller for large consumers).

## **3. The KEMA study**

KEMA, a commercial consulting company, were commissioned by EURELECTRIC to review for the EU countries the data on the evolution of consumer prices of electricity from 1995-2004 including a more detailed analysis for the period from 2000 onwards. The report makes no claims on the extent to which these price changes can be attributed to the impact of liberalization.

The analysis is careful to avoid any distortions from inflation (by presenting prices in real terms) and currency fluctuations (by presenting the results in local currencies and as index numbers). EU averages are computed weighting the national prices by the level of consumption (so, for example, prices in Germany will have more weight than prices from Luxembourg)

For taxes, prices for industrial consumers are exclusive of VAT (on grounds that VAT can generally be reclaimed) but include other taxes, while for residential consumers, it includes all taxes.

If the objective is to illustrate the movement of prices met by consumers, the decision on taxes is understandable – most consumers care more about the level of prices than about the constituent parts – but if the impact of liberalization is being judged, including taxes, which might vary from year to year, can only confuse the analysis. In the Appendix 2 of the KEMA report, there is some, albeit not very precise, information on taxes, but in the main body of the paper, the analyses show prices inclusive of all taxes for small consumers and including all taxes except VAT for large consumers.

### **3.1. Overall price trends**

#### **3.1.1. Industrial consumers in the EU 15 + Norway**

If the market is open, there is an issue about how the price of electricity can be known. If the electricity retail market is competitive, industrial consumers and retail suppliers negotiate an individual price, which is commercially sensitive and is unlikely to be disclosed. There must

therefore remain doubts about how representative published prices for large industrial consumers actually are.

Only 12 plus Norway, out of the 15 EU Member States are included in the analysis. Sweden, Denmark and the Netherlands are excluded because data for the whole period were not available.

Figures for industrial consumers in the KEMA Study are based on a consumer with an annual consumption of 24GWh. Under the 1996 Directive, such consumers should have been allowed choice of supplier by 2001. In practice, most Member States opened the market for such consumers between 1998 and 2001. Greece did not open the market until after 2001(it had a derogation). Norway opened the market for all consumers in 1991 and Britain opened the market for such consumers in 1994, while Sweden and Finland opened their markets in 1996 and 1997 respectively. Apart from in these four countries, wholesale markets were often not in place even when the retail market was open so the scope for retail competition to have an impact on consumer prices was limited. So, except for the Scandinavian countries and the UK, any impact of competition should only have been apparent from about 2000 onwards.

If we examine the overall data on industrial prices, the graph in the report (figure 1) shows that prices fell in real terms from 1995-2004 by 16.6 per cent. However, from 1995-2000, prices fell by 20.7 per cent but from 2000-2004, they increased by over 6 per cent. However, if we look on a country by country basis (figure 3), the picture is very confused, particularly since 1999, the time when liberalization might be expected to begin to have an effect in all countries.

The countries with the most dramatic movements in prices are the UK with a real reduction of 41 per cent, mostly since 1999 and Norway with a real increase of 34 per cent, with prices nearly doubling between 2000 and 2004. Prices in Finland also increased sharply, by 15 per cent from 1995-2004 and by about 30 per cent from 2000 onwards. Both these cases deserve further discussion.

### **3.1.2. The UK**

For the UK, industrial prices fell sharply after the introduction of retail competition for small consumers. There is strong evidence (Thomas, 2005), that electricity retailers used the opportunity that the end of regulation for small consumers gave to shift costs from industrial consumers to residential consumers. For example, Power UK<sup>4</sup> reported that wholesale prices went down by 35 per cent from January 1999 to January 2002. But the price paid by large consumers for their generation and retail elements of their bill had gone down by only 22 per cent, while the amount paid by small consumers had actually gone up by 5 per cent. It would appear that the retail companies kept these cost reductions as extra, unearned profit. The period 2002-2003 was also one characterised by financial problems in the sector. At one point, about 40 per cent of the generating capacity was owned by financially distressed companies – almost all the generators that did not own retail businesses were essentially bankrupt. This capacity has now been bought by integrated generator/retailers with the result that most power is generated by companies selling to their own consumers, leaving the wholesale market as largely irrelevant. The company owning most of the nuclear plants was only kept in business by massive state guarantees and subsidies with a value in excess of £10bn.

It would appear therefore that the price reductions for industrial consumers were only possible because of relative price increases for residential consumers and at the expense of the wholesale market, which, given the present industrial structure, is highly unlikely to be an effective price-setting forum.

This picture of windfall profits, a high level of company bankruptcy, and a shift of costs from large to small consumers hardly suggests that efficient wholesale and retail markets have been created.

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<sup>4</sup> Power UK 'Prices fall for some but stay the same for others' Power UK 97, March 2002, p 27.



### 3.1.3. The Nordic region

For Norway, the price increases followed dry winters in 2001 and 2002, which exposed the lack of investment in new generating capacity in the Scandinavian countries since the industry was opened to competition. The Scandinavian countries plus Denmark are now part of one electricity market, NordPool, so this lack of investment was felt throughout the region. This resulted in wholesale prices in NordPool increasing by about 600 per cent in the second half of 2002. These price rises clearly explain the sharp increase in prices in Finland. Given that Sweden and Denmark are part of the single Nordic market, it seems clear that they would also have experienced sharp price increases. The omission of Sweden and Denmark from the analysis of industrial prices is therefore highly distorting. If, for example, prices had risen at the same rate as in Finland, a significant part of the reported price reduction from 1995-2004 would have been lost and the increase in prices from 2000-2004 would have been much higher.

### 3.1.4. Other countries

Of the other countries, Spain, Portugal and France showed significant price reductions (20-35 per cent) over the whole period despite the high level of industrial concentration in those countries and the absence of effective wholesale markets. Greece and Germany show smaller overall price reductions of about 10 per cent. Greece was effectively a monopoly throughout the period, while prices in Germany fell by about 40 per cent from 1995-2000 but have risen by about 30 per cent since then in the period when it might be expected competition might be expected to have an impact. Prices in Italy and Ireland also fell by about 10 per cent from 1995-2000 but these reductions have been more than lost since then.

Overall, the picture given by the average price reduction from 1995-2004 of about 16 per cent is misleading because of the wide range of experiences it covers and because of the significant increase in prices from 2000 onwards. There is no convincing evidence that competition has reduced prices, in fact the contrary seems more plausible, with significant price increases occurring in Italy, Ireland and particularly Germany after competition was introduced. The Nordic countries, countries where competition is seen as being most effective, have seen large price increases in the period 2000-2004, while price reductions have been significant in countries (France, Spain and Portugal) where the impact of competition might have been expected to be small (because of uncompetitive wholesale markets and market concentration).

The UK is an important case and while it is clear there have been large price reductions here from 2000 onwards – the only country where this is the case – and it seems likely these price reductions were caused by market operation, it may be that much of this price reduction was paid for by small consumers and in the long-term, the lack of a healthy wholesale market may reduce the element of competition.

### 3.1.5. Household consumers in the EU 15 + Norway

For residential consumers, the data problems are reduced. Electricity is sold via published tariffs, albeit for a number of suppliers for each area and data is available for all 15 countries. KEMA figures are based on an annual consumption of 3500kWh.

The analysis for residential consumers produces a rather different picture to that emerging for industrial consumers. As with industrial consumers, for the EU 15 + Norway as a whole, prices fell by about 15 per cent in the period 1995-2004, but the fall is a smooth one with no price increases since 2000. However, the EU figures hide a highly variable position.

As with industrial consumers, the members of the Nordic market all show significant price rises, although in this case, the increases are not so sharp (8-36 per cent) and cover the whole period from 1995 onwards. The highest price rises are in the Netherlands which shows a 50 per cent real increase in prices, mostly from 1999 onwards. This underlines the potentially distorting impact of the omission of the Netherlands, Sweden and Denmark from the industrial consumer results. Ireland, which remains a monopoly for residential consumers, also shows a significant price increase.

Seven countries show significant price reductions (15 per cent or more), Spain, UK, Italy, France Greece, Portugal and Belgium. Of these, Greece, Portugal, France and Italy remain monopolies for residential consumers and in Belgium, the market has only been open for part of the country, since 2004 with the other half still a monopoly. In Spain, the retail market for residential consumers has only been open since 2003. The UK is the only country with full retail competition for more than about a year of the period covered that shows a real price reduction. However, this must be seen, as argued above, in the context of the larger price reductions for industrial consumers and the financial collapse of much of the generation sector in 2002.

In three further countries (Germany, Austria and Luxembourg), the overall movement in prices is small – less than 5 per cent increase or decrease. The German and Austrian markets have been open since 1999 and 2001 respectively but there is no apparent evidence of a resulting change in prices.

Overall, the evidence seems to suggest that competition for residential consumers tends to be associated with higher, not lower prices.

#### **3.1.6. Household consumers in the new member states**

No analysis of prices is presented for industrial consumers, and of the ten new member states, only five (Poland, Slovenia, Latvia, Hungary and Estonia) are covered, with insufficient data being available for the other five (Slovak and Czech Republics, Lithuania, Cyprus and Malta). The dominance of Poland in terms of consumption (two thirds of the total consumption of the countries covered) made KEMA use a simple average of prices rather than a weighted average. Overall, while nominal prices increased by 75 per cent, much of this was accounted for by inflation and real prices stayed largely static with real increases of about 40 per cent for Estonia and reductions of about 25 per cent for Slovenia. Since none of countries had real retail competition for residential consumers in the period covered, it seems unlikely that the price movements can be attributed to competition.

### **3.2. Price components**

The analysis discussed above does not make any attempt to identify the causes of the price movements reported. Factors other than the impact of competition, such as changes in fuel prices, changes in taxation rates and changes in prices of monopoly elements could all have a major impact on prices. The next section of the KEMA report attempts to disentangle these factors from each other.

#### **3.2.1. Taxation**

The analysis in the section on taxation provided by KEMA does not correct for inflation showing only nominal prices. The analysis for industrial consumers shows that taxation (apart from VAT) has gone up significantly in the period 1995-2004 from 4 per cent of final prices to 11 per cent with much of the increase in the period 2002-2004. If taxes are excluded, the underlying increase in the nominal price of electricity from 2000 onwards is moderated with prices increasing by about 5 per cent from 2000-2004 compared to 12 per cent if taxes are included. The report does not identify which countries increased taxation most in 2002-2004.

For residential consumers, taxation (including VAT) has also increased, from about 18 per cent of final prices to 24 per cent. Removing taxes shows that underlying prices fell by about 12 per cent in nominal terms compared to largely stable prices with taxation.

The lack of detailed country data and the lack of correction for inflation mean that this analysis does not help disentangle movements in taxation from the impact of competition on prices.

#### **3.2.2. Fuel prices**

The key fuel prices to examine are for gas and coal, which accounted for 20 per cent and 25 per cent respectively of generation in the EU-15 in 2000. The other major sources were nuclear (22 per cent) and hydro (21 per cent). Oil accounted for 6 per cent and this proportion is likely to have fallen since then. For coal, KEMA uses the North West European spot price. This has increased by

61 per cent from 1995-2004. If inflation with the Euro is about 18 per cent, this makes a real increase of about 36 per cent. However, the increase in nominal prices took place entirely in the period 2003-2004 and, from 1995 to 2003, prices appeared to have fallen by about 20 per cent in real terms.

While the spot price may be the best overall indicator available, it does not reflect the price paid by utilities for their coal. Utilities, especially if they are buying from indigenous sources often purchase coal on long-term contracts which are not strongly connected to spot prices. As power stations usually have several months of coal stocks, it seems likely that there would be a significant lag between spot price increases and an increase in the price of coal actually being burnt at power stations. For example, UK government statistics show that the price paid by UK generators for coal in 2004 was only 16 per cent higher in real terms than in 2003 and the 2004 price was still lower than the 1996 price.<sup>5</sup>

For gas, there is no European reference price, so KEMA uses national prices as reported by Eurostat and finds an increase in nominal terms of 25-50 per cent (in real terms this is about 6-27 per cent). Prices rose sharply from 1999-2001 but fell back from 2001-2004. In Britain, the real price paid by electricity generators for gas increased by about 18 per cent from 1996-2004, but almost all this increase occurred in 2004.

The countries which have seen the largest increase in electricity prices are the Nordic countries and while Denmark does use a significant amount of coal and gas, Norway and Sweden use very little and Finland gets most of its power from nuclear and hydro-electric sources. So for these countries, changes in the price of fossil fuels should have only a small impact on the cost of generation and the price increases must have been caused primarily by other factors, notably capacity shortage.

Overall, the price paid by the electricity industry for fuels may have been somewhat higher in 2004 than in 1995, but for most of the period, fossil fuel prices were stable or falling. Given that electricity prices did not show a sharp increase from 2003-2004 and that price increases were largest in countries that are not dependent on fossil fuels for generation, the evidence in the KEMA report that electricity price changes have been driven by changes in fossil fuel prices is not convincing. KEMA's conclusion that 'this development [increases in fossil fuel prices] has also had an influence on electricity prices' is not justified by the data they produce.

### **3.2.3. Wholesale electricity prices**

The KEMA analysis shows the evolution of wholesale market prices. As with gas, there is no European marker price for electricity and the KEMA analysis only presents national spot prices. However, it gives no data on the liquidity of these markets to show whether they are credible as price-setting arenas. In particular, it presents no evidence to show that the wholesale prices shown are at all representative of the price at which wholesale electricity is actually bought and sold. Only the NordPool market has sufficient liquidity for its prices to be trusted as representative of actual prices and shortage of generating capacity is beginning to put strains on even this market, potentially leading to parts of the region, at least temporarily, from being excluded from the market.<sup>6</sup> So an analysis based on spot market prices has limited value.<sup>7</sup> Of course, if wholesale prices have gone up as the KEMA analysis attempts to show, this begs the question, why? If prices have gone up because of shortage of generating capacity or because of lack of competition in the wholesale market, this cannot be presented as an implicitly exogenous factor forcing electricity prices up. In short, wholesale prices could have increased because of electricity liberalisation.

### **3.2.4. Network Charges**

Network charges are, as before the introduction of the EU Electricity Directive, regulated monopoly charges, so any reductions in these must be the result of factors other than competition. For

<sup>5</sup> Department of Trade & Industry (2005) 'Quarterly energy prices December 2005' DTI, London

<sup>6</sup> Power in Europe 'West Denmark El spot area under threat' 19 December 2005

<sup>7</sup> S Thomas (2005) 'The European Gas and Electricity Directives' EPSU, Brussels

example, in the UK, it was possible to reduce monopoly charges because the assets were privatised at well below their accounting value.<sup>8</sup> In other countries, the introduction of more formal regulatory methods may have forced prices lower. However, such changes did not require the introduction of competition.

The KEMA report shows that on average, network charges account for about 10-35 per cent of electricity prices for industrial consumers and 15-55 per cent for residential consumers. It is hard to understand how the ranges could be so wide and this does lead to suspicions that the data presented may not be comparable from country to country. However, these figures include taxes and there are no time series presented, so it is impossible to draw any conclusions on the impact of changes in network charges on the overall price of electricity.

### 3.3. Assessment

Under its own terms of trying to show how final electricity prices have moved over the period 1995-2004, the KEMA report is a useful document. However, the lack of detailed time series on the components of electricity prices and the failure to remove tax from the prices means it has no value on trying to determine the relative importance of the various cost components on electricity prices and it has no value in determining how successful competition has been in lowering the price of electricity. Hence, the KEMA report makes no claim that electricity price reductions have resulted from the introduction of competition to the electricity industries of Europe.

## 4. EURELECTRIC

EURELECTRIC used the KEMA study and other evidence in its own report on prices (EURELECTRIC, 2005). However, it goes much further than KEMA in attributing price movements to the impact of liberalisation and competition.

### 4.1. Price movements

EURELECTRIC notes the overall price reduction from 1995-2004 of about 15 per cent for both residential and industrial consumers but suggests that the price increases since 2000 are misleading because it claims 'industry observers' believe prices in 2000 were unsustainable. This is a hard position to understand. If unsustainably low prices were the result of the operation of the market, this suggests there must be some doubts about the appropriateness of a market system for electricity. As argued above (section 2.3) competition might drive prices down to unsustainable levels. If the price reductions from 1995-2000 were produced by other factors, it is hard to see how EURELECTRIC can then attribute them to the impact of liberalisation and the market.

An alternative explanation would be that prices were forced down by the large powerful companies to discourage or force out of the market any new entrants. There has been a substantial concentration of electricity markets in almost all EU countries since then with a handful of internationally based companies present in several markets. The level of concentration in most markets is now so high that successful new entry would be very difficult given the market power of the incumbents. This process of concentration once the sector was opened up was predictable and without strict regulation of markets and corporate mergers and acquisitions, potentially overriding any impact of the market, allowing such market power will inevitably lead to higher prices.

EURELECTRIC provides no evidence to support the claim that prices in 2000 were unsustainable. It also cites the impact of taxes, levies and surcharges, and the increase in fossil fuel prices as factors contributing to price increases since 2000. However, the evidence in the KEMA study does not support these assertions.

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<sup>8</sup> The methodology for setting these charges is based on rate-of-return considerations so a reduction in the value of the assets will lead to (temporarily) lower prices

#### 4.1.1. Taxes and levies

EURELECTRIC notes that for industrial consumers, the proportion of taxes and levies as part of the overall price (excluding VAT) increased from 4.2 per cent to 11.5 per cent in the period 1995-2004 with nearly all the increase occurring from 2000 onwards. The KEMA study shows that for industrial consumers, real prices increased by about 6 per cent. The increase in prices does seem to be accounted for largely by changes in tax. However, neither KEMA nor EURELECTRIC provides any evidence that price rises occurred in the countries where taxes and levies rose. For residential consumers the proportion of taxes and levies in the final price increased from 18.5 per cent to 23.8 per cent but two thirds of this increase took place before 2000 so taxes do not seem to account for the prices experienced by small consumers.

#### 4.1.2. Fossil fuel prices

EURELECTRIC presents the data on spot prices for oil and coal as evidence of upward pressure on costs. However, this data is of limited value for a number of reasons. The data is shown in nominal not real terms so much of the increase is due simply to inflation. Oil represents only a small part of the generation mix (6 per cent) so changes in oil prices will have little impact on costs. The price of coal actually fell even in nominal terms from 1995-2003 so any increase in electricity price from 2000-2003 would not seem attributable to increases in the price of coal. For gas, the lack of a gas marker price makes it difficult to determine how far electricity price increases have been driven by gas price increases.

A more serious problem is that the marker prices are not representative of the actual price paid by utilities for coal. As noted above, UK government statistics show that the price paid by UK generators for coal in 2004 was only 16 per cent higher in real terms than in 2003 and the 2004 price was still lower than the 1996 price.

In fact, most of the countries that experienced the sharpest increases in prices from 2000-2004, such as Norway, Finland and Sweden are not heavily dependent on fossil fuels for generation while some of the countries where prices have fallen from 2000-2004, such as UK and Spain, are heavily dependent on fossil fuels. So there is no strong evidence that increases in fossil fuel prices account for the increase in electricity prices since 2000.

#### 4.2. Productivity

EURELECTRIC reproduces the European Commission's analysis of labour productivity changes showing apparently impressive improvements in labour productivity from 1995-2001. However, there are a number of reasons why it would be inappropriate to attribute these changes to improved efficiency resulting from competition.<sup>9</sup>

First, increased labour productivity is not a worthwhile objective in itself. All things being equal, improving labour productivity is a desirable outcome but higher labour productivity is useful only if it reduces the cost of electricity. Consumers want cheaper electricity not electricity that requires fewer person-hours per kWh.

Second, there are a number of ways apparent labour productivity can be improved without improving the real efficiency of the workforce, for example, activities can be contracted out. Short term cost savings can also be achieved, for example by cutting maintenance or reducing R&D activity, which, in the long-term, will be to the detriment of consumers.

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<sup>9</sup> For a critique of productivity analyses, see D Hall (2005) 'Evaluating the impact of liberalisation on public services: A critique of the European Commission 2004 report "Horizontal Evaluation Of The Performance Of Network Industries Providing Services Of General Economic Interest" EC SEC(2004) 866' PSIRU, Greenwich.  
<http://www.psiru.org/reports/2005-03-EU-U-horizeval.doc>

Third, in the period covered to 2001, only the Scandinavian countries and the UK had implemented retail and wholesale competition, so if there were improvements in productivity in the other countries, it was not the direct result of competition.

The analyses do not investigate how far other factors unrelated to liberalisation, for example, the availability of new combined cycle technology which uses far fewer personnel than coal-fired plants, could have accounted for the changes in labour productivity. The problems of placing too much emphasis on a partial and imperfect indicator of efficiency like labour productivity are well illustrated by EURELECTRIC's subsequent report (see below), which shows that gains in labour productivity were at the expense of intermediate input productivity and were accompanied by a deterioration in capital productivity.

Even if these productivity improvements really did reflect increased overall efficiency, there is no analysis to show whether they are one-off changes that have already been carried out or whether they show that the electricity industry has been placed on a new, more dynamic productivity trajectory.

Clearly improvements to the overall efficiency of the electricity are desirable and there are measures available that would better reflect the efficiency of the industry. For example, a measure such as the non-fuel avoidable cost per kWh sold would reflect better how efficiently the industry controls the costs that it has a strong influence over.

#### **4.3. Development of markets**

EURELECTRIC asserts that electricity prices are now market driven and that cross-subsidies can no longer exist. However, transforming electricity from a monopoly to a market is not a worthwhile objective in itself. A standard product like electricity is not superior because it is supplied by a market. Consumers want cheap reliable electricity and are likely to be indifferent to whether it is supplied by a market or a monopoly.

The inadequacies of the market, for example in ensuring that there is sufficient 'peak' generating capacity, as implicitly acknowledged by the European Commission in its Security of Supply Directive, are already becoming apparent.

The assertion on cross-subsidies is more significant. It is clear that under the old system, cross-subsidies did exist, often with small consumers subsidising electric intensive industry. In a market, decisions by government to cross-subsidise a class of consumers are unlikely to be feasible, but this does not mean prices will be fair, i.e., that they reflect the costs the consumer actually imposes. In a market, prices will rise to the level the market will bear, which in turn will reflect the negotiating skills and the buying power of the consumer. In such a situation, large electric intensive consumers will generally do better than household consumers, who do not have the incentive, the skills or the buying power to force prices down to the minimum level.

However, if the market becomes tight, large consumers could be seriously affected. For large consumers, network charges are a relatively small element of their bills, which are dominated by the generation charge. So increases in the wholesale price will have a much greater impact than for small consumers, for whom network charges are a much larger element. In addition, large users' contracts are often more closely linked to spot market prices so if spot prices do go very high, as was the case in the Nordic region in 2002, the impact on prices will be much greater than for residential consumers, whose electricity rates are not so strongly linked to spot markets.

#### **4.4. Recommendations**

EURELECTRIC makes four recommendations. The first two: 'ensure full and effective implementation of the liberalisation package' and 'create a culture of unbundling' simply require the Commission to ensure the Directive is fully implemented. The third advocates the development of regional markets as a stepping stone from national markets to a single European market.

However, it is the fourth recommendation: ‘build trust in market fundamentals and reliance on prices’ that is of most interest.

There are two parts to this, the first being ‘increase participation from large industrial customers in the wholesale market’. EURELECTRIC implies that industrial consumers do not participate in markets because they are not aware of the opportunities that this provides. This seems implausible. Large industrial consumers are sophisticated buyers of commodities and to suggest they would not take the opportunity to take advantage of markets if these would bring benefits is not credible.

In fact, industrial consumers, as represented by IFIEC Europe (International Federation of Industrial Energy Consumers Europe), are profoundly dissatisfied with progress on liberalisation. At the Commission’s Florence Forum in 2005, their presentation stated that in 2004:

The current trading regime does not favour competition, allowing many European electricity producers to increase their commercial margins significantly; this constitutes a significant and undue transfer of wealth. The trading regime creates erratic price signals, with the result that electricity is purchased in a tremendously unstable environment; this gravely destructs industrial asset value.

IFIEC stated that one year later: ‘the situation is worse than it was a year ago’.<sup>10</sup> As argued above, while large consumers will tend to do better most of the time than small consumers because of their greater negotiating strength, if markets become tight, for example, because of lack of investment the impact on prices for large consumers will tend to be very large especially for electric intensive industries, which may find it difficult to survive if the price of electricity is too volatile.

The second part of building trust involved ‘make long-term contracts and partnership possible’. It is hard to reconcile this with competition and trust in markets is hardly likely to be increased if an increasing proportion of power is traded under opaque long-term contracts and partnerships.

#### 4.5. Assessment

EURELECTRIC’s conclusions are not in general backed up by the evidence they offer. The KEMA study, which makes no claims on the impact of liberalisation on prices, would need to have been specified differently, for example, discounting taxation and showing much more detail on individual countries if it was to back up conclusions on the impact of markets and competition on prices.

### 5. EURELECTRIC - 2006

In February 2006, EURELECTRIC published what it publicised as its alternative Benchmarking Report on Financial Performance of European Electricity Industry (EURELECTRIC, 2006).

Table 1. Savings to electricity consumers (1997-2004)

Year	Revenue 1997 prices (€/kWh)	Final electricity consumption (GWh)	Savings from 1997 (€m)	Savings from 1998 (€m)	Savings from 2000 (€m)
1997	0.0763	2139750			
1998	0.0717	2201700	-10075		
1999	0.0711	2243000	-11714	-1346	
2000	0.0706	2312600	-13219	-2544	
2001	0.0713	2364350	-11854	-945	+1655
2002	0.0706	2389510	-13483	-2628	0
2003	0.0711	2458128	-12832	-1475	+1229
2004	0.0704	2498893	-14644	-3248	-499
<b>Total</b>			<b>-87820</b>	<b>-12187</b>	<b>+2385</b>

Source: EURELECTRIC (2006) ‘Financial Performance of the Electricity Industry Post-Liberalisation’ EURELECTRIC, Brussels.

A key element of this was a claim that liberalisation had saved electricity consumers €88bn in the period 1997-2004. Clearly if this claim can be substantiated, it would be a powerful endorsement of liberalisation. However, there are three main problems with the analysis:

<sup>10</sup> [http://europa.eu.int/comm/energy/electricity/florence/doc/florence\\_12/ifiec\\_iem\\_p.pdf](http://europa.eu.int/comm/energy/electricity/florence/doc/florence_12/ifiec_iem_p.pdf)

- The starting date is arbitrary and does not match any event in the liberalisation programme;
- No attempt is made to correct for factors other than liberalisation that influence electricity prices; and
- EURELECTRIC claims the prices in 1997 were not sustainable.

### 5.1. Starting date

Table 1 shows that the extent of savings is highly sensitive to the starting date. While the EURELECTRIC report tries to justify the choice of 1997 as the ‘first complete financial years after the adoption of the first Electricity Market Directive’, there seems little logic behind this choice, albeit that it provides higher savings than choosing subsequent years would produce. The Directive was passed in 1996, but only had to be made national law by 1998. However, it was only from about 2000 onwards that the key elements of the Directive, wholesale and retail markets, began to be implemented. If the starting date is moved forward by just one year, the savings are reduced by nearly 85 per cent, while if the starting date is moved to 2000, the savings disappear completely.

### 5.2. Other factors

The KEMA Report, commissioned by EURELECTRIC, makes a systematic attempt to identify and quantify other factors that influence electricity prices, but the EURELECTRIC analysis ignores these factors and attributes all price reductions to liberalisation. Now that electricity prices are rising steeply, partly driven by fossil fuel price increases, it will be interesting to see if EURELECTRIC repeats the analysis.

### 5.3. Sustainability of prices

Whilst the report claims that liberalisation should be credited with the savings accruing from liberalisation, elsewhere, it claims the prices were not sustainable. It states (p 1):

When analysing the return on the invested capital, the authors found that for many companies the ROIC [return on invested capital] does not match the cost of funding. In other words these companies are not able to create value and thus, in the long run, not working on a sustainable basis.

And:

Comparing total returns on company shares in the electricity industry with that in other capital-intensive sectors indicates that the electricity sector in Europe is providing its shareholders with lower returns than most of the capital-intensive sectors, including the other utilities and other energy sectors.

If the prices experienced since 1997 are not sustainable, then the risk is that any benefits of liberalisation are short-term and may be lost once the industry moves to a sustainable basis with rates of return similar to that of comparable industries

### 5.4. Productivity improvements

The analysis also looks at productivity changes and concludes that whilst labour productivity has improved (by 2.64 per cent), capital productivity has declined (by 1.19 per cent) and intermediate-input productivity (fuel costs etc) has fallen by 6.35 per cent. The weakness of labour productivity analyses taken in isolation was illustrated in Section 4.2. EURELECTRIC acknowledges this stating (p 11):

Staff productivity growth has also been linked to a more frequent use of outsourcing, reflected by the worsening suffered in terms of value added produced per unit of intermediate resources.

In short, sacking workers to allow out-sourcing may have raised costs. Despite this, EURELECTRIC states (p 1): ‘intermediate-input productivity is strongly impacted by fuel costs, operating taxes and subsidies for renewable energies, which are beyond the control and scope of decision of company management.’ This seems hard to justify. While the companies clearly cannot control world market prices, one of the claims for liberalisation was that competition would force



companies to be more cost-conscious in their procurement especially for fuel, because if they did not minimise their costs, their market share and profits would suffer.

EURELECTRIC attempts to justify the reduction in capital productivity citing the need to respond to demand growth. This is again a difficult claim to understand, given that demand grew by only 2 per cent a year in the period covered, well below the rates that have applied for most of the electricity industry's history, over which real prices have tended to fall. EURELECTRIC presents no evidence to support the claim for unrepresentatively high level of investment in this period. EURELECTRIC states that capital productivity (like intermediate-input productivity) is not fully under the control of the companies. As with fuel prices, the cost of equipment is not fully under the control of the companies, but the effect of the market should surely be to provide stronger incentives to procure equipment more efficiently.

The evidence that liberalisation has improved productivity seems weak. Capital and intermediate input productivity have deteriorated while labour productivity has only been improved at the expense of poorer intermediate input productivity.

### **5.5. Assessment**

The EURELECTRIC evidence that liberalisation has brought savings to consumers is weak, while the analysis on productivity illustrates the weakness of using partial indicators of efficiency, like labour productivity, as indicators of overall efficiency. EURELECTRIC's scapegoat for these failings appears to be the regulators. The report states (p 1):

Based on their analysis, the authors call on regulators and policymakers to interfere less in market dynamics, which they do not only directly in the regulated segment but also in the competitive segments of the industry by changing the rules governing the market.

It is hard to avoid the conclusion that the authors want the freedom from regulation that markets bring, but do not like the risk and price pressures that markets bring.

## **6. The European Commission DG TREN**

The European Commission's report on the 'progress in creating the internal gas and electricity market' (European Commission, 2005b) contains assertions on movements in prices, claiming that the opening of markets has led to lower electricity prices. A particular concern (p 5) is that 'cross border trade increases competitive pressure on prices' and it attributes high prices in some regions to the lack of interconnections. It is not clear how this pressure might work. Some gains might be expected if trade is not restricted and the existence of the links allows the utilisation of plants to improve, for example, if peak demands in different markets do not coincide it may be that using imports from an adjoining market to meet peaks might be a cheaper way to meet these peaks than building sufficient capacity in the national market. However, this would require a cost-benefit analysis to show that increasing international connections was the most cost-effective way to supplying peak power, as international connections are often cost in the same order as new generating capacity. In short, any gains may not counterbalance the extra cost of increasing links.

It is hard to see why exposure to international trade would increase pressure on efficiency. International differences in prices are more likely to be driven by resource factors, e.g., the availability of hydro-electric capacity, than by the efficiency of the sector. Increased international trade may be a 'zero sum game', in other words, any gains for an importing country through cheaper electricity may be balanced by losses for consumers in the exporting country if some of its cheap power is exported and has to be replaced by more expensive power.

Increased trade in electricity would make carrying out the monitoring functions that the Directive imposes on governments impossible. The logic of a free trade model is that capacity will be located in the most efficient places and in countries with comparative advantages, implying that the countries would no longer expect to have adequate capacity to meet their own needs (any more than countries plan to be self-sufficient for example, in steel production). Yet this directly contradicts the

Electricity Directive which requires governments to monitor national generating capacity to ensure that sufficient capacity is available. However, a government can have no control over the quantity and price of imported power. If, for example, imported power currently makes up, say, 20 per cent of a nation's supplies, no government would be able to predict whether in five years, that 20 per cent would still be offered. The government could not then make the judgement whether sufficient capacity would be available.

It is a highly contentious point whether, given the special characteristics of electricity (difficulty of storage, lack of substitutes etc), a country can sensibly take the risk of relying on imports to meet its electricity demands.

The Commission does raise concerns about corporate concentration in the sector, which it claims is increasing and on whether prices will be sufficient to stimulate sufficient new investment in generation. It also notes that the integration of retail and generation will reduce liquidity in markets. This latter development was entirely predictable and was already apparent before the revisions to the Directive were undertaken in 2003. Yet the Commission has placed no restrictions on this form of integration in the Electricity Directive.

The Commission notes the dissatisfaction of large electricity users with the markets stating that this was one of the factors behind the decision to launch an inquiry into the electricity (and gas) sector.

### 6.1. Assessment

This paper contains some assertions that prices have been reduced by liberalisation, but with little evidence to back it up.

## 7. The European Commission DG Competition

The Competition Directorate of the Commission, as noted above, opened an inquiry into the energy sector in June 2005, producing an 'issues paper' in November 2005 (European Commission, 2005a). It notes five issues on the electricity sector:

- Market concentration leading to the possibility of market power in most Member States;
- Vertical foreclosure due to integration of generation and retail;
- Insufficient market integration because of lack of interconnections;
- Lack of transparency in wholesale markets;
- Lack of trust from large consumers in spot and forward markets.

These are the issues necessarily taken up by DG TREN in its paper (see above).

While these five issues all impact on the level of competition, the Competition Directorate does not, at this stage present any evidence that prices have actually been affected by these market imperfections.

In February 2006, DG Competition presented a preliminary analysis of the issues, focusing particularly on the wholesale electricity markets (European Commission, 2006). Again, no evidence is presented on whether liberalisation has reduced prices.

The analysis is very much more detailed than any carried out by DG TREN, and provides clear evidence of factors already identified by most other studies. These include:

**Lack of liquidity in wholesale spot markets.** The markets with highest liquidity, Spain (84% of electricity consumption) and Italy (44%) are designed to give strong advantages to trading in the spot market, but are under investigation by national regulators for manipulation by the dominant players. The next most liquid market, NordPool has failed to stimulate investment in generation leading to highly damaging price spikes in 2002, while of the other markets, two (Germany and Netherlands) have only 12-13% liquidity, while the France, UK, Austria and Poland have less than 3.5% liquidity;

**High market concentration in generation.** The analysis shows that in many countries, generation is concentrated in very few companies and that because of the special features of electricity (e.g., inelasticity of demand), market players with limited capacity could have market power.

**Integration of generation and retail.** The analysis shows that in most European countries, the level of integration of retail and generation is high with little of the market open to independent power producers. No data is given on some of the most significant markets in Europe, including Italy, Spain and the four Nordic countries. Long term power purchase agreements act effectively as integration of generation and retail in many of the countries where integration is not so high (e.g., Portugal, Poland, Hungary and the Czech Republic).

The report strongly suggests that it will find that pro-competition measures are required to make markets work. However, the analysis utterly fails to even acknowledge two significant questions that must be addressed before such measures are implemented:

- Is an efficient wholesale electricity market achievable? And
- If it is, do the benefits of competition outweigh the costs (e.g., risk premium on investment and cost of building and operating markets)?

As the Carnegie Mellon study covering the USA (see below) so clearly states:

‘Deregulation has become the end rather than the means. If consumer welfare is the primary determinant of restructuring’s success, then restructuring should not be extended to other states before the full range of issues has been resolved and reduced prices or reduced rate of price increase have been demonstrated in restructured states.’

## 8. European Services of General Economic Interest Evaluation

This analysis uses a macro-economic model developed by Copenhagen Economics (CE) to determine whether there was a statistical relationship between the opening of the electricity market and electricity prices. For a detailed critique of the CE, see Hall, 2006. The study claims to have taken account of factors such as cost of fuel inputs, the share of nuclear generation capacity, the cost of investment and certain weather variables. The study found that that, ‘all other things being equal, these policies [market opening] directly decreased industrial real-term prices by just under 8% between 1990 and 2001.’ This is a hard finding to understand because, in that period, little liberalisation had taken place except in the UK and, for a couple of years, in Finland and Sweden.

In fact, the detailed results show wide variations with prices rising in some countries and falling in others, and in some countries some classes of consumers doing well, while others do badly. There is no data for half the countries including important markets like Germany, Spain, France and Italy, probably accounting for well over half the electricity consumption of Europe.

The statistical proxies for market opening are key and, as clearly demonstrated by the Competition Commission Inquiry, markets that, from a simple descriptive basis appear open, might be wholly uncompetitive. The most significant variable for the ‘market opening index’ used by the model was the degree of transmission unbundling. This is in fact independent of competition and, for example, in Spain, the transmission company was unbundled long before any attempt to introduce competition was introduced.

Equally, as argued in section 2, finding accurate proxies for the fuel price paid by electricity industries is very difficult.

Overall, it is far from clear that the model accurately represents the changes that have occurred in electricity, mixing unbundling, change of regulatory regime and introduction of competition, changes which could be introduced entirely independently, under a single heading ‘market opening’. The analysis needs to be more carefully thought out before it can be suggested that it proves that introduction of competition to electricity reduces prices.

## 9. International Energy Agency

The IEA's report is largely a prescriptive account of how to liberalise electricity markets successfully with little analysis of prices. The report states (p 12):

'In markets that have liberalised successfully, there is a clear trend of falling electricity prices for industrial consumers, in both nominal and real terms. The trend is less clear, and certainly slower, for household consumers.'

However, from a visual inspection, the graphs on which this conclusion is based do not seem to support this conclusion. Much the largest price reduction came in the 1980s in the USA, when Independent Power Producers (IPPs) were allowed in. While this did break the monopoly of the traditional utility, the IPPs were offered fixed price long-term contracts. There was little competition and certainly no wholesale and retail markets, so to this apparent success was based on a very limited form of liberalisation, far less ambitious than that being introduced in Europe. This strong suggestion that liberalisation does reduce prices (at least for industrial users) is hard to reconcile with the reports later statement (p 13):

All in all, these factors [fuel prices etc] make electricity retail prices paid by end-users complex to interpret. In reality, retail prices are poor indicators of whether performance development is positive in the electricity industry.

The IEA report therefore does not provide useful evidence on the impact of liberalisation on prices.

## 10. Professor Leprich

In November 2005, Professor Leprich of University of Applied Sciences in Saarbrücken presented an analysis of problems in European electricity markets. Claude Turmes, a Green MEP, takes up this analysis in his own publication, echoing most of the points made by Leprich and suggesting similar policy remedies (Turmes, 2005). Leprich's concerns seem to be based on recent high prices in electricity spot markets and on corporate concentration. His analysis concentrates on France and Germany because of their size and because of the dominance of the French and German companies in Europe.<sup>11</sup> He does not present any data on the extent to which wholesale price rises have been translated into retail price increases.

Leprich asserts that companies are currently making windfall profits from plants with low running costs and high fixed costs (nuclear and lignite) because the plants are amortised and do not have to pay for CO<sub>2</sub> certificates, which Leprich claims is the main factor behind increases in wholesale market prices. He claims that 'windfall' profits are being made and cites higher profits for all four of the major German companies (RWE, E.ON, Vattenfall Europe and EnBW (controlled by EDF)).

There would appear to be at least three problems with this analysis. First, in any well-functioning market, in a period of high spot prices, producers with low costs make additional profits. Equally, in a period of low prices, high cost producers fail, for example, in 2002, 40 per cent of Britain's generating capacity was owned by companies that were effectively bankrupt including all the nuclear plants. Price volatility, windfall profits and company failures are all inevitable consequences of any well-functioning market. However, electricity wholesale markets are not functioning well so other factors may be in place. The liquidity of the wholesale markets in Europe apart from NordPool is too low for their prices to be trusted and increases in the spot price generally do not reflect the cost of purchase of wholesale supplies. The integration of generation and retail means that when wholesale prices are high, integrated companies may be able to increase prices

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<sup>11</sup> Leprich makes some comments on the UK, which are not fully accurate. For example, he states that the majority of plants in UK is gas-fired. This is not true. In 2004, gas-fired plants represented only 40 per cent of generation and 35 per cent of capacity. He also claims that North Sea gas prices are more volatile than those of Europe. It is not clear what basis there is for this statement. Prices on the UK gas spot market are volatile but most gas for power generation is still bought on long-term contracts at stable prices. None of the European hubs are sufficiently liquid for the prices to be regarded as reliable.

under the cover of increased wholesale prices far more than their costs from their own generating plant have gone up.

Leprich claims the problems are exacerbated by market concentration, particularly in Germany and France. His solutions are essentially designed to make competition work where it has so far failed. They include:

- Windfall taxes;
- Market share limitations;
- Power release and divestiture programmes;
- Limitation of vertical integration of generation and supply;
- Ownership unbundling between generation and transmission.

Windfall taxes are a blunt instrument. They have to be introduced for each specific case and they are almost always bitterly resisted by the companies who claim they blunt their incentive to invest. Nevertheless, in other sectors, such as the oil sector, the taxation regime is adjusted to maintain a balance between the need to provide investment incentives and the need to restrict unearned profits. For example, if the world oil price increases significantly, oil producers with low cost fields make windfall profits, which are often taxed by the government. If windfall profits are persistent, this suggests that more fundamental reforms are required, i.e., either making the market work more efficiently or abandoning the use of markets.

The issue of integration of generation and supply is curiously argued. The Directives have not contained any provisions on this form of integration and the example given by Leprich, the proposed merger of Gas Natural and Endesa, is more a horizontal integration of gas and electricity than a vertical integration of generation and supply.

Unbundling of transmission and generation is desirable if a market system is being sought. Power release programmes and divestiture programmes might also be a useful way to open up the market.

However, the question Leprich does not address and which is particularly relevant to limits on market shares and break-up of large companies is whether a wholesale electricity market is actually feasible or desirable. If as noted earlier, introduction of a market forces prices down to short-term marginal cost, a market might be possible in the short-term but would not be sustainable. Thomas argues that wholesale electricity markets are not feasible on six grounds (Thomas, 2005):

- Inability to store power;
- Need for supply and demand to match at all times;
- Lack of substitutes;
- Vital role in modern society;
- Electricity is a standard product; and
- Environmental impacts.

If an efficient and sustainable wholesale market is not achievable, unbundling generation and transmission and generation is irrelevant and breaking up large companies may just lead to the replacement of strong companies with a long-term perspective and high skills and capabilities by small companies with short time horizons, inadequate skills and no reputation to preserve.

## 11. Carnegie Mellon and other US studies

Parallel to the reforms to the electricity industry in Europe, the US electricity industry has also been subject to a reform process. The reforms are largely driven by the individual states and some states have instituted reforms as radical as those in Europe, for example, California and the Pennsylvania, Jersey, Maryland (PJM) system, while many other states have retained the old monopoly regulated structure.

The problems suffered in California have been widely documented, even if there is little consensus on the underlying causes of the problem, but reforms of other systems, such as PJM have a relatively good reputation. However, there is increasing evidence that reforms have not produced lower prices for consumers. The Carnegie Mellon study (Carnegie Mellon, 2005) states (p 2): ‘Our research shows that there is no evidence that restructuring has produced any measurable benefit to consumers or to the systems which have restructured.’ And (p 3) ‘Where prices have fallen they have done so in large part because regulators have demanded that they do so.’ It finds four major problems:

- Comparison of industrial electricity price data between restructured and non restructured states shows that there has been no reduction in price, or even in the rate of price change, in restructured states, and the record on overall operations costs and thermal efficiencies is mixed;
- Restructuring has introduced several elements into the industry which act to raise costs, not lower them;
- Retail competition in the U.S. has faltered; and
- The U.S. transmission system was not designed to handle the volume of long-distance transactions generated by multi-regional electricity markets.

The report states (p 2): ‘Deregulation has become the end rather than the means. If consumer welfare is the primary determinant of restructuring’s success, then restructuring should not be extended to other states before the full range of issues has been resolved and reduced prices or reduced rate of price increase have been demonstrated in restructured states.’

In a report for the Virginia State Corporation Commission (Commonwealth of Virginia State Corporation Commission, 2005), Rose found that: ‘The economic health of these markets [wholesale and retail electricity] is questionable’ and that: ‘Of the 17 jurisdictions that allow retail access, there is little, if any, effective retail competition for electric service in the residential and small commercial market.’

## 12. Assessment

Despite assertions by the European Commission and EURELECTRIC that electricity liberalization has resulted in significant price reductions for consumers, the evidence as produced, for example, by KEMA and the Commission itself does not support these assertions. The price reductions that have occurred in the past decade took place mostly in the period 1995-2000, before liberalization was effective in most of the European Union and since then, prices have risen steeply, in many cases wiping out the gains of the earlier period. Other factors, not properly accounted for, such as fossil fuel price movements, technological innovations and changes to regulatory practices are more likely to have led to the price reductions that occurred in the period 1995-200 than reforms that had not then taken effect.

The liberalized model is now facing its most severe test to date. If it cannot cope well with volatile fossil fuel prices and if the market does not stimulate enough investment to prevent the apparent looming capacity shortages in much of the EU, the model will have failed. The unproven nature of the model makes morality of the Energy Ministers recommending the export of this model to neighbouring countries highly questionable.

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