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Electricity Market Liberalisation and Integration in the European Union*

Tooraj Jamasb and

Michael Pollitt**

Electricity sector liberalisation is part of the wider trend toward liberalisation and the withdrawal of the state from involvement in infrastructure industries. The electricity liberalisation in the European Union (EU) is the world's most extensive cross-jurisdiction reform program of the sector and involves liberalisation of electricity markets in member states and integration of the national markets. The member countries include some of the world's pioneering countries (e.g. UK, Norway) as well as slow-reforming countries (e.g. France, Greece). In the absence of a centrally driven programme, the pace of reform in the EU would have been considerably slower.[1]

The electricity liberalisation trend in the EU is taking place amid a world-wide slow down in the pace of reforms. The California electricity crises in 2000–01 and the 2003 blackouts in New York and parts of Europe have dampened political enthusiasm for reforms. In Latin America, political and public support for reforms is on the decline. Elsewhere, apart from some leading countries such as the Nordic countries, Australia, New Zealand and Chile there has been limited progress towards comprehensive energy market reforms.

EU electricity reform is increasingly focused on market integration and cross border issues, signalling that it may be closer to realising a single market. However a single market requires physical interconnections and technical co-ordination between national markets and raises important issues regarding the framework within which market integration is implemented. While individual countries have made substantial progress toward liberalisation, the goal of a single electricity market remains a long way off. This paper reviews the state of electricity sector liberalisation in the EU and discusses the prospects for further progress towards an integrated European market in the light of the recent challenges facing the energy sector.

Electricity sector reforms

A successful liberalisation requires a suitable structure for wholesale and retail electricity markets, transmission capacity and ancillary services, independent oversight of competition, and regula-

Table 1

Main steps in electricity reform

Restructuring	• Vertical unbundling of generation, transmission, distribution, and supply activities.
	• Horizontal splitting of generation and supply.
Competition and markets	• Wholesale market and retail competition.
	• Allowing new entry into generation and supply.
Regulation	• Establishing an independent regulator. • Provision of third-party network access. • Incentive regulation of transmission/distribution networks.
Ownership	• Allowing new private actors. • Privatising the existing publicly owned businesses.

Source: Authors' compilation.

* The authors would like to thank David Newbery for detailed comments and the EU's SESSA project for providing a platform for many in-depth discussions of the European electricity market. All remaining errors are the responsibility of the authors. This paper is a considerably shortened version of Jamasb and Pollitt (2005).

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[1] Unless otherwise specified, with the EU electricity market we generally refer to the EU-15 countries plus Norway and Switzerland (EU-15 + 2) as the latter countries are closely associated with the Union. The 10 Accession Countries are not included in this analysis.

tion of monopoly transmission and distribution networks. Experience from around the world has produced a measure of consensus over some generic reform steps for achieving a well functioning market-oriented industry (Jamasb 2006; Joskow 1998; Newbery 2002a). Table 1 outlines the steps for reforming a vertically integrated and publicly owned ESI into a competitive and privately owned industry.

The EU electricity liberalisation

Many of the liberalisation initiatives in Europe and elsewhere began in the early 1990s in an atmosphere of reduced concern over energy supply security. The ending of the Cold War made imports of gas from Russia less risky in an environment where markets favoured the building of new gas-fired plants. An initial surplus of generation capacity facilitated the reforms, as there was no pressing need to ensure guaranteed returns to new investment.

European level reform has been pursued via the EU Electricity Market Directives of 1996 and 2003 which: (i) required the members to take a minimum set of steps by key dates toward the liberalisation of national markets, and (ii) initiated efforts to strengthen the interfaces between national markets by improving cross-border transmission links and trading rules. The EU has also subsidised some cross-border transmission upgrades (e.g. between Ireland and Great Britain).

The Directives focused on unbundling the industry and the opening of national markets. The 2003 Directive further promotes competition by toughening regulation of access to networks, requiring independent regulators and regulation of cross-border trade.[2] The 2003 Directive required that all non-household customers could choose a supplier by 1 July 2004. By July 2007 it aims to achieve: (i) unbundling of transmission and distribution system operators (TSOs and DSOs), (ii) free entry to generation, (iii) monitoring of supply competition, (iv) full market opening, (v) promotion of renewables, (vi) strengthening the role of the regulator and (vii) a single market after a review to assess obstacles to the single market in 2006 (Table 2).

Table 2

EU electricity directives

	Most common form pre-1996	1996 Directive	2003 Directive
Generation	Monopoly →	Authorisation → Tendering	Authorisation
Transmission Distribution	Monopoly →	Regulated TPA Negotiated TPA Single buyer	Regulated TPA
Supply	Monopoly →	Accounting separation	Legal separation from transmission and distribution
Customers	No choice →	Choice for eligible customers (=1/3)	All non-household (2004) All (2007)
Unbundling T/D	None →	Accounts	Legal
Cross-border trade	Monopoly →	Negotiated	Regulated
Regulation	Government → Department	Not specified	Regulatory authority
TPA = third party access.			

Source: Vasconcelos (2004).

Key reform steps in the EU

Restructuring

The aim of vertical unbundling is to separate the potentially competitive generation and supply from the natural monopoly networks. Effective separation of generation from transmission is crucial for competition in the wholesale market and to ensure non-discriminatory access to networks. Unbundling can take the form of functional, accounting, legal, or ownership separation, the latter being the most effective. In turn, unbundling retail from distribution is important for retail competition. In Britain, following legal separation some distributors have left the retail business, as it removed the scope for cross subsidies, and non-integrated businesses have taken market share from incumbents.

The initial structural differences and the flexibility allowed by the first Directive have meant that the EU countries have adopted different approaches to separate these functions. Evidence suggests that vertical integration

[2] Cross border trading rules are also covered by an additional regulation 1228/2003 on conditions for access to the network for cross-border electricity exchanges.

Table 3

Extent of network unbundling

	Transmission system operator Score/5	Distribution system operator Score/5
Austria	4	3
Belgium	4	3.5[a)]
Denmark	4	3
Finland	5	1.5
France	4	1
Germany	4	1.5
Greece	1	0
Ireland	3	3
Italy	5	3
Luxembourg	1	1
Netherlands	5	3
Portugal	5	3
Spain	5	4
Sweden	5	4
UK	5	4.5
Norway	5	1.5

- TSO: Ownership unbundling, Yes=1, No=0; DSO: Legal unbundling, Yes=1, No=0
- Published accounts, Yes=1, No=0
- Compliance officer, Yes=1, No=0
- Separate corporate identity, Yes=1, No=0, Often=0.5
- Separate locations, Yes=1, No=0, Partly=0.5

[a)] Brussels region not yet legally unbundled and no compliance officer in Flanders region.

Source: Based on European Commission (2005).

between generation and retail has a strong commercial rationale as supply risks in the generation can be insured against by integrating into retail. Table 3 shows the extent to which member countries have separated networks from competitive activities using the five best practice criteria. In many countries the separation of TSOs has been more stringent than for DSOs, as most have implemented ownership or legal separation rather than accounting or management separation.

Competition

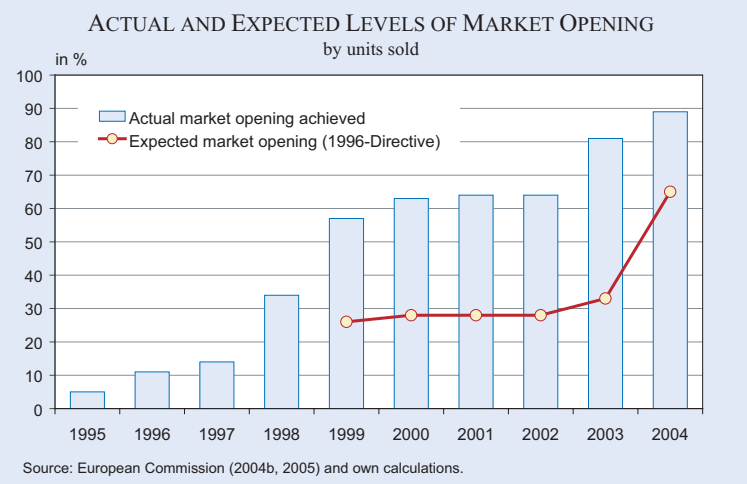
Effective competition may require horizontal unbundling of generation and retailing to reduce market concentration. The Directives do not require horizontal separation to control market concentration. However, in order to meet market opening rules, ENEL of Italy (30 percent state-owned) was required to sell off 15,000 MW capacity and EdF of France auctioned some 6,000 MW capacity (42 TWh energy) per year. In England and Wales the largest generators were obliged to divest part of their plant portfolio to other firms and later traded horizontal divestitures for the right to integrate into supply. In several significant European markets, competition cannot be expected to operate without (further) horizontal structural changes (e.g. in France).

Despite a mixed ownership structure, wholesale competition is, at least in principle, complete in all member countries, and large users and many small consumers can freely choose their electricity suppliers. The 2003 Directive raised the standards for competition by ruling out the single-buyer model for distribution utilities (adopted by Northern Ireland, Portugal and Italy) and requiring regulated third-party access to distribution networks. Some countries have exceeded the minimum required levels and have already extended market opening to households (Figure 1).

Regulation

While regulation can oversee a competitive sector, it is difficult to engineer drastic changes after initial restructuring. The regulator should seek to minimise regulatory uncertainty by establishing credible governance rules. Where competitive and regulated activities remain integrated, the regulator must ensure that generators and retailers have non-discriminatory third party access to networks. Network charges typically constitute around one-third of final prices but vary by over a factor of two across the EU, signalling a potential for efficiency improvement. Advances in regulation theory and practice attempt to mimic market competition and several European regulators have adopted various incentive-based

Figure 1



Source: European Commission (2004b, 2005) and own calculations.

schemes for regulation of networks using price caps and benchmarking (Jamasb and Pollitt 2001).

Contrary to best practice advice of ex ante establishment of independent regulators, the EU's focus on raising the standards of regulation came after the restructuring drive. As a result, many European regulators are weak in the face of established incumbents. In Germany, despite full market liberalisation, the regulator first took office only in July 2005. With no independent regulator in place and a lack of incentive-based regulation schemes, the network charges in Germany have been among the highest in Europe. Recognising the importance of regulation, the 2003 Directive required establishment of independent regulators.

Privatisation

The perceived benefit of privatisation is that the pursuit of profit leads to increased efficiency. Privatisation can also provide significant proceeds for the government and reduce its future liabilities (Newbery and Pollitt 1997). Evidence suggests that privatisation can deliver benefits when combined with effective restructuring, competition and regulation (Newbery 1999; 2002a). However, privatisation is not a prerequisite for liberalisation. In Norway, competition and incentive regulation were applied to state, county and municipality owned enterprises.

Privatisation has not been part of the EU's drive toward liberalisation. While the political rationale for avoiding sovereign issues and delays is understandable, state ownership of dominant incumbents (e.g. in Norway) can be conducive to competition. In some countries, this has been resisted partly because of fears of national companies falling into foreign ownership (e.g. The Netherlands and Norway). In Germany and Belgium, the industry was largely privately-owned before reform. The most extensive privatisation programs have taken place in the UK and Portugal, while some countries have undertaken partial privatisation (e.g. Italy and France).

Effects of reform

Market structure

While some outcomes of reforms can be difficult to measure, the impacts on market structure have been easier to observe. The financial integration of electricity markets in Europe has taken place more rapidly than the integration of power flows and networks. In the absence of strict control of Mergers and Acquisitions (M&As), European firms have shown a marked tendency towards consolidation and market concentration at national and EU levels (Newbery 2002b; Codognet et al. 2002). This may in turn limit the effectiveness of competition.

Horizontal concentration

The legacy of pre-reform public ownership and centralised control through national companies (e.g. in France, Portugal, Italy, Greece and Ireland) has ensured that horizontal concentration remains high in many countries. While some reforms have led to reduced concentration in generation and retailing (e.g. England and Wales, and the Nordic market), they remain exceptions rather than the norm. Among the EU-15, concentration in generation for the largest three generation firms remains above 60 percent in 10 markets (by installed capacity). In retailing there is a similar picture with the three-firm concentration ratio remaining above 60 percent in 12 markets (by number of customers).[3]

European utilities have been keen to position themselves in the emerging market and have moved more quickly than national and European decision-makers. Some acquisitions have involved considerable premiums reflecting the acquiring firms' expectations. More than two-thirds of the European market is owned by eight large companies, with the Europe-wide four-firm concentration ratio at 50 percent. The ownership structures are complex and include many partial shareholdings. Moreover, inter-fuel competition between gas and electricity seems to be beneficial for the single energy market, and therefore the merger tendency between gas and electricity firms can restrain competition.

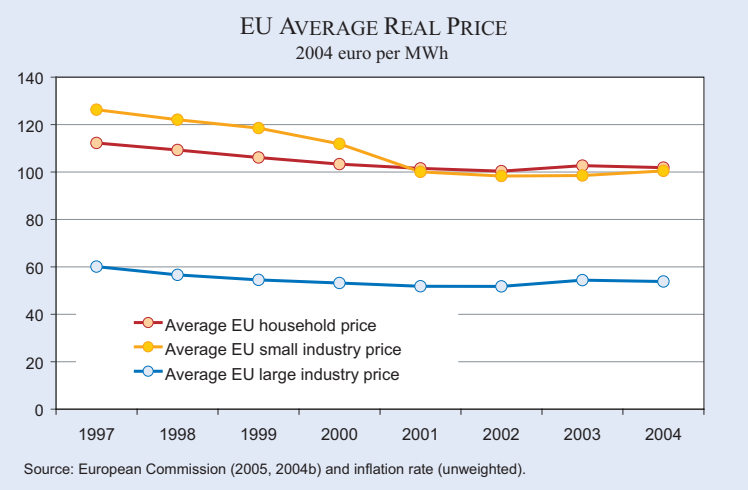
Vertical integration

In pre-liberalisation electricity sectors, vertically integrated structures had apparent economic and technical advantages and were a convenient organisational arrangement for state-owned sectors. While reforms have attempted to reduce this, profit-oriented and privatised utilities have exhibited tendencies toward vertical (re)integration through domestic and cross-border M&As. Vertically integrated electricity utilities

[3] Concentration figures are from European Commission (2005).

have been among the most active in European M&As and have tended to acquire other vertically integrated companies (Codognet et al. 2002). In Great Britain, the retail margin appears to have increased with higher concentration resulting from M&As as the number of national competitors in supply has fallen and the degree of integration between generators and suppliers has increased.

Figure 2



Despite the obvious problems associated with increased market concentration, national and supranational regulators have been relatively inactive in tackling the issue (Thatcher 2002). The desire to create national champions may have constrained intervention to create a diversified ownership structure. Also, M&A decisions are usually the responsibility of national competition agencies, and it is not clear that these agencies are sufficiently aware of the dynamics and complexities of electricity markets. A competent energy regulator is needed to provide clear advice on such cases (Newbery 2004).

Sector performance

Electricity prices

The effect on electricity prices is, perhaps, the single most important indicator of liberalisation. A desirable outcome for the single market is to achieve lower average EU-wide tariffs and price convergence through wholesale and retail competition.

A decline in the price-cost margin may suggest efficiency gains and that these have been passed on to customers. Liberalisation may also involve rebalancing of tariffs for different customer groups as a result of cost-reflective pricing. The picture is further complicated by changes in prices for gas, oil and coal. There is a significant variation in end-user prices in the EU, although this can be associated with different components of the final price (European Commission 2004b). The integrated Nordic market exhibits higher degree of wholesale price convergence than other European markets reflecting limited interconnection capacity (Boisseleau 2004; Bower 2002). Italy and Ireland exhibit notably high generation prices and retail margins.[4] At the same time, Norway and UK (with the longest incentive regulation of networks) have some of the lowest network charges. The UK exhibits the lowest retail supply cost and margin.

The EU average prices for major customer groups have seen a general decline between 1997 and 2003 (Figure 2). The price reductions for households, small industries and large industries have been 6, 20, and 9.5 percent respectively. Prices for the customers seem to have come more in line with the underlying costs of supply, which would suggest that residential prices should be higher than those of small industries. This has arisen against a background of flat or rising fossil fuel prices for electricity generation over this period.[5] It also comes at a time when operating costs seem to have been falling, combined with sharp declines in employment in recent years. Labour productivity in the utilities (including electricity) sectors has increased by about 30 percent between 1996 and 2001 (European Commission 2004a).

Distribution tariffs vary significantly, although less than for transmission tariffs (the distribution charges in Germany are twice those in the UK and explain more than half of the differential in the final prices between the two countries). There are also significant variations in distribution tariffs within individual countries that reflect legitimate cost variations, inefficiency, the use of distribution charges as local taxes by municipal owners, or even joint cost allocations within vertically integrated businesses cross-subsidising competitive segments such as retailing

[4] Generation fuel taxes vary across countries (see IEA 2004).
[5] There is only patchy data available on fossil fuel prices on a consistent basis (see IEA 2004).

from monopoly segments. Incentive regulation has led to concerns about the effect on the quality of service, which exhibits variations both across and within countries (CEER 2003). However quality of service is usually explicitly incentivised.

Investment adequacy

In the absence of central planning, the market must deliver sufficient and timely investments – a major concern in liberalised electricity markets. Assessing the incentives for future investment adequacy is difficult due to pre-existing over-capacity. However, over time, as demand and supply move more into balance, new investment with the promise of an adequate return will be needed. A period of high demand growth and sustained under-investment can eradicate the existing reserve capacity and threaten the stability of the system, especially where this is combined with a lack of political will to allow prices to rise.

It is expected that the financial and physical integration of the European electricity market would cause its profitability to converge. It is more difficult to determine whether the return is at an efficient level and whether it will lead to sufficient new investment. In Norway, in recent years, the return on capital for electricity utilities has been lower than that of the manufacturing industries (von der Fehr et al. 2005). This gives rise to the question as to whether electricity is less risky than other industries, thus justifying lower returns. Meanwhile, much of the electricity infrastructure in Europe is aging and there is a need for significant asset renewal in coming years. Given the long economic life of such assets, it is important to ensure the efficiency and strategic value of the new investments.

Security of supply

Figure 3 shows changes in the remaining capacity in the Union for the Co-ordination of Transmission of Electricity (UCTE) system, which consists of the transmission networks in continental Europe between 1999 and 2003. Overall, reserve capacity in the post-liberalisation year appears to have been relatively stable. Reserve capacity for the period between May and July 2003 is somewhat lower than previous years. With the exception of February, the reserve capacity for the colder months of the year has generally improved. We note that this data is rather crude and does not include intra-month peaks or reflect variations in the likelihood of an outage at the same measured reserve margin. A better measure would be given by the loss of load probability.

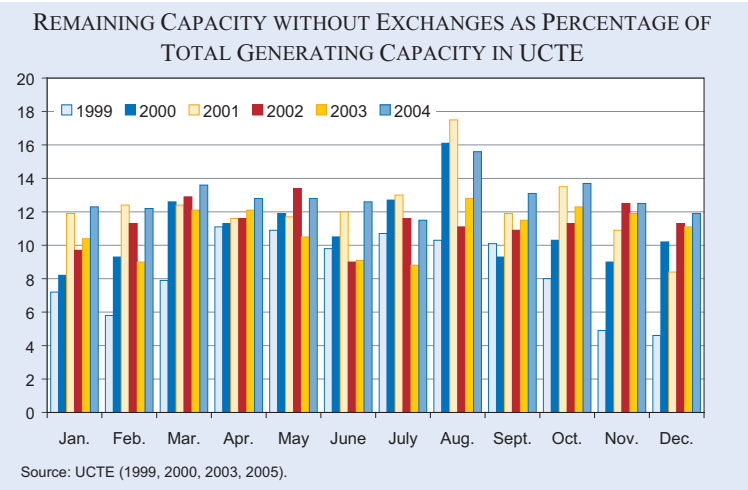
In the short run, increased trade and interconnections can improve utilisation of existing capacity. Individual countries can maintain a degree of domestic energy security by limiting reliance on import dependence. The best insurance policies against interruptions in energy flows are national reserve policies and effective EU-wide crisis management and sharing of reserves.

Environmental and social impact

Between 1992 and 2001, the share of renewables as a percentage of targets for 2010 in seven countries declined or remained the same. For the whole of the EU during the same period, the share of renewables increased to about 10 percent (European Commission 2004a). However, progress towards target levels has been uneven and the European market integration does not appear to stand in the way of different national emphasis on renewables. The trade-off between achieving lower prices through reforms and environmental concerns about demand growth may be reduced by low carbon and clean technologies.

Between 1996 and 2001, EU electricity prices have consistently increased at a lower rate than the con-

Figure 3



Source: UCTE (1999, 2000, 2003, 2005).

sumer price index. During this period, the affordability index for electricity improved for all income groups in most member countries and consumers appear to be generally satisfied with service quality (European Commission 2004a). Recent increases in fuel prices have ended this benign period of declining real prices. The ability of regulators to pass efficiency gains from liberalisation to customers will be increasingly important for continued public acceptability of further integration of European markets.

Conclusions and policy implications

The centralised approach to market liberalisation in the EU has succeeded in maintaining the pace of reform in the original EU-15 and in a number of associated and accession countries. Given the initial diversity across EU electricity sectors, the Directives have achieved a degree of standardisation of structures, institutions and rules in national markets. Market opening has proceeded rapidly and in many cases, beyond the minimum requirements.

While progress toward a genuine single market remains slow there has been progress in regional markets. There are several recognisable regional markets in the EU: the Nordic, UK-Ireland, Baltic, east European, west European, southeast European, Iberian and Italian zonal markets. However, these markets vary in degree of internal integration. The Nordic market is the most advanced with formal and common market rules and price convergence, while the Iberian market is taking shape. The west European market (including France, Germany, Switzerland, Netherlands and Belgium) is the largest regional market, and its central geographic position implies that progress toward the single market depends on the development of this market.

Liberalisation and integration of the European market remains a work in progress characterised by uncertainty over its end point. Effective unbundling, regulation and competition are required for a competitive market. This requires that decision makers need to take action to:

- promote extension of regional markets,
- encourage expansion of interconnector capacity to facilitate cross border competition,
- unbundle networks and regulate and enforce accesss arrangements effectively,
- block anti-competitive rises in concentration via mergers,
- develop arrangements to secure a collective reserve capacity and to prevent free-riding, and
- enforce disclosure, transparency, and the collection and publication of new types of data that would allow proper monitoring of liberalisation progress.

Decision makers must make sure that market incentives are allowed to work in order to avoid a return to monopolies of the past. The process of referring merger cases to competition authorities has been ineffective in preventing market concentration. Many of the required measures can be left to national governments/regulators, but where these do not take sufficient action the European Commission must have the authority to intervene to achieve a genuine European single market in electricity.

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