10 The Changing Structure of the Electric Utility Industry in Europe: Liberalisation, New Demands and Remaining Barriers

Reinhard Haas[1]

Christian Redl[2]

Hans Auer[3]

Abstract

Liberalisation of the electricity sector in various countries and regions worldwide as a precondition for the introduction of competition has faced electricity generators and suppliers, grid operators, governments, regulatory authorities and, finally, also consumers with new challenges. This chapter summarises this development with a regional focus on the European Union.

Keywords: liberalisation, electricity supply sector, European Union

[1] Prof. Dr. Reinhard Haas is an Associate Professor at the Energy Economics Group at Vienna University of Technology, Austria.

[2] Christian Redl is a Research Assistant at the Energy Economics Group at Vienna University of Technology, Austria.

[3] Dr. Hans Auer is Senior Research Assistant at Energy Economics Group at Vienna University of Technology, Austria.

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10.1 Introduction

The restructuring of electricity markets in most European countries started in the late 1990s and is still going on. In the European Union (EU) this process was triggered by Directive 96/92/EC of the European Parliament and of the Council concerning common rules for the internal market in electricity. The major motivation for this directive was the conviction that liberalisation, price deregulation and privatisation would lead to competition in both generation and supply, resulting in lower prices for European consumers. As the main driving force, the European Commission's main expectation was that: "market forces produce a better allocation of resources and greater effectiveness in the supply of services" (European Commission, 1996).

However, these expectations were based on simplified assumptions about the behaviour of large incumbent players being reinforced by national politicians forcing national champions and European authorities allowing too much concentration within the electricity supply industry. In turn, the aforementioned directive was overruled in 2003 by Directive 2003/54/EC, which contains stricter provisions, especially with regard to unbundling. In 2007 the European Commission put forward the third legislative package, which includes a proposal for a new directive amending Directive 2003/54/EC – again containing stricter rules for the supply industry.

This chapter is organised as follows: The next section will summarise the organisation of the electricity supply industry (ESI) before liberalisation of the sector was implemented. Section 10.3 focuses on the implementation process and explains the main provisions of the first and second electricity directives. Price formation in liberalised markets is considered in Section 10.4. In Section 10.5 the performance of the markets will be analysed, while Section 10.6 discusses remaining barriers and problems associated with liberalisation of the ESI and the latest proposal of the European Commission. Finally, Section 10.7 gives the authors' conclusions.

10.2 The European Electricity Supply Industry in Pre-liberalisation Days

In a perfect market, competitive prices ensure efficient resource allocation, which maximises social welfare. Yet, under certain constraints (e.g. monopolies, pollution) market forces alone cannot manage an optimal allocation, giving rise to state intervention by means of regulation.

The quick provision of an area-wide electricity supply was a socio-political high priority in the twentieth century. However, in the early twentieth century prices increased as result of the monopoly structure of the ESI. This monopoly structure arose from pronounced economies of scale in the generation sector, low investments in infrastructure and the network representing a natural monopoly. Hence, politics considered societally justifiable electricity prices ('fair' prices),

security of supply and build-up of an infrastructure would best be reached via an ESI subject to tough regulation (price and/or ownership regulation).

Indeed, until the end of the 1990s, almost every electricity supply industry in Europe was largely vertically integrated with a captive franchise market, either state-owned (in the majority of cases) or under mixed private/public ownership (as in Belgium, Germany and Switzerland). Throughout Europe the ESI was price-regulated, the standard model being either average cost or cost plus regulation. Regulated area monopolies prevailed in all countries. Yet ownership structures and degree of vertical integration were different among the European countries.

Although electricity networks were typically synchronised over wide areas, interconnections of areas under different transmission system operators (TSOs) were frequently guided by security rather than by economic considerations. However, most trade in the past was due to economic benefits of arbitrage during off-peak and peak load hours.

To sum up, the standard model before liberalisation was “an effectively vertically integrated franchise monopoly under either public ownership or cost-of-service regulation” (Newbery, 2006).

10.3 Restructuring of the European Electricity Supply Industry

In the 1980s the role model of a vertically integrated regulated ESI was increasingly questioned by economists and politicians, among others. The key point of criticism concerned a supposedly inefficient electricity supply attributable to high prices resulting from high costs and a low service level. It is worth mentioning that this criticism was mainly aimed at the 'weak' regulatory authorities and their lacking capabilities to guarantee an efficient provision of electricity services.

To increase the economic efficiency of the utility industry three measures were proposed:

- Liberalisation;
- Introduction of competition and/or
- Privatisation.

The restructuring of EU Member States’ electricity markets was finally triggered by a directive concerning common rules for the internal market in electricity, which came into force in February 1997. The main intention was to create a common competitive European electricity market. The major issues of this directive (Directive 96/92/EC, 1996) were:

- Minimal requirements for the unbundling of generation and transmission;
- Minimal market opening, expressed by the consumption size of 'eligible customers';
- Different approaches to access to the grid (negotiated or regulated, Third-party Access or Single Buyer).

Table 10.1: Milestones of reform of electricity markets in the EU

1996	EU-15	European Council of Energy Ministers and Parliament reach agreement on a market liberalisation directive
February 1997	EU-15	This Directive concerning common rules for the internal market in electricity (Directive 96/92/EC) becomes valid while waiting up to 2 more years for its implementation by countries
1998	Spain	Introduction of a Spanish centralised pool
1998	Poland	Introduction of TPA (market opening: 22%)
1998	Germany	100% market opening
February 1999	EU-15	Directive comes into force after a 2-year implementation delay: market opening attributable to the directive between 30% and 35% in Austria, Belgium, France, Italy, Spain, Portugal and the Netherlands
2001	Austria	100% market opening (in a second step)
2001	EU-15	Approval of the Directive of the European Parliament and the Council on the promotion of electricity from renewable energy sources in the internal electricity market (RES-E Directive) (European Parliament and Council, 2001 – Directive 2001/77/EC)
2003	EU-25	Approval of the Directive concerning common rules for the internal market in electricity (officially Directive 2003/54; usually named 'the Second Directive')
2003	Spain	100% market opening
2004	EU15+10	Expansion of the EU to 25 member countries, new CE member countries to open their market with 30% minimum
2004	EU 25	Electricity Directive 2003/54 due to be implemented by member states
		All nondomestic customers in the EU made eligible in July 2004
		An EU Regulation on cross-border electricity trade comes into effect (Regulation 1228/2003) in July 2004
2005	Portugal, The Netherlands	100% market opening
2007	EU 27	As result of Electricity Directive 2003/54, 100% market opening in all EU-27 countries in July 2007

However, each national government within the EU had to transpose the directive into national law, yielding rather different approaches. An overview of the major milestones is provided in Table 10.1. In practice, the major area of action within the European liberalisation project was 'Providing access to the market'. Aside from a minimal level of unbundling, the restructuring of utilities and the design of market places was not tackled comprehensively by governments in most

countries (there were a few exceptions: Spain created a centralised pool, and Italy divested generation capacities). Also, provisions ensuring adequate generation and transmission capacity were given far less attention. Independent energy regulators were introduced in all countries except Germany (and Switzerland, but this country is not part of the EU). In addition, environmental issues were also treated very prominently.

The first important requirement for a competitive electricity market recognised in the electricity directive is nondiscriminatory access to the grid for new entrants. This means that access to transmission and distribution should be offered to all market participants at reasonable and nondiscriminatory prices. In turn, a precondition for competition is the unbundling of generation and supply from transmission. Unbundling is of crucial importance so as to avoid possible distortion, discrimination and cross-subsidies between different segments of the supply chain within the integrated incumbent. To achieve this, competitive segments of the supply chain (i.e. generation and supply) must be separated from noncompetitive segments (i.e. the grid). Figure 10.1 depicts this graphically.

According to the first directive, vertically integrated utilities had to keep separate accounts for generation, transmission and distribution activities (Directive 96/92/EC, 1996).

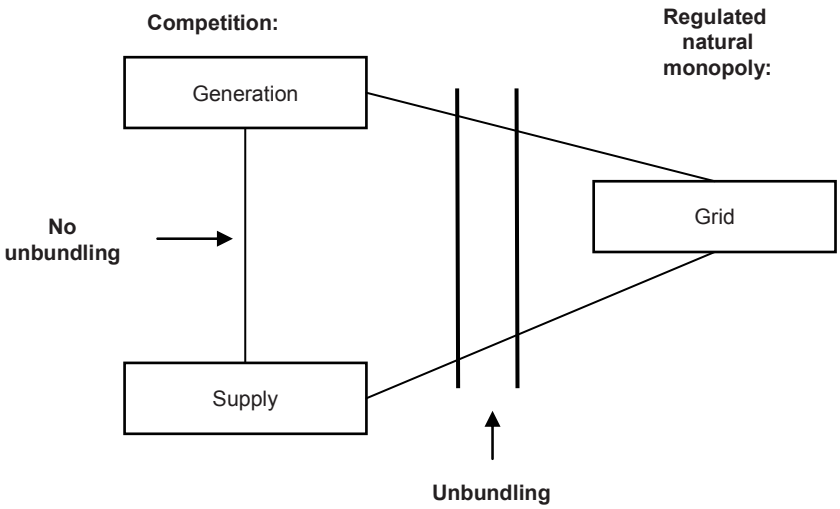

Figure 10.1: Separation of competitive from noncompetitive segments through unbundling

Member states could choose between negotiated or regulated third-party access or the single-buyer procedure when organising access to the transmission and the distribution network (Directive 96/92/EC, 1996). In all countries except Germany access to the grid was regulated by the directive. Finally, this was also introduced in Germany.

The third important issue in the directive concerns market opening: gradual opening in three steps (26.5% in February 1999, 28% in February 2000 and 33% in February 2003) was foreseen (Directive 96/92/EC, 1996). The geographically and temporally different opening of the markets led to at least some distortions regarding free choice of supplier. Some countries, such as Germany, the Netherlands, Spain, Portugal and Austria, opened their markets fully, while others, such as France, Luxemburg and the Czech Republic, opened theirs only partially.

As the directive only set minimal requirements, a rather diverse implementation in the EU's different member states was the consequence. Moreover, the economic and competitive performance of the national markets left much to be desired (see Section 10.5 for a detailed analysis). As a consequence, a second directive entered into force in 2003 and had to be implemented in national law by July 2004 (Directive 2003/54/EC, 2003).

This directive required legal and organisational unbundling of the transmission and distribution system (with exceptions for small distribution companies) from the vertically integrated company to ensure a proper separation of competitive segments from noncompetitive ones. Access to the network must be based on published, objective and nondiscriminatory tariffs, which must be approved by a regulatory authority. Since July 2004 all nonhousehold customers and since July 2007 all customers have had the option of choosing their electricity supplier (Directive 2003/54/EC, 2003).

10.4 Price Formation in a Liberalised Competitive Electricity Market

Before liberalisation, regulated electricity prices corresponded to average costs of power generation. In a liberalised competitive power market, prices are expected to equal short-run marginal costs. In the long run, the competitive price level should not exceed long-run marginal costs of new power plants. However, in a noncompetitive environment prices may exceed the former price level because of either mark-ups or strategic investment withholding. Figure 10.2 compares these different price development scenarios.

In competitive markets, marginal generation costs are relevant for price formation. In these markets, the wholesale price is determined by the generation costs of the marginal technology (i.e. the SRMC of the most expensive plant needed to meet demand – merit order principle): Generation costs of the various power plants are classified by rising generation costs resulting in a stepped supply curve with constant marginal costs up to the capacity limit of each plant. In addition, at least in the short term electricity demand can be modelled as price inelastic, resulting in an almost vertical demand curve. Figure 10.3 illustrates price formation in competitive power markets.

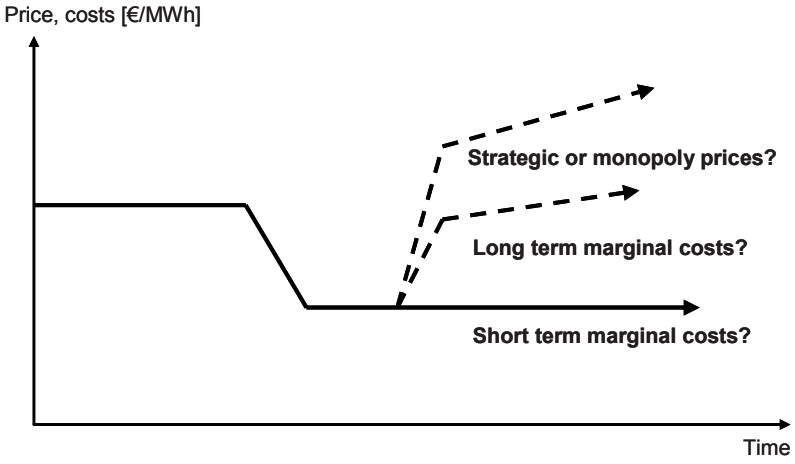

Figure 10.2: Price scenarios in liberalised markets

The intersection of supply and demand curves in Figure 10.3 implies that power plant types A, B, C and D are needed to satisfy electricity demand, where plant D is utilised only partly. Clearly, both supply and demand curves are subject to dynamic changes over time, resulting in varying system marginal costs and, hence, volatile patterns of wholesale prices. The concept of system marginal costs is reflected in uniform pricing auctions of wholesale markets. All inframarginal suppliers receive the system price as remuneration. Hence, the difference between total revenue and total generation costs – also called producer surplus – represents the contribution margin to cover fixed costs.

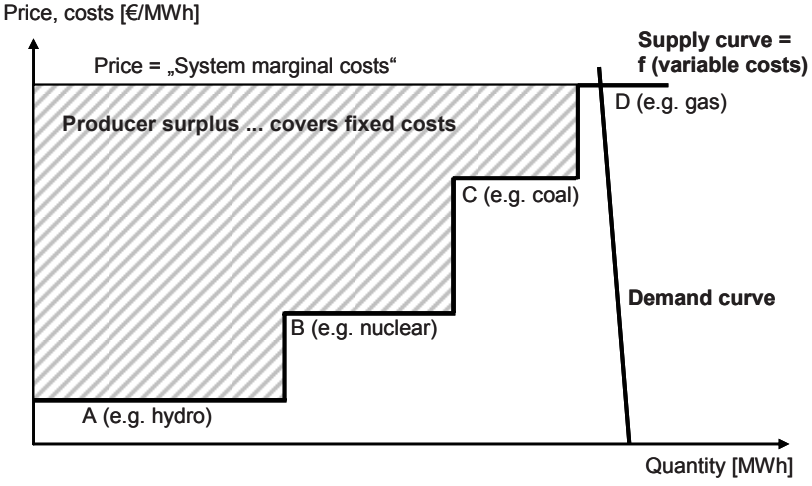

Figure 10.3: Price formation in electricity markets

The volatile pattern of prices shows various periodicities (from daily to yearly). Figure 10.4 shows an overview of electricity generation and consumption on a monthly basis in the core Continental European wholesale power market from January 1999 to December 2007.[4] Supply is clustered into nuclear power, conventional thermal power (lignite, hard coal, gas and oil), hydro power and 'new' renewables.

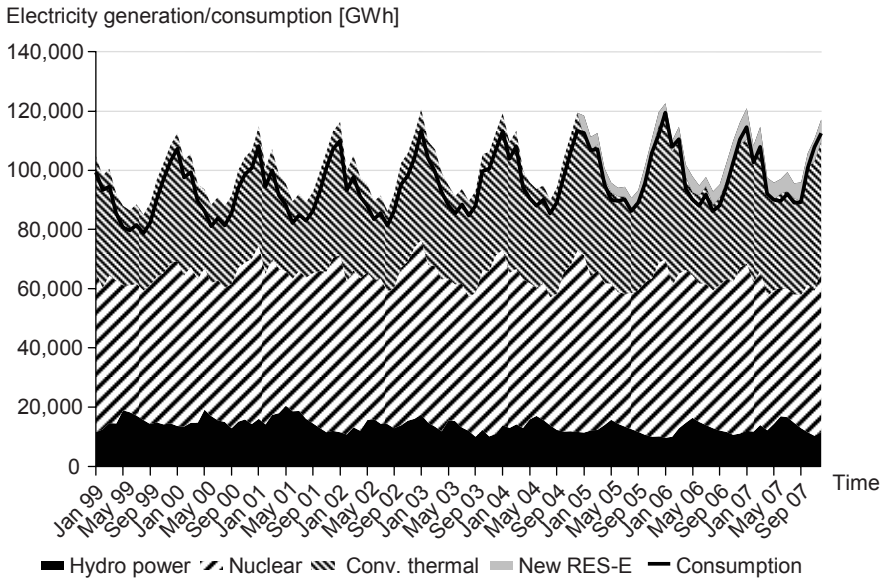

Figure 10.4: Development of electricity generation and consumption on a monthly basis in Western Europe (AT, CH, DE, FR) from January 1999 to 2007 (UCTE, 2008)

Figure 10.5 depicts a simplified supply and demand representation for the core Continental European wholesale power market. It is possible to identify a strong convexity of the merit order curve with a high slope of the supply curve approaching system capacity limit. Therefore, small fluctuations in demand or supply can yield significant price effects. More than 50% of total generation stems from power plants with low short-run marginal costs. These comprise run-of-river hydro power plants, new renewable plants that are subject to national support schemes and, finally, nuclear power plants. Generation costs of fossil-fuelled power plants are much higher, resulting in a huge jump in the merit order curve. The ranking of conventional thermal power plants changes depending on the prevailing fuel and CO_2 price level. Usually, new lignite-fired plants are the cheapest thermal generation source, followed by new hard coal- and natural gas-fired plants, with oil-fired plants being the most expensive generation technology. Nev-

[4] This market comprises Austria, France, Germany and Switzerland.

ertheless, distinctions between different technologies using different fuel types are not clear cut. Different ages and, hence, efficiencies of the plants and changing fuel and CO_2 prices result in a heterogeneous composition of the merit order curve.

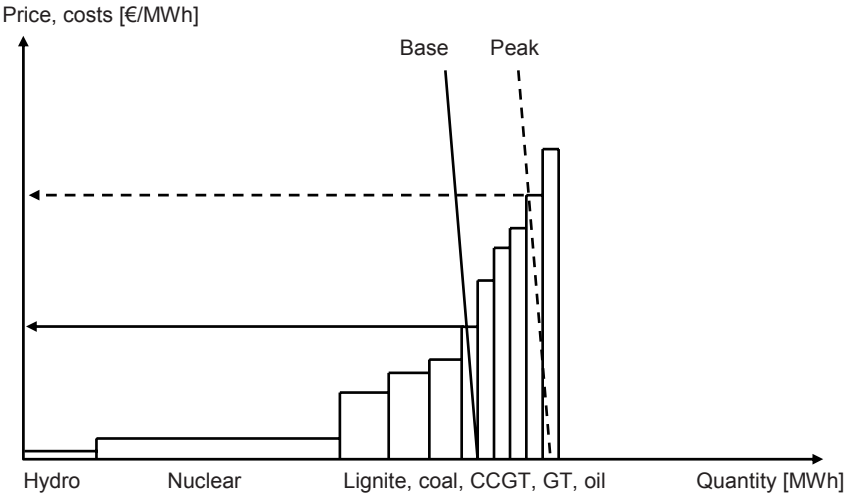

Figure 10.5: Stylised supply and demand curves for the Western European power market (AT, CH, DE and FR)

10.5 Performance of the Wholesale and Retail Markets

A major objective of liberalising the European electricity supply industry was and still is the creation of a single market. Nonetheless, this area currently consists of several submarkets separated by scarce transmission capacity and in access conditions to the grid. Another major obstacle for a joint competitive European market is a too-low number of competitors, resulting in a general lack of competition in virtually all local and national electricity markets both wholesale and retail, also because barriers to entry and incentives to collude remain too high. In addition, increasing horizontal integration with natural gas supply is observed. Hence, the paramount objective is still to construct competitive markets, while at the same time ensuring a reasonable level of grid reliability and supply adequacy (Haas et al., 2006).

Figure 10.6 depicts the average wholesale prices in these different submarkets in 2007, due to cross-border transmission bottlenecks or other exchange barriers (e.g. long-term contracts).

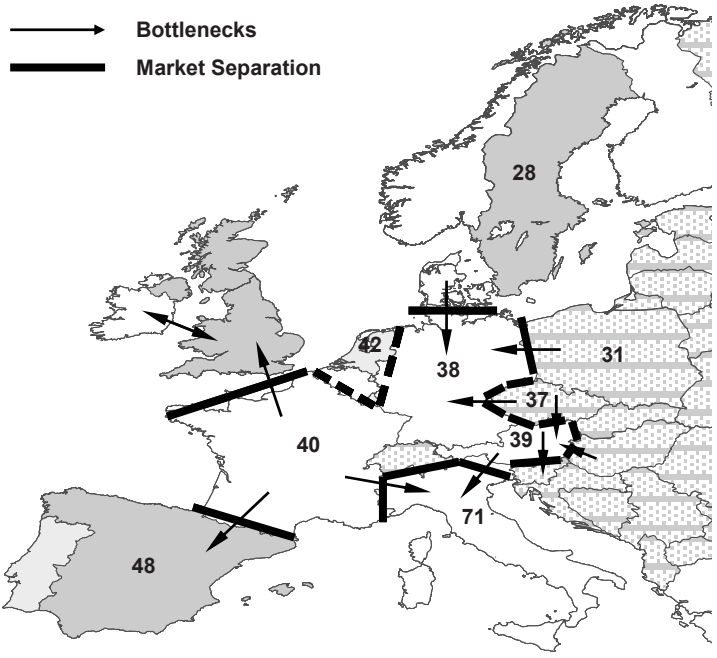

Figure 10.6: Average wholesale electricity prices in [€/MWh] and transmission grid bottlenecks in Europe in 2007 (APX, 2008; EEX, 2008; EXAA, 2008; IPEX, 2008; Nord Pool, 2008; OMEL, 2008; OTE, 2008; PolPX, 2008; Power-next, 2008)

Figure 10.7 shows the evolution of spot market prices in Europe from 1999 to 2007. With the exception of Italy a certain convergence of spot market prices is visible for 2004. Over the whole period virtually no price difference is observed between Germany, France, and Austria.

In 2007, again, increased convergence of Continental European spot prices was observed. First, implicit auctions between France, Belgium and the Netherlands were introduced, leading to coupling of these markets and thereby effectively removing the market separation in northwestern Europe. Moreover, Czech power prices almost reached Western European levels, for a number of reasons. CO_2 certificate prices fell dramatically during 2007, nuclear production decreased in the Czech Republic and more cross-border capacities became available owing to a reduction in the number of long-term contracts between Germany and the Czech Republic.

To assess the performance of a liberalised electricity market it is of prime importance to see how electricity prices have developed since restructuring. Therefore, a major question for further investigations is whether these prices are a competitive outcome; that is to say whether these prices really do reflect the marginal costs of generation or whether they are increased by some kind of market power.

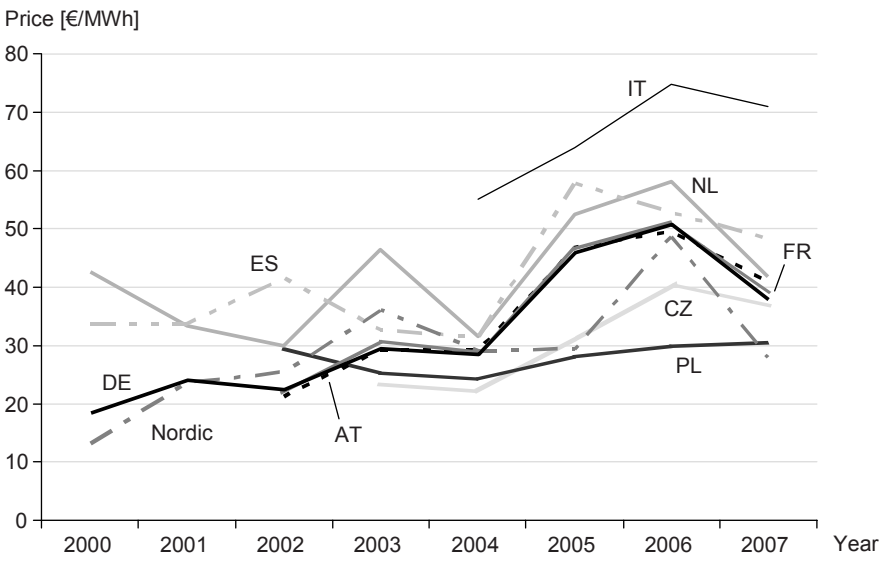

Figure 10.7: Wholesale electricity prices in selected European countries (APX, 2008; EEX, 2008; EXAA, 2008; IPEX, 2008; Nord Pool, 2008; OMEL, 2008; OTE, 2008; PolPX, 2008; Powernext, 2008)

Owing to the dominance of fossil-fuelled power plants in the EU power markets, primary energy prices and CO_2 emission allowance prices are crucial determinants of the development of power prices. Besides parameters directly affecting generation costs of thermal plants, production of inframarginal technologies (e.g. hydro run-of-river and nuclear power) also indirectly influences price formation.

Figure 10.8 shows the comparison of realised German EEX spot market prices and modelled system marginal costs. These prices are the relevant benchmark in the regional Western European power market, as depicted in Figure 10.6. The model shows a close correlation between prices and costs from 1999 to 2001, with a structural break in December 2001. Prices and costs diverge between 2002 and 2004. This mark-up led to the following interpretation. Müsgens (2004) argues in an analysis of the German wholesale market: "The difference between marginal costs and prices is attributed to market power. […] there is strong evidence of market power in the second period from September 2001 to June 2003". In 2006 and 2007 prices again significantly diverge from the competitive benchmark model (London Economics, 2006; European Commission, 2007a; Hirschhausen et al., 2007).

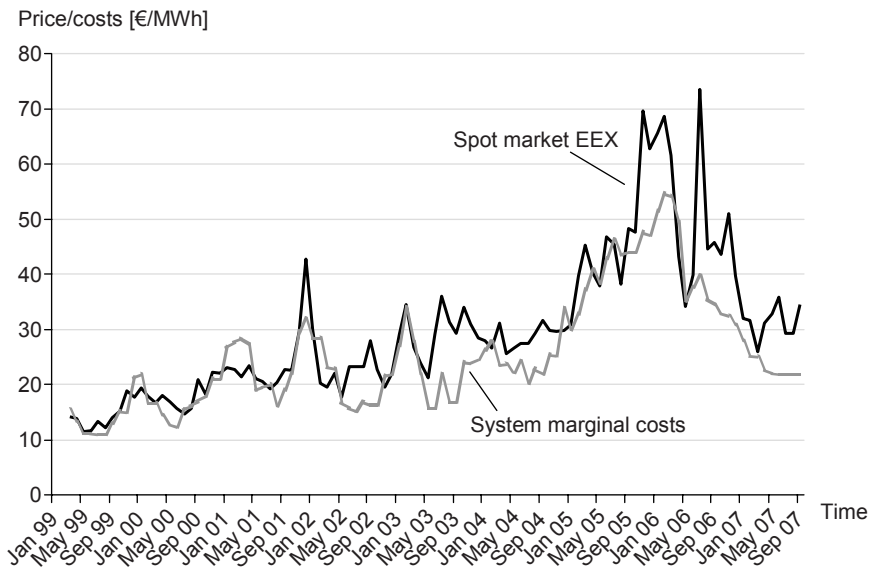

Figure 10.8: Evolution of electricity prices and system marginal costs in the regional Western European power market from 1999-2007 (BAFA, 2008; EEX, 2008; UCTE, 2008; authors' own calculations)

The industrial reference model for electricity changed completely between 1995 and 2001. It has shifted from a preference for vertical disintegration between generation, trading and sales to final consumers toward a preference for vertical reintegration of production, trading and final sales. However, for effective competition a large number of companies is required. This has been clearly demonstrated by the English and Welsh examples, where the number of generators has been increased several times by the regulatory authority. The 'merger-mania' within Continental Europe after the start of liberalisation indicates that the major strategy of the larger incumbent utilities is competing by merging so as to purchase market shares. These activities reached a numerical peak in 2003, 4 years after liberalisation started. As can be seen from Figure 10.9, of the 13 largest generators that existed in Continental Europe in 1999, only 9 remained 6 years later. Now in Continental Europe six large concerns dominate the market: EdF-EnBW, RWE, E.ON, Vattenfall, Enel-Endesa and Gaz de France-Suez-Electrabel.

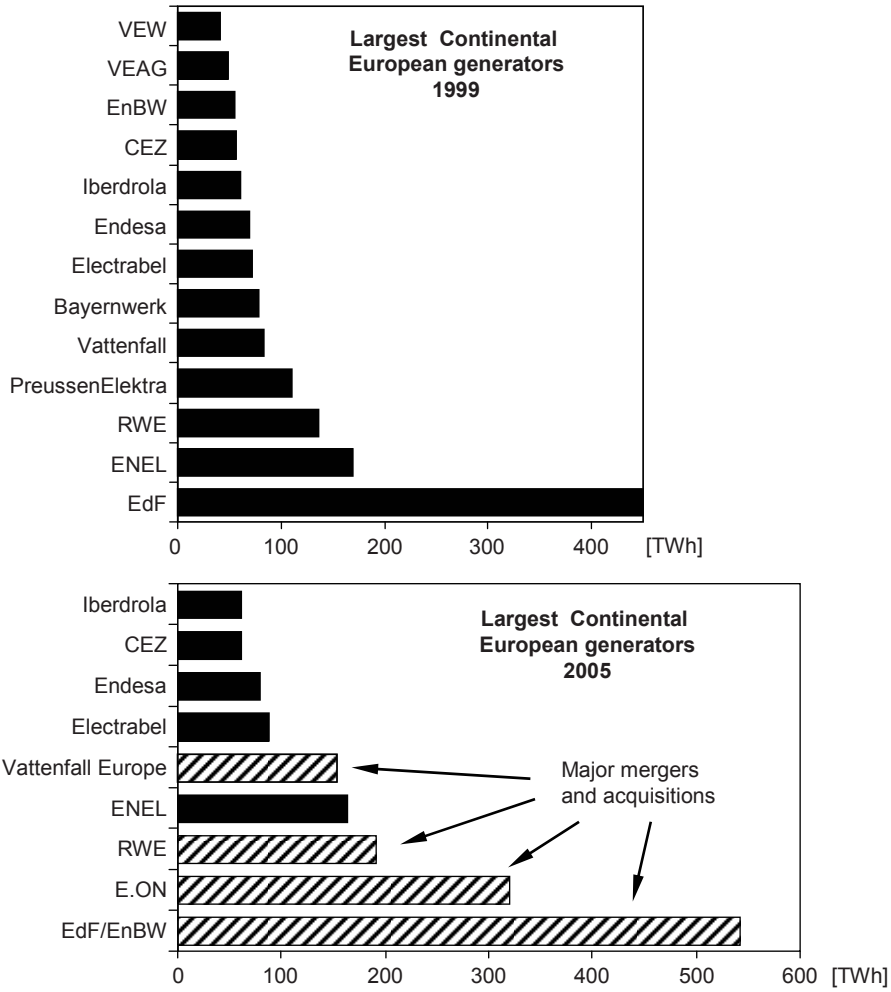

Figure 10.9: Largest European electricity generators in 1999 and 2005 (authors' own investigations)

The major expectation of final customers with respect to the liberalisation of electricity markets was that prices would drop substantially. Figures 10.10 and 10.11 depict the price evolution in some Continental European countries from 1999 to 2004 for industrial and household customers, respectively. As can be seen from Figure 10.10 large electricity users did indeed see lower prices, at least temporarily, but prices have been rising in most countries since 2002 or 2003. France is an exception, with a slightly decreasing price pattern ever since 1995. Eastern European countries show generally rising price patterns.

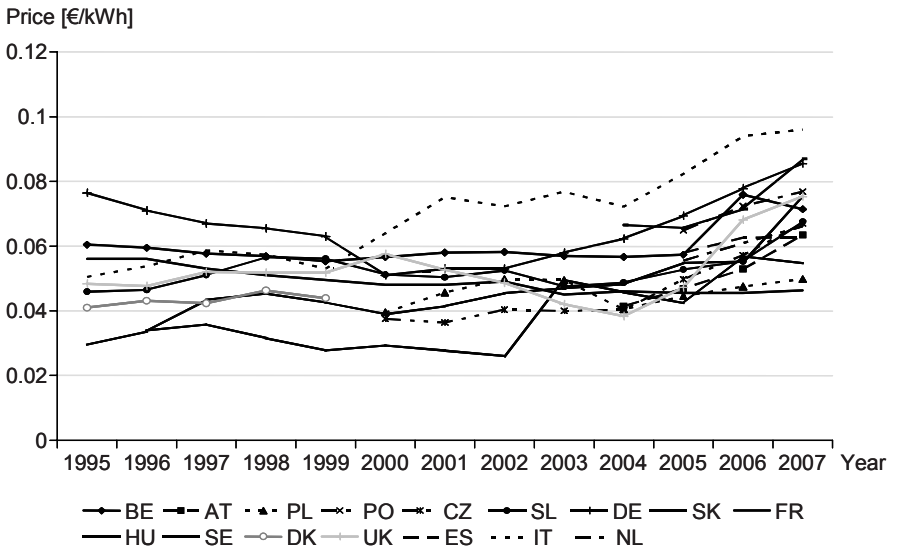

Figure 10.10: Evolution of large industrial customers' electricity prices in selected Continental European countries excluding taxes (EUROSTAT, 2008; average electricity consumption: 24 GWh)

Yet, as Figure 10.11 shows, households' electricity prices remained stable in the majority of the countries investigated after liberalisation was introduced and started rising in many cases from 2004 onward. Moreover, neither for households nor for industrial customers has there been any obvious price convergence. This was one of the expectations of the common European market. Household prices in Eastern European countries have been rising continuously.

Of course, there are many reasons for price increases, e.g. transaction cost of market creation (e.g. splitting of distributor into two legal companies: one for distribution and one for supply), new power plants that have to meet new ecological legislation (emission limits, minimum thermal efficiency etc.), which will mean utilisation of expensive technologies (especially in Eastern Europe), emission allowances for CO_2, consumer tax imposed on fossil fuels from 2007 (according to EU rules), fees for increasing share of renewables-based electricity (RES-E) production, and, finally, rising primary energy prices. Clearly, Figures 10.10 and 10.11 require more in-depth investigation.

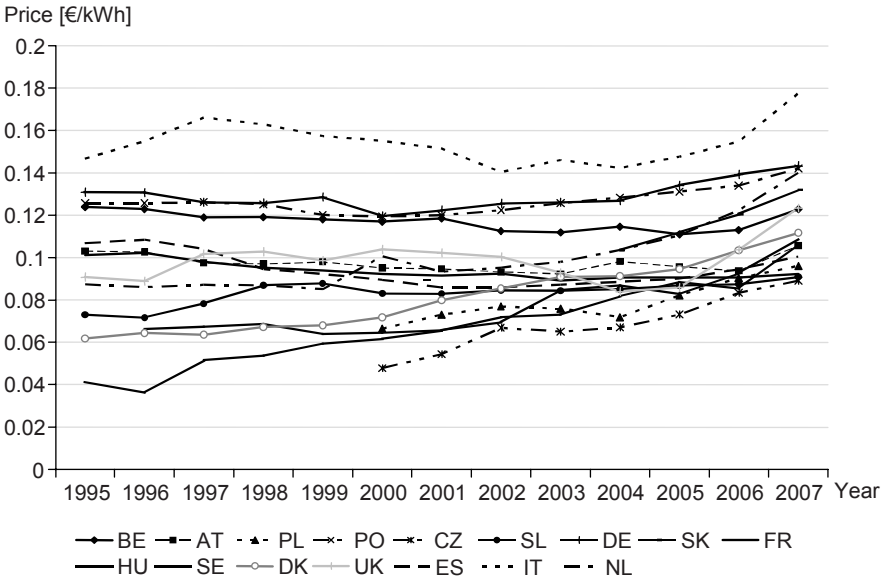

Figure 10.11: Evolution of households' electricity prices excluding taxes in selected Continental European countries (EUROSTAT, 2008; average electricity consumption: 3,500 kWh)

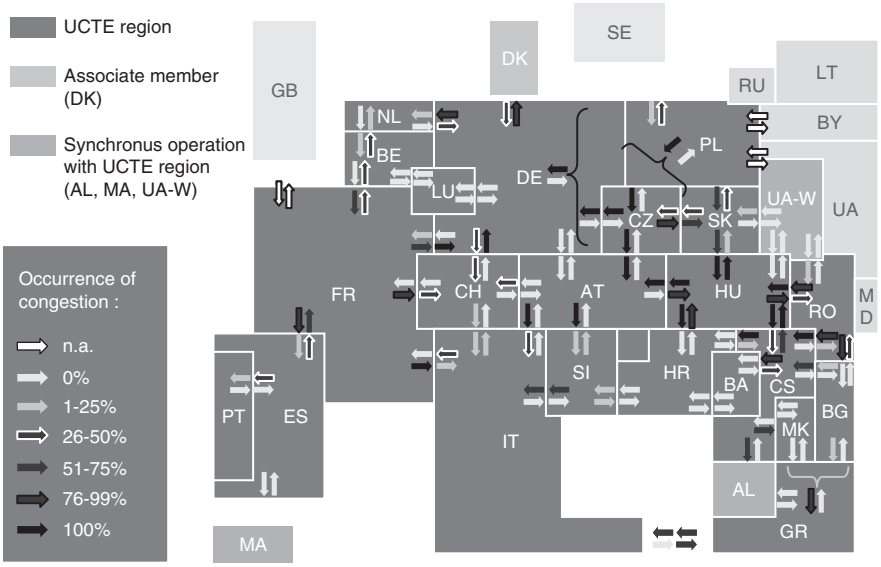

Figure 10.12: Cross-border congestion in Continental Europe for 2006 (UCTE, 2007)

Currently, transmission constraints have a substantial impact on the separation of submarkets in Continental Europe, which also limits competitive pressures from neighbouring markets. Hence, another important precondition for a sufficiently wide market would be that there is sufficient transmission capacity for supply to neighbour regions, increasing the number of potentially competing generators. Figure 10.12 depicts the situation at cross-border transmission lines for the year 2006.

The development of cross-border congestion (load flows divided by NTC) in winter and in summer over the period 1996-2005 is shown in Figure 10.13. Only borders with more than 85% congestion in at least one of the last 10 years are considered in Figure 10.13. In principle, it can be seen that there has been a continuous increase in aggregated congestion since the start of liberalisation.

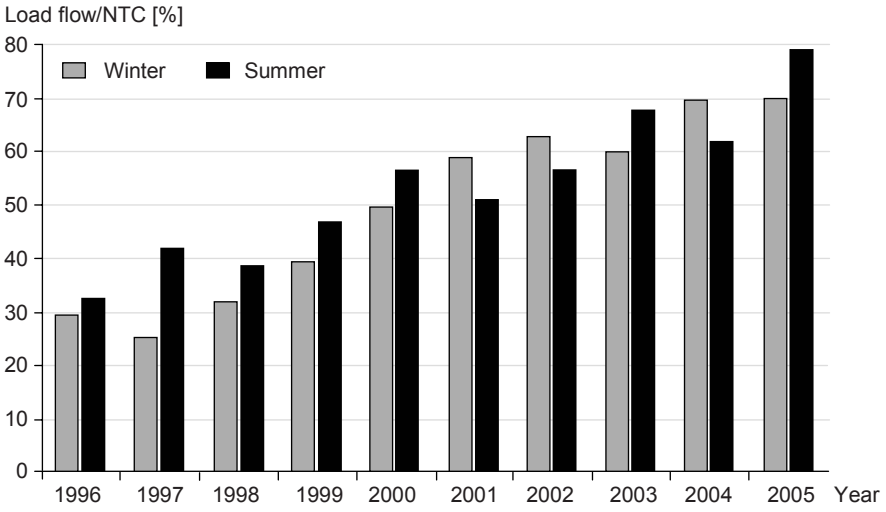

Figure 10.13: Development of aggregated cross-border congestion (load flows divided by Net Transfer Capacities) in winter and in summer over the period 1996-2005 (UCTE, 2008)

10.6 Remaining Barriers to Effective Competition

Meanwhile, the EU has successfully initiated the most extensive and ambitious project for building a new electricity market. However, there are no guarantees that the dynamics of this construction will not dissipate, as in the US, or that the internal market will not remain fractured in 'national or local blocks', which could persist for a long time (Glachant & Lévêque, 2005; Glachant & Finon, 2005). Moreover, as argued by Haas et al. (1997) and Haas and Auer (2001), the expectation of lasting competition in a 'free' market is based on highly simplified assump-

tions of the strategic behaviour of electricity generators and network operators. The caveats described by Banks (1996) are similar ("the market is a wonderful thing and it should be exploited as far as possible, but it also has its limits") to those of Newbery (2002), which are based on the experience in the UK and the Nordic market.

10.6.1 Decreasing Excess Capacities

As in many electricity markets that have been liberalised, most European countries started liberalisation with significant excess capacities in generation, which had built up in the time of regulated area monopolies. Indeed, it was a common motivation and driver for introducing competition. Nonetheless, excess capacity in generation plays a core role in the restructuring process of an electricity supply industry. If utilities compete with excess capacity in generation, which also depends on transmission capacity, the price they receive for electricity will be equal to their short-term marginal cost. In a situation of perfect competition without remarkable excess capacities the price will not rise above the long-run marginal costs of new technologies. However, if there is no competition or a too-tight capacity the price can be substantially higher than both marginal costs, especially when demand is inelastic relative to price. Figure 10.14 depicts this development graphically.

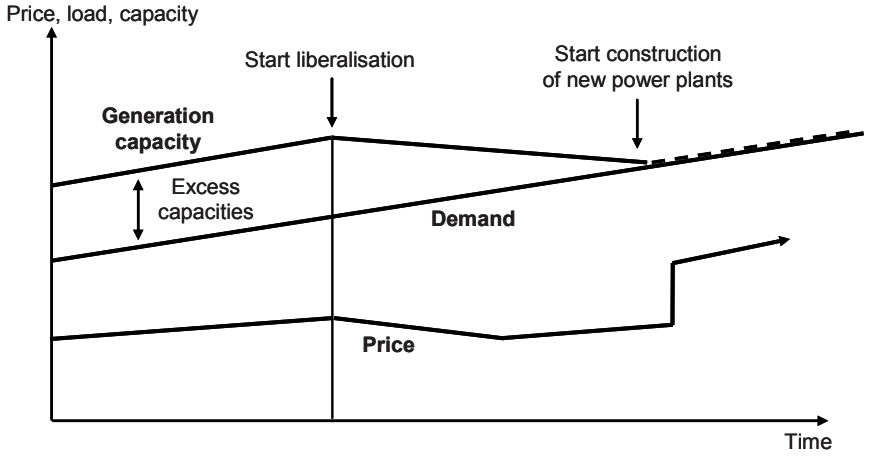

Figure 10.14: Decreasing excess capacities and corresponding wholesale prices

In fact, spare capacity has decreased continuously in recent years in the various submarkets (spare capacity = net capacity minus maximum load). In this context, variations and uncertainties in available capacities play a crucial role. Analysis of the effects of extending the core Western European regional market by the addition of Central and Eastern European EU member states indicates that no im-

provements can be expected in terms of security of supply. Adequate generation capacity is available for the foreseeable future; nevertheless, after 2012 when no new power plants have been or are being built and concentrated decommissioning of existing power plants (both nuclear and fossil-fuelled plants) is going on, this will have negative effects on security of supply. One remaining major uncertainty is the magnitude of demand growth (Haas et al., 2008).

Figure 10.15 depicts the developments currently looming in load and generation capacity. In recent years spare capacity decreased continuously in the core Continental European submarket consisting of Austria, France, Germany and Switzerland (spare capacity = net capacity minus maximum load). In Figure 10.16 the effects of extending the market by the Czech Republic and Poland are shown. Comparison with Figure 10.15 indicates that no improvements concerning security of supply can be expected from this market coupling.

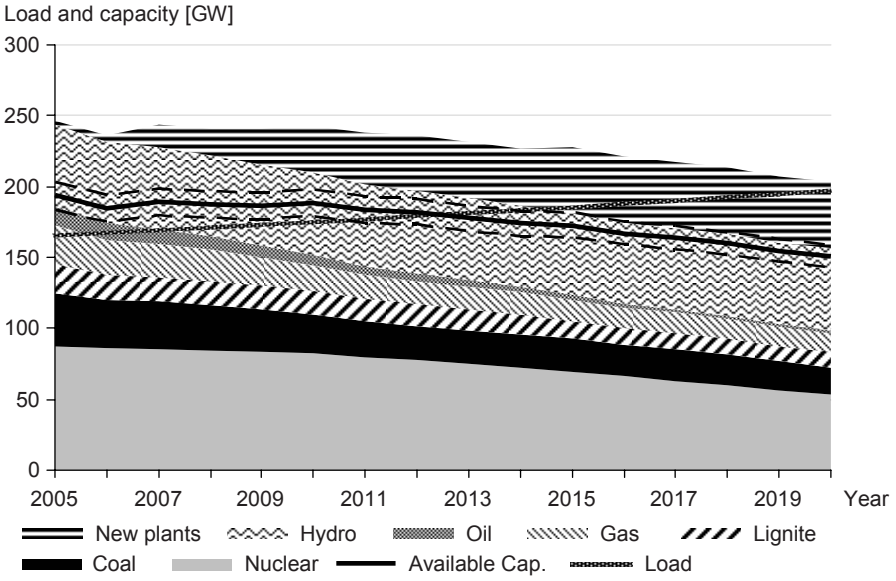

Figure 10.15: Trends in generation capacity and load in the Austrian, French, German and Swiss regional market (Platts, 2007; UCTE, 2007; UCTE, 2008; authors' own calculations)

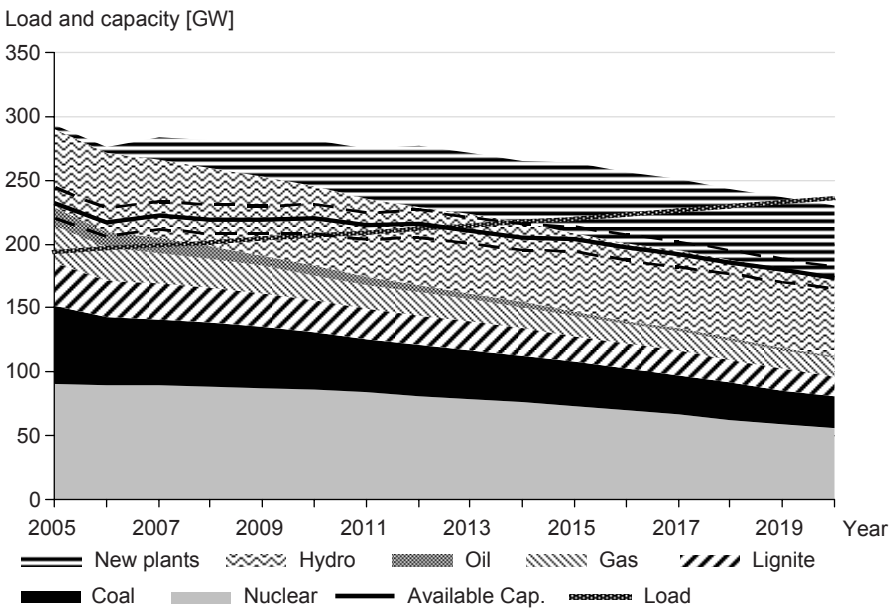

Figure 10.16: Trends in generation capacity and load in an integrated market consisting of AT, CH, DE, FR, CZ and PL (Platts, 2007; UCTE, 2007; UCTE, 2008; authors' own calculations)

10.6.2 Lack of Players

As mentioned earlier, the major obstacle to a common European market is the general lack of competition in national wholesale and retail electricity markets, reinforced by (at least) two other factors: (1) insufficient availability of transmission capacity between the submarkets and (2) increasing horizontal integration with natural gas supply.

This is recognised by the European Commission (2007b), which states: "far too many of the EU's citizens and businesses lack a real choice of supplier. Market fragmentation along national borders, a high degree of vertical integration and high market concentration are at the root of the lack of a truly internal market." Therefore, the third legislative package for the EU electricity and gas markets was presented in September 2007 (European Commission, 2007b).

As nondiscriminatory network access and sufficient incentives for investing in transmission grids cannot be guaranteed with the current unbundling rules, the Commission proposes ownership unbundling of the transmission system. As a second – though not preferred – option the Commission suggests an independent system operator (European Commission, 2007b).

10.6.3 Extending the Markets: a Solution?

In the light of market integration, removing cross-border transmission grid bottlenecks is not a straightforward issue. Besides lacking acceptance (which is also the case in the generation sector), the following questions arise: (1) Who will invest? (2) How can recovery of investments be ensured?

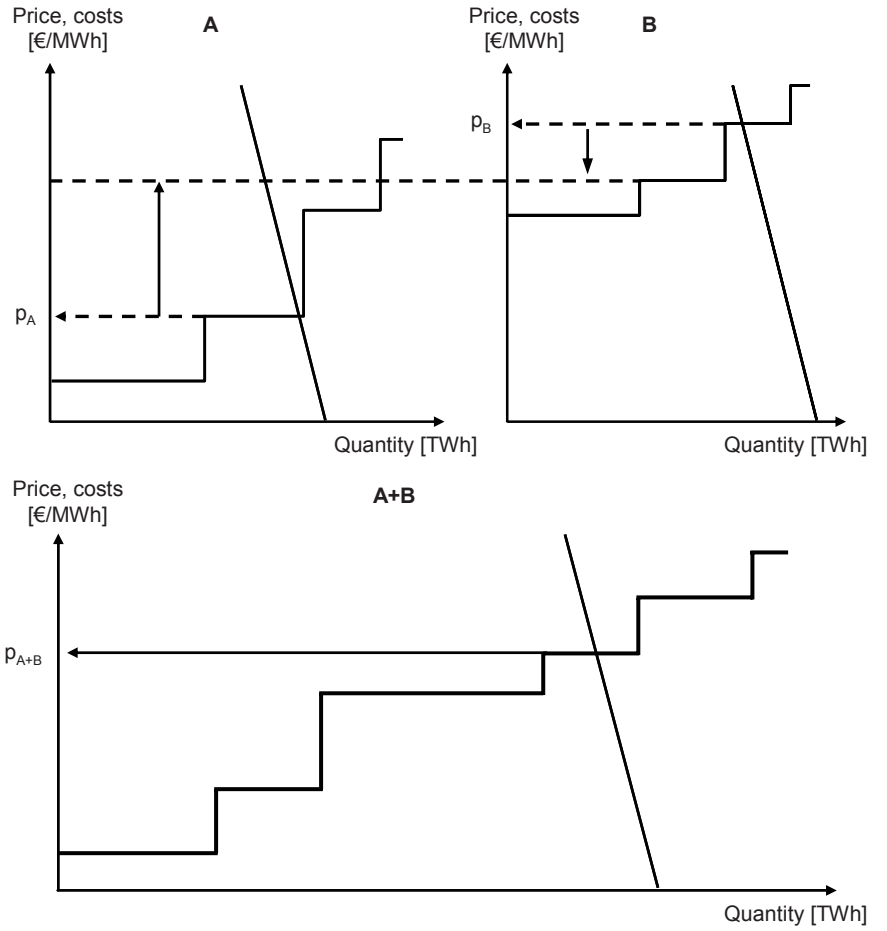

Figure 10.17: Effects of market extension in an electricity market

Currently, we do not see sufficient incentives for TSOs to invest in cross-border capacities within the present regulatory framework, especially with regard to legal unbundling. First, in the presence of a high wholesale price in the local market relative to the neighbouring markets the incumbent generator will be reluctant to increase interconnector capacity. Second, revenues from capacity auctions at congested cross-border lines have to be used for interconnector capacity investments

or, in the absence of these investments, simply to reduce the cost base for determining network tariffs, which constitutes a zero-sum game for the TSO.[5] In the light of unbundling provisions, the authors consider ownership unbundling as a means of resolving the aforementioned shortcomings.

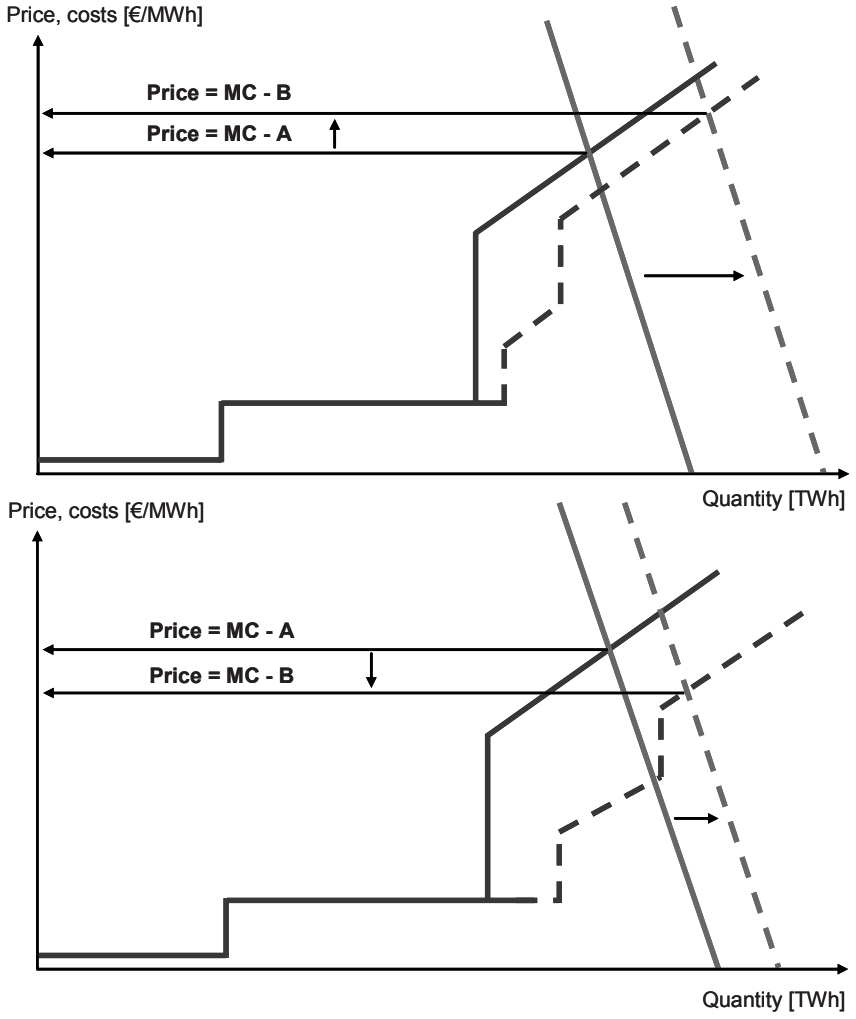

Figure 10.18: Effects of integrating a 'short' country (top) and a 'long' country (bottom) in an existing market

Figure 10.17 shows the theoretical result of market coupling of a low-price market A (with 'cheap' excess capacity, e.g. the Czech Republic) and a high-price

[5] See Regulation (EC) 1228/2003 for details (Regulation 1228/2003, 2003).

market B (with no cheap excess capacity, e.g. the Austrian, French, German and Swiss regional market). As a result, prices increase in market A and this goes along with an increase in producer surplus in market A, whereas prices decrease in market B, increasing consumer surplus in B. Of course, sufficient cross-border capacities must be made available at low costs.

Figure 10.18 depicts the effect of full market integration for two different cases. In the first case, adding a 'short' country B – a typical import country with demand exceeding capacities – results in price increases for the extended market relative to the former single market A. On the other hand, when a 'long' country B – where demand is less than installed capacities – is added prices decrease for the extended market relative to the single market A.

10.7 Conclusions

The European electricity markets are still under construction, but some conclusions are already possible on developments so far.

Liberalisation in Continental Europe started about a decade after the advances made in the UK and Norway. However, it seems that the Continental European countries had not learned much about conditions for competition from experience in the UK and Norway. Instead of divesting generation capacity and increasing the number of competitors (as recommended by Newbery & Pollitt, 1997), most countries pursued mergers (DE, NL), retained oligopolies (NL, ES, AT, CH) or a private monopoly (BE) or supported the concept of national champions (PO, FR).

Currently, the major obstacle to a common market that works reasonably well is a general lack of competition in virtually all local and national wholesale and retail electricity markets. Either the number of competitors is too low or barriers to entry or incentives to collude are too high. This situation is compounded by insufficient transmission capacity between the submarkets and increasing horizontal integration with natural gas supply.

Finally, it is stated that sufficient spare capacities in generation and transmission are currently still available in Europe. The definitive litmus test for liberalisation will come in every submarket in the EU at the point in time when the bulk of excess capacities have disappeared and demand has come close to available capacities. Current developments imply upcoming security of supply problems by 2012 in the Continental European markets investigated, even in the case of an extended multiregional market. The most important problem is how to provide long-term incentives for investment in upgrading and in new generation and transmission capacities, and also in demand-side efficiency and demand responsive measures. This issue is especially relevant in the context of decentralised vs further centralised development of the electricity supply system.

Moreover, to bring about the EU's goal of effective competition in a single integrated European electricity market and to avoid market power, the following structural conditions have to be fulfilled:

- Ownership unbundling of the transmission system from generation and supply as a means of both guaranteeing nondiscriminatory access to the grid and inciting and providing adequate transmission capacity to connect the single submarkets, thus creating a larger market with more potential competing players.
- With respect to the market structure, a rethink of structural remedies such as divestments or capacity payments.

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