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Divestiture as an Instrument of a Pro-active Competition Policy: Conceptual Issues and Lessons from International Experiences

Christian von Hirschhausen, Anne Neumann, and Hannes Weigt

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TECHNISCHE UNIVERSITÄT DRESDEN

Dresden University of Technology

EE²

Chair for Energy Economics and Public Sector Management

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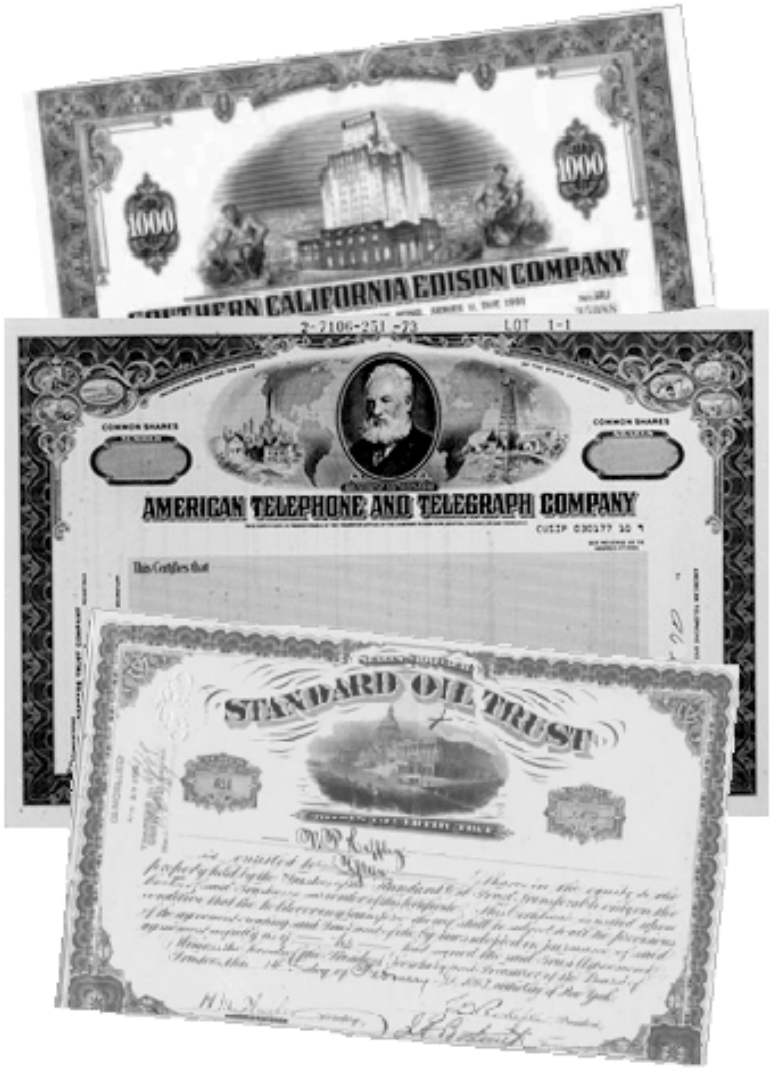


Prof. Dr. Christian von Hirschhausen

Dr. Anne Neumann

Dipl-Wi.-Ing. Hannes Weigt

With assistance from:

Fabian Kirsch and Friedrich Kunz

Executive Summary

- Given insufficiently competitive wholesale electricity markets in Germany there is an ongoing discussion about the appropriate instruments of a pro-active competition policy. This study analyzes horizontal divestiture form an economic perspective. We discuss the conceptual justification of divestiture and report on selected empirical evidence on divestiture.
- Horizontal divestiture of one or few market dominant firms leads to intensified competition; other things being equal, prices will drop. A part of the oligopoly profits (producer rent) is transferred to consumers; overall welfare increases. Divestiture can also be an appropriate instrument in merger cases to avoid dominant market position of the merged firm.
- This study reports effects of divestiture in selected cases; among these effects are reduced prices; intensified competition and increased innovation. In some cases we find that the effects are long-term.
    - In the English electricity sector, divestiture of electricity generators led to intensified competition and falling prices. Similar divestiture can also be observed or is planned in two U.S. States (California and Texas, respectively).
    - In two classic Antitrust cases in the U.S., divestiture led to significantly improved competition, lower prices and accelerated technical progress (cases of AT&T and Standard Oil).
    - In two recent merger case of energy companies in the U.S. divestiture played an important role in maintaining a competitive structures, both horizontally (Exelon-PSEG merger project) and vertically (SoCal Gas and San Diego Gas & Electric).
    - We also quote a variety of divestitures in other countries and in other sectors. It is often difficult to quantify the effects precisely, because the external conditions change rapidly.
- We conclude that divestiture is an instrument of a proactive competition policy that can enhance competition in a sector and lead to lower prices. Both economic theory and the empirical analysis presented in this study imply the positive effects of divestiture on consumers and on social welfare. The cases also indicate the need for detailed market monitoring in real time.

1 Introduction

Market power has been identified as a persistent phenomenon in many industries, network industries and others, leading to a significant deterioration of consumer surplus and, thus, social welfare. Combating market power is therefore a prime task of competition policy and sector-specific regulation. It is generally agreed that in many cases a pro-active competition policy (in the U.S.: Antitrust) is required to bring about more competitive market results. Horizontal divestiture of existing companies is one instrument of such a policy, as is a strict merger control.

Electricity generation markets are one example of an industry with potentially competitive market structures, since it is characterized by increasing marginal costs and there are no indications of natural monopoly characteristics. However, one observes significant issues of market power in electricity generation markets around the world. This is particularly the case where former monopolistic markets are opened up for competition, but in which the initial market structures are still largely monopolistic or oligopolistic. Such is the case in the German electricity market, which has been subject to high market concentration since the formal opening of the market in 1998. Henceforth, a series of instruments of a pro-active competition policy have been discussed in Germany, amongst them the horizontal divestiture of firms.

In the context of this discussion, the Chair of Energy Economics and Public Sector Management at Dresden University of Technology (EE^2) has been asked by the Ministry of Economy of the Federal State of Hesse to provide an expertise on the international experience with divestiture, in particular the longer-term effects on competition. This includes lessons from electricity generation divestiture and merger procedures, but also lessons from other sectors, be they network industries (such as telecommunication) or others (such as the oil industry).

Subsequently, this study analyzes international experience with pro-active competition policy, divestiture and merger policies in the electricity sector and in other industries. After a discussion of the conceptual issues (Section 2), the study focuses on case studies of horizontal divestitures and pro-active use of merger policies (Sections 3 to 5). Each case study describes the point of inception, the measures taken to combat market power, and the short-term and long-term results of the competition policy. Section 3 summarizes two classical cases where horizontal divestiture of electricity generation capacities was supposed to lead to more competitive market structures (UK and California). We also look at a very recent case of proposed divestiture (TXU), and provide an overview about virtual divestitures (so called Virtual Power Plants). Section 4 addresses classical cases of divestitures in US Antitrust law from the telecommunication (AT&T) and the oil (Standard Oil) sectors. Section 5 presents cases of divestiture in the framework of merger procedures in electricity cases. Section 6 concludes.

2 Conceptual Issues

2.1 Horizontal divestiture

The objective of competition policy is to increase the competitiveness of markets through price and/or structural instruments or – in the case of natural monopoly network industries – through sector-specific regulation. One important instrument of competition policy is divestiture, i.e. the splitting-up of certain parts of an enterprise or a holding company, with the objective to increase the degree of competition on this specific market. Divestiture is generally considered a "hard" instrument of competition policy, because it directly impacts the management and ownership structure of the firms. "Softer" instruments include the facilitating of market entry, or asymmetric regulation (e.g. of network access).

In general, one can distinguish two types of divestiture:

- Vertical divestiture implies the separation between formerly integrated units of a firm along the vertical value-added chain of an industry. An example is the separation between electricity generation and electricity transmission. Such a vertical unbundling is generally useful to separate the natural monopoly segment of the sector (here: transmission) from the potentially competitive segment (here: electricity generation). A vertically integrated firm has substantial incentives to prevent network access for potential competitors to the market, which will diminish the intensity of competition;
- horizontal divestiture implies the separation of production capacities of dominant firms at the horizontal level, i.e. the same level of the value-added chain. Horizontal divestiture of dominant firms is thus supposed to lead to a larger number of competing producers and therefore to enhance the intensity of competition within a market. The "marginal" effect of divesting assets of market dominant firms is larger for an initial high concentration; the effect diminishes the more independent firms operate in the market. Increasing competition leads to lower prices, from which a larger number of consumers can benefit. Thus, consumer rent increases significantly, which more than offsets the reduction of producer rent: social welfare increases.[1]

A similar effect is obtained by a policy prohibiting mergers that would result in a market dominant position, or identifying structural remedies to mitigate this effect of market dominance ("merger remedies"). Remedies include the divestiture of plants or specific capacities, the transfer of rents from producers to consumers, or the introduction of price caps. Thus, a pro-active approach to merger

[1] Although vertical and horizontal divestitures are generally treated separately in the literature, there is potential interrelation between the two: thus, horizontal unbundling can remain ineffective if one of the firms remains vertically integrated. Likewise, a low horizontal market concentration may lead to wrong conclusions regarding competition policy if the vertical links are neglected. Vertical separation may therefore be a necessary condition for horizontal unbundling to be effective. Whilst taking into account these interdependencies, this study will focus on horizontal divestitures.

control, in combination with structural measures and other instruments, can prevent the emergence of market power and of higher prices.[2]

2.2 Effects of divestiture on efficiency, prices and social welfare

Divestitures generally have an impact on the efficiency of firms and of markets, and, thus, on social welfare. A consensus has emerged in theory and policy that social welfare is the main criterion to assess potential effects of competition policy instruments, such as divestiture. Social welfare is defined as the sum of consumer rent (willingness-to-pay minus prices paid) and producer rent (revenues minus variable costs). This so-called "more economic approach" to competition policy acknowledges the need for a quantitative assessment of different development paths, and provides an objective measure. In this subsection, we discuss the effects of divestiture on the different efficiency criteria: allocative, productive, and dynamic efficiency.

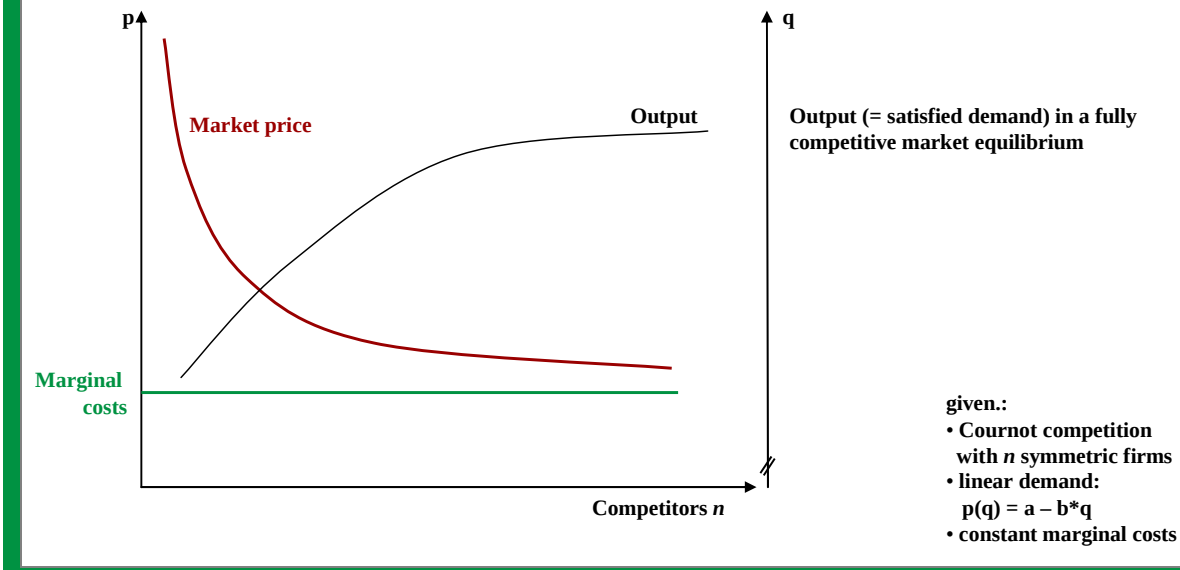
2.2.1 Allocative efficiency

Allocative efficiency characterizes a situation where the allocation of factors of production and the allocation of goods to consumers is structured such that the prices approach marginal costs, and social welfare is maximized (for details see Mas-Colell et al., 1995). Ceteris paribus, a larger number of independent firms on a market foster competition, which drives down prices for the consumers, and increases the amount of goods produced and consumed.

Horizontal divestiture leads to an increase in the number of competitors and thus, ceteris paribus, to lower prices for consumers and higher social welfare for society. Figure 1 shows the relation between the number of players and the market price in a "normal" Cournot-competition. As the number of competitors (n) is increased, the total output supplied by all producers increases as well and this drives down the market price.

[2] Competition authorities can clear a proposed merger subject to remedies. Structural remedies redefine allocation of property rights (i.e. divestiture) whilst bearing a substantial risk given the irreversibility of the decision. Behavioral remedies constrain the merged firm's property rights and require monitoring by authorities following the merger.

Figure 1: The impact of competition on prices in an oligopolistic market



Source: own illustration

2.2.2 Productive efficiency

The effect of divestiture on productive efficiency is complex: on the one hand, the increased level of competition reduces the inefficiency inherent in the management of the former monopolistic firm (so-called X-inefficiencies, Leibenstein, 1966). These managerial inefficiencies result from the "quiet life" (Hicks) of a monopolist and the low incentives for cost efficiency. On the other hand, divestitures may reduce economies of scale if the resulting firm size is such that the costs of production are higher than in the previous situation. In some cases, a high market concentration or the wish to merge horizontally are motivated by economies of scale.[3]

If significant economies of scale prevail, prohibiting mergers can prevent companies from realizing lower average costs; likewise, splitting up firms horizontally may destroy scale economies. In this situation, the advantages of a pro-active competition policy need to be weighted against the potentially adverse effects of foregone scale economies.[4] However, the competitive forces unleashed by the first divestitures will outweigh the scale economies. Also, as indicated above, the scale economies of increased firm size may be eaten up by inefficiencies resulting from the comfortable market power situation.

Figure 2 shows the trade off between consumer surplus resulting from horizontal divestiture, the "Harberger-Williamson conflict". Assume that in the point of inception, there is one firm holding a monopoly and realizing the maximum scale economies. It has low marginal costs (MC_M) but only

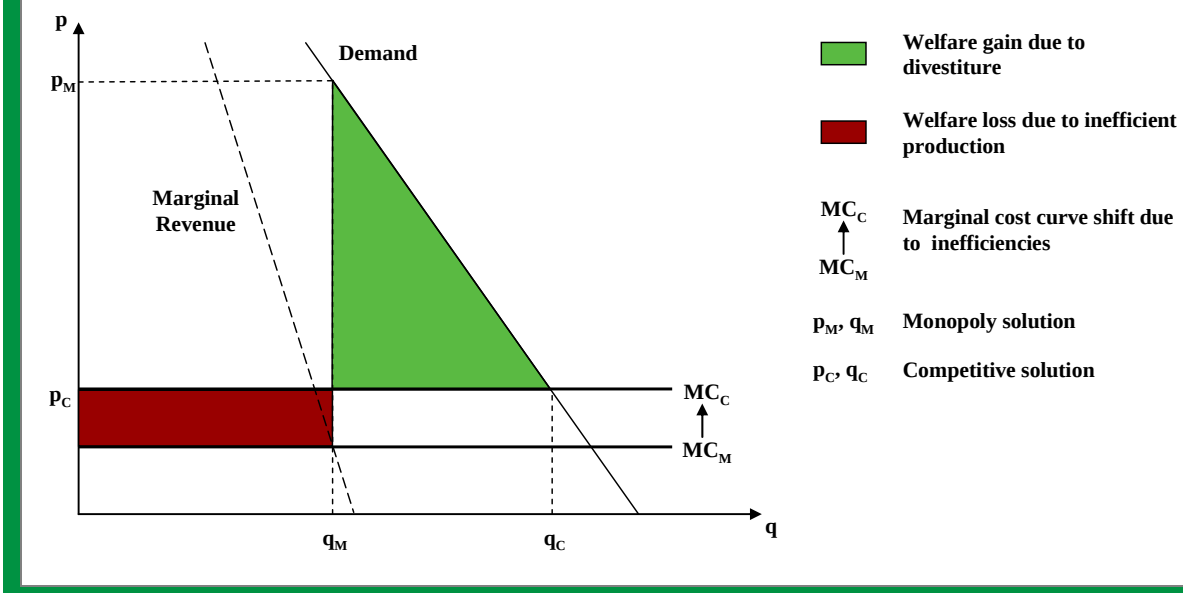
[3] Economies of scale means that average costs of production can be reduced when the firm produces a larger output; diseconomies of scale means just the opposite.

[4] This is known in the literature as the Harberger-Williamson conflict, see Viscusi, et al., 2005, Ch. 7:

supplies the monopolistic, low quantity, raising prices to p_M. This market outcome has to be compared to a fully competitive market in which the market price equals marginal cost.

A divestiture leads to an increase in the number of firm, which drives up the produced quantity and reduces prices. However, the marginal production costs (MC_C) may also be affected: i) marginal costs can remain the same e.g. due to high technical restrictions which are not effected by the size of a firm; ii) marginal costs can decrease e.g. due to the higher pressure of competition; iii) marginal cost can increase e.g. due to lost incentives to increase efficiency or effort levels as the producer surplus decreases with competition. In the first two cases the impact of welfare is clear as the loss due to prices above marginal costs will vanish, demand will increase, producer rents will be transferred to consumers, and an additional welfare increase occurs. In the last case (Figure 2) the situation may be more complex as an increase in production costs can offset possible welfare gains. In this case, consumer rent is increased but producer rent is decreased. However, even in this case the welfare effects of the first divestiture are positive: gain in consumer rent more than offsets the loss of producer rent. This is in particular the case for low demand elasticities (steep demand function).

Figure 2: Impacts on consumer on producer surplus due to divestiture



Source: own presentation, following Viscusi, et al., 2005, Ch. 7

2.2.3 Dynamic efficiency

The dynamic efficiency of a sector, i.e. its ability to innovate and invest, is also increased by divestiture. Increased competition forces companies to more innovation, to modernize products and production structures, and to develop other strategies to survive in the more competitive market place. Hence, divestiture has a tendency to increase dynamic efficiency. Also, more intensive competition

favors the most economic investment decisions. The decline in investment of the incumbent may be more than offset by investment by new market entrants trying to increase their market share.[5]

We conclude that if markets are highly concentrated, divestiture tends to increase economic efficiency, to lead to higher market competition and lower prices, and to foster social welfare.

2.3 Divestitures are part of a proactive competition policy

Divestitures are an important instrument of a proactive competition policy. Persistently uncompetitive markets require a proactive competition policy if one wants to reap the multiple advantages of competition. In particular, divestiture as a "hard" instrument requires fundamental political support by the competition authority since it is a complex and time-consuming process, with the benefits only reaped years after the event. Divestitures can also play an important role in merger procedures, in particular in Europe, where they are generally only applied in such cases and are not a viable option for general competition policy. A positive effect on competition through divestiture is generally obtained by a policy that prohibits mergers resulting in a market dominant position, or that identifies structural remedies to mitigate this effect of market dominance ("merger remedies"). Remedies include the divestiture of plants or specific capacities that transfer rents form the producers to the consumers, or the imposition of price caps. Thus, a pro-active approach to merger control, in combination with structural measures and other instruments, can prevent the emergence of market power and of higher prices.[6]

Divestitures are treated differently in different jurisdictions: in the U.S., divestiture has been identified as an important instrument of antitrust and competition policy more than 100 years ago. Enacting the Sherman Act (1890) and its two companion Acts, the Clayton Act and the Federal Trade Commission Act (both 1914) made it possible to divest companies that monopolized, attempted to monopolize, or affected trade adversely otherwise. In the U.S., divestiture therefore has a long tradition, and competition authorities can base their action on a significant body of experience and analytical work.[7]

In Europe, divestiture has for a long time been limited to merger processes in the context of Art. 81, 82, EU Treaty. However, a consensus on the importance of divestiture in competition policy seems to be emerging in the context of the „more economic approach" gaining ground in Europe, too.[8] The pro-active approach to creating more competitive markets has been identified as a necessary instrument in Europe, too. This makes economic sense: there is no reason to limit a welfare-enhancing policy instrument to a very limited number of merger cases that occur stochastically.

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[5] It is sometimes argued that divestiture may lower the investment incentives of incumbent firms (e.g. Monopolkommission, 2007). However, it is likely that the (regulated) monopolist had over-invested in previous periods, so that some investment reduction may have positive effects.

[6] The empirical evidence on the success of divestitures in the context of merger proposals generally highlights the positive medium-term effects. Thus, the recent survey of divestitures as merger remedies in the EU shows that 94% of assets divested to competitors or new entrants were still in business three to five years after the divestiture (EC, 2005). In the U.S., the rate was at about 75% (Lêveque, 2007). In Europe, 81% of the remedies are considered effective. On the empirical analysis, see also Papandopoulos and Tajana (2006).

[7] See FTC (1999a) for a survey of experiences with divestiture.

Note that horizontal divestiture generally is a "one-shot" policy measure. Once applied successfully, there is no need to apply the instrument further on. By contrast, regulation refers to a long-time, permanent activity that is justified, e.g. by the presence of natural monopolies, or the need to monitor market dominant enterprises.

3 Divestitures in the Electricity Sector

3.1 United Kingdom: from 3 to 5 to Competitiveness

The horizontal divestiture of electricity generation capacities in the UK in the mid-1990s is a case of a successful pro-active competition policy with tangible short-term and long-term effects. With a certain time lag, the more competitive structure of the wholesale market led to decreasing prices. This structural measure laid the foundation for a competitive wholesale market for years to come.[9]

3.1.1 Point of inception

Starting with the liberalization process in 1989 the state owned monopolized electricity sector was privatized. The Central Electricity Generation Board (CEGB) owned generation and transmission whereas distribution and supply was divided in twelve „Area Boards". In the course of liberalization, the CEGB was split up into three generation companies[10] and one transmission company. The Area Boards were transformed and privatized into independent Regional Electricity Companies (RECs). Competition on the wholesale market was planned to be fostered by a mandatory pool where the price was defined via supply schedules and forecasted demand.

The first years of the liberalized market were marked by slightly increasing prices and the construction of new natural gas power plants, the so called „Dash for Gas" which lead to an increased number of new entrants. In 1993 the Office of Electricity Regulation (OFFER) decided that the recent price movements marked a decoupling of prices and costs and decided to divest the two leading electricity generation companies. Furthermore, the state-owned nuclear plants where partly privatized. Starting in 1995 (with the end of a take over protection for the RECs) a number of mergers and acquisitions took place, amongst them mergers between generating companies and supply companies; thus the vertical separation between generation and supply was no longer consequently pursued.[11] Until 2002 the market structure has been transformed leaving five integrated suppliers. In the course of the merger process, National Power and PowerGen had to undertake a further divestiture of generation capacity in order to take over regional suppliers. In 2001 the mandatory pool has been replaced by the „New

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[8] Under the economic approach, one first attempts to determine the existence of collusion and the magnitude of its effects and then considers which if any remedies is appropriate. Under the legal approach taken by antitrust, the first step is the determination of whether there exists an agreement and, if there is, certain legal sanctions apply (Kaplow and Shapiro, 2007).

[9] This case study is mainly based on Newbery (1995, 2000, 2004, 2007), Evans and Green (2005), Newbery and Pollitt (1997), see references.

[10] Two of the generation companies (National Power and PowerGen) have been privatized whereas the operator of nuclear plants (Nuclear Electric) remained under state ownership.

[11] Since 2000 a full unbundling of the RECs network operation has been enforced.

Electricity Trading Arrangements“ (NETA) which has been extended to the Scottish market in 2005 (BETTA).

3.1.2 Divestiture and other measures taken

In the course of the British liberalization process a number of different competition policy measures have been implemented. Beginning with privatization and divestiture of the former state owned electricity companies the liberalization process was started in the early 1990s. The fossil plant fleet has been split in two companies: 30 GW were transferred to National Power and 20 GW to PowerGen. Nuclear plants remained in state ownership. Due to the state ownership of the British electricity market this process did not require interference of private ownerships structures. The same is true for the distribution companies.

Regularly, the high market concentration was considered a critical issue for the development of competitive price levels. One active measure to combat high concentration levels was to support market entry by new generators. In particular, the regulator favored the market entry of Independent Power Producer (IPPs) by allowing the RECs to contract long-term with IPPs. Thus, 5 GW capacity of new combined cycle gas turbines were planned within few months, adding to the 5 GW that the two incumbents already planned.

In the following analysis, we will focus on the divestiture of electricity generation by the dominant incumbent firms: in 1993, the regulator (OFFER) suspected the dominant companies to manipulate prices, as price-cost margins seemed to reflect a decoupling of electricity and fuel prices. OFFER threatened to announce National Power and PowerGen to the Monopolies and Merger Commission (MMC). To avoid this step both agreed to divest 15% of their capacity and permitted a two year price regulation. In 1995, 6 GW of coal capacity was sold to the Eastern Group, one of the RECs. With the privatization of the modern nuclear plants as separated companies, an oligopolistic market with four larger and several smaller companies emerged.

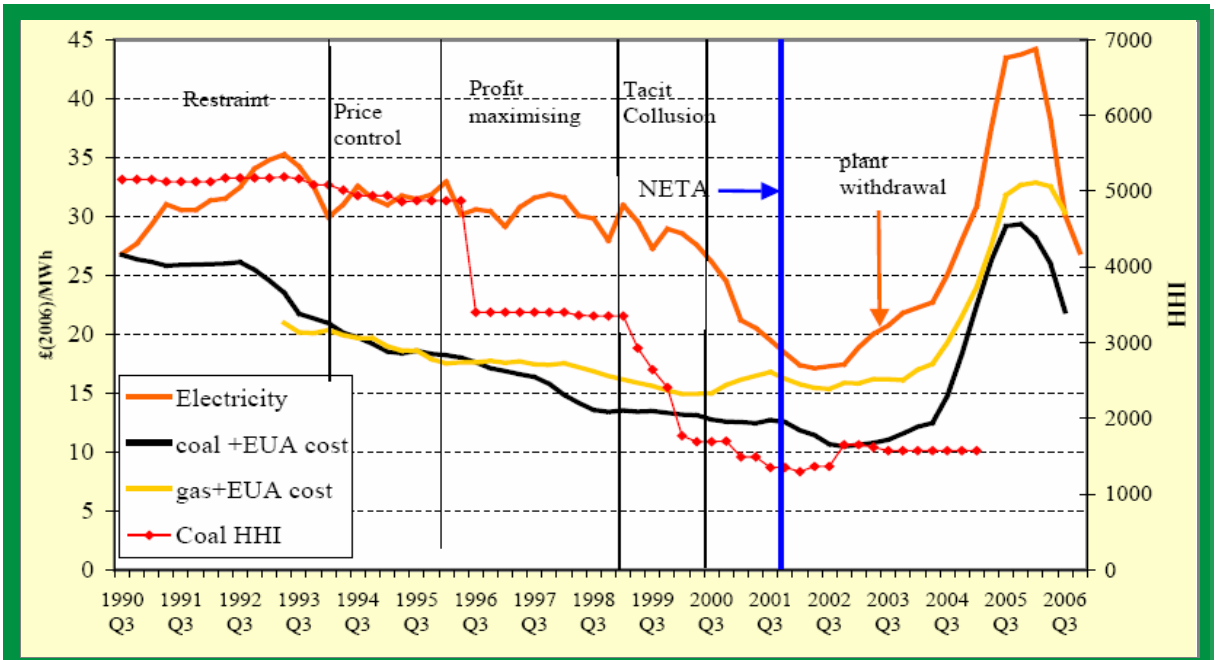
However, the effects of this first divestiture were limited. Prices remained approximately stable, despite a significant drop of coal prices, and a modest reduction of natural gas prices. Clearly the new market structure, de facto a dominant oligopoly, was able to keep prices high, despite the newly emerging competition by the Eastern Group. Also, one has to acknowledge that the plants that had been divested were mainly base-load plants, such that the mid-load plants and the peakers remained even less competitive.

The competition-enhancing effect of the second divestiture period was more significant, since it succeeded in passing a critical threshold. Both dominant firms had to divest another 4 GW of capacity, respectively, in exchange for the take over of a REC.[12] Thus, they followed a similar movement that started in 1995, and in the course of which eight of the twelve RECs were subject to takeover bids. For the two incumbents, the divestiture can thus be seen as trading horizontal against vertical integration.

[12] The divestiture has been further supported by the Labour government with a coal moratorium.

The effects of this second wave of divestiture were significant, as evidenced by Figure 3 (see Newbery, 2007) after a brief period of a tacit collusion (1999), electricity prices fell significantly, albeit constant or even slightly rising energy prices. By late 2001, market concentration had declined significantly, the HHI-Index for coal plants being almost 1000; parallel to this development electricity wholesale prices hit an all-time low (~15£/MWh). Since then prices increased again which is mainly due to increased fuel prices. Even with slightly increasing concentration the market has remained competitive.

Figure 3: Price development and market concentration in the British electricity market



Source: Newbery, 2007

3.1.3 Assessment

Both the privatization and the regulation of the British electricity market are generally considered a success. Newbery and Pollitt (1997), Pollitt and Domah (2001) and Littlechild (2006) provide empirical evidence on the positive effects of restructuring on efficiency and welfare. One of the central competition policy measures was to transform the monopolistic market structures inherited from the CEGB into competitive structures. Active pursuit of divestiture was key in the effort. The reduction of the incumbents market shares as well as the fostering of new market entrants lead to a competitive market structure. In 2004, no market participant owned more than 17% of capacity (Table 1).[13] Privatization and divestiture were accompanied by other restructuring measures that made the UK market the most competitive in Europe. Generation and network activities were unbundled early on and a strong regulator was installed that was able to develop a competitive market design slowly but surely. Zachmann (2006) has shown that even with re-increasing market concentration, the UK

[13] Since 2004 the shares have slightly increased again. Most of the market participants are integrated companies owning generation and supply. From the initial 14 suppliers at the beginning of liberalization (in England and Scotland) now only five regional suppliers remain.

wholesale market is much more competitive than, for example, the German one. Divestiture and pro-active competition policy and regulation have succeeded and provided significant consumer rent and welfare.

Table 1: Structure of the British electricity market (1990 and 2004)

1990		2004	
Company	**Capacity [GW] (market share)**	**Company**	**Capacity [GW] (market share)**
National Power	30 (45%)	British Energy	11,6 (17%)
PowerGen	20 (30%)	*PowerGen (E.ON)	8,3 (12%)
Nuclear Electric	8 (12%)	*Innogy (RWE)	8 (12%)
Scottish power	4,5 (7%)	*Scottish&Southern	5,3 (8%)
Scottish Hydro	3,8 (6%)	*Scottish Power	4,7 (7%)
		*EDF	4,7 (7%)
		BNFL	2,7 (4%)
		*Centrica	2,2 (3%)
		Other	9,2 (13%)
		Plants owned by bank companies	7,9 (11%)
		Plants for sale	6,3 (9%)
Sum:	66,3	Sum:	68,9

Source: Thomas, 2004; * companies owning generation and supply

3.2 California divestiture: a special case of divestiture

The divestiture of electricity generation in California in the late 1990s was part of a large scale restructuring program aimed at installing a competitive wholesale electricity market, unbundled from a competitive electricity generation sector. The assessment of this experience has to be nuanced: the approach to divestiture itself followed the standard recipe of a pro-active competition policy and was well-founded. However, divestiture was followed by other measures that were incoherent and lead to the collapse of the entire market design. Therefore, the objective of divestiture was not attained, and it is difficult to single out the effects of divestiture from the rest of policy measures taken.

3.2.1 Point of inception

Divestiture of electricity generation in California occurred in the midst of a large restructuring program, which was among the first in the entire U.S.. Before restructuring the market was characterized by three vertically integrated companies securing generation and supply: Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E). Electricity prices were amongst the highest in the country, and there was a general consensus upon the need for market-oriented restructuring. The reform package was approved in 1996 and implementation started in 1998. Network operations were transferred to a state owned, non-profit independent system operator (California Independent System Operator, CAISO) guaranteeing non-discriminating access to the network. Furthermore, the CAISO was reliably for the management of the reserve markets. The three incumbent suppliers had to divest large parts of their power plant assets to reduce market concentration. The California Power Exchange (CalPX) was introduced as the central wholesale

market for electricity. Incumbents were obliged to cover their supply completely via the CalPX to guarantee a high liquidity on the spot market. However, they were forbidden to sign long term contracts to hedge their demand. Consumers were free to choose their suppliers although a price cap regulation was introduced until 2002.

3.2.2 Divestiture and other measures

Several measures were taken with the specific objective to develop a competitive wholesale market. The vertical separation between electricity generation and transmission assured conditions for a non-discriminatory access to the network, which is a necessary ingredient for competition. As an independent system operator CAISO was able to establish itself as a nonpartisan player in the market. Further upstream, the reforms sought to reduce the oligopolistic market situation: the three incumbents had to divest 50% of their fossil power plants to competing companies. Thus 18 GW of capacity – amounting to about 30% of the whole market – were sold to five independent suppliers.[14] By the summer of 1999 all incumbents sold more than the requested 50% and the five new suppliers – AES, Duke, Dynergy, Reliant, Southern (later Mirant) – held nearly equal shares of the divested capacities (Table 2).

The divestiture of electricity generation in California was the most drastic that has been carried out in recent times, and it achieved the objective of a more competitive market structure. The HHI-Index fell from about 2700 in 1995 to only 960 in 1999. This can be considered as almost optimal in competition policy terms. The two dominant firms (PG&E, SCE) found themselves with reduced market shares of only 21% and 17%, respectively; SDG&E even disappeared as an independent generator due to another competition-policy measure (described in the ENOVA-case in Section 5.2). Market entry of companies from other U.S. states was favored, as well as greenfield investments. Overall, the divestiture was rapid, consequent and efficient. In addition to concentration reduction the CalPX has been classified as central pool thus increasing price transparency, forming a benchmark for over the counter transactions, and facilitating market entrance. To further increase liquidity on the exchange the three incumbents were obliged to trade only via the spot market. As they supplied the majority of California's consumers it was guaranteed that the CalPX represented a realistic demand level. The newly formed California electricity market thus was neither dominated by any oligopoly nor hindered by intransparent trading transactions.

However, the potentially positive effects of the divestiture on market prices and consumer benefits could not emerge. Due to a severe inconsistency in the reform package, the market became unbalanced after price spikes in the summer of 2000, leading to a collapse of the entire system. In fact, final consumer prices were capped for the regulated suppliers who were thus unable to recover the high prices paid at the wholesale market. In addition, alleged market manipulation between the balancing market and the wholesale market aggravated the situation. PG&E and SCE lost support from the

[14] SCE sold most of its capacity in one and a half month after market opening. PG&E sold part of their plants in July 1998 and the remaining ones in April 1999. SDG&E sold their plants in spring 1999.

financial markets and had to go into bankruptcy. Trading at the CalPX collapsed, and the system operator had to impose rolling black-outs to avoid the collapse of the entire electricity system. The California government interfered, reinstalled long-term contracts through a public trading agency (Department of Water Resources) and brought restructuring to a standstill.

3.2.3 Assessment

The interpretation of the Californian experience has to be nuanced: on the one hand, there was a consequent and consistent approach towards divestiture with the aim of marking an oligopolistic market competitive. The divestiture of electricity generation capacities by the dominant firm followed clear rules, a reasonable objective, and can be considered a success. On the other hand, however, the potentially positive effects of this competition policy could not translate into lower prices and consumer benefits due to the inconsistencies of the overall market design and bad management of the crisis by the government.

Thus, the divestiture of electricity generation in California should be considered as a feasible approach of a competition-oriented policy. But the Californian experience also shows that a single focus on policy measurements on the wholesale market is insufficient to generate a competitive electricity market.

Table 2: Structure of the Californian electricity market (1995 and 1999)

1995		1999	
Company	**Capacity [GW] (market share)**	**Company**	**Capacity [GW] (market share)**
PG&E	20,2 (37%)	PG&E	11,6 (21%)
SCE	20,1 (36%)	SCE	9,5 (17%)
SDG&E	3,1 (5%)	SDG&E	0,7 (1%)
Other	13,3 (23%)	AES	4,7 (8%)
		Duke	2,9 (5%)
		Dynergy	2,9 (5%)
		Reliant	4,0 (7%)
		Mirant	3,2 (6%)
		Other	16,2 (29%)
Sum:	56,7	Sum:	55,7

Source: Blumstein, Friedman and Green (2002), Marnay et al. (1998)

3.3 Texas TXU: divestiture plans to reduce market power

The case of Texas largest utility TXU Corp. is ongoing, but it fits well into the series of policy actions to curb market power and establish more competitive wholesale electricity markets through divestiture. Market power abuse has been proven by the market monitor. As a consequence, the Texas Public Utilities Commission has recommended fining TXU, and the legislature is considering horizontal divestiture to mitigate the situation.

3.3.1 Point of inception

The electricity market of Texas forms a separate electric interconnection of the U.S. located entirely in Texas with a single balancing authority (Electric Reliability Council of Texas, ERCOT). The market covers about 20 million people in a geographic area of about 518,000 square kilometers. It is a summer-peaking region responsible for about 85% of the electric load in Texas. Within this market TXU Corp. is the largest energy provider, in terms of number of customers and size of total electric load. TXU is vertically integrated owning about 17.6 GW generation capacities as well as transmission and distribution grids serving 2.1 million electricity customers.

The quarter hourly balancing market run by ERCOT balances actual generation and demand in real-time. Market participants in Texas submit their generation and load schedules to ERCOT, which purchases additional generation at the market clearing price on the balancing energy market in case of excess demand and sells back energy to the suppliers at market clearing price, if generation exceeds real-time demand. Suppliers furthermore are allowed to submit offers to increase or decrease production relative to their energy schedules prior to the balancing energy market auction. ERCOT clears the auction by determining the lowest-priced supply offers to meet the balancing energy demand and manage interzonal congestion. The market clearing price is equal to the most expensive accepted offer, if congestion is absent. All purchases and sales settle at the market clearing price.

This liberalized market structure resulted in generally competitive outcomes, based on the annual State of the Market Reports (SOM Reports). However, the evaluation in the 2005 SOM report identified a potential market power issue: TXU was a pivotal supplier[15] in approximately 554 of 657 considered price spike intervals[16] during June and September 2005. Furthermore, TXU offered significant quantities at prices well in excess of its short-run marginal cost and had withheld capacity from the market. TXU could have produced 513 GWh more than it actually did during the period of observation. In March 2007, the Texas Public Utility Commission (PUC) recommended to fine TXU and suggested that structural measures are necessary to curb the market power of TXU.

3.3.2 Assessment of market power potential

The assessment of TXU's market power potential is based on a study by Potomac Economics Ltd. (2007), analyzing the deregulated wholesale electricity market during the summer of 2005. The first step of the market power analysis was to define the term 'market power', the relevant market including the definition of the relevant product, and the relevant geographic scope. In a second part it was investigated whether the market outcomes represent competitive market behavior and whether the market participants abused market power.

[15] The pivotal supplier is likely to have market power because the demand can not be satisfied without the resources owned or controlled by this supplier. However, this is no proof for market power abuse.

[16] Price spike intervals are defined as intervals where the Market Clearing Price of Energy in one or more zones exceeded 20 times the natural gas price index (Potomac, 2007).

The investigation defines market power as the "ability for market participants to profitably raise high process significant above competitive levels". The definition describes two necessary conditions to possess market power:

- Market participant must have the ability to raise prices for a significant period of time.
- Market participant must have the incentive to raise prices.

The relevant product should include all reasonable substitutes and products that would discipline the market participant attempting to withhold capacity. As the scope of the investigation was focused on the balancing market it was furthermore necessary to identify generation capacities that were able produce balancing energy. Three categories were considered:

(1) Available capacity offered in the balancing market
(2) Other on-line and off-line capacities qualified to provide balancing energy
(3) All other off-line capacities.

The main concern was to define which capacities were parts of category 2, as these were not actively part of the balancing market and thus had a significant impact on the obtained results. Therefore, the technical requirements to participate in the balancing market - namely the fast start up capability - have been considered as main criteria. An additional aspect of the relevant product market was the possibility of demand substitution or potential demand responses. As the only possible response of demand in the 15 minute timeframe was to curtail its consumption, it was unlikely that large amounts of demand were actively curtailed to participate in the balancing market.

The relevant geographic market was defined as the area in which market participants competed to sell the relevant product. In electricity markets the geographic market is generally bounded by transmission network constraints. In ERCOT five congestion management zones were determined. In the case of congestion the competition in the relevant market was limited, caused by supply restriction imposed by the market operator. Hence, the relevant geographic market was reduced and included only those zones with unrestricted supply. In ERCOT the South to Houston, South to North, and North to Houston constraints were frequently binding during the investigated period (Figure 4).

After the definition of the underlying market characteristics it was assessed whether TXU had the ability to abuse market power during this period. To evaluate the competitiveness of the market a pivotal analysis was used. A supplier is considered pivotal if his capacities are necessary to fulfill the demand requirements. Hence, the frequency of periods where a supplier is pivotal is important to identify a potential market abuse.[17] In general, if a supplier is frequently pivotal the ability to raise prices increases, thus the first necessary conditions to have market power is fulfilled. In the investigation period TXU was pivotal in 84% of the price spike intervals. This indicates that TXU had the ability to raise prices significantly, but it does not indicate conclusively that TXU had market power.

[17] As the pivotal analysis takes the specific nature and the time dependence of electricity markets into account it is a more suitable tool to analyze market power issues than classical concentration indices as the HHI.

The second important aspect of market power is the incentive to raise prices. To estimate the possible profit obtained via market power abuse TXU's bidding strategy has been analyzed in detail. As ERCOT runs a uniform-pricing auction to match supply and demand for balancing electricity, offering capacities at marginal costs is the profit-maximizing strategy for suppliers if the market is completely competitive. If capacities are offered at prices above marginal costs the risk increases that the bid is not accepted in the auction. Hence, if a supplier continuously offers above his marginal costs this can be seen as indicator for insufficient competition in a market.

Therefore, a comparative analysis of TXU's offer prices was conducted. The marginal costs of TXU's generation units were assumed to be equal to the generic costs in the ERCOT protocols. The results of the analysis are that TXU offered only 57% of its dispatchable capacities at prices within a $50 markup of its estimated short-run marginal costs during the study period. 42% were offered at prices of more than $50 above the estimated short-run marginal costs. Furthermore, the price increase of the average market clearing prices ranged from 8% in June and September 2005 to more than 20% in July and August 2005 (Figure 5). The analysis concluded that TXU's offer prices of its on-line capacities were not competitive.

To estimate the impact of TXU's bidding strategy on the balancing market a simulation was carried out based on ERCOT's scheduling, pricing and dispatch model, the estimated marginal costs of TXU, and the actual inputs used to clear the balancing energy market. The net costs increases on the balancing energy market were approximately $70 million. This only measures the direct impacts on the balancing energy market. Additional indirect impacts on the costs of bilateral contracts were not considered.

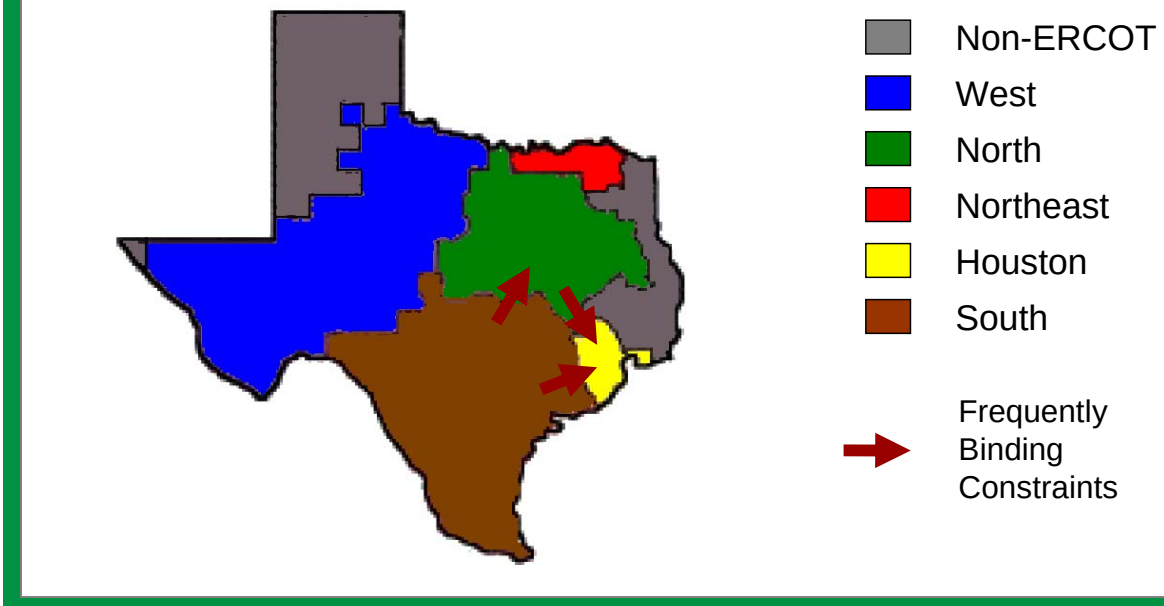
To further substantiate the incentive of TXU to raise market prices the additional obtained profit was calculated. As benchmark the results of the simulation were used to calculate the theoretical profit under competitive conditions. Thus, TXU's net profit in the balancing market decreased from approximately $70 million actual to $50 million in the competitive simulation. Accounting for the net balancing energy obligations, congestion-related charges and credits produced the actual net balancing market position of approximately $51.6 million was well above the $31 million in the competitive simulation. Based on these results the net balancing market position of TXU rose by $19.6 million and resulted in reduced energy production of approximately 513 GWh making the bidding strategy profitably proofing the incentive to raise prices.

Thus the main results of the analysis are:

(1) TXU had the ability to raise market clearing prices, because of the frequency TXU was a pivotal supplier.
(2) TXU had the incentive to raise prices, caused by the net seller situation and the increased revenue when using a strategic bidding strategy.
(3) TXU's bidding strategy constituted economic withholding of production, resulting in producing 513 GWh less.

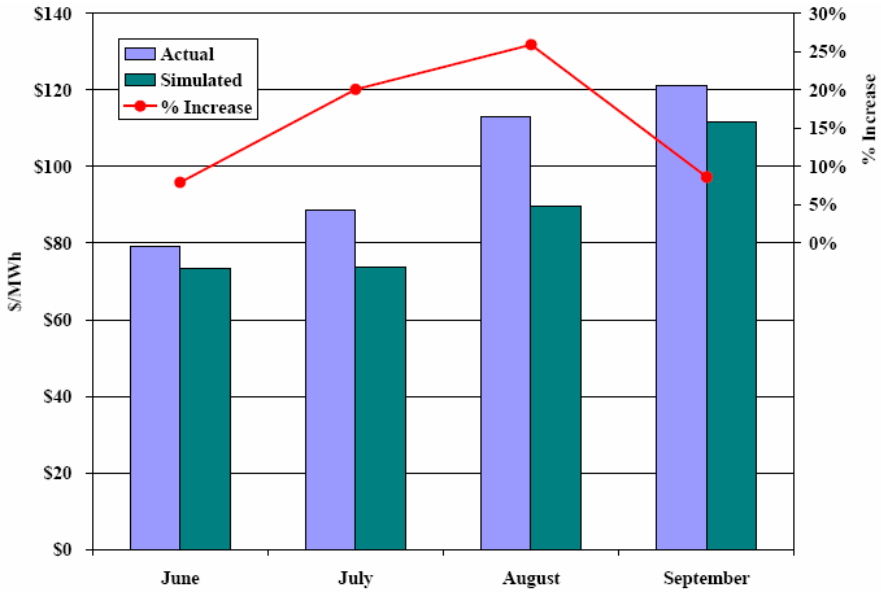
(4) TXU market power abuse resulted in non-competitive offers and higher market clearing prices on average.

Figure 4: ERCOT congestion management zones



Source: Suez (2005)

Figure 5: Average actual vs. simulated market clearing prices in Texas (ERCOT), 2005



Source: Potomac (2007), p. 29

3.3.3 Regulatory action and expected consequences

Based on the identification of market power abuse, the Texas Public Utility Commission has taken action against TXU. This includes both a fine to the company and the threat of divesting generation assets to reduce the potential of market power abuse in the future. Due to the market power abuse in 2005, TXU was fined to pay $210 million including $70 million in proposed market refunds to

wholesale power buyers and $140 million in penalties.[18] Thus, the Commission followed the reports' suggestion that consumer welfare had been unduly reduced by TXU's pricing behavior. In addition, the Commission also opened a case on the regulated income of TXU, accusing it to have earned $80 million more than authorized by regulators in 2006 and possibly earlier years in its regulated activities. The other action proposed is to divest some of the generation assets of TXU to limit its potential of market power abuse (Wall Street Journal, 2007). This could be achieved by splitting up TXU or forcing it to sell a fraction of its generation capacities. The legislature will also consider structural changes in the market to lessen the influence of dominant generators in the wholesale markets. This would also imply further market modeling to identify the potential candidates for divestiture.

The case of TXU shows that market monitoring and pro-active competition policy are an integral part of the market-oriented design of the Texan electricity market. It also indicates the importance of real-time market-monitoring analysis to identify market power and to combat it rapidly. Both, the Texan regulator and legislator are increasing the pressure on market participants to increase competition and protect consumers.

3.4 Virtual divestitures: a popular compromise

3.4.1 The concept of virtual divestiture

In addition to the physical divestiture of electricity generation capacities, virtual divestitures are becoming increasingly popular as an instrument of a proactive competition policy. "Virtual divestiture" refers to a spin-off of generation capacities of an incumbent, however without changing the property right structure of these facilities. Thus, the divestiture is a mere financial transaction, not a physical one: an owner of virtual power plants basically has a contract allowing him to trade a given capacity without actually managing a specific power plant. Regulatory authorities see an advantage of virtual over real divestitures in the possibility to withdraw the measure after a certain time, or to continue if the desired outcome has not been accomplished.

A virtual divestiture can either be a contract linked to a certain market outcome (financial divestiture) or like an optional forward contract with physical delivery (physical divestiture). In the first case the buyer obtains a contract from the incumbent giving him a payment whenever the market price for the underlying product is above a predetermined threshold. Thus, the buyer becomes a passive market participant and the contract can be seen as hedge against price increases. In the second case the buyer obtains the right to freely trade its bought capacity at the market whereby the seller is responsible for physical delivery. Thus the buyer becomes an active market participant. Willems (2006) concludes for oligopolistic electricity markets that physical virtual power plant divestitures increase competition while financial virtual divestitures increase the contracted volume of incumbents. Hence, the physical form of virtual divestitures is more suited to reduce market power potentials as they come closer to real, physical divestitures.

[18] As the process is still ongoing TXU has the opportunity to rebut the findings before the Commission.

To improve the effect of virtual divestitures the regulatory authority has to assure that the divested facilities increase competitiveness within the market, incumbents are not allowed to buy back their sold capacities, and that large market participants are not allowed to increase their market share beyond certain limits.[19]

3.4.2 Applications in European electricity markets

In the ongoing liberalization process of Europe's electricity markets several cases of virtual divestitures, so-called Virtual Power Plants (VPPs) have taken place as a substitute for real divestitures to curb market power and increase the competitiveness of markets.

In the Netherlands, VPPs were proposed in the Nuon merger case. In 2003 Nuon – a vertically integrated energy supplier – aimed to take over Reliant`s generation capacities. As Nuon owned about 900 MW of decentralized generation assets and had contracted the new 800 MW Intergen power plant it would become a dominant market player. Together with Essent, the Dutch electricity market would be dominated by a duopoly. Thus the Dutch competition authority NMa opted to prevent the merger if no counteractions were taken to increase market competitiveness. It demanded a virtual divestiture of 900 MW power plant capacities in 90 contracts with duration of five years. After legal actions the capacity has been reduced to 200 MW which were auctioned in September 2004 in 10 MW blocks. Seven (out of a total of 29) bidders were successful in obtaining blocks.

In Belgium, the electricity market is dominated by Electrabel which owns about 90% of the generation assets. In 2003 the Belgian Competition Council approved that Electrabel was allowed to become the default supplier for customers of several intermunicipal distribution companies. As part of this appointment Electrabel had to virtually divest part of its generation assets. The auctions were supposed to be on a quarterly basis with a maximum of 1,200 MW of capacity whereof two third were base load, and one third was peak load. The VPP products were designed as rights to nominate energy at a pre-determined price thus the main difference between the base and peak load product was its price. The schedule of the auctioned blocks was decided by the buyer. No single buyer was allowed to obtain more than 40% of the capacity for sale. Although this threshold seems reasonable in general to prevent the emergence of dominant firms, the limited capacity offered in total implies that none of the buyers can achieve more than 4% of available capacity in the market. Thus, Electrabel did not face a significant competitor this way.[20] The auction was carried out by the Belgium power exchange Belpex. Starting in December 2003 seven auctions took place until May 2006.

The French electricity market, too, is dominated by a single firm, Électricité de France (EdF). Virtual divestiture of generation capacities was required in a recent merger case: the European competition authority required EdF to divest part of its generation capacity to acquire a share in Germany's

[19] Further competition policy measurements that fall short from the given segmentation can still be defined as virtual divestiture e.g. if a transmission company is requested to keep a certain amount of its transmission capacity free for other market participants.

[20] A study for the Competition Council suggested that the divested capacity should be between 2 and 5.6 GW to obtain sufficient mitigation effects (Platts, 2003).

supplier EnBW (Case COMP/M.1853 - EdF/ENBW). Starting in 2001 EdF was required to auction about 6 GW on an annual basis for five years. The VPPs take the form of either base load (4,400 MW) or peak load (1,000 MW) facilities and vary accordingly in their energy price. Since 2002 the allotment of the suppliers VPP to the transmission company RTE is coordinated by the French power exchange Powernext. Although the demanded time frame of the VPP auction ended in 2006 the VPP auction are continued. Up to September 2007, 25 auctions took place. The effect of the virtual divestiture is hard to estimate due to the late development of a transparent French wholesale market. However, even after the divestiture EdF remains the dominant generator with about 85 to 90% of available capacity. A further concern is that part of the VPP capacity is sold back to EdF instead of domestic customers. In 2004 this re-selling reached about 30% of the issued VPP capacity.

Spain is a particularly interesting case because virtual divestitures are not directly linked to a merger case, but rather as an instrument to establish a forward market. In 2006, the Spanish government required Endesa and Iberdrola to hold a series of five auctions offering virtual power plant capacity to members of the Spanish electricity market (Royal Decree 1634/2006) starting in summer 2007. At the time, Endesa owned about 37% of the installed capacity and Iberdola owned about 42%, thus the market was dominated by the duopoly. Whether the auctions have a pro competitive effect on the development of a futures market will have to be determined later on.

Further virtual divestiture cases have taken place in several European countries, showing that this instrument has become a serious option of active competition policy in electricity market liberalization:

- In the Czech Republic the dominant company CEZ held a VPP auction in line with an antitrust authority ruling related to the SCE acquisition in 2006;
- in 2005 the Italian Authority for Electricity and Gas aimed to promote competition in the wholesale power market via virtual divestiture of 3850 MW of Enel;
- in Ireland the regulatory authorities agreed to introduce a Virtual Independent Power Producers (VIIP) to lessen the dominance of ESB, via an auction process to provide independent suppliers with contracted capacity in 2005.

4 Other Cases of Divestitures

This section provides empirical evidence for divestitures in sectors other than electricity. First, two standard textbook cases of US Antitrust policy (AT&T and Standard Oil) and the long-term effects on markets and prices are briefly presented. Following, we provide evidence of cases in which divestitures have been taken place in a variety of sectors.

4.1 AT&T: from monopoly to competition

The divestiture of the former telecommunication monopolist AT&T through the Modified Consent Decree (1982) included a large number of reorganizations of the U.S. telecommunication market,

amongst others a competitive structure of the long-distance market (upon which we will concentrate in this case study). Divestiture of the vertically integrated, monopolistic structure of AT&T and market opening of the long-distance market implied a vast entry of large and smaller competitors. By 1995, a decade after the implementation of the divestiture, the long-distance market was declared competitive by the Federal Communications Commission (FCC); between 1984 and 1996, interstate access charges had declined by 65%. Divestiture had clearly been effective.

4.1.1 Point of inception

The telecommunications market shows several features similar to the energy and other infrastructure markets. Among them are the legacy of vertically integrated monopolistic enterprises, and the natural monopoly in some market segments. In telecommunications, the market for interexchange (long distance) services was a natural monopoly until the second half of the 20th century, and the local loop still remains a natural monopoly in many cases. Like in many other countries, the American Telephone and Telegraphs (AT&T) dominated the U.S. American telephony market over the first half of the 20th century, as an integrated monopolist in the local and long distance sector, the equipment sector, and research.

AT&T's market dominance at the beginning of the 20th century was based on a monopoly in the interexchange market through pioneering development and patents in long-distance technology. AT&T used this monopoly to leverage its market power to the local telephony market and to acquire its competitors. In 1921, AT&T had increased its market share in the local exchange market to 80%. Thus, in the 1930s AT&T had a monopoly in the long distance market, controlled most of the local exchange market, held a major share of the switching and terminal equipment market through Western Electric, and operated a major research organization, the Bell Laboratories.

Regulatory action was late to address the problems resulting from the monopolistic structure of the sector. Regulation of this monopolist was split among state and federal institutions, the State Public Utility Commission for intrastate communication and the FCC, which was established in the 1934 Communications Act for interstate communication (Crandall, 1991). In 1949, the Department of Justice filed an antitrust suite under the Sherman Act, Section 2, alleging AT&T of monopolizing the equipment sector by use of its market power in the telephony sector. The suit was settled in 1956 with a consent decree that allowed AT&T to keep Western Electric but prohibited entry into unregulated telecommunications markets. It also forced the Bell Laboratories to license its developments to AT&T's competitors (Cole, 1991). This combination significantly restricted AT&T's market power in new markets for data communications. However, it took half a century (1934 – 1984) until the monopolistic structures of the potentially competitive segments of the telecommunications market were abolished. In the rest of this case study, we will focus on the emergence of competition on the long-distance market brought about by divestiture.

The key issue is the transformation of a former natural monopoly, i.e. long-distance interexchange services, into a potentially competitive market, starting in the 1950s. With the introduction of

microwave transmission in the early 1950s, fixed costs for point-to-point communication networks fell significantly reducing the minimum efficient network size and thus encouraging potential infrastructure competition. In 1959, the FCC allowed private microwave networks. AT&T reacted with significant discounts to large users to discourage installation of alternative private line services.[21]
In 1963 Microwave Communications Incorporated (MCI) requested the permission to enter the Private Leased Line (PLS) market between St. Louis and Chicago as a common carrier, and thus as a competitor to AT&T. Eventually, in 1969, after six years of pleading, MCI was granted permission to enter the specific St. Louis - Chicago market. This decision forced MCI and other competitors to apply for each route individually. The specialized common carrier (SCC) decision in 1971 allowed free entry into the PLS market. In 1975 the entry was extended to the message toll service (MTS), the standard long distance service, with the introduction of MCI's Execunet service, but discontinued by the FCC in the same year. The entire long distance market was opened by the US Court of Appeals overruling the FCC decision in 1978.[22]
In 1974 the Department of Justice (DoJ) had already filed an antitrust suit under the Sherman Act Section 2 against AT&T for its refusal to grant network services such as originating and terminating calls to MCI and other competitors to maintain its monopoly in the long distance market. Furthermore, AT&T was suspect to predatory pricing (Crandall, 1991, Areeda and Turner, 1975). The prosecution, informally lead by William F. Baxtor, followed the "Quarantine Theory" demanding the separation of competitive and monopoly segments (Cole, 1991). AT&T, in contrast, advertised the monopoly structure of the sector. All in all, shortly before the break-up, AT&T covered about 90% of U.S. domestic and international outbound long-distance services (McAvoy, 1996). Almost the entire set of local operating companies belonged to AT&T, as well as its subsidiary, Western Electric, as the country's largest producer of telephone equipment that supplied almost all installations for the Bell System. Bell Laboratories also belonged to the group, as it was jointly owned by AT&T and Western Electric.

4.1.2 Divestiture and other measures

After a period of intense accusation and negotiation, a settlement was reached in 1982 that lead to the complete divestiture of AT&T, and opened up the way for competition in the long-distance market. The consent decree of 1982 was a modification of the 1956 decree under the Tunney Act and thus called the modified final judgement (MFJ) (Crandall, 1991). It was enacted in 1984. AT&T divested the Regional Bell Operating Companies (RBOCs) that remained regulated monopolists, and the markets for long-distance services and for equipment were opened. Thus, the break-up had a vertical component, the divestiture of the Bell operating companies isolating the natural monopoly, and a

[21] These tariffs were ultimately disapproved by the FCC. Rate distortions in the regulated long distance sector invited competitive entry. Especially long distance rates were regulated above cost to keep local rates low through cross-subsidization, which enabled raisin picking and arbitraging (Crandall, 2005).
[22] AT&T's reaction to this competitive entry was the refusal to interconnect the long distance competition with the local network where AT&T still held a monopoly position (Viscusi et al. 2005, Chapter 14).

horizontal component, the split up of the local exchange in geographically separated RBOCs. In the following discussion of the effects, we will focus on the market for long-distance services, where a previously monopolistic market was opened to competition.

The divestiture of AT&T and the opening of the long-distance market lead straight from a monopolistic situation to an almost perfectly competitive market. Two large competitors entered the market: MCI and Sprint. In addition, hundreds of smaller companies blossomed that also provided long-distance services. AT&Ts long distance market share declined rapidly. Its percentage shares of long distance carrier revenues fell from 90% in 1984 to 49% in 1996. During the same time, the total market revenues doubled (FCC, 2007). In 1995, the FCC declared that AT&T was no longer the dominant firm, and that the long-distance market had become competitive. In 1996, not less than 621 long-distance carriers were active in the market (FCC, 1998).

With competition intensifying in the long-distance market, and some regulation being updated, prices fell drastically. Estimates of the reduction of residential long-distance rates range between 50-60% (McAvoy, 1996) up to 90% in some cases.[23] Economides (2004) summarizes the general interpretation that even if a price-cost margin remained, the rapidly falling prices provided a largely sufficient proof that changing the structure of the long-distance market was beneficial to the customers and to social welfare.

In addition to competition and reduced prices, the divestiture also lead to more innovations in equipment and services. Innovation was particularly booming in the manufacturing equipment segment, where producers that had delivered the same telephones for about 40 years. However, some technical progress is also observable at the backbone core networks level. Baxter (quoted by MacAvoy, 1996, p. 29) observes that new services were rapidly being generated "as long-distance competitors vie with each other to provide the newest technology".

4.1.3 Assessment

The divestiture of AT&T was a necessary condition to establish competition in the market for long-distance telephony in the U.S.. Just opening the long-distance market but maintaining vertical integration would not have resolved the issue, because AT&T would not have had incentives to assure equal access to competing long-distance providers. In the case of AT&T, vertical unbundling turned out to be necessary for (horizontal) competition in the long-distance market.

There is a general assessment that the AT&T divestiture was successful, even though not all the expected results were achieved. With respect to the horizontal aspects (core network), the monopoly was transformed into a close oligopoly (three players), and intensive competition in the backbone networks could emerge thereafter. The concentration in the market for long-distance telephony was significantly decreased. Prices for long-distance interconnection telephony fell well above 50%, and in

[23] Note that a part of this decrease was the rebalancing of long-distance to local tariffs, where the cross-subsidization of the latter by the former was abandoned. Also, competition was not perfect as MacAvoy (1996) indicates that the prices of the three large suppliers (AT&T, MCI, Sprint) remained above their costs.

some cases up to 90%. Also, innovation in equipment and services was spurred by the divestiture and the subsequent competition.

The AT&T case holds several lessons for the establishment of competition in other network industries. Thus, vertical and horizontal market structures have to be considered simultaneously. Technological change may bring about competition in markets that were previously considered natural monopolies. Divestiture is a long-term process that needs to be started early if one wants to reap the benefits later. Last but not least, a proactive approach to competition policy and regulation is necessary to establish competition in previously monopolistic network industries.

4.2 Standard Oil

The divestiture of Standard Oil of the New Jersey Trust (1911) is another example of the positive effects of a proactive structural competition policy. The trust had expanded both horizontally and vertically in the later 19th century, and had obtained up to 85% of the capacities in oil refining. Divestiture lead to the establishment of competition between seven independent companies. In addition to increasing competition, the divestiture also lead to the development of innovation and accelerated technical progress in the sector.

4.2.1 Point of inception

In the 1870s and 1880s, a series of trusts was established in the U.S., leading to a threat of healthy competition in sectors such as railroads, steel, tobacco, and oil.[24] The Standard Oil Trust emerged from an unprecedented wave of mergers and acquisitions started in the 1860s by John D. Rockefeller in Cleveland, Ohio. By 1872, the "Standard Oil Company of Ohio" had acquired essentially all but four of the forty oil refineries located in Cleveland, Ohio. In addition, Standard Oil of Ohio had acquired a large number of refineries for crude petroleum in New York, Pennsylvania, and elsewhere. The trust had also obtained control over pipelines transporting crude from the fields to refineries in Cleveland, Pittsburg, Titusville, Philadelphia, New York, and New Jersey. In 1871/72, Standard oil negotiated secret rebates with the railroads, giving it a competitive edge in transportation. Hence, between 1870 and 1882 Standard Oil of Ohio controlled 90% of the business in producing, shipping, refining and selling petroleum and its products – a vertically integrated industry. Thus, the trust was able to influence the prices of crude oil and to control interstate commerce of oil products. A formal trust agreement was signed in January 1882.

Following Congress' passage of the Sherman Antitrust Act in 1890, the Standard Oil Trust was threatened with dissolution the first time in 1892. The decree was against seven individuals, Standard Oil Company of New Jersey, 36 domestic companies and a foreign company (controlled by Standard of New Jersey through stock ownership). However, the bill was dismissed since it had "not been proved to be engaged in the operation or carrying out of the combination."

[24] A trust is a combination of firms in which the individual firms do not merge but act as a single entity. In general, these trusts coordinate prices and quantities of their respective units, and thus seek to monopolize the market.

In 1899, headquarter of the Trust was transferred to New Jersey, and the Trust became the "Standard Oil Company of New Jersey". The State of New Jersey allowed a single corporation to own stock in other companies. By 1899, the Standard Oil Company of New Jersey controlled 84% of crude oil refined in the US. President Theodore Roosevelt committed himself in 1901 to an opposition of trusts and launched a lawsuit in 1906 against Standard Oil because of discriminatory practices on the market, abuse of market power and excessive control on the American oil industry.

4.2.2 Divestiture and other measures taken

In 1911, the Standard Oil Company of New Jersey and its subsidiaries were charged guilty for constituting a combination in restraint of interstate commerce, for attempting to monopolize, and for the monopolization of parts of commerce under Sections 1 and 2 of the Sherman Antitrust Act. The United States Supreme Court declared Standard Oil Company of New Jersey an "unreasonable" monopoly and ordered it to dissolve the corporation and to discontinue the illegal combination between the trust and its subsidiaries.

Standard Oil of New Jersey was split up in 38 different units.[25] Divestiture took place both vertically, along the value-added chain, but also horizontally. Thus, in a first instance the regional distribution companies were separated from each other. The re-organized Standard Oil Company of New Jersey and Standard Oil Company of New York emerged as two of the strongest companies. The agreement assigned marketing for New York State and New England to Standard Oil Company of New York (Socony) and allowed Socony to maintain its extensive overseas operations. Standard Oil (New Jersey) maintained marketing in the mid-Atlantic region and gained control of Standard Oil Company of Louisiana (Southern marketing), Carter Oil Company (production), Imperial Oil Company (Canadian operations) and Gilbert & Barker Manufacturing (service station equipment). In addition, other regional oil companies include Standard Oil of California, of Ohio, of Indiana Continental Oil and Atlantic Oil. Although competition between these companies took some time to develop, over time the regional monopolies were broken up and cross-country competition could emerge.

4.2.3 Assessment

The diverstiture had a long-term impact on the market structure in the oil business, and lead to tangible effects on competition and consumer rents: the dissolution of the Standard Oil Trust gave birth to a wide oligopoly of producers, the main of which were the divested Standard Oil of New Jersey (later on: Exxon), Standard Oil of New York (later on: Mobil), Standard Oil of California (later on: Chevron), Standard Oil of Ohio (later on Sohio, part of BP), Standard Oil of Indiana (later on: Amoco), Continental Oil (later on: Conoco), and Atlantic (later on: ARCO).

[25]The Anglo-American Oil Co., the Atlantic Refining Co., Borne, Serymser Co. Buckeye pipe Line Co., Crescent Pipe Line Co., Cumberland Pipe Line Co., Eureka Pipe Line Co., Galena-Signal Oil Co., Illinois Pipe Line Co., Indiana Pipe Line Co., National Transit Co., National Transit Pump and Machinery Co., New York Transit Co., Northern Pipe Line Co., Ohio Oil Co., Mid-Kansas Oil&Gas Co., Perice Oil Co., Perce Pipe Line Co., Prairie Oil and Gas Co., Prairie Pipe Line Co., Solar Refining Co., South Penn Oil Co., Penn-Mex Fuel Co., South West Pennsylavnia Pipe Line Co., Southern Pipe Line Co., the

Additional competition was induced by technological innovation. Standard of Indiana discovered "thermal cracking" which more than doubled the share of usable gasoline from a barrel of crude and started licensing to companies outside its own market in 1914.

The divestiture of the Standard Oil Trust is a milestone in antitrust and competition policy, and it has shaped later generation of cases. Even through it is a typical "antitrust" case, the lessons for situations of similar market structures in competition policy cases are evident: divesting a market-dominant company can improve the market structure, intensify the competition in the market, incite innovation, and accelerate technical progress, and thus lead to increased consumer rent and social welfare.

4.3 Divestiture in energy and other industries

Beside the electricity and natural gas sector especially the oil industry has been subject to several cases of divestitures and further measurements. Over the past two decades the oil industry has faced structural changes busted by technical advancements and emerging market structures like spot and forward market places. The FTC's analysis of petroleum mergers follows the same DoJ/FTC Horizontal Merger Guidelines that the agencies use to analyze mergers in other industries. Due to the globalization of the oil and petroleum industry the European Commission has also conducted several merger cases analysis. We provide a brief overview of merger cases in the EU and US, with a focus on divestiture and other competition policy measures.

4.3.1 Divestiture in the US oil sector

Since 1981 the US Federal Trade Commission (FTC) has investigated every major petroleum related merger (FTC, 2004). In 15 cases the FTC decided that the proposed mergers would result in significant anti competitive outcomes, in eleven cases the FTC demanded divestiture including sales of refineries, pipelines, terminals and marketing assets to accept the merger, and in four cases the parties abandoned their merger plans after the FTC's antitrust challenge. As many cases do not raise competitive issues, particular smaller ones, a case by case analysis is necessary to estimate the relevant issues, e.g. the relevant market and product.

One of the first cases of the FTC in 1984 was the merger of Texaco and the Getty Oil Company. In order to get the merger approved, Texaco needed to divest on of their refineries in New Jersey, divest either Texaco's pipeline interest or Getty's refining interests, and finally divest Getty's marketing assets in the Northeast, and a Texaco terminal in Maryland. In the same year the merger of Chevron and Gulf Oil also spurred divestiture measurements. Chevron needed to divest one of two specified Gulf refineries in Texas and Louisiana, Gulf's interest in the Colonial Pipeline, all of Gulf's marketing assets in six states and parts of South Carolina, and of Gulf's interests in specified crude oil pipelines, including 51% of Gulf's interest in the West Texas Gulf Pipeline Company to take over Gulf. The last case in the 1980s including divestiture actions was the acquisition of Atlantic Petroleum Corporation

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Standard Oil Companies of California, Indiana, Kansas, Kentucky, Nebraska, New Jersey, Louisiana, New York and Ohio, Swan&Finch Co., Union Tank Car Co., Vacuum Oil Co., and the Washington Oil Co.

by Sun Company. A divestiture of terminal and associated owned retail outlets in each area was demanded by FTC to approve the acquisition.

In the late 1990s a series of merger cases lead to several divestiture measurements commanded by the FTC. In 1997 the joint venture of Shell Oil Company and Texaco, Inc. raised the FTC's concerns that gasoline prices could rise by more than $150 million a year and the joint venture would violate federal antitrust laws. Both parties agreed to divest a package of assets, including Shell's Anacortes, Washington, refinery, a Hawaiian terminal, and retail gasoline stations in Hawaii and in California to Commission-approved buyers. The sales were scheduled to be consummated within six months of final approval of the settlement (FTC, 1997).

In the same year the British Petroleum Company p.l.c. (BP) and Amoco Corporation announced a merger. The transaction raised competitive concerns in a number of local markets in which the Commission proposed to take action. The complaint outlining the charges alleged that the merger of BP and Amoco would lessen competition in the wholesale sale of gasoline in 30 cities or metropolitan areas in the Eastern United States and the terminaling of gasoline and other light petroleum products in nine specified geographic markets. In order to resolve the antitrust concerns relating to the wholesale sale of gasoline, the proposed settlement required the divestiture of 134 gas stations in eight markets in which the companies' ownership overlaps.[26] In addition, in all 30 markets, including markets in which neither BP nor Amoco owned gas stations, the proposed settlement required that the companies give their wholesale customers the option of canceling their franchise and supply agreements with Amoco and BP, freeing them to switch their gas stations to other brands. To create an incentive for these dealers to change brands, the proposed settlement order would provide that wholesale customers who take advantage of this provision would be released from all debts, loans, and other responsibilities if they agree to switch to another brand that has less than 20 percent of the market (FTC, 1998). The merger shows the importance of case specific investigations and measurements.

Exxon Corporation's acquisition of Mobil Corporation was one of the largest merger cases in the petroleum industry in the last decades and the largest divestiture measurement demanded by FTC so far. Exxon, headquartered in Irving, Texas, and one of the world's largest integrated oil companies owns four refineries in the United States that can process approximately 1.1 million barrels of crude oil and other feedstocks daily and owns or leases approximately 2,000 gasoline stations nationally and sells gasoline to distributors or dealers that operate 6,500 retail outlets throughout the United States. Mobil, headquartered in Fairfax, Virginia, another of the world's largest integrated oil companies, operates four refineries in the United States, which can process approximately 800,000 barrels of crude oil and other feedstocks per day and about 7,400 retail outlets sell Mobil-branded gasoline throughout the United States. The FTC alleged that the acquisition would significantly injure

[26] In Tallahassee, Florida and Pittsburgh, Pennsylvania, Amoco would divest all of its retail gas stations. BP would divest its stations in Charleston, South Carolina; Charlotte, North Carolina; Columbia, South Carolina; Jackson, Tennessee; Memphis, Tennessee; and Savannah, Georgia. Again the divestiture would have to take place within six month.

competition in the markets in no less than twelve markets for refining and marketing of gasoline in the United States and allow Exxon/Mobil to raise gasoline prices for consumers.

Due to the large impact of the merger a number of divestiture measurements have been demanded by the FTC to approve the acquisition. This includes divestiture of marketing assets, gasoline stations, refineries and pipelines. [27] This measurements package was the largest demanded by the FTC so far (FTC, 1999).

The early 2000s yielded further cases of divestiture the FTC handled. Starting in 2000 BP Amoco and Atlantic Richfield Company (ARCO) announced their merger plans. The FTC opted for a preliminary injunction at the Federal District Court as the deal would violate antitrust laws by lessening competition in the exploration and production of Alaska North Slope crude oil and in the market for pipeline and storage facilities in Oklahoma, thereby raising prices for crude oil throughout North America. The FTC stated that the merger would create the third-largest private petroleum company in the world and the largest U.S. oil producer and refinery. The two companies are the largest producers of crude oil from Alaska and thus important for any refinery depending on Alaska oil, e.g. in California. To get the approval for the merger a comprehensive measurement package has been designed. BP Amoco would be required to divest ARCO's complete, free-standing businesses, including oil and gas interests, tankers, pipeline interests, real estate exploration data and selected long-term supply agreements. Most of the ARCO Alaska assets must be divested within 30 days of the signed order, and all assets must be divested within six months. Also the competitive concerns surrounding Oklahoma required BP Amoco to divest a large part of ARCO's assets to FTC-approved purchaser(s) within four months. Finally, for 10 years after it becomes final, the consent order would prohibit the respondents from reacquiring, either directly or indirectly, any interests in the assets they are required to divest, without first giving notice to the Commission (FTC, 2000b).

In 2001, another large merger was subject to FTC obligations. The merger of Chevron Corp. and Texaco Inc., two of the world's largest integrated oil companies, would be allowed to proceed, with significant divestitures required to remedy the likely anticompetitive impacts of the transaction. According to the Commission the merger would lessen competition in eleven market segments. Furthermore the FTC stated that if the transaction was allowed to proceed, either unilateral behavior by the combined Chevron/Texaco, or coordinated behavior among Chevron/Texaco and other remaining competitors, would lead to higher consumer prices.

The proposed order required Chevron/Texaco to divest all of Texaco's interest in the Alliance to Shell and/or Saudi Refining including gasoline marketing, marketing, refining and bulk supply of CARB gasoline in California, and two crude oil pipelines (one in California and one in the Gulf of Mexico).

[27] The new entity was requested to divest all of Mobil's gasoline marketing assets in the Mid-Atlantic Market and Texas metropolitan areas, and all of Exxon's gasoline marketing assets in the Northeast Market and California; Exxon's option to repurchase retail gasoline stores from Tosco Corp., in Arizona; Exxon's refinery in Benicia, California, the terminal operations of Mobil in Boston and the Washington, D.C. area, and the ability to exclude a terminal competitor from using Mobil's wharf in Norfolk; either Mobil's interest in the Colonial pipeline or Exxon's interest in the Plantation pipeline; Mobil's interest in TAPS; the terminal and retail operations of Exxon in Guam; a quantity of paraffinic lubricant base oil equivalent to Mobil's North American market share; and Exxon's jet turbine oil business.

Furthermore Texaco was required to divest assets outside the Alliance, including its one-third interest in the Discovery natural gas pipeline system in the Central Gulf of Mexico, a fractionating plant, and its general aviation business in 14 states (FTC, 2001).

The list of merger cases subject to the Commission can be continued up to 2007 with further divestiture cases (FTC, 2007). We provide a short overview:

- In 2001, Valero Energy Corporation and Ultramar Diamond Shamrock Corporation (UDS) proposed their merger plans. Government authorities found that the acquisition of UDS by Valero would eliminate one of the limited number of West Coast oil refiners. Valero was requested to sell the Golden Eagle refinery in Avon, California, to another company and divest some gasoline stations in California;
- In 2002 the Phillips/Conoco merger was subject to the divestiture of Conoco's refinery in Denver, all of Phillips marketing assets in Eastern Colorado; and the divestiture of Phillips refinery in Salt Lake City and all of Phillips marketing assets in Northern Utah;
- In the 2002 Shell/Pennzoil Quaker State merger case Pennzoil was required to divest its interest in a lube oil joint venture; and Pennzoil's sourcing of lube oil from third party lube oil refiner was frozen at the current level;
- Magellan and Shell were required to divest Shell's Oklahoma City terminal assets to approve their merger in 2004;
- In 2005 Valero and Kaneb had to adopt a measurement plan including the divestiture of Kaneb's three Philadelphia area terminals and two terminals in Northern California for light products, the divestiture of Kaneb's West Pipeline system, including associated terminals, and divest two terminals for ethanol in Northern California to get approval for their merger plans.

4.3.2 Divestiture in the European oil sector

The European Commission also has considered several merger cases in the oil industry in the last decades. One of the major transactions in Europe's oil industry in 1999 was the proposed merger of TotalFina, a French limited company whose activities include oil and gas production, refining, petroleum product distribution, petrochemicals and speciality chemicals, and Elf Aquitaine whose activities include oil and gas production, refining, petroleum product distribution, petrochemicals, speciality chemicals and the health sector (EC, 2001). The Commission decided to open an in-depth investigation as the planned merger could create a dominant company in France for wholesale and retail distribution of fuel. The Commission concluded that the merger would result in a single integrated refinery holding 55% of refining capacity and an equivalent share in the wholesale car fuel and domestic heating oil markets and controlling most French import depots, the three main pipelines supplying France and a substantial share of the local depots. Due to the absence of sustainable competitors TotalFina/Elf would have the possibility to increase prices, on the wholesale markets and on the retail market for sales of car fuel and domestic heating oil. Also, competition on the market for motorway fuels would be eliminated. On the market for liquefied petroleum gases (LPG) the situation

is similar, in particular the control of the logistical infrastructure for imports, storage and bottling raises concerns.

To address the wholesale concerns all or part of the interests held in three oil pipelines and 17 refined product storage depots will be sold. 70 service stations located on French highways will be divested to reduce concentration on the motorway fuels market. The disposal is divided equally between the two Groups' tradenames. As the first offered remedies to address the LPS concerns were regarded insuffiecient by the Commission TotalFina offered to sell off the whole of Elf Antargaz, which will have the effect of eliminating any overlap between Total's and Elf's LPG businesses. The situation at the airports in Lyon and Toulouse will be relaxed by offering half of the supply infrastructure to third parties. Taking all measurements into account the Commission approved the merger resulting in the new entity to become the world's fourth largest oil group.

4.3.3 Divestiture in other industries

Divestiture measurements are not restricted to energy industries. The European Commission analyzes all larger mergers in the European Union for anti competitive effects and requires measurements if necessary. A recent case of divestiture taking place in an industrial sector was the planned acquisition by Metso Corporation Oy (Metso) of Finland of the pulp and power business of the Norwegian group Aker Kvaerner ASA in 2006 (EU, 2006c). Both companies are worldwide players in the market for the development and production of equipment for pulp mills. The Commission is concerned that the proposed acquisition can create competition problems in a number of markets for pulp mill equipment, namely equipment for the cooking, brown-stock washing, oxygen delignification and bleaching stages of pulp production. The concerns have been addressed by Metso by offering to divest its business for the cooking stage as well as Kvaerner's businesses for brown-stock washing, oxygen delignification and bleaching equipment. This will eliminate all overlaps between Metso's and Kvaerner's activities in the supply of pulp mill equipment. The Commission has concluded that Metso's commitments would remove all competition concerns raised by the proposed transaction.

Another case of divestiture took place in the medical system branch. In December 2003, General Electric (GE) announced that it would buy Instrumentarium Oyj, a Finnish company which produces anaesthesia and critical care medical systems, including patient monitors. The European Commission has opened a detailed investigation into the proposed acquisition. The aim of the investigation was to determine the impact of the transaction in markets for patient monitors, C-arms (mobile X-ray machines) and mammography equipment bought by hospitals. The Commission also examined the extent to which Instrumentarium's strong position in anaesthesia machines and patient monitors could have a foreclosing effect for other producers of patient monitors. This issue arises from the fact that a patient under anaesthesia needs monitoring and therefore the patient monitor and the anaesthesia machine have to communicate properly. The Commission is concerned that Instrumentarium's anaesthesia machines are optimized for their own patient monitoring systems and third party options

face operational problems. The European Commission and the antitrust division of the US Department of Justice co-operated in this case, which requires regulatory approval on both sides (EC, 2003).

In order to get regulatory approval GE had to divest Instrumentarium's Spacelabs, including its worldwide patient monitoring business and to enter into a series of supply agreements with its acquirer, including for Instrumentarium's renowned gas monitoring module, a key component in operating room monitors. Furthermore, GE and Instrumentarium have to ensure that its anaesthesia equipment, patient monitors and clinical information systems will interoperate with third parties' devices. This package of remedies is supposed to remove the horizontal overlap between the activities of GE and Instrumentarium in the perioperative monitoring market and will ensure the emergence of an effective competitor to the merged entity.

In 2004, Air Liquide notified to the Commission its proposed acquisition of the Messer Group's activities in Germany, the United Kingdom and the U.S. Air Liquide is the world leader in the industrial gases sector with activities in the production and distribution of industrial and medical gases and the services connected to these products. The Commission market investigation of the case raised concerns about anti competitive effects in the so-called tonnage market and the market for electronic specialty gases. Furthermore, the merger will result in a very high market concentration in the German markets for gases in bulk and cylinders for industrial and medical use whereas no concerns for the UK have been detected (EU, 2004). To avoid an in-depth analysis Air Liquide offered a divestiture schedule allowing it to acquire the Messer Group's activities. The divestitures include half of Messer's Rhein/Ruhr pipeline and the complete pipeline network in the Saar area, as well as several tonnage plants producing gaseous oxygen and nitrogen, Messer's activities in CO tonnage Air Liquide will divest several liquefiers for air gases and the related customer base, its source in Burgbrohl and two sourcing contracts in Germany and Austria, filling centres and customers in the field of cylinders, and finally Messer's participation in its joint venture with Nippon Sanso.

Next to AT&T's pure divestiture the telecommunication sector is also subject to fast changes in market and technological structures in Europe. In 2002 the Swedish incumbent telecoms company Telia merged with the Finnish telecoms company Sonera. Both companies are partly state owned and among the leading telecommunications operators in their countries. The Commission launched an investigation stating that planned transaction leads to a significant overlap of activities in mobile communications, wholesale international roaming, and wireless local area network (WLAN) services in Finland. The loss of competitive pressure for Sonera by Telia and the strong vertical links would give the merged entity the incentive and ability to foreclose competitors from the retail services markets in both countries. To get the approval for the merger the parties offered to divest Telia's mobile communications business in Finland, including its WLAN business, create a legal separation between their fixed and mobile networks as well as services in Finland and in Sweden, grant non-discriminatory access to their networks, and divest Telia's nation-wide cable TV business in Sweden. The package resolved the Commissions concerns and the merger was approved (EU, 2002).

The list of divestitures in merger cases can be continued with cases in nearly all economic branches: e.g. the pharmacy sector with the merger of Pflizer and Pharmacia (case M.2922), the chemical sector with Degussa's purchase of Laporte (case M.2277), the nourishment industry with the acquisition of Ralston Purina by Nestlé (case M.2337). Since 1990 about 3,500 cases have been notified to the Commission of which 167 have resulted in an in-depth analysis so called Phase II Proceedings (EU, 2007).[28]

In 2005 the European Commission has published a study on merger remedies evaluating 96 cases between 1996 and 2000 and there development in the following five years (EU, 2005). The study states that 94% of divested assets, business or sub companies are still in the market three to five years after the divestiture took place. The rate is higher than presented in a similar study by the US Federal State Commission claiming that one fourth of the buyers left the market shortly after (FTC, 1999a). Furthermore 81% of the remedies are considered effective by the Commission. These two figures mark an impressive result of Europe's merger policy. However, looking into the details of the analysis shows some important points to consider (Lévêque, 2007). The study highlights several obstacles that can hinder the effectiveness of remedies, in particular the strategic behavior of the merged firms and insufficient trustees. Market shares of buyers generally tend to decrease after the divestiture while the merged firms share increases. One problem arises from the information asymmetries between the Commission and the buyers on one side and the merging firm on the other. As the latter has in-depth knowledge about the divested assets and an incentive to keep competition low, possibilities arise that the merging firm sells assets of inadequate scope, sells to weaker competitors, or colludes with the buyers. Thus, beside an in-depth analysis beforehand it is necessary to closely observe the development of the markets competitiveness after a merger.

5 Divestitures to Prevent Market Power in Energy Merger Cases

This section provides an overview of recent merger cases in which divestiture are considered as an instrument of preventing market power with a particular focus on energy cases. In particular we provide an insight to the assessment of potentially effects on market power. Two examples for recent cases in the US are illustrated before electricity mergers in European merger cases in several member states are presented

5.1 Exelon-Exelon-PSEG: identifying "ability" and "incentive" assets

The case of the planned divestiture of electricity generation capacity in the merger between the two large electricity utilities Exelon and PSEG (U.S. East Coast) shows proactive competition policy based on sophisticated market analysis by several regulatory bodies. It also shows that merger remedy

[28] A complete list of all cases subject to the European Commissions investigations can be found at their homepage (http://ec.europa.eu/comm/competition/mergers/cases/)

analysis and results can vary between different regulatory institutions The case holds interesting lessons for competition analysis in the continental European context.

5.1.1 Point of inception

On December 20, 2004 Exelon and PSEG announced their merger plans. The possible anti-competitive effects of the merger were proposed to be countered by divestiture of power plants. Exelon and PSEG are both large market participants in the North-Eastern U.S. electricity market of PJM Interconnection (PJM). PJM administrates the transmission grid providing electricity to approximately 51 million consumers with a peak load of about 140 GW and installed generation capacities of 165 GW.[29] Exelon distributes electricity to approximately 5.1 million customers in Illinois and Pennsylvania through its subsidiaries Commonwealth Edison (ComEd) and PECO Energy (PECO) and is also involved in natural gas distribution through PECO.[30] At the time, Exelon had a generation park of 33 GW, dominated by 11 nuclear plants, some coal base-load plants, few peaking units but no CCGT-plants. PSEG Holding consisted of four subsidiaries, including Public Service Electric and Gas (PSE&G) active in the transmission and distribution of electric energy and natural gas service to approximately 3.6 million customers, primarily in New Jersey. Exelon and PSEG were operating in a relatively tight power pool with local load pockets and thus had localized market power. The announced merger should lead to benefits both for consumers and shareholders of the companies, namely scale and scope economies in distribution and generation, financial strength, substantial synergies, improved nuclear operations, and combined expertise in competitive markets. In February 2005 Exelon and PSEG made four major regulatory filings relating to their planned merger, including applications to Federal Energy Regulatory Commission (FERC), the New Jersey Board of Public Utilities (NJPBU) and the Pennsylvania Public Utility Commission (PAPUC). In addition to the above filings, especially the Department of Justice (DoJ) also had a role in reviewing aspects the proposed merger. In addition to the market power issue, there was a political component involved in the merger: in fact, PSEG was considered as a "national champion" by the Government of New Jersey. On the other hand, Exelon was already amongst the largest electricity companies in the country and was considered as "Big Electricity" by some of the players involved in the merger process. Therefore, some political bias in favor of or against the merger could not be entirely excluded.

5.1.2 Divestiture proposals

In the course of merger process, a variety of measures were discussed, and most of them related to divestitures to remedy the increased potential for market power abuse resulting from the combination of incentive and ability assets. Even though different institutions that intervened in the case (FERC, DOJ, and the State of New Jersey) brought forward different figures for divestiture measures, they

[29] The geographic area of the PJM includes all or parts of New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, the District of Columbia, North Carolina, Kentucky, Ohio, Indiana, Michigan, Tennessee and Illinois.
[30] PECO`s facilities are not interstate facilities and therefore not subject to the Commission's jurisdiction under the National Gas Act.

converged in the overall attempt to curb the market power of the newly created firm. In this subsection we recall and compare different divestiture schemes that were proposed at different stages of the merger process.

5.1.2.1 FERC proposals

In December 2005, Exelon and PSEG proposed a comprehensive mitigation plan designed to fully address FERC's requirements for competitive markets.[31] With respect to fossil fuel facilities, the companies proposed to divest a total of 2,900 MW, including approximately 1,000 MW of peaking capacity and 1,900 MW of mid-merit capacity, of which at least 550 MW must be coal fired.[32] In addition, the companies proposed to transfer control of the energy from 2,600 MW of baseload nuclear capacity (including 2,400 MW in PJM East) as "virtual divestiture." The virtual divestiture would take one of two forms: (1) long-term firm baseload energy sales contracts (for at least 15 years, or the life of the unit); or (2) an annual auction, in 25 MW blocks, of 3-year firm entitlements to baseload energy.[33] The virtual divestiture was designed to transfer control over a portion of the output of the companies' combined nuclear fleet, as required by FERC regulations in order to qualify as mitigation, without sacrificing the benefits to the marketplace of enhancing the operation of the nuclear fleet by applying Exelon's nuclear operating expertise.[34]

FERC approved the merger subject to the divestiture of 2,500 MW in sales of virtual capacities ("long-term contracts") and another 1,500 MW in actual sales of capacity. This decision was based upon a company-wide modeling of the market effects (instead of a regionally differentiated analysis). Exelon had sold forward contracts up to 15 years, and thus, the divestiture of these contracts was considered almost as efficient as to divest physical plant.[35]

5.1.2.2 DoJ proposals

In addition to FERC, the Department of Justice's Anti Trust Division also investigated the case alleging that wholesale electricity was a relevant antitrust product market and PJM East and PJM Central/East were the relevant antitrust geographic markets. To determine the effects of the merger on market concentration, the DoJ analyzed the market using a post-merger Herfindahl-Hirschmann Index (HHI) according to the Federal Trade Commission's Horizontal Merger Guidelines. The merger would yield a post-merger HHI increase of more than 1,100 points in PJM East and approximately 790 points

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[31] FERC generally approves proposed merger in the energy sector if it finds that the consolidation "will be consistent with the public interest". This consistency includes consideration of three factors: effect on competition (including horizontal and vertical competitive issues), on rates, and on regulation. The principal focus of the FERC application is the effect of the merger on competition and how the companies propose to mitigate any anti-competitive effects the merger might otherwise have.

[32] The companies have proposed that the sale of this generating capacity will occur as soon as possible within 18 months following close of the merger.

[33] The long-term contracts could take one of two forms: either a swap, whereby the companies swap rights to energy in PJM for rights to energy outside of PJM, or an outright sale of energy from a particular unit.

[34] The companies have not offered to divest (i.e. sell outright) any nuclear plants and did not anticipate doing so.

[35] The main outcome of FERC's analysis was that the proposed mitigation plan would not completely compensate adverse effects on competition, especially in the non-firm energy and capacity markets. In May 2005 the companies proposed to divest additional 1,100 MW of generation based on the results of FERC's analysis. Furthermore, Exelon and PSEG committed to accelerate planned transmission upgrades and fund, depending on the approval, approximately $25 million in transmission upgrades in the PJM system. After the additional commitment, FERC determined on June 30th, 2005, that the Exelon/PSEG merger satisfies the public interest standard of the Federal Power Act and approved the merger.

in PJM Central/East. Thus the merger raised a presumption of significant antitrust concerns. Potential divestiture would reduce the market concentration significantly, caused by a decreased market share of the merged firm. Furthermore, the DoJ alleged that the proposed merger would substantially lessen competition. The combination of PSEG and Exelon's generating units would increase the merged firm's ability and incentive to withhold selected output, forcing PJM to turn to more expensive units to meet demand, resulting in higher clearing prices in PJM East and PJM Central/East.

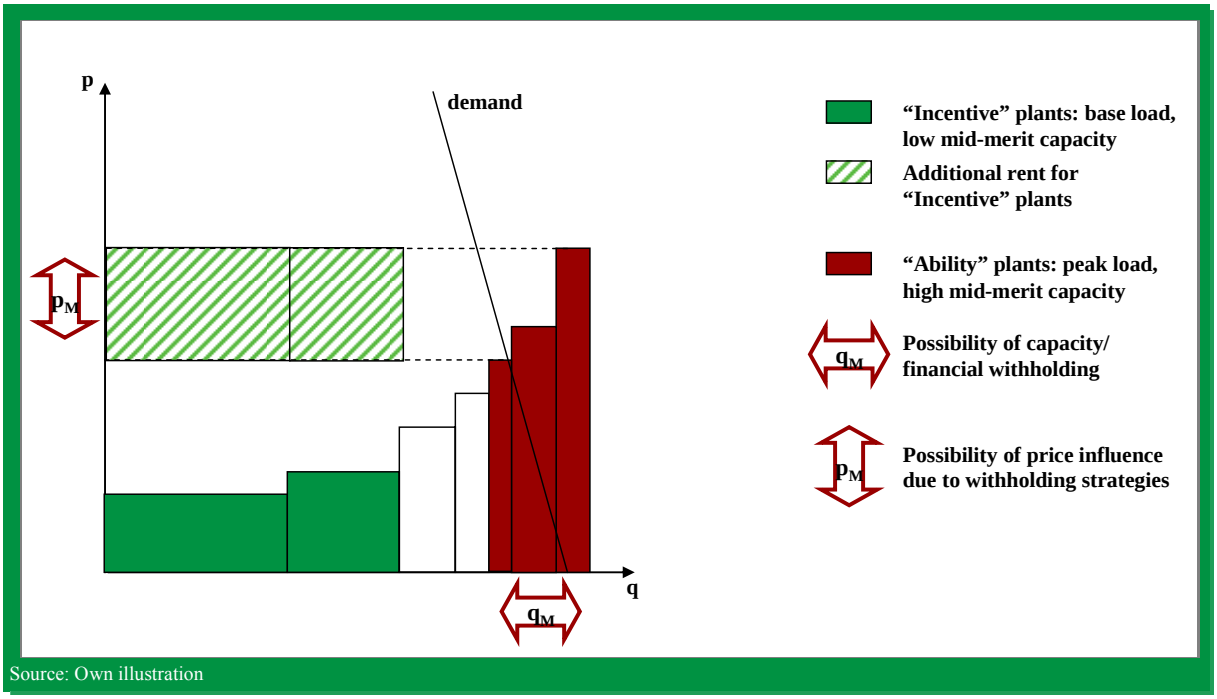
A large number of baseload (e.g. nuclear and hydro plants) and lower-cost mid-merit units provide a significant incentive to abuse market power as they profit from higher prices. Higher-cost mid-merit units also provide a substantial ability to withhold output in order to increase the market clearing price, as they have costs close to the clearing prices for a substantial number of hours during the year. Thus, by giving the merged firm an increased amount of both baseload and mid-merit and peaking capacity, the merger substantially increases the likelihood that Exelon would find it profitable to withhold output and raise price. With its increased share of mid-merit and peaking capacity, the merged firm would be able to reduce output and raise market clearing prices at relatively low cost. And with its increased amount of baseload and low mid-merit capacity, the merger would make it more likely that the increased revenue would outweigh the cost of withholding its higher-cost capacity (Figure 6).

DoJ's assessment was based on an analysis of market power in terms of "incentive" and "ability" assets, and it was somewhat stricter than FERC's divestiture requirements. The DoJ argued that a divestiture of key generating plants would substantially reduce the ability and the incentive to withhold output. As result of the analysis, DoJ required divestiture of specified generating plants including all of the merged firm's mid-merit coal-fired steam units (located at the Eddystone, Cromby, Hudson, Sewaren plants), one of the two combined cycle units at the Linden plant and several efficient peaking units (see Table 3).

Under the terms of the DoJ agreement, Exelon and PSEG would divest fossil-fuel fired electric generating stations with a total capacity of approximately 5,600 MW, assuring that the merger would not adversely affect competition. No divestiture of nuclear capacity or nuclear plants would be required by DoJ, as the increased fossil divestiture would resolve all competition issues and satisfy the requirements imposed by the FERC.[36]

[36] The virtual nuclear divestiture approved by FERC in June 2005 continued to be a FERC requirement even though it was not required by DoJ.

Figure 6: "Incentive" and "ability" plants and the possibility of market power abuse



Source: Own illustration

Table 3: Divestiture assets, Exelon-PSEG merger

Company	Name/Location	Characteristics	Capacity
Exelon	Cromby / Phoenixville, PA	coal- and natural gas/oil-fired facility	345 MW
Exelon	Eddystone / Eddystone, PA	coal-fired, and gas/oil-fired mid-merit and peaking facility	1,408 MW
PSEG	Hudson / Jersey City, NJ	coal- and natural gas-fired facility	991 MW
PSEG	Linden / Linden, NJ	combined cycle natural gas turbine and gas/oil-fired peaking facility	1,544 MW
PSEG	Mercer / Hamilton, NJ	coal- and natural gas/oil-fired facility	777 MW
PSEG	Sewaren / Sewaren, NJ	natural gas/oil steam facility	453 MW
			5,518MW

Source: Exelon Corp., News Release June 22, 2006

5.1.2.3 State of New Jersey

Further analyses were carried out by PAPUC and NJBPU. The NJBPU investigation has a special focus on the impacts on New Jersey. PSEG was the state's only remaining electric and gas utility that has not already been bought by an out-of-state company. During the fall and winter of 2005, the NJBPU conducted a series of public hearings and joined the New Jersey Public Advocate, NJPIRG, the New Jersey Large Energy Users Coalition and many others in filing expert testimony. Furthermore, an unprecedented coalition of residential, consumer and industrial utility ratepayers joined together to oppose the companies' proposed merger. The coalition identified negative effects of the proposed merger focusing on effects on reliability and customer service, and assistance for low-income ratepayers, concluding that the proposed merger would not benefit New Jersey ratepayers.

PAPUC analyzed effects of the merger particularly on Exelon's subsidiary PECO and finally approved the merger with the updated mitigation plan in January 2006. In sum, the New Jersey authorities

requested the divestiture of 10,000 MW of generating capacity, and to pay a "rate relief" of $600-1,500 per customer. Even though the merging parties had reached an agreement on divestiture both with FERC and with the DoJ, this final requirement imposed by the State of New Jersey broke the deal. Exelon and PSEG withdrew the merger case in September 2006.

5.1.3 Assessment

The Exelon-PSEG case shows that the analysis of divestiture must be carried out very detailed, at the level of power plants and also take into account the network topology and the supply demand situation in each hour. This level of granularity is required to detect the potential effects of market power abuse, and to identify the appropriate remedies. The proposed divestiture of "incentive" plants (baseload coal) and some "ability" plants (gas peakers) was calibrated such that the potential adverse effects of market power misuse were minimized.

5.2 Enova and Pacific: divestiture in a vertical electricity-gas merger case

The case of the divestiture of electricity generation capacities of San Diego Gas & Electric (part of the ENOVA Group) in the merger process with Southern California Gas (SoCalGas, part of Pacific Enterprises) is an example where market power was constrained in a vertical merger case; thus a balance was struck between the potential synergy effects of the merger, and the potential anti-competitive effects due to increased market power. The case also shows the divergence of interpretation of modeling results and the need for sophisticated, transparent technical-economic studies as the basis for merger and divestiture decisions.

5.2.1 Point of inception

The point of inception of this case of divestiture was the Pacific Enterprises-Enova merger, which could be interpreted as an example of a "new breed of gas and power convergence mergers" (Bailey, 1999, p. 51). Pacific enterprises main asset was SoCalGas, providing natural gas distribution services to about 5 million customers and 12,500 MW of utility-owned gas-fired generation in Southern California. The partner for this merger was the Enova Corporation whose primary asset was SDG&E, supplying 700,000 natural gas and 1.2 million electricity customers, and owning about 2,000 MW of gas-fired generation itself. Whereas the proponents of the merger suggested a potential for ratepayer savings of about $1 bn, intervenors argued that the merger would lead to increased market power and a potential manipulation of the Southern Californian wholesale electricity market.

Both the Federal and the State regulator considered the Pacific-Enova merger as a " convergence" merger which would lead to an integrated energy company capable of supplying both fuel (natural gas) and electricity in the new "Btu market" (Bailey, 1999, p. 52).[37] If this vertical merger had market power in the natural gas storage and transportation segments, it was argued, it could drive up the wholesale electricity price for the competitors of SDG&E, whereas SDG&E would benefit from

[37] Btu stands for „British thermal units", the measure of energy contained in natural gas.

internal transfer pricing within the merged firm, the so-called "Newbery-effect" (2006). Both the Federal Regulator (FERC) and the State Regulator (California Public Utility Commission, CPUC) found that the proposed merger indeed created the potential for market power manipulation.[38] In addition, with respect to long-term electricity generation capacity intervenors claimed that SoCal-Gas' market power as a gas distribution utility was a "barrier to entry" for generators considering locating in Southern Califonia (Bailey, 1999, p. 54).

All in all, the primary issue for the merger was the potential for, and the impact of, a postulated increase in natural gas prices on spot wholesale energy prices. As gas-fired generation is often the marginal resource setting prices in California's power market, intervenors claimed SoCalGas' system manipulations could be used to influence electric prices from which the corporation's electric generation assets would benefit. Both proponents and intervenors put forward complex models to support their viewpoint.

5.2.2 Divestiture and other measures

The divestiture measures were based upon a detailed market power analysis carried out by FERC.[39] This process quantified potential market power and effects on competition of the analyzed merger. FERC viewed the proposed merger of Pacific Energy and Enova as a case involving the new class of convergence mergers. The objective of a convergence merger is to create an integrated company providing fuel and power and may induce horizontal and/or vertical market power potentials. First, FERC analyzed the potential of horizontal market power regarding the market share of the combined company's unregulated natural gas and power marketing operations and also the market share of the combined company's power generation assets.[40] With respect to power generation assets, FERC agreed to the proponents claim that the amount of Pacific Energy generation assests (less than 200MW) was not a horizontal market power concern. The analysis of horizontal market power in gas distribution was subject to CPUC because SDG&E and SoCalGas are both "Hinshaw" pipelines.[41]

The second analyzed aspect was the potential of vertical market power abuse. Intervenors claimed that the merger could result in a higher market price of electricity because of the ability and the incentive of SoCalGas to manipulate the natural gas prices for electricity generators. To analyze this effect of the proposed merger FERC performed a static market concentration analysis of generation served by SoCalGas with and without competing generation. FERC concluded that, depending on the

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[38] In particular FERC was concerned about the ability of SoCalGas to provide preferential pricing and service to benefit SDG&E's gas-fired generation, and provide SDG&E with competitor gas purchase and SoCalGas system operating information. The CPUC, too, conclude that SoCalGas had vertical market power by virtue of its control over gas transportation and storage assets in Southern California. The CPUC determined that SoCalGas could effectively increase the delivered gas price to California generators and the associated price of power in the wholesale market.

[39] FERC's merger policy generally requires that mergers do not result in an adverse effect on competition, an adverse effect on rates or an adverse effect on state and federal regulation. FERC runs a five-step screening process to analyze these effects of a proposed merger: i) define the relevant product and geographic markets; ii determine the merged entity's concentration level; iii) assess whether new entry will mitigate competitive concerns; iv) assess efficiency gains uniquely provided by the merger; and v) determine if the merger is necessary to maintain the viability of either merger partner.

[40] Both companies had power marketing affiliates prior to the merger, but Pacific Energy relinquished its power marketing certificate with the announcement of the merger.

[41] These companies transport interstate natural gas not subject to regulations under the National Gas Act.

assumptions (transmission capacity, relevant geographic market for power) the announced merger did create the potential for market power manipulation. In particular, it allowed SoCalGas to provide preferential pricing, natural gas purchase information or system operating information to SDG&E. Based on these results FERC recommended a series of measures to mitigate potential anti-competitive effects, such as the sharing of competitive market information and preferential service between SoCalGas and SDG&E and Enova. Furthermore, FERC indicated that the potential of vertical market power abuse would be reduced if SDG&E divested its generation assets. Finally, the approval of FERC was made conditional on a number of mitigation measures that were primarily within the jurisdiction of the CPUC.

The CPUC determined that the announced merger would eliminate SDG&E as a competitor of SoCalGas and increase the horizontal market power regarding natural gas transportation and storage assets. CPUC therefore required SoCalGas to divest options to purchase the Californian facilities of competing interstate pipelines, Kern River and Mohave, thus preserving these pipelines as viable current and future competitors to SoCalGas. With respect to vertical market power CPUC mentioned that SoCalGas could effectively increase the natural gas price to generators and the wholesale price of electricity.[42]

As a result of the analyses, CPUC required in addition to the mitigation measures recommended by FERC, that SDG&E should divest its generation assets to mitigate the potential vertical market power abuse during high demand periods.[43] The Final Judgement of the DoJ specified the divestiture postulation of the CPUC. In detail, the DoJ identified that the proposed transaction would give Enova the incentive and the ability to raise prices significantly during periods of high demand and would therefore have two main effects on competition: first, the competition in the market during high demand periods may be substantially lessened; and second, the prices of electricity to consumers during high demand periods were likely to increase. These effects were mainly caused by the natural gas transportation and storage monopoly by SoCalGas. To preserve competition in Chula Vista, California, Enova had to divest the generation assets Encina in Carlsbad (693 MW) and South Bay in Chula Vista (951 MW) including all real property rights necessary to the operation of the facilities. Further, Enova was enjoined from acquiring or control joining in California Generation Facilities above 500 MW without prior notice to and approval of the United States if Enova does not own or control, in the aggregate, more than 500 MW of capacity of California generation facilities.

5.2.3 Assessment

The divestiture of electricity generation capacity (horizontal) in the (vertical) merger case between SoCalGas and SDG&E shows the interdependence between horizontal and vertical market power analysis, and the need for a comprehensive approach. The merger between market-dominant natural

[42] Proponents and intervenors of the announced merger ran market analysis to measure the effects of the merger and a potential gas price increase. These analyses as well as the FERC analysis revealed the key role of transmission constraints in determining the relevant product market. See Bailey (1999).

[43] The CPUC agreed with the proponents that a gas price increase would decrease the revenue of Enova.

gas distribution company with an electricity utility (with some degree of regional market power) belongs to the new generation of convergence mergers with clear implications on (vertical) market power. In this case, vertical market power was the driving force for (horizontal) divestiture.
The case holds at least three lessons for continental Europe and for Germany:

- Vertical market power is an important aspect of energy sector reform, and it has not been sufficiently addressed in recent merger cases;
- horizontal market concentration ratios (such as the HHI) may be meaningless once vertical market power plays a prominent role in the overall setting. Horizontal divestiture may be motivated by vertical market power issues, even though the horizontal structure of the market seems to be competitive;
- in-depth technical-economic modeling of markets is a necessary condition to make reasonable decisions about divestiture, mergers and other effects of competition policy. Detailed analysis of the type presented in the Enova-Pacific merger is relatively rare in continental Europe, in particular in Germany, but should be made mandatory in all significant cases.

5.3 European experiences with electricity divestitures in the context of mergers

Beside the British experience several other European countries have used pro-competitive measures to cope with competition issues. In fact, in the course of liberalization in Europe, divestiture of electricity generation has occurred regularly, too. It was usually linked to merger remedies to prevent dominant market structures. In the course of the European liberalization process several merger cases have drawn attention of competition authorities. To prevent dominant market structures divestitures have often been used to cope with anti-competitive outcomes of merger cases. Lévêque and Monturus (2007) provide a comprehensive overview about 241 merger and acquisition deals between European electricity and natural gas companies from January 1998 to July 2007. This section briefly reviews the major cases, however without providing a quantitative assessment of the results.

5.3.1 Italy

Italy is an interesting case because divestiture was not directly linked to a merger. The Italian electricity market was dominated by the state utility Enel which owned generation, transmission and distribution assets. After the vertical unbundling the new formed generation only company Enel was partly privatized (the state still holding majority with more than 60%). Due to its dominant market position no real competition could emerge in the short run. Thus in 1999 Enel was requested to divest part of its capacity to reduce its market share below 50%. The divested capacity has been split up into three independent companies which were sold until 2003.

5.3.2 Norway

The Norwegian Competition Authority (NCA) had a close eye on the development of the emerging Scandinavian electricity market, particularly relating to Norwegian state-owned electricity company Statkraft's acquisition of other Norwegian electricity undertakings. In March 2002, the NCA prohibited Statkraft from acquiring 45.5 % of the shares in Agder Energi. When Statkraft took over Trondheim Energiverk (TEV), its largest competitor in Central and Northern Norway, the NCA ordered Statkraft to dispose TEV's production operations or sell off other power production in the area. With Agder Energi's and TEV's facilities Statkraft would increase its share in total power production to 54 % and would own 58 % of the reservoir capacity in Central and Northern Norway.

NCA's intervention was appealed to the Ministry of Labour and Government Administration. The Ministry gave Statkraft permission to implement the purchase of Agder Energi, albeit subject to stringent conditions. Statkraft was required to sell its 20 % stake in Norway's second largest power producer, ECO Vannkraft AS. Furthermore, Statkraft had to divest its 49 % stake in Hedmark Energi AS to an independent third party. In sum Statkraft was forced to divest about 1 TWh. The aim of the remedies was to make market entry possible for one or more companies capable of competing with Statkraft in Southern Norway. In February 2003, the Ministry decided to uphold the NCA's intervention in the case of Trondheim Energiverk. By 2005 Statkraft worked out a divestiture plan in order to retain TEV: it proposed the NCA to sell shares in two sub companies to competitors and lease 65 % of the capacity of the Rana power plant for a period of 15 years (Statkraft, 2005a). However in November 2005 the Norwegian Ministry of Modernisation has resolved to revoke the order issued to Statkraft to sell TEV (Statkraft, 2005b).

5.3.3 Finland

The proposed acquisition of E.ON Finland Oy, the Finish part of the international E.ON AG Group by Fortum Power and Heat Oy, a subsidiary of Fortum Oy producing electricity, heat and steam has drawn attention of the Finish Competition Authority (FCA). Fortum is primarily active in the Nordic countries and the Baltic rim. Particularly in Finland, Fortum has a strong position in the production and wholesale of electricity. The business of E.ON Finland (former Espoon Sähkö) is primarily composed of the production, purchase and sales of electricity and district heating and the distribution of electricity.

The FCA determined the effects of the acquisition on competition regarding generation, distribution and transmission of electricity in the Nordic countries and district heating in regional markets. The main focus of the investigation was that a dominant position should not arise or be strengthened by the acquisition. Regarding generation and wholesale electricity market FCA concluded that the market does not effectively restrict the ability to affect the wholesale electricity prices and hence imposed conditions for the approval of the acquisition (FCA, 2006a).

The conditions comprised plant divestiture in the full amount of 214 MW located in Haapavesi (peat condensate power plant) and Hämeenlinna (combined power and heat production plant and gas turbine

power plant). Furthermore Fortum shall lease its share in the Meri-Pori coal-fired power plant until 30 June 2010 and offer to the Finnish market an annual 1 TWh of virtual capacity until 31 March 2011. The virtual divestiture is defined as a fixed amount, i.e. an even power throughout the year which should be sold to a competitor or a potential competitor independent of Fortum. The conditions are temporary as the situation in the Finnish electricity market is expected to change by the end of the decade when the new Olkiluoto nuclear power plant and the new transmission capacity between the Finnish and Swedish electricity networks will be completed (FCA, 2006b).

5.3.4 Denmark

DONG Energy, the Danish oil and natural gas incumbent, started to expand its activity into the power market by acquisition of stakes in power companies at the beginning of the 2000s. The European Commission, under the EU Merger Regulation, has approved the acquisition of sole control of Elsam and Energi E2, regional electricity generation incumbents in Denmark, and of Københavns Energi Holding A/S and Frederiksberg Elnet A/S, Danish electricity suppliers, by DONG, subject to conditions and obligations. After an in-depth inquiry, the Commission initially found that the deals would have anti-competitive effects in several markets along the gas supply chain in Denmark (EC, 2006a). These effects would have resulted from the combination of DONG's dominant position and the removal of actual and potential competition as well as the ability that DONG would then have to weaken its remaining competitors on the market. In particular, the Commission found that the transaction would have resulted in the removal of actual potential competition on the natural gas wholesale and retail markets, raised entry barriers on these markets, foreclosed an important segment of the Danish demand for natural gas, and that it strengthened DONG's ability to raise its rivals' costs for storage and flexibility.

To address the concerns identified by the Commission, DONG offered to divest the larger of its two Danish gas storage facilities. Furthermore, DONG will implement a programme releasing significant volumes of gas, equivalent to 10% of Danish demand in 2005. The gas release programme will include 6 yearly auctions of 400 million cubic meters for a total duration of 7 years. The auction will have two stages, whereby the primary auction will involve swapping the auctioned lots between the Danish hub and any of four northern European hubs in the UK, the Netherlands, Belgium and Germany. If all lots are not disposed of in the course of the primary auction, any remaining volumes will be sold against cash settlement in a secondary auction. The auction can be seen as a natural gas equivalent to a virtual power plant divestiture. The storage remedy will reinforce the effect of the unbundling of natural gas infrastructure assets which has already taken place in Denmark, and create conditions for competition in the provision of natural gas storage services. The gas release remedy will improve the liquidity of the Danish gas market and ensure that gas users will not face less choice than before the merger (EU, 2006a).

On the basis of past experience in carrying out such remedies, as well as detailed comments by energy market operators, the Commission concluded that the divestiture would establish a second,

independent player on the Danish storage market. In addition, the gas release will spur new entry onto the Danish natural gas market and increase the flexible liquidity of the wholesale market as well as free up contractually locked-in customers.

Related to this case is a transaction between Vattenfall and DONG. In order to get the sole control over Elsam DONG had to buy the remaining 35 % Vattenfall owned and offered plant capacity to obtain the share. Due to the important role Vattenfall plays in North Europe's electricity markets the transaction was inspected by the European Commission. The Commission concluded that Vattenfall's entry into Danish electricity markets would not lead to a significant impediment of effective competition in the European Economic Area or any substantial part of it. The Commission analysed the potential impact of the concentration on electricity markets in various countries, in particular whether Vattenfall, due to its significant presence in Denmark, Sweden and Germany, would have the ability and incentive to influence prices at the Nordic power exchange NordPool. However, the investigation showed that Vattenfall's market power would not be significantly changed by the operation. Thus DONG divested 2,400 MW of fossil and wind capacity to Vattenfall in return for obtaining the remaining 35 % share of Elsam and the 40 % share of Vattenfall in Avedøre 2, a multi-fuel power plant near Copenhagen (EU, 2006a).

5.3.5 France

The French natural gas market faced a serious restructuring in 2006 when the French government announced plans, which had apparently been in development since summer 2005, to merge French energy groups GdF and Suez. In the course of this merger GdF would have to be privatized. Short beforehand the Italian company Enel announced its interest in acquiring the energy-related businesses of Suez's. The intervention of the French government was considered by Enel as a veto and thus lodged a complaint with the European Commission (EC, 2006b). Furthermore, the Belgian competition authorities raised concerns as both large Belgian utilities are owned by the both French companies respectively.

The Commission's initial market investigation has found that the proposed transaction would raise significant competition concerns at all levels of the gas and electricity supply chain in Belgium and at all levels of the gas chain in France, given the horizontal overlaps and the vertical relationships between the two companies' activities. The Commission found that the merger would lead to high combined market shares in Belgium and removed GdF as the strongest competitor to the incumbents Distrigaz (natural gas) and Electrabel (electricity and to a lesser extent natural gas). The removal of GdF's competitive pressure would also have raised competition concerns with regard to the supply of gas to gas-fired power generators competing with Electrabel. Moreover, in view of its specific assets and strengths, no other company would have been able to reproduce the same level of competitive pressure as GdF. For France the Commission found that the merger strengthens GdF's dominant position by removing the competitive pressure exerted by Distrigaz, one of its best placed competitors. In addition, the proposed transaction would give the new entity control of most natural gas imports

into both Belgium and France. As limited liquidity of natural gas independent of the new entity the risk of excluding competitors from the downstream gas and electricity markets would increase. Furthermore, the Commission has identified potential vertical problems stemming from ownership of essential infrastructure e.g. due to the parties' control over Fluxys, the Belgian network operator, they would have had privileged access to natural gas supply infrastructure and storage. Finally, competition concerns would also have arisen in the market for district heating in France, where the merger would have combined the largest player (Suez) with its second largest competitor (GdF), thus leading to a further concentration of this market (EU, 2006b).

The Commission is therefore concerned that the merger would remove important competitive constraints that the two companies currently exert on each other, and may create or strengthen barriers for third parties to enter the market, thereby undermining the benefits of the on-going liberalisation of the energy sector in both Belgium and France. The European Commission expected both parties to offer extensive remedies. The parties proposed to divest GdF's stake in Belgian SPE, the second largest energy producer and supplier in Belgium, and a quarter of Suez's subsidiary Distrigas. The Commission did not consider the remedies sufficient to counter the anti competitive effects of the merger and demanded further measurements (Lévêque and Monturus, 2007). The former proposal was extended by the parties: Suez will divest Distrigaz (including its French activities) and relinquish control over Fluxys. GdF will in turn divest its shareholding in SPE and, to address the concerns in the district heating market, divest its subsidiary Cofathec Coriance. Furthermore, a series of investment projects will be carried out both in Belgium and in France with a view to increasing infrastructure capacities, thereby facilitating the entry of new competitors into the market and fostering competition. Most notably, the functioning of the Zeebrugge hub in Belgium will be enhanced through the creation of a single entry point linking all networks converging on Zeebrugge and through the operation of the hub by an independent operator, Fluxys, which will no longer be controlled by Suez.

The Commission carefully assessed the revised remedies and concluded that the final package would be sufficient to remove all competition concerns in a clear-cut manner. The remedies are consistent with the preliminary findings of the ongoing energy sector inquiry which emphasise the need for structural solutions, such as ownership unbundling and severing the link between supply and infrastructure to create pro-competitive conditions for the sustainable development of energy markets.

However, the merger did not yet took place as GdF would have to be privatized beforehand and the French Constitutional Council rejected a privatization before the whole liberalisation of energy markets in July 2007.

On 3 September 2007 the two companies announced their final agreement on the merger. The merged entity would become the fourth largest player in the European energy market, behind Gazprom, EDF and E.ON. The state of France will hold a minority blocking stake, as it will directly own over 35% of the new entity thus no full privatization is planned and 65% of Suez Environment will be sold via the stock market. Whether this merger schedule will finally pass all stages is currently unclear.

5.3.6 Spain and Portugal

The Spanish electricity market is more or less a separated island in the European grid as only few cross border capacities exists. Thus imports are no viable option for fostering competition in the market. As the market was dominated by four companies at the beginning of liberalization merger control became a relevant issue of competition policy. This has been shown in the case of a proposed merger by Endesa and Iberdrola. In order to get the approval both companies were willing to divest 16 GW of generation capacity and part of their distribution network. Nevertheless, after the European Union demanded further remedies the companies withdrew their merger plans as the expected revenues were not feasible anymore (Crampes and Fabra, 2004).

The proposed acquisition of joint control over Gás de Portugal (GDP), the incumbent gas company in Portugal, by Electricidade de Portugal (EDP), the incumbent electricity company in Portugal, and Eni, an Italian energy company has also drawn the attention of the European Commission in 2004 (EC, 2004). The Commission was concerned that the transaction could significantly strengthen EDP's dominant position in the electricity wholesale and retail markets and simultaneously strengthen GDP's dominant position in Portuguese gas markets. The results of the Commission's first phase investigation indicate that the merger may remove GDP as a potential competitor of EDP in Portuguese electricity markets and will also remove EDP as a potential competitor of GDP with respect to wholesale supply of gas in Portugal. Furthermore the Portuguese electricity market heavily relies on natural gas fired power stations. Thus the concentration may foreclose the electricity markets for new entrants. Finally the combined electricity gas company may also discourage new entry of gas suppliers into the Portuguese markets as the new entity has a significant part of the gas customer base in Portugal. In December 2004 the European Commission has decided to prohibit the proposed acquisition as it would have impeded effective competition.

6 Executive Summary

- Given insufficiently competitive wholesale electricity markets in Germany there is an ongoing discussion about the appropriate instruments of a pro-active competition policy. This study analyzes horizontal divestiture form an economic perspective. We discuss the conceptual justification of divestiture and report on selected empirical evidence on divestiture.
- Horizontal divestiture of one or few market dominant firms leads to intensified competition; other things being equal, prices will drop. A part of the oligopoly profits (producer rent) is transferred to consumers; overall welfare increases. Divestiture can also be an appropriate instrument in merger cases to avoid dominant market position of the merged firm.
- This study reports effects of divestiture in selected cases; among these effects are reduced prices; intensified competition and increased innovation. In some cases we find that the effects are long-term.

- In the English electricity sector, divestiture of electricity generators led to intensified competition and falling prices. Similar divestiture can also be observed or is planned in two U.S. States (California and Texas, respectively).
- In two classic Antitrust cases in the U.S., divestiture led to significantly improved competition, lower prices and accelerated technical progress (cases of AT&T and Standard Oil).
- In two recent merger case of energy companies in the U.S. divestiture played an important role in maintaining a competitive structures, both horizontally (Exelon-PSEG merger project) and vertically (SoCal Gas and San Diego Gas & Electric).
- We also quote a variety of divestitures in other countries and in other sectors. It is often difficult to quantify the effects precisely, because the external conditions change rapidly.

- We conclude that divestiture is an instrument of a proactive competition policy that can enhance competition in a sector and lead to lower prices. Both economic theory and the empirical analysis presented in this study imply the positive effects of divestiture on consumers and on social welfare. The cases also indicate the need for detailed market monitoring in real time.

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