

# THE EU'S MAJOR ELECTRICITY AND GAS UTILITIES SINCE MARKET LIBERALIZATION

GOUVERNANCE EUROPÉENNE ET GÉOPOLITIQUE DE L'ÉNERGIE

10

Christian SCHÜLKE



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TOME 10

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## Executive Summary

This study focuses on the evolution of major European energy utilities since the 1990s, when the liberalization of the European electricity and gas markets started. The author uses case studies in order to analyze how the largest companies in the sector adapted their strategies in the last fifteen years. All of them entered the markets of other EU countries, with some of them now being present in nearly all Member States. All utilities diversified their business activities in the energy sector, notably by developing their activities in electricity and gas. Thanks to numerous mergers and acquisitions, a limited number of big companies (the “Big-7,” or “seven brothers” as some call them mockingly in a reference to the “seven sisters” of oil majors) have an increasing share of the EU electricity and gas market. In this study, we analyze in more detail the EU’s seven largest utilities (by revenues in 2008): E.ON, GDF Suez, EDF, Enel, RWE, Iberdrola, and Vattenfall.

The first part of the study consists of detailed case studies of these seven companies. A group of mid-size utilities is presented in shorter paragraphs. Our analysis focuses on strategies, operations and assets, and gives less attention to financial aspects and energy trading. As for energy business sectors, we concentrate on electricity generation, transmission, distribution and supply, as well as natural gas downstream. By analyzing the evolution of the seven largest utilities since market liberalization, we aim to present the *status quo* of the company landscape of the European electricity and gas market.

In the second part, we give a short overview of the situation in major European electricity and gas markets today, presenting



the main companies in every market, their market shares and specificities of each market.

## Main Conclusions

In the conclusion, we identify some common features of major European electricity and gas companies. In the context of liberalization – even before the first directives were passed – there was a lot of movement in the sector. For many companies, we observe the *diversification of traditional business sectors*, as they entered the water, waste and telecommunications sectors. But many of them left these sectors again shortly afterwards and concentrated on their “core business,” i.e. energy. It is also notable that several energy utilities spun off participations in non-energy sectors (industry, real estate); this is for example very much true for the two largest German utilities E.ON and RWE.

At the same time, a strong general trend towards diversification of activities within the energy sector can be observed for all major utilities. All the companies now have electricity and natural gas activities, even if this is not true for all their countries of operation. The *synergy effects between electricity and natural gas* are obvious, as many customers need to be supplied by both products. Moreover, natural gas plays an increasingly important role for electricity generation. The respective importance of electricity and gas differs among major utilities: electricity and gas account for more or less equally important shares of total revenues in the case of E.ON and GDF Suez. For EDF, Enel, Iberdrola and Vattenfall, electricity clearly dominates, even if all of them are currently developing their gas activities. RWE is somehow in between these two groups.

It is important to note that these seven companies dominate the European electricity market, as they account for around 55 percent of the EU's electricity generation. The picture is different in natural gas, where major utilities like E.ON, GDF Suez and RWE share the market with other important players like Eni, GasTerra or Wingas. It is obvious (even if sometimes overlooked) that the important differences

between natural gas and electricity – which are two fundamentally different products – have an important impact on market structures.

All major utilities have used the opportunities of market liberalization for entering new markets in other European countries. Besides purely economic factors – which are, of course, the most important –, *geographical and cultural proximity* have played a decisive role in expansion strategies. Many utilities have, at least in the early stages of market liberalization, invested in countries surrounding their home market, or in countries that are culturally close. For instance, utilities from many Western European countries have participated in the (still ongoing) privatization of the energy sector in Central and Eastern Europe – but German companies are by far the most present. The United Kingdom is a special case, as nearly all of the large utilities are present there: the openness of the British energy market has attracted many investors from other EU countries, and led to a situation where most of the UK's utilities are controlled by foreign groups.

*Companies from outside the EU play a very limited role in the European electricity and gas market:* trans-border mergers and acquisitions are mostly intra-EU/European. The case of US energy companies is interesting in this context, as many of them invested in Europe in the 1990s, but then quickly divested their assets again due to economic failure. One should note, however, the growing presence of Gazprom in the wholesale and retail gas markets. *Many of the larger European utilities have assets outside the EU*, with investments in the Americas being the most significant. Several European companies have invested in the US (especially in the renewable energy sector). Spanish, Portuguese and Italian utilities have acquired sizeable assets in Latin America, too. Another important market is Russia, where E.ON, Enel and Fortum – companies headquartered in countries that have traditionally close links with Russia – have made large investments in electricity generation.

We do not discuss the legal aspects of European legislation in detail, but briefly assess their impact. *Ownership unbundling of transmission networks* is still not required, even under the EU's third liberalization package which passed in 2009. However,

we can observe a clear trend towards the divestment of transmission and, to a lesser degree, distribution activities by large utilities. Most major utilities now focus on electricity generation and supply of electricity and natural gas, with increasing interest in natural gas production as well. But large parts of the transmission and distribution networks in the EU are still owned by incumbent utilities that, of course, remain active in other parts of the value chain, like generation and retail. Some of the major utilities continue to consider transmission as one of their key assets and want to keep these regulated activities. It will be interesting to watch if they will stick to this strategy given the new regulatory conditions set by the third package.

As for *company ownership*, we observe that a large number of utilities are partly state-owned today. This marks an important change, if compared to the situation twenty years ago, when nearly all energy utilities were state-owned at 100 percent. The overall trend is clearly towards a lesser degree of state ownership, and hence a continuation of privatization. Only one of the “seven brothers” is still state-owned at 100 percent (Vattenfall). On the other hand, only in two of them, public bodies do not have any significant participation (E.ON and Iberdrola). The picture is similar for the mid-size utilities, i.e. the group of companies that follow the “seven brothers” in terms of revenues.

*All European utilities now publicly underline their big interest in renewable energies and commit themselves to reducing their CO<sub>2</sub> emissions.* A closer look at their production portfolios, however, shows that most of them have, for the time being, only a small part of “new” renewable production (i.e. electricity produced from renewable sources other than hydro). All major utilities are “latecomers” for wind, solar and biomass energy, but most of them currently plan to strongly develop offshore wind. *EU ETS has had only a limited impact in this context until now*, as it has changed merit orders in some cases, but it has not yet led to a significant change of energy mix and decisive decarbonization. In the view of many economists, cartel authorities and NGOs, EU ETS has rather produced windfall profits for companies, as permits have been distributed for free. Companies, of course, deny this accusation.

It is not our intention to contribute to this debate, but we believe that the *start of full auctioning of emission permits in 2013* in the EU-15 will bring an end to this problem. Once utilities will need to pay for the totality of their CO<sub>2</sub> emissions, renewable energies and nuclear power will become more attractive options. At least to a certain extent, this is also true for natural gas, as power production from gas emits roughly 50 percent less CO<sub>2</sub> than power production from coal. The perspective for Carbon Capture and Storage (CCS), on the contrary, seems more limited. At least for the time being, major European utilities are not ready to invest a significant amount of capital in this technology, which still needs to prove its reliability and already encounters sizeable local opposition in many places.

*The EU-wide expansion of major European utilities has been much faster than the integration of national markets.* Important differences between the markets of every Member State remain. It turns out that European directives have been implemented in different ways and with significantly different results by Member States. Moreover, most countries have not yet totally implemented the directives of the second package. National traditions and legacies from the past need to be taken into account – they often have a long life and present important political obstacles for liberalization. It also needs to be underlined that many governments favor, in one way or another, the creation and protection of “national champions,” whether they are owned by the government or private business.

Utilities have largely entered other European electricity and gas markets. This fact as such certainly contributes to the gradual integration of the markets, even if this will be a rather indirect side-effect. One needs to stress that for the time being *the relevant market for electricity and gas is still national in most cases*, with the notable exception of the Nordic electricity market. Encouraging progress is made in some other regions: the integration of the “Central Western European”<sup>1</sup> electricity market for instance has seen some important advances lately.

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1. Trilateral market coupling between France, Belgium, and the Netherlands since 2006; Germany and Luxembourg are to join in 2010.

On the other hand, the relevant market can even be sub-national (i.e. regional or local) for some parts of the value chain: supply in the residential market, for instance, is very much dominated by local companies in some countries.

*Overall, there is a greater tendency towards market integration on the European level in recent years.* This can be seen, for instance, at the institutional level, where mergers of power exchanges have taken place and enhanced cooperation between regulators emerges. The *crucial role of interconnections* (electricity lines and cables, gas pipelines) must be underlined in this context: in many places, this basic condition for market integration is still lacking or underdeveloped. This problem is widely recognized, but the construction of interconnectors has turned out to be difficult in many places: sometimes the economic interests of the involved players on both sides are diverging, and in many cases there is a high level of local resistance.

Moreover, the rules governing the access to interconnectors and the harmonization of overall market rules must be improved. Given these problems, the European Commission and European regulators have proposed, and now gradually implement, a *regional approach to market integration*. This approach is a good start, even if it only constitutes an appropriate intermediate step towards an EU-wide market.

## Introduction

The European Union (EU) started to liberalize its electricity and gas markets in the mid-1990s. The British and Scandinavian examples of electricity and gas market liberalization some years earlier, as well as positive experiences in the liberalization of the telecommunications sector, had been a motivation for the European Commission to propose EU-wide legislation on the issue. The first directives were adopted in 1996 for electricity (96/92/EC) and 1998 for natural gas (98/30/EC). A second liberalization package was passed in 2003 (directives 2003/54/EC for electricity and 2003/55/EC for gas), which imposed further measures in order to liberalize and integrate the European energy market. A third energy package was adopted in early 2009 and will come into force in March 2011.<sup>1</sup> The reforms imposed by these legislative packages are intended to create or increase competition in those parts of the value chain where this is feasible, i.e. electricity generation, electricity supply, gas production, gas import and gas supply. Competition cannot be a goal in the network-based part of the value chain, as transmission and distribution are natural monopolies in electricity and gas alike. The EU's energy liberalization legislation also has a second objective: creating an integrated European electricity and gas market. The "single market" as one of the main features of the European integration is thereby also applied to electricity and gas. Due to the particularities of these goods, it

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1. Directives 2009/72/EC for electricity and 2009/73/EC for gas, as well as three regulations: 713/2009 establishing an Agency for the Cooperation of Energy Regulators, 714/2009 on conditions for access to the network for cross-border exchanges in electricity, 715/2009 on conditions for access to the natural gas transmission networks.

is, of course, much more difficult to realize a single market for this sector than for most other economic goods or services. We do not discuss the different aspects of market liberalization as such here, as this has been done extensively elsewhere.<sup>2</sup>

The liberalization of the European electricity and gas markets has had important effects on the companies operating in the sector. European energy utilities have indeed undergone profound changes in the process of liberalization, as they became exposed to competition. Moreover, a rapid process of Europeanization of the sector took place, as all major utilities started to invest abroad. The capacity of most utilities to adapt to the new market conditions has been a surprise to many observers. In a relatively short amount of time, the company landscape has changed significantly: one must bear in mind that less than twenty years ago, there was strictly no competition between utilities in Europe. Industrial and residential customers had no choice but to buy electricity and gas from a sole supplier, which in most cases was a public company. Utilities enjoyed a monopoly position in their national or sub-national market. Cross-border electricity exchanges existed on a rather small scale (for example, using hydropower potential of neighboring countries), but this did not lead to competition.

A quote by Per Högselius on the development of the European electricity industry nicely summarizes these changes under the framework of “institutional revolution.” With some adaptations, this analysis could also be applied to gas: “During the past two decades the European electricity industry – defined in terms of the production, transmission, distribution and sale of electricity – has gone through what may be called an ‘institutional revolution.’ Politically, this revolution has centered around the issue of liberalization and cross-border integration of electricity markets, with – failed and successful – attempts to create new legal frameworks, new regulatory mechanisms and new marketplaces. From a business perspective, the institutional revolution has taken the form of new firm strategies, new competitive and cooperative relations among actors and not least a radical wave of mergers and acquisitions. The

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2. See for example Glachant and Lévêque [2009] or Percebois [2008].

ownership landscape in the European electricity market has been radically altered, both within individual countries and through a far-reaching internationalization.”<sup>3</sup>

Before liberalization started, substantial differences existed between Member States in terms of company structure in electricity and gas markets. Some had national state-owned monopolies (like *Electricité de France* [EDF] and *Gaz de France* [GDF] in France, or the *Central Electricity Generating Board* in the United Kingdom [UK]), whereas others had a mix of public and private companies which operated in their respective region (for example, Germany). The case of Central and Eastern Europe was distinct again, as these countries had communist-style centrally-planned economies until 1990. In many cases, the structure of the energy market reflected the general approach of a country towards the organization of its economy (strong role of the state vs. strong role of the private sector) and public administration (centralized or federal). Moreover, the energy mix of every Member State was the result of its endowment with energy resources and political choices (for example, for or against nuclear power). These characteristics are factors with a long life and can – at least partly – explain why the different European directives and regulations have not (yet) led to more similar electricity and gas markets all over the EU. Moreover, national economic traditions are indeed an obvious obstacle to the unification of national markets.

Some examples can illustrate the differences between the Member States’ energy markets:

- The number and market shares of major electricity and gas companies differ: in some Member States, there are still (near-) monopolies for electricity production and electricity and gas supply. In others, a large number of companies are active in these sectors, with no single company having a market share above 25 percent.
- Some Member States have opted for ownership unbundling of electricity and gas transmission systems; others have not. Some form of unbundling short of ownership unbundling (legal, functional, accounts) has, however, been introduced

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3. Högselius [2009], p. 258.



everywhere, and the third package imposes a further tightening of unbundling.<sup>4</sup>

- Some Member States have privatized state-owned electricity and gas companies; others have not. A clear trend towards privatization can be observed, though.
- In 15 Member States, regulated prices still exist for electricity (alongside market prices). In 13 Member States, regulated prices still exist for gas. In the remaining Member States, the market fixes electricity and gas prices.<sup>5</sup>

In the 1990s, electricity and gas companies, as well as national governments, have addressed the upcoming market liberalization in globally similar ways. Many argued that only larger and financially strong companies would be able to compete in the liberalized market. Many companies therefore tried to grow bigger in the early stages of market liberalization by acquiring or merging with other companies inside their country. Another strategy consisted of entering new business sectors like water or telecommunications. Several governments, especially those of countries with a fragmented electricity and gas sector, promoted the creation of strong “national champions” (for example, E.ON and RWE in Germany, Endesa and Iberdrola in Spain, Electrabel in Belgium). In other countries, strong “national champions” were kept intact (EDF and GDF in France, Vattenfall in Sweden). Great Britain is the only major European country where national monopolies (Central Electricity Generating Board and British Gas) were split up in order to create a competitive market. In Italy, the incumbent electricity company, Enel (Ente Nazionale per l’Energia Elettrica), was forced to sell an important part of its production assets, but Eni’s strong position in the Italian gas market has been left intact.

In a second step which was at its height in the late 1990s and early 2000s, most major utilities started to look abroad for acquisitions. In this process, all major utilities entered other European countries. Their motivation was threefold: first,

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4. Ownership unbundling is implemented in 15 electricity TSOs and 12 gas TSOs. European Commission (2009), p. 10.

5. ERGEG press release of 27 March 2009.

growth in the home market was barely possible for most of them. Second, new business opportunities emerged in neighboring countries in the context of market liberalization. Third, many large historic incumbents also benefitted from large surpluses in their regulated home markets, easy access to capital and money available from divestments – they were cash-long at that time. Per Högselius, in his study of Vattenfall's internationalization, gives still another motivation for large utilities to grow abroad: Vattenfall's "internal culture was [always] heavily oriented towards expansion and growth," to the point that the management was convinced that "a company without growth would not be able to survive on the long-term." As growth opportunities inside the Swedish electricity sector barely existed anymore, the company eventually chose to enter the electricity sectors of other European countries – also fearing that it might lose "its respected position in the community of major European electricity companies unless it [...] became more internationally active."<sup>6</sup> We suppose that similar arguments were made at other large utilities and used in order to justify investments abroad. The perception of peer pressure, for instance, was certainly an important factor in the decision-making processes.

The wave of very large mergers and acquisitions seems over now, but one cannot rule out further deals. Still, market concentration is more likely to continue via smaller or mid-sized acquisitions. In 2009, for instance, Gas Natural acquired Union Fenosa, Vattenfall acquired Nuon and RWE acquired Essent. Many formerly purely national utilities have become important players abroad and now realize large parts of their business outside their traditional home market – in many cases more than 50 percent of their revenues. The largest utilities are now present in nearly all Member States of the EU. Some of them clearly consider the European Union as the relevant strategic level. By doing so, they proceed faster than the market reality on the ground: in the absence of a sufficient level of interconnections, energy markets in the EU are still mostly national.

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6. Högselius (2009), p. 259-260.

One of the leading scholars on European electricity markets, David Newbery, has called the merger activities following market liberalization a “dramatic merger wave,” and has criticized that many mergers with adverse consequences for competition have been allowed by the competition authorities: “many mergers have been allowed to proceed that would cause economists considerable disquiet.”<sup>7</sup> In the context of merger control – but also when considering the electricity and gas markets in general – the question of the “relevant market” has been widely discussed. No simple answers are possible. The European Commission (Directorate General for Competition [DG Competition]), which is the relevant authority for the approval of cross-border mergers in the EU, mainly considers national markets as the relevant markets. This might be right in many cases, but there has been debate about the demarcation of the relevant market in some competition cases. Indeed, electricity and gas markets are larger than national in some cases, but smaller (i.e. sub-national) in others. The definition of the “relevant market,” of course, also depends on the part of the value chain under consideration.

Given the large number of “mega-deals” in the last decade, an outside observer might indeed wonder why European energy utilities have been so keen to merge and acquire. The point that only big companies survive in a liberalized market can be questioned. The idea that larger companies will enjoy huge synergy effects after mergers and acquisitions is rarely true. Indeed, smaller players often have higher profits. According to Michel Godet, “in reality, more than one out of two, perhaps even two out of three, mergers fail. This is essentially due to the incompatibility of formerly separate and distinct corporate cultures. Indeed, only about one out of ten mergers creates value for the acquiring firm.”<sup>8</sup> David Newbery underlines the personal interest of utility managers, as they (and their bank advisors) can earn more money when spending profits on acquisitions rather than returning them to shareholders. But

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7. Newbery (2007), p. 1-2.

8. Michel Godet analyzed mergers and acquisitions in all economic sectors, but his findings are probably just as valuable in the energy utility sector as in other sectors. Godet (2006), p. 57.

**Table 1. Major Mergers and Acquisitions in the European Electricity and Gas Sector (1998-2009)**

Year	Deal	Value (€bn)
2007	Enel + Acciona / Endesa	43.4
2000	Veba / Viag (E.ON)	38.0
2008	GDF / Suez	29.2
2002	National Grid / Lattice	19.2
2007	Iberdrola / Scottish Power	18.3
2009	Gas Natural / Union Fenosa	16.7
2001	E.ON / Powergen	15.3
2008	EDF / British Energy	13.5
2008	E.ON / Endesa and Enel assets	11.8
2003	E.ON / Ruhrgas	11.2
2003	Suez / Electrabel	11.2
2005	EDF + AEM / Edison	11.0
2009	Vattenfall / Nuon*	10.3
2002	RWE / Innogy	8.5
1999	Suez / Tractebel	7.5
2009	RWE / Essent	7.3

\* Acquisition in several steps: Vattenfall acquired 49 percent of Nuon in 2009 and will acquire the remaining shares in the coming six years.

Source: Lévêque and Monturus (2008), p. 297 and own research.

he also points to the fact that mergers between generation and supply companies are an attractive risk-reducing, and hence, synergistic strategy.<sup>9</sup> Moreover, we need to underline that some activities in the energy utility sector like nuclear or coal generation are very capitalistic: it is clear that companies need a certain size in order to be able to finance and build large plants. Of course, this favors large groups.

The seven largest utilities in 2009 – EDF, E.ON, Enel, RWE, Vattenfall, GDF Suez, Iberdrola (listed by electricity production in Europe in 2008) – account for around 55 percent of electricity generation in the EU. The share of the largest companies has been on the rise in recent years, due to mergers and acquisitions. Back in 2004, it was still at around 50 percent for the

9. Newbery (2007), p. 1.

**Table 2. The EU's Largest Electricity Producers (2007 and 2008)\***

	2007		2008	
	Production in TWh	% of overall production	Production in TWh	% of overall production
EDF**	647	20	641	20
E.ON	217	7	243	8
Enel	94	3	197	6
RWE	173	5	187	6
Vattenfall	168	5	161	5
GDF Suez (Electrabel in 2007)	141	4	145	5
Iberdrola	66	2	95	3
CEZ	74	2	68	2
Fortum	52	2	53	2
Statkraft	45	1	53	2
British Energy	58	2	52	2
DEI/PPC	54	2	52	2
Scottish&Southern	47	1	46	1
EDP	47	1	40	1
Union Fenosa	34	1	32	1
Verbund	28	1	28	1
Drax	27	1	27	1
Dong	20	1	19	1
Nuon	17	1	16	1
PVO	17	1	15	1
Endesa (included in Enel in 2008)	121	4	n.a.	n.a.
Overall generation in EU27	3,183	–	3,206	–

\* We have decided to use these figures published by PwC/Enerpresse, as the authors have calculated the numbers according to a common methodology, which facilitates comparison. According to this data, the eight largest companies generated 51 percent of electricity in Europe in 2007. The top 22 produced 67.5 percent. In 2008, the seven largest companies produced around 52 percent of electricity in Europe and the top 20 produced 68 percent. Since then, the share of the seven largest companies has still increased, inter alia due to the acquisitions of British Energy by EDF, Essent by RWE and Nuon by Vattenfall.

Production as published by the companies differs when compared to data by PwC/Enerpresse, mainly due to differences in accounting and consolidation, but also because of differences in geographical scope. For comparison, production as published by the seven largest companies in their 2008 Annual Reports: EDF 595 TWh, RWE 224 TWh, E.ON 224 TWh, Enel 208 TWh, GDF Suez 164 TWh, Vattenfall 163 TWh, Iberdrola 94 TWh.

\*\* EDF includes 100 percent EnBW and 100 percent Edison.

N.B.: TWh: terawatt hour.

Sources: 2007 data: PwC/Enerpresse, Climate Change and Electricity, November 2008, <http://www.pwc.fr>; 2008 data: PwC/Enerpresse, Changement climatique et électricité, November 2009, <http://www.pwc.fr>; own calculation for market shares.

seven largest producers at that time. As the share in electricity generation is seen as the most important element when assessing market power in electricity, one could ask if we are moving towards a European oligopoly with a small number of companies dominating the market. Richard Green, for instance, argues that these large utilities could see little incentives to compete: due to the relatively limited number of large companies that are active in many national markets (theory of multi-market contact), he argues that they could choose not to compete aggressively across Europe.<sup>10</sup>

In our opinion, it is still too early to analyze clearly the effect of European-wide expansion of major utilities via mergers and acquisitions. Only the future will show if a European oligopoly with limited competition emerges, or if, on the contrary, the expansion strategies of Europe's largest utilities bring along competition. After all, if between five and ten big groups remain, this could be enough to see competition develop. Moreover, the effects of further market integration on company structures and competition remain to be seen. Electricity and gas are indeed very specific sectors of the economy with high fixed costs and substantial investment needs. This necessarily limits competition. Maybe a small number of large groups is the only way to make competition work?

Be this as it may, one trend is obvious: a small number of large groups is controlling an increasing part of the European market. As mentioned above, this is true for electricity where seven groups control about 55 percent of electricity production. But this also applies to downstream gas markets. Interestingly, the two largest gas marketers (in volumes sold) in the EU are also major electricity producers: E.ON and GDF Suez. These two companies were also the two largest European energy utilities in terms of total revenues in 2008. Eni, an oil and gas company with vast upstream activities, and GasTerra, a gas trading company, are the two other large gas marketers in the EU. Following the trend towards integrated electricity and gas companies, most of the big players (but not all of them)

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10. Green [2006], p. 2540.

**Tables 3 and 4. The EU's Largest Gas Companies by Gas Sales Volume<sup>1</sup>**

*In 2008 according to RWE*

Company	Sales (bcm)
GDF Suez	115
E.ON	114
Eni	104
GasTerra	84
Wintershall	39
RWE	31
Gas Natural	25
Centrica*	21
Distrigas	18
VNG	16
Gas sales by Top-10	567
<i>Overall gas consumption in the EU</i>	490

N.B.: 1 TWh = 0.093 bcm (billion cubic meter).

\* Centrica: estimation by author, no exact information available.

Sources: RWE, *Facts & Figures*, May 2009, p. 135, BP (2009) and own research.

*In 2006 according to Harris (2008)*

Company	Sales (TWh)
E.ON	937
Eni	844
GasTerra	770
GDF	762
Statoil	589
RWE	361
Botas	336
Gas Natural	295
EDF	290
Wingas	228
Gas sales by Top-10	5,412
<i>Overall European gas consumption</i>	5,993

Sources: Harris (2008) and BP (2009).

1. Unfortunately, reliable figures about gas sales to end-customers in the EU are not available. This makes estimations about market shares very difficult. Therefore, we decided to present two different tables using different sources. In the first table, gas sales by the ten largest companies are obviously larger than overall EU gas consumption. In the second table, sales by the ten largest companies are nearly as high as overall European gas consumption. This is due to the fact that gas sales volumes sometimes include gas sold outside the EU and gas that is resold afterwards.

are now active in both markets. Electricity and gas remain, of course, distinct markets and one always needs to remember the differences between the two products. But the larger use of natural gas for electricity production has created greater synergies between the two markets in recent years. Oil majors and other companies active in gas upstream are less present today in the downstream gas sector than in the past, and formerly “pure” electricity companies have become increasingly active there. One can also expect this trend to continue because many customers prefer to be supplied by one company.

## Sources

Company sources (annual reports, websites, press releases) have been the main source of information. The extent to which some companies disclose more information than others is remarkable. This makes collection of comparable data difficult. The reader should keep this caveat in mind in relation to all numerical data (for example, production and sales volumes) and market shares given in this book. Where possible, we have footnoted the sources of data; if no coherent data was available, we undertook our own estimates comparing different sources. Some information given by companies is contradictory, as different calculation and consolidation methodologies are used. Data on sales volumes can be especially misleading, as distinctions between sales to end-customers, sales to resellers and intra-group sales are not always made. One could even suspect companies of intentionally misguiding the public and public authorities in some cases. More transparency and better market monitoring by regulators and other public authorities – leading to freely accessible publications with comparable data – would be very helpful in this context.

Various press reports and publications by energy regulators were other important sources of information. The website of the European Regulators’ Group for Electricity and Gas (ERGEG) provides useful information on national electricity and gas markets and market shares of companies (“National Reports” by national regulators), but the quality of information differs greatly between countries. Reports of the European Commission (like the results of the sector inquiry published in 2007) and



national authorities have also been used. Secondary literature has been consulted, mainly for overall assessments of European energy markets and the process of liberalization. Unfortunately, there are few publications about the strategy changes after liberalization and the internationalization process of European energy utilities. An interesting study on Vattenfall by Per Högselius is one of the rare examples.<sup>11</sup> In-depth studies of every single major European utility would indeed facilitate understanding and deepen analysis. In this book, however, we have chosen to give an overview of the seven major companies – hoping for further critical research to be undertaken to study single utilities in greater detail.

The respective entries in the “International Directory of Company Histories” contain very valuable information on the history of European utilities since the beginnings of the industry.<sup>12</sup> An extensive study of mergers and acquisitions within the European power and gas sectors, compiling a huge amount of data for every case, is a very useful tool for analyzing the numerous activities in this area.<sup>13</sup>

## Acknowledgments

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In the course of my research, I had the opportunity to meet and discuss with many representatives of companies, the European Commission, European energy regulators and other experts. Their comments and insights greatly helped to improve

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11. Högselius [2009].

12. Available online free of charge at <http://www.fundinguniverse.com/company-histories>.

13. Lévêque and Monturus [2008].

the quality of this book, and I therefore want to thank them all for the time devoted to interviews and e-mail exchanges. Special thanks go to David Großekathöfer (Stadtwerke München) who provided many useful comments on a first draft, as well as Matthias Dürr (RWE) and Robert Klotz (Hunton & Williams) who agreed to comment on the main conclusions of this book at an “IFRI Energy Breakfast Roundtable” in December 2009. All errors are the sole responsibility of the author.

### **Focus and Structure of the Book**

The main focus of this study is to present and analyze the changes of the European energy utility “landscape” since market liberalization. Who are the main players in the European electricity and gas sector today? What is their past, present and likely future? How have they changed their strategies in the last twenty years, in terms of business sectors and geographical scope? In our case studies of the EU’s seven largest utilities, we focus on the evolution of these big groups, their reactions to market liberalization and how they adapted their strategies to the new market environment. Our analysis puts more emphasis on strategies, operations and assets; it is not our intention to thoroughly analyze financial aspects.

In the first part, the study presents the seven largest electricity and gas utilities in the EU (sorted by revenues in 2008). They have been chosen for overall size, but also for having a major presence outside their home market in other EU countries. As for energy business sectors, we concentrate on electricity generation, transmission, distribution and supply, as well as natural gas downstream. We especially discuss European strategies and the presence of companies in different national markets of the EU. International activities outside the EU are only briefly mentioned. In a last section, we shortly present eleven other large electricity and gas companies active in the European market, whose overall size is smaller or which have a more limited geographical scope.

In the second part, we give a short overview of the situation in major European electricity and gas markets today: what are the main companies in every market, what are their market

shares and what is the degree of competition? How has national policy influenced the market structure? It turns out that European directives have been implemented in different ways and with significantly different results by Member States. National traditions and legacies from the past need to be taken into account – they often have a long life and can present important political obstacles for liberalization.

# Seven Case Studies of Changing Strategies of Major European Energy Utilities Since Market Liberalization

In this chapter we analyze the seven largest European electricity and gas utilities. We present the history, development since market liberalization and presence in European electricity and gas markets of every utility. They are listed according to their total revenues in 2008.<sup>1</sup>

## E.ON

Of the seven utilities studied here, E.ON probably constitutes the most interesting case. This company has arguably experienced the most radical changes when compared to its peers. E.ON had the highest revenues of all the companies in the sector in 2008 and it is active in more EU Member States than any of its competitors. E.ON distinguishes itself most by its numerous acquisition and merger activities that followed after the divestment of non-energy businesses. The company resulted from an initial merger between two German industrial conglomerates in the early phase of market liberalization. The newly created E.ON decided to concentrate on electricity and gas, which implied a series of divestments, which provided E.ON with necessary cash to acquire energy companies in Germany and elsewhere. The numerous acquisitions have significantly changed the nature of the company. E.ON's

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1. A comparative analysis of their choices in terms of energy mix can be found in the conclusion.

acquisition activity has slowed in recent years and the company has announced that it will focus on organic growth for the near future. It also plans to divest €10 billion (bn) in operations by 2010.<sup>2</sup> As a result of its acquisitions, E.ON is a truly integrated electricity and gas company today, with both activities having comparable size and importance.

Unlike most of its peers, E.ON is owned by private investors, with 70.1 percent of shareholders being located outside Germany.<sup>3</sup> But it is clear that E.ON only came into being with the strong support of the German government, which overturned substantial competition issues when allowing E.ON to acquire Ruhrgas. It was already obvious at the founding stages of E.ON that the sheer size of the company would give it considerable influence on German energy policy. But at the same time, decisions by the German government have important implications for E.ON. Like in the case of other large utilities, this is very much a two-way relationship. The ongoing discussions about the partial reversal of the nuclear phase-out are a good example in this context.<sup>4</sup> E.ON also closely collaborates with the German government when it comes to relations with Gazprom and Russian authorities (for example, concerning the Nord Stream pipeline project).

E.ON was created in 2000, when two major German holding companies that were both listed in Germany's blue chip index DAX 30, VEBA<sup>5</sup> and VIAG<sup>6</sup>, merged. Their respective electricity branches, PreussenElektra and Bayernwerk, merged to

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2. E.ON press release of 12 August 2009.

3. The only exception being the 1.9 percent shareholding by the Free State of Bavaria which is the only German public entity with shares in E.ON. But this shareholding does not give the Bavarian government any influence over E.ON's decisions, [http://www.eon.com/de/downloads/100316\\_geografische\\_verteilung\\_de.pdf](http://www.eon.com/de/downloads/100316_geografische_verteilung_de.pdf) [as of February 2010].

4. See Schülke (2010) on this issue.

5. VEBA: Vereinigte Elektrizitäts- und Bergwerks AG ("United Electricity and Mining Corporation"). Founded in 1929, VEBA was a holding company owned by the state of Prussia and then the German Federal Government. It was privatized in several steps between 1965 and 1987. The VEBA holding included several subgroups, active in electricity, mining, oil, chemical industry, logistics, electronics, real estate and telecommunications.

6. VIAG: Vereinigte Industrieunternehmungen AG ("United Industrial Undertakings"). Founded in 1923, VIAG was a holding company for industrial shareholdings of the German government. It initially focused on electricity generation, aluminum and chemical industries. Privatization of VIAG started in 1986; it owned more than 100 companies at that time. In the following years, VIAG implemented an important diversification strategy, acquiring companies and shareholdings in various sectors. It also became a mobile phone operator in 1997.

form the core of E.ON, E.ON Energie. As VEBA, VIAG and their sub-groups were located in several German regions and cities, E.ON had, and still has, a very decentralized structure which poses some problems for internal coherence – E.ON's structure is hence a good illustration of German federalism.<sup>7</sup> But efforts to streamline the structure are underway.

The European Commission allowed the merger between VEBA and VIAG under several conditions. Among other measures, the new group had to sell its shareholdings in several German regional and local energy companies, like VEAG (Vereinigte Energiewerke AG, founded in 1990 to take over power plants and transmission networks of the former German Democratic Republic [GDR]) and the *Stadtwerke*<sup>8</sup> of Berlin (Berliner Kraft- und Licht (Bewag)-Aktiengesellschaft, BEWAG) and Hamburg (Hamburgische Electricitäts-Werke AG, HEW). These three companies were later acquired by Vattenfall and eventually brought together under the umbrella of Vattenfall Europe. But E.ON was allowed to keep shareholdings in many other regional energy suppliers in Germany (*Stadtwerke* and other). In 2007, E.ON was the majority shareholder in 37 regional and supra-regional German power suppliers, and minority shareholder in 193 of such groups.<sup>9</sup> In July 2009, however, E.ON finalized a deal with a group of German *Stadtwerke* for the sale of Ruhrgas' subsidiary Thüga, which holds 90 minority stakes in municipal energy utilities. E.ON has thereby divested a very important part of its distribution business in Germany.<sup>10</sup>

E.ON's management decided in 2000 to focus on two main business areas: energy and chemical industry (chemical industry has been abandoned later, see below). This resulted in a number of divestments in the first years of the new group's existence,

7. Today, E.ON's corporate center is in Düsseldorf, its "Central Europe" market unit in Munich, its "Pan-European Gas" (E.ON Ruhrgas) market unit in Essen. E.ON Kraftwerke, which runs conventional power plants, and E.ON Kernkraft, which runs nuclear power plants, are located in Hanover, whereas E.ON Wasserkraft, which runs hydroelectric power plants, is located in Landshut.

8. *Stadtwerke* are municipal utility companies that supply the population with (usually) electricity, gas, heat and water. In many cases, they are also responsible for sewage and waste management, and sometimes even public transport.

9. According to Monopolkommission (2007), p. 54.

10. E.ON press releases of 12 August 2009 and 1 December 2009. "E.ON seals €2.9bn Thüga sell-off," *Financial Times online*, 12 August 2009.

**Table 5. E.ON: Major Divestments  
(transaction value of at least €2bn)**

Company / shareholding	Business sector	Year	Transaction volume (€bn)
VIAG Interkom	Telecommunications	2001	11.4
Degussa	Chemical industry	2003-2006	8.8
Viterra	Real estate	2005	7.0
VEBA Oel	Oil	2002	6.8
E-Plus	Telecommunications	2000	4.3
VAW aluminum	Aluminum	2002	3.1
Thüga (shareholdings in municipal utilities)	Electricity and gas	2009	2.9
Stinnes	Logistics	2002	2.8
VEBA Electronics	Electronics	2000	2.6
Schmalbach-Lubeca	Packaging	2002	2.3

Source: E.ON Strategy & Key Figures 2007, p. 8 and own research.

which had an overall volume of more than €60bn (see table 5): E.ON sold companies and shareholdings in non-core businesses like telecommunications (VIAG Interkom, E-Plus), oil (VEBA Oel) or real estate (Viterra). These companies were mostly active on the German market, but the money gained from these sales was reinvested mainly in energy companies active outside Germany (with the notable exception of Ruhrgas). E.ON hence transformed itself from a German multi-business group to a European energy group. Around 60 percent of its workforce today is employed outside Germany, and around 66 percent of its power generation capacity is located outside Germany.<sup>11</sup> Based on various data in E.ON's annual reports, we estimate that E.ON realizes 45-50 percent of its electricity sales in Germany, and approximately 85 percent inside the EU. After recent divestments and asset swaps, the share of electricity business outside Germany will increase further. In gas, the share of the German home market is still higher: 60-65 percent of E.ON's gas sales are realized in Germany.

11. Own calculation based on E.ON data.

## **Major Acquisitions by E.ON**

Several acquisitions played a key role in this transformation of E.ON. We describe major deals below in chronological order, and give a geographical overview of current E.ON activities afterwards.

E.ON announced in 2001 its intention to acquire the British electricity and gas utility Powergen, which had been one of the three power generators founded in 1990 after the split-up of the Central Electricity Generating Board. The acquisition was completed in July 2002 and also included Powergen's US subsidiary LG&E Energy Corp. As US law only allows pure energy companies to acquire companies in this sector, E.ON changed its business strategy and since then has only been focusing on energy: in order to acquire LG&E (Louisville Gas & Electric), E.ON announced its intention to sell remaining non-energy assets like Degussa (chemical industry), which were effectively sold in the following years. Hence the acquisition of Powergen had important consequences for E.ON's overall business strategy.<sup>12</sup> Powergen became the base of E.ON's UK activities, which was completed through the acquisitions of TXU's UK retail business later in 2002 and the distribution network operator Midlands Electricity in 2004.

Also in 2001, E.ON acquired further shares in the Swedish utility Sydkraft from HEW, the *Stadtwerk* of Hamburg, where Vattenfall was about to become the main shareholder. The initial shareholding in Sydkraft dated back to the 1990s, when one of E.ON predecessors, PreussenElektra, acquired stakes in Sydkraft. The deal in 2001 lifted E.ON's stake to 60.6 percent of Sydkraft's capital stock. E.ON's share, however, decreased again in the following years, when the Norwegian state-owned utility Statkraft increased its stakes. E.ON further developed its position in Sweden by acquiring the country's fourth-largest integrated utility, Graninge, in 2003, which previously had been partly owned by EDF. In 2005, Sydkraft was renamed E.ON Sverige. After long and complicated negotiations, E.ON and Statkraft finally agreed in July 2008 on a deal that allowed

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12. "E.ON will Powergen übernehmen und reiner Energiedienstleister werden," *Energie-Chronik*, April 2001, <http://www.udo-leuschner.de/energie-chronik>.



E.ON to acquire Statkraft's remaining 44.6 percent interest in E.ON Sverige. The €4.5bn transaction included asset swaps in Sweden, Germany and the UK. Statkraft also received E.ON shares equaling 4.17 percent of the company's capital stock.<sup>13</sup>

Another major acquisition was initiated in 2001, when E.ON stepped up its efforts to gain majority control of Ruhrgas.<sup>14</sup> Ruhrgas, by far the biggest German natural gas company, was owned via indirect shareholdings by several companies (including oil majors BP, Shell, and ExxonMobil). The deal was extraordinarily complicated and took more than two years to materialize. On the one hand, E.ON needed to negotiate with many different shareholders and thus agreed on various swap deals (for example, giving VEBA Oel to BP). On the other hand, and even more importantly, a long battle with competition authorities started in November 2001, when E.ON notified the Federal Cartel Office (*Bundeskartellamt*) of its intention to acquire a majority share of Ruhrgas. The Federal Cartel Office had strong objections to the acquisition of Ruhrgas by E.ON and hence prohibited the deal, as it would decrease competition in the German electricity and gas market.<sup>15</sup> The Monopolies Commission (*Monopolkommission*), an independent body that advises the German government on competition issues, also opposed the deal.<sup>16</sup> However, the German merger law foresees the controversial possibility of a "ministerial approval" (*Ministererlaubnis*): the Minister of Economics can overrule the Cartel Office's decision if he considers "macroeconomic advantages" as being more important than competition issues. E.ON applied for a "ministerial approval," and the Ministry of Economics indeed granted its

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13. The deal was finalized on 31 December 2008. See E.ON press releases of 24 July 2008 and 2 January 2009.

14. Ruhrgas was founded in 1926 by mining companies in the Ruhr, in order to exploit coal gas. It became the biggest German natural gas company after World War II, enjoying a quasi-monopoly in gas import and supply. It was the major partner for gas cooperation with the Soviet Union, which started in 1973. Its precise market share is difficult to establish, but certainly amounted to more than 60 percent in 2001.

15. Bundeskartellamt press releases of 21 January 2002: Bundeskartellamt untersagt Fusion E.ON/Gelsenberg (Ruhrgas) and 28 February 2002: Bundeskartellamt untersagt E.ON Übernahme der Mehrheit an Ruhrgas.

16. Monopolkommission [2002].

approval in July 2002. The government's main argument was that the acquisition will improve German security of supply and improve the international competitiveness of Ruhrgas.

The decision was, however, brought to court by nine German energy companies: the *Oberlandesgericht Düsseldorf* prohibited the application of the ministerial approval, as the ministry had not fully respected the rules of procedure. The procedure was then repeated, and E.ON eventually settled the difference with the claimants out of court. The acquisition was finalized in January 2003. In its approval, the Ministry imposed the divestment of shareholdings in several regional suppliers in order to increase competition. This condition was fulfilled by E.ON, but it has not led to any increase in competition in the German gas market. The impact of the second requirement, a gas release program of 33 TWh annually, was also very limited.<sup>17</sup>

The Ruhrgas deal got high public attention in Germany, due to the long and controversial approval process. The German Ministry of Economics was heavily criticized for its decision to approve the deal, especially as the minister Werner Müller and his deputy Alfred Tacke were seen as biased, due to their links to the energy business.<sup>18</sup> Most media comments and academic experts opposed the acquisition, as did the EU competition commissioner at that time, Mario Monti. The European Commission, however, did not have jurisdiction in the affair, as at least two-thirds of both companies' turnover was obtained in Germany ("two-thirds rule"). It is not our intention to further discuss the case here,<sup>19</sup> but it seems obvious that the German government preferred creating a "national champion" in the electricity and gas business to improving competition in these markets.

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17. Lohmann (2006), p. 122 and 126.

18. Werner Müller indeed preferred not to deal with the issue personally and delegated it to Alfred Tacke, as Müller had worked in leading positions at VEBA between 1980 and 1997. To add to these criticisms, Werner Müller became CEO of Ruhrkohle AG (RAG) in 2003 – a company in which E.ON was a major shareholder at that time. Moreover, Alfred Tacke became CEO of STEAG [a subsidiary of RAG] in 2004.

19. See various entries in *Energie-Chronik* between 2001 and 2003 and Lohmann (2006), p. 110-127.

In November 2004, E.ON declared its intention to acquire the gas business of the Hungarian incumbent MOL. E.ON first planned to acquire all of MOL's gas businesses, including trading, storage, import, domestic production and transport, which would have resulted in a deal with a combined value of up to €2.1bn. The European Commission did not approve this acquisition plan, as it would, in the DG Competition's view, limit competition in the Hungarian gas sector. E.ON was already active in gas and electricity distribution in Hungary thanks to prior acquisitions, and would have had a very strong position in all parts of the gas value chain. After negotiations with the European Commission, E.ON agreed to acquire only the trading (at 100 percent), storage (at 100 percent) and import businesses (50 percent of Panrusgaz; the other shareholders are Gazpromexport and Centrex Hungaria) from MOL. Gas production in Hungary and transport remained with MOL. Moreover, E.ON agreed to release significant amounts of imported gas for a duration of eight to ten years (16 bcm, equivalent to 14 percent of Hungarian consumption). The transaction was finalized in 2006 and its value was about €1.1bn.<sup>20</sup>

In 2006, E.ON announced its interest in acquiring Spanish utility Endesa. Endesa's shareholders and the Spanish government, however, opposed E.ON's plan. Long and complicated negotiations took place, but when Enel and the Spanish holding Acciona presented a common bid for Endesa, E.ON abandoned its plan to acquire Endesa (see Enel section for details). Instead, it found an agreement with Enel, Endesa and Acciona that allowed it to acquire some of Endesa's and Enel's assets. In the end, E.ON acquired assets in Italy, Spain, France, Poland and Turkey for a total of €11.8bn.

These assets include:

- in Spain, EnelViesgo and some of Endesa's Spanish generation capacities, making it the fourth-largest power producer in Spain;
- in Italy, Endesa Italia with over 7.2 gigawatt (GW) of installed capacity, equally making it the fourth-largest power producer in Italy;

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20. E.ON press releases of 4 November 2004 and 13 January 2006. European Commission press release of 21 December 2005 [IP/05/1658].

– in France, 65 percent in Endesa France/SNET, with almost 2.5 GW of installed capacity, making it the third-largest power producer in France.

These deals were finalized in June 2008.<sup>21</sup>

In October 2007, E.ON realized the acquisition of a majority stake in OGK-4, a major Russian power generator that was privatized from the state-run former monopoly RAO UES (Unified Energy System of Russia). E.ON had previously tried to acquire other Russian generators (T GK-10 and OGK-5; the latter was acquired by Enel, see Enel section), but then paid €4.1bn for 69 percent of OGK-4. E.ON's shareholding in OGK-4 increased to 78.3 percent at year-end 2008. OGK-4 had 8.3 GW of production capacity (based on natural gas and coal). Many analysts have criticized the acquisition price as being too high, and a press report in October 2008 revealed that the stock market value of E.ON's shares in OGK-4 was only €1.4bn at that time, whereas the acquisition price for the several tranches had amounted to €4.6bn. E.ON also confirmed problems in the cooperation with OGK-4 management, which has led to several changes of senior managers.

Some observers have seen the acquisition of OGK-4 mainly in the context of E.ON's desire to enter the Russian upstream gas sector, as the acquisition of OGK-4 might facilitate negotiations on the latter issue.<sup>22</sup> Be that as it may, E.ON has found an agreement with Gazprom on the Yuzhno Russkoye gas field in June 2009, where E.ON will have a 25 percent stake. Gas from this field is scheduled to be transported to Germany via Nord Stream, the pipeline project E.ON is pursuing with Gazprom, BASF/Wintershall and Gasunie. The negotiations concerning the entry into Yuzhno Russkoye have lasted for five years; it was announced that this major acquisition would be finalized by the end of 2009, but there was still no news concerning its finalization at the time of writing in March 2010.<sup>23</sup>

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21. Lévêque and Monturus (2008), p. 122-123. E.ON press releases of 2 April 2007 and 26 June 2008.

22. E.ON press releases of 24 May 2007, 15 September 2007 and 15 October 2007. E.ON Financial Report 2008. "Russische Kraftwerkstochter macht E.ON keine Freude," *Energie-Chronik*, October 2008.

23. E.ON press release of 5 June 2009.

**Table 6. E.ON: Major Acquisitions  
(transaction value of at least €1bn)**

Company / shareholding	Business sector	Country	Year	Transaction volume (€bn)
Powergen / LG&E	Electricity and gas	UK and US	2002	15.3
Endesa / Enel assets	Electricity	Spain, Italy, France	2008	11.8
Ruhrgas	Gas	Germany	2003	11.2
OGK-4	Electricity	Russia	2007	4.1
TXU (UK retail business)	Electricity and gas	UK	2002	2.5
Midlands Electricity	Electricity	UK	2003	1.6
Graninge	Electricity	Sweden	2003	1.1
MOL (gas trade and storage)	Gas	Hungary	2006	1.1
Airtricity North America	Renewable energies	US and Canada	2007	1.0
Sydkraft	Electricity	Sweden	Several steps	*

\* Total unknown, €4.5bn for Statkraft's 44.6 percent in 2008.

Source: E.ON Strategy & Key Figures 2007, p. 8, and own research.

### **Current Situation: E.ON's Presence in More Than 30 Countries**

Today, E.ON is present in over 30 countries in Europe (inside and outside the EU), Russia and the United States. It is active in most electricity and gas markets in the European Union – no other utility has such broad activities there. E.ON's positions in the respective markets range from limited participation in a local company to market leader. We give an overview of E.ON's position by country or region below, preferring (as we will do for other companies) a geographical approach to a sectoral approach.<sup>24</sup> We hence do not follow E.ON's company structure, which is organized following a mix of sectoral and geographic aspects. The corporate center in Düsseldorf is leading ten market units:

24. We only shortly discuss gas exploration and production, which is outside our main scope, and do not discuss energy trading activities. Like its peers, E.ON is active in energy trading in nearly all European countries.

**Table 7. Sales and Adjusted EBIT by Market Unit**

Branch	2007 sales	2008 sales	2007 adjusted EBIT	2008 adjusted EBIT
Central Europe	32.0	41.1	4.7	4.7
Pan-European Gas	22.7	27.4	2.6	2.6
UK	12.6	11.1	1.1	0.9
Nordic	3.3	3.9	0.7	0.8
US Midwest	1.8	1.9	0.4	0.4
Energy Trading	–	31.8	–	0.6
New Markets	0.2	5.9	0.01	0.1
Corporate Center	–4.0	–36.2	–0.2	–0.3
Total	68.7	86.8	9.2	9.9

N.B.: EBIT: Earnings before Interest and Taxes.

Source: E.ON Strategy & Key Figures 2009, p. 9.

- Central Europe (E.ON Energie, Munich): electricity generation, electricity transmission, electricity and gas distribution, electricity and gas sales in continental Europe;
- Pan-European Gas (E.ON Ruhrgas, Essen): gas exploration and production, transport and storage, wholesale and supply in Europe and Russia;<sup>25</sup>
- UK (Coventry): electricity generation, electricity distribution, electricity and gas supply in the United Kingdom;
- Nordic (Malmö): electricity and heat generation, electricity, heat and gas distribution and marketing in the Nordic countries (mainly Sweden);
- Italy (Milan): electricity generation, gas distribution, electricity and gas marketing in Italy;
- Spain (Madrid): electricity generation, distribution and sales in Spain;
- Russia (Moscow): electricity generation, sales to large industrial customers and wholesale marketing in Russia;

25. One of the conditions of the ministerial approval concerning E.ON's acquisition of Ruhrgas obliges E.ON to keep the former Ruhrgas largely as a separate entity. E.ON and E.ON Ruhrgas therefore operate as two independent companies, with E.ON Ruhrgas mainly responsible for gas up- and midstream and E.ON Energie for gas downstream. See Lohmann (2006), p. 119.

- US Midwest (Louisville): electricity and gas business in the United States (mainly Kentucky);
- Climate & Renewables (Düsseldorf): global renewables and carbon-sourcing businesses;
- Energy Trading (Düsseldorf): European trading activities in electricity, gas, coal, oil and CO<sub>2</sub> allowances.<sup>26</sup>

### *Germany*

Germany is E.ON's home market. E.ON is the market leader in gas and the second-largest company in electricity there. Due to various majority and minority shareholdings in regional and local energy companies (*Stadtwerke* and other), it is difficult to establish E.ON's precise market share in the different market segments, especially in distribution and sales. In power generation, E.ON formed a duopoly with RWE "with a dominant position and no competition" according to the German Federal Cartel Office and the German energy regulator in 2008.<sup>27</sup> Whereas RWE has a market share of more than 30 percent in net generation, E.ON's share has been at around 25 percent until recently. E.ON's share has decreased in recent years, as E.ON swapped some assets with Statkraft in 2008 and additionally divested 4,800 megawatt (MW) of production capacity in Germany in 2009. The latter divestment stems from an agreement with the European Commission in February 2008 that allowed E.ON to avoid two competition procedures linked to its electricity activities.<sup>28</sup> The 4,800 MW of generation capacity have been sold (or swapped with assets outside Germany), to GDF Suez (Electrabel), EnBW (Energie Baden-Württemberg AG), EDF, Verbund and the *Stadtwerke* Hannover. After these transactions, E.ON claims that its market share in electricity production in Germany is now at 15 percent – which probably means that it does not form a duopoly with RWE anymore.<sup>29</sup>

26. E.ON, like other companies, is also trading in countries where it has no physical assets and which are hence not listed below.

27. The third- and fourth-largest utilities in Germany, EnBW and Vattenfall with market shares of 12-15 percent of generation, are not able to exercise market power according to the Federal Cartel Office. Bundesnetzagentur (2008), p. 10.

28. E.ON press release of 28 February 2008 and European Commission press release of 28 February 2008 (MEMO/08/132).

29. Interview with Wulf Bernotat, *Handelsblatt*, 30 November 2009.

An important issue for E.ON's position in the German electricity generation market is the future of nuclear energy in Germany: E.ON is operating 6 of the 17 working reactors in Germany, and has a total of 8.6 GW of nuclear capacity in Germany.

In its agreement with the European Commission, E.ON also committed itself to selling its high-voltage electricity transmission grid in Germany (E.ON owned about 10,700 kilometers [km] of 220 and 380 kilovolts (kV) lines, of a total of 36,000 km in Germany). This offer was received as a big surprise, as E.ON had previously opposed ownership unbundling. Moreover, the German government was thought to defend the interests of German utilities when strongly opposing ownership unbundling in the negotiations concerning the 3<sup>rd</sup> energy liberalization package, which entered into their final phase in early 2008. TenneT, the state-owned Dutch electricity Transmission System Operator (TSO), acquired E.ON's network in November 2009 for €1.1bn.<sup>30</sup>

It is more difficult to evaluate E.ON's share in electricity distribution and sales in Germany. Participations in regional and local suppliers probably give E.ON a position that is stronger than market shares show. The sale of Thüga (see above), however, has clearly diminished E.ON's position in this market segment.<sup>31</sup> The Federal Cartel Office in 2007 estimated that E.ON has a share of more than 15 percent in the electricity wholesale market.<sup>32</sup> According to another source, E.ON's share of sales to end customers was around 16 percent in 2007 (including consolidated participations).<sup>33</sup> The *Bundesgerichtshof* (the German court of last resort in all matters of criminal and civil law) has confirmed a decision by the Federal Cartel Office in 2008 that prohibited the acquisition of shares in a regional supplier by E.ON, as this would further decrease competition

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30. E.ON press release of 10 November 2009.

31. It is interesting to note that many of E.ON's competitors demanded a divestment of Thüga at the time of the E.ON-Ruhrgas merger in 2002-2003. E.ON wanted to keep Thüga at that time (and got permission to do so), but changed its mind in 2008-2009. See Lohmann (2006), p. 118.

32. Monopolkommission (2007), p. 54.

33. RWE, *Facts & Figures*, May 2009, p. 119 and 127, and own calculations.



in the German electricity market.<sup>34</sup> This decision effectively prevented E.ON (and also RWE) from further increasing their market shares in Germany. After the sale of Thüga, however, one might expect the Federal Cartel Office to change its opinion and allow E.ON to acquire shares in local or regional suppliers if the company had the intention to do so.

Due to the complex structure of the German gas market and its low level of transparency, it is even more difficult to establish E.ON's actual share in this market, where it also has several shareholdings in other gas companies and suppliers. Some estimations put E.ON's overall market share at around 60 percent. Its share of gas imports to Germany was put at 54 percent in a recent study;<sup>35</sup> the Monopolies Commission even put it at 60 percent. E.ON Ruhrgas is also by far the largest gas TSO in Germany, owning around 50 percent of the gas transmission network directly and being an important shareholder in several joint-ventures that own other transmission pipelines in Germany.<sup>36</sup> Besides transmission, E.ON also owns around 30 percent of distribution network operators through its shareholdings in many German gas companies.<sup>37</sup> The European Commission has criticized E.ON for not granting sufficient access to its transmission network, notably at entry points. In order to avoid a fine by the European Commission, E.ON Ruhrgas has proposed to reduce its long-term capacity reservations in December 2009.<sup>38</sup>

Overall, E.ON is by far the biggest company in the German gas market. Its market share has however decreased in 2009 due to the fact that long-term "take-or-pay" contracts with Gazprom oblige E.ON to buy fixed quantities of natural gas at a price indexed on the oil price. The price E.ON pays to Gazprom has been much higher than the spot market gas price in 2009. This situation has offered new opportunities to E.ON's competitors, which often rely on spot market gas. If this trend continues, E.ON's share in the German market could fall below

34. Bundesgerichtshof, Beschluss KVR 60/07, 11 November 2008: E.ON/Stadtwerke Eschwege.

35. Harms and Leprich (2009), p. 27.

36. For more details, see E.ON Strategy & Key Figures 2009, p. 80-81.

37. Monopolkommission (2007), p. 112.

38. European Commission press release of 17 December 2009 (MEM0/09/567) and E.ON Ruhrgas press release of 17 December 2009.

50 percent. This would be a somewhat paradoxical reversal of the situation in the German gas market, as the same long-term contracts that now cause problems to E.ON had been a guarantee for E.ON Ruhrgas' dominant position in the German gas market in the past.<sup>39</sup>

### *United Kingdom*

Thanks to its acquisition of Powergen in 2002 and several smaller acquisitions, E.ON is today one of the leading electricity and gas companies in the United Kingdom, active in power generation as well as electricity and gas distribution and retail. E.ON is the second-largest power generator in the United Kingdom with a market share of around 10 percent, and third in power and gas sales, with a market share of 24 percent in power supplied and 7 percent in gas supplied. As the owner of two of the fourteen electricity distribution areas (East and West Midlands), E.ON has 17 percent of the distribution networks.<sup>40</sup> E.ON's generation portfolio is mainly based on coal and natural gas, which each amounted to 49 percent of generation in 2008. E.ON plans to build nuclear plants in a 50-50 joint-venture with RWE. They were successful in bidding for land at two sites reserved for nuclear new build in April 2009. The two companies aim to deliver at least 6 GW of new nuclear capacity at around 2020.<sup>41</sup> The United Kingdom is also one of the most important markets for E.ON's renewables division, which is pursuing several offshore wind projects there. One of these projects is London Array, which could become the largest wind farm in the world.

### *Scandinavia*

E.ON and its predecessors have been active in the Swedish market since the 1990s. In several steps (see above), it acquired different assets to become the second-largest energy utility in Sweden. Sweden clearly constitutes the center of E.ON's activities in the Nordic region. In 2008, E.ON supplied around 16 percent

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39. "Germany: E.ON is negotiating a reduction in Russian gas supplies," *OSW EastWeek*, 9 December 2009.

40. E.ON Company Report 2008, p. 5. E.ON Strategy & Key Figures 2009, p. 86.

41. E.ON press release of 29 April 2009.

of the electricity consumed by end users in Sweden. Furthermore, it has a market share of 53 percent in the small Swedish natural gas market (by quantities of supplied gas). E.ON also has minor shareholdings in Finland and Denmark.<sup>42</sup> E.ON entered the Finnish market in 2001, when it acquired shares in the utility Espoon Sähkö, which was then renamed E.ON Finland. It divested this participation again in 2006, but has kept its shareholding in the Finnish gas company Gasum.

For power production, the relevant market is the well integrated Nordic region (Sweden, Norway, Finland, and Denmark). In this market, E.ON is the fourth-largest electricity producer with a market share of 8 percent (its share in Sweden is around 20 percent). Moreover, E.ON is the third-largest player in power/gas retail in the Nordic region, with 0.9 million (m) customers.<sup>43</sup> It is noteworthy that E.ON is the only foreign company that has a significant position in the Nordic electricity and gas market – all the other big players come from the region.

### *Belgium and the Netherlands*

E.ON is a major power producer in the Netherlands and a supplier of electricity and gas to private and business customers in the Netherlands and Belgium. Moreover, E.ON has recently finalized a swap deal with GDF Suez (Electrabel) which provides it with significant generation capacity and drawing rights in Belgium.<sup>44</sup> E.ON's presence in the Netherlands dates back to 1999, when PreussenElektra acquired Electriciteitsbedrijf Zuid-Holland (EZH), a Dutch power generation company. Today E.ON has a market share of around 10 percent in the Dutch generation market. Following the swap with Electrabel, E.ON now has a comparable market share in Belgium, making it the third-largest power producer there. In electricity supply, E.ON has shares of 10-12 percent in the Belgian and Dutch markets, with industry customers accounting for the largest part of sales.

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42. E.ON Ruhrgas also has upstream activities in Norway.

43. E.ON Strategy & Key Figures 2009, p. 96 and 100.

44. E.ON acquired one coal plant, one gas plant and drawing rights from nuclear power plants. E.ON press release of 31 July 2009.

## France

E.ON only recently entered the French electricity market: in June 2008, it took over 65 percent of the Société Nationale d'Electricité et de Thermique (SNET) from Endesa. E.ON announced in October 2009 that it will acquire the remaining 35 percent of SNET from EDF via an asset swap that gives EDF's German subsidiary EnBW drawing rights from E.ON power plants in Germany and a stake in a coal plant. E.ON will also obtain drawing rights from EDF's nuclear plants in France.<sup>45</sup> SNET's coal power plants and some wind farms make E.ON the third-largest power generator in France, but its market share is only 2-3 percent. E.ON, however, plans to develop its position, and has even declared its readiness to take part in future nuclear projects (European Pressurized Reactor, EPR) in France.<sup>46</sup> Besides power production, E.ON also sells electricity to industrial corporate customers and municipal energy suppliers in France.

Via E.ON Ruhrgas, E.ON is also active in the French gas market. E.ON usually does not publish its gas sales per country, but when commenting on anti-trust proceedings by the European Commission in July 2009, it revealed that it sold 8.7 TWh of gas in France in 2008, making it the foreign company with the largest market share in France (according to E.ON's own statement; its market share amounts to around 2 percent).<sup>47</sup> In its anti-trust proceedings, the European Commission imposed fines of €1.1bn on E.ON and GDF Suez (€553m for each) for market sharing between 1975 and 2005. The market sharing started when Ruhrgas and GDF jointly constructed the MEGAL pipeline (*Mittel-Europäische Gasleitung*), and the Commission claims that this practice continued after market opening in 2000.<sup>48</sup> E.ON and GDF Suez immediately announced an appeal against the Commission's decision.<sup>49</sup>

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45. E.ON press release of 1 October 2009.

46. E.ON's CEO has underlined this recently: E.ON Press Talk with Wulf H. Bernotat, Paris, 7 July 2009, <http://www.snet-electricite.fr/documents/discours-Bernotat.pdf>.

47. E.ON Ruhrgas press release of 8 July 2009.

48. European Commission press release of 8 July 2009 [IP/09/1099].

49. E.ON Ruhrgas press release of 8 July 2009 and GDF Suez press release of 8 July 2009.

### *Italy*

E.ON established E.ON Italia with the goal of furnishing energy to major industrial customers in 2000. Since then, E.ON has acquired several additional assets and equity investments there. Today, E.ON has a large presence in Italy, encompassing electricity and gas, generation, distribution and sales. Major steps were the integration of Thüga's shareholdings in several gas distribution companies in early 2008, and, most importantly, in June 2008, the acquisition of 80 percent of Endesa Italia (following the deal with Endesa and Enel; the acquisition was followed by a major reorganization of E.ON's Italian activities). Today, E.ON is one of the principal players in the Italian energy market; it claims to be Italy's fourth-largest energy company.<sup>50</sup> E.ON has around 6 percent of installed electricity generation capacity and it supplies electric power and natural gas to more than 800,000 customers, households and companies, giving it a market share of around 7 percent in electricity sales (by quantity).<sup>51</sup> E.ON recently declared its intention to sell its gas distribution network in Italy, but the deal was not finalized at the time of writing.<sup>52</sup>

### *Iberia*

After its failed takeover bid for Endesa, E.ON entered the Spanish market in 2008 through the acquisition of several Spanish assets from Enel and Endesa. After these transactions, E.ON has a market share of around 5 percent in the Spanish energy market. It owns several coal, gas and hydro power plants and has power distribution and retail activities.

### *Central and Eastern Europe*

E.ON's antecedents had already acquired various assets and shareholdings in Central and Eastern Europe, as they participated in the privatization process in the 1990s. Early targets were companies in Hungary, Slovakia and the Czech

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50. Interestingly, GDF Suez also claims this position.

51. <http://www.eon.it> and own research.

52. "Snam interested in E.ON's Italy gas network," Reuters, 27 May 2009. "Snam to make non-binding bid for E.ON Italy grid-sources," Reuters, 22 July 2009. "E.ON to complete Italian grid sale in Q1," Reuters, 15 December 2009.

Republic. More recently, E.ON successfully participated in privatization bids in Bulgaria and Romania. E.ON Ruhrgas also acquired significant shareholdings in the gas businesses of the three Baltic states. Hence E.ON today has important activities and assets in nearly all Central and Eastern European countries that joined the EU in 2004 or 2007. According to the Polish newspaper *Rzeczpospolita*, E.ON is the seventh-largest foreign investor in Central-Eastern Europe, and the foreign energy utility with the largest revenues there (€8.3bn in 2008).<sup>53</sup>

In Hungary, Slovakia and the Czech Republic, E.ON is active in power production as well as gas and electricity distribution and sales. It has a particularly strong position in Hungary, where it has a market share of around 35 percent in electricity retail, and is the dominant gas company since the acquisition of gas storage and trading activities from MOL. In Slovakia, E.ON Ruhrgas also operates, together with GDF Suez, the gas transmission network, which is crucially important for the transport of Russian gas to Western Europe. Moreover, E.ON has a market share of around 30 percent in electricity retail there. In the Czech Republic, its share of the electricity retail market amounts to 25 percent. In Romania, E.ON is active in gas and electricity distribution and sales (market share of around 15 percent in electricity), and in Bulgaria only in electricity distribution and sales. In Estonia, Latvia and Lithuania, E.ON is one of the two main shareholders in the three national incumbent gas suppliers, the other main shareholder being Gazprom.

### *Outside the EU*

E.ON's activities outside the EU are concentrated in the United States and Russia. Its US business stems from the acquisition of the UK utility Powergen and includes power generation and transmission, as well as power and gas distribution and sales, primarily in Kentucky. E.ON's US branch realized sales of €1.9bn in 2008. Moreover, E.ON's renewables branch develops several renewable energy projects in the US. In Russia, E.ON Ruhrgas has a long-standing partnership with

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53. <http://grafik.rp.pl/grafika2/368638>.

Gazprom, dating back to the 1970s. E.ON holds 3.5 percent of Gazprom's shares (after having an even higher share in the past). It is currently about to enter the Russian upstream gas market. E.ON entered the Russian electricity market in January 2008 with the acquisition of OGK-4 (see above for details).

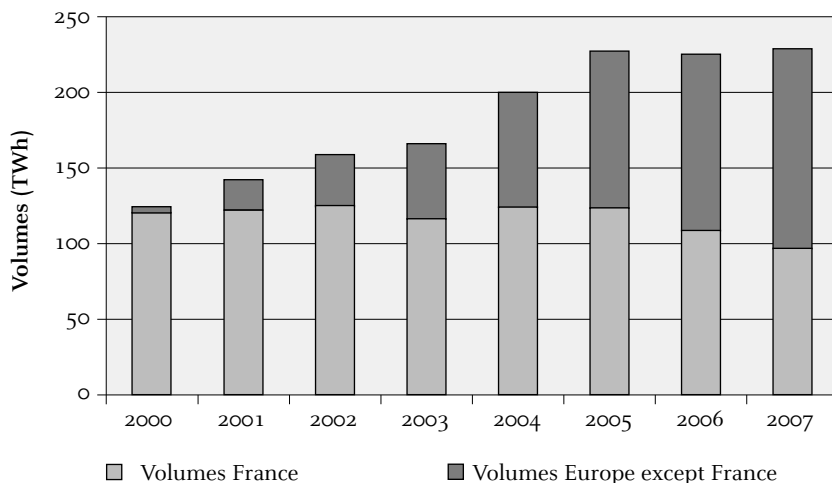
## **GDF Suez**

GDF Suez, the second-largest energy utility in Europe by revenues, is the result of a merger between Gaz de France, the former French gas monopoly, and Suez, a French corporation with worldwide business activities. The merger, completed in 2008 after more than two years of intense discussions, allowed the creation of a truly integrated electricity-gas utility with a broad presence throughout Europe and significant activities in other parts of the world. Eighty-five percent of the company sales (€83bn in 2008) are realized in the energy sector, whereas the remaining 15 percent come from the subsidiary Suez Environnement, the second-largest water treatment and waste processing company in the world.

The two parties to the 2008 merger were each of a very different nature. Gaz de France was set up as a state-owned company by the French government in 1946, when France nationalized its energy sector. Since its beginnings, GDF has had a close relationship with EDF, especially in the distribution segment, where both companies share a common service (see box 1). Inter alia, due to these close relations, a merger between EDF and GDF had been proposed in the 2000s instead of the GDF-Suez merger. GDF enjoyed a quasi-monopoly position in the French gas market until 2000, when the liberalization of the European gas market started. GDF began its internationalization in the 1990s, by acquiring stakes in gas companies in Germany, Italy, the United Kingdom, Slovakia, Mexico and some other countries. After initial ideas to develop important activities outside Europe, GDF has then, in the context of market liberalization in Europe, chosen to focus its strategy on Europe.<sup>54</sup> As a consequence of its internationalization, GDF has sold more gas to industrial and commercial clients outside

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54. Vignon and Grandclement (2008), p. 12.

**Graph 1. GDF Gas Sales to Industrial and Commercial Customers 2000-2007**

Source: Vignon and Grandclement (2008), p. 22.

France than inside France since 2006. At the same time, and as a consequence of market liberalization, the quantity of gas sold in France has declined (see graph 1). Another indicator of GDF's internationalization is the repartition of the company's revenues. In 1998, only 10 percent of its revenues were realized outside France. This share grew to 41 percent in 2007.<sup>55</sup>

GDF was one of the pioneers of liquefied natural gas (LNG) and strongly developed its LNG activities over the years, becoming the European leader in the field. From 1998 onwards, the company started exploration and production activities. In the 2000s, GDF also entered the electricity sector, but only at a very limited scale. Finally, the French government decided to change the nature of the company (from state-owned to public) in 2004 and GDF's capital was partially floated on the Paris Stock Exchange in 2005. The French government kept 79.8 percent of the shares until the merger with Suez. In 2007, the last year before the merger, GDF's revenues amounted to €27.4bn, whereas Suez realized €47.5bn.

55. Vignon and Grandclement (2008), p. 4.



Suez's history goes back to 1858, when it was founded to build and operate the Suez Canal in Egypt.<sup>56</sup> After the canal's nationalization by president Gamal Abdel Nasser in 1956, the company had to change its activities and became a multinational corporation that was active in various sectors (banking, television and others). It became a majority shareholder in Lyonnaise des Eaux, a leading water utility, which had been active in energy before World War II. Suez entered the energy sector when it took over Société Générale de Belgique in 1988, which had a major holding in the Belgian energy company Tractebel.<sup>57</sup> When Gérard Mestrallet became CEO of Suez in 1995, he restructured Suez and eventually reduced its activities to energy, water, and waste treatment. The merger with Lyonnaise des Eaux in 1997 – after thirty years of strong links between the two companies – was a major step in this context, as well as the gradual acquisition of the remaining shares in Tractebel (then Electrabel's parent company). In 2007, Suez finally became the single owner of Electrabel, the largest electricity producer in the Benelux countries. Electrabel was mainly active in electricity, but had also diversified into gas. It had significant activities outside the Benelux countries in France, Italy, Germany, Poland, Hungary and other countries. Suez also was a majority shareholder in Distrigas, the largest Belgian wholesale gas supplier.

### **The Merger**

Suez was the object of several merger attempts and speculations in the 1990s and 2000s. In 2000, news reports indicated that a merger between E.ON and Suez was about to be finalized, but the deal was never concluded.<sup>58</sup> At around the same time, the idea of a rapprochement between Suez and GDF emerged. At least in public, the idea only gained momentum in early 2006, when Enel announced its intention to acquire

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56. The company was founded as *La Compagnie universelle du canal maritime de Suez*. It has repeatedly changed its name since then before its rebranding to "Suez" in 2001. For the sake of simplicity, we only use this name.

57. Suez's entry in Tractebel was a move to block a hostile takeover bid for Société Générale de Belgique by Carlo de Benedetti, the Italian industrialist. Hence the 2008 merger between GDF and Suez has some parallels to this 1988 transaction, as blocking the entry of an Italian investor (this time Enel) was, according to many press reports, an important motivation.

58. "E.ON und Suez Lyonnaise dementieren Berichte über bevorstehende Fusion," *Energie-Chronik*, September 2000.

Suez. The French government was strongly opposed to an acquisition of Suez by Enel. Then Prime Minister Dominique de Villepin announced, only two days after Enel had made public its interest in Suez, that the French government would favor a merger of Suez and GDF. The two companies confirmed this first public announcement of their merger plans, which had already been prepared in advance. Critics in France therefore argued that the “danger” of a takeover by Enel was only a pretext to realize the long-planned merger, which also meant that the French government’s part in GDF was reduced to a minority (but blocking) share. The Italian government complained to the European Commission about this act of “economic patriotism” to the disadvantage of Enel. In response, the European Commissioner in charge of the internal market, Charlie McCreevy, stated that the French position is “legally correct, but against the spirit of the European internal market.”<sup>59</sup>

Long discussions among French politicians, managers and workers of the two companies and the general public took place after the announcement of the merger plan. The trade unions, the left-wing opposition and GDF workers were strongly opposed to the government’s idea. They did not agree to the industrial logic of the merger and feared that the French *service public* model could suffer. Heated debates and two court rulings delayed the merger, but it finally came into existence on 22 July 2008. The French Parliament needed to pass a special law allowing the privatization of GDF, as the French state only has a minority share of 35.6 percent (as of 31 December 2008) in GDF Suez, after having been the majority shareholder of GDF before the merger.<sup>60</sup> The French government, however, keeps a “golden share” in the new company through which it can oppose the sale of gas infrastructure in France. Moreover, the French government clearly announced its intention to control the strategy of the new group.<sup>61</sup> It is of course difficult to know with certainty to what extent this happens in reality.

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59. <http://www.melchior.fr/Enel-Suez-GDF-l-annee-20.5558.0.html>.

60. The law was passed on 8 November 2006, having received 137,449 amendment proposals during the debate in Parliament.

61. Prime Minister François Fillon as quoted by Bloomberg [3 September 2007]: “With 40 percent, the state keeps the control. What is important is to have control. We have the control, we control the strategy.”

The European Commission approved the merger under several conditions, which included the divestment of Distrigas (acquired by Eni) and SPE (the second-largest electricity producer in Belgium, acquired by Centrica). Suez also agreed to relinquish control over Fluxys, the Belgian gas network operator, and GDF agreed to divest its subsidiary Cofathec Coriance, a district heating company in France.<sup>62</sup>

In the context of the merger, Suez's water and waste assets were spun off into a new publicly-traded company, Suez Environnement, in which GDF Suez has a 35.4 percent stake (as of 31 December 2009). For a long time Suez had resisted spinning off these activities, and the solution is a compromise that allows GDF Suez to fully incorporate the revenue streams of Suez Environnement.

As reasons for the merger, both companies stated that each of them would be too small to compete on the European market and too weak to be a strong global player. Moreover, they pointed to the synergy effects of the merger, which concern both geographic and industrial (gas-electricity integration) aspects. It was also argued that GDF Suez could become a powerful competitor to EDF in France – which is a surprising argument, given the dominant position of EDF in the French electricity market (with a market share of around 90 percent of production) and the fact that the French government is the biggest shareholder in both companies. It is difficult to imagine that the French government would allow for real competition between two companies in which it is the single largest shareholder. Still, GDF Suez is often described as the biggest challenger to EDF, and EDF's management was reportedly rather unhappy about the GDF-Suez merger.<sup>63</sup> Moreover, the situation might change once the “NOME” (acronym for *Nouvelle organisation du marché électrique*) law – under discussion at the time of writing – is in force.

One year after the merger, most commentators underline that the merger has been a success. It is indeed interesting to

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62. European Commission press releases of 14 November 2006 (IP/06/1558 and MEMO/06/424).

63. “EDF was outraged when the French government allowed the merger of quoted utility Suez with state-controlled Gaz de France. That deal will present the biggest challenge to EDF's hold on the French energy market.” “EDF plays a political game in its attempt at international expansion,” *Financial Times*, 7 April 2008.

note that there has been little talk of rebellion or boardroom quarrels – which accompany nearly every merger process, and were well documented by the media in the case of the GDF-Suez merger. A management reorganization, giving up the strict parity between managers coming from the two merged companies, marked the first anniversary of the merger.<sup>64</sup> However, problems do exist: inside Electrabel, some complain about the fact that the former Belgian energy flagship is losing its “Belgian” identity. The company also has had an uneasy life with Belgian authorities recently, which some have linked to the fact that Electrabel is now “less Belgian.” Moreover, it is increasingly difficult to explain why pay differentials exist between former GDF workers earning civil service salaries and former Suez workers earning the better wages of the private sector. A trade union representative underlined this: “We have the old GDF people asking why they should do the work for 30 percent less pay.”<sup>65</sup>

### ***GDF Suez’s Position in the Different European Markets***

Since the merger, GDF Suez is among the energy utilities with the largest presence in Europe (albeit less broad geographically than E.ON). It is also one of the European utilities with the most important activities outside Europe, which account for 14 percent of total sales. France and Belgium are the single most important countries for the company, respectively contributing 37 and 16 percent to total sales in 2008. The company does not specify the respective shares of gas and electricity in its sales or profit. In overall terms, it qualifies its position on the European markets as:

- largest gas company in Europe (largest gas buyer and marketer, largest transport and distribution network, second-largest storage operator);
- largest LNG company in the world, largest importer and buyer of LNG in Europe, second-largest LNG terminal operator in Europe;
- fifth-largest electricity producer and marketer in Europe.<sup>66</sup>

64. “Un an après sa naissance, GDF Suez réorganise son management,” *Les Echos*, 6 July 2009.

65. Quoted in: “Benefits of GDF Suez’s bitter tie-up clear to see,” *Financial Times*, 23 July 2009.

66. GDF Suez Activities and Sustainable Development Report 2008, p. 29.

**Table 8. GDF Suez Revenues and EBITDA by Business Line (2008)**

Business line	Contribution to revenues		Contribution to EBITDA	
	€bn	percent	€bn	percent
Energy Europe & International*	30.5	37	4.4	32
Energy France	14.5	17	0.2	1
Energy Services	14.0	17	0.9	6
Environment	12.4	15	2.1	15
Global Gas & LNG	10.8	13	3.7	27
Infrastructures	0.9	1	2.9	21
Total	83.1	100	13.9	100

N.B.: EBITDA: Earnings before Interest, Taxes, Depreciation and Amortization.

\* "Energy Europe & International" was divided into Benelux & Germany (€14.2bn revenues, €1.8bn EBITDA), other Europe (€8.7bn revenues, €0.8bn EBITDA), and International (€7.6bn revenues, €1.8bn EBITDA) in 2008.

Source: GDF Suez Activities and Sustainable Development Report 2008, p. 8, and own calculation.

GDF Suez is organized in six business lines:

- Energy France: electricity production, gas and electricity supply, energy services for private individuals, professionals, companies and territorial communities in France;
- Energy Europe & International: production, distribution and supply of gas and electricity outside France, organized in five subdivisions "Benelux & Germany," "Europe" (other than France, Benelux and Germany, including Russia), "North America," "Latin America," "Middle East, Asia & Africa;"
- Global Gas & LNG: exploration and production of gas and oil, procurement and routing of gas and LNG, energy trading and supplying major accounts in Europe;
- Infrastructures: transmission of natural gas and electricity, gasification of LNG, storage of natural gas, distribution of natural gas (primarily in France);
- Energy Services: offers effective and sustainable energy and environmental solutions through multi-technical services in the areas of engineering, installation or energy services to customers in industry, the tertiary sector and infrastructures;
- Environment: water, sanitation and waste management services to communities and manufacturers (GDF Suez owns 35.4 percent of Suez Environnement).

## France

France is the traditional home market of the former GDF, which enjoyed a more or less monopolistic position on the French gas market before 2000.<sup>67</sup> France is by large the single most important country for GDF Suez, especially concerning gas. GDF Suez is the dominant company in the French gas market, owning and managing most of the transport, distribution and storage infrastructure (with the exception of the South-West region, controlled by Total's subsidiary TIGF). GDF Suez is by far the largest gas supplier in France with more than 10m customers. In 2008, the company realized around 60 percent of its worldwide gas sales in France. Its position is most dominant in the household sector (market share of 91 percent),<sup>68</sup> but it has lost to competitors in the important sector of big industrial clients (its market share declined from 75 percent in 2000 to 59 percent in 2008).<sup>69</sup> Due to the regulated gas tariff in France, the profitability of supply activities is limited. According to press reports, GDF Suez even lost money in this segment in 2009.<sup>70</sup> Its distribution activities are managed by the subsidiary Gaz Réseau Distribution France (GrDF), which has common structures with ERDF, EDF's French distribution subsidiary (see box 1). The European Commission suspected GDF Suez of abusing its dominant position in the French gas market. After negotiations with the Commission in December 2009, GDF Suez agreed to gradually decrease its share of import capacity to France from 2010 onwards. The company's share will be less than 50 percent by 2014. These commitments prompted the European Commission to end its investigations.<sup>71</sup>

GDF Suez is also the second-largest electricity producer and marketer in France. It produces around 5 percent of French electricity, mainly from hydroelectric plants, but also increasingly from combined cycle gas turbine (CCGT) plants. Several plants are under construction or planned, as GDF Suez wants

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67. Only some minor municipal suppliers co-existed with GDF. GDF was the only company allowed to import gas.

68. E-mail from GDF Suez representative to the author, 22 February 2010.

69. Vignon and Grandclement (2008), p. 22. GDF Suez Document de référence 2008, p. 92.

70. GDF Suez perdra de l'argent en 2009 sur la vente de gaz en France, <http://www.usinenouvelle.com>, 27 August 2009.

71. European Commission speech/09/569, 3 December 2009.

to increase its production capacity in France from 6.4 GW to 10 GW in 2013. It also has drawing rights from two nuclear plants, and will be a minority shareholder in the second French EPR plant. It is also developing renewable energy projects, and has the objective to increase its share of French hydroelectric capacity through bidding in planned concession auctions. In electricity sales, GDF Suez has an overall market share of around 5-7 percent today. It plans to develop this position, as it has indicated a long-term objective of a market share of 20 percent in the electricity retail market.

### **Box 1. Cooperation Between GDF Suez and EDF in Distribution**

Since their beginnings, EDF and GDF have had some common structures, in particular to manage gas and electricity distribution networks and customer service. Until July 2007, customer services for residential customers were managed in common (this meant in practice that customers received only one bill covering services from both companies). ERDF and GrDF have continued their close cooperation in distribution, even if each company now independently manages its portfolio of clients. Some of their personnel are employed by common structures, which also deal with many client contacts (repairs, meter readings etc.). This provides both companies with synergies, as approximately one-third of technical and metering services carried out at customer premises relate to both electricity and gas. It will be interesting to observe if this cooperation will continue in the future: the influential trade unions favor maintaining the common structures, but as both companies have started to compete for residential customers – GDF Suez now also provides electricity to residential customers, and EDF also offers natural gas –, their cooperation in distribution could become more difficult. EDF's CEO Henri Proglio recently put into question the future of this common structure.<sup>1</sup>

1. "Distribution : EDF remet en cause sa filiale commune avec GDF Suez," *Lesechos.fr*, 4 February 2010.

### *Belgium and the Netherlands*

In Belgium and the Netherlands, GDF Suez is particularly strong in electricity, but also has a solid position in gas. Its subsidiary Electrabel (Suez has been Electrabel's majority shareholder since 2003), the incumbent electricity supplier of

Belgium, is the largest power producer in the Benelux region today. It produced around 86 percent of electricity in Belgium in 2008. Moreover, the company has around 20 percent of production capacity in the Netherlands, also making it the single largest producer there. However, its market share in Belgium decreased to around 65 percent after the swap agreement with E.ON in 2009.<sup>72</sup> GDF Suez is the operator of the seven Belgian nuclear plants – indeed the only nuclear plants GDF Suez is currently operating. The company has repeatedly had difficult negotiations with the Belgian government concerning nuclear power, as the Belgian government has several times changed its opinion concerning the future of Belgian nuclear plants. Notably, it has imposed a special tax on the producers of nuclear power. A “global agreement” concerning the cooperation between GDF Suez and the Belgian government was signed in October 2009, but it remains to be seen if it has solved all outstanding issues.<sup>73</sup>

In response to respective legislation, Electrabel ceased its operational activities in electricity or gas network operations in Belgium in 2005. But it has kept minority participations in Elia, the electricity transmission network operator, and Fluxys, the gas transmission network operator. However, the company announced to divest these participations in March 2010.<sup>74</sup>

On the supply side, GDF Suez is the largest gas and electricity supplier in Belgium, and is also active in the Netherlands through Electrabel Nederland. According to the Belgian regulator, GDF Suez has a market share of 84 percent in electricity sales to big industrial customers (connected to the network at more than 70 kV).<sup>75</sup> For electricity supplied via the distribution network, Electrabel had a market share of 70 percent in 2008.<sup>76</sup> In gas supply in Belgium, GDF Suez had a market share of around 30 percent in 2008, with market shares of 20 percent for big industrial customers and 64 percent for gas supplied via the distribution network.<sup>77</sup> In the Netherlands, GDF Suez had a market

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72. GDF Suez press release of 31 July 2009 and Trends-Tendances, 5 March 2009, p. 38-39.

73. See for example GDF Suez press releases of 22 October 2009 and 31 December 2009.

74. Enerpresse, 5 March 2010.

75. CREG Rapport Annuel 2008, p. 51.

76. CREG et al. (2009), p. 9.

77. CREG et al. (2009), p. 10 and GDF Suez Document de référence 2008, p. 92.



share of 7 percent in gas sales to big industrial customers.<sup>78</sup> Before the merger, Suez was even the dominant gas player in Belgium thanks to its subsidiary Distrigas. But the European Commission imposed the divestment of this company as one of the conditions in its approval of the GDF-Suez merger. Finally, the Netherlands is one of the most important countries for GDF Suez's exploration and production activities, as 36 percent of the company's gas production was realized there in 2008.

### *Germany*

In Germany, GDF Suez is active in electricity and gas. Electrabel entered the German market in 1998, selling electricity to industrial customers and taking participation in three *Stadtwerke*. Its production capacity in Germany got an important boost thanks to the recent swap agreement with E.ON; GDF Suez now has a market share of around 2 percent. GDF made its first acquisition in Germany in 1994. In 1998, it acquired a participation of 32 percent in Gasag, Berlin's historic gas supplier which has recently started to supply gas to customers outside Berlin. Recent media reports indicate that GDF Suez is about to increase its share in Gasag and hence reinforce its position in the German gas market. GDF also planned to acquire 49.9 percent in the *Stadtwerke* of Leipzig for €520m, but a local referendum in 2008 rejected the privatization of the municipal supplier, against the wish of the city's mayor.<sup>79</sup> In the sector of big industrial customers, GDF Suez had a market share of 2 percent in 2008.<sup>80</sup> It also has some upstream activities in Germany, as well as participation in transmission pipelines and storage sites. Numerous press reports have been indicating for more than two years now that GDF Suez is in negotiations with the Nord Stream consortium, which is to build the Baltic Sea gas pipeline. No decision has been made at the time of writing.<sup>81</sup>

78. GDF Suez Document de référence 2008, p. 92.

79. "Les habitants de Leipzig barrent la route à GDF," *L'Écho online*, 28 January 2008.

80. GDF Suez Document de référence 2008, p. 92.

81. GDF Suez's interest in Nord Stream is sometimes seen as a reaction to the fact that Turkey blocked GDF Suez from becoming a shareholder in the Nabucco project for political reasons—Turkey is opposed to France's recognition of the Armenian genocide and enraged by French opposition to the Turkish EU bid.

### *Italy*

GDF Suez is, according to its own assessment, the fourth-largest energy utility in Italy, active in electricity and gas. It also offers energy services there. GDF entered the Italian market in 1997 by acquiring positions in the energy services sector. Electrabel entered Italy in 2000, and, since 2002, it owns production capacities in cooperation with Acea, Rome's municipal utility. Since 2009, GDF Suez also receives 1.1 GW of virtual power plant capacities from Eni, which gives it a combined market share in production of 6-8 percent. GDF Suez is active in electricity and gas sales and distribution thanks to various shareholdings, but it has decided in mid-2009 to retreat from a deal with Eni concerning the takeover of Romana Gas, the gas supplier of Rome.<sup>82</sup> In the sector of gas sales to big industrial customers, GDF Suez had a market share of 10 percent in 2008.<sup>83</sup>

### *United Kingdom*

GDF entered the British gas market in 1999 by acquiring Volunteer Energy, a gas trading company. The French gas company has further developed its presence since then and had a 15 percent market share for commercial and industrial gas customers in 2007.<sup>84</sup> This makes it the third-largest supplier of gas to business customers in the UK. GDF Suez is also active in gas and oil exploration and production in the UK.

Electrabel did not enter the British market before the merger, and GDF Suez only became an important electricity player in the UK in 2008, when it acquired Teesside, Europe's largest CCGT plant. This gives it a market share of around 2-3 percent in the British generation market. The company sells electricity at the wholesale market and to industrial customers. In April 2009, GDF Suez, in a consortium with Iberdrola/Scottish Power and Scottish and Southern Energy, participated in the first round of auctions of land to build new nuclear power stations. The consortium dropped out after prices had gone up significantly,

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82. *Enerpresse*, 23 July 2009.

83. GDF Suez Document de référence 2008, p. 92.

84. Vignon and Grandclement (2008), p. 23.

but it acquired an option for the acquisition of land at Sellafeld in October 2009, with the objective to build a nuclear plant there.<sup>85</sup>

### *Iberia*

GDF Suez has rather limited activities in Spain and Portugal, mainly consisting in electricity production (participations in CCGT plants and wind parks). Electricity from these plants is sold to the wholesale market. The assets and shareholdings stem from several acquisitions by Electrabel, the first ones dating back to the late 1990s. The market share in production amounts to around 2-3 percent. In gas, GDF entered the Portuguese market in the 1990s by acquiring a share in the second-largest Portuguese distributor Portgas (now EDP Gas). GDF also entered, back in 2001, the Medgaz consortium (12 percent share), which built the pipeline of the same name, linking Algeria to Spain. Suez Environnement also holds an 8.8 percent shareholding in the Spanish gas company Gas Natural, but it has recently announced its attention to sell its shares. In the run-up to the GDF-Suez merger, a takeover of Gas Natural by Suez was widely seen as Suez's "plan B" if the tie-up with GDF unraveled. Moreover, the Spanish government was reported to fear an aggressive expansion of GDF Suez into the Spanish market.<sup>86</sup>

### *Central and Eastern Europe*

GDF and Suez acquired several participations in the former communist countries of Central and Eastern Europe when those privatized their energy companies. GDF was among the first Western European companies to enter the new markets in the East, as it acquired shares in the Hungarian gas distributors Egaz and Degaz in 1995. It then increased its shareholdings and finally merged the two companies. GDF Suez today has a market share of around 13 percent in gas sales in Hungary. Suez also entered Hungary quite early on, in 1998, by acquiring

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85. "Franco-Spanish group quits race for nuclear site," *Financial Times*, 29 April 2009. GDF Suez press release of 28 October 2009.

86. "GDF Suez ready to join Gas Natural bid," *Financial Times*, 19 June 2008. "Spain plans defences against Suez-GdF," *Financial Times*, 10 September 2007.

the largest conventional Hungarian power plant, Dunamenti. After being solely an electricity producer, it also started sales and trading activities in 2003. Today GDF Suez produces around 8 percent of Hungarian electricity.

Suez's Tractebel entered the Polish market in 2000 by acquiring shares in a large power plant (Polaniec plant).<sup>87</sup> The share was taken over by Electrabel in 2001 and increased to 60 percent in 2003. GDF Suez is today the sixth-largest electricity producer in Poland, with a market share of 4-5 percent, and it also sells electricity to large customers there. The Polish press recently revealed that GDF Suez has plans to significantly increase its production capacity in Poland.<sup>88</sup>

GDF, together with Ruhrgas, acquired control of the Slovakian gas company Slovenský Plynárenský Priemysel (SPP) in 2002 (for €2.8bn; 51 percent of the shares remain with the Slovak government, but the two companies have operating control). SPP is active in international transit, controlling the Slovak part of the main pipeline bringing Russian gas to Western Europe, domestic gas transmission, storage, distribution and sales in Slovakia.

In Romania in 2004, GDF acquired the gas distribution company Distrigas Sud, which has 1.2m customers in Southern Romania. GDF Suez has a 40.8 percent share in Distrigas Sud, one of the first privatized energy companies in Romania.<sup>89</sup> Distrigas Sud realized around 25 percent of Romanian gas sales in 2008. Moreover, GDF Suez is active in gas storage in Romania via two shareholdings. The company also participates in the project concerning the construction of a new nuclear reactor in Cernavoda; it has a 9.15 percent participation in this project.<sup>90</sup> The project seems relatively well on track for a

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87. This was not the first time Suez invested in Poland: the company had already invested there in the 1920s.

88. "Kto i gdzie chce wybudować elektrownię" [Who and where they want to build power plants], *Gazeta Wyborcza*, 24 June 2009.

89. International Finance Corporation, the private sector arm of the World Bank Group, and the European Bank for Reconstruction and Development, are the two other international shareholders, each having 5.1 percent. The Romanian state has 37 percent and the State property fund 12 percent.

90. The remaining shareholders are Romania's state-owned Nuclearelectrica with 51 percent, CEZ, Enel and RWE with 9.15 percent each, and Iberdrola and ArcelorMittal with 6.2 percent each.

commissioning in 2015/2016, even if the Romanian government could still decide to reduce its stake and thereby modify the project.

### *Outside the EU*

GDF Suez, which describes itself as “a world leader in energy,” has important activities outside the EU. These include gas exploration and production (Norway, North Africa), LNG (GDF Suez is the largest LNG gas importer in the US), but also “classic” utility activities like electricity production and distribution. For example, GDF Suez is one of the first European companies present in this sector in Turkey, as it owns a CCGT power plant and acquired the gas distributor Izgaz in 2009. Its most significant extra-European activities are located in the Americas, where Suez had started important acquisition activities in the 1990s. Asia and the Middle East are the two other important regions for GDF Suez. It owns power plants and sells electricity and gas in several countries (among others: US, Brazil, Chile, Peru, Panama, Thailand, Singapore, Arab states of the Persian Gulf). In the Gulf region, GDF Suez is active in several desalination projects. In 2009, GDF Suez also participated in a joint bid with other French companies for the construction of nuclear plants in the United Arab Emirates, which was not successful in the end. Overall, 35 percent of GDF Suez’s electricity production is realized outside the EU.<sup>91</sup>

## **EDF**

Electricité de France is the historic French electricity operator. Founded in 1946 when France nationalized major components of its energy sector, it replaced the roughly 1,500 private companies that had previously assured French electricity production, transmission and distribution. The company became a monopoly in charge of transmission and distribution, and a quasi-monopoly for generation and commercialization with a clear purpose: improving efficiency in generation through standardization and implementing full reliable access to electricity with the same price for the same supply anywhere

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91. GDF Suez Document de référence 2008, p. 42.

in France. EDF remained in the same situation until the French Parliament transposed the first electricity liberalization directive of 1996 into French law in 2000. Still today, EDF remains the dominant player in the French electricity market.

EDF started to internationalize in the 1990s and today realizes roughly half of its revenues abroad. As most of its early acquisitions abroad (notably in Latin America) proved unsuccessful, EDF then refocused on Europe. Besides France, the UK, Germany and Italy are the most important countries for EDF today. EDF was 100 percent state-owned until 2005, when it was partly introduced to the stock market, after the change of its legal status to a listed-company (*société anonyme*; SA). The French state currently has 84.4 percent of the shares, and it is obliged by a special law to keep at least 70 percent. The strong position of the French government in EDF and the French reluctance to open its energy market to competition have been the object of recurring protests by other European utilities and governments. EDF is indeed in a quite unique – and advantageous – situation, as major acquisitions by foreign companies in the French electricity sector are not feasible due to the fact that, for political reasons, all nuclear power plants in France will remain operated by EDF. Moreover, EDF owns all currently operating nuclear power plants in France at 100 percent. This will change in the near future, but for the time being EDF will remain the majority shareholder in any nuclear facility in France.<sup>92</sup> On the other hand, EDF is able to acquire important assets in other European countries where no similar restrictions apply.

Whereas hydropower dominated EDF electricity mix in the early years, oil became the dominant energy source in the 1960s: in 1973, 43 percent of EDF's total output was provided by oil-fired power stations. The 1973 oil crisis led the French government to the decision to start a vast nuclear program in order to ensure French energy independence. Nuclear power in 1973 provided 8 percent of EDF's output, and this share increased at a fast pace thanks to the so-called "Messmer

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92. Other companies have minority shareholdings in nuclear plants currently under construction or development. Moreover, the acquisition of minority shareholdings in existing nuclear plants has been discussed lately.

Plan<sup>93</sup>: it reached 49 percent in 1983, and 75 percent in 1990. In 2008, 86 percent of EDF's production in France was nuclear-based. Hence it is fair to say that nuclear energy is an integral part of EDF's (if not French) identity.<sup>94</sup> Forty-seven percent of the EU's nuclear power production comes from the 58 French reactors. However, the very ambitious and impressive French nuclear program (46 reactors put in operation between 1977 and 1987, and twelve more between 1988 and 1999) was based on overestimates of future electricity consumption: this resulted in EDF having immense overcapacity.<sup>95</sup> In order to use its capacities, EDF was trying to stimulate demand for electricity in France, inter alia by attracting energy-intensive industries to France with low electricity prices. EDF also started to export large amounts of electricity to neighboring countries, with Italy, Switzerland, Germany, and the United Kingdom becoming the biggest buyers.

EDF is still largely focused on electricity, but it has decided to diversify into gas by proposing multi-energy offers and energy services especially to big customers. The advantages of electricity-gas synergy are currently less important for EDF, as gas only plays a minor role in EDF's power production portfolio (it is even marginal in EDF's production inside France, albeit there are several CCGT plants under construction). Most of EDF's gas activities are located outside France: its subsidiaries EDF Energy, EnBW (Energie Baden-Württemberg AG) and Edison all sell more gas than EDF in France. Edison has the most significant gas activities of them all with a significant gas portfolio and a presence in gas exploration and production. In a perfect illustration of EDF's quest to develop its gas activities, the company signed a memorandum of understanding with Gazprom in late 2009 concerning "the possibility of EDF participating" in South Stream, an offshore pipeline project in the Black Sea developed by Gazprom and Eni. At the same occasion, EDF confirmed its intention to sign a long-term gas sales contract with Gazprom.<sup>96</sup>

93. From the name of Pierre Messmer, French Prime Minister from 1972 to 1974.

94. G. Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (2<sup>nd</sup> edition), Cambridge, MA, MIT Press, 2009.

95. In 1988, for instance, the average load factor of EDF's nuclear plants was only 61 percent, whereas in West Germany it was at 74 percent, in Switzerland at 84 percent and in Finland at 92 percent.

96. EDF press release of 27 November 2009.

**Table 9. EDF's Total Sales and EBITDA by Country 2008**

	Total sales (€bn)	Total sales (%)	EBITDA (€bn)	EBITDA (%)
France	34.3	53	9.0	63
UK	8.3	13	0.9	6
Germany	7.5	12	1.1	8
Italy*	6.0	9	0.9	6
Other Europe	7.6	12	2.1	15
Outside Europe	0.6	1	0.2	1
Total	64.3	100	14.2	100
Total outside France	30.0	47	5.2	37

\*EDF EBITDA in Italy: €0.8bn from Edison, €0.1bn from other shareholdings.

Source: EDF Rapport Annuel 2008, p. 8.

In the 1980s, EDF developed its first international projects, with China and French-speaking Africa being the first destinations for consultancy and plant-construction jobs. In the early 1990s, EDF started to expand in Europe. Negotiations concerning a participation in the modernization of the East German electricity sector in 1991 were not successful, but the same year, EDF entered a consortium that built a gas-fired power station in Britain. Investments abroad reached 3bn French francs (€0.46bn) in 1994, with the next steps being acquisitions in Sweden (Sydkraft in 1994, Granninge in 1996 – EDF later sold these shareholdings to E.ON) and Italy (Ilva SE). We describe below how EDF has strongly developed its position in the European electricity markets: it is, by far, the biggest electricity producer in Europe today, producing roughly 20 percent of the EU's electricity (595 TWh in 2008). Seventy-nine percent of EDF's electricity production is realized in France, and 72 percent of its total production comes from nuclear power. Thanks to the high share of nuclear generation and hydroelectricity, EDF has the lowest CO<sub>2</sub> emissions per kWh among the seven largest European utilities. This constitutes an important competitive advantage as electricity producers in the EU will need to pay for all of their CO<sub>2</sub> emissions from 2013 onwards.



After various acquisitions in the 1990s and 2000s, EDF announced, in July 2009, the divestment of assets worth €5bn. Its strategy for the 2008-2012 period is based on three priorities: the global nuclear revival, renewable energies and energy efficiency, and the strengthening of its leadership position in Europe.

Unlike other companies, EDF regrettably does not publish updated information concerning its internal structure or an organizational chart detailing its branches. Therefore, it is only possible to underline that subsidiaries in which EDF has less than 50 percent of voting rights (EnBW, Edison) play an important role. EDF has set up branches for special business areas: EDF Trading (100 percent EDF) was set up in 2000. It buys and sells electricity, emission permits, natural gas, coal, freight, biomass and oil on a global scale. It realized a profit of €1bn before tax in 2008. EDF Energies Nouvelles – formerly SIIF Energies, of which EDF bought 35 percent in 2000 – manages the group's “new” renewable energy assets (all renewable energies other than hydropower; mainly wind). It was introduced separately to the stock market in 2006; 50 percent of shares remain with EDF, 25.1 percent remain with Group Mouratoglou and 24.9 percent are free floating. EDF Energies Nouvelles realized sales of €1bn in 2008, equally distributed between Europe and the Americas.

### *France*

France is, of course, the most important country for EDF. Its traditional position as market leader has not yet been seriously questioned, even if its market shares have slightly decreased. Thanks to support from political leaders, EDF will probably remain the dominant player in French electricity for years to come, ensuring that the French *service public* model will remain in place. EDF has indeed strong links with the French government, not only due to the fact that the government is the major shareholder. The government also fixes the regulated electricity tariff for household and business customers. The heated debate on the regulated French electricity tariff in the summer of 2009 has shown that the French government is not always inclined to fulfill EDF's economically

argued demands: French electricity customers pay significantly lower prices than their Western European peers.<sup>97</sup>

In 2008, EDF served 26.5m customers in France (electricity and gas, without Corsica and overseas territories) – this meant that EDF had lost 0.7m customers since full market opening in 2007, as it still had 27.2m customers in 2007.<sup>98</sup> Nevertheless, the company has a market share of around 85-90 percent in electricity sales. EDF has a similarly dominant position in electricity generation: it produced around 88 percent of French electricity in 2008, after 89 percent in 2007 and 88 percent in 2006. No other big European utility enjoys a similarly strong position in its home market, and only in four EU Member States is the electricity generation market more concentrated than in France.<sup>99</sup> One should note, however, that EDF agreed in 2001 to release 5,400 MW of its production capacity in auctions, so-called “virtual power plants.” Thereby, around 40 TWh is offered every year to competitors which equals around 8 percent of EDF’s electricity production in France. Nevertheless this measure has not been enough to create real competition. Moreover, the price paid by competitors is quite high (it approximates prices at the electricity exchange).<sup>100</sup> An extension of the measure is currently under debate, as a way to avoid legal procedures by the European Commission, which criticizes France for being slow to implement European legislation requiring market liberalization.<sup>101</sup> Finally, the overall situation of the French electricity market might change once the NOME law – under discussion at the time of writing – is in force.

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97. In June 2009, EDF’s CEO Pierre Gadonneix asked for electricity prices to be increased by 20 percent over the next three years. In August 2009, the French government decided to increase tariffs by 1.9 percent for households, 4 percent for small and medium-sized enterprises, and by 5 percent for big enterprises. This makes price increases of around 20 percent by 2011 quite unlikely. According to Europe’s energy portal, French household customers pay €0.157 per kWh, whereas Spanish customers pay €0.159, British €0.166, Belgian €0.205, German €0.253, Dutch €0.283 and Italian €0.304 (based on a yearly consumption of 3,500 kWh, as of February 2009 – <http://www.energy.eu>).

98. The French regulator CRE reported that 1.0m French households (of a total of 29.6m) were supplied by an alternative electricity supplier at the end of June 2009, which means that EDF has a lost roughly 1.0m customers since market opening in 2007. CRE press release of 1 September 2009.

99. These were in 2007 Greece, Estonia, Latvia and the Czech Republic according to Cappgemini (2008), p. 18.

100. See SiaConseil (2006), SiaConseil (2008), CRE (2009) and Edf website for more details on VPP (<http://capacityauctions.edf.com>).

101. Accord Paris-Bruxelles sur le marché de l’électricité, Enerpresse, 17 September 2009.

In order to respect unbundling requirements of the EU, EDF set up two subsidiaries in France which it owns at 100 percent: Réseau de Transport d'Électricité (RTE) for high-voltage electricity transmission and Electricité Réseau Distribution France (ERDF) for electricity distribution. Both cover the whole French territory, with RTE being the single operator of the French transmission network and ERDF serving 34,000 French towns, representing 95 percent of electricity distributed in France (see box 1). The remaining 5 percent are served by municipal enterprises.

Moreover, since 2000 EDF has a 34 percent share in Dalkia, Europe's leading energy services provider with activities in several European countries. Dalkia had €8.6bn of revenue in 2008; its majority shareholder is Veolia Environnement, which has 66 percent.

### *United Kingdom*

The United Kingdom is EDF's second most important market. Between 1998 and 2002, EDF acquired several energy companies in Britain for a total of around £6.2bn. The first and largest acquisition in this period was London Electricity in 1998, for roughly £2bn. EDF bought the former public sector electricity utility from US utility Entergy, which was one of the many US investors that left the British energy sector after a short period.<sup>102</sup> After the completion of several other acquisitions, EDF brought together its British assets in one structure, EDF Energy. It thereby became one of the largest energy companies in Britain, benefitting from the opportunities of liberalization and privatization there.

In 2008, EDF concluded its most important deal in Britain to date. For £12.4bn, it acquired British Energy, the largest British electricity generator that runs the country's nuclear power stations. In May 2009, EDF and British utility Centrica agreed on a deal giving Centrica 20 percent of British Energy for £2.3bn. As part of the deal, Centrica transferred its 51 percent share in the Belgian SPE to EDF, and it received additional drawing rights from the British nuclear plants.

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102. Entergy had acquired London Electricity in 1996. See Haar and Jones [2008].

Thanks to the acquisition of British Energy, EDF tripled its production capacity and now is the biggest electricity producer in Britain, with a market share of around 18 percent.<sup>103</sup> Moreover, this acquisition puts EDF in a very advantageous position for the nuclear new build in Britain. EDF and Centrica have announced that they will build four nuclear reactors of the new EPR technology in Britain, also under an 80-20 joint-venture.<sup>104</sup> However, several analysts expressed doubts about EDF's capacity to finance the construction of nuclear reactors in Britain as scheduled.<sup>105</sup>

Between 1998 and 2002, EDF Energy also acquired three of the fourteen British electricity distribution areas: London, East England and South East England. They form a connected entity and make EDF the largest distribution network operator in Britain, serving 7.8m customers. After the acquisition of British Energy, however, EDF Energy has announced its intention to sell its British distribution assets (worth around £4bn). Negotiations on the issue are ongoing at the time of writing.

### *Germany*

In Germany, EDF is mainly active through its shareholding in EnBW, the third-largest energy utility in Germany. EDF acquired 34.5 percent of EnBW in 2001, and later increased its share to 45.01 percent. OEW, a consortium of towns and local authorities in the German state of Baden-Württemberg, owns an equal share. Operational control is with EDF, but important decisions need to be taken in common. When EDF entered into EnBW's capital, the European Commission imposed several conditions on EDF, including the obligation to make available to competitors portions of generation capacity in France via "virtual power plants," and the end of its control over a hydropower producer in France (Compagnie Nationale du Rhône, sold to Suez in 2003).<sup>106</sup>

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103. EDF has agreed to sell two large thermal power stations in order to respond to competition concerns of the European Commission.

104. EDF press release of 11 May 2009.

105. "EDF power price curb could hit UK nuclear reactor plans," *The Times*, 10 August 2009.

106. See above and European Commission press release of 7 February 2001 (IP/01/175).

EnBW's activities are concentrated in its historic region, Germany's South-Western state of Baden-Württemberg. But as a consequence of market liberalization, it is now active in the whole of Germany, via participation in other energy companies and local suppliers (*Stadtwerke*). Moreover, EnBW has some shareholdings outside Germany, often in cooperation with EDF. EnBW, which has a balanced power plant portfolio including nuclear energy, produced around 11 percent of German electricity in 2008. Its market share in electricity distribution and sales is larger, amounting to around 15 percent and making it the third-largest company in this area. EnBW is also one of the four electricity TSOs in Germany, owning the transmission network of Baden-Württemberg which represents around 11 percent of the whole German network. Unlike its peers E.ON and Vattenfall, EnBW (just like RWE) wants to keep this asset. Electricity represents 78 percent of EnBW's revenues, as its gas activities are rather limited: EnBW sells gas to end-users and has a share of around 7 percent in this market. EnBW announced its intention to extend its gas activities by acquiring up to 48 percent of the third-largest German gas importer VNG in 2009.

Numerous press reports in 2007 indicated that EDF was interested in a take-over of Germany's second-largest energy utility RWE. The news gave birth to many speculations, but EDF officially denied any contacts with RWE. RWE suspected speculation by some actors on the financial market behind the leak and asked German authorities to inquire. A hypothetical takeover of RWE, which is without doubt politically very sensitive if not impossible, would have implied a divestment of EDF's shareholding in EnBW.<sup>107</sup>

### *Italy*

Italy is the third most important country for EDF's international activities. EDF has been cooperating with several partners in Italy, but its Italian activities have never been easy, as politics have regularly complicated EDF's Italian business. EDF

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107. "EDF will RWE übernehmen und sich aus EnBW zurückziehen," *Energie-Chronik*, May 2007. "RWE shares jump on report that EDF plans takeover," Bloomberg, 11 May 2007. "RWE befürchtet gezielte Kursmanipulation," *RP online*, 12 May 2007.

has been cooperating with the former monopoly Enel for several decades, and has been, *inter alia*, delivering electricity to Enel under long-term contracts since 1988. Both companies are also cooperating in the nuclear field: EDF will be Enel's industrial partner for the nuclear new build in Italy, and Enel has a 12.5 percent participation in the Flamanville EPR project (see Enel section for more details).

In 2000, EDF established an Italian branch (EDF Italia), whose main activity was electricity sales to big customers. EDF Italia was integrated into Edison in 2006, as EDF is a major shareholder in Edison since 2001.<sup>108</sup> EDF's presence in Edison has been the object of several disputes, political discussions and ongoing negotiations. In 2001 EDF acquired its first shares in Edison, which was owned by Fiat and Italian banks at that time. Neither the other shareholders nor the Italian government welcomed the deal. The Italian Parliament even passed a law in 2004 that restricted EDF's voting rights to 2 percent, although the company had a much higher shareholding. This law was later invalidated and a new ownership model for Edison was set up: the company's main shareholders today are EDF (which has 50 percent of voting rights<sup>109</sup>), the Italian utility A2A (which has 25.5 percent of voting rights; it is owned by the cities of Milano and Brescia) and Carlo Tassara Spa of French investor Romain Zaleski (10 percent, see graph 13 in annex).<sup>110</sup>

Edison's complicated structure also poses operational problems: there are ongoing discussions about who has the right to use what electricity produced from Edison's power plants. The fact that an important part of Edison's production comes from Edipower, a company in which Edison is a 50 percent

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108. Edison is the second-largest electricity producer and the third-largest gas company in Italy, with total sales of €11.1bn in 2008.

109. EDF has a direct shareholding of 19.4 percent and holds 30.6 percent via Transalpina di Energia, a common holding company with Delmi, of which A2A is the major shareholder [see graph in annex for details].

110. Recent press reports indicate that Carlo Tassara wants to sell its stake, and there are also plans to restructure the complicated ownership structure of Edison – these plans are all but new. A2A, which by the way stated to be “upset” about EDF's reinforced cooperation with Enel in the nuclear field, wants to get more control over Edison. Sources: A2A “upset” by partner's nuclear deal with Enel, Reuters, 6 August 2009. Edison investors hire Mediobanca for restructuring-source, Reuters, 2 April 2009.

shareholder and in which A2A and the Swiss Alpiq each have a 20 percent stake, makes things even more complicated. The difficult ownership structure put aside, Edison has become the most important challenger to the incumbent Italian electricity company Enel. It produces around 16 percent of Italian electricity, which it mainly sells to the wholesale market, big industrial customers and the Italian power exchange. It was only in 2008 that Edison entered the residential market. Besides electricity (which accounts for around 63 percent of Edison's revenue), Edison also has important gas activities. These are of particular interest for EDF, which has only very limited experience in natural gas, but wants to develop its gas activities. Edison has a market share of around 16 percent of Italian gas supply. Like several other gas suppliers, Edison has recently stepped up its activities in the gas upstream sector in order to be present in the whole value chain of natural gas. Around 10 percent of its gas sales are currently covered by gas produced by Edison itself. The company also is a shareholder in two pipeline projects that could bring additional gas to Italy (Galsi and Italy-Greece-Interconnector) as well as in the world's first offshore LNG receiving terminal (Adriatic LNG located offshore of Porto Levante).

Besides Edison, EDF is also active in Italy via its subsidiary Fenice (100 percent EDF). This company was founded by Fiat and taken over by EDF in 2001. Fenice provides energy (mainly from cogeneration) and environmental services to companies and the public sector; it realized €0.6bn of sales in 2008.

### *Belgium and the Netherlands*

Despite geographic and cultural proximity, EDF had only a limited presence in Belgium before 2009. It owned 50 percent of a Belgian nuclear plant and sold rather small amounts of electricity and gas to business customers in Belgium. In 2009, however, EDF's position in Belgium received a considerable boost through the acquisition of 51 percent of the shares of SPE from Centrica. SPE is Belgium's second-largest energy company, which produces around 12 percent of Belgian electricity and has 1.6m electricity and gas customers. EDF and Centrica had agreed to the deal in May 2009 in the context of Centrica's acquisition of 20 percent of British Energy. The European Commission approved the deal, despite some opposition in Belgium, as it

made the French government the major shareholder of the two largest power producers in Belgium (with Electrabel being controlled by GDF Suez since 2008). The Belgian enterprise minister, for instance, voiced concerns that this could lead to price collusion between Electrabel and SPE.<sup>111</sup> In a way, the Belgian electricity market is now a mirror of the French electricity market: GDF Suez is the dominant incumbent and EDF its largest competitor, whereas in France EDF is the dominant incumbent and GDF Suez its largest competitor.

In the Netherlands, EDF is just about to start operations thanks to the construction of a CCGT plant in cooperation with Dutch utility Delta.

### *Iberia*

EDF has only very limited activities in Spain and Portugal today. However, the company had shown interest in becoming an important actor in the Spanish electricity market on several occasions in the recent past. In 2008, for instance, EDF declared its interest in acquiring shares in Iberdrola. But the Spanish company, backed by the Spanish government, refused this plan and EDF had to stand down.<sup>112</sup> Seven years earlier, EnBW, apparently acting on behalf of EDF, acquired shares in the then fourth-largest Spanish energy utility Hidrocantábrico. EDF's 2002 annual report qualified this acquisition as "a first step" in the Spanish market and accordingly ranked Spain as one of EDF's five priority countries. But as EnBW/EDF were not successful in their plan to become the majority shareholder of Hidrocantábrico (also because of opposition from the Spanish government), EnBW sold its shares again in 2004.<sup>113</sup> EDF has also been active in the Spanish wholesale market since 2000, selling electricity to industrial customers via its branch Hispaelec. However, EDF sold Hispaelec to Alpiq in November 2009; the industry news service Enerpresse called this transaction the end of EDF's Spanish adventure.<sup>114</sup>

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111. European Commission press release of 12 November 2009 (IP/09/1704); "EDF est-il en train de tailler des croupières à GDF?" *La Libre Belgique online*, 12 May 2009.

112. La bataille entre EDF et Iberdrola tourne au vinaigre, AFP, 4 April 2008.

113. "EnBW zieht sich aus dem spanischen Strommarkt zurück," *Energie-Chronik*, July 2004.

114. Enerpresse, 5 November 2009.



### *Austria*

EDF has been active in Austria since 1998, when it acquired, together with GDF, 25 percent of the energy supplier ESTAG. After a failed attempt to increase their share to 49 percent in 2007, EDF acquired GDF Suez's share in June 2009. This move was seen by some analysts as preparatory for the sale of the whole shareholding, but sources inside EDF deny this, pointing to the fact that rumours of this kind have existed for eight years now.<sup>115</sup>

### *Central and Eastern Europe*

Like most major West European utilities, EDF has actively participated in the privatization auctions in Central and Eastern Europe. Its presence is concentrated in three countries: Hungary, Poland and Slovakia. Its entry in the region relied on a diversification strategy, concentrating on electricity generation, distribution and combined heat and power operations. It has direct and indirect participation, alone or in partnership with other energy companies from Western Europe, especially EnBW. Compared to the German companies E.ON or RWE, but also compared to GDF Suez, EDF's presence in the region is smaller.<sup>116</sup>

EDF entered Hungary in 1996, when it acquired 61 percent of the electricity distributor Demasz. EDF today has 100 percent in Demasz, which serves nearly 800,000 customers and has a market share of around 11 percent. In 2000, EDF also acquired shares in BE ZRt, a power and heat generator. Today EDF has a 96 percent shareholding in this company which supplies 60 percent of Budapest's urban heating needs.

Since the mid-1990s, EDF has acquired, in several steps, shares in five Polish power production companies, some of which also produce heat. Through direct and indirect shareholdings (notably via EnBW), EDF is a major electricity producer in Poland today; its shareholdings taken together account for around 10 percent of Polish production capacity. Production is mainly coal-based, but EDF is also developing

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115. "EDF ups stake in Austria's Estag to 25 pct," Reuters, 26 June 2009.

116. LaBelle [2009], p. 4-5.

biomass and coal co-combustion. EDF is not active in distribution, but its subsidiary Everen has a market share of roughly 15 percent in electricity sales to industrial customers.

EDF entered Slovakia in 2002, when it acquired 49 percent of the power distributor Stredoslovenska Energetika (SSE); the remaining 51 percent are held by the Slovak National Property Fund. EDF has operational control over SSE, which has around 700,000 clients and covers a third of Slovakian territory (market share of roughly 30 percent). EDF plans to acquire or build generation capacity in Slovakia in order to match distribution needs.

Also in 2002, EDF was in negotiations with the Czech government concerning the planned privatization of the Czech electricity company CEZ. In the end, both parties did not reach an agreement, and CEZ has only been partly privatized so far.

### *Outside the EU*

Switzerland, albeit not a member of the EU, plays a crucial role for European electricity. Its geographic position makes it an important country for European electricity exchanges, and it also has significant peak hydro generation capacity. EDF has a long history of cooperation with Swiss companies, thanks to, inter alia, EDF's electricity exports to Switzerland. Since 2005, EDF has been a major shareholder in the Swiss electricity company Atel. In the context of the Atel-EOS merger, EDF increased its share and now has 25 percent in the merged company Alpiq, which produces one-third of Swiss electricity and has several shareholdings abroad.<sup>117</sup>

EDF's activities outside Europe are limited today, contributing only 1 percent of the company's revenues. Investments in Latin America (Brazil, Argentina, Mexico) in the 1990s proved unsuccessful and were sold by 2005. Today, EDF has a 30 percent shareholding in two nuclear EPR power plants in China, whose commissioning is expected for 2013 and 2015. The company also has limited shareholdings in Laos and Vietnam. Moreover, EDF has become a major player in the US nuclear sector via its acquisition of 49.99 percent of

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117. EDF press release of 16 January 2009.

Constellation Energy Nuclear Group. This deal (worth \$4.5bn) had encountered various difficulties before being finalized in November 2009. EDF thereby acquired a stake in five existing nuclear reactors in the US and aims to build four new EPR reactors there, also in a joint-venture with Constellation Energy.

## Enel

Enel (Ente Nazionale per l'Energia Elettrica – National Authority for Electricity) is the former Italian electricity monopoly and Italy's largest electricity company today. Even if it started its internationalization later than most of its peers, today it is one of Europe's largest electricity companies with a broad international presence. In particular, the acquisition of the Spanish utility Endesa, completed in 2009, has significantly changed the nature of Enel: back in 2005, Enel generated only 11 percent of its electricity and realized only 5 percent of its electricity sales outside Italy. Three years later, the degree of internationalization was significantly higher: in 2008, Enel produced 62 percent of its electricity and realized 49 percent of its electricity sales abroad.<sup>118</sup>

Enel was founded in 1962, when Italy decided to nationalize its electricity sector following long discussions. The complicated nationalization process lasted for several years, as nearly 1,200 companies were merged into Enel, resulting in a company that was difficult to manage. Political interference was significant, and Enel suffered major economic losses. Enel's production portfolio in the early 1960s was dominated by hydroelectricity, but the company then rapidly developed thermal, and especially oil, generation. Also, four nuclear plants were built, but in 1987 and hence just after Chernobyl, the Italian population voted in a referendum to stop the use of nuclear energy in Italy. Since then, Italy has become a major importer of electricity, mainly from France and Switzerland. Another problem for Enel has been recurrent local opposition to new coal power plants and virtually any other new electricity infrastructure.

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118. In 2009, the first year of full consolidation of Endesa, the share of generation and sales abroad was certainly still higher, but no information was available at the time of writing.

After legislative changes in the early 1990s, Enel was transformed from a public authority to a joint-stock company, and later to an industrial holding company. In 1999, Enel was privatized, when shares equalling roughly 32 percent of the company were placed on the stock market. Today, the Italian state has a minority shareholding in Enel (via the Ministry for the Economy and Finance, which has 21.1 percent, and the state-owned bank Cassa Depositi e Prestiti, which has 10.1 percent). 33.7 percent of the shares are held by institutional investors, and 35.1 percent by private investors (as of 31 December 2008). Also beginning in the 1990s, the Italian electricity sector was liberalized. The “Bersani Decree,” which came into effect in 1999, opened up several parts of the electricity market such as generation, import, export, purchasing and sales. The high-voltage transmission network, formerly owned by Enel, was first spun off to an Enel subsidiary, and became an independent company (Terna) in the end. Moreover, the Italian government required Enel to sell at least 15 GW of production capacity by 2002, which resulted in a significant lowering of Enel’s market share in power production in Italy. Hence Enel had to accept this quite radical step to diminish its position in its home market – few of its European competitors were required to do so.

Confronted by these changes, Enel first chose a diversification strategy and became active in water, telecommunications (mobile phone operator Wind, internet company Infostrada) and real estate. However, this strategy did not prove successful and most of the non-energy assets had been sold again by the mid-2000s. The last shares in the telecommunications company Wind were sold in 2008.

The sale of non-energy assets provided Enel with the necessary funds to implement a new strategy based on refocusing on energy and internationalization. Enel’s first significant step towards internationalization was the acquisition of Spanish utility Viesgo in 2001. Further acquisitions were realized in the following years in Bulgaria, Romania and Spain. By acquiring Slovenské Elektrárne in 2005, Enel became the largest power producer in Slovakia. After two major acquisitions in 2007-2008, of the Spanish utility Endesa and the Russian power generator OLGK-5, Enel stated that its international expansion was complete. As the acquisition of Endesa has left Enel with a significant

amount of debt, the company has announced that it will concentrate on consolidation, integration and “portfolio optimization” in the next years. It has already divested some assets and announced the sale of more assets in early 2009. Enel’s objective is to divest assets worth €10bn by 2010.<sup>119</sup>

Enel, just as its largest subsidiary Endesa, has started to diversify into gas by selling gas to end-use customers in Italy. But for the time being, Enel’s gas activities remain rather limited, even if there is an important potential for electricity-gas synergy: Enel produces a significant share of its electricity from natural gas. In 2008, 88 percent of Enel’s revenues came from electricity, and only 5 percent from gas.

### ***The Acquisition of Endesa***

The acquisition of Endesa<sup>120</sup> has significantly changed the nature of Enel, as it has made Enel a much more international company. Spain has become Enel’s second home market, and it has acquired significant shareholdings in Latin America. The takeover was the biggest deal in the European utility sector and the size of the acquisition is remarkable: Enel, with revenues of €43.7bn in 2007, acquired Endesa, which had revenues of €18.1bn the same year, for €43.4bn.

The deal was a long and complicated process, which reached very high political prominence and was widely debated in Europe. It started in September 2005, when Spain’s largest gas utility, Gas Natural, submitted a €22bn takeover bid for Endesa, which Endesa regarded as hostile. E.ON responded by announcing its interest in acquiring Endesa and offered €29bn in February 2006. The European Commission cleared the deal proposed by E.ON later in 2006, but the Spanish government

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119. Enel Annual Report 2008, p. 13 and 19.

120. Endesa was founded in 1944 as a government-owned electricity company. It became the leading electricity producer in Spain, inter alia, by acquiring several smaller utilities in the early 1990s. The company was privatized between 1988 and 1998. It started to internationalize its activities in the 1990s, first in Latin America, then in some European countries (Portugal, France, Italy). Endesa also diversified into water, telecommunications and real estate in the 1990s, but sold most of these assets in the 2000s. Moreover, it has become an important player in the Spanish gas market, too. Endesa had revenues of €18.1bn in 2007 and €22.8bn in 2008. 59 percent of its 2008 revenues were realized in Spain and Portugal, 37 percent in Latin America, 4 percent elsewhere.

and the Spanish energy regulator expressed their opposition to a foreign takeover of Endesa. They indeed imposed heavy conditions on E.ON if it wanted to acquire Endesa; this behavior was later declared a breach of community law by the European Court of Justice.<sup>121</sup> Gas Natural gave up its acquisition plans in February 2007, whereas E.ON increased its offer to €41bn. One month later, Enel and Acciona, a Spanish construction company that had already bought 30 percent of Endesa in 2006, announced their intention to jointly take over Endesa. Enel, already active in Spain thanks to its earlier acquisition of Viesgo, was asked to step in as a “white knight:” politically, it seemed a more welcome partner to the Spanish government than the German giant E.ON. Furthermore, Enel did not intend to have sole control of Endesa – Acciona would ensure that Spanish business still had an important say over Endesa.

The deal provoked many reactions and long negotiations took place between the companies, the Spanish government, the Spanish competition authorities, the Spanish energy regulator and the European Commission. As E.ON realized that the political opposition to its offer was too significant and that a successful acquisition of Endesa was impossible after Enel’s and Acciona’s declaration of interest, it gave up its intention to become the majority owner of Endesa. In April 2007 E.ON instead agreed with Endesa, Enel and Acciona on the acquisition of assets from Endesa and Enel in Italy, Spain, France, Poland and Turkey. Enel and Acciona then announced their joint offer for Endesa some days later, worth €43.4bn. Enel was to acquire 67 percent of Endesa, whereas Acciona would have 25 percent.

In October 2007, the Spanish authorities allowed Enel and Acciona to acquire Endesa under some conditions. Inter alia, “Acciona and Enel shall keep Endesa as an autonomous enterprise with full operational responsibility in complying with its business plan, and as the parent company of its group, keeping its own brand, registered office, directors and effective management and decision-making center in Spain.”<sup>122</sup> As agreed, Endesa sold its European activities to E.ON in 2008 (see E.ON section for details). Endesa was then jointly managed by Enel

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121. European Court of Justice press release of 6 March 2008.

122. Enel press release of 23 October 2007.

and Acciona, with Acciona having a disproportionately high share of power when compared to its shareholding. Cooperation between the two main shareholders proved uneasy, as Enel and Acciona had different management styles and contrasting ideas about Endesa's future. It was therefore no surprise that Acciona used its option to sell its share earlier than scheduled. The transfer of Acciona's 25 percent share to Enel was concluded in June 2009: Enel paid €11.2bn for the remaining shares, but at the same time sold some of Endesa's renewable generation assets to Acciona for €2.8bn. In result, Enel now has 92 percent of Endesa and full management and operational control.<sup>123</sup>

### ***Enel's Organization and Presence in the Different Markets***

Enel, as most of its peers, has a separate division for renewable energies which operates at an international level. Another particularity is the fact that Endesa continues to constitute an independent entity, assuring most (but not all) of Enel's activities in Iberia and Latin America. The Enel group is divided in eight divisions, the six most important being (in terms of revenues):<sup>124</sup>

- “Sales” operates in the end-user market for electricity and gas in Italy;
- “Generation and Energy Management” is responsible for electricity generation in Italy;
- “Infrastructure and Networks” manages electricity and gas distribution in Italy;
- “Iberia and Latin America” coordinates Endesa's operations in the electricity and gas markets of Spain, Portugal, Latin America and elsewhere;
- “International” manages Enel's foreign operations other than Endesa and Renewables;
- “Renewable Energy” develops and manages generation of electricity from renewable resources in Europe and the Americas under the name “Enel Green Power.” Enel recently announced its intention to sell a minority stake of “Enel Green Power.”

123. Enel press releases of 20 February 2009 and 25 June 2009. “Acciona and Enel negotiate a friendly Spanish divorce,” *Financial Times*, 13 January 2009.

124. The two other divisions are “Engineering and Innovation” and “Services and other activities.”

**Table 10. Enel 2008 Revenues and EBITDA**

	Revenues		EBITDA	
	€bn	%	€bn	%
Italy	51.2	67	7.4	52
Iberia & Latin America	15.8	21	4.6	32
International	4.7	6	1.0	7
Enel Green Power	1.8	2	1.2	8
Other	2.9	4	0.1	1
Total before eliminations and adjustments	76.4	100	14.3	100
Eliminations and adjustments	-15.4	-	0.0	-
Total	61.2	-	14.3	-

N.B.: Endesa is consolidated at 67.05 percent.

Source: Enel Annual Report 2008, p. 25, and own calculations.

### *Italy*

Enel as the former state-owned monopoly is the incumbent player of the Italian electricity market. However, Enel was forced to sell an important part of its generation assets in the early 2000s to competitors (Edison, Eni, municipal or regional utilities and foreign companies). In 2008, Enel was the single largest power generator in Italy, as it accounted for 32 percent of Italian electricity production. It had a market share of 41 percent in overall electricity sales to end-customers, with its market share in regulated distribution being much higher (85 percent) than its share in sales on the free market (27 percent of total volumes, still making Enel the largest seller in this market). Moreover, Enel is Italy's number two in gas with a market share of 7 percent in sales to end-consumers in 2008.<sup>125</sup>

As Italy opted for ownership unbundling, Enel was required to give up control of the high-voltage transmission network it had formerly owned. In 1999, the transmission network was first given to a newly-created Enel subsidiary, Terna. In 2004, Terna was introduced to the stock market, and Enel subsequently reduced its share in Terna to around 5 percent. Enel divested some remaining high-voltage network assets (mainly

125. Enel Annual Report 2008, p. 14.



**Table 11. Enel 2008 Italian Business**

	Revenues		EBITDA	
	€bn	%	€bn	%
Sales	22.6	44	0.6	8
Generation & Energy	22.1	43	3.1	42
Infrastructure & Network	6.5	13	3.7	50
Total before eliminations and adjustments	51.2	100	7.4	100

Source: Enel Annual Report 2008, p. 25, and own calculations.

132 and 150 kV) to Terna in 2008. Moreover, Enel also sold its gas distribution network “Enel Rete Gas” in 2009. Enel has, however, kept its important electricity distribution network, through which 76 percent of electricity consumed in Italy were transported in 2008. Enel is also known for being the first company that deployed smart meters on a large scale to all its electricity customers in Italy. In the generation sector, Enel is one of the first companies in the world to develop the use of hydrogen for power production. After the political decision in 2009 by the Italian government to build nuclear power plants, Enel is set to become the main actor in nuclear power in Italy. Enel had run the Italian nuclear power plants in the 1970s and 1980s, and today has access to nuclear technology in Spain (via its subsidiary Endesa), Slovakia (via its subsidiary Slovenské Elektrárne) and France (thanks to its participation in the French EPR program). In 2009 Enel signed agreements with EDF for a joint venture that will study the feasibility of constructing nuclear power plants in Italy.<sup>126</sup>

### *Iberia*

Enel's activities on the Iberian Peninsula are mainly conducted through its subsidiary Endesa, which is one of two dominating electricity companies in Spain. Moreover, Enel has some assets in renewable energy via its 50 percent shareholding in Union Fenosa Renovables. Until 2008, Enel also was active in Spain via its subsidiary Viesgo (acquired in 2001, sold to E.ON in the context of the acquisition of Endesa). Through

126. Enel press release of 24 February 2009.

the acquisition of Endesa, Spain has become the second most important country for Enel in terms of revenues and operations. Endesa was the largest electricity producer in Spain in 2008 with a market share of around 28 percent.<sup>127</sup> It produced 37 percent of its electricity from nuclear power, 34 percent from coal, 14 percent from CCGT, 10 percent from hydroelectricity and 5 percent from other renewables. In electricity sales, Endesa had a market share of 35 percent in the regulated market and 49 percent in the liberalized market. In gas, Endesa had a market share of 15 percent (including gas consumed in Endesa's power plants), or 8 percent in supplies to end-customers (according to the Spanish regulator).<sup>128</sup>

In neighboring Portugal, whose electricity market is coupled to the Spanish one under the Iberian Electricity Market (*Mercado Ibérico de la Electricidad*, MIBEL), Endesa has some smaller participation in electricity generation. Endesa was selling electricity in Portugal until 2007 (market share of 8 percent), but left the market due to the slow pace of deregulation and price caps. It however announced in early 2009 its return to the Portuguese market with the ambition to reach a market share of 10 percent in 2010.<sup>129</sup>

### France

Enel has long had the objective of developing a significant presence in the French electricity market. It has been active there for a long time, with cooperation in the nuclear field dating back to the 1970s when Enel participated in the Superphenix project. However, Enel's entry into the French market has been slow. Like EDF's activities in Italy with Edison, Enel's presence in France has regularly been the subject of Italian-French political negotiations: the activities of both companies in their respective countries have often been linked and described as results of political deals. It was also for political reasons that Enel did not pursue its plan to acquire Suez's energy assets in 2006 – a plan that was impossible to realize given the French government's preference for the GDF-Suez merger.

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127. Comisión del Mercado de Valores Mobiliarios et al. (2009), p. 24-25.

128. Comisión Nacional de Energía (2008b), p. 10.

129. Endesa enters Portugal seeking 10 pct market share, Reuters, 4 March 2009.

Since 2005, Enel has a 12.5 percent participation in the EPR nuclear plant that EDF is building at Flamanville. Enel will also participate in future EPR projects in France like the one at Penly. This allows Enel to train technicians and engineers in the latest nuclear technology, but the cooperation also includes access to nuclear capacity in France (800 MW in 2009, 1,200 MW in 2011). Moreover, Enel has acquired some wind assets in France, but also plans to build gas or coal plants there. It has also announced its intention to bid for concessions for hydroelectric plants. Enel is selling electricity to industrial customers in France, but its client portfolio is rather small (a meager 1 TWh of sales in 2008). Finally, Enel has a 4.9 percent participation in the French energy exchange Powernext.<sup>130</sup>

### *Belgium and the Netherlands*

Enel entered the Belgian market in 2008 by acquiring 80 percent of the company that is building a 420 MW CCGT plant in Marcinelle. Its construction is expected to be completed in 2011, and Enel has confirmed that it might give parts of its stake to EDF in an asset swap that would give it further production capacity in France.

### *United Kingdom and Ireland*

Following a public tender in 2008, Enel's subsidiary Endesa acquired generation assets from Electricity Supply Board (ESB, the incumbent electricity company of Ireland) for €450m. The Irish government had decided to decrease the market share of ESB, and Endesa now owns around 16 percent of installed generation capacity in Ireland, making it the second-largest electricity utility there. Endesa announced "ambitious growth targets for Ireland, Northern Ireland and Great Britain" after the conclusion of the deal<sup>131</sup> – it is indeed interesting to note that neither Enel nor Endesa have any significant position in the British market. The five other utilities analyzed in this book have important assets and respective market shares there – Enel and Vattenfall are the only groups without any significant presence there.

130. "EDF et Enel négocient un échange d'actifs," *La Tribune*, 13 July 2009. "Enel ou la stratégie des petits pas," *La Tribune online*, 13 July 2009.

131. Endesa press releases of 31 July 2008 and 8 January 2009.

### *Central and Eastern Europe*

Enel is active in three Central and Eastern European countries: Slovakia, Bulgaria and Romania. Its most notable presence is in Slovakia, where Enel, in 2006, acquired 66 percent of Slovenské Elektrárne, the largest power producer in Slovakia and the second-largest in Central Eastern Europe. Slovenské Elektrárne runs the four Slovak nuclear reactors, and also has coal, gas and hydroelectric plants. The formerly state-owned company, in which the Slovak National Property Fund still has 34 percent, produces around 75-80 percent of Slovak electricity. In 2008, Slovenské Elektrárne has started construction of two new nuclear reactors at Mochovce (western Slovakia), based on Russian technology. The start of operation is scheduled for 2012-2013. They will replace two older reactors shut down in 2006 and 2008 following an agreement with the European Union, which required this shutdown for security reasons. The Slovak nuclear program has repeatedly been criticized for its insufficient safety level, especially from international non-governmental organizations (NGOs) and Austrian politicians and society, but Enel and Slovenské Elektrárne have assured the public that the reactors have been updated to the highest security standards. Slovenské Elektrárne sells all its electricity on the Slovak wholesale market, as it has no distribution activities and does not sell electricity to industrial customers (but it plans to develop the latter activity). Slovenské Elektrárne also has regional expansion plans which mainly target the Czech Republic, Hungary and Poland.

In Romania, Enel participated in the privatization of the electricity sector and acquired shares in three electricity distribution companies between 2005 and 2008. Enel has thereby become the most important foreign operator in the Romanian electricity distribution sector, with a market share of approximately 30 percent. Enel also plans to build, in a joint-venture with E.ON, a coal power plant in Romania for the state-controlled energy producer Termoelectrica. Moreover, the company participates in the Cernavoda nuclear new build project.

In Bulgaria, Enel acquired shares in the Maritza East 3 lignite plant in 2003, and increased its shareholding to 73 percent in 2006. It thereby controls around 8 percent of the country's electricity production, but has no sales or distribution activities there.

### *Outside the EU*

Enel's activities outside the EU are concentrated in Russia and the Americas. Enel realized three major acquisitions in Russia in 2006-2007 and thanks to its various shareholdings Enel is now active throughout the whole energy value chain in Russia: it acquired 49.5 percent of the Russian electricity trader RusEnergosbyt in 2006, and then 59.1 percent of the electricity producer OGC-5 in 2007, which has four large thermal power plants.<sup>132</sup> Also in 2007, Enel acquired some former Yukos assets (mainly licenses covering oil and natural gas fields), in a joint-venture with Eni. This deal has been criticized as an action in favor of Gazprom, who did not want to acquire these assets outright, fearing legal problems. In May 2009, Enel, Eni and Gazprom indeed announced that Gazprom would use its put-option and acquire 51 percent of the Eni-Enel joint-venture SeverEnergia.<sup>133</sup>

In the Americas, Enel and Endesa each have significant assets in power production, sales and distribution. Enel specializes in renewable energy assets, whereas Endesa has a particularly strong portfolio in some Latin American countries (Chile, Argentina, Colombia inter alia) and produced over 60 TWh of electricity in Latin America in 2008. After the acquisition of Endesa, Enel is the leading private-sector electricity group in Latin America.

### **RWE**

RWE (Rheinisch-Westfälisches Elektrizitätswerk, Rhenish-Westphalian Electric Power Company) is one of the largest electricity producers and marketers in the EU. The company has a long history as it was formed in 1898 as a local electricity enterprise in Essen (Ruhr area). It then grew into neighboring German regions, and later on became one of the largest German utilities. Still today RWE has strong ties to its home region, as several cities and municipalities of North Rhine-Westphalia have an important shareholding in the company. RWE has

132. Enel currently owns 55.9 percent of OGC-5 after a sale of shares to the EBRD.

133. ENI and Enel buy Yukos assets, Reuters, 4 April 2007. Enel press release of 15 May 2009.

indeed followed the mixed economy model since its beginnings, as several municipalities acquired shares in RWE early on, usually in exchange for a concession given to RWE that it would become the monopoly supplier of the municipality. Municipal shareholders came to possess the majority of RWE's voting rights, but the company's daily affairs have always been managed by private entrepreneurs.

Historically, RWE has been a company very much focused on electricity, and much less on natural gas. RWE has been developing its gas activities since the 1990s, but electricity still dominates: RWE realized 66 percent of its 2008 revenues in electricity, versus 30 percent in gas. This puts it in between E.ON and GDF Suez (for which electricity and gas are more or less equally important), and EDF, Enel, Iberdrola and Vattenfall (which only have limited gas activities).

RWE's headquarters are located in Essen and hence at the center of the Ruhr – the heartland of German heavy industry. It is therefore no surprise that RWE's development was strongly linked to German industrialization. One of the most important entrepreneurs in German history, Hugo Stinnes, was the driving force behind the creation of RWE. From the beginning, RWE believed in the development of the electricity industry and built many large power plants, most of them based on coal, a resource that has always played an important role for RWE. This is underlined by the fact that RWE has also been mining coal, especially lignite, for decades. Still today, RWE's electricity production relies heavily on lignite and hard coal: 61 percent of RWE's electricity production in 2008 was based on these sources. However, the company has also participated in the German nuclear program since its beginnings in the early 1960s. Besides production, RWE has played a dominant role in the development of the German electricity grid; it has also become the largest TSO in Germany.

In gas, RWE was one of the first companies to supply coke-oven gas to industrial customers before World War I. But it was only a minor player when the German natural gas business developed in the 1970s. In 1988, the acquisition of Deutsche Texaco gave RWE access to oil and gas upstream assets. Eight years later, the acquisition of 50 percent of

**Table 12. Major RWE Acquisitions 2000-2009**

Company	Sector	Year	€bn
Essent	Electricity, gas	2009	7.3
Thames Water	Water	2000	7.1
VEW	Electricity, gas	2000	5.9
Innogy (UK)	Electricity, gas	2002	5.1
American Water	Water	2003	4.5
Transgas and Czech regional gas suppliers	Gas	2002-2003	4.1

N.B.: Only includes deals for which the transaction value has been published by RWE.  
 Source: RWE, *Facts & Figures*, May 2009.

**Table 13. Major RWE Divestments 2000-2009**

Company	Sector	Year	€bn
Thames Water	Water	2006	7.2
E-Plus Mobilfunk	Mobile telecommunication	2000	3.6
Hochtief Druckmaschinen	Precision mechanical engineering	2001-2007	1.8
DEA	Downstream oil	2002	1.5
Condea	Chemicals	2000	1.3
LAUBAG and VEAG	Electricity, lignite mining	2000	1.3
Hochtief	Construction	2004-2006	1.0
American Water	Water	2008-2009	n.a.

N.B.: Only includes deals for which the transaction value has been published by RWE.  
 DEA: RWE sold the downstream oil assets, but kept upstream activities.  
 Source: RWE, *Facts & Figures*, May 2009.

Thyssengas<sup>134</sup> brought RWE back to the larger gas business, as it then became a gas importer and TSO. Moreover, the merger with VEW in 2000 added some German regional gas companies to RWE's portfolio. RWE has also become active in LNG with the acquisition of 50 percent of the US LNG company Excelerate in 2008. Thanks to acquisitions in other European countries (inter alia, Essent in the Netherlands, Innogy in the UK and Transgas in the Czech Republic), RWE is currently the sixth-largest gas company in the EU in gas sales to end-use customers.

134. RWE acquired the remaining 50 percent in 2000 and 2002.

In the wake of the liberalization of the energy sector, RWE diversified its activities beyond electricity and gas. It became active in oil and chemicals with the acquisition of Deutsche Texaco, and had various shareholdings in the telecommunications sector in the 1990s. However, its experiences in telecommunications have been described as a “roller coaster ride,” and most of these activities were divested when the telecommunications market was liberalized in the late 1990s.<sup>135</sup> In the early 2000s, RWE also divested its downstream oil activities (DEA petrol stations) and financial participations in other industrial sectors (Hochtief, Heidelberger Druckmaschinen, Harpen). A case in point is RWE’s water activities (see box 2). In short, RWE abandoned the “multi-utilities” concept only after a few years, and in several steps reduced its activities in sectors other than electricity and gas. However, the company decided to strongly develop its electricity and gas activities at the European level. After some first steps towards internationalization in the 1990s, several acquisitions in the 2000s significantly changed the company’s scope of activity, which is now much more international than before.

### **Box 2. RWE’s Water Activities**

In the late 1990s, RWE decided to diversify its businesses and opted for a “multi-utility” strategy. Electricity, gas, waste and recycling, water and waste water constituted the new core business areas, which RWE wanted to develop at an international scale. RWE already had some limited participations in water at that time (inter alia in Berlin), but entered the water business at a large scale via two major acquisitions in the early 2000s. In 2000, RWE bought the largest water utility in Britain, Thames Water, which also had various international activities. Three years later, RWE acquired the largest water company in the US, American Water. The combined value of the two acquisitions was more than €18bn, and RWE became the third-largest water company worldwide, serving 56m customers. In the following years, water contributed around 10 percent to RWE’s overall revenues.

135. The last shareholding in telecommunications was divested in 2005. *International Directory of Company Histories*, vol. 50, London: St. James Press, 2003.



RWE envisaged important synergies between water and energy, as the utility hoped to offer each client water, electricity and gas services. But RWE soon realized that the British and North American water activities had only very limited synergies with continental European electricity and gas activities. Only five years after the acquisition of Thames Water (and only two years after the acquisition of American Water), RWE announced in late 2005 that it planned to divest its water business by 2007. The company had realized that economies of scale in water can be achieved on a regional scale, and not on a global one. Moreover, Thames Water's important activities in London turned out to be much less profitable than estimated, as the British water regulator required RWE to invest massively in the network. In the end, RWE only kept its limited water activities in continental Europe, as it was still convinced about synergy effects there. The company then decided to concentrate on its "traditional core competences" electricity and gas in Europe, where it saw many opportunities thanks to the ongoing liberalization of the energy sector.<sup>1</sup>

In October 2006 Thames Water was sold to a consortium led by an infrastructure fund for €7.2bn, which allowed RWE to exit its adventure in the British (and global) water market without a big loss, even if market observers estimated that the investment might not have earned the capital costs.<sup>2</sup> The divestment of American Water has proved to be more complicated, and led to substantial financial losses for RWE. After lengthy deliberations, RWE decided to use an initial public offer (IPO) in order to divest American Water. The placement was first held up by a long regulatory approval process, and then RWE postponed it due to the unfavorable situation on financial markets in 2007 and 2008. The first placement took place in April 2008, when RWE sold 39.5 percent. RWE further reduced its shareholding in 2009, and divested its last share in American Water in November 2009.<sup>3</sup>

1. RWE press release of 4 November 2005.

2. *Energie-Chronik*, September 2000, September 2001, October 2005, August 2006, and October 2006.

3. RWE Annual Report 2008, p. 53 and RWE Report on the first half of 2009, p. 10. American Water debut disappoints, FT online, 23 April 2008. RWE press releases of 18 and 25 November 2009.

RWE relies heavily on lignite (33 percent of owned generation in 2008) and hard coal (28 percent) for power production – no other major European utility uses coal to such a high extent. This makes RWE the biggest CO<sub>2</sub>-emitter of all European power producers, a fact that constitutes a competitive disadvantage due to the increasing need to acquire CO<sub>2</sub> permits. RWE, like its competitors, currently still receives a (decreasing)

number of permits for free (see conclusion for more details, also on the debate on related windfall profits). In 2008, RWE paid about €1bn for permits, and this amount could rise to €3bn by 2013. According to RWE, currently the company already needs to purchase around 40 percent of its CO<sub>2</sub> permits.<sup>136</sup> As the other producers in the EU, it will need to acquire 100 percent of permits from 2013 onwards. It is hence in RWE's best financial interest to reduce emissions: the company plans to reduce emissions by 20 percent by 2012, and by more than 30 percent by 2015. It wants to develop renewable energies, increase power production from natural gas, reduce the share of lignite and hard coal, but also develop Carbon Capture and Storage (CCS). RWE also plans to keep nuclear energy, hoping for the reversal of the German phase-out decision.<sup>137</sup>

RWE plans investments of €26bn by 2012, important parts of which will be invested in the modernization of its production capacities. 50 percent of this €26bn will be invested outside Germany. RWE's (until now very limited) activities in "new" renewable energies – mainly wind – have been managed by the Innogy subsidiary since February 2008. RWE Innogy is especially active in Germany and the United Kingdom, and also has assets in Spain, France, Portugal, Switzerland and the Czech Republic.

Like most of its peers, RWE is part-owned by public authorities. Historically, cities and municipalities from North Rhine-Westphalia participated in RWE. This gave the company a local identity and strong ties with its home region. Until 1998, when the system of multiple voting rights was abandoned, local authorities even had the majority of voting rights. But an increasing number of cities have sold their participation in RWE during the last decade. In 2004, the municipalities had around 33 percent of voting rights. Their influence has continued to decrease since, but there are contradictory reports

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136. E-mail from RWE representative to the author, 14 December 2009.

137. RWE plans to significantly change its fuel mix by 2020: it wants to increase the share of renewable energies (from 3 percent of installed capacity in 2007 to 17 percent in 2020), increase the share of natural gas (from 16 percent to 30 percent), reduce the share of lignite and hard coal (from 56 percent to 35 percent) and nearly keep the share of nuclear energy (14 percent in 2007, 11 percent in 2020). Source: RWE, *Facts & Figures*, October 2008, p. 30.

about their current shareholding: a joint-venture of municipal shareholders (RW Energie-Beteiligungsgesellschaft) has 15 percent of shares and 16.1 percent of voting rights (as of 31 December 2008),<sup>138</sup> which makes it the biggest single shareholder in RWE. The overall voting rights of municipalities (RW Energie-Beteiligungsgesellschaft plus others) seems to be higher than that, but probably less than 25 percent, which is the threshold for a blocking minority.<sup>139</sup> The municipal shareholders have the right to nominate four out of the twenty members of RWE's supervisory board (ten out of the twenty members are workers' representatives). Some press reports claim that local mayors tend to put their local interests above overall company goals (for example, when it comes to defending jobs in their own cities) – RWE representatives have contradicted this in discussions with the author. Moreover, analysts underline that the cities' participation is a protection against possible hostile takeovers.<sup>140</sup>

### ***RWE's Structure and Position in the Different European Markets***

RWE's internal structure has repeatedly been modified in recent years, with new CEOs<sup>141</sup> not only changing the business model (from "multi-utility" back to energy utility), but also the group's structure. After the last modification in 2009, the RWE group currently comprises ten main divisions, with four of them being geographic units and six being functional units:

- "Germany" (consisting of numerous branch companies) generates electricity, distributes and sells electricity and gas and mines lignite in Germany;
- "Great Britain" (RWE npower) generates electricity and sells electricity and gas in the UK;
- "Netherlands / Belgium" (Essent) generates electricity and sells electricity and gas in the Netherlands and in Belgium;

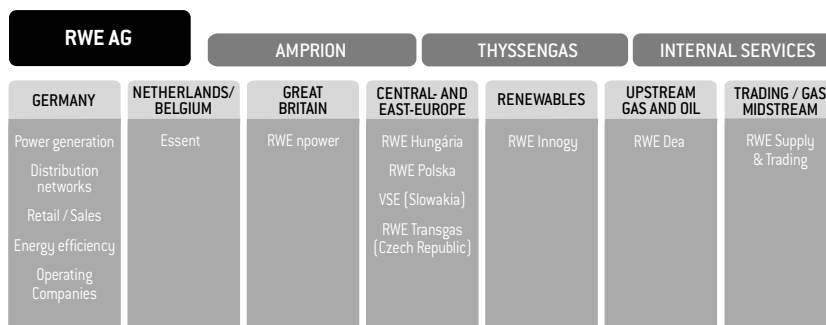
138. RWE-Factbook für Privataktionäre, May 2009, p. 25.

139. *Süddeutsche Zeitung online* estimated in March 2009 that local authorities had 18 percent of voting rights.

140. See for example "RWE: Städte sichern Einfluss," 3 January 2008, <http://www.managermagazin.de>; Aktienkurs bringt Kommunen bei RWE in Zugzwang, *Wirtschaftswoche*, 15 December 2005.

141. RWE changed CEO in 2003 and again in 2007.

Graph 2. RWE Structure



Source: <http://www.rwe.com>.

Table 14. RWE's Divisions: Revenues and EBITDA in 2008

Division	External revenues (€bn)	Intra-group revenues (€bn)	Total revenues (€bn)	% of total revenues
RWE Energy	30.4	2.1	32.5	40
RWE Supply&Trading	6.3	20.5	26.8	33
RWE Power	1.4	10.0	11.4	14
RWE npower	8.6	0.0	8.6	11
RWE Dea	1.8	0.2	2.0	2
Other (including RWE Innogy)	0.4	n.a.	n.a.	0
Total RWE group	49.0	32.8	81.8	100

Division	EBITDA (€bn)	% of EBITDA
RWE Power	3.5	42
RWE Energy	3.0	36
RWE Dea	0.7	8
RWE npower	0.7	8
RWE Supply&Trading	0.5	6
RWE Innogy	0.1	1
Other	-0.2	(2)
Total RWE group	8.3	100

N.B.: The table gives the companies' divisions before the latest modification of RWE's structure in 2009.

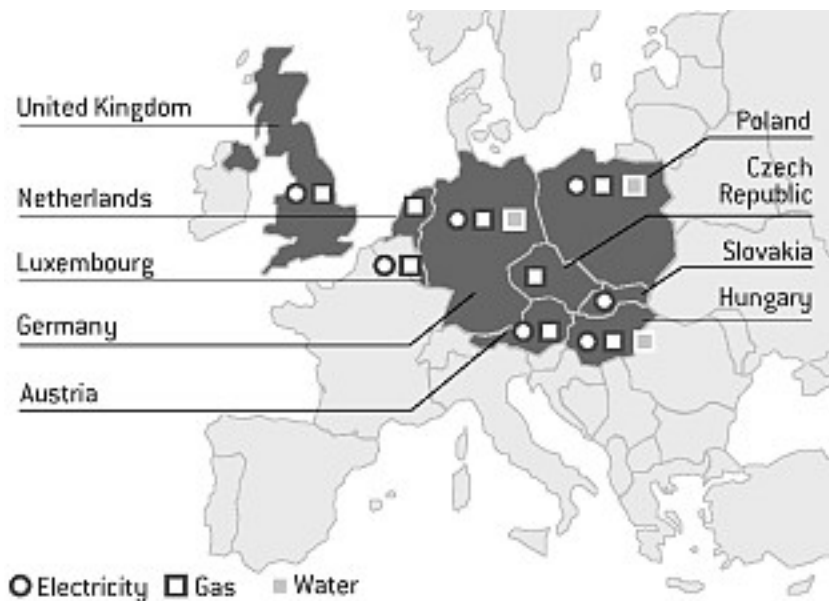
Source: RWE Annual Report 2008 and own calculations.

- “Central- and East-Europe” sells electricity and gas and manages distribution and transmission networks in the Czech Republic, Hungary, Poland and Slovakia;
- “Renewables” (RWE Innogy) was founded in 2008 and manages RWE’s renewable energy activities;
- “Upstream Gas and Oil” (RWE Dea) is producing gas and oil, mainly in Europe and North Africa;
- “Trading / Gas Midstream” (RWE Supply & Trading) runs energy trading operations and manages non-regulated gas midstream activities;
- “Amprion” manages RWE’s high-voltage electricity transmission network in Germany;
- “ThyssenGas” manages RWE’s high-pressure gas transmission network in Germany (RWE has committed itself to sell its gas transmission network);
- “Internal Services” (consulting, information technology [IT], services, technology).

RWE’s activities are concentrated to a very high degree in the EU. RWE’s core markets form a coherent geographic entity in Central Europe, to which one needs to add RWE’s UK business. Germany is by far the most important country: RWE realized 63 percent of its revenues there in 2008. The UK comes second with 20 percent, other European countries amount for 17 percent and extra-European business for 1 percent. The acquisition of Essent in 2009, however, will change the distribution and decrease the part of German activities in overall revenues.

### *Germany*

Germany is RWE’s home market, and still by far its most important country of operations. Its traditionally strong position on the German electricity market was reinforced in 2000, when it merged with its long-term rival VEW, which operated in neighboring areas in Western Germany. When approving the merger, however, the German Federal Cartel Office required RWE to divest its shareholding in the East German utility VEAG and the lignite company LAUBAG (Lausitzer Braunkohle AG [today Vattenfall Mining AG]), which RWE had acquired after German

**Map 1. RWE Core Markets**

Source: RWE, *Facts & Figures*, May 2009, p. 8 (before the acquisition of Essent).

reunification. RWE is the largest power producer in Germany today, with a market share of around 31 percent (including electricity purchased from other producers under long-term contracts). Its market share in sales to end-customers is lower, at around 16 percent. This made it the second-largest seller behind E.ON in 2008 – but after E.ON's sale of Thüga in 2009, RWE will probably become the largest seller as well. RWE sells considerable parts of its electricity via local companies in which it has minority shareholdings.<sup>142</sup> According to the German Monopolies Commission, RWE has majority participations in 26 regional or supraregional electricity companies, and minority shareholdings in 71 regional suppliers.<sup>143</sup> Hence, RWE's influence on the German electricity market is probably larger than

142. 4.5m of RWE's 11.5m German electricity customers and 2.0m of its 3.0m gas customers are "indirect customers", which means that they get their electricity or gas from companies in which RWE has a minority holding of at least 20 percent.

143. Monopolkommission (2007), p. 54.

the market shares might suggest. Moreover, RWE owns 31 percent of the German electricity transport network (220 kV and 380 kV), and an equal share of the high-voltage distribution network (110 kV). The company also owns around 20 percent of the medium and low voltage distribution network. Unlike E.ON and Vattenfall, RWE has no intention to sell its electricity transmission network.

RWE's position in the German gas market is much smaller, even if RWE is the third-largest gas seller to end-use customers with a market share of around 6 percent. RWE became a long distance natural gas carrier and natural gas importer after the acquisition of Thyssengas in 1996. However, RWE agreed with the European Commission in early 2009 to sell its gas transmission network, in order to avoid a competition case: the Commission suspected RWE of anti-competitive behavior and the refusal of transmission services to third parties. The divestment process for the asset, which comprises around 4,000 km of high-pressure gas transmission pipelines equaling 10 percent of the entire German transmission network, is currently ongoing.<sup>144</sup> However, RWE keeps its gas distribution network.

### *United Kingdom*

RWE entered the British electricity and gas market in 2002 by acquiring the utility Innogy plc, which operated power plants and supplied electricity and gas (under the npower brand) in Northern and Central England.<sup>145</sup> RWE later renamed its whole UK subsidiary RWE npower, and developed its production and sales portfolio. Today the UK is the second most important market for RWE, and it realizes one-fifth of its revenues there. RWE npower is the fourth-largest energy utility in the UK, having market shares of 14 percent in electricity production (mainly based on coal and gas), 17 percent in electricity supply and 9 percent in gas supply in 2008. The company serves around 7m customers (4.2m electricity, 2.6m gas in 2008); 59 percent of its electricity sales in 2008 went to industrial and corporate customers, 41 percent to private and commercial

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144. Official Journal of the European Union, 12 June 2009 [Commission decision of 18 March 2009].

145. RWE had already entered the British water market two years before, through the acquisition of Thames Water.

customers. The situation in gas sales is different, with 84 percent of sales going to private and commercial customers, and only 16 percent to industrial and corporate customers. Unlike most other major UK utilities, RWE npower is not active in electricity distribution.

In a 50-50 joint-venture with E.ON, RWE has obtained land for nuclear new build at auctions in April 2009. Both companies plan to build 6 GW of nuclear capacity there. RWE also develops new natural gas and coal plants, as well as offshore wind production in the UK.

### *Belgium and the Netherlands*

The Benelux market, geographically close to RWE's home region in Western Germany, has become the third home market of RWE: after the acquisition of Essent, RWE is the largest utility in the Netherlands. RWE has been active in the Benelux since the early 2000s through several shareholdings and acquisitions of several smaller Dutch gas suppliers. It also started selling electricity to industrial customers in Belgium and in the Netherlands. However, RWE abandoned its activities in Belgium only a few years later "due to a lack of access to the grid and other market related obstacles."<sup>146</sup> Moreover, RWE did not find ways to transport electricity produced in its German plants to Belgium, as there is no direct electricity interconnection between the two countries.

In early 2009, RWE and Essent announced that they had come to an agreement for a takeover offer; the acquisition was finalized in September 2009. It was the largest acquisition in RWE's history. Essent, the largest energy company of the Netherlands, had started to search for a large European partner in mid-2008, after previous plans of a merger with the second-largest Dutch utility Nuon did not materialize. The European Commission granted its approval to the merger under the condition that Essent divests its German activities and shareholdings beforehand. Essent was previously owned by Dutch regions and municipalities, which, over time, had merged their respective energy utilities.

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146. E-mail from RWE representative to the author, 14 December 2009.



Essent has about 6 GW of production capacity and supplies electricity, gas and heat to 2.6m private and business customers, mainly in the Netherlands, but also in Belgium. In the Netherlands, it has a market share of around 26 percent in retail (electricity and gas), and 23 percent in electricity production. RWE is not acquiring the whole of Essent: due to legal requirements of ownership unbundling, it cannot acquire the distribution networks, which are to remain with the former Essent shareholders. The same applies to Essent's waste management activities.<sup>147</sup> Moreover, Dutch courts have not allowed RWE to takeover Essent's stake in the Borssele nuclear power plant, which must remain in public Dutch ownership. This, and the disposal of Essent's participation in the *Stadtwerke* of Bremen, reduced the overall acquisition price from an initial €9.2bn to €7.3bn. Essent will remain an independent enterprise within the RWE Group and keep its name. It will manage RWE's Dutch and Belgian activities and therefore receive existing RWE's Dutch and Belgian assets.

Besides Essent, RWE also has a 19.8 percent shareholding in Enovos, which is the result of the 2009 merger of two Luxembourg utilities (Cegedel and Soteg) and the German Saar Ferngas. This makes RWE the third-largest shareholder in Luxembourg's biggest utility, after the Luxembourg government and ArcelorMittal.

### *France*

RWE has, since the early 2000s, limited renewable production assets in France. Its former subsidiary Harpen had acquired some hydro assets and developed wind power parks, which are now run by RWE's renewables branch Innogy. The contribution to overall French power production is marginal. RWE is not active in sales in France.

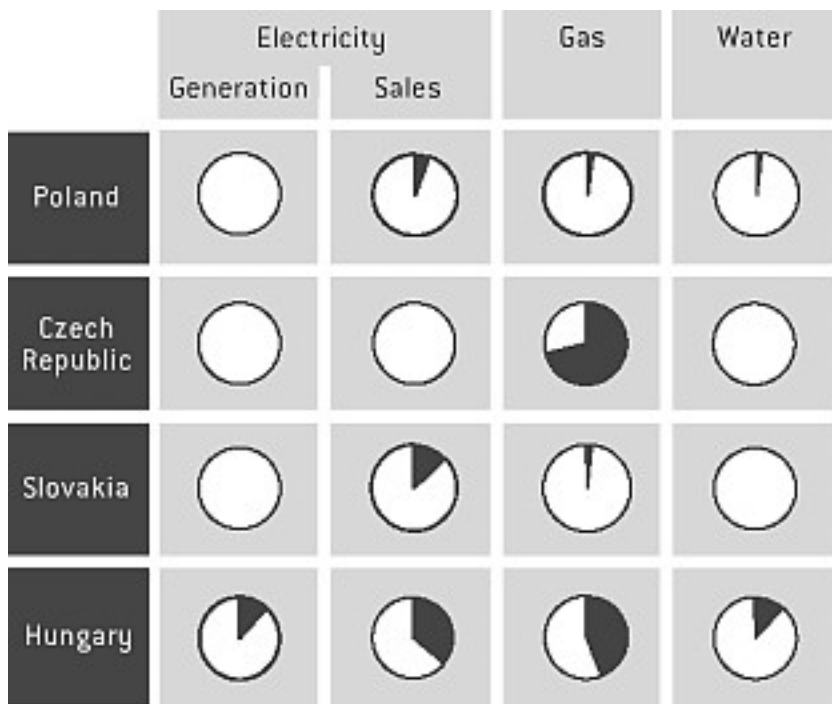
### *Austria*

RWE entered the Austrian market in 2001 by acquiring 49 percent of the regional power company KELAG (Kärntner

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147. Like many of its competitors, Essent was also active in telecommunications in the past. It sold its Kabelcom subsidiary in 2007.

**Graph 3. RWE's Market Shares in Central and Eastern Europe in 2008**



N.B.: RWE's market shares in grey.  
 Source: RWE, *Facts & Figures*, May 2009, p. 10.

Elektrizitäts-Aktiengesellschaft). The company had a market share of 4 percent in power production and 8 percent in power supply in 2008.

*Central and Eastern Europe*

Among the seven major European energy utilities, RWE is the one with the second-largest activities in Central Eastern Europe (behind E.ON). According to the Polish newspaper Rzeczpospolita, RWE had revenues of €7.4bn in the region in 2008.<sup>148</sup> Hungary and the Czech Republic are RWE's most important markets, but it also has activities in Slovakia and Poland (see graph 3).

148. <http://grafik.rp.pl/grafika2/368638>.

RWE entered Hungary in the 1990s, when the country was the first in the region to privatise its electricity and gas sector. RWE, together with EnBW, acquired the electricity generator Matra in 1995, and shareholdings in several distribution companies. RWE in 2008 had market shares of 15 percent in electricity production, 37 percent in electricity supply and 39 percent in gas supply. It has over 2m customers in electricity and gas each, and is also active in water supply.

In the Czech Republic, RWE realized one of its largest international acquisitions in 2002-2003, when it won the bid for the privatization of the country's gas transmission network, which includes one of the three main pipelines for transport of Russian gas to Europe. RWE acquired the Czech gas TSO Transgas, as well as shareholdings of between 46 and 58 percent in the eight Czech regional gas distributors for a total of €4.1bn. RWE had already entered the Czech market in 1997, when it acquired shares in the distribution company of Prague. RWE had a market share of 69 percent in gas supply in 2008, and served 2.3m customers. In January 2007, the European Commission put RWE's market share in gas sales at 84 percent.<sup>149</sup>

In neighboring Slovakia, RWE acquired 49 percent of the distribution company Vychodoslovenska Energeticke (VSE) in 2002. The remaining 51 percent is owned by the Slovak government, but RWE has operational control. VSE has a market share of around 13 percent in electricity distribution. RWE also started selling gas to industrial customers under the brand RWE Gas Slovensko in 2008.

RWE's position in Poland is smaller than in the Czech Republic, Hungary and Slovakia. In 2002, RWE acquired majority control of the power supplier and distributor Stoen, which has a market share of 6 percent in Polish electricity supply. RWE plans to increase its market share and get access to production assets in Poland. But after some initial interest, RWE decided, in late 2009, not to participate in the privatization of the electricity company ENEA.

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149. [http://ec.europa.eu/energy/energy\\_policy/doc/factsheets/market/market\\_cz\\_en.pdf](http://ec.europa.eu/energy/energy_policy/doc/factsheets/market/market_cz_en.pdf).

RWE participates in the Romanian nuclear project Cernavoda with a 9.15 percent shareholding. RWE was also in negotiations with Bulgarian authorities concerning the Belene nuclear power plant project, but declared in October 2009 that it would not pursue these plans.

### *Outside the EU*

RWE currently has no traditional utility activities outside the EU. However, it is active in gas upstream in North Africa, and has recently signed its first cooperation agreements with Turkmenistan for gas exploration. In early 2008, RWE announced its intention to acquire 51 percent of the Russian electricity generator TKG-2 from its partner Sintez, but then later in 2008 stepped back, citing uncertain market conditions in Russia. Sintez responded by taking RWE to arbitration.<sup>150</sup> Moreover, RWE has declared its interest in entering the Turkish electricity and gas market, and it is likely to participate in the privatization of the Turkish energy sector.

## **Iberdrola**

Compared to the five utilities analyzed above, Iberdrola and Vattenfall, which will be our last case studies, are much smaller in terms of revenues. Moreover, their activities are limited to a more restricted number of European countries. They thus form an intermediate group between the “Big-5” and other utilities with revenues below €15bn in 2008 and/or activities mostly limited to their national home market. We will briefly present some of these smaller utilities in section 1.8.

Iberdrola results from the merger of two Spanish electricity companies (Hidroila and Iberduero, both owned by private investors) in 1992. These two companies, or their antecedents, date back to the early days of electrification in Spain. Their beginnings are closely linked to the development of hydro-electricity in the North of Spain, but they were also active in Madrid and Valencia. The Spanish civil war slowed down the companies’ development, but as demand for electricity grew

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150. Sintez sues RWE for \$1.4 billion over TKG-2, Reuters, 10 November 2008.

substantially in the 1950s, they completed several large hydroelectric and thermal power plants in the late 1950s and 1960s. Iberduero was also among the pioneers of nuclear energy in Spain, as it participated in the construction of the country's second nuclear plant at Santa María de Garoña. In the context of the oil crisis of 1973, the Spanish government strongly promoted nuclear energy, and Iberdrola's predecessors participated in plant construction. When the Spanish government decided to freeze all nuclear construction due to overcapacity and high costs in 1984, the companies were left with a large debt burden.

In 1985, Red Eléctrica de España was created as the world's first company dedicated exclusively to power transmission and the operation of electrical systems. This early example of unbundling marked a radical change in the operation of the Spanish power sector and meant that Spanish utilities, including Iberdrola's predecessors, have had to dispose of their transmission grids and concentrate on power generation, distribution and sales.

The Spanish electricity market continued to evolve in the early 1990s, when the state-owned utility Endesa acquired a series of smaller utilities. To counterbalance Endesa's growing influence, Hidrola and Iberduero decided to merge in 1991. Since then, Iberdrola and Endesa are the two dominating players in the Spanish electricity market. They each had around 40 percent of the market in the 1990s, but their respective market shares have decreased since then.

Shortly after the 1992 merger, Iberdrola started its internationalization program by acquiring several electricity companies in Latin America. Unlike most other European utilities, Iberdrola's first international activities were located outside Europe, albeit in a region which is culturally close. The company also developed some smaller activities in neighboring Portugal, but it was only in 2007 that Iberdrola became a major European utility with the acquisition of Scottish Power. Through the latter acquisition, Iberdrola also took over important assets in the US. According to the company, Iberdrola's internationalization strategy was based on penetrating in low-risk, liberalized markets by developing a vertically integrated company and

**Table 15. Iberdrola Revenues by Country / Division (2008)**

	€bn	%
Spain	10.9	43
United Kingdom	8.0	32
Latin America	3.5	14
United States	1.0	4
Iberdrola Renovables*	1.9	8
Total	25.2	100

\* Iberdrola Renovables, the company's renewables branch, is mainly active in Europe and the US; around 68 percent of its installed capacity is inside the EU.

Source: Iberdrola Sustainability Report 2008, p. 19.

building a relevant presence in those markets, while avoiding hostile approaches when acquiring other companies.<sup>151</sup> Resulting from its internationalization, Iberdrola now has four core markets around the Atlantic Basin: the Iberian Peninsula, the United Kingdom, the United States and Latin America.

Iberdrola has undergone a significant and very rapid transformation thanks to its acquisitions since 2006. Between 2006 and 2008, overall sales were multiplied by 2.3, electricity production and sales by 1.5, and gas sales even by 5.6. At the same time, the degree of internationalization has strongly increased: Iberdrola realized 25 percent of its sales outside Spain in 2006; this share increased to 57 percent in 2008. Around 80 percent of the company's sales in 2008 were realized inside the EU.

The acquisition of Scottish Power in 2007 for €17.1bn was the biggest deal in Iberdrola's history. Earlier, E.ON had made a lower offer for Scottish Power, which the Scottish company refused. The acquisition gave Iberdrola access to important wind assets in the US, as Scottish power owned PPM Energy, which was the second-largest US wind producer at that time. Iberdrola continued to develop its position in the US through various smaller acquisitions, the most important of them being the acquisition of Energy East in 2008 for €3.4bn.

151. E-mail from Iberdrola representative to the author, 14 December 2009.

The acquisition of Scottish Power had the additional effect of reducing the risk of a hostile takeover of Iberdrola, which the company had feared for some time. Rumours and negotiations about (friendly or hostile) takeovers or mergers involving Iberdrola and Endesa, Repsol, Union Fenosa or EDF have repeatedly been reported since 2000. In 2008, Iberdrola even filed a formal complaint against EDF with the European Commission, as it was upset by EDF's unclear takeover intentions that resulted from various speculative signals.<sup>152</sup>

Iberdrola entered the natural gas business in 2001, but has only become an important gas player with a diversified supply portfolio as well as some LNG and storage assets thanks to acquisitions in 2007 and 2008. Only about 30 percent of the company's gas sales are realized in Spain; it sold more gas in the UK and the US than in its home market in 2008.<sup>153</sup> Iberdrola has no significant upstream activities. Overall, its gas activities remain relatively limited compared with its electricity activities.

Like many other utilities, Iberdrola diversified its business in the 1990s, entering the water, telecommunications and multimedia markets. These acquisitions have been sold again, but Iberdrola continues to be active in construction and energy engineering through its "Iberdrola Ingeniería y Construcción" subsidiary, and in real estate through "Iberdrola Inmobiliaria." These business sectors contribute only modestly to the company's revenues.

Iberdrola, which is wholly owned by private investors,<sup>154</sup> is the world's largest owner of wind parks. Earlier than its competitors, Iberdrola aggressively developed its renewables assets in Spain and abroad. It clearly considers its renewable arm as a global business. Iberdrola's business model makes renewable energies – mostly wind – the main driver of the company's growth strategy. In its strategic plan for 2008-2010, Iberdrola underlines its intention to remain the number one global operator in the renewables sector and the largest producer

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152. "Iberdrola lodges complaint against EDF," *Financial Times*, 28 February 2008.

153. Iberdrola gas sales in 2008: 66.7 TWh in the UK, 58.9 TWh in the US, 55.7 TWh in Spain.

154. Shareholders: 45.1 percent domestic (Spanish) entities, 28.4 percent foreign entities, 26.5 percent individual investors. Source: Iberdrola Sustainability Report 2008, p. 18.

of electricity from wind. Accordingly, Iberdrola plans to spend 48 percent of investments in renewable energy sources. Its renewables branch, Iberdrola Renovables, has been listed separately on the stock market since 2007 (Iberdrola currently owns 80 percent). The main countries for renewable activities are Spain, the UK, the US, and on a smaller scale other European countries like Greece, France or Poland. Moreover, Iberdrola has 14 percent in Gamesa, a Spanish wind generator manufacturer, with which Iberdrola has a strategic collaboration agreement. Both companies plan to merge their wind parks by 2011.

Iberdrola's large renewable energy assets will give the company a competitive advantage especially in the long term: when carbon prices rise as expected, for example, in the EU after the beginning of full auctioning of EU ETS (European Union Emission Trading System) permits starting from 2013, Iberdrola will pay less for CO<sub>2</sub> permits than producers that rely more heavily on fossil fuels. But at the same time, Iberdrola is also more dependent on the level of subsidies for renewable energies like feed-in tariffs. Governments usually guarantee a stable level of feed-in tariffs for a long time (for example, the first twenty years of operations in the case of wind power in Spain), but if the tariff level is modified, planned investments can lose their attractiveness. Companies then need to cope with the new situation and change their plans: for example, the recent reduction of feed-in tariffs for photovoltaics in Spain has led to a dramatic fall in new investments in 2009. Iberdrola was, however, barely affected, as the vast majority of its "new" renewable assets are wind parks. Moreover, a company can hedge the risk of changing regulatory conditions by developing renewable energy sources in different countries: 49 percent of Iberdrola's renewable capacity is already located outside Spain, and this share is expected to reach 61 percent in 2012.

### ***Iberdrola's Internal Structure and Presence in European Markets***

Iberdrola's internal organization consists of centralized corporate divisions that control overall governance and decentralized business units responsible for geographic zones. There are six corporate divisions: Operations, Office of the General



Secretary, Economic and Financial, Corporate Resources, Strategy and Studies, Development. Business divisions are divided into two subdivisions: "Spain and Latin America" and "International."<sup>155</sup> This is interesting, as it makes a clear distinction between operations in Iberia and Latin America on the one hand, and international activities in the UK, US and elsewhere on the other: Latin American operations, which started earlier in this culturally close region, seem to be regarded as more similar to domestic business than activities in the UK, even though the UK and Spain are both members of the EU.

Iberdrola operates its energy business under different brands: "Iberdrola" in Spain, Europe (with exception of UK), the US and Mexico, "Scottish Power" in the UK.<sup>156</sup> Renewable energy production is branded "Iberdrola Renovables," "Iberdrola Renewables," "Scottish Power Renewables" and "Rokas Renewables."

### *Iberia*

Iberdrola is one of the two leading electricity companies in Spain, nearly *ex-aequo* with Endesa, but with smaller market shares in production, distribution and sales in 2008. Iberdrola produced around 24 percent of Spanish electricity in 2008 (Endesa 28 percent).<sup>157</sup> Nuclear energy accounted for 37 percent of its net production in Spain in 2008, gas combined cycles for 29 percent, hydroelectricity for 13 percent, other renewables for 13 percent and coal for only 3 percent. Iberdrola is active in electricity distribution in Spain with a market share of around 38 percent, serving 10m customers. Concerning electricity sales, it is interesting to add that Iberdrola had a significantly higher market share in the regulated market (42 percent) than in the liberalized market (34 percent).<sup>158</sup>

Iberdrola started gas activities in 2001 and was the second-largest gas marketer in Spain in 2007, with a market share of 12 percent according to the Spanish regulator.<sup>159</sup> Seventy-three

155. "Spain and Latin America" includes "Network Business Spain", "Deregulated Business Spain & Portugal", "Latin America" and "Non-Energy Businesses." "International" brings together "US", "UK" and "Ingeniería y Construcción."

156. Energy East is to be incorporated into this architecture.

157. Comisión del Mercado de Valores Mobiliarios et al. (2009), p. 24-25.

158. Comisión Nacional de Energía (2008a), p. 5.

159. Comisión Nacional de Energía (2008b), p. 10.

percent of Iberdrola's gas supplies were used in its gas combined cycle power plants in 2008, and supply to end-customers is only on the liberalized market (mainly big customers, 0.2m customers in 2008).

In Portugal, Iberdrola has some renewable generation assets and markets electricity. In 2008, it also obtained a license to market gas. Moreover, it has a 9.5 percent participation in the country's largest utility EDP. Until 2008, the company had a minor shareholding in the Portuguese gas company Galp. Iberdrola does not publish separate figures for its activities in Portugal, so it is difficult to estimate its current market share there. It seems, however, to be very limited.

### *United Kingdom*

Since the acquisition of Scottish Power in 2007, Iberdrola has been active in the United Kingdom's electricity and gas market. Scottish Power was formed in 1990, when the British electricity sector was privatized. It was the successor of the South of Scotland Electricity Board, whereas the North of Scotland Hydro Board became Scottish and Southern Energy. Unlike in England and Wales, the Scottish electricity sector continued to be organized on an integrated basis: Scottish Power kept the high-voltage transmission network in the south of Scotland, which it still owns today. As many other European energy utilities, Scottish Power diversified into water and telecommunications in the 1990s, but sold these activities again in the early 2000s.

Scottish Power is the UK's fifth-largest electricity generator with a market share of around 8 percent. Eighty-nine percent of its production in 2008 was thermal (gas and coal), but Scottish Power has been developing renewable energies (mainly wind). ScottishPower Renewables is currently working on several offshore wind power projects in the UK, with a total capacity of 1.7 GW. Iberdrola Renewables is also active in the British wind sector, as it has obtained the rights to develop up to 7.2 GW of offshore capacity in the North Sea (in a 50-50 joint-venture with Vattenfall).<sup>160</sup>

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160. Iberdrola press release of 8 January 2010.

Iberdrola participated in the auctions for land for nuclear new build in early 2009 in a consortium with GDF Suez and Scottish and Southern Energy, but their bid was not successful, as they withdrew in reaction to high prices. Later in 2009, the same consortium however acquired a site at Sellafield for the possible construction of a new nuclear plant. It is unlikely that an investment decision will be taken before 2015.<sup>161</sup> Scottish Power is the sixth-largest marketer of electricity in the UK with a market share of around 7 percent. It is the operator of two distribution areas with around 3.4m electricity users, “Central and Southern Scotland,” its historic region, and “Merseyside and North Wales” (since the acquisition of the Merseyside and North Wales Electricity Board [MANWEB] in 1995). Scottish Power has a total of 5.2m electricity and gas customers, with a market share of around 6 percent in quantities of supplied gas.

#### *Other EU countries*

Iberdrola does not have significant activities in EU countries other than Spain and the UK. Its Renovables/Renewables branch has wind generation assets in various European countries. Moreover, Iberdrola is active in sales to big industrial customers in some countries (for example, France). It also participates in the Romanian nuclear project Cernavoda (6.2 percent participation).

#### *Outside the EU*

Iberdrola realizes around 20 percent of its revenues outside the EU, which is a high share if compared to other European utilities. Iberdrola's most important market outside the EU is Latin America, where the company realized 14 percent of its revenues in 2008. Iberdrola is active in electricity generation, distribution and sales in five Latin American countries: Mexico, Brazil, Guatemala, Bolivia and Chile. The US, where Iberdrola is active in electricity and gas, contributed 4 percent to total revenues in 2008. The company will strongly develop its renewable – mainly wind – assets there. In 2009, it was awarded more public money from the federal recovery package for

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161. Iberdrola Chairman: No Decision On Sellafield Plant Before 2015, Dow Jones, 9 December 2009.

renewables than any other company. Iberdrola finally announced in early 2009 its interest in entering the Russian and CIS electricity markets when signing an agreement with Russian electricity company Inter RAO. According to company sources, it is, however, unlikely that Iberdrola will directly own or operate assets there.<sup>162</sup>

## Vattenfall

Vattenfall is Sweden's historic electricity company and the only utility among the seven largest in Europe that is still 100 percent state-owned. The company was founded in 1909 as an agency of the Swedish government with the task of exploiting large-scale hydropower. Private companies had started to produce hydropower earlier, but the Swedish government wanted to guarantee a quick development of electricity production, fearing that private companies would lack the necessary funds. Vattenfall became the major electricity producer in Sweden, with a market share of around 30 percent in the 1930s and around 50 percent in the 1980s. In contrast to other countries like France, Great Britain or Italy, Sweden never nationalized its electricity sector: private and municipal electricity producers and distributors always co-existed with Vattenfall. Electricity transmission, however, was nationalized and controlled by Vattenfall from 1949 to 1992, when another state-owned utility, Svenska Kraftnät, took over ownership and control of the transmission system.<sup>163</sup>

As its European peers, Vattenfall remained a company mainly active in its home country until the 1990s. As the growth of Swedish electricity consumption slowed significantly in the 1980s, Vattenfall needed to decide if it wanted to consolidate its existing assets or to look for new growth opportunities. Like many European electricity companies at that time Vattenfall had to make a choice: keep its current business model, enter new business sectors or expand to new geographic

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162. Iberdrola press release of 3 March 2009. Iberdrola looks for new-build opportunities, World Nuclear News, 6 August 2009. E-mail from Iberdrola representative to the author, 14 December 2009.

163. The main source for this paragraph and the following is Högselius (2009), which provides a detailed and very good analysis of Vattenfall's internationalization process.

markets. As many others, Vattenfall first chose to diversify its business areas, offering energy- and environment-related services. Unlike most of its peers, Vattenfall did not diversify into natural gas in Sweden. One should note in this context that the Swedish gas market remains comparatively small, given that Sweden has no easy access to gas. The beginning of liberalization in the European energy sector and the promising investment perspectives in Central and Eastern Europe after 1990 changed the situation. At this time Vattenfall increasingly explored its options for entering new geographic markets. Moreover, the example of other European utilities expanding abroad inspired Vattenfall, and it even felt that it might lose its respected position among European electricity companies if it did not internationalize.

In preparation for its internationalization, Vattenfall changed its legal status in 1991. After long years of lobbying by Vattenfall, it was transformed from a government agency to a joint stock company. This gave the company more independence vis-à-vis government and Parliament, and was seen as a precondition for internationalization. The first internationalization strategy was set up in 1993 and focused on markets in geographical proximity to Sweden ("countries at a cable length's distance," i.e. the Baltic Sea region). Germany was identified as the first target country, as Vattenfall had already started cooperation with North German electricity companies (inter alia, by exchanging electricity with them). First efforts to properly enter the German market, however, proved unsuccessful. At the same time, foreign companies started to enter the Swedish market, which increased the pressure on Vattenfall to go international.

First, rather small steps towards international expansion were made in Poland in 1992 and in neighboring Finland from 1994 onwards. Vattenfall entered the German market in 1996 through a joint-venture called "Vesa Energy." In 1999, Vattenfall made its first big acquisition abroad when buying 25 percent of HEW, the municipal electricity company of Hamburg. At that time, the German electricity market was in a very active phase of consolidation, in which HEW had become involved, notably through negotiations to acquire BEWAG, the municipal

electricity company of Berlin, and VEAG, the largest electricity generator in East Germany. By 2002, and after some difficult negotiations, Vattenfall acquired control over all three companies, as well as LAUBAG, a company that operated lignite mines. Thanks to these acquisitions, Vattenfall has become one of the largest German utilities.

In 2000, Vattenfall also entered the Polish electricity and heat market and has been taking advantage of privatization opportunities since then. Vattenfall acquired the heat production company EW and the distribution company GZE, and increased its share in these companies to 75 percent by 2006. The same year, Vattenfall's German and Polish local brands were replaced by the Vattenfall brand. Eventually, the company merged its German and Polish business units.

Acquisitions in Germany and Poland have been met with criticism in Sweden, as Vattenfall has acquired several old coal plants there, which are big CO<sub>2</sub> emitters. This has been perceived as not being in line with Vattenfall's efforts to present itself as one of the leaders in clean energy and CO<sub>2</sub> reduction. Thanks to the high share of hydropower and nuclear production in Sweden, Vattenfall indeed produces electricity with comparatively low CO<sub>2</sub> emissions there. On the contrary, in Germany, Poland and Denmark, Vattenfall relies mainly on fossil resources for electricity generation. It is noteworthy in this context that the company has taken a leading role in developing CCS technologies, notably at its Schwarze Pumpe lignite plant in Germany.

In 2001, Vattenfall entered the Estonian heat market on a small scale by the acquisition of the heat company of the city of Pärnu. Vattenfall also considered entering the electricity and heat markets of the Baltic states at a larger scale, but has not yet realized these plans. Quite to the contrary, it sold its Estonian and small Latvian heat assets to Fortum in early 2007.<sup>164</sup>

Recently, Vattenfall entered two new markets. A major investment is the acquisition of the Dutch utility Nuon, of which Vattenfall acquired 49 percent in 2009, and has agreed to acquire the remaining 51 percent in the next six years (the

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164. Vattenfall press release of 21 December 2006.

total acquisition price is €8.5bn). Vattenfall has thereby become a major player in the Dutch electricity and gas market, and also obtained, for the first time, access to upstream gas assets. Moreover, the acquisition of Nuon gives Vattenfall access to the Belgian market. However, it does not reinforce Vattenfall's position in the German market, as the European Commission imposed the divestment of Nuon's German activities. Vattenfall also recently entered the UK market by acquiring and developing offshore wind farms there.

Vattenfall's transformation from a national into an international actor has been described as "a process that proved long and difficult."<sup>165</sup> But it also was a "highly successful internationalization" that created "one of the most radically internationalized electricity companies in Europe."<sup>166</sup> Through internationalization, the company has also grown bigger: overall sales have experienced strong growth since 2000. Lars Josefsson, Vattenfall's CEO since 2000 and an outspoken advocate of internationalization, stated in 2000 that he wanted the company to triple in size by 2005. In the end, Vattenfall even surpassed this goal, as revenues in 2005 were nearly four times as high as revenues in 2000. In 2008, they were more than five times as high as in 2000.

In 2008, Vattenfall realized only one-third of its revenues in the Nordic countries. Vattenfall does not publish separate numbers for Sweden, therefore we can only assume that Sweden accounts for 25-30 percent of Vattenfall's revenues. As several acquisitions abroad were realized in the early 2000s, the share of sales abroad in overall sales increased significantly at that time (see graph 4).

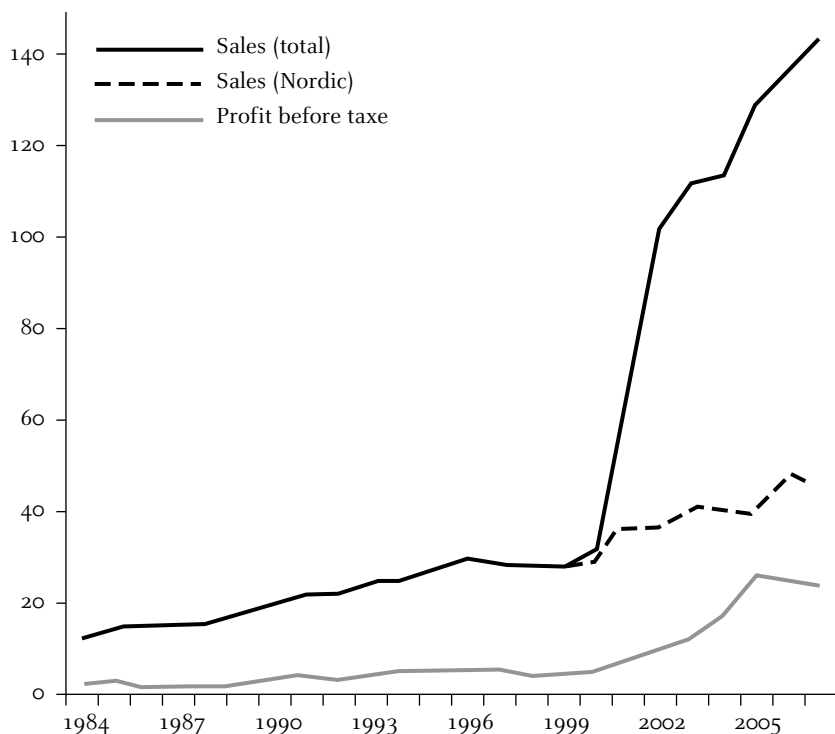
Operations in the Nordic countries prove to be more profitable, as they generate a significantly higher share of operating profits. Moreover, it is interesting to note that Vattenfall produced more electricity in Sweden than in Germany and Poland in 2008, but sold significantly more electricity to end-consumers in Germany and Poland than in Sweden (see tables 16 and 17).

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165. Högselius (2009), p. 258.

166. Högselius (2009), p. 258.

**Graph 4. Vattenfall Sales and Profit 1984-2007**  
(SEK bn)



Source: Högselius (2009), p. 259 (based on Vattenfall annual reports, 1984-2007).

**Table 16. Vattenfall External Net Sales and Operating Profit (2008)**

Region	External net sales (SEK bn)	% external sales	Operating profit (SEK bn)	% operating profit
Nordic countries (including UK)	54.7	33.3	16.8	56.1
Germany and Poland	99.2	60.3	15.1	50.6
Other	10.6	6.4	-2.0	-6.7
Total	164.5	100	29.9	100

Source: Vattenfall Annual Report 2008, p. 60 and 63, and own calculation.



**Table 17. Vattenfall Electricity Generation and Sales (2008)**

Region	Generation (TWh)	% generation	Sales (TWh)	% sales
Nordic countries	90.7	56	55.7	29
Germany and Poland	72.4	44	98.2	52
Other countries	–	–	4.1	2
Spot market	–	–	31.4	17
Total	163.1	100	189.3	100

Source: Vattenfall Annual Report 2008, p. 124.

### ***Vattenfall's Internal Structure and Presence in European Markets***

Vattenfall's internal organization consists of five business units: three of them follow a geographic logic (Nordic, Central Europe, Benelux) and are responsible for, inter alia, electricity and heat generation, distribution and sales in the respective countries. A newly created business group "Pan-European" deals with wind power, nuclear power, business development and engineering in all countries where Vattenfall is active. Another independent business unit is responsible for energy trading. It is noteworthy that the Central Europe business group (which comprises the German and Polish businesses) accounted for 68 percent of employees at year-end 2008, and the Nordic business group for only 29 percent. The acquisition of Nuon and reorganization of some business sectors have, however, changed this ratio in the course of 2009.

With its historic roots in the Swedish market, Vattenfall has become the leading energy group in the Nordic region. Outside Sweden, Vattenfall has assets in two other countries in the region, Finland and Denmark.<sup>167</sup> Besides electricity, Vattenfall is also active in heat: it is the fourth-largest supplier of heat in the Nordic region. Germany and Poland became important markets for Vattenfall in the early 2000s. The Netherlands and Belgium are other key markets for Vattenfall

167. The Nordic region (Denmark, Finland, Norway, Sweden) is well interconnected, and the electricity market can be regarded as truly regional. The region also has a common power exchange, NordPool.

**Table 18. Vattenfall's Market Positions**

	Sweden	Finland	Denmark	Germany	Poland
Electricity generation	1 (in the Nordic countries, including Norway)			3	7
Electricity trading	Top 3	Top 3	Top 3	Top 3	Top 3
Distribution	2	2	n.a.	4	5
Sales	1	3	n.a.	4	5
District heat	4	4	2	1	1

Source: Vattenfall website, based on 2008 data (prior to the acquisition of Nuon).

since the acquisition of Nuon in 2009. Limited activities exist in the United Kingdom. Norway, France, Switzerland, Austria and the Czech Republic are seen as “priority growth markets.” Unlike most of its peers, Vattenfall has no activities outside the EU.<sup>168</sup> According to the company, it is Europe’s fifth-largest generator of electricity and Europe’s largest generator of heat. It has an overall market share of around 5 percent in the European electricity, gas and heat market, and has announced a long-term target of achieving a market share of 10 percent by 2030.

### *Nordic countries*

Vattenfall is active in all Nordic countries, with the Swedish market being the most important. In Denmark and Finland, the company generates and sells electricity. It has no production assets in Norway, but sells electricity to major industrial companies there. In the whole region, Vattenfall has a market share of approximately 20-23 percent in electricity generation, and around 14 percent in electricity sales to end-customers.

Vattenfall’s Swedish activities comprise generation, distribution and sales of electricity and heat. Its market share in electricity generation is around 50 percent, which makes it the biggest electricity generator by far. Vattenfall’s power production in Sweden is mainly based on nuclear and hydropower. The

168. Vattenfall had acquired some participations in Asian and Latin American power plant projects in the 1990s, but sold these participations again soon after.

company is the second-largest electricity retailer with a market share of around 15 percent. Moreover, it is the main regional and local network operator in Sweden with 0.9m customers.

In Finland, Vattenfall has been active in electricity and heat generation, distribution and sales since 1995. Through several acquisitions, it has become one of the largest energy companies there. Vattenfall is the second-largest electricity retailer in Finland with a market share of around 10 percent.

Vattenfall has been present on the Danish energy market since 1996 and today generates and sells electricity to energy companies there. It has no retail activities in Denmark. In 2006, Vattenfall acquired generation assets from Elsam and E2 under an agreement with DONG, giving it a significant presence in generation (mainly fossil-based, but also increasingly biomass and wind). Vattenfall controls approximately 24 percent of the Danish power generation capacity.

In Norway, Vattenfall sells electricity to big industrial customers. It was the third-largest retailer in 2007 with a market share of around 8 percent. In the past, Vattenfall was also active in electricity distribution in Norway: it owned Oslo Energi, Norway's largest power supplier, but sold this subsidiary in 2001.

### *Germany*

Thanks to its acquisitions between 1999 and 2002, Vattenfall has become one of the four large utilities in Germany. Its size is comparable to EnBW's, with Vattenfall having a slightly higher share in electricity production (third-largest generator with a market share of around 12-14 percent), but a smaller share in retail (fourth-largest retailer with a market share of around 10 percent). The company is also active in heat generation and sales, but only recently started to sell gas to end-customers. This is, *inter alia*, due to the fact that Vattenfall has a shareholding in Gasag, the historic gas supplier of Berlin, since the acquisition of BEWAG. Moreover, Vattenfall has been the electricity TSO in the Eastern part of Germany (former GDR), Berlin and Hamburg since its acquisitions in the early 2000s. However, Vattenfall announced the sale of its high-voltage transmission grid to a consortium of Elia, the Belgian electricity

TSO, and Industry Funds Management, an investment fund, in March 2010. Permissions are pending at the time of writing, but they are not expected to pose any problem.<sup>169</sup>

In recent years, Vattenfall has suffered setbacks in Germany, especially in terms of image. Incidents at Vattenfall's nuclear power plants in Germany and poor communication of those incidents were met with criticism by the public and media.<sup>170</sup> The construction of a new coal power plant in Hamburg has been delayed by difficult negotiations with local authorities and has also caused public opposition. Several politicians and NGOs asked Vattenfall customers to change supplier. Even the city of Hamburg, which had sold its municipal electricity company to Vattenfall between 1999 and 2002, has now established a new municipal electricity company, as it is seemingly unhappy with Vattenfall's policy.

Besides "traditional" utility business, Vattenfall also mines lignite in Eastern Germany. Moreover, it is active in telecommunications and real estate.

### *Benelux*

Thanks to the acquisition of Nuon in 2009,<sup>171</sup> Vattenfall has become a major player in the Benelux energy market. Most of Nuon's assets are located in the Netherlands, but the company is also developing its position in Belgium. In the Netherlands, Nuon is the third-largest electricity generator with a market share of around 18-20 percent. It is the second-largest electricity retailer with a market share of 30 percent. The company, formerly owned by a group of local authorities, has strongly developed renewable energy production and provides 28 percent of Dutch wind energy. Vattenfall and Nuon together aspire to becoming the largest offshore wind generator in Europe. This should not hide the fact that the bulk of Nuon's electricity generation comes from gas and coal power plants.

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169. Vattenfall, Elia and IFM joint press release of 12 March 2010.

170. In a highly unusual step, all the other operators of nuclear power plants in Germany publicly criticized Vattenfall's management of incidents at its German nuclear plants in 2009. See "Konkurrenten greifen Vattenfall an," *Handelsblatt*, 26 August 2009.

171. Vattenfall acquired 49 percent of Nuon in 2009, and will acquire the remaining 51 percent in the next six years. Over the next four years, the brand name Nuon will be kept.

Nuon is also active in natural gas: it is the second-largest gas retailer in the Netherlands with a market share of 28 percent of gas supply. It entered the Dutch gas upstream market in 2008 with the objective to build a portfolio of gas assets that provides 10 to 20 percent of the company's gas demand for the next ten years. By acquiring Nuon, Vattenfall hence entered the gas downstream business at a much larger scale than before and even gained access to natural gas upstream assets. It will be interesting to see if Vattenfall will follow its peers and successfully diversify further into gas. Nuon had separated its electricity and gas network activities in 2008 in a company called Alliander, which remains wholly owned with the original shareholders. This means that Vattenfall does not own distribution networks in the Netherlands.

Before the acquisition by Vattenfall, Nuon had entered the Belgian and German energy market. The European Commission, in its approval of the acquisition, imposed on Vattenfall the sale of most of Nuon's German activities, as Nuon Deutschland had become the strongest new entrant in Hamburg and Berlin – cities in which Vattenfall had taken over the historic suppliers and now is the incumbent.<sup>172</sup> Nuon, however, keeps its Belgian activities, where it is one of the most successful new entrants with a market share of around 5 percent in both electricity and gas supply. It owns one wind farm and has plans to develop its production capacity there.

### *Poland*

Vattenfall entered the Polish market in 1992 and has acquired several companies and shareholdings since then in privatization rounds. Today, it is the fourth-largest private energy company in Poland, and the largest foreign energy company. Vattenfall is the seventh-largest electricity generator (market share of 2-3 percent) and the sixth-largest retailer (market share of around 10 percent) in the very fragmented Polish market. It is the largest heat producer in Poland with a market share of 24 percent.<sup>173</sup>

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172. European Commission press release of 22 June 2009 [IP/09/978].

173. According to <http://www.vattenfall.pl>.

In November 2008, Vattenfall acquired 18.7 percent of ENEA, the third-largest electricity company in Poland with a market share of around 8 percent in electricity generation and 15 percent in electricity sales to end-customers. The Polish government decided to privatise additional shares of ENEA in 2009. Vattenfall was expected to be the front-runner, but RWE emerged as most probable bidder. After exclusive negotiations, RWE however stepped back and the future of ENEA has again become unclear.<sup>174</sup>

### *United Kingdom*

Vattenfall owns several wind farms in the United Kingdom, and has plans to develop its wind portfolio there (especially offshore). It had declared its interest in the privatization of British Energy in order to enter the British nuclear market, but ultimately retreated. After some initial interest in the land auctions for nuclear new build in 2009, the company did not participate in the end. But it has again been mentioned as a potential investor for a share in nuclear power plants to be developed by EDF in the United Kingdom.<sup>175</sup>

## **Other European Utilities**

Besides the seven utilities presented in detail, there are of course many other utility companies in the EU. All these are smaller than the companies analyzed above and/or are very much focused on one national market. Eni, a big oil and gas upstream company, is an exception, as it also is a large gas trader and distributor. We briefly present some of these companies in the following paragraphs, in alphabetical order and without any intention to give an exhaustive overview.

### *Centrica*

Centrica was created in 1997, when British Gas split into two companies: Centrica, which took over gas supply, services, retail business and some limited gas production assets, and BG

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174. "RWE schreckt in Polen zurück," *Handelsblatt*, 14 October 2009.

175. "Sweden stops Vattenfall/British Energy bid-paper," Reuters, 30 April 2008; "Vattenfall pulls out of UK new nuclear market," 5 June 2009, <http://www.contractjournal.com>; "Swedes prepare to snap up stake in Britain's new nuclear reactors," *The Times*, 15 October 2009.

Group, which took over gas and oil exploration and extraction. Centrica is the largest supplier of gas to domestic customers in the UK with a market share of 44 percent in this segment (9.5m customers). It is also one of the largest electricity retailers with a market share of around 22 percent and 6.1m electricity customers. It operates its retail business under the brand "British Gas" ("Scottish Gas" in Scotland). Due to price volatility and also due to the fact that it does not own electricity generation assets, the company has suffered losses in recent years. It has, however, acquired a 20 percent participation in British Energy from EDF, and will obtain electricity from British nuclear plants (see EDF section for details).

The company has some assets abroad, mainly in North America. In the context the acquisition of a 20 percent participation in British Energy, Centrica sold its 51 percent participation in SPE, the second-largest Belgian electricity producer, to EDF. Centrica also has some activities in the wholesale markets of Spain, the Netherlands and Germany.

### CEZ

CEZ is the largest electricity company in the Czech Republic and also has operations in other countries in Central and Southeast Europe. CEZ, in its current form, was founded in 1992. Eight regional distribution companies were separated from CEZ in 1994, before CEZ took control of five of them again in 2003. This move resulted from the abandonment of earlier privatization plans that aimed at selling 67.7 percent of CEZ and six regional distribution companies to a foreign utility (EDF and Enel had filed unsuccessful offers in 2002).<sup>176</sup> CEZ has been partly privatized with the state holding 70 percent as of May 2009, and 30 percent being held by other shareholders. UniCredit and Citibank were the largest other shareholders with 8 and 7 percent of shares respectively.<sup>177</sup> CEZ's principal businesses encompass electricity generation, distribution and sales, heat sales and coal mining. The company sees its strength in realizing the successful transformation from a centrally-planned communist-style market to a liberalized market. It

176. "Tschechische Stromwirtschaft findet vorerst keinen Käufer," *Energie-Chronik*, February 2002.

177. As of December 2008, source: CEZ Annual Report 2008, p. 94.

now wants to use these experiences in other countries in Central and Southeastern Europe. CEZ presents itself as the “most profitable and least indebted” power company in Europe, and has the objective of becoming the leader on the Central and Southeastern European electricity market.<sup>178</sup>

In the Czech Republic, it has a market share of around 73 percent in electricity generation, and around 45 percent in electricity supply (in terms of volumes sold). Moreover, CEZ controls 5 out of the 8 Czech electricity distribution companies accounting for 62 percent of customers.<sup>179</sup> Its power production is mainly coal-based (using lignite mined in its own mines), but it also has two nuclear plants and 34 hydropower plants. Abroad, the company has acquired three distribution companies and a power plant in Bulgaria, giving it a share of 12 percent of installed generation capacity there. In Romania, CEZ owns the country’s largest distributor Electrica Oltenia and two other distribution companies. It plans to develop large wind farms and a CCGT unit there and also has a share in the Cernavoda nuclear power plant project. Moreover, CEZ acquired two coal power plants in the South of Poland. CEZ entered in a strategic alliance with MOL of Hungary in 2007, with, inter alia, the plan to jointly develop CCGT plants. In 2009, CEZ entered the market of an “old” EU Member State for the first time when it acquired the German lignite mining company MIBRAG (Mitteldeutsche Braunkohlengesellschaft mbH (Central German Brown Coal Company) in a joint-venture with the J&T Group. It now plans to build a coal power plant in Germany, located next to its mines. Also in 2009, CEZ entered two markets outside the EU, as it acquired the only Albanian electricity distribution company and a 50 percent stake in a Turkish distribution company.

### *DONG*

DONG is an integrated energy company, mainly active in Denmark, and on a smaller scale in neighboring North European countries. The company was founded as Dansk Naturgas in 1972,

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178. <http://www.cez.cz/en/cez-group/cez-group.html>.

179. CEZ Investor presentation November 2009, [http://www.cez.cz/edee/content/file/investori/equity\\_investors\\_november\\_2009.pdf](http://www.cez.cz/edee/content/file/investori/equity_investors_november_2009.pdf).



and was active in gas and oil exploration and production, but also gas distribution, in the first years of its existence. The nature of the company changed in the early 2000s, when it acquired stakes in several Danish electricity companies. In 2005, it merged with five Danish electricity companies and hence became the Danish “national champion” in the energy sector. The five integrated companies included two major electricity producers in Denmark, Elsam and Energi E2, and three distribution companies. Since the merger, the Danish government has a 73 percent majority in DONG, with former Elsam and Energi E2 owners having 18 percent. The company now realizes most of its revenues in energy sales and distribution, and electricity generation. Exploration and production only accounted for 9 percent of revenues in 2008.

The company produces around 50 percent of Danish electricity, with 86 percent of electricity generation based on thermal sources, and 14 percent from renewable sources (mainly wind) in 2008. DONG's market share in electricity retail is lower, at around 35 percent. Outside Denmark, the company is marketing electricity and gas in Sweden, where it has a market share of around 5 percent in electricity. DONG is also present in the Netherlands and Germany and plans to strengthen its position there. It also has limited power production assets (mainly wind) abroad.<sup>180</sup> In Germany, the company has a 25.1 percent participation in Lübeck's municipal energy and water supplier, and recently acquired Essent's former German subsidiary Kom-Strom. In October 2009, DONG announced that it would freeze all plans to build new coal plants until 2020, as it does not think that CCS technologies will be available and accepted by the public before that date. As a consequence, new coal plants are not compatible with the company's aim to generate half of its energy in 2020 from CO<sub>2</sub>-neutral energy sources.<sup>181</sup>

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180. In 2007, DONG divested the renewables portfolio which Energi E2 had developed in Spain for €0.7bn to E.ON.

181. “DONG Energy drops investments in new coal power plants,” *Vattenfall Energy News Europe*, Week 42, 2009.

## EDP

EDP (Energias de Portugal, formerly Electricidade de Portugal) is the third-largest electricity company in the Iberian Peninsula, and the largest Portuguese industrial group. EDP is the only company that has significant electricity and gas generation, distribution and supply activities in both parts of the Iberian market, Portugal and Spain. It was founded in 1976 as the state-owned electricity monopoly in Portugal. But since the beginning of privatization in 1997, the share of the state has decreased and currently stands at 20 percent. EDP is still mainly an electricity company, but it has diversified into gas, mainly thanks to acquisitions in Spain: in 2008, the company realized 89 percent of its revenues in electricity, and 9 percent in gas.

With market liberalization, EDP's market share in electricity generation in Portugal has decreased to around 65 percent, but it still has around 95 percent in Portuguese electricity supply. Power generation is mainly based on hydroelectricity and thermal power, but the company has also strongly developed wind power. EDP planned to acquire, together with Eni, Portugal's main gas company, Gas de Portugal (GDP). However, the European Commission prohibited the acquisition in 2004, as it would have had, in its view, negative consequences for competition.<sup>182</sup> Hence EDP's Portuguese gas activities remain limited to its control of one of the six distribution companies (Portgas).

EDP's gas activities in Spain are much more significant (Spain accounts for 88 percent of EDP's overall gas sales), but EDP also has important electricity activities there. EDP is present on the Spanish electricity market mainly via its subsidiary HC Energía, the fourth-largest electricity operator in Spain. Its gas activities are mainly realized by Naturgas, in which it has a 66 percent stake.

Outside the Iberian Peninsula, EDP is active mainly via its renewable energies branch EDP Renováveis, which was introduced separately to the stock market. The EDP group holds 62 percent of EDP Renováveis (as of June 2009). EDP Renováveis is the fourth-largest wind energy company in the world, but has

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182. European Commission press release of 9 December 2004 [IP/04/1455].

only contributed 4 percent to EDP's overall revenues in 2008. Thanks to important investments, this share should, however, increase. EDP Renováveis' main countries of operation are the US (45 percent of installed capacity), Spain (38 percent), Portugal (12 percent), and France (4 percent). Outside the EU, EDP is present in the Brazilian electricity sector, where it produces, distributes and supplies electricity via its subsidiary Energias do Brasil.

### *Eni*

The Italian oil and gas company Eni, mainly known for its upstream activities, is an important player on the European gas market and one of Europe's largest gas marketers (with E.ON and GDF Suez). It is active in the supply, transport, distribution and sale of natural gas. Moreover, Eni also has several power plants in Italy. Gas mid- and downstream and electricity accounted for around one-third of the company's revenues and one-quarter of its EBIT in 2008.

Around 50 percent of Eni's gas sales are realized in Italy and the remaining 50 percent abroad, mainly in other European countries. In 2002, Eni acquired full control of Italgas, the leading gas distributor in Italy. Today, Eni has 53 percent in Snam Rete Gas, the leading player in the regulated gas business (transport, distribution, storage, LNG regasification) in Italy. Moreover, Eni acquired Distrigas in 2008, the leading gas supplier in Belgium, which was formerly part of Suez. Eni is also present in many other European gas markets, notably in Spain, where it has had a 50 percent stake in Union Fenosa Gas since 2002. Eni, of which the Italian government owns 30 percent, plans to develop its international presence. Its objective is to realize 61 percent of its gas sales abroad in 2012. Eni, which has a market share of around 45 percent in gas sales in Italy, expects its sales in Italy to decrease as a consequence of market opening. Its gas activities in Italy are subject to competition investigations by the European Commission, which accuses Eni of "capacity hoarding," "capacity degradation" and "strategic under-investment" in its international gas transmission pipelines.<sup>183</sup>

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183. European Commission press release of 19 March 2009 (MEMO/09/120).

In the early days of Eni, Enrico Mattei had the ambition of making Eni the sole energy company of Italy, which would also be responsible for electricity production and nuclear energy. Eni had first developed activities in electricity at that time, but Mattei's vision was not realized, as Enel came to be the leading Italian electricity company. Since the creation of Enipower in 1999, Eni is (again) active in electricity: it owns several thermal power plants in Italy and produces around 10 percent of the country's electricity. Its share in electricity sales also stands at around 10 percent.

### *Fortum*

Fortum is the largest Finnish utility, active in the generation, distribution and sale of electricity and heat. The company was founded in 1998 through the merger of the electricity company Imatran Voima (state-owned) and the oil company Neste Oyj (listed). The oil and gas business was again separated from the company in 2005 into Neste Oil. The Finnish state currently holds 50.8 percent of Fortum's shares.

The company is the second-largest electricity generator in the Nordic countries with a market share of 13 percent in 2008; its electricity production inside the EU is mainly based on hydro and nuclear (45 percent each). Moreover, it is the largest electricity distributor and retailer in the Nordic region. Its presence in the Nordic market is mainly concentrated in Finland and Sweden (the country has more customers in Sweden than in Finland), but it also has subsidiaries in Norway. Fortum has no downstream gas activities, but it is active in heat: it is the largest heat generator in the Nordic region. Its market shares in Finland are around 30 percent in electricity generation and 12 percent in electricity retail. In Sweden, the company has market shares of 17 percent in electricity generation and 14 percent in electricity retail.

Outside the Nordic region, Fortum is active in the Baltic states (some limited heat sales) and Poland (electricity and heat sales). Moreover, Fortum has become an important player on the Russian electricity market. It entered this market in 2003 by acquiring shares in the distribution company Lenenergo (which it divested again in 2007). Fortum has shares in two Russian electricity generators: TKG-1 (since 2006) and TKG-10 (since 2008).

### *Gas Natural*

With the acquisition of the electricity company Union Fenosa, which was completed in September 2009, Gas Natural has become one of the three leading energy utilities in Spain. The incumbent gas company in Spain, it has now fortified its position as market leader in gas with a market share of around 60-65 percent. Large parts of its gas portfolio are based on LNG, and Gas Natural is the world's second-largest LNG company. Through the acquisition of Union Fenosa, Gas Natural has also become the third-largest electricity company in Spain, though well behind Endesa and Iberdrola. After the acquisition of Union Fenosa, Gas Natural has a market share of around 20 percent in electricity generation and 13 percent in electricity retail. If one takes electricity and gas together, Gas Natural is the largest marketer of energy in Spain.

Gas Natural started to enter foreign markets in 1992 and is active in 23 countries worldwide since the acquisition of Union Fenosa. Most of its international activities are located outside Europe (for the most part in Latin America). The company is active in gas distribution in Italy on a small scale and sells gas on the French and Portuguese wholesale markets. Moreover it is active in electricity distribution in Moldova, where it is responsible for power supply to 70 percent of the population. The company's main shareholders are Caja de Ahorros y pensiones de Barcelona and Criteria Caixacorp which have 37.5 percent each. The Spanish oil company Repsol is the third-largest shareholder having 30.8 percent.

### *Gasunie and GasTerra*

Gasunie and GasTerra are the main players in the Dutch natural gas market. After being the trading and supply branch of Gasunie, GasTerra became an independent gas trading company in 2006. Since then, Gasunie's activities have been limited to gas infrastructure. The company's main task is to operate the Dutch high-pressure gas pipelines; this task is done by Gasunie's subsidiary Gas Transport Services B.V. (GTS). Gasunie, which is 100 percent owned by the Dutch state, has also been running the North German gas transmission system since the acquisition of BEB in 2008. Moreover, it offers gas storage and LNG services. GasTerra (50 percent owned by the Dutch state, the remaining shareholders being Shell and ExxonMobil) is an international

gas trading company. It buys gas from Dutch gas producers (89 percent of purchases) and from abroad (11 percent), which it then sells to Dutch and foreign customers (energy companies, power stations, industry). Its sales of 84 bcm in 2008 made it the EU's fourth-largest gas seller. GasTerra realized 39 percent of its 2008 sales in the Netherlands, 23 percent in Germany, 10 percent each in Italy and the UK, and the remainder in France, Belgium and Switzerland.

### *Public Power Corporation (PPC)*

The Public Power Corporation (PPC, DEI in Greek) is the largest power generator in Greece with a market share near to 100 percent and a near-monopoly position in power supply. The company was set up in 1950 by the Greek government and it was partly privatized in 2001. The Greek state today holds 51 percent of PPC's shares. The company owns two large lignite mines and lignite is the largest source of power for PPC, accounting for 55 percent of power production. Due to this, PPC emits more CO<sub>2</sub> per kWh of electricity generated than any other major European electricity generator. PPC was the sole owner of the Greek transmission system, but after the beginning of unbundling, it reduced its share in the Greek TSO to 49 percent.

### *Scottish and Southern Energy*

Scottish and Southern Energy was formed in 1998 following the merger of Scottish Hydro-Electric and Southern Electric. The listed company, in which no single entity has more than 5 percent of shares, is the third-largest electricity generator and the second-largest energy supplier in the United Kingdom, with a market share of around 12 percent in electricity generation and 17 percent in electricity retail. Its power production is mainly thermal (around 80 percent), with the remainder coming from renewable energy sources (hydropower and wind). The company is one of the leaders in renewable energies in the UK, and serves a total of around 9m customers. Operating under several brands, Scottish and Southern Energy also runs the electricity transmission network in the North of Scotland, and the electricity distribution networks in Northern Scotland and Central Southern England. It owns 50 percent of Scotia Gas Networks, the UK's second-largest gas distribution company which provides natural gas customers

in Scotland and the South and South East of England. Scottish and Southern Energy is very much focused on the British market, but it has also some operations abroad, especially in wind energy. Notably, it has acquired Airtricity, the largest generator and supplier of renewable energy in Ireland, in 2008.

### *Statkraft*

Statkraft is Norway's leading electricity company. We mention it here because Norway, which of course is not a member of the EU, is very much integrated into the EU electricity market. After being a state company for most of its history, Statkraft has been transformed into a limited company in 2004, but the Norwegian state remains the owner of 100 percent of its shares. Statkraft is mainly active in power generation and supply, district heating and energy trading. It is the largest power producer in Norway with a market share of around 35 percent, and the third-largest in the Nordic market with a market share of around 14 percent. The company is also active in electricity retail with a market share of 24 percent in Norway. After an important asset swap with E.ON in 2008, Statkraft is currently the largest renewable energy producer in Europe.<sup>184</sup> This is mainly due to its very important hydro production in Norway, which also constitutes a pivotal reservoir for peak production in Europe: Statkraft is a major importer of electricity towards the EU, and very active in energy trading. The big exposure to hydroelectricity, however, constitutes a risk in dry periods, which Statkraft has reduced by developing wind and gas power (in Norway, Germany, the UK and Sweden). Recent acquisitions and organic growth have changed the geographic focus of the company: in 2007, only 3 percent of its production capacity was located outside Norway. This share has grown to 28 percent in January 2009. Moreover, the company plans to further develop its international activities, notably in South East Europe (first hydro projects in Albania and Turkey). Outside the EU, Statkraft develops renewable energy projects in Asia and Latin America, mainly via SN Power (in which it has a 60 percent shareholding).

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184. As a result of the asset swap with E.ON, Statkraft has significantly reduced its activity in Sweden, where it had shares in E.ON Sweden (the former Sydkraft). At the same time it has become the single largest shareholder in E.ON, having a 4.17 percent stake.

# Overview of Major National and Regional Electricity and Gas Markets in the EU

In its inquiry into the European gas and electricity sectors,<sup>1</sup> the European Commission underlined that there is no European market for electricity and gas yet, as most national markets are not yet sufficiently interconnected. Moreover, many other obstacles (structural and/or regulatory for instance) remain for the creation of a truly single market. Most observers share the view of the European Commission, as the Nordic market is probably the only regionally integrated electricity market in the EU today. Predictably, Member States have taken different approaches in implementing the liberalization directives. One should also bear in mind that Member States had very different market structures in the early 1990s. Even if the same European directives apply in all Member States, they have been implemented in different ways and with significantly different results by Member States. Moreover, most countries have not yet totally implemented the directives of the second package, which has led the European Commission to launch infringement procedures for failure to implement the second package against 25 of the EU's 27 Member States.<sup>2</sup>

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1. European Commission [2007].

2. Only Cyprus and Malta avoided action – due to their small size and isolated energy systems, they benefit from exemptions. European Commission press release of 25 June 2009 [IP/09/1035].



In this context, national traditions and legacies from the past need to be taken into account, as they often have a long life and present important political obstacles for liberalization. It also needs to be underlined that many governments have been favoring, in one way or another, the creation of “national champions,” be they owned by the government or private business. This, of course, impedes liberalization in many cases. In short, there is a diverse set of market structures in the EU today. There is, however, a common trend towards demopolization in most countries, even if concentration processes have recently taken place in a limited number of countries (for example, the United Kingdom). In order to present an overview of these highly divergent national markets, we offer a short overview of major national and regional markets in the EU in the following sections. This should allow for a better understanding of the European electricity and gas markets, and a more precise evaluation of the relative position of each large utility (also see statistical data on national electricity and gas markets and market concentration in electricity generation in annex).

Even if we have mostly national markets today – with the exception of the Nordic and increasingly the Central-Western European electricity markets –, there are some trends towards greater integration between groups of Member States. One example is the launch of the trilateral market coupling between French, Belgian and Dutch electricity markets in 2007, a cooperation between the three power exchanges (APX, Powernext, Belpex) and the three TSOs (Elia, RTE, TenneT). Germany is to join the market coupling in 2010. Moreover, Elia and RTE created a common technical coordination center (called Coreso) in 2009, which supplies national TSOs with forecasts about the security of the grid of the North West of Europe. National Grid of the UK joined Coreso three months after the start of operations. Similar processes are taking place elsewhere. A good example is the common Iberian market (MIBEL), which, however, has turned out to be difficult to establish. It is noteworthy that these developments are mainly limited to electricity. For now, gas markets remain much more national, or even sub-national where different market zones exist. This is due, to a large extent, to the fundamental differences between the two products.

These differences can also explain, at least partly, why in most Member States – but not in all – there is less competition in gas than in electricity.

It is not in the scope of this paper to analyze in detail how far the expansion strategies of large utilities contribute to the trend towards greater integration of the different national markets. In our view, it is without doubt that the emergence of truly European utilities with activities in many EU countries contributes positively to market integration, as these companies have a natural interest in the interconnection and integration of national markets. Unsurprisingly, they ask for market conditions that are as uniform as possible in all Member States. Most of them also argue for further liberalization and market opening – even if in many cases this means that they will face more competition in their home market. Most big utilities seem to have accepted this and compensate for decreased market shares at home by expanding activities abroad.

## **Germany**

Germany, the largest country in the EU in terms of population and gross domestic product (GDP), also has the highest electricity consumption in absolute numbers. Moreover, it has the second-largest gas market of the EU. Concerning market structure and competition, the country is within the EU average. Its electricity and gas markets are neither very competitive and fragmented, nor are they among the least competitive and most monopolistic ones.

### ***The German Electricity Market***

Market liberalization has significantly changed the structure of the German electricity market. In the mid-1990s, there were around ten major electricity producers in Germany, with the retail market fragmented among a huge number of supply companies enjoying regional or local monopolies. The beginnings of market liberalization led to several far-reaching merger and acquisition activities. The most important ones were the merger of Bayernwerk and PreussenElektra which formed E.ON, and the acquisition of VEW by RWE. Two major foreign utilities

entered the German electricity market at that time: EDF bought shares in EnBW, which itself was the result of the merger of several regional electricity companies. Vattenfall acquired and subsequently merged VEAG, BEWAG, HEW and LAUBAG.

As a result, RWE, E.ON, Vattenfall and EnBW have achieved a market share of 80-95 percent in electricity generation in recent years (depending on years and calculation methodology). The German regulator, for instance, estimated that in 2007, these four companies produced 87.9 percent of net electricity for general consumption (451.4 TWh out of 513.5 TWh).<sup>3</sup> The production capacities of all four companies are more or less regionally concentrated, as every company has its historic home region(s). Until 2009, each of the four large integrated utilities also owned the transmission network in its region. A major change took place in 2009, when E.ON sold its network. Moreover, Vattenfall divested its transmission network in March 2010 (see below for details).

Of the four large German utilities, RWE and E.ON are by far the most dominant players, as they together produced around 55-60 percent of German electricity in recent years (RWE around 30 percent, E.ON around 25 percent). The smaller companies of the "Big-4," Vattenfall and EnBW, produced around 12-15 percent of electricity each. As a consequence, the German regulator, the Federal Cartel Office and the *Bundesgerichtshof* are of the opinion that RWE and E.ON form a duopoly and dominate the German generation market.<sup>4</sup> It will be interesting to see if the authorities change their view after the divestment of 5 GW of production capacity by E.ON following its agreement with the European Commission. This step has reduced E.ON's share of electricity production to around 15 percent.

Moreover, E.ON and RWE are regularly accused of using their market power to manipulate the German electricity exchange EEX (European Energy Exchange). The companies, of course, deny these accusations; court proceedings are

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3. Bundesnetzagentur [2008b], p. 13.

4. Bundesnetzagentur [2008b], p. 13.

ongoing.<sup>5</sup> Interestingly, in its proceedings against E.ON the European Commission initially assumed that RWE, E.ON and Vattenfall formed an oligopoly on the German electricity wholesale market. But in its final decision, the Commission did not specify whether the three companies form an oligopoly, or whether just RWE and E.ON form a duopoly.<sup>6</sup>

The German electricity distribution market is very fragmented with 855 distribution system operators (DSOs) in June 2008, 779 of which had less than 100,000 customers.<sup>7</sup> Many of them are active only in one region or city and are often owned by municipalities. Moreover, the fact that most of them have no, or only very limited, production capacities makes them dependent on the four big producers. This in turn impedes competition. In addition, the big producers have shareholdings in several local and regional distributors, even if the sale of Thüga by E.ON in 2009 has changed this situation to a certain extent. The four large utilities taken together realized around 52 percent of electricity sales to end-customers in 2007, with E.ON, RWE and EnBW having market shares of around 16 percent each, and Vattenfall having only 4 percent.<sup>8</sup> These figures include sales via consolidated participations – they would be significantly higher if sales via companies in which the big generators have minority participations were counted as well.

Until the end of 2009, the German high-voltage transmission network was operated by four TSOs, which were all subsidiaries of the four big generators. Of a total of 35,250 km of 220 and 380 kV lines, RWE owned 11,500 km, E.ON 10,600 km, Vattenfall 9,500 km and EnBW 3,600 km (as of 2008).<sup>9</sup> But a major change to this traditional structure happened in November 2009, when E.ON sold its grid to the Dutch state-owned TSO TenneT. Vattenfall sold its grid in March

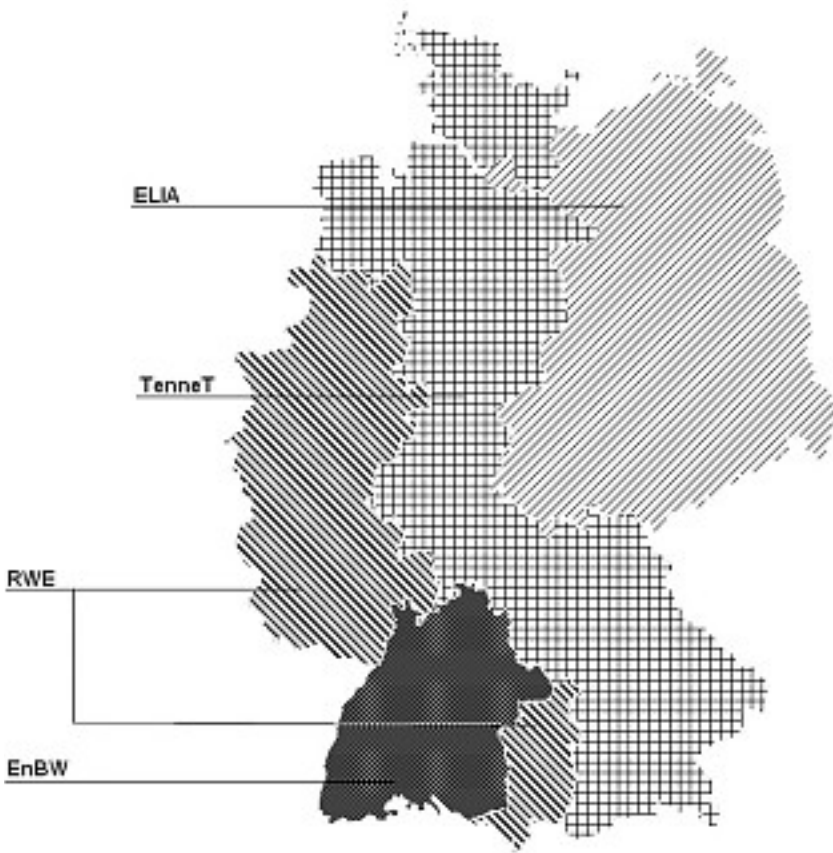
5. See, for example, "Energieverbraucher verklagen E.on und RWE," *Spiegel online*, 8 May 2009; "Manipulation an der Strombörse," *Wirtschaftswache online*, 12 March 2007; "Manipulation an der Strombörse?" [http://www.energienetz.de/de/Energiebezug/Strom/Stromboersen/site\\_516](http://www.energienetz.de/de/Energiebezug/Strom/Stromboersen/site_516).

6. Bundesnetzagentur [2009], p. 14.

7. Bundesnetzagentur [2008a], p. 6.

8. Own calculation based on RWE Fact & Figures, May 2009, p. 127, which quotes data provided by the Bundesverband der Energie- und Wasserwirtschaft (BDEW).

9. <http://www.udo-leuschner.de/energie-chronik/080702.htm>

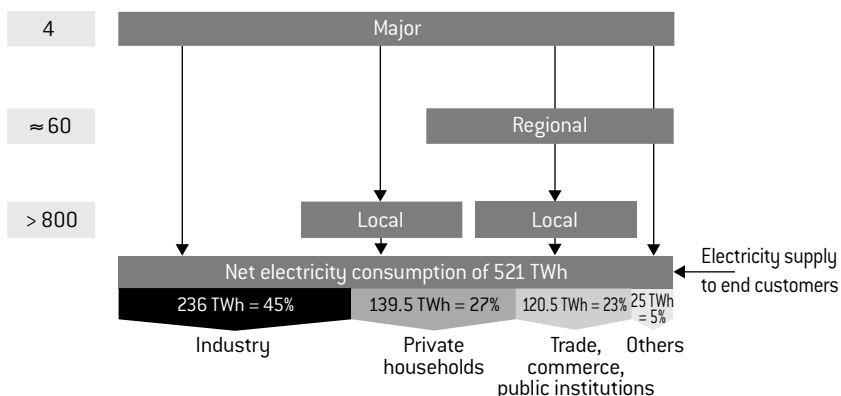
**Map 2. TSO Areas in Germany in 2010**

Source: Author.

2010 to a consortium of the Belgian TSO Elia and an Australian investment fund (Industry Fund Management). On the other hand, RWE and EnBW want to keep their high-voltage networks – at least for the time being. The coalition government of CDU/CSU and FDP declared, in late 2009, its intention to set up a single German TSO in the coalition agreement, but this plan has become highly unrealistic after the acquisitions by TenneT and Elia.

As of today, most observers regard the extent of competition in the German electricity market as unsatisfactory, and the result of liberalization as rather disappointing. In the first years of

**Graph 5. Structure of the German Electricity Market (2008)**



Source: RWE, *Facts & Figures*, May 2009, p. 119.

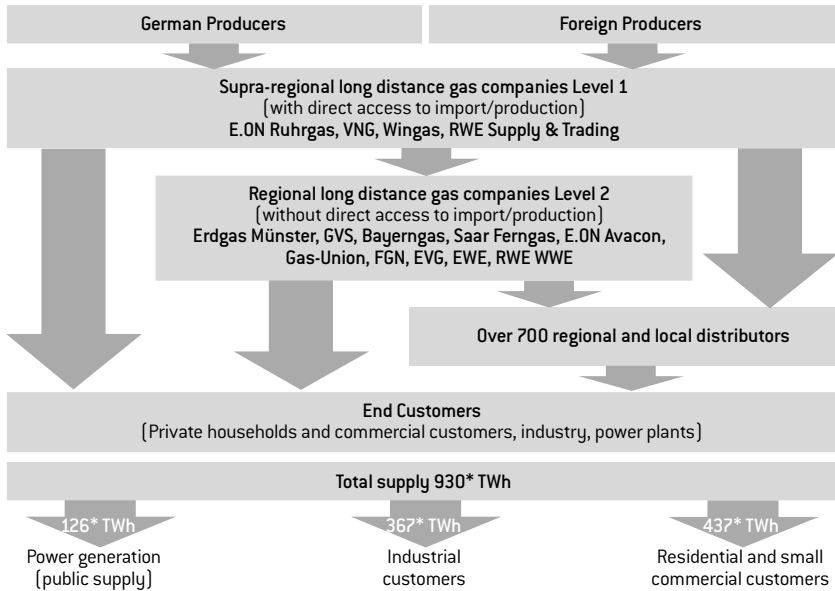
liberalization after 1998, there was a surprisingly high level of competition that led to important reductions of the electricity price between 1998 and 2000. Households obtained reductions of up to 30 percent and some industrial customers of even 70 percent.<sup>10</sup> Utility representatives underline that these reductions led to losses for the electricity generators, as they did not control the situation due to their lack of preparation for, and understanding of, a liberalized market.<sup>11</sup> Since the mid-2000s, there have been many debates about the lack of competition in Germany. The issue of increasing electricity prices predictably dominated public debates, but competition authorities and the regulator have also criticized the lack of competition based on investigations into the functioning of the electricity market (see above). Not surprisingly, most energy companies and their associations reject this view, citing the increasing level of competition and market entrants.

### **The German Gas Market**

In its 2008 report to the European Commission, the German regulator writes that “the German gas markets are still characterized by a high level of concentration.” There is “no effective

10. “Ganz schön bedient,” *neue energie*, July 2005.

11. Matthias Dürr (RWE) at IFRI Energy Breakfast Roundtable in Brussels, 17 December 2009.

**Graph 6. Structure of the German Gas Market (2008)**

\* Preliminary figures.

Source: RWE, *Facts & Figures*, May 2009, p. 142.

competition,” but it also notes that there has been “some movement” in the market recently.<sup>12</sup> It is very complicated, if not impossible, to estimate the market shares of the different companies in the German gas market. This is due to a lack of transparency, and also to the fact that there are many intra-company sales. Moreover, the German gas market has a complicated market structure consisting of four “supra-regional long-distance gas companies,” ten “regional long-distance gas companies” and over 700 regional and local distributors (according to an analysis by RWE, see graph). The *Bundesnetzagentur* divided German gas companies into 20 TSOs and 697 DSOs in June 2008.<sup>13</sup>

12. Bundesnetzagentur (2008a), p. 19.

13. Bundesnetzagentur (2008a), p. 15.

A recent and very detailed study of the German gas market does not give any figures for market shares, underlining the lack of transparency.<sup>14</sup> According to the regulator, the three largest wholesalers (which are not named) had a market share of 26.3 percent in the overall market in 2007 and 45 percent in the market for big customers (>100 GWh per year).<sup>15</sup> In 2007 the European Commission estimated that the largest wholesale company (obviously E.ON Ruhrgas) accounted for 60 percent of the wholesale market.<sup>16</sup> In any case, the market share of “new” entrants since market liberalization is still low, with the incumbents largely dominating (the largest ones being E.ON Ruhrgas, VNG, Wingas and RWE). The most successful new entrant in the German gas market is GDF Suez with sales of around 30 TWh in 2008-2009.<sup>17</sup>

In his encyclopedic study of the German gas market, Heiko Lohmann underlines that important changes have taken place in the German gas market in recent years. Thanks to the work of the regulatory authority and changed market behavior of large incumbents (in particular E.ON Ruhrgas), competition is now more and more becoming a reality according to Lohmann.<sup>18</sup> He thereby gives a more nuanced view than the German regulator (see above) or the German Monopolies Commission, which concluded in 2007 that “it is not possible to speak of functioning competition in the German gas market.”<sup>19</sup>

## France

France is the Western European country where the electricity and gas markets have changed the least. The French government has never been very keen on introducing competition, and has often been slow to implement European

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14. Lohmann [2009], p. 49.

15. According to the same source, they still had 30.9 percent of the overall market and 50 percent of the big customers in 2006. Bundesnetzagentur [2008a], p. 21.

16. [http://ec.europa.eu/energy/energy\\_policy/doc/factsheets/market/market\\_de\\_en.pdf](http://ec.europa.eu/energy/energy_policy/doc/factsheets/market/market_de_en.pdf).

17. Lohmann [2009], p. 50.

18. Lohmann [2009], p. 3. Heiko Lohmann published another study about the early steps of German gas market liberalization in 2006 [see Lohmann 2006].

19. Monopolkommission [2007], p. 149.



directives. Due to this, the historic incumbent electricity and gas companies (EDF and GDF Suez – which were until recently state-owned monopolies) still very much control the market. New entrants and the French regulator CRE (Commission de Régulation de l'Énergie) have continuously complained about difficulties of entering the market. The predominance of regulated tariffs for electricity and gas – especially in the residential sector, but not only there – is a particularity of the French market and certainly does not help to foster competition, as regulated prices often do not reflect production costs. EDF, GDF Suez and their competitors regularly complain about this, as they make very low profits or even losses in their sales to residential customers.

### ***The French Electricity Market***

According to the CRE, 66 percent of overall electricity consumption was under regulated electricity tariffs in June 2009 (the real share is higher, as customers under TARTAM tariff are counted as customers under market price).<sup>20</sup> Ninety-five percent of electricity consumed by households is under the regulated tariff.<sup>21</sup> As for electricity generation, the French situation is unique in so far as the country has a very high share of nuclear production. In 2008, 76 percent of French electricity was generated by nuclear plants, 14 percent by renewable energy sources (mainly hydropower) and 10 percent by thermal plants.<sup>22</sup> The high share of nuclear base-load makes competition in generation more difficult than in other countries that have a more diversified and flexible production mix – especially as all nuclear plants (and many hydro plants) are owned by the historic operator EDF. Thanks to this, EDF has a market

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20. TARTAM stands for "Tarif Réglementé Transitoire d'Ajustement du Marché", a special transitory tariff that allows companies that left the regulated tariff for the free market to come back to regulated tariffs. Many companies used this opportunity as market prices went up and remained higher than the regulated tariff. Customers under TARTAM pay a premium of 10-23 percent over the original regulated tariff, but this price in most cases remains below the market price. This controversial measure by the French government has been widely criticized, and should be abandoned in 2010. The European Commission began an investigation into regulated electricity tariffs in France in 2007, which has been extended in 2009. See European Commission press release of 10 March 2009 [IP/09/376].

21. CRE [2009].

22. Percentages calculated with data from <http://www.ufe-electricite.fr>.

share of around 88 percent in electricity generation. The second-largest producer, GDF Suez, has a market share of around 5 percent (mainly hydro), and the third-largest, E.ON, 2-3 percent (mainly coal).

The French wholesale market has been coupled with the Belgian and the Dutch ones since 2006. Thanks to this, electricity prices at the power exchanges (Powernext in France, Belpex in Belgium and APX in the Netherlands) have been increasingly converging since then: in 2008, base-load prices were the same for 70 percent of the cases and peak-load prices for 72 percent of the time.<sup>23</sup>

Due to the high degree of nuclear production by one single company, the sale of electricity produced in EDF's nuclear plants through auctions ("Virtual Power Plants") has been introduced following a request of the European Commission (in the context of EDF's acquisition of shares in EnBW). These auctions are of crucial importance for alternative suppliers, as they give them a chance to acquire electricity and then sell it to end-use customers. However, the prices realized at these auctions have been considerably higher than the production costs of EDF. Therefore, the price at which alternative suppliers can acquire electricity produced in EDF's nuclear power plants is one of the most important points in the ongoing debates concerning the reform of the French electricity market. This reform should be introduced in 2010: after the publication of the Champsaur report in April 2009, the French government and Parliament are expected to decide on a new electricity market law in 2010 (NOME). Consultations with the European Commission and the industry on this issue are ongoing. It is however politically impossible to transfer some of the existing nuclear power plants to another operator in a measure to stimulate competition: public opinion considers it safer to have only one national operator (i.e. EDF). Moreover, the French population is strongly attached to the *service public* model, for which EDF, as a nation-wide and public operator, is a strong symbol.

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23. These values were 64 percent and 61 percent respectively in 2007. RTE, Rapport d'activité 2008, p. 10.

The concessions of a substantial part of French hydropower plants are up for renewal in the next years. Many European companies have declared their interest in the upcoming auctions, and one might expect that EDF's share in overall hydropower production will decrease in the future.

In electricity sales, EDF also enjoys a very strong position. The exact market share is difficult to estimate, but should be around 85-90 percent. Competition is most advanced amongst the largest customers. Alternative suppliers have a market share of around 18 percent in this segment. In the overall market, alternative suppliers have a market share of 10 percent.<sup>24</sup> GDF Suez, the incumbent gas company, is the largest alternative supplier for electricity, with a market share of around 5-7 percent.

The high-voltage electricity transmission network is operated by RTE, which is 100 percent owned by EDF. RTE is widely regarded as an independent TSO and as an international reference for network construction and operation, especially concerning interconnection issues. On the contrary, the incomplete unbundling of ERDF, another EDF subsidiary that is responsible for distribution to around 95 percent of electricity customer sites in France, has been criticized.<sup>25</sup> The remaining 5 percent of customer sites are supplied by around 160 local distribution companies.

### ***The French Gas Market***

Unlike in most other countries, the French gas market is somewhat more competitive than the French electricity market – at least if one takes the market share of alternative suppliers as the criterion: alternative gas suppliers (all suppliers other than GDF Suez, Total and 22 small local suppliers) have a market share of 14 percent in gas sales. Alternative electricity suppliers account for only 10 percent of electricity sales.

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24. Shares according to CRE (2009). Alternative suppliers are defined as all suppliers that are not historic suppliers. The historic suppliers are EDF and around 20 small local suppliers owned by municipalities (which had not been nationalized in 1945). For their (very limited) sales outside their traditional area, these local suppliers are considered as alternative suppliers.

25. Competitors have criticized that ERDF does not operate separately from other business sectors of EDF. Moreover, the similarity of names and logos of ERDF and EDF has been criticized.

However, GDF Suez, operating under the brand Gaz de France in gas retail and wholesale in France, is still by large the dominant player of the French gas market. All market segments taken together, GDF Suez sold around 61 percent of gas delivered to end-customers in France in 2008. Total comes second with around 16 percent, EDF third with around 4 percent. E.ON, which is – according to its own information – the largest foreign company in the French gas market, had a market share of around 2 percent.

When evaluating market shares in the different market segments, one needs to consider that 55 percent of French gas consumption is under regulated tariffs whereas 88 percent of delivery points are under regulated tariffs. Ninety-one percent of consumption by residential customers is under regulated tariffs, but only 18 percent of consumption by large clients directly connected to the transmission network is under regulated tariffs.<sup>26</sup>

GDF Suez has a market share of 85 percent in the residential sector, with other historic suppliers (local distribution companies) having around 10 percent and alternative suppliers having around 4 percent. In the non-residential market, alternative suppliers have a market share of around 18 percent, and in the subsector of big industrial clients (those which are directly supplied from the transport network), they have 26 percent.<sup>27</sup> GDF Suez indicated that it had a market share of 59 percent in the big customer sector in 2008 (which it calls “grands comptes,” representing its 300 largest customers).<sup>28</sup>

The majority of gas infrastructure (transmission and distribution networks, storage sites, LNG terminals) in France is owned and operated by subsidiaries of GDF Suez. The company owns and operates 88 percent of the transmission network. The remaining 12 percent is operated by the French oil major Total, which took over, in 2004-2005, some of the historic gas companies in the South-West region of France. GrDF, GDF Suez’s distribution subsidiary, owns and operates 96 percent

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26. CRE (2009).

27. Shares according to CRE (2009). Clients directly supplied from the transport network account for 0.01 percent of delivery points, but 31 percent of consumption.

28. GDF Suez Document de référence 2008, p. 92.

of the gas distribution network. The remaining 4 percent is operated by small local distribution companies.<sup>29</sup> GDF Suez's subsidiary Storengy operates 13 of the 15 storage sites in France; another subsidiary, Elengy, operates the two French LNG terminals. GDF Suez also is by far the largest gas importer in France. In negotiations with the European Commission, however, GDF Suez accepted to gradually decrease its share of import capacity from 2010 onwards, reducing it to less than 50 percent by 2014 (see GDF Suez section for details).

### United Kingdom<sup>30</sup>

According to most observers, the United Kingdom has the most competitive electricity and gas market in Europe. The privatization and liberalization undertaken there in the late 1980s and 1990s has indeed served as an example and motivation for the European Commission to propose the EU-wide liberalization of the sector. The English and Welsh gas and electricity markets were the first in Europe to be liberalized in the early 1990s. Monopolies in gas (a national monopoly: British Gas), electricity generation (a national monopoly: the Central Electricity Generating Board, CEGB) and electricity supply (regional monopolies: the Regional Electricity Companies) were broken up – hence the British government took bold steps that were more radical than those undertaken in most other European countries. A series of mergers and acquisitions followed, with many assets changing owner several times.<sup>31</sup> Several foreign investors from the US and Europe entered the market, Whereas most US investors left the market again fairly soon,<sup>32</sup> five European utilities (EDF, E.ON, GDF Suez, Iberdrola, RWE) came to be major players in the British electricity and gas market.

29. Information as of 2007, [http://ec.europa.eu/energy/energy\\_policy/doc/factsheets/market/market\\_fr\\_en.pdf](http://ec.europa.eu/energy/energy_policy/doc/factsheets/market/market_fr_en.pdf).

30. For electricity and gas, one needs to distinguish the different constituent parts of the United Kingdom: for obvious geographical reasons, Northern Ireland forms a separate market from the rest of the UK. But even inside Great Britain, differences exist between England and Wales on the one hand, and Scotland on the other: energy liberalization was done in different ways and with different results there. But since 2005, Great Britain has a single electricity wholesale market, as market arrangements for England and Wales were extended to Scotland.

31. Green [2006] provides a good overview of these developments.

32. See Haar and Jones [2008] on this issue.

**Table 19. Electricity Generation Capacity and Net Generation in Great Britain**

Company	Generation capacity (2009, %)	Net generation (2007, TWh)	Net generation (2007, %)
EDF Energy*	18	27.2	7.6
Npower (RWE)	14	25.8	7.2
E.ON	11	41.2	11.5
SSE	10	41.1	11.5
Scottish Power (Iberdrola)	7	24.3	6.8
Centrica	6	15.4	4.3
GDF Suez	6	11.1	3.1
International Power	6	n.a.	n.a.
Drax	5	n.a.	n.a.
British Energy	–	62.1	17.4
Others	23	109.2	30.6
Total	100	357.4	100

\* Includes British Energy for generation capacity.

Sources: Ofgem (2009), p. 22 for generation capacity; EDF presentation 24 September 2008, E.ON Annual Report 2008, p. 96, and own calculations for net generation.

### ***The British Electricity Market***

The very fragmented British electricity generation market of the late 1990s has become more concentrated again: in 2007, there were six major producers that accounted for 62 percent of electricity generation (see table 19). Since then, the largest generator in Britain and operator of the British nuclear power plants, British Energy, has been acquired by EDF. This has led to further concentration, even if EDF divested 20 percent of British Energy to Centrica in 2009 and announced plans to divest further shares of British Energy. It is noteworthy that Scottish and Southern Energy (SSE) and Centrica are the only major electricity generators in Britain that are not owned by foreign companies (as of early 2010).

On the retail side, one must distinguish between the markets for domestic (household) and non-domestic customers. Six large companies – which are all major electricity generators – supplied 99 percent of domestic customers in 2008. The situation in the market for small, non-domestic customers is quite similar.

**Table 20. Market Shares in the British Electricity Retail Market (in %)**

Company	Domestic customers	Non-domestic consumers (consumption below 100 kW)	Non-domestic consumers (consumption between 100 kW and 1 MW)
British Energy	–	–	15
British Gas / Centrica	22	31	6
E.ON	18	15	11
EDF Energy	13	16	18
GDF Suez	–	–	6
RWE npower	15	11	18
Scottish Power (Iberdrola)	12	6	5
SSE	19	18	16
Others	0	2	5

N.B.: Domestic customers: as of June 2008 and by number of customer accounts.

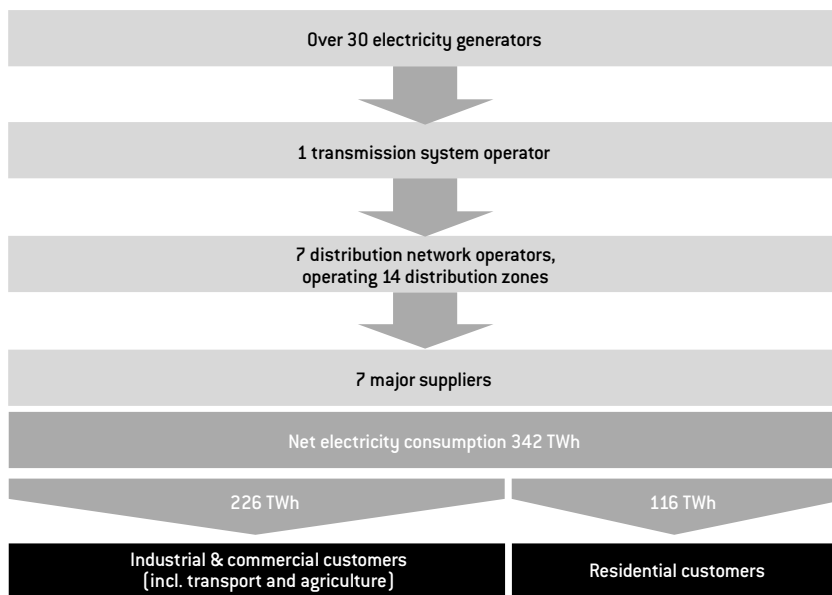
Non-domestic customers: as of November 2008 and by volume of supplied electricity.

Source: Ofgem (2009), p. 28-29.

The market for large non-domestic customers has a slightly different composition, but the major electricity generators also have important market shares. Thus, the retail market is modestly concentrated, but this is not seen as a problem for competition: the Office of the Gas and Electricity Markets (Ofgem) stated in 2009 that “the six largest suppliers are acting competitively and we have found no evidence of a cartel.”<sup>33</sup> It is however noteworthy that the retail market is less fragmented than the generation market, and that all major suppliers have important generation capacity. The six largest suppliers account for 54 percent of generation capacity. Conversely, not all generators are active in supply.

Electricity transmission and distribution networks in the UK are unbundled, but to varying degrees. The English and Welsh high-voltage transmission networks are ownership unbundled, as their owner and operator, the National Grid, has no generation, wholesale or retail activities. National Grid also

33. Ofgem (2009), p. 7.

**Graph 7. Structure of the UK Electricity Market (2007)**

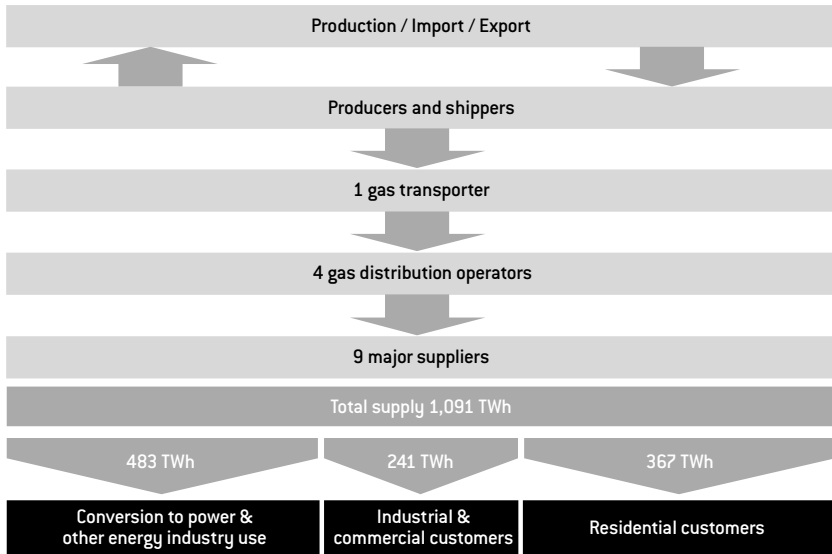
Source: RWE, *Facts & Figures*, May 2009, p. 120.

operates the Scottish transmission network, even if it does not own it (it is owned by SSE and Scottish Power). The situation for electricity distribution networks is different, as all large suppliers (with the exception of RWE npower and Centrica) have affiliates that own and operate distribution networks. There are 14 distribution zones in the UK, operated by 7 distribution network operators (DNOs). Only 2 DNOs have no generation and retail activities. EDF Energy, which owns and operates 3 distribution areas, announced its intention to divest its distribution networks in 2009.

### **The British Gas Market**

The former fully integrated monopoly in the British gas market, British Gas, was privatized in 1986 – four years earlier than the monopoly electricity generator. Starting in 1986, the British gas market has been gradually opened to competition. The privatized British Gas was demerged into two separate companies, BG plc and Centrica, in 1997. Centrica took over



**Graph 8. Structure of the UK Gas Market (2008)**

Source: RWE, *Facts & Figures*, May 2009, p. 141.

gas supply, services, retail business and some gas production assets, whereas BG plc took over the bulk of gas and oil exploration and extraction, and also the high pressure gas transmission system. The transmission system was demerged from BG plc three years later. It was then acquired by National Grid in 2002, which today owns and operates the British high-pressure gas transmission system. The company is also the largest of the four gas distribution network operators, owning and operating distribution networks in five areas. The three other gas DNOs are Wales & West Utilities, Northern Gas Networks and Scotia Gas Networks.

Unlike in many other European countries, there are several companies that bring natural gas to the British market. For domestic gas production, there are, for instance, five companies with a market share of more than 5 percent. Moreover, there are 16 shippers with primary capacity on the Interconnector pipeline for imports from Belgium, and 7 main shippers on the Langeled pipeline from Norway. Moreover, there is an increasing number of companies active in LNG import. According to the

**Table 21. Market Shares in the British Gas Retail Market (in %)**

Company	Domestic customers	Non-domestic consumers (non-daily metered)	Non-domestic consumers (daily metered*)
BP	–	–	3
British Gas / Centrica	44	21	7
Corona	–	12	1
E.ON	13	19	5
EDF Energy	7	2	–
Eni	–	–	9
Gazprom	–	4	1
GDF Suez	–	7	13
RWE npower	12	5	2
Scottish Power (Iberdrola)	9	1	–
Shell	–	5	15
SSE	15	5	–
Statoil	–	–	20
Total	–	17	17
Wingas	–	–	6
Others	0	2	0

\* Annual consumption greater than 58,600,000 kWh.

N.B.: Domestic customers: as of June 2008 and by number of customers.

Non-domestic customers: as of November 2008 and by volumes of gas supplied.

Source: Ofgem (2009), p. 52-53.

British regulator, it is very difficult to assess the market shares of gas producers and importers, but this market seems highly competitive.<sup>34</sup>

In gas retail, one needs again to distinguish between the domestic and non-domestic market. In the domestic market, the six major electricity suppliers are also the main gas suppliers, but with significantly different market shares: Centrica, the owner of the former monopoly and incumbent supplier British Gas, has a much higher share in gas than in electricity. The market structure in the non-domestic market is more fragmented, which is a sign for a high degree of competition (see table 21).

34. Ofgem [2008], p. 76.

## Italy

Since the 1960s, the Italian electricity and gas markets have been dominated by two state-owned companies: Enel for electricity and Eni for natural gas. Both companies have been partly privatized, but the state remains an important minority shareholder in both. Market liberalization has changed the picture, as Enel has entered the gas market and Eni has entered the electricity market. Moreover, other companies have increasing shares in both markets. However, Enel is still by far the largest company in the Italian electricity market and Eni dominates the Italian gas market. The largest competitor to the former monopolies is Edison, a company active in electricity and gas. It is controlled by EDF and A2A.<sup>35</sup> In distribution and sales to end-use customers, the Italian market is very fragmented with a high number of local companies active in both sectors.

### *The Italian Electricity Market*

Market liberalization has had more tangible results in the Italian electricity market than in the gas market so far. The “Bersani Decree” of 1999 opened up the electricity market and brought important structural changes: Enel had to divest 15 GW of production capacity which equaled around 25 percent of its capacity at that time. The electricity transmission network was also spun off to an independent TSO, Terna. In result, Enel is not the single dominating company of the Italian electricity market anymore. Its share of net electricity generation in 2008 amounted to 31 percent, while Edison’s market share was 12 percent. Eni was the third producer with 9 percent, followed by Edipower (in which Edison has a 50 percent stake) with 8 percent and E.ON with 7 percent. In line with this data, the share of the three largest generators has decreased from 71 percent in 2001 to 52 percent in 2008. When considering the Italian electricity generation market, it is important to note that electricity imports represented 12 percent of power requirements on the network in 2008.<sup>36</sup>

35. A2A is an Italian utility born out of the merger of two municipal electricity and gas companies, AEM of Milan and ASM Brescia at the end of 2007.

36. If no other source is indicated, all data in this chapter is taken from Autorità per l'energia elettrica e il gas [2008, 2009].

**Table 22. Structure of the Italian Electricity Retail Market (2008)**

Type of market	Volumes (TWh)	Volumes (%)	Withdrawal points (m)	Withdrawal points (%)
Protected-tariff service	89.3	31.5	32.4	91.0
Safeguard service	12.8	4.5	0.2	0.9
Liberalized market	181.4	64.0	2.9	8.1
Total	283.5	100	35.6	100

Source: Autorità per l'energia elettrica e il gas (2009), p. 39 and own calculations.

In electricity sales, there were three companies with a market share higher than 5 percent in 2008: Enel with 47 percent, Edison with 6 percent and AceaElectrabel with 6 percent. These market shares apply to the whole retail market, i.e. the free market and the regulated market. As in other countries, important differences in terms of market shares exist between the regulated and the free market. In 2008, 64 percent of electricity was supplied on the liberalized market and the trend towards a larger share of consumption served by the free market should continue. In terms of customer sites, however, the situation is different, as the vast majority of the numerous customers with small consumption (households and small business) is still under regulated tariffs. The full liberalization of the market took place on 1 July 2007. Since then, all customers including households can choose their supplier and switch to the free market. Changes of price types have been introduced the same day, with the introduction of the “protected-tariff service” for households and small companies and the provisional “safeguard service” for all customers that cannot access the protection segment and that are without a contract for electricity on the free market.

Enel is by far the dominant company in the regulated market for residential customers and small companies, with a market share of around 80 percent in terms of volumes in 2008. Enel was even more dominant in the provisional “safeguard service” market segment with a market share of 84 percent in 2008.

The degree of concentration of the free market is much lower than that of the regulated and “safeguard” market. Enel was also the largest company in this segment in 2008, but with

a much smaller market share of 27 percent. Other companies with market shares above 5 percent in 2007 (no information available for 2008) were Edison (11.5 percent), Eni (6.6 percent), Axpo (5.9 percent) and AceaElectrabel (5.3 percent). The combined market share of the three largest companies was 43.6 percent in 2008.

Enel is also by far the most important electricity distribution network operator: around 87 percent of distributed electricity went through its network in 2008. There were 130 other distribution network operators, but none of them had a market share of more than 5 percent. Electricity transmission networks are owned and operated by Terna, an independent company that was spun off from Enel in several steps in the early 2000s. It was IPO-ed in 2004; currently the state-owned Cassa Depositi e Prestiti (CDP SpA) is its main shareholder with 30 percent of shares. Enel has around 5 percent.

### ***The Italian Gas Market***

Italy's gas market is more concentrated than the country's electricity market, mostly due to the fact that public authorities have not taken the same bold structural measures as in electricity. As a result, the incumbent Eni enjoys a very dominant position in the Italian gas market. The differences between gas and electricity play an important role in this context, as politicians seem to give security of supply priority over competition. Indeed, Italy depends heavily on gas imports from Russia, Algeria and Libya. The country is the EU's third-largest gas consumer, consuming only slightly less gas than Germany: this is mostly due to the fact that more than 60 percent of Italy's electricity generation is gas-based.

The three leading companies Eni, Enel and Edison provided 85 percent of Italy's gas (i.e. produced or imported gas) in 2008. Their share of total gas demand (i.e. gas sold on wholesale and retail markets, including resales) was lower, with Eni having a market share of 36 percent, Enel 12 percent and Edison 9 percent. A2A had 7 percent and E.ON had 5 percent. The situation differs in each market segment, for example with a large number of small local suppliers for household customers.

**Table 23. Leading Gas Sellers in Italy by Market Segment (2008, in %)**

Market segment	Largest seller	Market share	Second-largest seller	Market share	Third-largest seller	Market share	Accumulated market share of three largest sellers
Electricity generators	Eni	42.5	Enel	29.8	Edison	8.7	81.0
Industry	Eni	46.5	Enel	11.8	Energie Investimenti	8.1	66.4
Trade and services	Eni	20.8	Energie Investimenti	10.4	Enel	10.1	41.3
Households	Eni	29.9	Enel	12.9	Hera	6.1	48.9

Source: Autorità per l'energia elettrica e il gas (2009), p. 70.

These small operators seem, however, to be unable to compete with larger companies for larger clients; electricity generators, for instance, are supplied mainly by the three large operators (see table 23).

The dominant position of Eni is closely linked to its control of the Italian gas transmission network. The TSO Snam Rete Gas – in which Eni has a controlling stake of 53 percent – owns and operates around 95 percent of the gas transmission network in Italy.<sup>37</sup> The Italian energy regulator has repeatedly called for ownership unbundling of Snam Rete Gas – but the Italian government opposes this measure.<sup>38</sup> The gas distribution segment is highly fragmented, with more than 300 distribution network operators (there were more than 800 ten years ago). Only seven companies have more than 500,000 customers, and 25 have between 100,000 and 500,000 customers in 2007. The 32 largest distribution companies, however, distribute 75 percent of the total gas volume. Eni is also the largest company in this market segment, with companies of the Eni group controlling around 27 percent of the distribution network as measured by volumes sold.

37. The Italian treasury has 5 percent of the shares and the remaining 42 percent are free floating. <http://www.snamretegas.it/en/media/PDF/factsEng.PDF>.

38. "Eni still pulls all the strings in Italian gas market," *Utility Week online*, 7 August 2009.

Based on Eni's control of the transmission network and import capacities, several institutions have accused Italy's incumbent gas company of impeding competition. For instance, an investigation conducted by the Italian National Competition Authority (Autorità garante della concorrenza e del mercato) found that Eni had abused its dominant position in the Italian gas market. The authority imposed its highest fine ever (€290m) on Eni in 2006 for blocking third-party access to a pipeline that carries gas from Algeria to Sicily, saying that the company interrupted the necessary capacity increases on the line.<sup>39</sup> The European Commission has also been investigating Eni since 2007, suspecting the company of "capacity hoarding," "capacity degradation" and "strategic underinvestment" in Eni's international transmission pipeline system.<sup>40</sup> The Italian regulator also notes in his report that the level of competition on the Italian gas market is not sufficient, underlining that the lack of infrastructure is one of the key problems.<sup>41</sup> The Italian Parliament has taken steps in order to improve competition, i.e. by limiting Eni's share of gas imports: Eni had 75 percent in 2002 and was obliged to decrease its share by 2 percent every year until 2010, finally reaching 61 percent). Moreover, a cap of 50 percent was imposed on Eni's sales to end-customers until 2010.<sup>42</sup> In order to respect these restrictions, Eni has started a gas release program, which, however, has seemingly not been an outright success. An extension of the import and sales restrictions until 2015 was under discussion in the Italian Parliament in 2009.<sup>43</sup> Eni points to these measures when replying to accusations – and underlines that it controls less than two-thirds of the Italian market, compared to E.ON Ruhrgas controlling 84 percent and GDF Suez controlling 89 percent of their respective home markets (according to Eni CEO Paolo Scaroni).<sup>44</sup>

39. "Eni set to appeal antitrust fine," *Financial Times*, 17 February 2006.

40. European Commission press release of 19 March 2009 [MEM0/09/120].

41. Autorità per l'energia elettrica e il gas (2008), p. 50.

42. "Les expériences de 'gas release' en Europe," CRE, 2004, <http://www.cre.fr>.

43. "Antitrust says gas caps needed, with flexibility," Reuters, 7 May 2009.

44. "Eni still pulls all the strings in Italian gas market," *Utility Week online*, 7 August 2009.

## Spain

In line with Spain's economic development, the country's energy use has sharply increased in recent years: gross electricity generation rose from 196 TWh in 1998 to 310 TWh in 2008 and gas consumption tripled in the same period to 39 bcm in 2008.<sup>45</sup> The Spanish electricity and gas markets are now the fifth-largest in the EU. Thanks to its growth, the Spanish market has attracted the interest of many foreign companies in recent years. German, French and Italian companies have sought to enter the market – with mixed results: Enel of Italy acquired Endesa after E.ON failed to do so in 2007/2008. Following an agreement with Enel and Endesa, the largest German utility, however, acquired some Spanish assets from Enel and Endesa, giving E.ON a solid position in the Spanish market. Other interested companies like EDF have not (yet) succeeded in entering the Spanish market (with the exception of Portugal's EDP, which now controls HidroCantábrico). E.ON's and EDF's failure to make large-scale acquisitions in Spain was clearly due to resistance by the Spanish government. After Endesa and Iberdrola grew bigger in the 1990s through mergers and acquisitions, further merger plans between Spanish utilities were brought forward in the last decade. The only bigger deal that finally took place was the acquisition of Unión Fenosa by Natural Gas in 2009. As a consequence, the Spanish electricity and gas sector is dominated by three companies: Endesa and Iberdrola are the leading electricity utilities which also have significant gas activities, and Gas Natural is the leading gas company which also has significant electricity activities.

### *The Spanish Electricity Market*

In electricity, Endesa and Iberdrola dominate all parts of the value chain except high-voltage transmission. The two companies had a market share of roughly 52 percent in Spanish electricity generation in 2008, with Endesa producing 28 percent and Iberdrola producing 24 percent. This represented a market share of around 41 percent in the Iberian market (Spain and

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45. BP [2009] for gas, BP website for electricity (<http://www.bp.com>).



Portugal taken together), with Endesa producing 22 percent and Iberdrola producing 19 percent.<sup>46</sup> Hence Endesa produced more electricity than Iberdrola in 2008 (88 TWh for Endesa, 68 TWh for Iberdrola), but Iberdrola has more installed capacity in Spain (Iberdrola 26 GW, Endesa 22 GW, of which 17 GW on the Spanish mainland). This is due to the fact that the energy mix of both companies is quite different. Endesa produced 87 percent of its electricity from thermal and nuclear sources in 2008, whereas these sources amounted to only 69 percent of Iberdrola's production: the company has a comparatively high share of renewable production (27 percent). The third-largest producer was Unión Fenosa with a market share of around 13 percent. Gas Natural produced 7 percent of Spanish electricity in 2008, HidroCantábrico (controlled by EDP of Portugal) produced 5 percent and Viesgo (controlled by E.ON) produced 3 percent. Other producers and electricity imports amount to 21 percent of Spanish electricity.<sup>47</sup>

Electricity supply in Spain is marked by the co-existence of regulated and liberalized prices. The gradual transition towards liberalized prices took another step on 1 July 2009, when regulated tariffs for consumers with a contracted capacity of more than 10 kW were abolished. This means that 1.3m of the 24m electricity consumers in Spain are now in the liberalized market. The remaining consumers can choose to switch to the liberalized market. In 2007, 7 percent of customers representing 27 percent of consumption were in the liberalized market. This share had been higher in the past, but some customers returned to regulated prices between 2005 and 2007, for the simple reason that regulated tariffs were lower than market prices. This reflects an important problem: as regulated tariffs are below production costs, there was an accumulated "tariff deficit" of €14bn at the end of 2008.<sup>48</sup>

Iberdrola and Endesa sold nearly the same amount of electricity in Spain in 2007, with Iberdrola being the leader in the regulated market and Endesa in the liberalized market (see

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46. Comisión del Mercado de Valores Mobiliarios et al. (2009), p. 24-25 and e-mail from Iberdrola representative to the author, 14 December 2009.

47. Comisión Nacional de Energía (2009), p. 32.

48. Comisión Nacional de Energía (2008c) and Enerpresse, 6 July 2009.

**Table 24. Market Shares on the Spanish Mainland Electricity Supply Market (by volume, 2007, in %)**

Company	Regulated market	Liberalized market	Total market
Iberdrola	42.2	33.7	39.9
Endesa	35.4	48.6	39.0
Unión Fenosa	15.4	13.0	14.8
HidroCantábrico	4.7	2.4	4.1
Viesgo	2.3	2.2	2.3
Others	0.0	0.0	0.0

Source: Comisión Nacional de Energía (2008a), p. 5 and own calculations.

table 24).<sup>49</sup> Unión Fenosa was the third most important seller with around 15 percent. It is notable that the electricity sales market is largely dominated by only three companies – this is a remarkably small number of companies. This situation is probably due to the persistence of regulated tariffs for 73 percent of consumption (in 2007).

Ownership of the Spanish high-voltage electricity transmission network is unbundled: it is owned and operated by Red Eléctrica de España (REE), which has no generation or supply activities. When the TSO company was created in 1985, it was the first company in the world dedicated exclusively to power transmission. The acquisition of transmission networks by REE happened in two steps, the 400 kV network being unbundled first, and the 220 kV network some years later. REE is a listed company with 80 percent of shares free-floating and 20 percent held by Sociedad Estatal de Participaciones Industriales (SEPI), a large industrial holding company owned by the Spanish state.

There are five main distribution companies in Spain, which also act as DSOs. They are part of the five main electricity groups Endesa, Iberdrola, Unión Fenosa, HidroCantábrico and Viesgo. Endesa and Iberdrola are the two largest companies, with Endesa also owning and operating the networks of the Spanish islands.

49. Data as presented in the 2008 Annual Reports of both companies is unfortunately difficult to compare due to inconsistencies.

**Map 3. Electricity Distribution Areas in Spain**

Source: Comisión Nacional de Energía (2008c), p. 54

The Spanish electricity market has been integrated with the Portuguese market since July 2007 in the Iberian Electricity Market (MIBEL). This is the second regional electricity market integration in the EU after NordPool. In 2007, there was still a notable price differential in the integrated market, as the weighted average base-load price in the spot market was €64/MWh in Spain and €70/MWh in Portugal. This difference was due to restrictions in interconnection capacity. Since 2007, price levels have sharply decreased due to the economic slowdown and falling energy prices, and they have also come closer in both parts of the MIBEL market. In the longer run, the market integration will increase competition in both countries. This could especially apply to Portugal, where EDP is still by far the dominant player with market shares of around 65 percent in generation and 95 percent in supply.

Table 25. Market Shares in the Different Segments of the Spanish Gas Market (2008, in %)

Company	Gas trading activities				Gas infrastructure activities		
	Share of available gas (imports)	Share of traded gas in the Spanish OTC market	Retailing market share	Distribution system share of total Spanish grid	Transmission system share of total Spanish grid	LNG regasification share of total Spanish LNG terminals	
Gas Natural	41.86	13.4	45.53	86	6	4	
Iberdrola	12.53	12.2	12.79	-	-	10	
Unión Fenosa	11.95	15.0	12.36	-	-	16	
Endesa	8.35	10.8	9.24	9	3	8	
Naturgas	4.34	9.0	5.41	5	2	4	
Cepsa	4.79	12.3	4.33	-	-	4	
Shell	3.42	7.9	3.19	-	-	-	
GDF Suez	2.59	3.8	2.30	-	-	-	
BBE	2.65	3.4	2.10	-	-	-	
BP	1.82	4.0	1.09	-	-	-	
E.ON	1.39	-	0.86	-	-	-	
GALP	0.25	-	0.28	-	-	-	
Sonatrach	0.77	-	0.27	-	-	-	
Others	0.04	-	0.24	-	-	-	
Enagás*	3.26	-	-	-	89	50	

\* After July 2008, Enagás is no longer allowed to import gas in Spain.

Source: Comisión Nacional de Energía (2009), p. 99.

## ***The Spanish Gas Market***

The size of the Spanish gas market has increased sharply in recent years. Spain is in a unique situation when compared to other European countries, as the majority of its gas imports come from LNG. In 2008, for instance, 29 bcm (or 73 percent of total imports) arrived by LNG, and 11 bcm arrived by pipeline.<sup>50</sup> No other EU Member State has such a high share of LNG in its imports. In 2008, the industrial sector represented 44 percent of consumption, electricity generation represented 42 percent, and domestic and commercial consumers represented 13 percent.

Gas Natural is the incumbent gas company in Spain, with a market share of 42 percent in gas imports in 2008. In 2007, Gas Natural's share was still at 52 percent. Iberdrola, Unión Fenosa and Endesa were other important importers with market shares between 8 and 13 percent.

Gas Natural acquired Unión Fenosa in 2009, but it was forced to guarantee that it would not control Unión Fenosa Gas (UFG), the gas branch of Unión Fenosa. Gas Natural now has a 50 percent stake in UFG; Eni holds the remaining 50 percent (since 2002). It remains to be seen if this change in ownership of UFG will have an influence on competition in the Spanish gas market – the company had indeed become one of the most important competitors of Gas Natural. As the following graph shows, the development of the Spanish gas market since 2001 has been marked by a clear trend towards more competition: the market share of the incumbent (Gas Natural) has decreased from roughly 80 percent to around 50 percent (in terms of volumes sold).

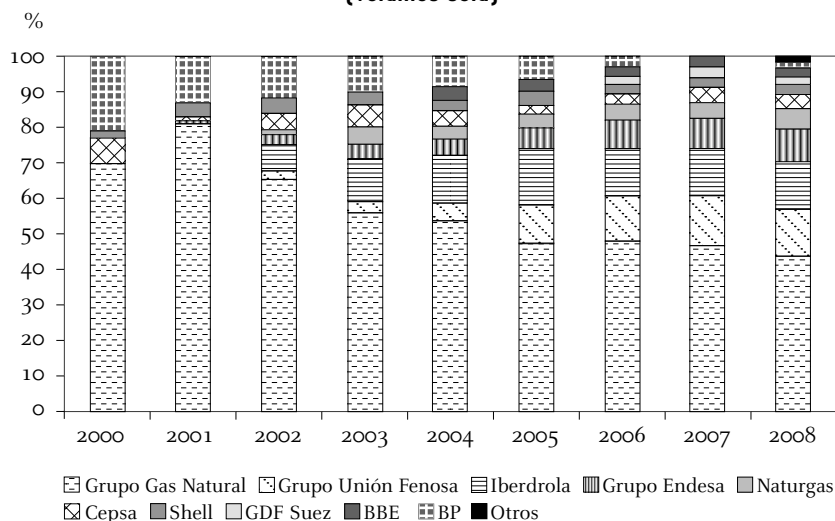
In the view of the European Commission, a gas release program (started in 2001) enabled competition in the Spanish gas market, where competition has been intense in the industrial segment of the market.<sup>51</sup> Whereas the regulated tariff prevails in the electricity market, the vast majority of Spanish gas consumption is in the liberalized market (96 percent of total consumption in 2008). Competition is quite naturally much more intense in this sector of the market: Gas Natural

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50. According to BP [2009].

51. [http://ec.europa.eu/energy/energy\\_policy/doc/factsheets/market/market\\_es\\_en.pdf](http://ec.europa.eu/energy/energy_policy/doc/factsheets/market/market_es_en.pdf).

**Graph 9. Market Shares in the Spanish Gas Retail Market 2000-2008  
(volumes sold)**



Source: Comisión Nacional de Energía (2009), p. 97.

**Table 26. Spanish Gas Retail Market: Market Shares in Terms of Volume (2007, in %)**

Company	Liberalized market	Regulated market
Gas Natural	43.7	81.7
Unión Fenosa Gas	12.9	0.1
Iberdrola	13.4	–
Endesa	9.2	10.1
Naturgas	5.3	7.9
Cepsa	4.5	–
Shell	3.3	–
GDF Suez	2.4	–
BBE	2.2	–
Others	2.8	0.1

Source: Comisión Nacional de Energía (2009), p. 94.

had a market share of 46.5 percent in 2007 and five other companies had market shares of at least 4 percent. The situation in the regulated gas market is different: Gas Natural had a share of 82.4 percent there in 2007, with only two other companies having a notable presence there (see table 26). In terms of

customers, 60 percent were in the regulated market, but they only represented 11.5 percent of consumption.

The largest part of the Spanish gas transmission system is ownership unbundled: the independent TSO Enagás<sup>52</sup> owned and operated 89 percent of the transmission network in 2007. Three suppliers controlled the remaining parts. The situation for distribution networks is different, where the incumbent supplier Gas Natural owns and operates 86 percent of the network. However, in 2009 Gas Natural agreed to sell parts of the distribution network as a condition for acquiring 50 percent in Unión Fenosa Gas. Two other suppliers, Endesa and Naturgas, control the remaining parts of the network. The control of LNG terminals is another crucial issue, given the high share of LNG in the Spanish market. The TSO Enagás owns and operates the three largest Spanish LNG terminals and currently controls around two-thirds of Spanish LNG import capacity.<sup>53</sup> The remaining capacity is owned by suppliers.

## Nordic

The Nordic electricity market – consisting of Denmark, Finland, Norway and Sweden – was the first in Europe to be integrated regionally. It has a common power exchange (NordPool) and most of the region works as one synchronized zone (ENSTO-E's [European Network of Transmission System Operators for Electricity] regional group Nordic – former Nordel). The only exception is “Denmark West,” i.e. the Danish mainland, which is part of ENSTO-E's regional group Continental Europe (former Union for the Co-ordination of Transmission of Electricity [UCTE]). Iceland is also part of ENSTO-E's regional group Nordic, but not interconnected. The region is seen as one of the most competitive electricity markets in Europe, mainly thanks to its regional integration which leads to a lower level of market concentration when compared to the rest of

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52. Enagás was set-up as a state-owned company in 1972. It was sold to Gas Natural in 1994, but then IPO-ed in 2002. Today, it is a listed company with 70 percent of shares free floating. The Spanish hydrocarbon law imposes a 5 percent maximum limit on shareholdings and a 3 percent limit on the exercise of voting rights. Moreover, voting rights of entities involved in the gas sector are limited to 1 percent. Currently, six shareholders have 5 percent each: Sagane Inversiones, CIC Cajastur, Banca Inversiones, Kartera 1 (BBK), SEPI, Oman Oil Holdings Spain.

53. Based on data from Gas Infrastructure Europe, November 2009, <http://www.gie.eu.com>.

**Table 27. Electricity Generation and Consumption in the Nordic Region (2008, in TWh)**

	Denmark	Finland	Iceland	Norway	Sweden	NORDEL
Electricity generation	34.6	74.1	16.5	142.7	146.0	414.0
Electricity consumption	36.1	87.0	16.6	128.9	144.1	412.7

Source: Nordel (2009a).

Europe. Sweden and Norway are the largest electricity markets in the region. The gas markets of the four countries are relatively small and underdeveloped. This is surprising at least at first view, given the important level of gas production in Norway and Denmark. On the other hand, the sparse population density of large areas of the region is an obvious impediment to the development of gas markets.<sup>54</sup>

### ***The Nordic Electricity Market***

Taking into account their small populations, the Nordic countries have surprisingly large electricity markets (see table 27). Their high electricity consumption per capita can be explained by climatic reasons and industry structure. In 2008, industry accounted for 47 percent of electricity consumption in the Nordic region, housing accounted for 28 percent housing, and trade and services accounted for 22 percent.

Electricity generation is dominated by hydropower, which accounts for 58 percent (see table 28). The differences in energy mix between the four interconnected countries have been a good reason and motivation to integrate the electricity markets. Complementarity is indeed a major advantage of the region, as it allows balancing fluctuations in renewables production due to meteorological factors (less hydropower production in a dry year, less wind production when the wind is not blowing etc.).

54. If not indicated otherwise, information in this chapter is taken from Danish Energy Regulatory Authority (2008), Energy Market Authority of Finland (2008), Norwegian Water Resources and Energy Directorate (2008), and Swedish Energy Markets Inspectorate (2008), as well as Nordel (2009a) and Nordel (2009b).



**Table 28. Energy Mix in Nordic Electricity Generation (2008, in %)**

	Denmark	Finland	Iceland	Norway	Sweden	NORDEL
Hydropower	0	23	75	98	47	58
Nuclear power	–	30	–	–	42	20
Coal / gas / biomass	80	47	0	1	10	19
Wind power	20	0	–	1	1	3
Geothermal power	–	–	25	–	–	–

Source: Based on Nordel (2009a), p. 7.

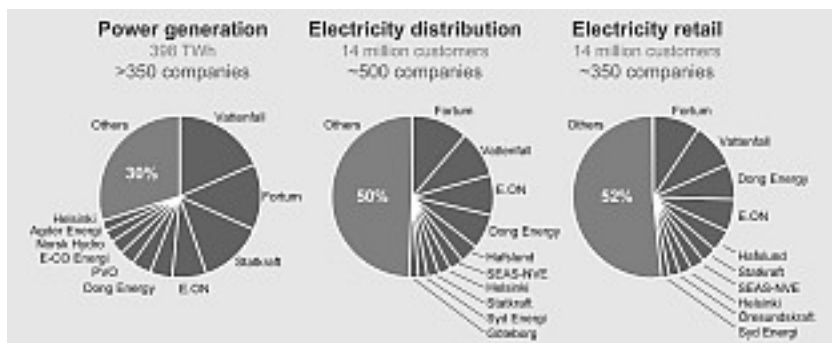
**Table 29. Nordic Electricity Market  
(percentage of hours with identical prices in 2007)**

Areas with a common price	% of hours
Sweden, Finland	95
Sweden, Finland, South Norway, Central Norway, East Denmark	65
Sweden, Finland, South Norway, Central Norway, North Norway, East Denmark	38
Sweden, Finland, South Norway, Central Norway, North Norway, East Denmark, West Denmark	28

Source: Swedish Energy Markets Inspectorate (2008), p. 18.

Determining the relevant market is crucial for the evaluation of the market position of every electricity company. Hence the reality of market integration is important. In the case of the Nordic market, most observers tend to use the region as the relevant market, but this assumption can be questioned when we take into account the price differentials that exist in the Nordic region. There are transmission limitations inside region, and therefore eight electricity spot areas exist inside NordPool. In case of congestion, market splitting between the different areas is used: transmission limitations are solved by price signals, whereby the price in a shortfall area will be higher than the price in a surplus area. In 2008, the period of identical prices in all eight areas was exceptionally low, at only 7 percent (it was at 28 percent in 2007, and 33 percent in 2006). Inside the area, some parts are better integrated than others and hence have a higher proportion of hours with the same price (for example, Sweden and Finland, see table). In the case of

**Graph 10. Market Shares in the Nordic Electricity Market**



Source: Fortum presentation September 2009.

Denmark, there is not even an interconnection between West and East – the first cable linking the two parts of the Danish system is currently under construction.

At a regional level, the Nordic electricity market is fairly fragmented. In generation, the five largest companies – Vattenfall, Fortum, Statkraft, E.ON and DONG – account for around 60 percent of the market. Around 350 companies account for the remaining generation. In retail and distribution, the market is even more fragmented, as the five largest companies have only 30 percent in each segment (see graph 10). It is interesting to note that E.ON is the only company from outside the region that has a significant share of the market. The companies from the region often have assets in neighboring countries (i.e. Vattenfall in Finland or Fortum in Sweden).

Quite logically, the respective national markets are more concentrated than the regional market – but still rather less concentrated than other national markets in the EU. In all countries, the state-controlled incumbent<sup>55</sup> is the largest producer. The retail markets are much more fragmented with many municipal companies serving local customers. In Sweden, the three largest electricity generators – Vattenfall (45 percent), E.ON (20 percent) and Fortum (19 percent) – accounted for

55. Statkraft and Vattenfall are 100 percent state-owned, DONG at 73 percent, Fortum at 51 percent.

**Table 30. Natural Gas Consumption in the Nordic Region (2008)**

Country	Consumption in bcm
Denmark	4.6
Norway	4.4
Finland	4.0
Sweden	1.0

Source: BP (2009).

84 percent of generation in 2008. The retail market is more fragmented, with Vattenfall having around 30 percent, E.ON having 12 percent and Fortum having 8 percent in 2007. In Norway, Statkraft produces 35 percent of electricity and has a market share of 25 percent in retail. In Finland, Fortum produces around 30 percent of electricity and has 12 percent of retail. The second-largest producer PVO has a market share of 20 percent in electricity generation. The Danish electricity sector is highly concentrated, as DONG produces 50 percent of electricity in Denmark and has a share of 35 percent in distribution. The second-largest company, Vattenfall, produces 20 percent of Danish electricity.

In all Nordic countries but Finland, the TSO is ownership unbundled and state-owned. The Finnish TSO Fingrid is not fully ownership unbundled, as two generating companies, Fortum and Pohjolan Voima Oy, each own 25 percent of the shares.<sup>56</sup> Distribution networks in the Nordic countries are mostly owned and operated by small or medium-sized local distributors, which are municipal companies in many cases.

### **The Nordic Gas Market**

Even if Norway and Denmark are important gas producers with a production of 99 bcm and 10 bcm respectively in 2008,<sup>57</sup> the Nordic gas markets are relatively small when compared to population and GDP. Only in Denmark and Finland is

56. The other owners of Fingrid are the State of Finland (12 percent) and insurance companies (38 percent).

57. BP [2009].

natural gas an important fuel for electricity generation (around 21 and 15 percent of total electricity production respectively in 2006).<sup>58</sup>

The Danish gas market is highly concentrated with three companies – DONG, HNG/MN, and Statoil Gazelle – controlling around 95 percent of the total amount of gas available in the wholesale market. DONG alone controls 85 percent of the gas from the Danish part of the North Sea. The retail market is also dominated by DONG, which provides 44 percent of gas sold to end-customers. There is one TSO in Denmark responsible for gas and electricity (Energinet.dk) and there are five distribution companies, with DONG being the largest of them. The other distribution companies are owned by municipalities.

The Norwegian downstream gas market is relatively small. There is only one gas-fired power plant in Norway, and only a few industrial customers use natural gas. The main use is for petrochemical feedstocks.

The natural gas market in Finland is isolated and small, as all gas is imported from Russia. One company, Gasum, acts as the sole importer and wholesale supplier in Finland.<sup>59</sup> As one pipeline from Russia is the only supply option, Finland is exempted from the EU's gas directives. Gasum also owns and operates the transmission network. Energy and power companies, which use natural gas to co-generate heat and power, account for over 50 percent of Finnish gas consumption. Pulp and paper companies account for over 30 percent. Only a small secondary gas market with some limited trading exists. Retail supply of gas is undertaken by around 30 companies having designated distribution areas; they also operate the distribution networks.

The very small Swedish gas market is dominated by the only two importers, DONG and E.ON. E.ON is also the dominant player in retail, accounting for around half of gas sold. Five other companies market gas to around 55,000 natural gas users (of whom around 2,600 are business users).

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58. <http://www.iea.org>.

59. Gasum is owned by Fortum (31 percent), Gazprom (25 percent), the Finnish Government (24 percent) and E.ON Ruhrgas (20 percent).

## Belgium and the Netherlands

The Netherlands and Belgium are important energy markets in Northwestern Europe, respectively being the EU's eight- and ninth-largest electricity, and sixth- and seventh-largest gas markets, in terms of consumption. The electricity markets of both countries are reasonably well interconnected in the trilateral market-coupling with France (see paragraph on French electricity market). Gas markets are also fairly integrated, with the Netherlands being an important gas source for Belgium.

### *The Belgian and Dutch Electricity Markets*

The Dutch energy market is of course marked by the country's significant gas production. As a result, natural gas accounts for a large part of the country's energy mix. For instance, gas is used for around 60 percent of Dutch electricity production. However, the Netherlands is not self-sufficient in electricity: the country imported 16 percent of the electricity it consumed in 2007. In general terms, the Dutch electricity market is one of the few competitive markets in the EU: the European Commission stated in 2007 that the Dutch electricity market "is functioning well."<sup>60</sup> The Dutch regulator does not publish market shares for single companies, which makes statements about market shares more difficult.

There are seven large, and eighteen small, electricity producers in the Netherlands, with the four largest generators controlling three-quarters of the capacity.<sup>61</sup> The four largest producers are Essent (acquired by RWE in 2009) with 23 percent of installed capacity, Electrabel (GDF Suez) with 20 percent, Nuon (acquired by Vattenfall in 2009) with 18-20 percent and E.ON with 10 percent. As for net generation, Electrabel is the largest producer.<sup>62</sup> Essent and Nuon are also large electricity suppliers, whereas Electrabel and E.ON are mainly active in the wholesale market. According to press reports, Electrabel and E.ON are interested in the acquisition of Oxxio, which is

60. [http://ec.europa.eu/energy/energy\\_policy/doc/factsheets/market/market\\_nl\\_en.pdf](http://ec.europa.eu/energy/energy_policy/doc/factsheets/market/market_nl_en.pdf).

61. Energiekamer [2009], p. 12.

62. GDF Suez Document de référence 2008, p. 62.

the fourth-largest electricity and gas supplier in the Netherlands: this would allow Electrabel or E.ON to match their generation assets with a much larger portfolio of clients.

For electricity retail, the Dutch regulator only publishes data for the residential market. In this market, the three largest companies had 80 percent of the market at the end of 2008, and only one other company has a market share above 5 percent. According to information published by RWE, Nuon has a market share of 30 percent, Essent has 26 percent, Eneco (owned by 61 Dutch municipalities) has 24 percent, Oxxio (owned by Centrica) has 5 percent and other companies share the remaining 15 percent.<sup>63</sup>

There is one state-owned unbundled electricity TSO in the Netherlands, TenneT. In distribution, there are eight regional DSOs. TenneT is currently taking over the 110 kV and 150kV networks from regional DSOs. A recent law requires DSOs to be ownership unbundled before 2011.

The Belgian energy market has traditionally been concentrated, with the incumbent Electrabel and its main shareholder Suez being the dominant players in electricity and gas. Several developments in recent years have brought some changes to the Belgian market, but real competition is still only emerging: since the merger between GDF and Suez, Electrabel is now part of GDF Suez (in which the French government is the single largest shareholder). Electrabel was obliged to cease its operational activities in the electricity transmission network in 2005, but has kept a minority participation in Elia, the electricity TSO. GDF Suez, however, announced in March 2010 to divest this participation.

In electricity generation, Electrabel had a market share of around 86 percent in 2008. But this share is expected to decrease to around 65 percent in 2010, as Electrabel agreed on an asset swap with E.ON, which will become the third-largest producer with a market share of 10-15 percent. The second-largest Belgian producer, SPE, has a market share of around 13 percent. The European Commission has allowed EDF to acquire a 51 percent majority shareholding in SPE in November 2009. This deal had

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63. RWE, *Facts & Figures*, May 2009, p. 18.

been opposed – in vain – by Belgian competition authorities and the Belgian regulator, as they were worried by the fact that the French government, already the single biggest shareholder in Electrabel, controls EDF. All other producers have a market share below 5 percent.

In electricity supply, Electrabel is also the largest company by far, with a market share of around 73 percent in 2008. SPE is the second-largest supplier with around 12 percent of the market. The Dutch companies Nuon and Essent are the most successful new entrants with 3 and 2 percent respectively. E.ON also had 2 percent.<sup>64</sup> Interestingly, Electrabel had a higher market share – 84 percent – in the big industrial customers segment (customers connected to the network at more than 70 kV) than in electricity supply via the distribution network, where it had 70 percent in 2008.<sup>65</sup>

### ***The Belgian and Dutch Gas Markets***

The Dutch gas market is less competitive than the electricity market: the Dutch regulator said that “the various parts of the Dutch [gas] wholesale market are without exception highly concentrated.”<sup>66</sup> This is particularly true for the low-calorific part of the gas market. The number of players in the wholesale market has considerably increased in recent years, but the incumbent wholesaler GasTerra still controls more than 80 percent of the available gas. In the small consumers market, there are, according to the regulator, three large suppliers with a combined market share of 77 percent at the end of 2008 – the same companies that also dominate electricity supply. Like in electricity, they have more or less comparable market shares between 24 and 28 percent.

Like in electricity, there is one state-owned gas TSO, Gas Transport Services (GTS), which is a subsidiary of the state-owned Gasunie. There are 11 gas DSOs, which are all owned by municipalities and provinces. Only four of them have more than 100,000 customers.

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64. CREG et al. [2009], p. 8.

65. CREG et al. [2009], p. 9 and CREG Rapport Annuel 2008, p. 51.

66. Energiekamer [2008], p. 34.

In Belgium, there is not one clearly dominant company in gas supply. In overall gas sales, Distrigas (acquired by Eni following the GDF-Suez merger) has around 39 percent, Electrabel has 30 percent, SPE has 11 percent, GDF Suez has 7 percent (which can be added to Electrabel's share) and Wingas has 7 percent. There is a marked difference between the wholesale market and gas supplies via the distribution network. For the latter, which account for around 46 percent of total sales, Electrabel has a market share of 64 percent, SPE has 15 percent and Distrigas has 7 percent. In the wholesale market, Distrigas is the largest player with a market share of 72 percent in 2008. GDF Suez is the second-largest company in this market with 13 percent.<sup>67</sup>

## Central and Eastern Europe

The energy markets of Central and Eastern European countries constitute a special case inside the EU. The legacies of communist times can still be seen there, as these ten countries have – to varying degrees – a lower level of economic development than the EU average, and accordingly a lower energy consumption per capita (see table 31).<sup>68</sup> Moreover, as they joined the EU in 2004 and 2007, some of the liberalization directives were introduced later, as some of the new Member States were granted exemptions. The energy situation of every Central and Eastern European country is different, in terms of national resources, market organization and company structure. However, all of them undertook a major restructuring of their energy sectors after the end of communism, which included privatization programs of varying degrees. Privatization started in the mid-1990s, with Hungary being the front-runner. In some countries, the energy sector is now completely privatized; in others, privatization has been slow and partial. In general, distribution companies have been privatized first, and many new entrants started with sales operations. Electricity generation and gas import companies have been privatized at a slower pace, as they are generally regarded as strategically

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67. CREG et al. (2009).

68. Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia joined the EU in 2004, Bulgaria and Romania in 2007.



**Table 31. Size of Electricity and Gas Markets in Central and Eastern Europe (2007/2008, by electricity consumption)**

Country	Electricity production (TWh)	Electricity consumption (TWh)	Gas consumption (bcm)
Poland	139.7	138.4	13.9
Czech Republic	77.1	65.6	8.7
Hungary	37.0	40.9	12.0
Romania	56.1	40.2	14.5
Slovakia	27.2	26.8	5.7
Bulgaria	41.4	26.2	3.3
Slovenia	14.1	13.2	n.a.
Lithuania	12.5	8.1	3.2
Estonia	10.9	6.6	n.a.
Latvia	4.6	6.4	n.a.

Sources: IEA (2009) for Poland, Czech Republic, Hungary, Slovakia (2008 data) and <http://www.enercee.net> for other countries (2007 data) for electricity; BP (2009) for gas (2008 data).

more important. In all cases, foreign companies, mainly from the EU-15, have been major investors – especially German (E.ON, RWE), French (EDF, GDF Suez) and Italian (Enel) companies.<sup>69</sup> The case of the partly state-owned Czech electricity incumbent, CEZ, is particularly interesting, as it is the only of the region's companies that also has important assets in other Central and Eastern European countries (Poland, Romania and Bulgaria). Thanks to its production assets in the Czech Republic and abroad, CEZ is the only company coming from the region that ranks among the 20 largest power producers in the EU.

Even if energy consumption per capita is lower than the EU average, energy intensity is higher: the Central and Eastern European countries generally need more energy to produce one unit of GDP. Hence the potential to improve energy intensity is high at the level of end-use consumers, but also concerning transmission and distribution losses. In some of the region's countries, energy poverty remains an important social problem

69. See LaBelle (2009) on this issue.

– governments therefore tend to keep (regulated) energy prices low, as the social system is not yet developed enough to provide targeted help everywhere. Of course, this does not make it easier for new companies to enter the market, nor does it help to increase competition. In many cases, foreign investors have complained about end-user prices that do not cover production costs.<sup>70</sup> In the longer term, this could lead to important problems, as companies will not invest sufficiently in new electricity and gas infrastructure.

There are significant differences between the ten Central and Eastern European Member States in terms of market structure. In the Czech Republic, Estonia, Latvia and Slovakia, electricity generation is very much dominated by the incumbent company, which has between 80 and 100 percent of production capacity. The structure is more fragmented in other countries, but the state often remains the main shareholder in the different electricity generation companies. For example, this is the case of Romania, where different companies exist for thermal, hydro and nuclear production – all of them are controlled by the government.<sup>71</sup> Slovakia and Hungary are exceptions, as foreign companies – Enel in Slovakia and GDF Suez and Alpiq of Switzerland in Hungary – are major power producers there. The Polish generation market, by far the largest in the region, is particularly fragmented. Around 80 percent of generation capacity is still controlled by the state, as privatization has been on the agenda for many years, but only a few generation companies have so far been privatized.

Throughout the region, Romania, Poland and Hungary have the largest gas markets (in terms of consumption). But the whole region consumes only around 65 bcm per year, which is significantly less than the yearly gas consumption of Italy alone. Most Central and Eastern European gas markets are very concentrated with the incumbent company dominating the market with market shares of more than 80 or 90 percent.

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70. To give just two examples: foreign investors in the Polish electricity sector complained about the uneconomically low level of regulated electricity prices in 2009 [see for example Enerpresse, 20 November 2009]. In Hungary, E.ON received payments from the government to compensate for the low level of retail prices in natural gas [see for example E.ON Confirms Compensation Deal With Hungary Government, Dow Jones, 10 June 2009].

71. On electricity reform and privatization in Romania, see Diaconu et al. (2009).

Hungary is the only country with four large suppliers, but there is no real competition because of the predominance of regulated prices. Foreign investors – from Western Europe, but also Gazprom – have entered the gas markets in several countries.

Romania is in a unique situation, as the country is a major gas producer, albeit production is declining. Romgaz (state-owned) and Petrom (controlled by OMV) are the major gas producers. They are also active in storage and trading. The two major distribution companies, Distrigas Sud and Distrigas Nord, are owned by GDF Suez and E.ON Ruhrgas respectively. Two trading companies are in charge of gas imports, WIEE (a joint-venture between Wintershall and Gazprom) and Wirom (a joint-venture between WIEE and GDF Suez).

In the Czech Republic, RWE is by far the largest gas company. It has acquired the TSO Transgas and has shares in six of the eight distribution companies, giving it a market share of around 80 percent in the retail market. RWE is also the sole gas importer in that country. In Slovakia, E.ON Ruhrgas and GDF Suez jointly own 49 percent of the national gas company SPP, which enjoys a near-monopoly position. In the Baltic states, E.ON Ruhrgas and Gazprom are major shareholders in the respective national gas companies. Only in Poland, is the national incumbent, PGNiG, which has a near-monopoly market position in all market segments, still state-owned at 100 percent.

## Conclusions

This study focused on the evolution of major European utilities since the 1990s, when the liberalization of the European electricity and gas markets started. Our case studies of the seven largest utilities in 2009 – E.ON, GDF Suez, EDF, Enel, RWE, Iberdrola and Vattenfall – have analyzed the significant changes that these companies have gone through in the last fifteen years. They have adapted their strategies to the new market environment in different ways, often consistent with their companies' and countries' economic traditions and cultures. All of them entered foreign markets in other European countries, but only a few of them have important assets outside the EU. They have become European players with some of them having assets in nearly all Member States of the EU: this very fact has a huge impact for the EU's energy policy.<sup>1</sup> The EU's electricity and gas companies, which were strictly national companies less than twenty years ago, have been Europeanized in a short amount of time.

The companies analyzed in this book all diversified their business activities, especially by using the synergies between electricity and gas. Some utilities have entered other business sectors like water, waste or telecommunications, but this “multi-utility” strategy has not been successful: nearly all these activities have been sold again, sometimes after only a very short period. It is also notable that several energy utilities spun off participations they had had for many years in non-energy sectors. In particular, this was the case for the two largest German utilities

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1. See maps in annex for an illustration of their presence throughout the EU.

E.ON and RWE. In short, the capacity of these companies to adapt to new market conditions and to benefit from new opportunities has been truly impressive.

The capacity to adapt is especially true when it comes to embracing competition. Less than twenty years ago, there was strictly no competition between utilities in Europe, and all utilities enjoyed a monopoly position in their national or sub-national market. Since then, it has become possible to enter the others' market and the big groups have largely used this opportunity. They indeed started to compete against each other. The competition case involving GDF and Ruhrgas is a good illustration of this: in 1975 both companies agreed not to enter the market of the other when they built the MEGAL pipeline. The European Commission fined both companies in 2009, as the Commission believed that they had continued market-sharing after the beginning of market liberalization in 1999. But the two companies have changed their business models since the mid-2000s, giving up their previous market-sharing agreement and literally becoming the most successful new foreign entrant into the other's market. Their case illustrates that the EU's large utilities do compete against each other in some countries and market segments.

### *The emergence of "seven brothers"*

The numerous mergers and acquisitions in the last fifteen years have led to a limited number of big companies. It is not easy to classify the largest companies, and our choice of taking overall sales as the criterion is certainly just one possibility. In any case, a small group of five to ten utilities currently dominates the electricity and gas markets in the EU. There are some good reasons to concentrate on the seven biggest utilities; some have called them the "seven brothers" of European utilities, in a reference to the "seven sisters" of oil majors.<sup>2</sup> But in the current situation, there is a pronounced difference between the first five companies (E.ON, GDF Suez, EDF, Enel, RWE) and the two smallest of the "Big-7," Vattenfall and Iberdrola. The two latter utilities are between the five largest and the

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2. For example, Thomas (2009).

numerous other smaller companies active in the sector. It is noticeable that, of the five largest companies, two are German and two are French. Not surprisingly, the fifth of the “Big-5” also comes from a large EU country, Italy.

*No British among the Seven, but two German and two French*

But none of the seven largest utility groups is headquartered in the third-largest economy of the EU, the United Kingdom: the privatization of the British energy sector has led to a situation where most of the UK’s major utilities are owned by foreign companies. In a way, the British energy sector is thereby more Europeanized than the German or the French energy sector: an interesting conclusion, given the UK’s “half-in, half-out” position in the EU in general. The British case shows that the often heated debates about foreign ownership of big utilities are out of touch with today’s market realities. It is indeed surprising to see that many actors still defend the concept of “national champions” and argue that they should be protected against foreign takeovers. The largest utilities are indeed less and less “German,” “French” or “Italian:” in the case of E.ON, only one-third of the shareholders are German, 60 percent of the workforce is employed outside Germany and the company sells more electricity outside Germany than inside the country. On the other hand – and this is an important caveat – ownership is less international for most other companies, especially those in which a national government has an important stake (EDF, GDF Suez, Enel, Vattenfall). Some of the national governments are tempted to use “their” companies for political goals, often to the frustration of company management, which would pursue a European strategy based on profit-maximization.

Last, but not least, it is interesting to note that the large majority of management and supervisory board members are still nationals of the utility’s home country. In December 2009, none of the seven largest utilities had a “foreign” CEO.<sup>3</sup> The nationality of management board members was as follows: EDF: 13 French, 1 Italian, 1 German; Enel: 8 Italians; E.ON: 5 Germans;

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3. Vattenfall has named a Norwegian (Øystein Løseth) to become the company’s first foreign CEO in 2010. RWE had a Dutch CEO (Harry Roels) from 2003 to 2007.

GDF Suez: 4 French, 2 Belgians; Iberdrola: 6 Spanish; RWE: 6 Germans; Vattenfall: 5 Swedish, 2 Norwegians, 2 Germans, 1 Finnish, 1 Dutch. Thus, the degree of Europeanization is surprisingly low if one looks at major utilities from the boardroom perspective. But we also need to note that senior management of utilities with assets in many EU countries now sees the market through multiple national lenses. Thereby, senior managers broaden (i.e. Europeanize) their view and it is only logical that they have become more favorable to EU-wide market integration and harmonization. Recent statements by industry representatives, for example the demand to harmonize subsidies for renewable energies at the EU level,<sup>4</sup> illustrate this development.

#### *A strong trend towards electricity-gas synergy*

A strong general trend towards diversification of activities within the energy sector can be observed for all major utilities. All companies now have electricity and natural gas activities, even if this is not true for all their countries of operation. The synergies between electricity and gas are obvious, as many customers need to be supplied by both products and hence ask for combined offers. Moreover, the share of natural gas in electricity generation has significantly increased in the last twenty years. This, of course, also favors electricity-gas synergy. The relative importance of electricity and gas for each of the major utilities is far from being homogenous: thanks to mergers between large electricity and gas companies, electricity and gas are more or less equally important for E.ON and GDF Suez. For these two companies, both products contribute in roughly equal terms to overall revenues. In the case of EDF, Enel, Iberdrola and Vattenfall, electricity clearly dominates. RWE is somehow in between the two groups of utilities.

It is important to note that these seven companies dominate the European electricity market, as they account for around 55 percent of the EU's electricity generation. The picture is different in natural gas, where major utilities like E.ON, GDF Suez and RWE share the market with other important players

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4. This demand was made, for example, by the CEO of E.ON. See interview with Wulf Bernotat, "Europa braucht eine einheitliche Energiepolitik," *Handelsblatt*, 24 June 2009.

like Eni, GasTerra or Wingas. It is obvious (even if overlooked sometimes) that the important differences between natural gas and electricity in terms of production, transport, storage possibilities and consumption have an important impact on market structures. Finally, it is interesting to observe that the gas market is more competitive than the electricity market in some countries, like France or Spain. This somehow contradicts conventional wisdom, which claims that it is easier to bring competition to the electricity sector than to the gas sector.

### *Geography and culture matter*

All major utilities have used the opportunities of market liberalization for entering new markets in other European countries. Besides purely economic factors – which are, of course, the most important –, geographical proximity and cultural affinity have been essential factors for expansion strategies. It is difficult to say without insider knowledge of companies' decision-making how important these factors have been in reality, but a simple analysis of “who acquired where” shows their significance.

Nearly all major companies are present in the UK today, which arguably has the most open market. French and German companies are particularly present there. Many companies have also participated in the privatization of utilities in Central and Eastern Europe; German utilities are the largest investors there, which is a consequence of geographical proximity and historical links. Enel has a major presence in Romania, a culturally close country. Moreover, Enel acquired Endesa, after Spanish authorities did everything to avoid a takeover of Endesa by E.ON. The fact that E.ON comes from a culturally more distant country with a different economic culture than Enel might have played a role there. Before the acquisition of Endesa, Enel was already present in Spain – and Endesa in Italy. The Nordic market is another example of how cultural affinity and similar economic thinking play a role: companies of the region are very active in neighboring countries, but only one outside player (E.ON) has important assets there. The example of Belgium is also striking, with French or French-Belgian companies being



the dominating energy companies there. EDF, for instance, has all its major foreign assets in neighboring countries: the UK, Italy and Germany, where EnBW is even active in a region bordering France.

In all cases, the integration of newly acquired companies into the group is a major challenge. Several solutions can be observed, with some acquired companies keeping a strong identity, a certain degree of autonomy and a separate brand (like Endesa, Edison or Scottish Power) under the umbrella of the group. In many cases, local management is kept. In other cases, subsidiaries are completely incorporated and the head of the branch is a manager dispatched from the company's headquarters. In many cases, a gradual process can be observed: first the original name and greater autonomy are kept for some years after the acquisition. But then, after some time, the group's headquarters effectively take control of the acquired company, streamlining operations and changing the name of the local company. It will be an important factor to watch in the years to come if large utility groups like the "seven brothers" will succeed in creating truly integrated European companies. There are important differences throughout Europe when it comes to business culture and forming a coherent group out of companies with sometimes very different traditions is no easy task.

#### *Hostile takeover bids rarely succeed*

The case of E.ON's failed bid for Endesa also illustrates another fact: a hostile takeover bid for a large utility creates strong political opposition in nearly all cases, not least due to the importance of the energy sector for an economy. This in turn makes a successful takeover very difficult. Several examples in the last decade, like Enel's failed attempt to acquire Suez, EDF's failed attempt to acquire Iberdrola or the Italian law diminishing EDF's voting rights in Edison, show that national governments are ready to use their power to avoid takeovers that they consider hostile. A good relation with national authorities and local partners thus seems necessary if a utility wants to acquire companies in other European countries.

### *Few outsiders in the EU market*

Companies from outside the EU play a very limited role in the European electricity and gas market: trans-border mergers and acquisitions are mostly intra-EU. Norwegian and Swiss utilities are an exception, but the economies and companies of these countries are highly integrated with the EU even without their countries being EU members. The case of US energy companies is interesting in this context, as many of them invested in the EU in the 1990s, but then quickly divested their assets again due to economic failure.<sup>5</sup> An interesting thing to watch is the evolving position of Gazprom in European energy markets – especially in the gas market. The Russian gas company has opened retail subsidiaries in some Member States and has participations in several other gas suppliers and gas transport companies, for example in the Baltic countries, Finland, Germany, Austria, Romania and the UK.<sup>6</sup>

### *Markets outside the EU play a minor role for most European utilities*

Many European utilities have assets outside the EU, but in most cases, those assets only account for a relatively limited part of overall revenues. For EDF, RWE and Vattenfall, assets outside the EU are marginal; in the case of the E.ON, GDF Suez, Enel and Iberdrola, they account for less than 20 percent. In geographic terms, investments in the Americas are the most important. Utilities have invested in the US (mainly in the renewable energy sector) and Spanish, Portuguese and Italian utilities have important assets in Latin America. Here too cultural closeness is an obvious factor. Another important market is Russia, where E.ON, Enel and Fortum – companies from countries that have traditionally close links with Russia – have made important investments in electricity generation.

### *Entering new markets vs. defending the home market*

Entering new markets abroad presupposes a stable and ideally strong position in the home market. There have been polemic debates about companies that, thanks to the “helping

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5. See on this issue Haar and Jones [2008].

6. See on this issue Loskot-Strachota [2009].

hand” (or closed eyes) of national authorities, can operate in a more or less protected home market, but use the openness of other national markets in order to invest there. This has indeed been true in some cases, where national governments were keen to protect (or create) “national champions.” In the early phase of market liberalization, we have seen the creation of national champions in some countries: E.ON and RWE in Germany, Endesa and Iberdrola in Spain, Electrabel in Belgium. This has led to market concentration and a lower level of competition.

But in the last five years or so, most incumbents have seen their market share in their respective home market decreasing. This is especially true for electricity and gas sales, as many companies lost customers after market opening to new (trading) companies or foreign competitors. As for electricity generation, the construction of new power plants by new entrants and asset swaps like the one between Electrabel and E.ON are gradually decreasing the markets shares of incumbents. In any case, growth at home is rarely possible for major European utilities. They either already have a very high to near-monopoly market share, or national competition authorities interdict them further growth. Therefore, they have mainly increased their revenues thanks to activities abroad in the last decade. In our view, this trend is likely to last. As a logical consequence, the importance of the home market and the share of revenues coming from it have decreased for all utilities. In overall terms, we think that, for the large utilities studied here, gains in other countries more than compensate losses in the home market. Making profits in a liberalized and European-wide market is probably more difficult than in a regulated national market – but the companies with the best business models have clearly benefited from the extension of their market made possible by liberalization. They have increased their revenues and EBITDA in a way they could not have done had they remained active in their home country alone.

#### *Market concentration and competition*

After the wave of mergers and acquisitions in recent years, one might wonder if the outcome of liberalization is an oligopolistic electricity and gas market with limited competition. After

all, European Commission officials concede in private that the emergence of a small number of EU-wide players was neither the intention of liberalization nor the expected outcome. Therefore, some market observers have made the criticism that the developments of the last decade have led to an oligopoly that impedes effective competition.<sup>7</sup> In our opinion, it is still too early to clearly analyze the consequences for competition of the EU-wide expansion of major utilities. Only the future will show if a European oligopoly with limited competition emerges, or if, on the contrary, the expansion strategies of Europe's largest utilities bring along competition. After all, competition could develop with five to ten big utility groups in the European market. Moreover, the effects of further market integration on company structures and competition remain to be seen. Electricity and gas are indeed very distinct sectors of the economy with high fixed costs and substantial investment needs. This necessarily limits competition. In our view, it is doubtful if small new market entrants can successfully compete with large incumbents, especially in the electricity generation market. Large foreign players have a better chance there, and some examples of national markets that became more competitive after acquisitions of major foreign players are encouraging. Maybe a small number of large groups is the only way to make competition work in the European electricity and gas market?

*A presence in distribution or sales alone is not enough  
to establish a viable business position*

Looking at the experiences of new entrants (newly established companies or companies becoming active abroad), it becomes clear that a presence only in distribution or sales is not a viable business model in the longer term. In many cases, entering the sales market or acquiring distribution assets is the preferred and easiest way to enter a new market, and many companies start by doing this. But without access to electricity

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7. See, for example, "Power games: The final shape of the European energy market is emerging: An oligopoly," *The Economist*, 26 February 2009, or the interview with François Possemiers, President of the Belgian regulator CREG, in *La Libre Belgique*, 23 January 2010, where Possemiers stated: "We risk going towards a situation of natural or friendly oligopoly in Europe. The companies do not hurt themselves. [...] The historic operators have kept tremendous power in their home territories."

production or gas import capacity, new entrants have a difficult life, as they need to buy electricity or gas from the incumbents. This clearly limits their profits, as electricity generation and gas import are normally the most profitable parts of the value chain. Being present in both production and supply also allows companies to hedge these activities, in case the price for electricity or gas at the wholesale market reaches particularly high levels. Stemming from this, we can observe that many new entrants have sought to build electricity production capacity or to get access to gas import capacities. This creates new capacities – new power plants, new pipelines and new LNG terminals – and thereby has positive effects on competition and security of supply.

#### *A clear trend towards ownership unbundling*

This book has not discussed the legal aspects of European market liberalization and some of the hotly debated issues like ownership unbundling. But we have observed a clear trend towards the divestment of transmission and distribution networks. Many countries have imposed unbundling of transmission networks by law. But even in those countries where ownership unbundling is not required by law, it has happened or is likely to happen soon. Examples of recently finalized or announced divestments are: E.ON and Vattenfall selling their high-voltage electricity networks in Germany, RWE selling its gas transmission network in Germany, EDF selling its electricity distribution network in the United Kingdom, Enel selling its gas distribution network in Italy.

In some cases, these divestments might be the result of tougher regulation and price caps imposed on transmission tariffs by regulators and the European Commission. Moreover, many experts believe that it is nearly impossible to implement the Independent Transmission Operator (ITO) model, as control rights given to regulators pose many practical problems.<sup>8</sup> Hence some companies are keen to avoid never-ending battles with regulators by pre-emptively divesting their network assets. It is interesting to observe that unbundled TSOs and DSOs are

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8. Klotz [2009].

organized in different ways and have owners of a different nature. In some cases, they are independently listed companies (for example, National Grid in the UK). In other cases, they are owned by the government (for example, TenneT in the Netherlands). A third model, which could become more common in the future, are TSOs and DSOs owned by large investment or pension funds (for example, Enel Rete Gas, a gas DSO, in which a financial consortium has an 80 percent stake since 2009). Mixed ownership models also exist. In short, the ownership unbundling of network activities has the potential to lead to entirely new forms of asset ownership in the electricity and gas sectors.

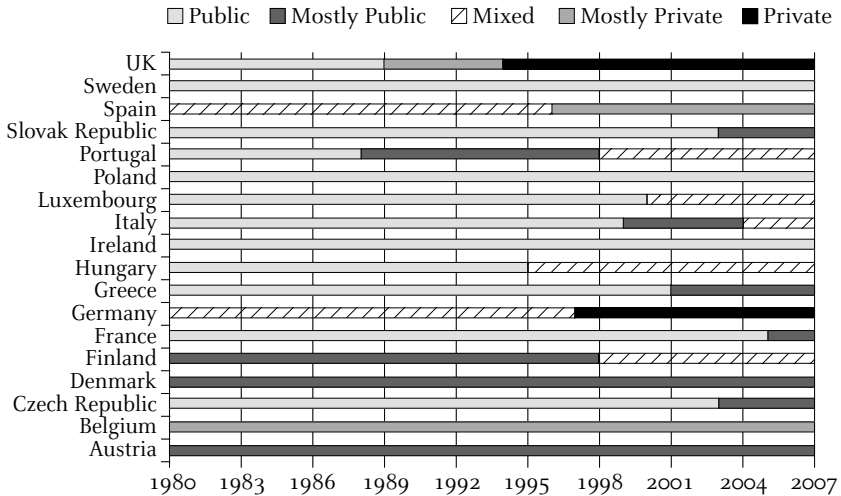
Of course, some utilities active in retail still remain owners of transmission networks without any intention to sell them for the time being (for example, EDF via RTE of the French electricity transmission network, GDF Suez of the French gas transmission network, E.ON Ruhrgas of a major part of the German gas transmission network, RWE of a major part of the German electricity transmission network, RWE of the Czech gas transmission network). But at the same time, it seems that most major utilities now increasingly focus on electricity generation, natural gas import and supply of electricity and natural gas. One should note the increasing interest in natural gas production as well. For some of them at least, transmission and distribution network activities seem to become less part of the “core business.” One reason for this tendency is the fact that electricity generation and gas import often constitute the market segments where the best margins can be achieved – but network activities are also a low-risk business that can be a good hedge against the riskier unregulated businesses.

### *Privatization as a consequence of liberalization?*

European legislation has never imposed the privatization of utilities and it is unlikely that any such proposal will be made. But in the context of market liberalization, privatization has indeed taken place in many cases, often in several steps (see graph 11 for an overview of the situation in the electricity sector).<sup>9</sup> As a result, four of the seven major utilities are

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9. On the issue in a more general context, see Heddenhausen [2007].

**Graph 11. Electricity Privatization Timeline by Country**

N.B.: Data used for the graph simplifies the situation by taking into account only the largest company of each part of the electricity sector. In the case of Sweden, for example, a privately-owned company (E.ON) has had an important market share in electricity generation and supply since the early 2000s, but this is not acknowledged in the graph.

Source: Pollitt (2009) using the OECD international regulation database.

currently partly state-owned. Only one of the “seven brothers” is still state-owned at 100 percent (Vattenfall), but at the same time, only two of them are listed companies in which the state does not have any participation (E.ON and Iberdrola).<sup>10</sup> The picture is similar for the middle-sized utilities, i.e. the group of companies that follow the “seven brothers.”

One can observe an overall trend towards a lesser degree of state ownership. In our view, continuation of privatization is likely.<sup>11</sup> However, this should not hide the fact that state ownership is still wide-spread in many Member States. In the

10. The case of RWE is unique in this context, as several German cities have a substantial participation, but not the German Federal government.

11. The CEO of E.ON, Wulf Bernotat recently presented a different view on this issue. In his opinion, the state has gained more influence over energy utilities in several EU countries. His statement somehow contradicts the fact that several companies have been privatized in recent years, and no major company has been nationalized. At the same time, Bernotat indirectly raises an interesting question: how can one clearly assess the degree of influence a government is exercising over an energy company? See interview with Wulf Bernotat and Gérard Mestrallet, *Handelsblatt*, 30 November 2009.

context of the current economic crisis, some governments might be keen to sell their participations in utilities: this is a way to make money, which would relieve tight state budgets, strained from large amounts of money spent for recovery packages. Moreover, a new investment cycle is about to start in the electricity sector, with major investments ahead in the next twenty years. Many governments will likely encourage the private sector to invest as much as possible in order to avoid spending public funds.

The economic model and tradition of a Member State of course plays an important role in this context: all major utilities in the Nordic countries are at least partly state-owned. In France, the partial privatization of EDF (in which the state still owns 85 percent) and GDF (via the merger with Suez) has been strongly opposed, due to fears about the future of the *service public* model.<sup>12</sup> Moreover, the French government seems to resist further privatization, as it wants to maintain its influence over the long term vision for industrial policy and the effectiveness of investment. In the UK and Germany, privatization took place early, in the 1980s and early 1990s. In Central and Eastern Europe, many privatizations took place in the context of economic transition. But there are important differences between the countries, and many companies are still state-owned, especially electricity producers and gas companies. In some cases foreign state-owned companies participated in privatization rounds and acquired assets abroad. It is indeed difficult to consider these cases as real privatizations (for example, EDF investing in Poland or Hungary, or Vattenfall in Germany and Poland).

But the most important question to ask in this context concerns the behavior of companies: does it make a difference for a utility if it is state-owned or listed on the stock-market? No easy answer is possible: when it comes to obstructing competition and market foreclosure, ownership is probably not so important. It is quite obvious that all companies, as long as they can, use their market power to maximise profits. So for the everyday functioning of the

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12. Interestingly, once the partial privatizations had taken place, protests ended.



electricity and gas markets, company ownership is maybe not that important. Governments of course want state-run companies to make money – but some of them do interfere in their management for political reasons.

One can easily observe that some governments in the EU prefer subsidizing state-owned utilities from the state budget in order to ensure low prices for consumers (mainly through regulated prices). Such actions, which are particularly common in Central and Eastern Europe, clearly distort the market. Moreover, governments sometimes interfere in a company's decisions-making for political reasons: decisions by Vattenfall to acquire companies in Germany, Poland and the Netherlands that produce electricity mainly from coal have led to repeated tensions with the Swedish government and Parliament.

*The domination of fossil fuels in the energy mix of all utilities but EDF*

There are major differences between the utilities analyzed in this study in terms of energy sources used for electricity production. As there is no common standard for the publication of a company's energy mix, it is not easy to compare the data published by the utilities (see box 3). For all utilities but EDF, fossil fuels clearly dominate the production mix, accounting for 45 to 75 percent of production. In some cases, coal is the dominating fossil fuel (RWE, E.ON, Vattenfall), in others natural gas (GDF Suez, Iberdrola). All utilities have some nuclear production, which accounts for 15 to 30 percent of production for all utilities but EDF. EDF, by far the EU's largest electricity producer, produces around 70 to 75 percent of its electricity from nuclear. The share of renewable energies ranges from 2 percent in the case of RWE to 26 percent in the case of Vattenfall. The vast majority of electricity production from renewable energies comes from hydroelectricity. The major utilities produce only a small part of their electricity from wind, solar or geothermic sources. Notable exceptions are Iberdrola and, to a lesser extent, Enel, which have strongly developed these "new" renewable energy sources.

### Box 3. Utilities' Production Mix (net production, 2008)

EDF (no overall data available): France: Nuclear 86%, Hydro 10%, Fossil fuels 4%; UK (installed capacity, before acquisition of British Energy): Coal 82%, Gas 16%, RES 1%; EnBW (installed capacity): Fossil fuels 44%, Nuclear 32%, Hydro 23%, Other RES 1%; Edison: Fossil fuels 89%, Hydro 10%, Wind 1%; no data for other countries available.<sup>1</sup>

Enel (in Europe): Coal 30%, Hydro 20%, CCGT 19%, Nuclear 18%, Oil&Gas ST/OCGT 8%, Other RES 5%.<sup>2</sup>

E.ON (E.ON Group): Hard coal 31%, Natural gas 30%, Nuclear 24%, Hydro 6%, Lignite 5%, Wind 2%, Other 2%.<sup>3</sup>

GDF Suez (GDF Suez Group): Natural gas 50%, Hydro 18%, Nuclear 17%, Coal 12%, Other RES 2%, Other non-RES 1%.<sup>4</sup>

Iberdrola (Spain+UK): CCGT 34%, Nuclear 26%, Coal 14%, Hydro 11%, Other RES 11%, Cogeneration 4%.<sup>5</sup>

RWE (RWE Group): Lignite 33%, Hard coal 28%, Nuclear 22%, Gas 14%, RES 2%, Other 1%.<sup>6</sup>

Vattenfall (Vattenfall Group): Fossil fuels 46%, Nuclear 28%, Hydro 24%, Other RES 2%.<sup>7</sup>

1. Annual Report 2008.

2. Presentation of 2008 results: annexes, p. 10, <http://www.enel.it>, and own calculation.

3. <http://www.eon.com/de/businessareas/35251.jsp> [data for 2009].

4. Activities and Sustainable Development Report 2008, p. 47.

5. Results 2008, p. 5, <http://www.iberdrola.es> and own calculation.

6. Annual Report 2008, p. 61, and own calculation.

7. Annual Report 2008, front cover [inside].

All utilities now publicly underline their big interest in renewable energies and define ambitious CO<sub>2</sub> reduction goals – not least because the public and politicians are demanding this. However, one should not forget that CO<sub>2</sub> emissions of the EU's power sector decreased by only 3 percent between 1990 and 2006.<sup>13</sup> According to PwC (see table 32), the evolution of the “carbon factor” (kg CO<sub>2</sub> per MWh of electricity produced) of the twenty largest electricity producers of the EU has remained nearly stable since 2001. But reducing CO<sub>2</sub> emissions

13. According to Pollitt [2009], p. 20-22, who uses data from the European Environment Agency for the EU-15 plus Czech Republic, Hungary, Poland and Slovakia.

**Table 32. CO<sub>2</sub> Emissions by Company (2001-2008)**

Company	Kg CO <sub>2</sub> /MWh* in 2001	Kg CO <sub>2</sub> /MWh in 2004	Kg CO <sub>2</sub> /MWh in 2006	Kg CO <sub>2</sub> /MWh in 2008	Overall group emissions (million tonnes) in 2008
RWE	700	761	771	742	138
Vattenfall	394	403	450	452	73
Enel	526	514	495	422	83
E.ON	457	413	456	411	100
GDF Suez	371	327	314	327	46
Iberdrola	148	179	297	283	27
EDF	134	148	142	140	90
Average of 20 largest producers**	371	368	368	350	760

\* Kg CO<sub>2</sub>/MWh means kg CO<sub>2</sub> per MWh of electricity produced ("carbon factor").

\*\* Sum for overall emissions.

N.B.: Mergers and acquisitions have been taken into account retrospectively, i.e. emissions have been recalculated. For example, CO<sub>2</sub> emitted by Edison in 2001 (when EDF was not yet a shareholder of Edison) is included into EDF's carbon factor in 2001.

Source: PwC/Enerpresse, Changement climatique et électricité, November 2009, <http://www.pwc.fr>.

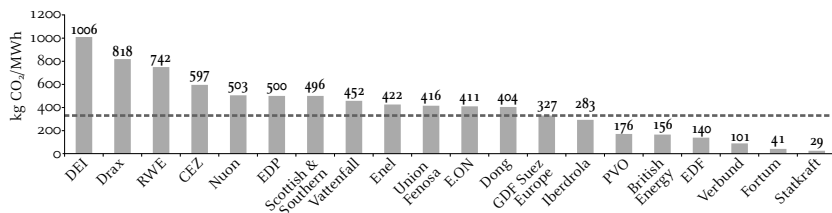
is also increasingly in the financial interest of utilities, as the EU ETS is now a reality for all electricity producers. In this context, it is very important to bear in mind that there are significant differences between Europe's largest electricity producers in terms of carbon emissions per MWh of electricity produced. EDF with only 140 kg CO<sub>2</sub>/MWh will be much less affected by full auctioning of permits than RWE with 742 kg CO<sub>2</sub>/MWh (see table 32 and graph 12 and annex for details).

### *Will EU ETS lead to a change of the energy mix?*

According to many observers, the EU ETS has been the source of windfall profits for electricity producers more than causing any changes in the energy mix: Point Carbon estimates that the allocation of emissions permits for free could lead to up to €71bn of windfall profits for European electricity producers by 2012.<sup>14</sup> Unsurprisingly, the issue of windfall profits has led

14. <http://www.businessgreen.com/business-green/news/2213702/europe-cap-trade-scheme-hand>.

**Graph 12. Carbon Factor**  
(kg CO<sub>2</sub> per MWh of electricity produced)



Source: PwC/Enerpresse, *Changement climatique et électricité*, November 2009, <http://www.pwc.fr>.

to many heated debates. Due to the complexity of the matter, it is very difficult, if not impossible, to assess the amount of windfall profits with certainty.<sup>15</sup> Accusations of windfall profits through the EU ETS are of course denied by the concerned companies. In any case, the situation will change in 2013, when all permits will be auctioned (with the notable exception of power plants in Central and Eastern European countries, which obtain free allocations until 2019). Thanks to this, electricity production from sources with low CO<sub>2</sub> emissions – renewables and nuclear – should become considerably more attractive for economic reasons. Natural gas will also win, as it might increasingly be used for replacing coal. But the impact of the EU ETS does not seem to be important enough to lead to a rapid and radical change of the production park towards low carbon electricity production: 75 percent of power plants currently under construction in Europe will be coal or gas fired according to a recent survey by Capgemini.<sup>16</sup>

*Major utilities are latecomers for renewable energies and hesitate with CCS*

As for the large utilities analyzed in this book, a close look at their production portfolios shows that most of them have, for the time being, only a very small part of “new” renewable production (wind, solar, biomass etc.). The impression one gets

15. For scientific contributions on the issue, see, for example, Ellermann and Joskow (2008), Point Carbon (2008), Sijm, Neuhoff and Chen (2006).

16. Capgemini (2009), p. 4.

when reading the companies' publications or listening to their statements would appear to suggest otherwise. All major utilities – with the exception of Iberdrola – are “latecomers” to renewable energy sources, which have mainly been developed by smaller companies. The latter fact has also led to slightly more competition, as these small producers are new entrants in the production market. This effect will probably remain limited and temporary, as large utilities are now increasingly acquiring renewable energy companies. Moreover, they are strongly developing offshore wind projects, and could become major renewable electricity producers in the future. It is interesting to note in this context that most major utilities have created special subsidiaries to develop renewable energies on a European and even worldwide level. Some of these subsidiaries have been introduced separately to the stock market. This shows that renewable energies indeed have special features and their development demands a different approach. One should not forget, however, that a significantly higher share of renewable energies in the future will only be achieved if CO<sub>2</sub> emissions will have a higher price than in the first two phases of EU ETS. Moreover, governments will need to continue subsidizing renewable energy sources that are not yet competitive.

The perspectives for Carbon Capture and Storage, on the contrary, seem more uncertain when one assesses current investment projects. Most major European utilities do have CCS projects, but only Vattenfall has already a small pilot plant working. Major utilities currently do not seem willing to invest significant amounts of capital in this technology, but will rely heavily on public money to be spent on CCS. At the same time, several CCS projects have already been postponed or cancelled because of local opposition.

*The beginning of a new investment cycle...*

According to the European Commission, investments of €1,600bn will be needed in the European electricity and gas sector until 2030.<sup>17</sup> A major new investment cycle like the one between 1960 and 1980 is now starting, as many power plants

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17. European Commission (2008), p. 24.

need to be replaced and new electricity and gas transmission and distribution infrastructure need to be built. Moreover, the objective of increasing the contribution of renewable energies creates significant investment needs, also for electricity transmission networks. In the context of ongoing liberalization, ambitious climate goals and renewed fears concerning energy security, it has become difficult for companies to determine the right investment policy. An evolving political and regulatory framework results in unclear investment signals. An increasing level of ideological or local opposition against new infrastructure – for example, a coal plant, a high-voltage line or a LNG terminal – makes new investment even more difficult.

Moreover, the responsibility of the different market actors for uninterrupted supply at acceptable prices has become less clear than in regulated markets. To give just one example: in the past, companies working in a regulated market were responsible for assuring peak-load capacity at all times. In a liberalized market, no company would be ready to invest in peak-load plants that are not profitable. In a situation like this, should government and/or the regulator be allowed to force companies to invest?

*... in times of economic crisis*

The current economic crisis has not changed these mid- and long-term needs, but it is resulting in some deferral of, or stoppage in, investments due to the temporary decline of electricity and gas consumption. UCTE for instance recently reduced – from 50 GW to 20 GW – its forecast for additional electricity generation capacity needed to maintain security of supply until 2020.<sup>18</sup>

In response to the crisis, several utilities have significantly reduced their investment plans: E.ON scaled back planned investments from €36bn to €30bn for 2009-2011, Enel from €44bn to €32bn for 2009-2013, Iberdrola from €13bn to €4.5bn for 2009 and Gas Natural / Union Fenosa from €21bn to €11-13bn in 2009.<sup>19</sup> It remains to be seen if utilities will step

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18. Capgemini [2009], p. 6.

19. Capgemini [2009], p. 5.

up their investments soon enough in order to guarantee a sufficient level of supply in the future: stopping investments for too long after a demand drop in the short term will result in insufficient capacity some years later. Moreover, if the EU wants to achieve its ambitious climate goals, major investments need to take place in the years to come in order to decarbonize electricity production, for example, by decarbonizing coal using CCS and bringing on low carbon options like renewable energies and nuclear energy.

At the same time, some of the major utilities have announced substantial divestment plans in 2009. E.ON and Enel announced divestments worth €10bn each and EDF announced divestments of €5bn.<sup>20</sup> These decisions have partly been made after agreements with the European Commission and with the aim of mitigating competition concerns. They will result in ownership unbundling of transmission or distribution networks in some cases. But in other cases, divestments of strategically less important assets are needed to provide cash and thus to help avoiding “imperial overstretch” after costly acquisitions.

*The utilities' EU-wide expansion was faster than the integration of the national markets*

Overall, the EU-wide expansion of major European utilities has been much faster than the integration of national electricity and gas markets. Our study clearly shows that utility companies have entered other European electricity and gas markets at a large scale. Thereby, they are now active in various national electricity and gas markets that share some common features, but not (yet) in a single European energy market: for the time being the relevant markets for electricity and gas are national in most cases.<sup>21</sup> The Nordic electricity market is a notable exception. The presence of one company in several EU countries certainly contributes to the gradual integration of the markets, even if this will be a rather indirect side-effect of the companies' behavior. More research is needed to analyze this link.

20. Capgemini (2009), p. 6.

21. The relevant market can even be sub-national (i.e. regional or local) for some parts of the value chain: supply in the residential market, for instance, is still very much dominated by local companies in several European countries.

Substantial price differences for electricity and gas – at power exchanges as well as for end-consumers – illustrate the fact that the electricity and gas markets of the EU are insufficiently integrated (see annex for examples).<sup>22</sup>

In recent years however, there has been a stronger tendency towards a higher level of market integration on the European level. This can be seen, for instance, at the institutional level, where mergers of power exchanges have taken place and enhanced cooperation between regulators emerges. The crucial role of physical interconnection (electricity lines and cables, gas pipelines) must be underlined in this context: in many places, this basic condition for market integration is still lacking or underdeveloped. This problem is widely recognized, but only very few of the necessary investments have been made.<sup>23</sup> Moreover, the governance of, and access to, interconnections, as well as the harmonization of overall market rules, must be improved in order to achieve a “level-playing field” in the European electricity and gas markets.

Given these problems, the European Commission and European regulators proposed, and now gradually implement, a regional approach to market integration. It consists of one initiative for electricity with seven regions and one for gas with three regions.<sup>24</sup> This measure seems to be the right path, even if it only constitutes an appropriate intermediate step towards an EU-wide market. The support of Member States’ governments will be crucial, as significant advances depend on their commitment to create real competition in energy markets. As for companies, it remains to be seen if increasing market integration will have implications for the company structure and market concentration.

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22. Price differentials are of course not only due to insufficient market integration, but also to other factors. However, the insufficient level of market integration certainly plays a crucial role in this context.

23. On the issue of electricity interconnections in Europe, see Nies (2009).

24. See [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_INITIATIVES](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_INITIATIVES) for details.





# Annex

**Map 4. The EU's Major Utilities:  
Presence in European Electricity Markets**



- EDF      □ Enel      ▲ E.ON      △ GDF Suez
- Iberdrola      ○ RWE      ★ Vattenfall
- Significant presence      □ Limited presence

Source: Author.

**Map 5. The EU's Major Utilities:  
Presence in European Gas Markets**



- |                        |                    |              |            |
|------------------------|--------------------|--------------|------------|
| ■ EDF                  | □ Enel             | ▲ E.ON       | △ GDF Suez |
| ● Iberdrola            | ○ RWE              | ★ Vattenfall |            |
| ■ Significant presence | ▒ Limited presence |              |            |

Source: Author.

## Annex 1. Additional Data at EU Level

**Table 33. Size of Major National Electricity and Gas Markets in the EU  
(2008, by electricity consumption)**

Country	Electricity production (TWh)	Electricity consumption (TWh)	Gas consumption (bcm)
Germany	608.0	587.0	82.0
France	549.0	501.0	44.2
United Kingdom	372.9	383.9	93.9
Italy	304.4	343.9	77.7
Spain	287.4	276.4	39.0
Sweden	146.0	144.4	1.0
Poland	139.7	138.4	13.9
Netherlands	102.7	118.4	38.6
Belgium*	81.0	91.6	17.0
Finland	74.4	87.1	4.0
Austria	61.7	66.6	9.5
Czech Republic	77.1	65.6	8.7
Greece	57.4	64.5	4.2
Portugal	45.2	54.6	4.6
Romania**	56.1	48.1	14.5
Hungary	37.0	40.9	12.0
Denmark	36.1	34.6	4.6
European Union / EU27***	3,361.7	n.a.	490.1
Turkey	190.1	189.8	36.0
Norway	143.0	129.0	4.4
Switzerland	66.9	65.5	3.1

\* Includes Luxembourg for gas.

\*\* Electricity data for Romania is for 2007 and according to <http://www.enercee.net>.

\*\*\* Electricity data for EU27 is for 2007 and according to <http://epp.eurostat.ec.europa.eu>.

Sources: IEA (2009) for electricity, BP (2009) for gas.

**Table 34. Market Share of the Largest Electricity Generator  
(% of total generation, 2007)**

Country	Market share
Cyprus	100.0
Malta	100.0
Estonia	94.0
Greece	91.6
France	88.0
Latvia	86.0
Belgium	83.9
Slovenia	82.0
Luxembourg**	80.9
Czech Republic	74.2
Slovakia	72.4
Lithuania	70.5
Portugal	55.6
Ireland	48.0
Denmark	47.0
Sweden	45.0
Hungary	40.9
Austria*	34.4
Italy	31.3
Spain	31.0
Germany**	28.4
Romania	27.5
Finland	26.0
United Kingdom	18.5
Poland	16.5
Croatia	84.0
Turkey***	38.0
Norway****	32.5

N.B.: No data available for the Netherlands.

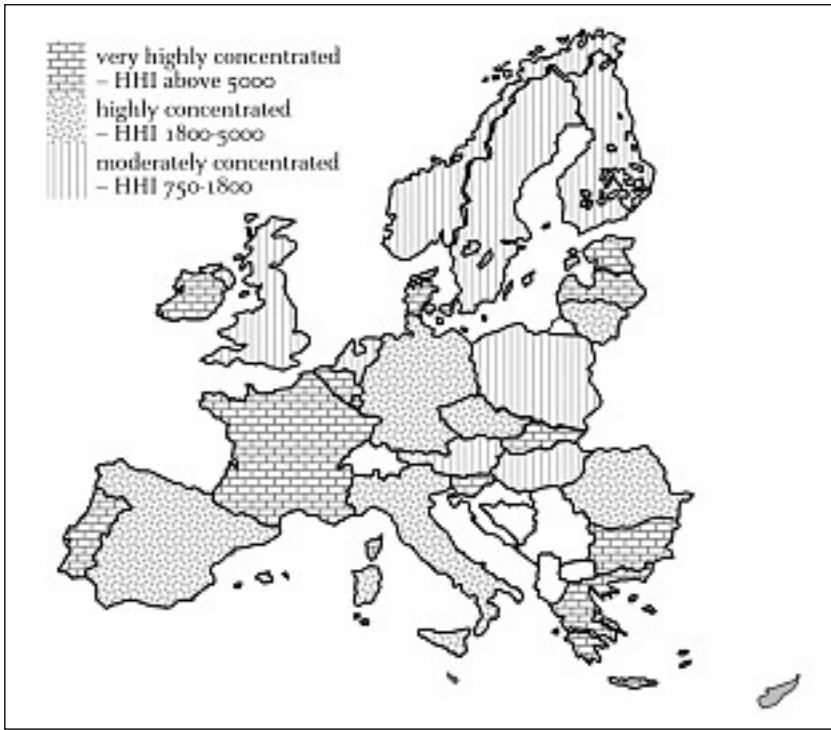
\* 2001 (Austria).

\*\* 2004 (Luxembourg, Germany).

\*\*\* 2005 (Turkey).

\*\*\*\* 2006 (Norway).

Source: <http://epp.eurostat.ec.europa.eu>.

**Map 6. Market Concentration of Electricity Wholesale Markets (by HHI)**

Source: European Commission (2009), p. 6 (using regulator's data).

**Table 35. Market Concentration:  
HHI Values for Available Installed Electricity Generation Capacity (2003-2005)**

Country	HHI	CR(1/2, in %)*
France	8,592	92.6
Belgium	8,307	90.7
Italy	4,150	n.a.
Spain	2,790	71.4
Netherlands	2,332	57.7
Germany	1,914	54.1
United Kingdom	1,068	32.6

\* CR(1) for France and Belgium, CR(2) for the others, CR(1/2) being the market share of the (two) largest generator(s).

Source: [http://ec.europa.eu/competition/sectors/energy/inquiry/electricity\\_final\\_execsum.pdf](http://ec.europa.eu/competition/sectors/energy/inquiry/electricity_final_execsum.pdf) (p. 15) for all countries but Italy; Percebois (2008), p. 10, for Italy.

## ***Electricity and Gas Prices: Differences between Member States***

### *At end-consumer level*

In the first semester 2009, electricity prices (without taxes) ranged between €0.0587 (Estonia) and €0.1416 per kWh (Slovakia) for industrial customers and between €0.0685 (Bulgaria) and €0.1789 per kWh (Ireland) for household customers. Gas prices (without taxes) ranged between €5.10 (Romania) and €11.08 per GJ (Germany) for industrial customers and between €5.28 (Romania) and €15.76 per GJ (Ireland).

Source: Eurostat – for medium-sized industries and medium-sized households (500-2000 MWh of annual electricity consumption and 10,000-100,000 GJ of annual gas consumption).

### *At wholesale level*

**Table 36. Average Electricity Base-load Price at Power Exchange (2007)**

Country/region and power exchange	Average price (€/MWh)
Scandinavia (NordPool)	27.9
Germany (EEX)	38.0
Spain (OMEL)	39.3
France (Powernext)	40.9
Italy (MGP/IPEX)	71.0

Source: Autorità per l'energia elettrica e il gas (2008), p. 38.



**Table 37. Power Generators with the Highest CO<sub>2</sub> Emissions in the EU (2007)**

Company	Electricity production (TWh)	Overall group emissions (million tonnes)	Cost of emission permits (£bn)	Cost of emission permits as % of group revenue
PPC (Greece)	54	53.0	0.7	14.2
Polish Energy	n.a.	55.0	0.8	13.3
CEZ	74	38.3	0.5	8.4
Vattenfall	168	86.0	1.2	7.9
Endesa	121	66.8	0.9	5.2
RWE	173	142.9	2.0	4.8
Electrabel	141	32.6	0.5	3.3
Enel	94	54.9	0.8	1.8
E.ON	217	81.2	1.1	1.6
EDF	647	56.0	0.8	1.3

N.B.: The table shows that the cost of emission permits under EU ETS affects electricity producers unevenly. For those with a low "carbon factor" (low CO<sub>2</sub> emissions per MWh of electricity produced) like EDF, the cost of emission permits is relatively much lower than for those with a high carbon factor like PPC or the Polish electricity producers (both have a production portfolio mostly based on hard coal and lignite, and hence a high level of CO<sub>2</sub> emissions per MWh of electricity produced).

Sources: PwC/Enerpresse, *Climate Change and Electricity*, November 2008, <http://www.pwc.fr>, for electricity production volumes; *Financial Times*, 8 December 2008 for other data.

**Table 38. Major European Electricity and Gas Companies:  
Presence in Selected Markets**

		Germany	France	United Kingdom	Italy	Iberia	Benelux
EDF	E	Significant	Leader	Leader	Significant	Present	Significant
	G	Present	Present	Present	Significant	–	Present
Enel	E	–	Present	–	Leader	Leader	–
	G	–	–	–	Significant	Present	–
E.ON	E	Significant	Present	Significant	Present	Present	Significant
	G	Leader	Present	Significant	Present	Present	Present
GDF Suez	E	Present	Present	Present	Present	Present	Leader
	G	Present	Leader	Present	Significant	Present	Significant
Iberdrola	E	–	–	Significant	–	Leader	–
	G	–	–	Significant	–	Present	–
RWE	E	Leader	–	Significant	–	–	Significant
	G	Present	–	Significant	–	–	Present
Vattenfall	E	Significant	–	–	–	–	Significant
	G	–	–	–	–	–	Present
		Nordic	Poland	Czech Republic (CZ) and Slovakia (SK)	Hungary	Romania	Bulgaria
EDF	E	–	Present	Present (SK)	Present	–	–
	G	–	–	Present	–	–	–
Enel	E	–	–	Leader (SK)	–	Significant	Present
	G	–	–	–	–	–	–
E.ON	E	Significant	Present	Significant	Significant	Significant	Significant
	G	Significant	–	Significant	Leader	Present	Present
GDF Suez	E	–	Present	–	Significant	–	–
	G	–	–	Significant (SK)	Significant	Significant	–
Iberdrola	E	–	–	–	–	–	–
	G	–	–	–	–	–	–
RWE	E	–	Present	Significant (SK)	Significant	–	–
	G	–	–	Leader (CZ)	Leader	–	–
Vattenfall	E	Leader	Present	–	–	–	–
	G	–	–	–	–	–	–

E: electricity (generation and/or supply), G: gas.

Leader: largest company or more than 30 percent market share.

Significant: between 10 and 30 percent market share.

Present: less than 10 percent market share.

**Table 39. Summary of Preceding Overview**

Company	E/G	Presence (number of countries / regions)	Total E+G	Overall countries / region
E.ON	E	12: 8× Significant, 4× Present	23	12
	G	11: 2× Leader, 3× Significant, 6× Present		
GDF Suez	E	8: 1× Leader, 1× Significant, 6× Present	17	10
	G	9: 1× Leader, 5× Significant, 3× Present		
EDF	E	9: 2× Leader, 2× Significant, 5× Present	15	9
	G	6: 1× Significant, 5× Present		
RWE	E	5: 1× Leader, 4× Significant,	10	6
	G	5: 2× Leader, 1× Significant, 2× Present		
Enel	E	6: 3× Leader, 1× Significant, 2× Present	8	6
	G	2: 1× Significant, 1× Present		
Vattenfall	E	4: 1× Leader, 2× Significant, 1× Present	5	4
	G	1: 1× Present		
Iberdrola	E	2: 1× Leader, 1× Significant	4	2
	G	2: 1× Significant, 1× Present		

***Presence of seven major utilities in selected markets***

*(presence in gas and electricity is counted only once):*

- Benelux: 5 – EDF, E.ON, GDF Suez, RWE, Vattenfall.
- Czech Republic and Slovakia: 5 – EDF, E.ON, Enel, GDF Suez, RWE.
- Germany: 5 – EDF, E.ON, GDF Suez, RWE, Vattenfall.
- Iberia: 5 – EDF, Enel, E.ON, GDF Suez, Iberdrola.
- Poland: 5 – EDF, E.ON, GDF Suez, RWE, Vattenfall.
- United Kingdom: 5 – EDF, E.ON, GDF Suez, Iberdrola, RWE.
- France: 4 – EDF, Enel, E.ON, GDF Suez.
- Hungary: 4 – EDF, E.ON, GDF Suez, RWE.
- Italy: 4 – EDF, Enel, E.ON, GDF Suez.
- Romania: 3 – Enel, E.ON, GDF Suez.
- Bulgaria: 2 – Enel, E.ON.
- Nordic: 2 – E.ON, Vattenfall.

Table 40. Major Utilities: Revenues 1998-2008

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Centrica	11.1	11.0	16.3	20.3	22.8	25.9	27.0	19.6	24.1	23.8	26.8
EDF	29.5	32.1	34.4	40.7	41.8	44.9	46.9	51.1	58.9	59.6	64.3
Electrabel*		6.4	8.5	12.7	15.1	11.0	12.5	12.0	13.5	15.2	
Endesa**	6.8	13.5	15.7	16.1	17.2	16.6	17.6	18.2	20.6	18.1	22.8
Enel	20.5	21.0	26.8	28.8	30.0	31.3	36.5	33.8	38.5	43.7	61.2
Eni (Gas&Power)		32.0	48.8	49.8	49.0	52.4	59.7	73.7 (23.0)	86.1 (28.4)	87.3 (27.6)	108.2 (36.9)
E.ON	-	-	93.2	79.7	35.1	43.8	46.5	56.1	67.8	68.7	86.8
Gas Natural***	2.7	3.2	4.9	5.5	5.3	5.6	6.3	8.5	10.3	10.1	13.5
GDF****				14.4	14.5	16.6	17.5	22.4	27.6	27.4	83.1
Iberdrola	5.9	6.3	7.0	8.1	9.6	9.5	10.3	11.7	11.0	17.5	25.2
RWE	37.5	38.4	47.9	62.9	46.6	43.9	42.1	39.5	44.3	42.5	49.0
SSE*****					6.4	5.9	7.5	10.8	14.8	22.4	32.0
Suez (energy)		31.5	34.6	42.4	46.1	39.6	38.1	41.5	44.3 (32.9)	47.5 (35.5)	-
Vattenfall	3.2	3.2	3.8	7.5	11.0	12.3	12.2	13.3	14.7	15.5	17.1

\* Part of Suez since 2003 (50.1%) / 2005 (100%).

\*\* Part of Enel since 2008 (62%) / 2009 (100%).

\*\*\* Gas Natural acquired Union Fenosa in 2009. Union Fenosa had €7.2bn revenues in 2008 and €6.0bn in 2007. For 2008, this would account to pro-forma joint revenues of €20.7bn.

\*\*\*\* GDF Suez since 2008.

\*\*\*\*\* Scottish and Southern Energy: financial year April-March (April 2008 – March 2009 = 2008).

N.B.: All data in €bn and , some inaccuracies might occur due to changes in reporting, floating exchange rates for companies headquartered in countries that do not have the euro (i.e. Centrica, SSE, and Vattenfall).

Sources: Lévêque and Monturus (2008) and own research.

Table 41. Major Utilities in 2008

	E.ON	GDF Suez (energy)	EDF	Enel	RWE	Iberdrola	Vattenfall
Revenues (€bn)	86.8	83.1 (70.7)	64.3	61.2	49.0	25.2	17.1
EBITDA (€bn)	13.4	13.9 (11.8)	14.2	14.3	8.3	6.4	4.8
Margin (EBITDA/revenues, in %)	15.4	16.7 (16.7)	22.1	23.4	16.9	25.4	28.1
Net Debt (€bn at end-2008)	44.9	28.9	24.5	50.0	18.7	28.4	6.9
Employees	93,500	198,200 (134,600)	160,900	76,000	65,900	33,000	32,800
Electricity production capacity (GW)	74	68	127	94*	45	43	35
Electricity generation (TWh)	318	276	610	253	224	124	163
Electricity sales (TWh)	615	197	674	270	317	182	189
Gas sales (TWh)	294 (1,224)	500	19	86	218 (328)	181	n.a.

\* With Endesa at 100 percent.

N.B.: Electricity and gas sales: to end-customers if data available; some doubts especially for gas; overall sales including intra-group or to resellers in brackets if available. Compare with following table by RWE.

Some data includes extra-European values.

Sources: Annual Reports 2008.

**Table 42. The Largest Electricity Companies in Europe:  
Consolidated Electricity Sales (TWh)**

Company	2006	2007	2008
EDF	610	656	674
E.ON	362	435	615*
RWE	312	306	317
Enel (including Endesa in 2008)	159	166	270
Vattenfall	195	194	189
Iberdrola	96	130	182
GDF Suez	145	168	197
Endesa	148	153	n.a.

\* This represents a surprisingly high increase when compared to 2007 and 2006, which cannot be justified by new acquisitions alone. It might be due to changes in reporting / consolidation. Source: RWE, *Facts & Figures*, 2009 and own research.

**Table 43. The Largest Electricity Producers in Europe:  
Installed Generation Capacity and Net Generation (2008)**

Company	Installed capacity (GW)	Net generation (TWh)
EDF (including EnBW)	127	641
Enel*	94	197
E.ON	74	243
GDF Suez	68	145
RWE	45	187
Iberdrola	43	95
Vattenfall	35	161

\* With Endesa at 100 percent.

Sources: Companies' Annual reports 2008 for capacity, PwC/Enerpresse, Climate Change and Electricity, November 2009, <http://www.pwc.fr>, for net generation.

## Annex 2. Additional Data at Country Level

**Table 44. Installed Generation Capacity in Great Britain by Company (2008, in %)**

Company	Share of total capacity
British Energy	15
RWE	12
E.ON	12
SSE	12
Scottish Power	7
EDF	6
International Power	6
Centrica	6
Drax	5
Others	19

Source: Ofgem (2008), p. 37.

**Table 45. Market Concentration in the Italian Electricity Generation Market (2001-2007)**

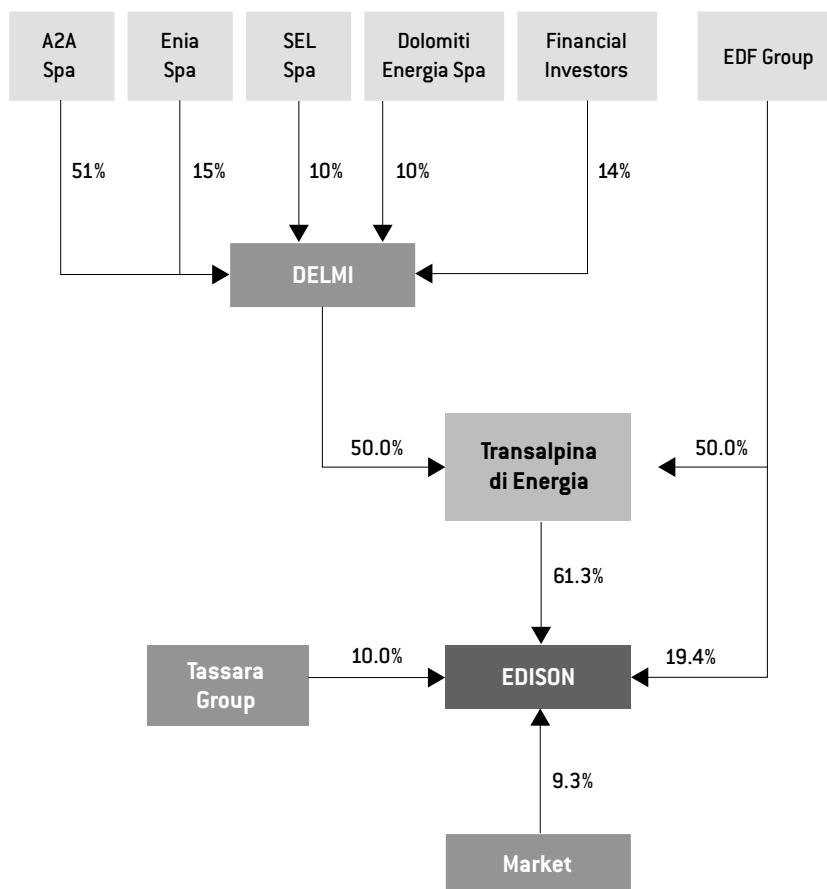
	Number of companies with >5% share of net generation	% share of net generation of the three main companies	Net installed capacity (GW)	Peak demand (GW)	Demand (TWh)*
2001	4	70.7	76.2	52.0	304.8
2002	3	66.7	76.6	52.6	310.7
2003	4	65.9	78.2	53.4	320.7
2004	5	64.4	81.5	53.6	325.4
2005	5	59.4	85.5	55.0	330.4
2006	5	57.1	89.8	55.6	337.5
2007	5	54.7	93.6	56.8	339.9

\* Net of energy for pumping and before grid leakage.

Source: Autorità per l'energia elettrica e il gas (2008), p. 33.

### Annex 3. Additional Data at Company Level

Graph 13. Edison Shareholder Structure



As of 31 March 2009.

Source: Based on <http://www.edison.it>.





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# THE EU'S MAJOR ELECTRICITY AND GAS UTILITIES SINCE MARKET LIBERALIZATION

GOVERNANCE EUROPÉENNE ET GÉOPOLITIQUE DE L'ÉNERGIE

A major change has taken place in the company structure of the European electricity and gas markets. Twenty years ago, national or regional monopolies dominated the markets and there was strictly no competition between utilities. But since the liberalization of EU energy markets began in the 1990s, companies like E.ON, GDF Suez, EDF, Enel, and RWE have become European giants with activities in a large number of Member States. The advocates of market liberalization did not expect, or even intend, the emergence of a small number of large utilities that control an increasing part of the EU market. Some observers already claim that liberalization has led to an oligopoly with detrimental consequences for competition.

Based on extensive background research, this book presents a fact-based analysis of the changes in the European utility sector since the 1990s. Case studies of the seven largest utilities illustrate how companies adapted their strategies to the changing market environment. The author underlines diverging choices and common trends like geographic expansion into new markets via mergers and acquisitions or diversification of business activities with the aim of using synergies between electricity and gas.

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