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Regulation of the Electricity Market in Germany

From regional monopolies to competitive markets

Volker Heck*

The supply of electrical energy is a segment of the economy that has traditionally been subject to numerous interventions by the state. The basis for this is the opinion that supplying electricity is a vital public service that should not be exposed to the risks of the market. Therefore, electricity was provided solely by state-run monopolies or strictly regulated private regional monopolies throughout the world until the late 1980s.

To the extent the concept of competition as the predominant governing principle gained acceptance in the 1980s with deregulation policies in the United States and, above all, Great Britain, governments also examined the extent to which supplying energy could be subjected to the laws of the market in order to reach energy and environmental policy goals more efficiently through competition: Market-oriented competition was to supply consumers at the most favourable terms. It is undisputed that electrical grids can be viewed as a natural monopoly, since electricity is an energy source that must be transmitted over lines. The construction of parallel lines for the purpose of competition between networks is generally unreasonable from an economic standpoint. Conversely, however, the other levels of the value chain – generation, trading, sales – must be opened up to competition. To ensure competition in these segments and prevent grid operators from abusing their monopoly positions, regulation of prices and services provided over the electrical grid is necessary (Figure 1).

Internal market as prelude

These realizations are increasingly being accepted in European policy, too. As an essential component on the path to a unified European internal market – which was contemplated in the treaties founding the European Union – the EU Commission tackled reform of the regulatory framework of the European electricity and gas industry in the nineties, using the energy market reforms in Great Britain, Norway, and later in the other Scandinavian nations as a model. Even though the common goal was "more competition in the energy markets", the reform had to take into account the differing initial situations in the individual EU countries. Thus, in France and Italy about 90 percent of electricity consumption by end users was attributable to a single company in each country, whereas in Germany, for example, a pluralistic structure predominated with regional monopolies covered by anti-trust laws. Other markets were already organized around a competitive model: England and Wales introduced a wholesale

Figure 1

General Principle for Liberalization of Electricity Market

Source: RWE.

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market with a pool-system in 1989 and broke up the heretofore vertically integrated energy utilities into various energy generation and sales companies (which were then privatized) and a grid operator (which was later taken public). Norway followed in 1991. There, too, the state power supply companies were broken up into a grid company (Statnett) and a generation company (Statkraft). Later a power exchange was set up in Oslo (NordPool 1993). In the years that followed, Finland (1995) and Sweden (1996) took similar steps to reform their electricity markets, which were expanded by the entry of these countries into the Norwegian power exchange system. The development of all these markets was oriented toward the same model: the abolition of regional or national monopolies by opening up generation markets to competition, free access to the grid for third parties, a free choice of supplier by consumers and the establishment of wholesale markets for electricity.

In view of the structural differences, it was not possible to harmonize the systems of liberalized markets with those of countries still closed to competition within a reasonable period of time. This meant that only general, omnibus legislation – which enabled individual countries to pursue different methods of implementation and market organization while maintaining the common goal – made sense with respect to liberalization and deregulation at the European level.

After four years of tough negotiations, the European Council and the European Parliament adopted the first Directive on the Internal Market in Electricity in 1996, based on Art. 95 of the EC Treaty. It took effect on 19 February 1997 and was to be transposed into national law within two years. The main requirement was to take steps to open national electricity markets to competition. In the first step in 1999, 23 percent of the market was to be opened up; by 2000, this limit was to be expanded to 28 percent and by 2003 to at least 33 percent. These threshold values represented minimum values, which could also be exceeded by the individual member states under the principle of subsidiarity by selecting the customers eligible for competition. In addition, the Directive governed the organization of grid access, the separation of the grid from sales and generation in terms of management and accounting, and free access to generation and line construction. Thus, the markets that had already been liberalized acted as models for development of the Directive. However, diverging from this, the Directive permitted three systems for organizing grid access: regulated access, negotiated access and the single buyer system.[1]

The first phase of German electricity market reform

The energy law in effect before the implementation of the Internal Market Directive in Germany dated from the year 1935 and placed the private sector electricity industry under state supervision. Major components of this law included a requirement that electricity suppliers obtain permits before commencing operations, an obligation to supply electricity to all customers and the establishment of closed supply areas. These regional monopolies, which were based on an exception in the Act against Restrictions on Competition, were negotiated in license agreements with municipalities in exchange for the payment of license fees for the use of public roads. In addition, the tariffs for supplying small customers were subject to state regulation. Special agreements were made with large buyers and policed by the Federal Cartel Office for abuse.

The EU Directive on the Internal Market in Electricity required a fundamental revision of existing energy law. The Energy Industry Act [Energiewirtschaftsgesetz], which took effect on 29 April 1998, required energy supply companies to grant other companies access to their networks in a non-discriminatory manner (Figure 2). There was no requirement to unbundle the current vertical integration of companies into generation, transmission/distribution and sales companies. These segments merely had to be shown separately in accounting records. At the same time, all customers received the right to choose their suppliers freely at the first step. This complete and immediate liberalization distinguished Germany from the majority of European countries, which decided to open their markets gradually. Germany took another separate path by deciding not to set up a regulatory authority. The government relied on the market to regulate itself and restricted itself to *ex post* controls by reviewing allegations of abuse under anti-trust laws.

Associations of grid operators and grid users were to regulate grid access jointly and determine grid fees

[1] Under the single buyer system, the single buyer is responsible for centralized purchase and sale of electricity. If a customer in this system finds a supplier with a low price, the single buyer takes this electricity into its grid, and the customer receives the price advantage.

Figure 2

Source: RWE.

through association agreements based on the principle of negotiated grid access. In the first association agreement, the associations initially agreed upon transaction-based fees, which were to be charged separately for each transit. Since this concept became a real barrier to competition due to procedural complexities, a non-transaction and non-distance-related fee was introduced when the association agreement was amended in 1999. Negotiated grid access was significantly simplified by setting uniform grid fees per grid operator and voltage level. In addition, industry solutions were developed, e.g. for data management and for switching customers. However, they were only recommendations, and not all companies adopted them.

Even if network access was troublesome at the start of liberalization, industry and households nevertheless profited from significant decreases in prices attributable to the competition that sprung up between 1998 and 2000. The industry became more consolidated due to the cost pressure resulting from falling prices (Figure 3). The initial eight large inter-regional utilities merged into the four companies that exist today: EnBW AG, e.on Energie AG, RWE AG, and Vattenfall Europe AG. These companies account for about 80 percent of the electricity generated in Germany. Their subsidiaries operate the transmission network in the four German control zones. In addition, they hold equity interests in numerous of the over 50 regional utilities and approximately 840 local suppliers, which are mainly municipal utilities.

In the first phase of the liberalization, a large number of new, independent suppliers caused significant movement in the market. However, most of their business models turned out to be not economically viable over the long term. In addition, they felt noticeably constricted by established utilities. The charging of changeover fees or insistence on highly complex sets of contracts were cited as examples of this. Today only a small number of suppliers remains in the mass market. New players in the services and trading segments and alliances of regional or local utilities (e.g. Trianel) have been more successful in establishing themselves in the market.

An essential component of this success was the start of exchange trading in Germany in 2000: in two marketplaces initially (Leipzig and Frankfurt) and then only at the European Energy Exchange (EEX) in Leipzig after their merger in 2002. The EEX initially started with pure spot market trading, but now offers monthly, quarterly, and yearly futures on the forward market, too. 138 companies from 17 countries currently trade on the EEX (March 2006). In 2005 alone, the total trading volume rose by 52 percent to 602 terawatt hours (TWh). The quantity traded on

Figure 3

Source: RWE.

the spot market alone (86 TWh) corresponds to 17 percent of all electricity consumption in Germany. Thus, the EEX is currently the most liquid wholesale trading market in Europe, excluding mandatory exchanges, such as the Spanish OMEL.

The increase in government charges, a strong increase in the demand for electricity, and rising prices for primary sources of energy have resulted in a noticeable increase in end consumer prices in Germany since 2000. Even though these prices were still below the pre-liberalization level in 2005, the prices were seen to be a sign of inadequate competition in the electricity market as early as 2003.

To the extent electricity became a commodity listed on an exchange, the cost-plus principle, which had predominated in the wholesale market in the past, was replaced by a market price formed on the basis of supply and demand. The amount of this competitive price for electricity is currently based on the marginal costs of the most expensive power plant still necessary to meet demand. If the costs of the marginal power plant increase, the market price also increases. Significant factors influencing the supply-side are, for example, the availability of power plants and the (increasing) feed-in from wind power generators in the short term and changes in capacity or the composition of the power plants – which have more long-term effects. Weather, business conditions, and demographic changes may affect the demand side. The market price may also be affected by political factors, such as subsidies for renewable energies and combined heat and power generation and the introduction of trading in CO_2 emission certificates since 2005.

The highest possible availability of reliable information and, therewith, high market transparency are of great importance to the functioning of the wholesale market for electricity, which is influenced by so many factors. Market participants have responded to calls for regulation of the information that should be published with voluntary initiatives, e.g., with respect to available transmission capacity or generation. For example, since early April, the four large German power plant operators have provided information on installed and available capacity and generated energy to all interested parties on the EEX Internet platform each trading day. This is to increase confidence in pricing on the EEX and further promote competition.

The second phase – start of regulation

Along with the reluctance of member states to open their markets rapidly and complaints all over Europe about difficulties in gaining market access, this development gave the Commission reason to provide a stimulus for accelerating the liberalization process by presenting proposals for a new directive.

In 2003, the European Council and the European Parliament agreed on an acceleration package (Figure 2). The new regulation obliged member states to open the electricity market for all commercial customers by 2004. From 2007, all household customers in the EU were to be able to freely choose their suppliers. In addition, vertically integrated companies were required to unbundle and create a separate legal entity for the grid (with the possible exception of companies with < 100,000 customers). Finally, member states were required to set up national regulatory authorities.

These changes necessitated extensive amendments to the German Energy Industry Act. This change in paradigm from association agreements to a regulated system contributed to Germany's inability – and that of many other member states – to meet the 1 July 2004 deadline for implementing the Directive into national law. The new Energy Industry Act finally took effect on 13 July 2005, more than a year late.

Figure 4

KEY ELEMENTS OF THE NEW GERMAN ENERGY INDUSTRY ACT (EnWG)

- New Act on the regulation of the German electricity and gas markets (Energiewirtschaftsgesetz – EnWG) enforced on 13 July 2005
- New regulatory authority "Bundesnetzagentur"(BNA, Federal Grid Agency, formerly known as regulatory agency for post and telecommunications) to monitor grid access as well as electricity and gas grid fees
- Grid operators with fewer than 100,000 electricity or gas customers can be regulated by one of the 16 federal states. The federal states may delegate responsibility to the BNA.
- Ex-ante approval of all grid fees
- Method of calculating grid fees
  - Present "current cost accounting" to be maintained for existing assets; real rate of interest on equity (equity-financed regulated asset base) 6.5%
  - As of 2006, regulation based on historic cost accounting with inflation-adjusted returns for new assets; nominal interest rate on equity 7.91 %
- Proposal of a system of incentive regulation until July 2006 by BNA to replace the current "cost plus" calculation. Incentive regulation, on the basis of a legal regulation, is expected to become effective in 2008.
- The tariff-rate approval by the federal states for electricity tariffs of residential customers will be abolished two years after the formal start of regulation.

Source: RWE.

Figure 5

Source: RWE.

Grid access rules remained basically unchanged with the exception of the rules for the balancing power market. The most important new rules for the electricity sector (Figure 4) were as follows.

A regulatory agency was set up to supervise grid access and monitor grid fees (Figure 5). Regulatory tasks were delegated to the Federal Grid Agency for Electricity, Gas, Mail, Telecommunications, and Railroads (the Federal Grid Agency for short, BNetzA). State regulatory agencies are responsible for companies with fewer than 100,000 customers connected to their distribution grids if their distribution grids are situated within that German state. The German states can re-delegate these tasks to the Federal Grid Agency. All the German city-states as well as the States of Thuringia, Lower Saxony, Schleswig-Holstein and Mecklenburg-Vorpommern have made use of this option.

In the future, all grid fees must be approved *ex ante* by the competent regulatory agency. The rules for calculating such fees are set forth in detail in the Energy Industry Act and in a supplemental Network Fee Regulation. For new assets, the return on equity was set at 7.91 percent. For old assets it is 6.5 percent (before taxes in each case). The equity ratio was limited to 40 percent.

Beyond mere cost control, an incentive regulation system is to be established no later than 2007. The Federal Grid Agency is to work out a concept for this system by July 2006 with the participation of the German states and the affected industrial associations and scientists. The system will be finally established by a regulation issued by the German Federal Government with the approval of the Bundesrat.

Vertically integrated companies will be required to unbundle their networks legally, functionally and in accounting terms, from the generation, sales and trading segments (Figure 6). While transmission network operators must unbundle as soon as the new Energy Industry Act takes effect, the legal unbundling of distribution grid operators can be postponed until 1 July 2007. Distribution grid operators with fewer than 100,000 customers, which are not part of a corporate group, are excepted from the requirement of legal unbundling.

Sales companies must inform their customers of the composition of the electricity they deliver and its environmental effects. In so doing, distinctions must be made between the categories of nuclear energy, fossil fuels and other fuels. In addition, the grid fee must be shown separately on customer invoices.

Finally, it was decided that – consistent with regulation of the grid segment – *ex ante* review of general tariffs for small customers should expire when the Federal Tariff Regulation for Electricity expires in

Figure 6

Source: RWE.

July 2007. Thus, there would be a transition from the cost-plus principle to competitive prices for this group of customers, too. Due to increasing freedom in setting prices, new market participants, in particular, would be given incentives to enter the market in form of margins that are likely to be adequate. For this reason, it was anticipated that competition would be stimulated in the household customer market.

Therefore, the Federal Grid Agency concentrates on the grid segment. The agency is responsible for rule-making, e.g. for the incentive regulation and the balancing power market, and for grid access and customer switching procedures. Its oversight responsibility extends, for example, to compliance with unbundling requirements and non-discrimination provisions, in addition to approval of grid fees. The Federal Grid Agency is also the place for grid users to file complaints.

The Federal Grid Agency has no influence on price formation in the wholesale and retail markets. It is the task of the Federal Cartel Office to monitor this as part of its policing of abuse under anti-trust laws (Figure 7). In the special case of trading at power exchanges, stock exchange oversight authorities, such as the Stock Exchange Council [Börsenrat] or the Trade Monitoring Office [Handelsüberwachungsstelle] are responsible for preventing market manipulation. Allegations that the "Big Four" abused their market power were again not proven in the sector inquiry by the EU Commission. The commission found no evidence of this in light of their actual market shares of the wholesale trade and the large number of marginal power plants involved in price-setting. This is all the more so, since the influence of wind-generated electricity and interconnection capacity on the competitive situation was not taken into account.

The Federal Grid Agency has already dealt with a massive quota of work since its inception in the summer of 2005. In addition to harmonizing customer switching procedures and data formats, and questions about balancing group accounting and obtaining minute reserves, comprehensive data on grid operators has been gathered. Thus, power grid operators had to provide the Federal Grid Agency with almost 700 individual pieces of data on their companies by 1 November 2005 as a basis for the comparison market and the incentive regulation. For many companies compliance was difficult since these data could often not be gathered or could not be gathered as within the stated stipulations.

However, the Federal Grid Agency has focused its efforts on reviewing applications for approval of grid fees. Electricity grid operators had to submit their applications to the competent regulatory authorities by the end of October 2005. The review period is six months from the time all documents are submitted. In addition, there were conceptual activities in developing the incentive regulation.

Current and future challenges: Design of incentive regulation

It appears that politicians and the public will measure the success of the regulatory authorities solely by how quickly grid fees drop. Lower grid fees should make it easier for competitors to enter the market and facilitate liberalization. However, the aim is to find a reasonable balance between an adequate return on invested capital, so grid operators can maintain their ability to invest, and the interest of grid users in the lowest possible prices.

One problem with traditional cost-plus regulation, which is currently the basis for grid fee approval proceedings, is a tendency for regulated companies to over-invest. This occurs when the grid operator's costs of capital are lower than the return it is granted. Added to this are possi-

Figure 7

FEDERAL GRID AGENCY – FEDERAL CARTEL OFFICE:
COMPETENCIES AND INTERVENTION POSSIBILITIES

Source: RWE.

ble inefficiencies in operations: When regulation is cost-based, the grid operator has no incentive to lower its costs, since they are reimbursed on a 1:1 basis. Any reduction in costs would directly result in a reduction in revenues.

Thus, the focus of the current review of approval applications is on whether the grid costs listed by grid operators are really grid costs and if their scope is justified. Despite extensive data collection by the Federal Grid Agency, the problem remains that, in doubtful cases, grid operators always have better knowledge of their cost situations than the regulatory authorities. Therefore, grid operators will try to use this superior knowledge to their advantage in the cost reviews. Therefore, the Federal Grid Agency tends to mistrust all attempts by grid operators to maintain the current level of costs. It is anticipated that the Federal Grid Agency may use the extensive discretion granted to it by the Grid Fee Regulations to lower fees markedly. In light of the interpretation of the calculation method announced by the Federal Grid Agency, litigation is beginning to emerge over the correct interpretation of the regulations. Thus, instead of imputed trade taxes, only the portion of actually paid trade taxes, attributable to network operation, should be recognized. This would annul the combination of public services in many municipal utilities for tax purposes and run counter to the concept of unbundling. In addition, the Federal Grid Agency is attempting to limit the equity needed for operations and thereby the returns on invested capital to such an extent that the grid operator's ability to make investments may be significantly restricted.

These problems should be overcome – at least in part – with introduction of the Incentive Regulation in 2008. However, the basic goal of this mechanism is to influence the behaviour of grid operators so they develop a self-interest in making grid operation more efficient within the framework of maximizing their operating profits. Thus, both customers and grid operators should profit from the advantages of increased efficiency. Additionally, grid operators should be enforced to invest in the grid not being negatively affected by the incentive regulation. Thus, the Federal Grid Agency must act with high sensitivity not trying to push through marked grid reductions at any costs.

Figure 8

INCENTIVE REGULATION: DRAFTED CONCEPT OF THE FEDERAL GRID AGENCY

Source: RWE.

In its first draft for the report, to be compiled by July 2006, the Federal Grid Agency already presents detailed proposals (Figure 8). Here, too, there is a cost control at the start of the first two regulatory periods – which will last between three and five years. To this end, a development path for revenues is to be established for each regulatory period, based on the initial cost basis. This determines the extent to which the grid operator must change its revenues within the regulatory period. Apart from inflation, the basis for determining efficiency requirements is firstly, the anticipated development of general productivity of grid operators and secondly, efficiency objectives that are specific to the company. The latter are determined by benchmarking the grid operator using a combination of various methods to ensure robustness. Deficits in efficiency that would not be found by cost control are to be detected through "as if" competition, taking structural differences thoroughly into account. In so doing, it must be kept in mind that the grid operator with the lowest fees is not necessarily the most efficient. More inefficient grid operators will be given higher objectives than efficient ones.

Increases in efficiency and cost reductions below the established level are credited to grid operators in the form of additional profits that may be retained. These additional increases in efficiency are not passed on to grid users until the start of the next regulatory period, as part of cost controls.

If the grid operator does not meet efficiency requirements through lack of effort or if the regulatory au-

thority sets the requirements too high, there is a risk the grid operator may suffer a loss. Therefore, one of the core requests of the energy industry associations (VDEW, VDN) is that the efficiency requirements be not only attainable but also surpassable. A grid operator of average efficiency must be able to obtain average, market-based profits. If the Federal Grid Agency proposes to introduce efficiency requirements that are based on the most efficient grid operator, this will overstrain most of the grid operators reducing their profits far in excess of the objectives of grid regulation. On the contrary ensuring the achievability of efficiency requirements has to be one of the basic principles of incentive regulation.

There are differences of opinion, particularly with respect to what amount of progress in increasing productivity and efficiency is possible and reasonable for an individual grid operator within a regulatory period. The regulatory authority must not quantify potential reductions of individual cost items, but must rather determine the overall potential for increased productivity on the basis of only those costs that are subject to influence. Completely eliminating all the inefficiencies identified in the benchmarking process within one period could overtax a company, as shown by experience, e.g. Great Britain. In the final analysis, the grid operators themselves are responsible for selecting the measures to be taken. However, additional standards on the quality of supply (interruptions of supply, quality of service, quality of the voltage) should prevent cost-cutting measures from being taken solely at the expense of the quality of supply. Whereas reductions in grid fees are apparent immediately, omitted investments become apparent gradually in the medium and long term only. Therefore, there is no clear accountability.

With respect to the demands for noticeably lower grid fees often raised by politicians and the public, it must be recognized that many costs cannot be influenced by the grid operator – at least in the short term. This applies, for example, to the costs of grids with higher voltage levels that can only be passed on, to system services and to additional costs occasioned by the Renewable Energies Act or the Combined Heat and Power Generation Act. Moreover, grids cannot be modified at will within a short period of time. They have developed over time and can be adapted to changes in generation and consumption structures only within the framework of long-term investment cycles. The efficiency potential of optimizing fixed assets that can only be optimized over the long term must be much larger than optimizing the particular fixed assets. Since investments cause short-term costs of capital and generate revenues only in the long run, incentive regulation at first hampers investments. Moreover, personnel costs cannot be reduced at will, due to collective wage agreements and employment laws. All these considerations must be taken into account in setting efficiency requirements. Therefore, there can be no rapid downward price spiral to the level of the most economical grid operators if these differing considerations are taken into account.

The Federal Grid Agency will present its final proposal for an incentive regulation in July. Politicians and regulatory authorities will then face the task of moulding it into a regulation. On the one hand, the incentive concept must be simple and transparent for the public. On the other hand, complex operational and economic interrelations must be reasonably reflected. All participants must resist attempts to simply push through grid fee reductions – which are unreasonable from an operational standpoint – for purely political reasons. Otherwise, restrictions on the grid operator's ability to make investments can endanger the currently recognized high quality of supply.

At present, it is unclear how the division of responsibilities between the Federal Grid Agency and the state regulatory authorities will work out. A committee involving representatives from the Federal Grid Agency as well as from the States should ensure close coordination and a uniform interpretation of discretionary leeway. It is still too early to assess the extent to which this will succeed.

Questions of grid access have lesser weight as compared to other industries. The electrical grid is, of course, a natural monopoly, and rules must be established for its use. However, it is not in exclusive use, as are railroads and gas networks. Of particular importance are the rules associated with first-time use of third-party grids, e.g. in the context of a customer switching or connection of a power plant to a grid. For example, a sales company must not gain access to grid data through common use of IT systems. Grid users must be treated equally in billing procedures. A transparent and non-discriminatory procedure must be implemented for processing grid connection applications from power plants, particularly if available grid capacity is not adequate for the connection capacity being requested in a territory.

Prices in the wholesale markets have led many investors to initiate new power plant projects and expand generation capacity. The large number of investment projects being announced attests to this. This also proves that, if there is competition in the wholesale markets, the markets will provide sufficient incentives for investment in security of supply. The member states of the European Union rightly refrained from including command measures in the acceleration package and in the discussions of the Directive on the Security of Electricity Supply and Infrastructure Investments.

Applications to connect power plants to the grid, which are currently piling up particularly in North Rhine-Westphalia, provide new challenges to transmission grid operators. Not only must they integrate these power plants into the grid, they must also cope with the expansion of wind energy and increasing demands made on the efficiency of the transmission grids by the growing international trade in electricity. The increasing feed-in of wind energy – which is concentrated in North Germany far from the main consumer centres – into the grid and the trade in electricity therefore require, according to the conclusions of the 2005 Dena Study on the Integration of Wind Energy, the construction of at least 855 km of new high voltage lines, particularly in a north-south direction, by 2015. This is aggravated by the planned shutdown of nuclear power plants, primarily in southern Germany, where no adequate replacement investments are foreseeable. This not only stresses the ability of transmission operators to invest. In view of the long planning and approval process, however, these changed requirements appear difficult to meet.