Jurgen Schwarz, Konstantin Staschus, Torsten Knop, Karl-Rudolf Zettler

Overview of the EU Electricity Directive
Realization of European Electricity Directives

A panel session on Realization of European Electricity Directives convened at the 1999 IEEE PES Summer Meeting, which was held in Edmonton, Canada, on July 19 1999. The session was sponsored by the IEEE PES Energy Development and Power Generation Committee and was organized by Thomas J. Hammons, chair of the International Practices Subcommittee and chair of the Power Engineering Chapter, UKRI Section; Jurgen Schwartz, DVG, Heidelberg, Germany; and Zoltan Reguly, Hungarian Power Companies, Budapest, Hungary. Hammons served as moderator.

The panelists were all experts responsible for transmission system planning or operation, system access, and trading and/or regulation in their respective countries. They addressed not only their countries' responses to the European electricity directive but also different aspects of the electricity directive. Their reports covered the synchronous operation of central Europe (UCPTE/CENTREL) as well as Russia.

The following presentations were made:

- The EU Electricity Directive and Consequences for Intersystem Operation, by Jurgen Schwarz, Konstantin Staschus, Torsten Knop, and Karl-Rudolf Zettler, DVG, Heidelberg, Germany
- 1999: Prance Opens its Electricity Market, by Francois Meslier, EDF, France
- Italian Electric Sector Restructuring: Main Recent Moves, by Luigi Salvaderi, ENEL, Spa, Rome, Italy
- German Open Access and Transmission Pricing within the European Framework, by Konstantin Staschus, DVG, Heidelberg, Germany
- EU Electricity Directive: Where Are We in Poland, by Malgorzata Klawe and Hanna Trojanowska, Polish Power Grid Company, Warsaw, Poland
- Realization of European Electricity Directive: Hungarian Case, by Karoly Gerse, Magyar Villamos Muvek Rt (Hungarian Power Companies, Ltd.), Budapest, Hungary
- Current Situation of Central Europe and Beyond after the EU Electricity Directive has come into Force:
  Switzerland, by Antonio Tiberini and Edgar Amthauer, Elektrizitats-Gesellschaft Laufenburg (EGL), Laufenburg, Switzerland
- Liberalization of the Portuguese Electricity Sector, by Antonio Jorge Viegas de Vasconcelos, Electricity Regulatory Commission, Lisbon, Portugal
- Some Aspects of Russian Electricity Policy Taking into Account the EU Electricity Directive, by Nikolai Voropai, Energy Systems Institute, Irkutsk, Russia, and Yu. N. Kucherov, JSC 'UPS of Russia', Moscow, Russia

Edited versions of these presentations appear in this issue of *IEEE Power Engineering Review.*

The European Parliament and the Council issued a directive concerning common rules for the internal market in electricity on 19 December 1996. -This Internal Electricity Market (IEM) Directive (96/92/EC) was the result of several years of negotiation between the European Union (EU) members. It establishes common standards for the generation, transmission, and distribution of electricity by laying down the rules relating to the organization and functioning of the electricity sector, access to the market, criteria and procedures applicable to calls for tender, and the granting of authorizations and the operation of systems.

Implementation of the Directive

The directive came into effect 2 months after having been issued and had to be implemented in 12 of the 15 member states within 2 years of that date, i.e., by 19 February 1999 (Belgium, Ireland, and Greece in 2000 or 2001).

With regard to the opening of the market, the directive sets minimum goals for a gradual opening of the national electricity markets. Concerning the opening of their networks, the member states have the choice between regulated or negotiated third-party access and the single-buyer scheme. Formerly vertically integrated electric utilities have to unbundle their administration and accounting in the whole EU. Further requirements concerning the unbundling process are at the discretion of the member states.

This article is based on a presentation given at the 1999 IEEE PES Summer Meeting panel session on " Realization of European Electricity Directives." J. Schwarz, K. Staschus, T. Knop, K.R. Zettler are with DVG, Heidelberg, Germany.

It is up to the member states to opt for either a tendering or an authorization procedure with regard to the construction of new generating capacity. The specification of public service obligations and of support schemes for electricity generated from renewable sources is also left to the members.

Recent Activities

A number of different activities were recently started by the transmission system operators (TSO) in the IEM to address open questions concerning implementation of the directive. Most important among those activities was the founding of the IEM Association of European Transmission System Operators (ETSO) in Frankfurt/Germany on 1 July (Figure 1). The founding associations of ETSO are the Union for the Coordination of Transmission of Electricity (UCTE), founded 1 July 1999 as the successor of the Union for the Coordination of Production and Transmission of Electricity (UCPTE) founded in 1951, NORDEL (the similar association for the cooperation between the Scandinavian TSOs), the United Kingdom Transmission System Operators' Association (UKTSOA), and the Association of the Transmission System Operators in Ireland (ATSOI). These associations agreed that ETSO should be the single point of dialog and common representative platform of the TSO industry of the EU vis-a-vis its institutions and other European organizations. The functions of ETSO are:

- Coordination of actions related to representation and communication of the founding associations and their respective members
- Development of common principles and the harmonization and establishment of a minimal set of rules in order to enhance network operation and maintain transmission system security while facilitating the internal European market for electricity
- Representation of the TSOs of the IEM countries at European and international level, particularly vis-a-vis the institutions of the European Union
- Study of certain problems of common European interest to the TSO industry.

General Principles on International Transmission Access and Pricing

The directive together with the implementations within the member states represents only the legal framework. It does not, however, describe the mechanism of transmission access and pricing. In order to do so, the European TSOs took the initiative and established the steering group (SG) on International Exchanges of Electricity in November 1998. The SG mainly coordinates two working groups: Technical Rules for Cross-Border Transmission and Economic Rules for Cross-Border Transmission. The work of these groups is based on active participation and cooperation among the expert structures of all TSO organizations in the EU, i.e., UCTE, NORDEL, UKTSOA, ATSOI, and EURELECTRIC. (EURELECTRIC is the association of the EU electricity industry representing it in public affairs, in particular, in relations with the EU institutions, in order to promote the interests of its members at the political level).

The results have been published in a final report entitled "International Exchanges of Electricity: General Principles of the European Transmission System Operators," dated 26 April 1999. Among the criteria stated within these principles are cost-reflectivity, due consideration of physical realities, nondiscrimination, transparency, and applicability within the framework set by the directive and its individual national implementations. The principles described in the final report also apply to all non-EU states that are strongly interconnected with the IEM electrical networks (i.e., NORDEL and UCTE members outside the EU). The principles have been designed such that the information exchange needed for secure system operations also supports a fair pricing system, and, vice versa, so that the incentives set by the pricing system support secure operations.

The development of these principles was only possible in a short window of opportunity. On the one hand, it is expected that not only the power markets within each EU member state work according to the IEM Directive, but also the cross-border markets within the EU, for which these principles are crucial. On the other hand, each TSO is bound, first and foremost, by its country's laws that implement the directive. In many cases, these laws have only recently been drafted. Before a reliable draft law existed, a TSO had no basis for discussing international access and pricing rules; the outcome of these discussions could well have contradicted its own country's eventual laws.

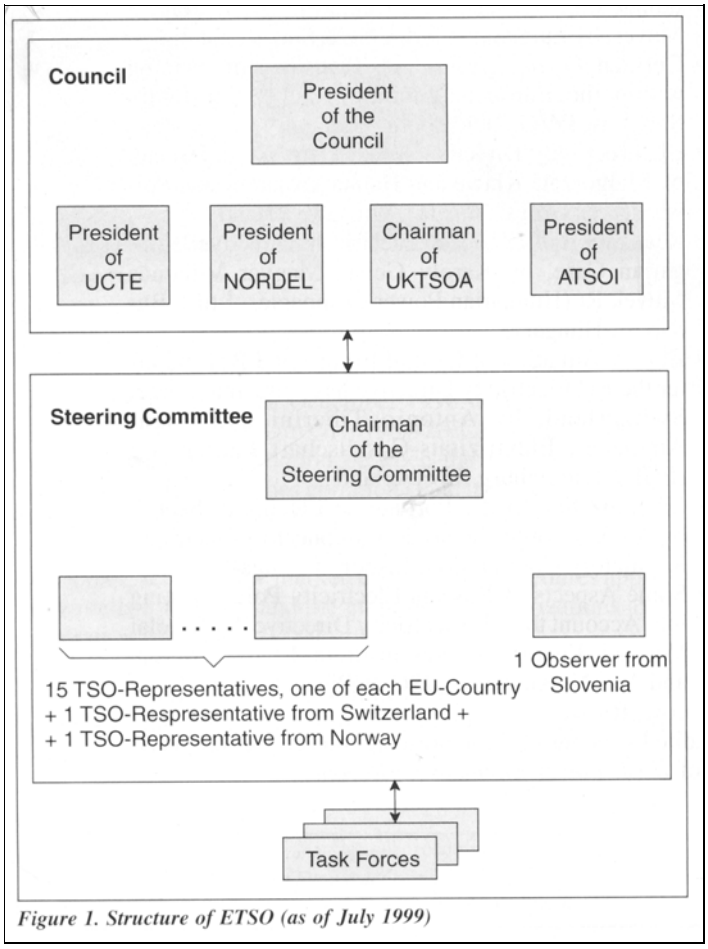

Figure 1. Structure of ETSO (as of July 1999)

Figure I. Structure ofETSO (as of July 1999) 6

Hereby, it has to be considered that, in most European countries, national authorities regulate grid access.

As a result, these principles had to be developed in a very short time. The current general principles are based on an earlier version, which has been intensively circulated for comments in Europe. It incorporates many changes proposed by TSOs, regulators, and network users as well as general comments from the EU Commission and academics. It has been approved by the decision-making committees of UCPT, NORDEL, British Grid, and Irish Grid.

The proposed principles listed in the final report of the SG are summarized within two categories:

- Operational handling of international transmission access
- International transmission pricing.

Operational Handling of International Transmission Access

An important piece of information for market participants is the available transfer capabilities (ATCs). The European TSOs commit to regularly publish nonbinding ATC forecasts. This, in turn, assumes the harmonization of the technical vocabulary for the definition of ATC.

Besides ATCs, definitions concerning firmness of transmission service, allocation of redispatching costs, and the procedure for accepting/declining transmission requests will be defined by subsidiarity and made public to the market participants by each TSO. An international congestion management methodology consisting of market-oriented approaches is still being discussed:

- Internationally coordinated redispatch/counter trading
- Transmission capacity auctions
- Market splitting.

Which combination of approaches is applied best in a certain case of congestion is still under investigation. Moreover, it has to be in accordance with the respective national grid code or operational rules.

In order to guarantee grid security, the load pattern must be computed by using physical flow models instead of applying the contract path method.

The handling of cross-border power transmission requires agreements on basic rules on the exchange of

information (online measurement, network topology data, schedules for relevant cross-border exchanges, and confidentiality commitment).

International Transmission Pricing

The international pricing system must accommodate different pricing models within different states, both point-of-connection (entry/exit) oriented and transaction oriented. "Transaction" should be understood in a general sense throughout this paper. It can also be the aggregated net values of all transactions between countries or areas. This strikes a compromise, suggested by various TSOs and, in response to comments from the EU Commission and academics, between the advantages for secure system operation by notifying and pricing all individual transactions on one extreme and the advantages of unencumbered power trading by not having to notify and price any transactions in the other extreme. Thus, each country, at least, needs to notify each other country of the aggregated net transactions between itself and all other countries.

Theoretically, international operational and pricing systems can be imagined without any information on individual or even country-aggregated transactions; after all, within individual countries, such transaction independence already exists. In practice, however, the infrastructure of communication channels, operations planning software and data exchange, and verification procedures do not currently exist in Europe to apply such systems internationally without endangering system security. The country-aggregate level of transaction dependence will be needed at least for the foreseeable future, for operational reasons, to give to the market participants appropriate price signals because of the diversity of different organizations of electric markets and because of the tight meshing in the central European electric networks.

The pricing system must be objective (based on realistic models), cost-reflective, nondiscriminatory, transparent, and supportive of the development of the IEM. The addition of non-cost-reflective tariffs should be avoided, while the addition of cost-reflective tariffs should provide the market participants with the right economic signals. The cost component method proposed by the "International Exchanges of Electricity: General Principles of the European Transmission System Operators" (final draft of 26 April 1999) containing the components G, T, and L fulfills these criteria. It consists of system costs for allowing:

- Generators to access the grid (G cost component)
- Transport to/from the border and through transit countries (T cost component), whereas T can be direction or distance dependent
- Loads to access the grid (L cost component).

The combination of the three elements should add up to the total costs of each system, calculated according to each country's accounting rules or regulation system. This guarantees that transit fees cannot lead to unjustified TSO tariffs.

The European TSOs have reached a consensus with the EU commission that the T costs can be important, i.e., a TSO should receive such costs for international usage from its international partners. However, different opinions exist as to how T should appear in the prices seen by the network users. Some TSOs fear that a pricing system containing three components is too awkward for the customers. Thus, they prefer to add or to integrate the T costs paid to the other TSOs to their G and L components. As a result of that, the pricing is still being discussed vigorously.

In order to warrant a smooth cross-border power transfer, the European TSOs intend to establish an inter-TSO clearing mechanism. The basic principle makes sure that the T costs will be shifted to the regions that cause them. Details of the clearing mechanism remain to be worked out.

Synchronous Systems

The opening of an internal European market for electricity also affects nonmember states and their electric systems. The principle of nondiscrimination requires that certain commercial and technical rules are harmonized in the IEM. Synchronously interconnected electric systems are influenced by this development and often forced to adapt to the standards of the IEM.

Currently there are four synchronously operated electrical systems forming parts of the IEM. The largest of these systems, the Trans European Synchronously Interconnected System (TESIS), extends beyond the IEM (Figure 2). Both UKTSOA and ATSOI are, on the other hand, completely within the limits of the IEM. The synchronous system in northern Europe comprises the electrical system of Norway, which is outside the EU, yet adopts the rules of the IEM. TESIS comprises mostly members of the UCTE. Not all of these countries are in the EU, and, of those outside the EU, only Switzerland participates in the IEM. Those relations are depicted in more detail in Figure 2.

Through these effects, the single market will extend beyond the borders of the EU and may contribute to the extension of the synchronous area TESIS.

Perspective

Further development depends on the successful implementation of a working IEM for electricity. The national and European authorities can implement further measures if considered necessary in order to achieve this goal. Current developments, however, inspire confidence that this will not be required and a working single market for electricity will be a reality soon.

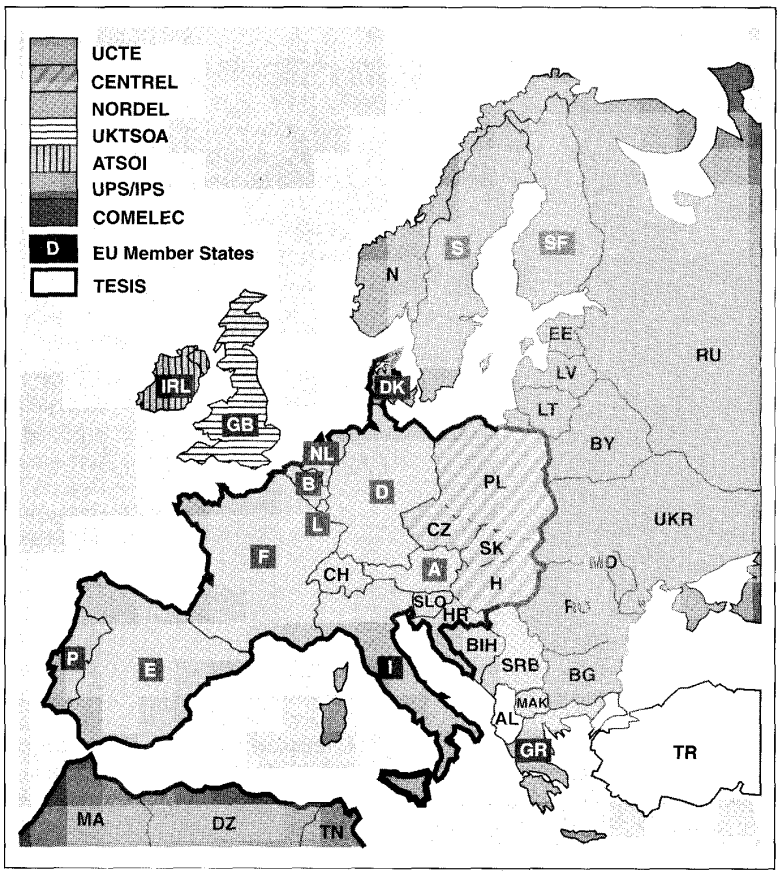

Figure 2. Structures of the European transmission systems (as of July 1999)

Francois Meslier

France Opens Its Electricity Market

The EU Electricity Directive leaves a great deal of freedom to the member states, and the opening of the French market is intended to be progressive and controlled

The European directive concerning the internal electricity market is to be transposed into French law in the final months of 1999. This legislative procedure marks the end of a process that got under way in the European Union (EU) a dozen years ago. It also marks the entry of EDF into a new environment, governed by new rules of the game. What are the stakes of this transposition? How have we reached this stage? What are the next deadlines? How are the other European countries readying themselves for it?

The bill for the "modernization and development of the electricity public service" was adopted during a first reading by a 19-vote majority in the National Assembly on 2 March 1999. Although many other stages must be gone through before the final adoption of the legal enactment, the players of the power market now have support which provides major indications on what the final law to come into force should be.

Nearly 10 years and many meetings were needed before the 15 member states of the EU came to an agreement on a directive setting out the principles of the European electricity market. The process actually got under way in May 1987. After a period of confrontation, marked, among others, by the rejection by the European Parliament of the text presented by the European Commission, the viewpoints among the member states gradually came closer together as of 1995 and finally ended up in the adoption of a directive in late 1996. Once this stage had been completed, it remained for the member states to transpose this European text into their national law. This is the period we are currently going through in France.

The European directive contains three compulsory provisions:

- The opening to competition of part of the national power markets. Some clients, referred to as "eligible customers," must have the possibility of choosing their electricity suppliers. However, the directive only lays down a minimum percentage of the opening of the market. Each country is then free to determine which customers will be eligible. In France, the bill calls for the opening of the market at the level defined by the directive, 26.5% in the first stage (see Table 1). In the EU, the effective average opening planned for 1999 should come to 60%. This percentage is explained by the fact that some countries have liberalized or will liberalize all of their market as of 1999: the Scandinavian countries, Great Britain and Germany.
- The possibility for independent producers to obtain authorizations from the public authorities to set up business in France and have access to the power transmission and distribution networks in exchange for a fee so as to be able to supply their customers.
- A set of provisions enabling third-party access to the neutral and independent network. This implies accounting unbundling, in other words, the separation of accounts for electricity generation, transmission, and distribution activities and the appointment of a network operator independent of the other players in terms of management.

Apart from that, the European directive leaves a great deal of freedom to the member states. That's why the content of the laws of transposition of the directive to national legislation is so important.

Member states are free to do the following in particular:

- Entrust missions in the general economic interest (a notion which encompasses the public service such as it is conceived in France) to one or more companies in the power sector, which is envisaged in France
- Conduct a long-term energy policy and planning, which is also envisaged in France
- Determine what types of customer will be eligible.

This article is based on a presentation given at the 1999 IEEE PES Summer Meeting panel session on "Realization of European Electricity Directives." F. Meslier is director of Transmission System Development, EDF, France.

Table 1. Opening of the electricity market in France at levels defined by the directive		
Year	Share of Eligible Market	Number of Eligible Customers in France (estimate)
1999	26.48%	~ 400
2000	~ 30%	~ 800
2003	~ 33%	~ 2,500

Far-Reaching Dialog Beforehand

Starting in February 1998, the French government decided to initiate dialog between the various players of the power market (EDF, unions, customers, contractors in the sector, elected representatives, local communities, etc.) before transposing the directive into French law. To serve as a basis for this dialog, the Ministry of Industry published a white paper presenting the different choices available to the country on the occasion of the transposition. The government also consulted the Economic and Labor Council, the Competition Committee, the Higher Electricity and Gas Committee, as well as the Regional Economic and Labor Councils. At the same time, prime minister Lionel Jospin entrusted Jean-Louis Dumont (a Socialist Party deputy from the Meuse) with a "mission of reflection and mediation with the social partners and the economic milieu." Among others, it dealt with concerns related to the status of the personnel of the power sector, EDF's future missions and the obligations to be fulfilled by the electricity public service. Before putting the bill before Parliament, the government received the opinion of the Council of State.

Legislative Process

The transposition bill, known as the "bill for the modernization and development of the electricity public service," was adopted in the Council of Ministers of 9 December 1998 and by the National Assembly of 2 March 1999 and later discussed in the Senate.

Once the law has been voted in Parliament, the final text will be forwarded to the general secretariat of the government. He will be responsible for presenting the text for the signature of the president of the republic, who will have a fortnight to enact the law (in other words, give it legal force). The act will then be published in the official journal.

The president of the republic may, within a period of 2 weeks, request the Parliament to deliberate over the bill or some of its articles. In practice, this is something that seldom occurs. He, as well as the presidents of the Senate and the National Assembly, or of a group made up of 60 deputies or 60 senators, may also refer the issue to the Constitutional Council so as to make sure that the law conforms to the Constitution. The Constitutional Council has a month to express an opinion on this matter or a week if the government makes such a request. Its decisions are imposed on all concerned, and no appeal proceedings can be undertaken.

If the Constitutional Council declares that the bill conforms to the Constitution, it can be enacted. On the other hand, if the Council states that a bill as a whole is contrary to the Constitution, the whole legislative procedure must be started again. The Constitutional Council may decide that part of a law conforms to the Constitution; in such a hypothesis, the law may be enacted except for those articles or parts of articles that are contrary to the Constitution.

However, the enactment of the law will not bring the process for the transposition of the directive to a close. In fact, some provisions will have to be specified by application decrees to be drawn up by the government and published in the official journal in the coming weeks and months. That is why the full application of the definitive text will still require another few months.

It being observed that the directive has not been transposed before the deadline date (19 February 1999 for France), the European Commission might take legal action against France liable to-lead to its sentencing, by lodging a complaint before the Court of Justice of Luxembourg. This is what is known as an action for defaulting. There is still some tolerance in actual fact. When it observes that the transposition process has indeed been undertaken (which is the case for France), the commission often grants the member state an additional period of time.

Controlled and Transparent Opening
The opening of the French market is intended to be progressive and controlled. In a first stage, more than 400 eligible customers in France will be able to negotiate the conditions of their electricity supply with the various producers of the EU. This represents over 26% of French electricity demand. In addition and under certain conditions, the bill also allows the purchase of electricity for resale in the national territory and acknowledges the partial eligibility of non-nationalized distributors (NND). All of these elements will make it possible to create a genuinely competitive power market as of 1999.

France is not the only European country to adopt a gradual approach to the opening of its market. Austria, Italy, Ireland, Belgium, Portugal, and Greece are doing or are planning to do the same.

Contents of the Bill
The text consists of measures aimed at ensuring the opening of the French market, as well as maintaining the characteristics particular to public service and to long-term planning.

Eligible Customers and Modes of Network Access
Any final consumer whose annual consumption on a site is higher than the limit set by the Council of State will be acknowledged as an eligible customer for this site and will be able to choose his supplier. He is therefore able to "conclude an electricity purchase contract with a producer or supplier of his choice established on the territory of a Member State or of the European community, or within the. framework of the performance of international agreements, on the territory of another state."

The text also specifies that "a right of access to the public transmission and distribution networks is also guaranteed by the operators of these networks so as to: ensure the implementation of the contracts between an eligible customer and the supplier of his choice, allow the supply by a producer of his premises, subsidiaries, parent company and subsidiaries of the latter, within the limit of his own production, ensure the implementation of the electricity export contracts concluded by a producer established on the national territory, and ensure public service missions."

The bill stipulates that the "tariffs for the utilization of public transmission and distribution networks to be paid by the users shall be calculated in a nondiscriminatory way on the basis of all of the costs of these networks ... The decisions concerning the tariffs and price limits shall be made jointly by the Ministers of Economy and Energy, on the proposal of the Electricity Regulation Commission."

Authorizations and Invitations to Tender
According to the bill, EDF and the other electricity suppliers may request authorizations to build and operate new generation facilities. These authorizations will be issued by the minister of energy.

The text stipulates that "when generation capacities do not meet the multiyear investment programming objectives, particularly those concerning generation techniques and the geographical location of the facilities, the minister of energy may resort to the tendering procedure, after receiving the opinion of the public transmission network operator." The Electricity Regulation Commission shall implement these invitations to tender.

The bill specifies that authorization requests and bids in response to the invitations to tender may be examined according to certain criteria: "the security and safety of public electricity systems, installations and associated equipment; the choice of sites, land use and the utilisation of public ground; energy efficiency;
the technical, economic and financial capabilities of the applicant or requesting party; and compatibility with public service principles and missions, particularly the objectives of multiyear investment programming and environmental protection."

Transmission Network Operator
The text stipulates that "within Electricite de Prance, the operator of the public electricity transmission network shall carry out its missions under conditions laid down by specifications approved by decree by the Council of State."

It shall have network operation and maintenance functions, as well as network development responsibilities. The extent of the missions entrusted to it make it a major player in this field.

Indeed, the bill specifies that "the operator of the public transmission network shall operate and maintain the public electricity transmission network. It shall be responsible for the development of this network so as to allow the connection of producers, distributors and consumers, as well as the interconnection with the

other networks... The network operator department shall implement the demand, supply and consumption programmes established beforehand ... The public transmission network operator department shall see that there is a balance of power flows on the network at all times, and shall also ensure the security and efficiency of this network, by taking into account the technical constraints involved. It shall also watch that there is due compliance with the rules concerning the interconnection of the various national power transmission systems."

Furthermore, the text stipulates that the "public transmission network operator department shall be independent, from the management standpoint, of the other activities of Electricite de France. For the appointment of its director, the chair of Electricite de France shall propose three candidates to the minister of energy. The minister shall appoint one of these candidates as director for a 6-year period, after receiving the opinion of the Electricity Regulation Commission ... Within Electricite de France, the public transmission network operator department shall have its own budget. The budget and financial statements shall be notified to the Electricity Regulation Commission."

The bill also specifies that "the public transmission network operator department shall preserve the confidentiality of information of an economic, commercial, industrial, financial, or technical nature the communication of which would be detrimental to the rules of open competition and non discrimination imposed by the law. The list of information concerned shall be determined by decree issued by the Council of State."

The text also calls for sanctions should there be breaches of confidentiality. It stipulates "that any person in possession of the aforementioned information and who belongs to the public transmission network operator department shall be fined 100,000 French francs for knowingly communicating the aforesaid information, in any form whatsoever, to any person foreign to this department."

An operator department was not set up outside EDF because the directive does not impose this. At the most, it stipulates the independence of the network operator with respect to the management of the other activities not related to the transmission network. Other countries, such as Germany and Austria, have made the same choice as France. Furthermore, the text offers many guarantees to ensure that the operator department will act in an independent and nondiscriminatory way.

Public Service

The bill stipulates that "the electricity public service aims at ensuring the supply of power throughout the national territory." It specifies that this public service "shall ensure the balanced development of electricity supply, the development and operation of public electricity transmission and distribution networks, as well as the supply of electricity."

The bill stipulates namely that the electricity supply mission consists in particular in ensuring the following throughout the territory: (1) "the supply of electricity to customers who are not eligible... while contributing to social cohesion, by means of national geographical equalisation, guarantee of the continued supply of energy to the needy, and by favouring demand side management (...); (2) emergency electricity supply to producers or to eligible customers connected to the public networks, whenever they make the request for such supply ... ; and (3) power supply to any eligible customer when the latter is unable to find a supplier."

Financing of Public Service Missions

It would be unfair that expenses related to public service missions be borne solely by EDF in the face of competition. That is why the law provides for the setting up of appropriate financing systems.

The text specifies that some public service expenses shall be subject to specific financing. These expenses concern the following in particular: "extra costs which may result from contracts arising from invitations to tender ... or from the purchase obligation; extra generation costs, in areas that are not interconnected to the continental metropolitan network; *the* additional research and development costs necessary to increase the transmission capacities of power lines, in particular those intended for the interconnection with neighboring countries and the improvement of their aesthetic blending into the environment."

According to the bill, these missions shall be financed by an electricity general interest expenditure fund. "The fund shall be supplied by contributions paid by the producers or their subsidiaries and by the distribution organizations, when these different operators supply energy to final customers installed on the national territory, by electricity producers generating power for their own use ..., as well as by final customers importing electricity or who make intra-Community power acquisitions... The amount of the

contributions ... shall be calculated in proportion to the number of kilowatt-hours supplied to the final customers established in the national territory or produced by autoproducers for their own use."

The text also specifies that the fund shall be "managed by the Caisse des depots et consignations (Deposit and Consignment Office) under a specific account." The Caisse des depots et consignation is a public financial organisation.

Long-Term Planning of Investments

The bill stipulates that "the ministry of energy shall decide and make public the multiyear generation investment programming which lays down the objectives concerning the breakdown of generation capacities by primary energy source and, if necessary, by generation technique and geographical area. ... This programming is set out in a report presented to Parliament by the Minister of Energy in the year following any renewal of the National Assembly." In France, except for dissolution by the president of the republic, the National Assembly is renewed every 5 years. "The first of these reports shall be presented in the year which follows the enactment of this law."

The text specifies that "to draw up this programming, the minister of energy shall particularly use as a basis a multiyear forecast inventory drawn up at least every two years, under the control of the State, by the public transmission network operator. This inventory shall take into account consumption trends, transmission capacities and exchanges with foreign networks."

Speciality Principle

The text specifies that EDF "shall be able, by subsidiaries or companies, groupings or organizations in which it or its subsidiaries hold shares, to propose to eligible customers present on the national territory a comprehensive offer of technical or commercial services together with the supply of electricity." Concerning noneligible customers, the bill stipulates that EDF and the subsidiaries that it controls shall only be able to "propose advisory services meant to promote demand side management. They shall not be able to offer services concerning the construction or maintenance of internal installations, the sale and rental of user energy appliances."

Regulation

The text stipulates that "the Electricity Regulation Commission shall consist of six members appointed for a six-year period owing to their qualifications in the legal, economic and technical fields. Three members, including the chairman, shall be appointed by decree. The three other members shall be respectively appointed by the President of the National Assembly, the president of the Senate and the chairman of the Economic and Labor Council."

The bill equally states that a "government commissioner to the Electricity Regulation Commission appointed by the minister of energy shall make known the government's analyses, particularly as concerns its energy policy."

According to the bill, "the Electricity Regulation Commission may, either automatically or at the request of the minister of energy, or a physical person or legal entity concerned, sanction any breaches by the public transmission or distribution network operators or their users that it may observe", particularly in the case of breaches of a legislative or regulatory provision relative to the access to or utilization of the networks. The commission may also "temporarily forbid access to the networks for a period not exceeding one year" and "a pecuniary sanction the amount of which shall be proportional to the- seriousness of the breach and to the advantages obtained from this breach."

Transitional Measures Pending Full Transcription

The transposition of the directive into French law will take several months and might not take place before Autumn 1999. In the meantime, the present legal system, arising from the Nationalization Act of 1946, continues to be applied to the fullest extent, but the direct effects of the European Directive must be respected.

Thus, customers consuming more than 100 GWh (including their auto-production) are automatically eligible. In France, this concerns 185 sites belonging to 81 industrial or service groups and representing for EDF a sales revenue of about 15 billion French francs (about 20% of total consumption).

EDF has therefore set up a number of temporary measures. They call for EDF to allow for eligible customers to change of supplier if they wish to do so. The corresponding service shall be remunerated according to the "postage stamp" principle, in other words according to the power and energy conveyed over the network and not to the distance covered. This is the principle adopted in nearly all the European

countries. Customers choosing another supplier will be invoiced for the making available of electricity, so as to be able to cover the expenses currently borne by the company, other than those directly related to the supply of energy. These charges can be compared in level and structure to those prevailing in the other countries for access to the network.

EDF will also make sure that sensitive information gathered as a result of its network management activities remains confidential.

To do so, the chair of EDF, Francois Roussely, has entrusted the transmission network operator with implementing the necessary temporary measures. Wide media coverage has been devoted to the scope of its mission, as well as to the network access tariffs. These subjects are also to be found on the EDF Web site. This will make it possible for a large number of people to get acquainted with the mission and tariffs and allow them to compare prices of the different suppliers in accordance with their needs. In addition, a unique reception point has been set up for eligible customers wishing to obtain information on transmission network access prices or to change suppliers.

Other decisions called for by the directive and which take effect immediately include unbundling, i.e., separate accounting for generation, transmission, and distribution activities. In addition, autoproducers may use the network to supply their subsidiaries and premises, regardless of the number and consumption.

EDF is Ready to Face Competition

What will be the effects of the opening of the French market? Francois Roussely stated recently that, in France, EDF normally stands to lose customers because it enjoyed a virtual monopoly. However, the company has shown good financial results over the past few years and is ready to face the competition in France and carry on with its development in Europe and throughout the world.

In 1998, EDF recorded a gross income of 8.1 billion French francs (1.2 billion Euros), 15% higher than the prior year. The company's main management indicators are positive:

- Growth of sales made it possible to maintain the sales revenue figure at 185 billion French francs (28.2 billion Euros), within a context of price reductions (-4.6% in April 1997 and *2.5% in May 1998)
- Reduction of the debt and financial costs
- Net cash flow up by more than 10% to 49.2 billion French francs (7.5 billion Euros) versus 43.8 billion French francs in 1997
- Payment of 3.1 billion French francs (0.476 billion Euros) in corporate tax and a contribution to the State amounting to 2.9 billion French francs (0.444 billion Euros)
- EDF invested 11.1 billion French francs (1.7 billion Euros) in equity interests abroad.

EDF, along with its partners, is involved in the operation of distribution companies supplying more than 15 million customers (30 million in France). It also contributes to building and operating generation facilities with a capacity of over 15,000 MW, or the equivalent of nearly 15 % of the installed capacity in France.

Luigi Salvaderi

Electric Sector Restructuring in Italy

Industry restructuring is moving at a rapid pace, with many generators entering the production sector, a new ISO entrusted with the transmission function, and tariffs that will gradually eliminate existing cross-subsidies

After a long-lasting process involving many ideological, political, and financial issues, a law (Law 128) was passed on 24 April 1998 by the Italian Parliament that, with its Article 36, delegated to the government the task of issuing the operational decrees needed to enforce in Italy the EU Directive 96/92 CE for the introduction in Europe of the internal electricity market.

At the beginning of November 1998 the Ministry of Industry issued a draft decree, discussed by the two concerned commissions of the Senate and in the Lower Chamber in various hearings with the Italian Authority for Electricity & Gas, the Merger and Monopoly Commissions, the representatives of the Electric Industry as well by other interested parties (Consumer Association etc.). At the beginning of February 1999, the two commissions gave their advise to the government. The Ministry of Industry, by taking into account the parliamentary suggestions, issued the final text of the decree, which was approved by the Government by 19 February 1999 and passed into the Italian Legislation by 31 March 1999. The main aspects of the new electric sector are described in the following.

Industry Restructuring

Generation

Generation, import, and export are liberalized; producers willing to enter the free market have to request authorization.

To avoid/prevent the danger of abuse of dominance position the following criteria are established:

- By 1 January 2003, no generator should have the capability of producing/importing more than 50% of the total Italian supply
- Within the same date, ENEL Spa has to divest at least 15 GW (out of the present 58 GW)
- To promote the renewables, from 1 January 2001 all Companies that produce/import more than 100 GWh per year from conventional sources must supply 2% of its production with *new* renewables; such obligation can be satisfied also by buying "allowances."

At the moment of writing, the nature and the timing of such huge divestments are being discussed: two or three "mirror" companies, having a similar mix and balanced geographical site, are forseeable. This high priority and very sensitive issue should be defined within the Summer 1999.

Transmission

Transmission will remain a regulated activity. The ISO solution (separation of the operation and ownership of the grid) has been choosen.

A new independent public joint stock company fully owned by the Ministry of Treasury, the Gestore della Rete Trasmissione Nazionale (GRTN), constituted by ENEL Spa within 30 days for the enactment of the decree, will have the tasks of planning, scheduling, dispatching, and operating the system and to "order" to the network owners (by stipulating suitable contracts) the needed maintenance and reinforcements of the transmission system. To the GRTN, all contractual obligations of ENEL (including contracts for import and the PPAs with incentivated QFs), with the exception of the network ownership, as well as a portion of the related debt will be transferred. The GRTN will not have regulatory powers, entrusted to the Authority for Electricity & Gas.

This article is based on a presentation given at the 1999 IEEE PES Summer Meeting panel session on "Realization of European Electricity Directives." *L. Salvaderi is with ENEL, Spa, Corporate, Electric System Development & Relations with the Authority.*

As anticipated, ENEL and the other network owners will keep the ownership of the wires and will be obliged to carry on the above mentioned O&M and reinforcements "ordered" by the GRTN: the related contractual arrangements should assure a fair return on their investments.

Two further joint stock companies are envisaged:

• Single buyer (SB), a subsidiary company of the GRTN created within 6 months since the enforcement of the decree (that is probably within October 1999): it will have the responsibility of supply for the captive consumers (and for the eligible consumers which will request to remain captive; this will be allowed for a maximum of 4 years), through a suitable portfolio of contracts with generators and with distributors respecting directions of the regulator. The single buyer has the duty of carrying on each year the forecast of the demand for the following three years and of the needed contracts with generators to face the demand *with the needed reserve margin.* The Ministry of Industry can authorize the sale of shares of the SB, within a maximum percentage of 10% each, to the various distributors.

• Power exchange (Operatore del mercato), owned by the GRTN, will be instituted within 9 months (probably 1 January 2000). The following dispatching models are envisaged in the decree: from the enforcement of the decree up to 31.12.2000, bilateral contracts between generators and distributors; and, by 1 January 2001, a bid-based compulsory pool run by the power exchange, coexisting with bilateral contracts when duly authorized, is envisaged. The rules of such rather complex market structure, in particular the relationships between the two markets (SB for the captives and the PX for the eligible consumers), are to be fixed in the next future. A key issue appears to be how the component of the tariff to the captive consumers related to the generation will be handled by the regulator after the enforcement of the pool; regulatory (for the captive consumers) and financial issues (nature and length of the contracts, "one way" CdFs, which the SB has to stipulate with the generators) are to be solved.

Distribution

The old distribution activity has been subdivided into a wires business and a supply business. The first one is subject to concession and regulated, the second one is liberalized.

By 31 March 2001, the Ministry of Industry will issue licenses for distributors that were engaged in distribution business on 1 April 1999; each license will have a 30-year term.

Within 6, months, all distributors having more than 300,000 clients (namely ENEL and a few municipalities) must unbundle the distribution business to the captive consumers and set up Companies to which assets and a suitable portion of the debt will be transferred.

In order to rationalize the distribution in the municipalities, only one concession will be granted after 31 March 2001. Where two distributors presently exist, as in the in the big cities (Rome, Milan, Turin), the distributors should take the appropriate steps and present to the Ministry of Industry a consolidation proposal by 31 March 2000. If agreement cannot be reached, the municipalities that serve at least 20% of the consumers *have the right to ask ENEL Spa to sell* its local distribution business by 31 March 2001. Should an agreement on the business value be not obtained within 30 September 2000, the selling price will be determined by three external experts two named by the two parties and a third one named by the president of the court having jurisdiction where the Municipalities are located.

Moreover, the municipalities serving more than 100,000 consumers may ask to extend the aggregation to neighboring municipal districts; however mandatory arbitration is not foreseen in these cases.

The presence of only one concession in the municipalities is referred to only in the wires business; therefore, at least in principle, the domestic consumers should have the future possibility of choosing their suppliers since the supply activity is expected to be liberalized.

Supply

The supply business will act as a separate business from the wire business. Suppliers must take an active role in competing for eligible consumers business, in principle whether in their own area or outside their host area in order to protect/increase their market share.

Services open to competition are meter operation, data collection, and aggregators.

As a result, ENEL spa will be shaped as an industrial holding (Figure 3), controlling:

• One or more production companies, within the capacity/generation limits above mentioned
• Ownership of the transmission network
• One distribution company and the supply to the captive consumers
• One company for supply to the eligible consumers
• One company for the nuclear phase-out, to be transferred to the Treasury
• Various companies for renewables (Erga), lighting (Sole), and activities beyond the meter (Seme)
• Various companies for services (construction & engineering, real estate, R&D, informatics, water)
• Telecommunication company for the third mobile phone (Wind).

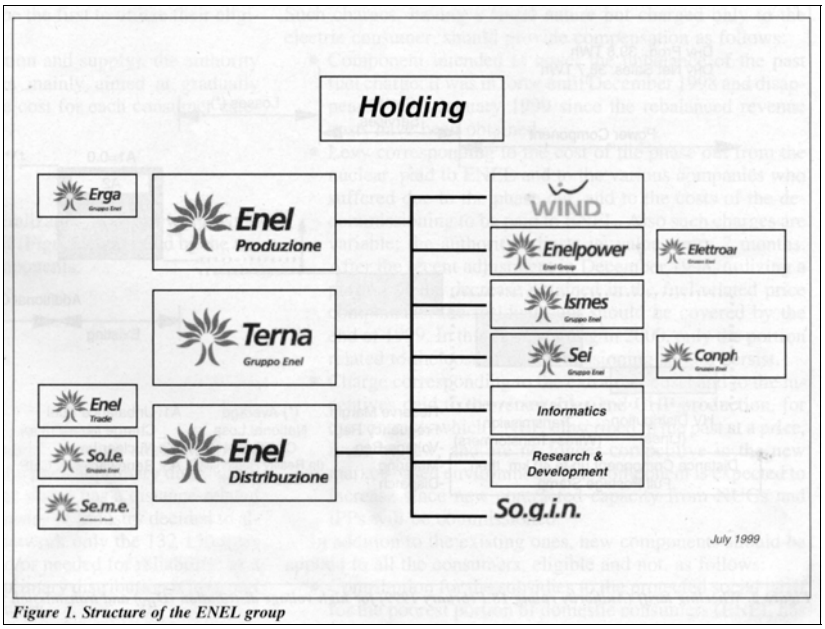

Figure 1. Structure of the ENEL group

Market Opening

The market opening envisaged by the draft decree goes beyond the limits imposed by the directive. The forecasted opening shares are 30% by 1999,35% by 2000, and 40% by 2002. These percentages will be achieved as follows:

- Starting in 1999, clients with a yearly consumption, self-production included, higher than 30 GWh per year per site will be eligible. In addition, clients sited *in the same or neighboring municipalities* can aggregate themselves in consortia in order to reach 30 GWh, with the constraint that each client consumes at least 2 GWh per year.
- In 2000, these limits will decrease down to 20 GWh per year per site and, for a consortium, to 1 GWh per year for each client
- By 2002, the limits will be 9 GWh per year per site and, for a consortium, 1 GWh per year per client
- Also by 2002, choice will be extended to *multisite* clients having a total consumption of 40 GWh per year and, for a consortium, the same 1 GWh per year by each member.

It may be stressed that the eligibility of the consortia reflects the backbone nature of the small industries in the Italian economy. As a result, the Italian market liberalization appears to be allocated in the midrange among the EU countries, between the 100% of UK, Sweden, Finland, Denmark (opening obtained before of 1999) and Germany and the 25% and 29% planned by Greece and Belgium.

Regulatory Actions

Among the new key features of the Italian electric sector is the role the new regulator, the Authority for Electricity and Gas, operational since March 1997. It was very active, and its major moves have been:

- Restructuring, effective August 1997, of the "variable part" of the tariff. Instead of the past "pass through" system fixed "ex post" to cover the fuel and the import cost, now only an "ex ante contribution," which is updated every 2 months according to a basket of fuels, is now recognized. The mechanism was designated to trigger the efficient use of the generating plant and of the nonthermal production (and probably the utilization of the interconnection lines for import for "commercial trades"). As a matter of fact, the "contribution" is lower than the cost of ENEL contracts for import purchases with firm capacity. Consequently, the Authority measure impacted on the financial result of ENEL, which appealed to the Court, winning the first degree judgment (the final decision is expected in midsummer) and put pressure on the type of fuels to be used.

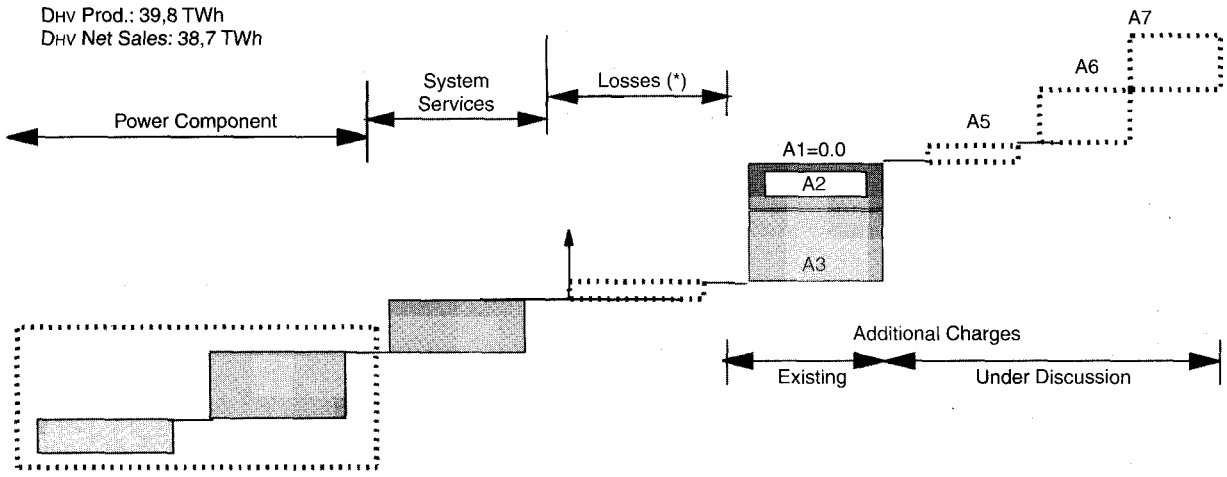

Figure 2. Wheeling tariff (Authority ruling 18 February 1999) for high-voltage distribution (Day) and transmission (T) only 14

• Revision of the prices paid by ENEL for purchases of "surplus production" from auto-producers, with a gradual reduction of the past "capital avoided cost and O&M" component and a realignment of the "fuel avoided cost" to the price of the thermal production and no more of gas as before.

• Revision of the "fixed part" of tariffs, which in the past were used in Italy as a tool for more general purposes of economy policy and, as a result, produced many cross-subsidies among the various sectors and also within the same sector.

The guidelines for a new tariff structure, aimed at a gradual rebalance of cost to prices, were issued in mid-March 1998 and have been discussed in various hearings with all the players. Summarizing the content of the proposals:

• In *production,* since the new market structure has been not yet defined, the criteria should avoid the effects of a dominant position

• In *transmission,* in absence of the mentioned new institutional framework, the Electricity & Gas Authority did not disclose its ruling of the transmission tariff; correspondingly, so far all the consumers pay a pancaked tariff including generation, transmission, distribution, and losses. Nevertheless, in February 1999 *the* authority created the wheeling tariff addressed at the consumers who were eligible to choose at the market opening, in particular those connected to the HV primary distribution network (132-150 kV) who should be the first to utilize their eligibility.

• In the "fornitura" (distribution and supply), the authority has established the criteria mainly aimed at gradually rebalancing the price to the cost for each consumer category.

New Wheeling Tariff

For the impact on the market liberalization, it seems worthwhile to discuss the new wheeling tariff (Figure 2), as ruled by the authority. It has the following components:

• Power charge
• System services
• Losses
• Other "para-fiscal" charges.

***Power* Charge**

The authority constructed a "mega" postage stamp both for transmission (380-220 kV) and the present primary distribution network (132-150 kV); this mega stamp has a distance-related component up to 40 km. The Ministry of Industry decided to allocate to the new transmission network only the 132-150 lines having transmission function and/or needed for reliability; as a result almost 50% of the present primary distribution is now part of the national transmission network.

System Services

The following system services were identified:

• Static reserve margin • Dynamic duties for frequency (primary and secondary) regulation • Voltage duty for the reactive support

• Dispatching
• Measures.

While the last four components are compulsory for all requiring the wheeling, the reserve margin, corresponding to the past (and still present) obligation of supply of ENEL Spa as integrated utility for all the Italian consumers, can be optionally contracted by each wheeler.

Losses

A site-related marginal loss coefficient has been proposed, similar to the one used in Norway, to give a signal to the siting of future generation. At ENEL extensive optimal power flow computations were carried out, in order to assess, under various system conditions, such values in the various nodes/areas of the country. Coefficients for seven (each related to more than one administrative regions) "generation" areas have been fixed.

So far, no specific decision has been taken as far as the handling of potential transmission constraints. In ENEL's perception, the TSO should handle the issue and charge it to the Distributors.

Other Charges

Such charges, having a fiscal nature but charged only to the electric consumer, should provide compensation as follows:

• Component intended to cover the unbalance of the past fuel charge: It was in force until December 1998 and disappeared by 1 January 1999 since the rebalanced revenue costs have been obtained.

• Levy corresponding to the cost of the phase out from the nuclear, paid to ENEL and to the various companies who suffered due to the phase out, and to the costs of the decommissioning to be paid to ENEL. Also such charges are variable; the authority adjusts its value every 2 months. After the recent adjustment in December 1998, utilizing a portion of the decrease obtained in the fuel-related price components, the residual debt should be covered by the end of 1999. In this case, starting in 2000, only the portion related to the cost of decommissioning should persist.

• Charge corresponding to the extra fuel costs and to the incentives paid to the renewables and CHP production, for the contracts which ENEL subscribed in the past at a price, fixed by law, and are no longer competitive in the new market-based environment. This component is expected to increase since new contracted capacity from NUGs and IPPs will be commissioned.

In addition to the existing ones, new components should be applied to all the consumers, eligible and not, as follows:

• Contribution for the subsidies to the protected social tariff for the poorest portion of domestic consumers (ENEL has proposed that this component should applied only to the domestic sector)

• Subsidy for some consumers (e.g. aluminum, railways, etc.) having special discounts by law: This should be paid by the majority of the HV consumers (34.6 TWh out of 37.4 TWh).

Component related to the investments, approved and recognized by the authority, which the industry will make for R&D.

A further component related to the stranded costs, mainly in generation, corresponding to the opening of the market, is being discussed by the Ministry of Industry and the Regulating Authority. Its nature and value are still an open question, influenced also by the discussions of the Italian government with the EC Commission.

The ruling of the authority concerning the wheeling tariff is very tight; in particular the return on the invested capital was fixed to a level that does not correspond to the present earnings of the segment transmission within ENEL. Moreover, the provision of not recognizing in the wheeling tariff the reserve margin component (and the cost sustained by ENEL in the past for its responsibility of supply) now made optional- could entail substantial financial losses to ENEL.

Floating ENEL

The government aims to float some 15% of the ENEL equity within 1999;
the ENEL management and their financial advisors are preparing the related evaluation.

Key issues, at the time of writing (mid July, 1999), are:

• New level of the tariff system, under definition by the authority, from which derives the profitability of the most of the ENEL business

• Related aspect of the remuneration allowed to the capital invested on the regulated business

• Parameters and the time validity of the "price cap" (RPI-X) regulation, particularly the value of the productivity expected by ENEL

• Solution of the problem of the stranded costs.

A suitable balance of the somewhat conflicting interests of the company, the present owner (the Ministry of Treasury), the future stockholders, and the consumers is needed; the decisions expected by the end of summer 1999 will deeply affect the value of ENEL.

Portugal and the European Electricity Directive

Until the late 1980s, electricity supply in Portugal was a vertically integrated, state-owned monopoly: Liberalization started then in the generation sector. First, small cogeneration and renewable-based projects were allowed and subsidized. In the early 1990s, large IPPs made their appearance. In fact, the 600 MW coal-fired Pego power station was the first project-financed power station in continental Europe.

During the 1990s, the Portuguese power sector experienced deep structural changes. Reform initiated in the first half of the 1990s anticipated the new rules defined by the European directive 96/92/EC on the internal electricity market.

The major milestones in the process of liberalization of the Portuguese electricity sector may be summarized as follows:

- Transformation of the vertically integrated state-owned company into a holding company owning separate generation, transmission, and distribution companies (1994)
- Definition of a new legal framework (1995)
- Appointment of an independent regulator (1996)
- Privatization (1997, 1998).

Since January 1999,33% of the Portuguese supply market is open to competition.

Tariffs for transmission, for distribution, and for final customers are now established by the independent regulator. Transmission tariffs are paid by all customers, and they include access to interconnections. No extra charge exists for import/export transactions.

Given its small size, future developments of the Portuguese power system depend, to a large extent, upon the development of a truly competitive European electricity market. Appropriate pricing of cross-border transactions and suitable congestion management mechanisms at the European level, not foreseen in the *96/92/EC* directive, are needed to allow full integration in the internal market.

Meanwhile, regulation is improving transparency and efficiency of the Portuguese power system, giving customers and investors a more clear and stable framework where new opportunities can be explored.

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Konstantin Staschus

German Open Access and Transmission Pricing within the European Framework

The German government's main reasons for letting market participants jointly define the rules for network access are consistency and flexibility

With about 480 TWh of annual consumption on the public networks, plus 30 TWh of industrial and German Rail self-generation, Germany is the second largest power market in Europe after Russia. Many other countries, either direct neighbors or only several hundred kilometers away, feature similarly large power markets, e.g., France, Italy, Scandinavia, and the so-called CENTREL countries (Poland, Czech Republic, Slovak Republic, and Hungary) whose networks have been operated synchronously with the UCTE grid since late 1995. About 60 EHV circuits (about half 220-kV and half 380-kV) connect Germany to its neighbors in all directions, and about 40 TWh each are physically exported and imported each year. Much of this interchange is dominated by seasonal hydro-thermal exchanges with Austria and Switzerland, but large exchanges also take place with France, Luxemburg, the Netherlands, Denmark, Sweden (including via two de-connections with Denmark and Sweden), Poland, and the Czech Republic.

Compared to some other European countries, Germany has a very diverse electric utility landscape, including over 900 utilities, most of them municipal. The great majority of them cooperate in the association of German electric utilities, VDEW. There are also close to 50 regional distribution companies and eight transmission system operators (TSOs); the latter cooperate in the German Interconnection Association, DVG Deutsche Verbundgesellschaft e. V.

Implementation of the EU Electricity Directive

The European Union (EU) Electricity Directive (Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996) demands that most member states implement some form of open access by 19 February 1999. The German Energy Market Law doing that went into effect 19 April 1998. This law opened the entire market immediately; there were no demand thresholds or transition periods and no provisions for stranded investments. Only utilities whose investments in combined heat and power or east German lignite-fired plants are endangered may be able to reject open access transactions. The main components of the law abolish prior exceptions from antitrust laws for "demarcation" and exclusive "concession" contracts and thus enable negotiated third-party access (NTPA). The Economics Ministry has the power to regulate transmission access and pricing but prefers a negotiated associations' agreement, enforceable through the antitrust offices on federal and state levels. Single buyer schemes, one of the market opening options of the EU directive, are permitted at the municipal distribution level as an alternative to NTPA, subject to government authorization limited until 2005. Relatively few municipal utilities have applied for that status. Specifics on the functioning of open access were soon after dealt with in the associations' agreement on transmission pricing enacted in May 1998 and the DVG GridCode published in July 1998.

Associations' Agreement on Transmission Pricing and GridCode

The associations' agreement, signed by the association of German electric utilities (VDEW), of German industry (BDI) and of industrial self-generators (VIK), prescribes postage stamp pricing for the distribution networks (generally < 110 kV), paid at the demand point. For the transmission networks, in addition to a postage stamp component collected in portions at both demand and injection points, a distance-dependent price component is added for transactions whose average straight-line distance exceeds 100 km (DM 0.125/(kW*a*km)). Transactions pay only for the voltage levels they use; the affected voltage levels above the levels of connection to the grid are determined on the basis of the linear distance between injection and demand. System services, transformation and losses are charged separately.

Corresponding to the agreement's transaction-oriented approach, the GridCode describes a system for registering, operationally evaluating, and updating transactions, including their sources and sinks and ^-hour schedules. For small customers (e.g., households), the schedules can be handled via load profiles. System users coordinate bilaterally (i.e., between supplier and recipient) the transmission service program schedules; positive and negative injections must be balanced. The supplier and the recipient can pass on

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This article is based on a presentation given at the IEEE PES Summer Meeting panel session on "Realization of European Electricity Directives". K. Staschus is head of Economics, DVG, Heidelberg. Cermany.

their responsibility for the notification of their schedules to third parties such as brokers, traders, or marketers. Schedule deviations are partly handled via system services; partly the supplier and recipient are individually responsible for schedule deviation payments as a function of thresholds. All system operators concerned (transmission and distribution) must accept the transmission service in order for it to be valid; in case of danger to security or reliability, service can be rejected. Program values for approved transmission services can be updated until noon 1 day ahead, and updating of program values later than noon is admissible in cases of plant outages.

Current Developments

Although the number of concluded open access transactions remained under 100 during 1998, many customers had already in 1998 used the new opportunities provided by the law to achieve substantial price reductions. Starting in January 1999, many more customers switched suppliers either entirely or for part of their load. In summer 1999, price reductions of 10% and more arrived at the household customer level, and the first national marketing campaigns for gaining household customers began. Thus, the number of transactions is still rising fast, and the power prices for all customer classes have fallen substantially already. The European Energy Exchange in Frankfurt, one of two institutionalized power exchanges in Germany, is to commence operations with futures in the year 2000, fostering competition further.

The government's main reasons for letting the market participants jointly define the rules for network access are consistency and flexibility. The German-wide agreement prevented 900-plus different pricing systems that were theoretically possible otherwise. Being a recommendation that addresses methods, not prices themselves, it unifies handling without eliminating flexibility. The current agreement was already very successful at opening the market, but in its application both the transmission and distribution system operators, and also the network users, were able to identify areas for improvement, in particular in the ease of handling. A new version of the associations' agreement has been negotiated and was signed on 13 December 1999. The declared goal is simpler handling through reduced transaction dependence, achieved not through point-to-point but control-area-to-control-area schedules. This direction is consistent with the European-wide discussions on international system access (International Exchanges of Electricity: General Principles of the European Transmission System Operators. Final Draft 26 April 1999. http://www.eurelectric.org). GridCode changes will likely be necessary as a result of the new agreement; these are discussed in a new 30-member Transmission System Consultation Committee with the new associations' agreement and new technical access rules for the GridCode.

The German power market has become very dynamic and competitive, with many new entrants (German and international) active in power trading and sales.

Nikolai I. Voropai, Yuri N. Kucherov

Russia and the EU Electricity Directive

From the technical viewpoint, penetration of the UPS of Russia to the European market causes no radical problems, but the political atmosphere plays an important role in realizing such plans

The electricity directive of the European Union (EU) aims at the extension of the competitive electricity market across the European continent. The goal of Russia and its unified power system (UPS) is to become an equal partner and major player in the European electricity market.

Expediency and efficiency for the UPS of Russia to participate as an equal partner of the European electricity market as well as the appropriate interaction with power systems of the CIS countries should underlie the policy for development of the Russian electric utility industry and the UPS of Russia.

Russian Power and Energy Potential

The territory of Russia has an abundance of fuel resources, represented by 38% of the prospected world gas reserves, 13% of oil, and 12% of coal. This energy potential, coupled with the scientific and technological potential of its engineers and researchers, is massive and impressive. It will allow Russia to play a special role in the development of the electric utility industry on the Euro-Asian continent.

The UPS of Russia, the world's largest centrally managed interconnection, has been created and successfully operates in Russia. The UPS of Russia has been operating for 40 years, and there has been no emergency affecting the entire UPS.

There are 75 power systems operating within the territory of the Russian Federation.

As of January 1998, the installed capacity of power plants in the UPS of Russia, along with the interconnected power system (IPS) of the East, consists of 199.6 million kWh or 93% of the installed capacity of power plants in Russian Federation. The types of generation in the UPS of Russia and the IPS of the East and their share of the total are:

- 41.3 million kW (21%) in hydro power plants (HPP) and pumped-storage plants (PSP)
- 21.3 million kW (11%) in nuclear power plants (NPP)
- 137.0 million kW (68%) in thermal power plants (TPP). Electric power produced by the power plants of the UPS of Russia and the IPS of the East in 1997 totaled 802.7 billion kWh or 96% of the electric power produced by all power plants of the Russian Federation, including 149.2 billion kWh produced by HPP, 108.1 billion kWh produced by NPP, and 545.4 billion kWh produced by TPP.

The main grid of the interconnected power systems operating in parallel with the UPS of Russia uses two systems of rated voltages:

- 330-750 kV in the IPS of North West of Russia and in some of the IPS of the Center
- 220-500-1,150 kV in the most part of UPS. As of January 1998, more than 444,000 km of overhead transmission lines and 552 million kVA of transformer capacity are in operation in the electric networks of the UPS of Russia (with the East) at voltages of 110 kV and higher.

Present External Electric Ties of the UPS of Russia

External electric ties of the UPS of Russia consist of interstate ties with the power systems of the states belonging to the UPS of the former USSR and other countries. The IPSs of Russia have efficient interstate ties with the IPSs of the Ukraine, Transcaucasia, Kazakhstan, Belarus, and the Baltic countries. Their use is determined by economic and political agreements. Electric power exports to the republics of the former USSR in 1997 totaled 15.6 billion kWh.

Electric power is also exported to other countries: to Finland via the dc link at substation Vyborgskaya, to the islanded areas in Norway and Finland, and to the power system of Bulgaria via the electric networks of the Ukraine. In 1997, the UPS of Russia supplied 5.0 billion kWh of electric power to foreign countries.

This volume of exported electricity is below the export capacity of the UPS of Russia and can be increased.

This article is based on a presentation given at the 1999 IEEE PES Summer Meeting panel session on "Realisation of European Electricity Directives." *N.I. Voropai is with the Energy Systems Institute, Irkutsk, Russia; Y.N. Kucherov is with JSC "UPS of Russia," Moscow, Russia.*

Status of the European Electricity Market

The European Electricity Directive that defines the European electricity market consists of general rules for the organization of each sector: generation, transmission and distribution system operation, unbundling and transparency of accounts, and control of access to the system. However, there are a number of defined problems that have to be solved in order to realize a full-value electricity market.

Originally the European electricity market will cover about a quarter of electricity consumption. The real competition will arise in 4 to 5 years, as new electric networks are sufficiently developed. The current interstate transmission lines are available only for emergency assistance between the systems and for long-term electricity export/import contracts between the connected countries.

In the process of creating the full-value competitive European electricity market, electric utilities will have to seriously change their methods of operation.

Participation in the European Market

Factors enabling the UPS of Russia to participate in the European electricity market are as follows:

- Surplus fuel and energy resources in Russia, which allow the production of competitive electric power
- Advantages gained by the countries of western and central Europe due to diversification of energy supply sources, improvement of their environmental situation, etc.
- Advantages gained by both parties as a result of joint operation and coordinated development of power systems
- Available and actively studied technical possibilities for the UPS of Russia to participate in the European electricity market
- Rich experience already gained by the joint operations of the UPS of Russia and the IPSs of the countries of CIS and central Europe.

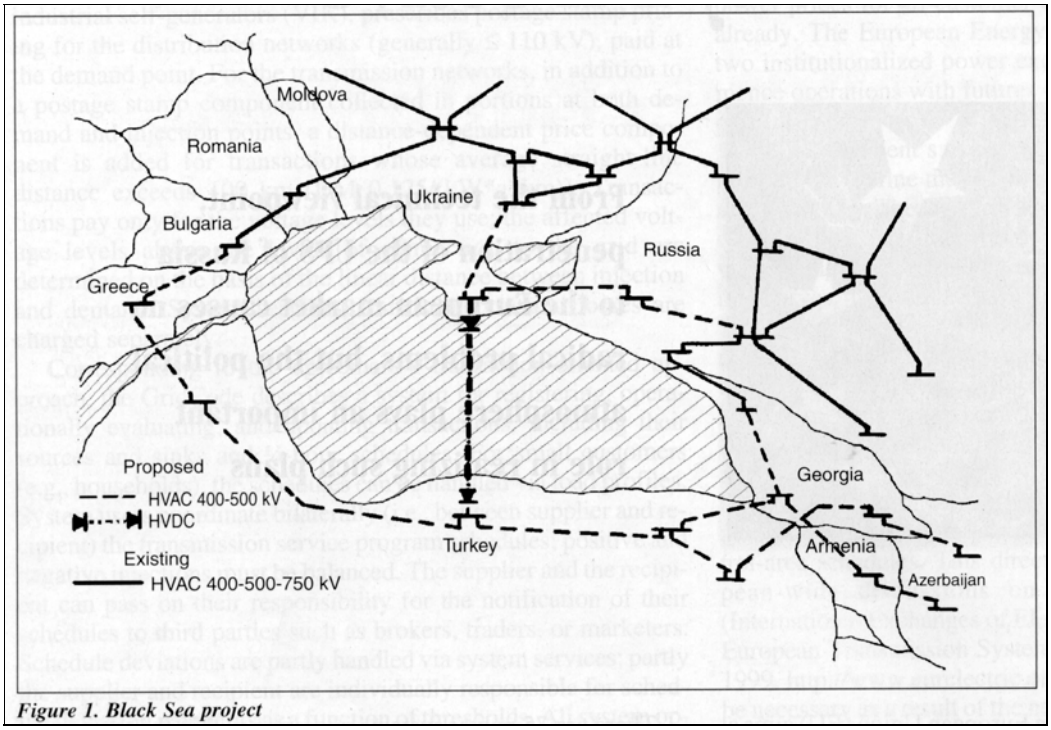


Figure 1. Black Sea project

International Electricity Cooperation on the European Continent

The best scenarios for energy cooperation and development on the European continent should be directed at the creation of the common electricity market and increasing the capacity of the common energy space. A number of international projects aimed in this direction have been imple- mented with Russian participation.

Some of them are:

- Interconnection of the power systems of the Baltic countries (the project "Baltic Ring"), implemented with the participation of 11 countries of the Baltic region
- Use of existing powerful electric ties of the Lvov and Moldavian cutsets between power systems of western European countries and the neighboring countries of eastern Europe
- Construction of the transmission line with a high transfer capability between Russia, Belarus, Poland, and Germany (the project "Energy Bridge East-West")
- Interconnection of the power systems of 11 countries of the Black Sea economic cooperation (the IPS BEC).

The construction projects of the 500 kV dc multisubstation East-West transmission line and the Baltic Ring project are aimed at the creation of a powerful electric network, interconnecting the energy systems of the coastal countries of the Baltic Sea, the Scandinavian countries, the Baltic countries, Russia, Belarus, Poland, and Germany.

In the west, the Baltic Ring is created by the dc cable transmission lines between Sweden and Germany and Denmark and Germany. In the future, it will be completed by the cable lines between Norway and Germany and between Sweden and Poland by the transmission lines of Russia, Belarus, and the Baltic countries in the east, by the dc link in Vyborg and the transmission lines of the Scandinavian countries in the north.

The dc transmission line linking Russia, Belarus, the Baltic countries, Poland, and Germany is considered to be a part of the Baltic Ring, closing it in the south. The Baltic Ring is supposed to improve the operation efficiency of power systems in Russia, Belarus, Poland, Lithuania, Latvia, and Estonia and, on the whole, stimulate economic development of the countries in the Baltic Sea region. At the present time, the joint operation of the UPS of Russia with the Nordel System interconnection has been a very positive experience. The projects to increase the dc link capacity with Finland to 1,400 MW initially and to 2,000 MW in the future are underway. The possible creation of new electric ties between the Karelskaya and Kolskaya power systems and the countries belonging to the Nordel System is being considered.

The results of the studies on the Baltic Ring project have demonstrated that creation of a common market will be beneficial to both consumers and power companies. Development of cooperation between the countries participating in the project will lead to a decrease in operating costs, a reduction in the required capital investments, a reduction of delays in capital investments particularly for production of reserve and peak power. Power supply reliability improvement will be gained with a simultaneous decrease in emissions into the environment to meet international standards.

Basically, there are technological preconditions for production and transmission of electric power under conditions of the common market. Adjustment and fulfillment of the norms and rules concerning trade and environment protection are a precondition for market creation.

An important result of the studies on the Baltic Ring project is development of cooperation. The joint activity of 18 power companies and power utility systems supported by financial institutions, the EU, and scientific institutions is unprecedented in the history of development of the countries in the Baltic Sea region. Understanding the significance of this regional cooperation contributes to the development of partnerships between those countries whose economy is in a transition period and their western neighbors, and to the solution of the problems on a regional level.

At the international symposium in Halkiditi (Greece) in 1994, JSC "UPS of Russia" proposed that the countries of the Black and Caspian Seas and the former Central Asia focus their efforts on the creation of a large interstate interconnection. On the initiative of JSC "UPS of Russia," this project is being studied.

Creation of the IPS in the Black Sea region is aimed at interconnecting the power systems of this region by powerful electric networks, a part of which already exist. Such interconnections would allow one to develop the electric utility industry of the whole region in a more optimal way, to rationally use energy resources, to improve the reliability of power supplies to consumers, to perform mutually beneficial exchanges of power and electricity and, in general, to positively influence the economy of all the countries in the region.

The IPS of the Black Sea region should be based on electric networks of the highest voltage classes, created by the members of the former Council for Mutual Economic Assistance. These are 400 and 750 kV networks connecting Russia, the Ukraine, Moldavia, Bulgaria, and Romania in the northwest, 330 and 500 kV networks connecting Russia, Georgia, Armenia, and Azerbaijan, and 220 kV overhead lines with Turkey (Figure 1).

There is even a preliminary study on the possibilities of a Russia-Italy "Electric Bridge."

Technical and Technological Aspects

Taking into consideration prospects of electric power industry development on the European continent, one should speak of three bulk interconnections: UCPTE, NORDEL, and the interconnection of CIS.

Each interconnection is practically self-balanced in electricity and capacity. The structure of generating capacities by equipment type in each of them has been formed on the basis of the internal requirements and is rational and sufficient.

Between the interconnection of CIS and UCPTE (taking into consideration the electric power systems of countries in central Europe), there are very strong ac ties of 400 and 750 kV, the transmission capacities of which are now highly insufficient. With regard to the planned Russia-Belarus-Poland-Germany dc transmission line, it is necessary to consider future interconnections between them using both dc and ac lines. Because of broader utilization of direct current in the "Baltic Ring"(i.e., in the ties with NORDEL), a rather rigid network structure, resistant to disturbances at the expense of system control capabilities with the help of dc transmission lines and FACTS technology in the main ac grid will be formed. This will provide stability to withstand disturbances and controllability of the main structure of the all-European interconnection.

The technical and technological peculiarities of the CIS interconnection, which was formed historically, predetermine the necessity of its consideration as the single technological system whose joint operation with UCPTE and NORDEL is expedient and possible while meeting the system specifications.

Economic, Legislative, and Political Conditions

Potentially, Russian electric power is a competitor in the European electricity market now and in the foreseeable future. From the technical viewpoint, penetration of the UPS of Russia to the European electricity market causes no radical problems.

Nevertheless, new conditions arising after introduction of the EU electricity directive should be taken into account. In the process of integration into the European electric power industry, the UPS of Russia will face competition. It will make the UPS of Russia adhere to the requirements for quality of the supplied electric power, system reliability, and offering various electric power services to the market (reserves of different types, etc.).

Effective participation of the UPS of Russia in the European electricity market demands a corresponding Russian state policy, a required legislative base. This policy definitely should be created on the principles of the European Energy Charter. The political atmosphere on the continent plays an important role in the realization of such plans.

Malgorzata Klawe, Hanna Trojanowska

Poland and the EU Electricity Directive

Focus is on a phased opening of the internal electricity market for internal competition, restructuring and privatization of the electric power sector, and fuel supply sectors

Poland has entered the preaccession phase of the integration process with the European Union (EU). The Polish electric power sector is proving its capability of meeting the challenges posed by the accession and, in the process, may facilitate unavoidable transformation in other areas of the Polish economy. The currently implemented legislation related to the electric power sector in Poland conforms to the IEM 96/92/EC Directive.

As a consequence of Polish electric power sector restructuring, separation of generation, transmission and distribution was introduced in 1990. The generation subsector consists of over 30 generation companies, with a total installed capacity amounting to 34,000 MW and with gross annual electricity generation amounting to 142 TWh. The transmission subsector is represented by the Polish Power Grid Company as transmission system operator (TSO) and is preparing itself to play the role of the operator in the balancing market. The distribution subsector is represented by 33 distribution companies providing services to about 15 million customers.

Legal Situation

The new, modem energy law came into force in December 1997, followed by secondary legislation. The implementation of secondary legislation to the energy law was generally completed in 1998. The Energy Regulatory Authority issued licenses for entities acting in the electric power sector.

The basic mechanism ensuring the efficiency of the electric power sector is competition in production and supply of electricity based on the transparent and nondiscriminatory principles of access to the power system. The regulated TPA principle has been selected for conditions related to the safety and security of the power system, reliability and quality of supply, and for the pricing and conditions of supply for other users connected to the system. The time schedule for its implementation was approved as is shown in Figure 1.

According to the governmental decision, the model of the electricity market structure will be adopted very soon, followed by its implementation.

By 1 January 1999, 37% of the Polish internal electricity market was opened. According to the time schedule, the internal market will be fully opened by the end of 2005.

Electricity Market

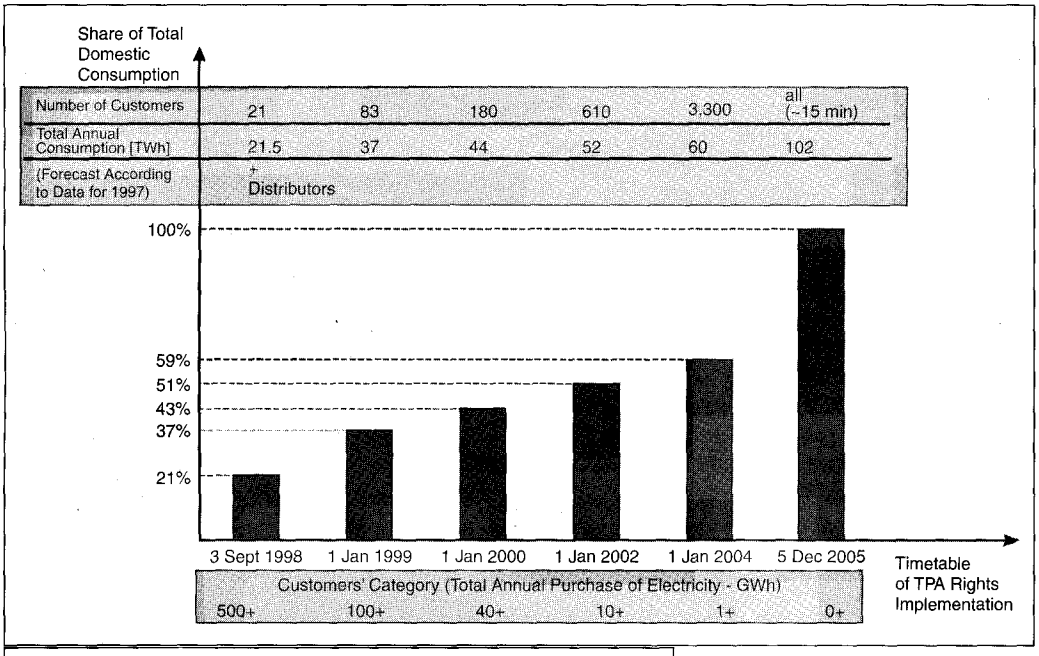
Organization of electricity markets in Poland and the level of their opening to international competition considers regulations that are binding for EU member states.

The authorization/licensing procedure for regulation of activities on electricity markets has been introduced.

The general provision concerning the structure of electricity markets in Poland assumes the division of electricity markets into two parts. The first part will cover the sale/purchase of electricity based on contracts and agreements and on a power exchange. The second part will be the creation of a balancing market aimed at thebalance of current demand and supply in case it is not covered by the first part of the market. Balancing of electricity is assigned as the responsibility of the TSO (Figure 2).

The power exchange seems to not be an optimal solution for the future. Looking for broader cooperation opportunities, one should consider regional power exchange in the future European exchange.

This article is based on a presentation given at the 1999 IEEE PES Summer Meeting panel session on "Realization of European Electricity Directives." M. Klawe and H. Trojanowska are with the Corporate Strategy Office, Polish Power Grid Company, Poland.



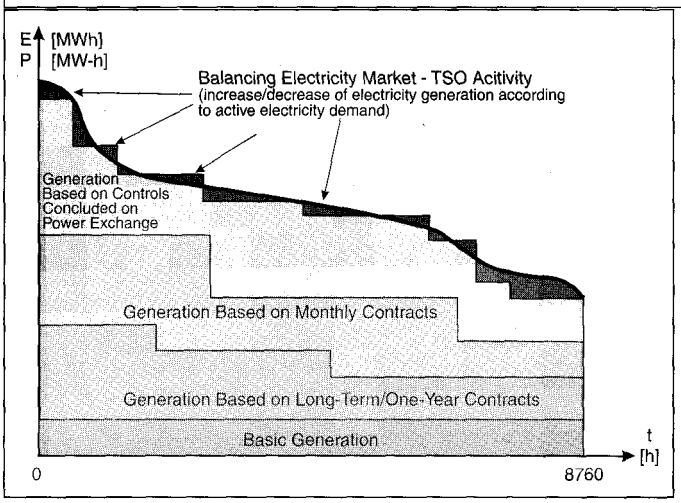


Figure 1. Timetable of TPA implementation in Poland
Figure 2, Balancing the electricity market

Transmission System Operator

The responsibilities of the TSO are defined according to EU rules, and the organization of the TSO is in place. The following are its specified responsibilities:

- Operation, maintenance and development of the transmission grid
- Dispatching of generation sources and interconnectors Administration of the system electricity market (metering and settlement)
- Tenders for ancillary services
- Management of system constraints
- Long-term power system development
- Contracts for electricity delivery with customers connected to the transmission grid
- Establishment and operation of a balanced electricity market
- Management of long-term contracts signed with generators for delivery of electricity.

The process of the ongoing power sector transformation aims at creation of the proper environment to enable power generating companies to compete and electricity suppliers and customers to do business under the market conditions.

Privatization of the Electric Power Sector

The key issue enabling reasonable competition is privatization. Privatization of the electricity industry has been the most talked about privatization topic not only in Poland.

Even though Poland is at the beginning of the privatization process, according to general rules described by the Polish government, the process has already successfully been completed for three stations: Krakow CHP, Bedzin CHP, and PAK Power Stations Group.

According to expert evaluation, nine Polish power stations are ready to compete not only on the Polish

market but also on the European IEM.

Key Determinants of Preaccession Phase

Temporarily, considering the global economic and political situation that Poland is in during the preaccession stage, the Polish electric power sector consciously protects its electricity market by limiting grid access to electricity generated in Poland. However, the agreements on opening the market internationally during the preaccession phase are possible to conclude on a reciprocity basis.

During this accession process, the Polish electric power sector will focus on a phased opening of the internal electricity market for internal competition, on restructuring and privatization of the electric power sector, and on the fuel supply sectors. Poland has already managed to define stranded costs and their recovery and to open the market for external investments through a liberalized system of authorization licensing.

The big challenge for all accession countries is the development of a technical infrastructure for the market and the interconnections as the hardware for the future trade of electricity.

Since the beginning of 1999, electricity prices are no longer controlled by the state; however, the independent Energy Regulatory Authority is responsible for supervision of price shaping.

The ongoing process of transformation still requires solution of the most crucial problems, such as:

- Harmonization of energy markets together with restructuring of the coal industry
- Creation of strong entities in the electric power sector acting in a competitive environment
- Management of financing for future development and modernization of the sector.

Antonio Tiberini, Edgar Amthauer

Interconnections in Central Europe and Switzerland

Not an EU member, Switzerland is fully integrated in UCPTE activities and has an observer status in the European electric bodies that worked out principal suggestions for handling cross-border and transit exchanges

Switzerland is intensively interconnected at the center of the European power system both in terms of tie-line capacity and cross-border trade. The dominating influence of seasonal variations of hydrological circumstances on Swiss generation, 60% of which is hydropower, is the driving force for power exchanges with its neighboring countries, where mainly thermal power stations are installed. This cross-border trade makes use of the complementary properties of the power generation structures and has substantial mutual benefits. This was the reason why Switzerland became the crystallization point for the interconnection of the European power systems in Laufenburg, where up-to-date major coordination functions are performed at the international level for UCPTE and at the national level for the Swiss TSOs.

Legal Situation

Not being a member of the EU, negotiations about a bilateral arrangement on electricity exchanges between the EU and Swiss authorities have been initiated. Switzerland is fully integrated in the activities of the UCPTE and has an observer status in the European electric bodies that have worked out the principal suggestions for the handling of cross-border and transit exchanges of electricity. The draft of an Electricity Market Law (EMG) has been published by the Swiss authorities. An updated version that takes into account the comments of the involved parties is expected in 1999. In general, the draft complies with the requirements of the EU directive with the exception of the time schedule for the market opening steps.

General Principles for Market Opening

The industry in Switzerland came to the conclusion that an efficient functioning of the market must not be based on individual transactions of power between producers and final consumers. The Swiss approach is to fulfill all desired power exchanges without taking into account their type and purpose. In the cases of predicted congestion it does not expect to reject desired power exchanges but to identify measures to alleviate the congestion according to their impact.

A market organization based on an application, approval/ rejection procedure for individual transactions has certain disadvantages that are considered to be unacceptable, because:

- It is not flexible enough because of the need for defined delays for placing the application and the verification of permissible execution or rejection. Thus, the advantages of short notice adaptations of the desired power exchanges would get lost. This is of special importance for Switzerland because of its dominating share of hydropower stations, where the necessity for these fast adaptations arises from unexpected inflows to the run of the river stations and from the possibility of short notice change of the high pressure hydro storage plants power output.
- It hampers intermediate trade of electricity because an artificial allocation of producers and final clients would have to be installed in order to identify the transactions that are the basis for the remuneration of transmission services and congestion management.

These are the reasons why Switzerland is about to opt for a network access regulation based on the point-of-connection principle. The industry has established an appropriate report "Schweizerisches Durchleitungsmodell," which defines a set of rules for the remuneration keys and mechanisms for the grid owners and complies with the draft of the EMG. The final customers pay their network access fees and thus achieve access to the entire Swiss network without any further charges for transmission. Subject to negotiations on future rules for international power exchanges, an exit fee charged for exports is envisaged that will partly cover the cost of the transmission grid.

This article is based on a presentation given at the 1999 IEEE PES Summer Meeting panel session on "Realization of European Electricity Directives." A. Tiberini and E. Amthauer are with the Elektrizitats-Gesellschaft Laufenburg (EGL), Laufenburg, Switzerland.

Cross-Border Power Exchange

As the EU directive follows the subsidiarity principle by leaving the choice of regulation for network access up to the national authorities, solutions based on the two principle alternatives (point of connection and transaction oriented) will have to coexist in Europe. Therefore, it is difficult to establish the regulations for cross-border and transit power exchanges. At present (January 1999) two regions (Nordel, British Grid Systems) exist, which, although they are not interconnected to the central part of Europe with ac links, do not apply the transaction principle for their network access regulation.

In central Europe, a majority of countries have opted for regulation of their internal network access with rules based on the point of connection principle, appreciating the arguments mentioned before. Nevertheless for cross-border transmission there is a wide spread fear of losing control of the system which is mainly advanced by operational security. That is why many countries tend to base international electricity exchanges entirely on the transaction principle. The Swiss industry came to the conviction that market forces sooner or later will succeed in gaining a solution that will avoid the cumbersome transaction oriented procedure.

However, there is an appreciation that the application of such a regulation from the very beginning of the market opening will require organizational measures to keep up system security, for transmission pricing and for congestion management. For these aspects, conceptual ideas have been proposed and will have to be developed further.

European Electricity Directive: the Hungarian Case

The regulation of the Hungarian Electricity industry is based on the Electricity Law from 1994. It regulates a very special single buyer model. The main player in this model is the transmission company Magyar Villamos Muvek Rt. (MVM Rt.), which owns the transmission assets including the dispatching center and has a monopoly on import-export rights. The transmission company is obliged to serve the six distribution companies on the basis of long term sales contracts that, on a rolling base, are valid for 15 years. It also has the right to purchase all available generation capacity of the generators on the basis of long-term contracts that are valid until the end of life of the generation assets. The transmission company is obliged to develop the transmission network and to prepare the power plant establishment plan every 2 years. It also has an administrative role.

The regulator, the Hungarian Energy Office, issues the operational and establishment licenses and establishes the price regulations. After privatization in 1995, the electric utility industry unbundled. The owners of the distribution companies are the big western European utilities (EDF, RWE, EnBW, Bayernwerke), while the owners of the generation companies are big utilities (e.g., RWE, Tractebel, IVO now Fortum), independent generators (like AES) or financial institutions (Crosus, Tomen, etc.). However, MVM Rt., as the owner of Paks Nuclear Station, some old coal fired stations, and the peak load/secondary reserve gas turbines, has an important position in generation also.

Hungary signed the Europe Agreement for accession to the EU, and the government started to harmonize the legal framework. There is a target that the bill of the new electricity law has to be ready by the end of this year (1999), and the whole regulation will be renewed in the following year. The new energy policy has not been published yet, but the basic elements are well known:

- Market opening step by step, starting in 2001 (before the accession) for the largest customers (above 100 GWh/year)
- Optional pool
- Regulated TPA
- Reciprocity will be regulated
- Further unbundling, establishment of the new independent system operator (from the dispatching center of MVM Rt. and from the regional network operators of the distribution companies)
- Liberalization of export-import monopolies, power plant establishment, etc.
- Existing transmission company and the distribution companies will run both for the liberalized and for the franchise market
- Stranded costs have to be addressed
- Licensing for generators, transmission, distribution, wholesale, supply, ISO, traders.

The conditions in Hungary are different from those in other countries. First of all, in Hungary, there is no over capacity in generation, and the majority of running generators have to shut down before 2004 because they do not meet environmental requirements. New units are necessary before the market opens, but nobody will install new generation without long-term contracts under the existing economical and political background in Hungary. The result of this could be some stranded investment.

One other very important issue is that owners of the distribution companies purchased the companies

with licensed supply areas. With the market opening, they will lose a lot of customers.

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