



THE LIBERALISATION PROCESS OF THE SPANISH ELECTRICITY SECTOR

Abstract

At the beginning of 1998, the 54/1997 Electricity Law entered into force, introducing a new configuration for the Spanish electricity system. Before this, the electric utilities and the Spanish Ministry of Industry and Energy signed a Protocol outlining the general structure of the future changes which would lead to the transformation of the Spanish electricity system from one based on a central purchasing agent model to one based on wholesale and retail competition.

The structure of the power industry prior to the 54/1997 Electricity Law consisted of a number of vertically integrated electricity companies, most of them privately owned. One company (REE, Red Eléctrica de España) controlled by the State, was the System Operator, with the property of most of the Transmission Network. This company was created in 1984, as an attempt to improve overall efficiency in the sector by central coordination of all available resources and by central planning of new investments. Later, in 1987 a New Legal Framework (Marco Legal Estable) was established in order to assure financial stabilisation to the electric utilities, fixing revenues based on standard costs and setting a National tariff system.

The start for the liberalisation process began with the 1994 Electricity Act (LOSEN) with the creation of the Regulatory Commission and the allowance to open access to new entrants.

The Spanish electricity model finally set in 1998 seeks the introduction of competitiveness in the power sector through a few basic principles:

- Shorter state intervention by rationalisation of the energy policy constraints and by leaving to the market forces the system operation and planning (except for transmission planning);
- Separation of activities: Regulated activities (transmission and distribution) are separated from non-regulated activities (generation, trading);
- The design of a bulk power competitive market, including competition in generation, freedom of entry, a power pool managed by a market operator (OMEL), free bilateral contracts (physical and financial) among agents and equal participating conditions for both the generation and demand sides;
- Non-discriminatory access to the network is guaranteed to all participating agents in the market;
- Transmission and distribution network businesses are considered as regulated natural monopolies with regulated transmission and distribution tariffs paid by all network users;

- Regulatory Commission functions include the achievement and promotion of competition and supervision of the transparency and independence of the system operation;
- Creation of a calendar for customer choice that establishes when and what size of customers would become qualified customers.

LIBERALIZACIJA SEKTORA ELEKTRIČNE ENERGIJE U ŠPANJOLSKOJ

Sažetak

Početak 1998. godine na snagu je stupio Zakon o električnoj energiji s naznakom 54/1997, koji je uveo nove odnose u sustavu električne energije u Španjolskoj. Prije toga, elektroprivreda i španjolsko Ministarstvo za industriju i energiju potpisali su protokol s općim odredbama o budućim promjenama koje bi trebale dovesti do preobrazbe španjolskog sustava električne energije od modela centralnog prodajnog agenta k modelu konkurencije vele- i maloprodaje.

Struktura energetske industrije prije Zakona 54/1997 sastojala se od nekoliko vertikalno integriranih elektroprivrednih subjekata, većinom u privatnom vlasništvu. Jedna od kompanija (*REE, Red Electrica de Espana*), koju je kontrolirala država, predstavljala je operatora sustava, s većinskim udjelom u vlasništvu prijenosne mreže. Ova je kompanija stvorena 1984. godine u pokušaju da se poboljša ukupna učinkovitost sektora središnjom koordinacijom svih raspoloživih resursa i središnjim planiranjem novih ulaganja. Kasnije, 1987. godine, stvoren je novi pravni okvir (*Marco Legal Estable*) kako bi se osigurala financijska stabilnost elektroprivrednih poduzeća, utvrdili prihodi na osnovu standardnih troškova i odredio nacionalni tarifni sustav.

Početak procesa liberalizacije naznačen je Zakonom o električnoj energiji iz 1994. godine (*LOSEM*), stvaranjem komisije za regulaciju i omogućavanjem otvorenog pristupa novim sudionicima.

Španjolski model za električnu energiju, konačno definiran 1998. godine, zastupa potrebu uvođenja konkurencije u energetske sektor putem nekoliko osnovnih načela:

- kraća intervencija države kroz racionalizaciju ograničenja energetske politike, prepuštanje rada i planiranja sustava silama tržišta (osim kod planiranja prijenosa);
- odvajanje aktivnosti: regulirane aktivnosti (prijenos i distribucija) odvajaju se od nereguliranih (proizvodnja, trgovina);
- stvaranje konkurentnog tržišta ukupne energije, uključujući konkurenciju u proizvodnji, slobodu sudjelovanja, energetske pool kojim upravlja tržišni operator (OMEL), slobodne bilateralne ugovore (fizičke i financijske) među agentima i jednake uvjete sudjelovanja kako za proizvodnju, tako i za potražnju;
- nediskriminacijski pristup mreži garantiran je svim sudionicima na tržištu;

- poslovanje mreže prijenosa i distribucije smatra se reguliranim prirodnim monopolima s reguliranim cijenama prijenosa i distribucije koju plaćaju svi korisnici mreže;
- djelovanje komisije za regulaciju uključuje ostvarenje i unapređenje konkurencije, kao i nadziranje transparentnosti i neovisnosti rada sustava;
- stvaranje kalendara za izbor klijenata kojim se utvrđuje kada i koji od klijenata mogu postati kvalificirani potrošači.

1. INTRODUCTION

At the beginning of 1998, the 54/1997 Electricity Law entered into force, introducing a new configuration for the Spanish electricity system. Before this, the electric utilities and the Spanish Ministry of Industry and Energy signed a Protocol outlining the general structure of the future changes which would lead to the transformation of the Spanish electricity system from one based on a central purchasing agent model to one based on wholesale and retail competition.

The structure of the power industry prior to the 54/1997 Electricity Law consisted of a number of vertically integrated electricity companies, most of them privately owned. One company (REE, Red Electrica de España) controlled by the State, was the System Operator, with the property of most of the Transmission Network. This company was created in 1984, as an attempt to improve overall efficiency in the sector by central co-ordination of all available resources and by central planning of new investments. Later, in 1987 a New Legal Framework (Marco Legal Estable) was established in order to assure financial stabilisation to the electric utilities, fixing revenues based on standard costs and setting a National tariff system.

The start of the liberalisation process began with the 1994 Electricity Act (LOSEN) with the creation of the Regulatory Commission and the allowance of open access to new entrants.

The Spanish electricity model finally set in 1998 seeks the introduction of competitiveness in the power sector in order to obtain an efficient economy and a transparent behaviour of the participants. The model of liberalisation established in the Law is consistent with the goals of the European Directive and places Spain among the countries with the most liberalised electricity sectors. The purpose of this paper is to discuss the basic features of the liberalisation process and the basic principles which rule the system.

2. FORMER STRUCTURE OF THE SPANISH POWER INDUSTRY

2.1. The evolution from 1987 to the beginning of privatisation

The Spanish electric power industry is the fifth largest in the European Union with 44,079 MW of installed capacity and 205,698 GWh demanded in 2000 (REE, 2000). Figure 1. shows the installed capacity at the end of 1996. It must be noted the well diversified composition of the generation mix, resulting from the national resource endowment and the energy policy decisions made at the end of the 1970s.

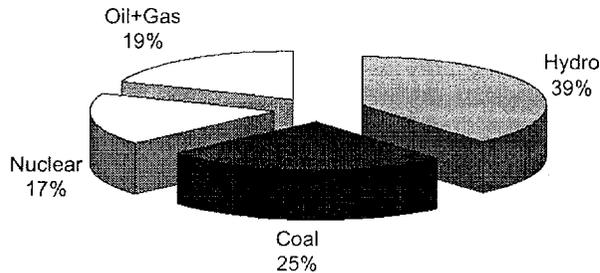


Figure 1. Capacity by Fuel Type (1987-1996) *Source: REE (1996)*

Spain has significant hydroelectric resources, which represent at present (2001) nearly 37 percent of total installed capacity. However, because of variation in precipitation, there is substantial variation in hydro production between dry and wet years. Hence during the 1987-1996 dry period the average annual hydro production only accounted for around 19 percent of total output whereas it was around 30 percent of total production from 1977 to 1987. On the other hand, like many other European countries, Spain has practically no domestic reserves of petroleum and natural gas, coal being the only indigenous fossil fuel available.

The oil crisis of 1973 and 1979 made more expensive the traditionally high Spanish oil bill, so that the efforts of successive governments were intended to reduce the dependence on external energy sources. As a result, investment focused on the construction of coal-fired and nuclear plants. This investment program doubled the existing capacity in 1974 with the aim of meeting the demand growth and eliminating oil in the generation of electricity.

Coal-fired plants generated 41 percent of total electricity production during the 1987-1996 period, whereas the role of oil declined to around 1.5 percent. In 1997 the contribution of oil has been virtually negligible, representing 0.1 percent of total production.

Finally, natural gas is expected to be increasingly used in electricity production in the medium term. In 2000 gas power generation meant just 5.8 percent of gross generation. However, the flexibility and high-efficiency of the new combined-cycle gas turbine generator sets (CCGT), the necessity of reducing the sulphur dioxide emissions and the construction of the new pipeline permitting the supply of gas from Algeria are factors that might encourage the Spanish "dash for gas". New investments in power generation represent projects for 27,220 MW of combined cycle natural gas plant currently under consideration, either as additional power or to replace existing generating plant, OMEL (2000).

The former electricity industry had been a mixed system of public and private ownership until the privatisation of Endesa in October 1997, which was the first step towards liberalisation taken by the government in order to assure a minimum degree of competitiveness (see Figure 2).

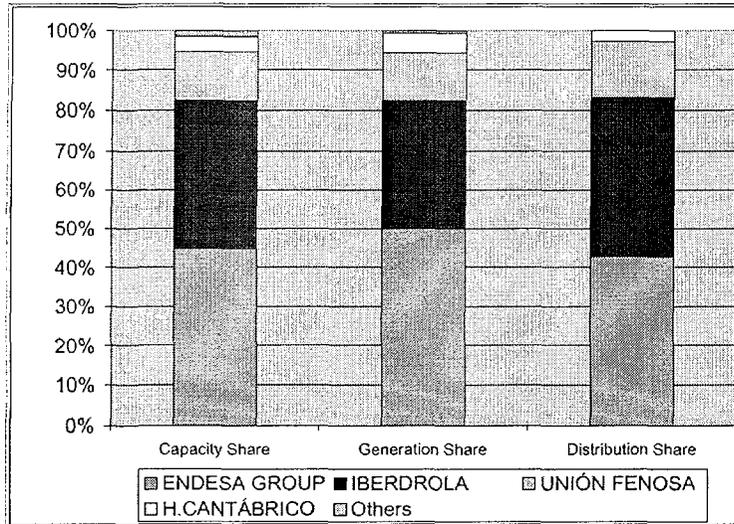


Figure 2. Sector Shares of Spanish Electricity Companies (1996)

In the early 1980s, a number of changes were introduced in the Spanish electricity system, partially motivated by the financial crisis in industry. A number of factors contributed to a generalised crisis in electricity utilities:

- An exaggerated demand increase forecast by the Government had led to an excessive investment program and electrical companies got into substantial foreign debt;
- The increase in interest rates and the fall of the Spanish exchange rate caused severe financial deterioration;
- In 1984, the review of the National Energy Plan imposed a nuclear moratorium on five of the nuclear plants under construction.

In 1985 a national grid company was created, Red Eléctrica Española (REE) with most of the transmission assets of all firms in the industry. REE was responsible for the management, design and maintenance of the high voltage transmission network and for the national central dispatch.

This process of reorganisation of the industry concluded with the introduction of a new regulatory regime, the so-called Marco Legal Estable (hereafter MLE) or Stable Legal Framework. The MLE established a regulatory model that has been in operation until the end of 1997.

Under the MLE the industry operated as an integrated system with respect to key decision-making both long term and short term. On one hand, the Ministry of Industry and Energy was responsible for the long-term planning of the generation investments.

The state-owned grid company (REE) was responsible for the unified dispatch system. REE dispatched all plants in a merit order of variable costs. Firms managed the

availability of plants, but production was determined by REE, irrespective of the demand of each firm's clients and regardless of plant ownership.

The MLE replaced a previous regulatory regime, based on the service regulation cost where the Ministry of Industry approved the tariffs with the aim of covering the costs declared by the firms.

In summary, the MLE guaranteed a stable remuneration to the electricity companies, without the uncertainty of the previous system. At the same time, the incentive mechanisms promoted efficient behaviour of the firms. That is, investors were provided with an assurance that they would be able to recover their investment over the life of the plant, provided that the companies operate efficiently.

The vertical integration between generation distribution and retailing generated a lack of transparency that prevented the identification and the true cost allocation among activities, allowing the existence of cross-subsidies. On the other hand, the government increased its control of the electricity sector, directly via the PEN, or indirectly, through Endesa or REE. In consequence, under MLE an opaque industry was created with high levels of administrative intervention.

2.2. *The start of the liberalisation process*

The first step towards a more flexible and liberalised regime was taken in December 1994 with the approval of the Ley de Ordenación del Sistema Eléctrico Nacional (hereafter, LOSEN). In order to promote some degree of competition the LOSEN introduced a system similar to the single buyer procedure proposed by the European Directive (EC, 1997).

The most salient measure of this legislative reform was the creation of the National Electricity Regulatory Commission (CNSE, originally CSEN). The CNSE was created as an independent regulatory agency with the aim of guaranteeing the transparency and objectivity of the entire system operation.

The LOSEN introduced a set of measures intended to gradually enhance the transparency and the role of the market forces in the industry while the key features of the MLE were maintained.

Since the applicable rules of the LOSEN were never developed, the sector continued operating under the MLE until the approval of the Electricity Law 54/1997 of 27 November 1997. The current Law is based on an agreement that the Ministry had previously signed with the electricity companies in December 1996, the so-called "Protocol".

The Law establishes a more liberalised model of the market organisation by extending the introduction of competition to generation and supply.

The basic principle for the liberalisation process stands on the fact that the electrical supply, its quality and cost, do not require greater state intervention than their own specific regulation.

Competition in generation is a key aspect of electricity regulatory reform. Under competition, generators typically have the option of entering their supply prices into a competitive "pool" which establishes a dispatch merit order based on the bids it has received. Electricity pools are now in operation, apart from Spain, in England and Wales, Norway, Australia, Alberta (Canada), Chile and Argentina, among others. Electricity pools can be mandatory (e.g. England and Wales), or non-mandatory (e.g. Norway), in which case bilateral trade outside the pool is permitted.

3. THE SPANISH LIBERALISED ELECTRICITY MARKET

3.1. Basic principles

Some of the main principles through which it is intended to obtain competitiveness and transparency are:

- Free entrance to the market,
- Choice of supplying,
- Free investment in generation assets,
- Free pricing.

Some mechanisms must be imposed in order to gradually pass from the former scheme to a new competitive scenario:

- Separation of activities
 - Regulated (Transmission, Distribution)
 - Non-regulated (Power Generation, Retailing)
- Liberalisation and Competitiveness in Power Generation
- Independent Operators
 - System Operator REE
 - Market Operator (or Power Exchange) OMEL
- Open access to grids for all generators and suppliers
- Progressive Supply liberalisation schedule
- Competitive Transition Charges (CTCs)

The central feature is the creation of a competitive wholesale electricity spot market based on generators' and consumers' bids. Therefore, unlike other electricity pools (for example the former market in England and Wales) demand side bidding is allowed. The wholesale market is organised in several markets: daily, intra-daily, constraint management and ancillary services. At the same time, both financial and bilateral physical contracts will be developed.

The electricity market must be managed in accordance with the principles of transparency, objectivity and independence, in compliance with the Electricity Sector Act and the regulations that developed the Act.

Participation in the market is carried out using an electronic trading system capable of efficiently and transparently handling the incorporation of a large number of electricity purchasers and sellers of electricity and a very high volume of transactions and related settlements.

Regarding the distribution activity, the main characteristic of its nature as a natural monopoly, imposes a regulation on the activity, with obligation of supply, open access of networks to others, and retribution based on two schemes:

- Standard costs,
- Reference Network.

The basic functions of the distribution companies are:

- Transmission of electricity from HV network to consumers, with a certain quality,
- (Transient) Retailing of regulated consumer tariffs.

3.2. *New independent operators*

In order to assure independence and transparency of the electricity market two separated operators control both market and system operation. The creation in 1994 of REE very much facilitated the introduction of a central system operator which also owned the transmission grid.

The introduction of the new bulk market was also facilitated by the previous scheme of the single buyer procedure, but with a competitive market regulated by the OMEL.

3.2.1. System operator REE

System operation is centralised in virtually all electricity systems due to technical constraints and to take advantage of the substantial economies of coordination. The pool handles, at least in part, the economic operation of the system, i.e. it determines an economic merit order among pool generators and a price. Economic operation of electricity systems need not be a centralised activity. The System Operator (REE) and the Market Operator (OMEL) separately perform these two functions; nevertheless, efficient operation of power pools requires substantial coordination between them.

The main functions of REE as the technical manager are:

- Guarantee the technical balance of the network,
- Proposal and application of a security criteria,
- Guarantee the third party access to the transmission network,
- Planning proposal of the transmission network,
- Establishing requirements for the system regulation,
- Technical management of the ancillary services,
- Demand forecasting.

3.2.2. Market operator (OMEL)

The Electricity Sector Act and Royal Decree 2019/97 of 26 December 1997, which govern the organisation and regulation of the electric power production market, entrust functions to Compañía Operadora del Mercado Español de Electricidad, S.A. (OMEL) which can be classified as follows:

- Functions relating to the operation of markets,
- Functions relating to additional information or information on other transactions that is required for scheduling purposes,
- Functions relating to information on other deregulated transactions,
- Functions relating to Market Rules and the Contract of Adherence,
- Functions relating to information to be provided to market participants,
- Functions relating to information given to third parties,
- Functions relating to the principles of independence, transparency and objectivity,
- Functions relating to short and medium term forecasts.

3.3. The wholesale electricity spot market (pool)

The basic principle governing the organisation of the electricity market, as expressly stipulated in the Electricity Sector Act, is the free trading of electricity for producers, qualified consumers and resellers. In order to make free trading viable and effective, the Act established the electricity market, the characteristics and organisation of which are described below.

At present, the electric power production market is configured as the set of economic transactions derived from the participation of market agents in the sessions of the daily market, including bilateral contracts, the intraday market and from the application of the system operating procedures. The pool price is set through a marginal price setting procedure as shown in Figure 3.

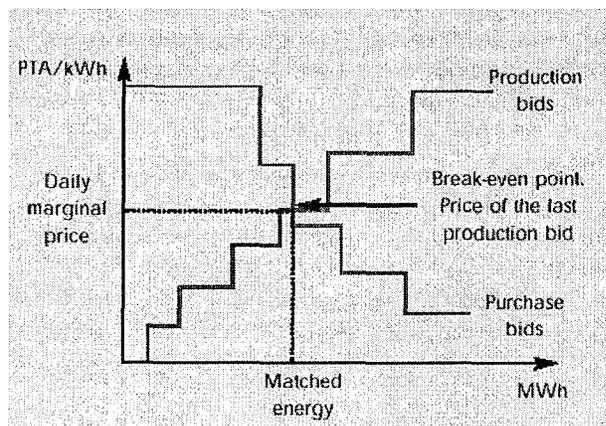


Figure 3. Daily Market Supply and Demand curves

The market participants are entities authorised to act directly in the electric power market as buyers and sellers of electricity. Those who may act as market participants include producers, distributors and resellers of electricity, qualified consumers of electricity and power companies or consumers residing in other countries.

Producers, external agents and qualified consumers may enter the market as market participants or sign bilateral contracts, which must be declared to the market operator. Once these contracts have been declared, they are considered firm agreements and have the same rights and obligations as organised market transactions.

4. CONCLUSION

The Spanish market now has over three years experience of normal and effective functioning and it provides electricity trading sessions to market participants, comprising the main daily market. Although much has been done to provide effective competitiveness and transparency to the Spanish electricity industry, still there is much to work on. The main obstacle for complete liberalisation is the actual composition of market participants. This will be changed as new external agents enter and as vertical integration of existing utilities begins to be effective.

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