

# A new reign in Spain

Spain's electricity sector has undergone a profound transformation since 1998, successfully transitioning from a regulated system to a competitive one. Still, much remains to be done for consumers to get the full benefits of the reform

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SPAIN'S WHOLESALE ELECTRICITY market liberalised in 1998, followed by the retail market. Full liberalisation was achieved in January 2003. It was due to move to a new stage on 20 April, when integration with Portugal began. This is a long way from where the system stood ten years ago, when competition was a distant concept and remunerating electricity companies was determined through 'standard costs'.

Its success belies the fact that much remains to be done for consumers to get the full benefits of liberalisation and the reform of regulation, in a system where the majority of small electricity consumers are still supplied under a regulated full-service tariff. The rise to power of the socialist government in March opens the door to much needed reform, primarily in regulation.

## *From regulation to competition*

The signing of the Electricity Protocol, in 1996, between the largest Spanish electricity companies and the government, laid out the basic framework for competition.

One basic pillar was the agreement over compensating companies for stranded costs, known as competition transition costs (CTCs). These were to compensate generators for the revenue shortfall from liberalisation, and the inability to recover the past investment costs. Since CTC payments are considered temporary, it was decided the scheme will expire no later than 2010.

1997 saw frantic efforts to define all the relevant aspects of the new competitive world, even as many remained sceptical.

Scepticism was natural, based on the time available, and the relatively limited international experience in the design of wholesale electricity markets. In California, discussions over the design of the wholesale market had begun years before. How could Spain develop its framework in one year? The sceptics were partly right. In spite of efforts, in 1998 many aspects of the organisation were only provisionally defined. Nevertheless, the wholesale market started operating as planned and has done without interruption ever since.

Still, concerns remain. The authorities reject takeovers and mergers between incumbents. The government forbade large incumbents from investing to increase their installed capacity for a number of years. However, in six years, only one case relating to alleged market power abuse has been brought. The case relates to prices observed in three specific days in 2001. The Competition Tribunal has not yet issued a decision. No substantive cases have been brought relating

to anticompetitive behaviour in the retail market. The sale of Viesgo to Enel by Endesa, new generators and the integration of the Iberian electricity systems should further allay concerns and reduce the government's perception of the need to closely monitor electricity market outcomes.

## *The structure of the market*

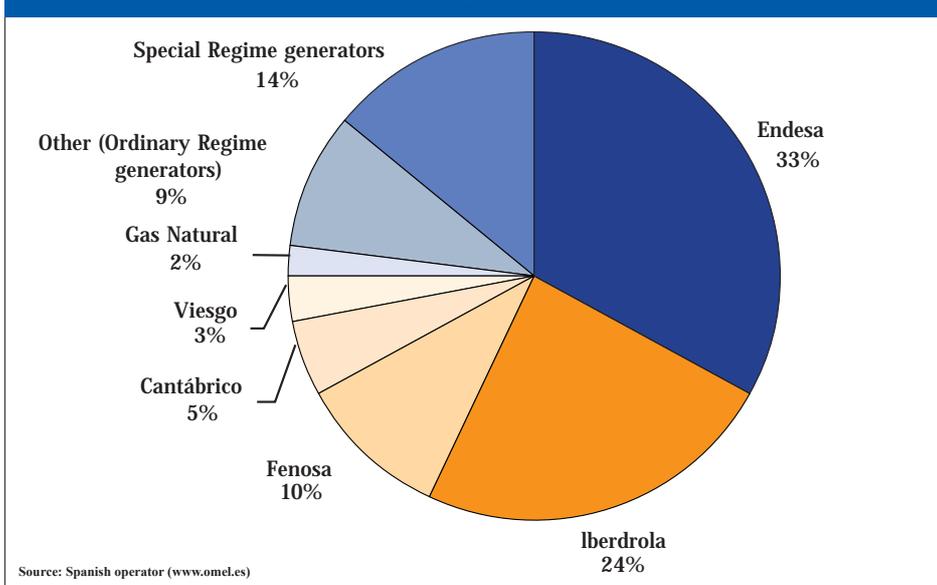
In 1998, the Spanish electricity market had 40 million consumers, peak demand of around 30 GW and total annual production of 180 TWh. Generation was based on nuclear, coal and hydro, with oil and gas as reserve. The reserve margin stood at 20 per cent. The system was relatively isolated, with interconnection

capacity with France a mere 800 MW in addition to smaller interconnections with Portugal and Morocco.

Demand has grown rapidly. Initially, this was met by the expansion of regulated generation and the reduction in the reserve margin. New competitive entry, in the form of combined cycle gas turbines (CCGTs), did not come in until early 2002. During that winter Spain experienced dry conditions leading to reduced hydro generation and some supply difficulties. The delay in building of CCGTs was blamed on a world shortage of gas turbines due to high demand but also to delays in granting the required environmental impact licenses. The system now seems to have stabilised, with a



Figure 1: 2003 generation shares



steady growth of new plants to meet demand, and a reserve margin of almost 10 per cent.

Incumbents are required to separate their regulated and unregulated activities. In addition, electricity companies have been required to slowly reduce their stakes in Red Eléctrica de España (REE), the Spanish TSO. REE has also acquired most of the HV transmission assets, with options to acquire the rest and is independent.

### The wholesale market

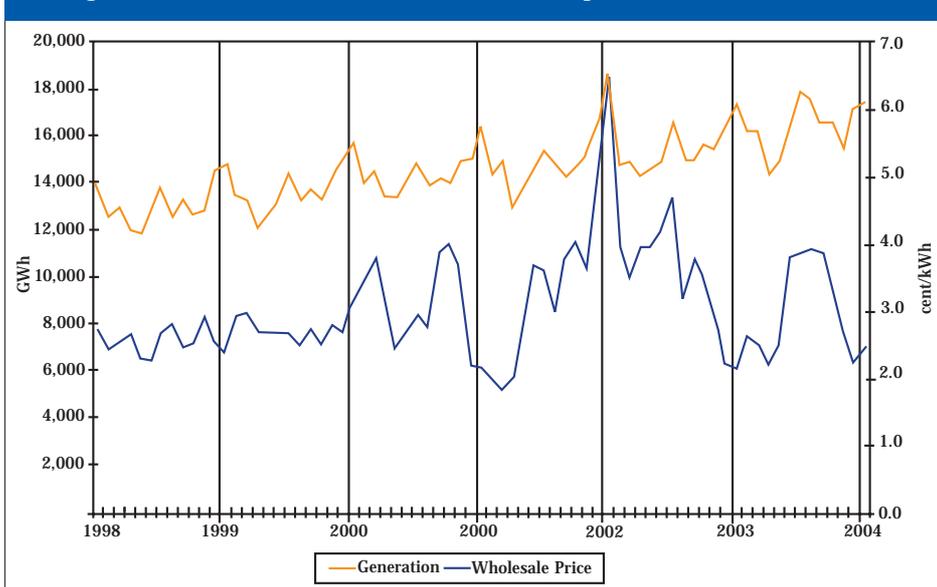
From an organisational perspective, the main features of the Spanish market are:

- Day-ahead market: This market is compulsory for so-called Ordinary Regime generators, which receive no subsidies. Of these, only generators with physical delivery bilateral contracts are excluded from the matching process. The price for deliveries matched in the day-ahead market for each hour of the following day is equal to the last generation offer accepted to meet demand in that hour.

Generators can specify a minimum level of revenues as a binding condition. See figure 3.

- Constraints management: Trans-mission constraints are managed by REE. The hourly wholesale price is uniform. Constrained-on generators are paid the price specified in their offer to the day-ahead market, while constrained-off generators effectively see the sales to the day-ahead market cancelled. Consequently, there is no compensation to generators required to reduce their generation as a result of congestion management.
- Reserves management: Primary reserve is compulsory on generation, secondary reserve bands are contracted for the following day through offers for secondary reserve bands, and tertiary reserve operates as a dynamic mailbox.
- Optional intra-day markets for adjustments by generators in the programme of their plants or for buyers to adjust their supply

Figure 2: Evolution of demand and wholesale prices (excluding capacity payment)



needs. There are six overlapping sessions, each covers all the hours traded in a day-ahead market but not yet dispatched.

- Imbalance settlement system, based on the cost of energy in tertiary reserve, or in the day-ahead market, plus a penalty.

The price in the wholesale market is equal to the last offer accepted to meet demand. This means that the wholesale price will not rise to reflect the value of loss load (VOLL) in conditions of unserved energy, even if agents anticipate the shortage. In addition, the maximum price is capped at 180 (\$214)/MWh. Under these conditions, market revenues by themselves would not reflect the value of generation capacity, bringing under-investment. Consequently, Spain provides explicit remuneration, in addition to revenues from energy sales.

Generators are entitled to the capacity payment, regardless of whether or not the plant was dispatched. Initially the only requirement was that generators had to have operated for the equivalent of 100 hours at full capacity over the last five years. The requirement is now more stringent and generators must have operated for the equivalent of 480 hours over the previous year. This distorts the behaviour of peaking plants since in wet years they are compelled to offer generation below cost to meet the requirement. This reduces the attraction of building peaking plant, in spite of the fact that this is precisely the plant type that most economically provides security of supply.

The total paid is shared by generators based on their share of total available generation capacity. The amount was initially set at an average of 8 (\$9.5)/MWh, but was reduced to 5 (\$5.9)/MWh despite the progressive reduction in the reserve margin and the increase in the economic value of capacity. The methodology for determining the average level capacity payment has not been made public. This may deter new entrants, and explain why new generation is built mostly by incumbents.

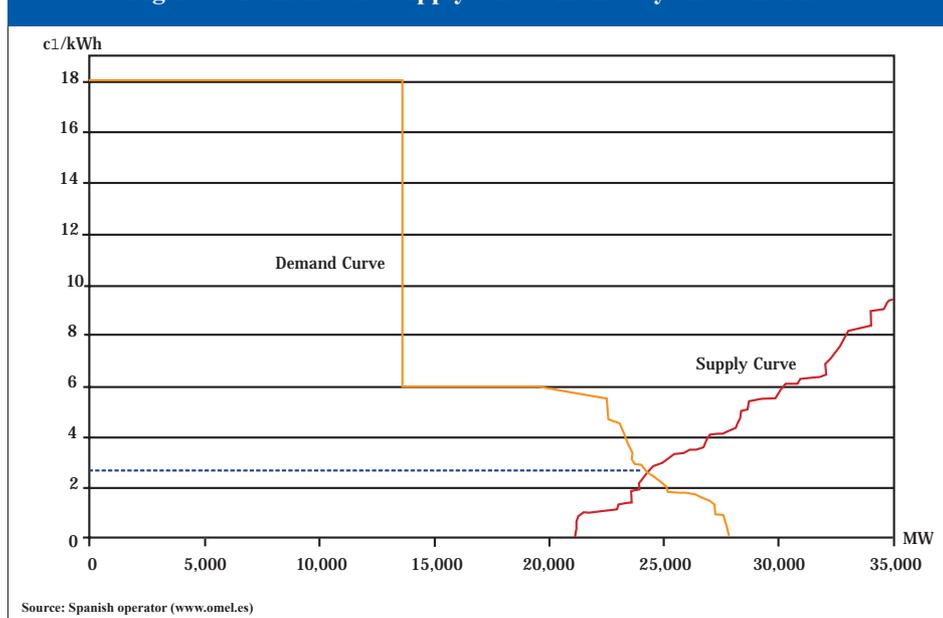
The amount paid by consumers under the capacity payment scheme differs according to the number of periods in their tariffs, and whether the consumer is supplied under the regulated full-service tariff (including energy and delivery) or under the access tariff (delivery only). At one extreme, larger consumers supplied under an access tariff pay an average of less than 2 (\$2.3)/MWh, while smaller consumers under access tariffs pay 13 (\$15)/MWh. Distribution companies, buying on behalf of consumers under the regulated full-service tariff, pay what is required so the target level is met.

Generators and consumers who enter into physical bilateral contracts are excluded from the capacity payment scheme. The fact that the larger consumers supplied under the access tariff pay less for capacity than what a generator would receive, has obstructed the use of physical bilateral contracts. It is likely that this problem will be resolved by the Iberian market.

### Special Regime generation

Provisions exist to subsidise certain forms of energy, such as cogeneration, renewables and waste-based generation. This is known as

Figure 3: Demand and supply curves in the day ahead market



Special Regime generation.

Special Regime generation has developed unevenly, with wind energy quickly approaching government targets while small-hydro and biomass make little progress. Special Regime generators can choose between receiving a regulated fixed price or participating in the pool and receiving a premium. Remuneration is linked to the evolution of tariffs and the generation technology, but is reviewed every four years.

In its last meeting before the elections, the Spanish Council of Ministers approved new regulation for new Special Regime generators. Such generators can sell their electricity at a regulated price, but are encouraged to participate in the pool by a specific premium. In addition, the evolution of the premium for generators covered by this new framework is linked to the evolution of the average tariff through a predetermined formula. The government can change the level of the premium only for future generators, and only with sufficient notice. The aim was to reduce regulatory risk, to facilitate the raising of capital by investors and the achieving of Special Regime targets at least cost.

According to the new Royal Decree, new Special Regime generators will be penalised for imbalances to their forecast production. The conditions for new connection to the grid have also been tightened, with a view to reducing the negative externalities that wind generators and others have on system operation.

### Transmission

Transmission revenues remain regulated. The level of remuneration consists of two parts. There is an amount set in 1998 and updated, to pay for assets which were in place, or those which have replaced old assets. Second, there is an amount paid for new assets required because of demand growth. Remuneration is based on the first year costs, which are updated, without taking into account the fact that assets are amortised over time.

REE has sought to acquire most transmission assets. Incumbents' ownership of

REE has fallen, as new laws limit the participation of agents who are in the electricity market to 5 per cent each and 40 per cent in aggregate

### Distribution

It is necessary to distinguish between large and small companies. There are five large distribution companies supplying 98 per cent of total electricity while 300 small distributors supply the remaining 2 per cent.

The level of remuneration for large distribution companies is updated with the expected Retail Price Index and demand growth, adjusted by an efficiency (X) factor and economies of scale factor. While the X factor has been set at 1 per cent, the economies of scale factor has been set at 0.3, an unreasonably low level compared to evidence on the magnitude of the economies of scale.

The starting point was the 1997 level of remuneration. The formula determines the amount to be paid as a whole, while actual payments to individual distributors are based on a share of the total collected. This share was to converge from the pre-1998 shares to shares reflecting the relative costs that each distribution company was deemed to have under a reference model of the distribution network. However, the Administration decided to freeze those shares in 2001. As a result, the individual revenues grow in line with the national average demand growth, which penalises distributors whose demand growth is faster and benefits distributors whose demand growth is slower.

Discussions are taking place to reform distribution companies' remuneration. The idea is to have a revenue cap that reflects the demand growth of each individual company rather than the average demand growth in the system. The cap would continue to include an efficiency factor. These caps would be subject to review, at which time the level of revenues will be reset to the level of costs. Companies would have a reasonable opportunity to recover costs, and would have incentives to maximise efficiency. These improvements

would be transferred to consumers at each tariff review.

A basic prerequisite for its introduction is the definition of a set of regulatory accounts, so that the regulator can determine whether costs are excessive. This proposal faces the problem of the initial definition of the regulatory asset base. Since the asset valuation and amortisation criteria have not been consistent, there is a risk that prudent companies will be penalised with respect to those who have chosen slow amortisation methods, who have capitalised a large portion of costs, or who have been more inefficient and carry a larger asset base in their books. Trying to correct for these factors is almost impossible, which indicates that a pragmatic approach needs to be taken.

### Retail supply

Distribution companies carry out regulated supply under regulated full-service tariffs to consumers who have not exercised their eligibility. For this, the distribution company receives regulated revenues and is compensated for the costs of buying the energy in the wholesale market each hour. Energy costs are not recognised by reference to the distributor's own costs, but to the average price of the electricity in the market in that hour. Thus, distribution companies do not have incentives to enter into contracts with generators for supply to regulated tariff customers, and there is no risk of self-dealing. At the same time, this raises the problem of how to protect consumers from wholesale price volatility.

Consumers who have exercised their eligibility can buy directly and pay the delivery tariff, or can enter into a contract with a competitive retailer who will take care of buying the energy and paying the regulated access tariff to the distribution company. The retailer can enter into any hedging agreement it wishes, and can define any condition with its customers.

### Tariffs

In Spain, tariffs are uniform and vary only according to consumption characteristics.

Following liberalisation, tariffs fell rapidly, though not due to a reduction in costs of supply. Instead, the driving force was the government's wish to control inflation at a time when European economic integration was limiting the economic tools available, and to convince the public that liberalisation had been a success. This reduction was achieved by reducing the annual level of the CTC compensation payments.

Indeed, the complexity of the negotiations and the pressure to reach an agreement meant some important details were omitted. There was nothing requiring tariffs to be set in a manner sufficient to recover the outstanding CTC entitlements. Tariffs were reduced regardless of the evolution in the costs of supply. Eventually, in 2000, the tariffs had been lowered so much that they did not yield enough receipts to pay the costs of supply. This situation repeated itself in 2001 and 2002.

Consequently, the government approved in late 2002 a new methodology to define this level of tariffs. This allowed generators to

securitise past deficit entitlements in late 2003. According to the new methodology, in force until 2010, the maximum annual increase in average tariffs was capped at 1.4 per cent with an additional allowance of 0.6 per cent for deviations in forecasts. In turn, changes in individual tariffs cannot differ by more than 0.6 per cent with respect to the change in the average tariff. In addition, the cap applies to the average tariff level, and is calculated assuming no changes in the demand structure.

This would be unsustainable if costs were to increase faster, or if consumers abandon the regulated full service tariff and reduce their contribution to total cost recovery. Both are likely to occur. First, the introduction of CO<sub>2</sub> emissions rights in 2005 will increase wholesale costs. Second, consumers who leave the regulated tariff reduce the amount they pay over and above the costs the system saves when a consumer exercises eligibility.

Maintaining this methodology would hamper retail competition development. Currently 70 per cent of the energy consumed is bought by distributors under the regulated full service tariff, even though all consumers are free to abandon the regulated tariff and be supplied by a retailer. It would be a mistake to consider this a failure of retailers. In fact, the problem can be blamed on cost inconsistencies between full service and access tariffs. This means customers may face an increase in their bills if they exercise their eligibility.

Thus, retailers would only be able to make attractive offers if they were willing to make a loss. Therefore, it is the regulated full service tariff that discourages new retailers. The fact that changes in individual tariffs cannot differ more than 0.6 per cent from the change in the average tariff means that any rebalancing would be slow, blocking the development of retail competition for years.

Initially it was foreseen that full service tariffs for customers connected at high voltage would disappear in 2007. This would imply a potentially large increase in the cost of supply for high-voltage consumers still served under the regulated full service tariff. Shortly before the elections, the former government stated that eliminating these tariffs would be delayed. It is unclear what position the new government will take.

### *Planned next steps*

There are two major developments that will affect the way in which the Spanish market will operate: the integration of the Spanish and Portuguese systems, and implementation of the CO<sub>2</sub> greenhouse gas European emissions directive.

The two governments signed a Protocol in 2001 for the creation of an Iberian electricity market. The Protocol established that the Iberian market would be structured around two 'poles': the Spanish pole, in charge of the spot transactions, and a Portuguese pole, in charge of forward transactions. In effect, the Spanish pole would just require that the Spanish spot market also receive and manage the offers by generators based in Portugal. The Portuguese pole would require the setting up of a new market organisation, which would only manage physical trades and at a later stage manage financial trades.

Progress is slowed by the need to define a

consistent set of regulations. Concerns exist also about flows of funds from one country to another and about how to avoid one country free-riding on the other country's generation capacity payments and security of supply.

One important step was taken on 15 April, with Portugal's approval of a Decree-Law which defines the manner of cancellation of the Portuguese purchase power agreements (PPAs). Under the present system, the Portuguese TSO, Rede Electrica Nacional (REN), buys wholesale electricity via PPAs for resale under a regulated bulk supply tariff to distribution companies, for them to supply tariff customers. As a result, most generation is covered by PPAs between generators and REN. The text of the Decree-Law has not yet been published. However, it would seem that it foresees the possibility that compensation will be paid directly to generators, if they agree to the early cancellation of their PPAs, or to REN, so that it can honour its commitments.

The proposed arrangements will have to be approved by the EC. The Portuguese government appears confident. However, it remains to be seen whether the proposed compensation arrangements will allay Spanish concerns about whether compensation to Portuguese generators will distort their incentives and affect price formation in the Iberian wholesale market.

The other planned development arises from the obligation to comply with international commitments to reduce emissions, as laid out in the EC's Directive. This foresaw the creation of a market scheme for the exchange of emission rights due next January. During the transitional period (2005 - 2007), at least 95 per cent of the rights will be granted for free, but this will reduce to 90 per cent between 2008-2012. The objective is to protect companies from suffering financially as a result of the scheme. However, if generators take account of the market value of the rights when submitting their generation offers, wholesale electricity prices will increase.

### *Need for additional reform*

The main areas for reform include:

- **Regulatory transparency:** The CNE's role is focused on consultative and conflict resolution functions. Consistent with new European requirements, the CNE will be given the opportunity to define tariff methodology or even the tariffs themselves. The CNE should also get more powers and independence, but these must come together with regulatory transparency and the definition of an effective appeals mechanism. These reforms will reduce regulatory risk, which reduces the costs consumers bear, and encourage entry by new competitive agents.

- **Tariff reform:** The current methodology is inadequate. Tariffs must cover the prudent costs of service. Regulated full service tariffs must be redefined as tariffs of last resort, set above retail prices so as not to distort the development of retail competition. Tariff design must also be reconsidered, to ensure they adequately reflect marginal costs, so consumers make efficient decisions. Electricity tariffs also include substantial costs in excess of the marginal costs of supply, and this may distort fuel choice decisions by

customers favouring natural gas. One alternative is for these costs to be charged on both tariffs in a way that ensures revenue sufficiency while minimising distortions on consumption efficiency.

- **Stranded costs:** CTCs distort market efficiency without providing reasonable certainty of compensation. In order for the market to operate without distortions, the CTC mechanism needs to be reconsidered.

- **Wholesale market:** Most of the needed reforms are foreseen in the context of the creation of the Iberian market: the creation of the forward market, the reform of the treatment of intra-country congestion, and the elimination of the discrimination in the capacity payment supported by different customers. However, it would be necessary to define a transparent methodology for the determination of the payment, and to allow the price in demand bids to set the market price, removing any price caps that would prevent the price from rising to VOLL. Both measures will improve security of supply, providing better signals for investment and introducing flexibility in demand if there were ever supply problems.

- **Regulated activities:** Transmission and distribution remuneration is arbitrary with no mechanism to ensure consistency. A system of cost-based incentive regulation must be put in place, with periodic tariff reviews. It will be important that these regulations come with a commitment to transparency and the definition of an effective appeals mechanism.

### *Conclusion*

Spain's electricity sector has been transformed over the past decade. Part of the success must be attributed to the incumbents, who refrained from exploiting system weaknesses, in the knowledge that such abuse might result in a regulatory backlash. Part must also be attributed to the authorities, who established protections for consumers and kept a close eye on market developments.

However, six years on, many strengths have become weaknesses. The mechanism for CTC payments and the regulated full service tariffs which facilitated the transition are preventing full, effective competition developing. Removing these devices will expose companies and consumers to the results of their decisions and will incentivise efficient behaviour and maximise social welfare.

The hope is that the new government will move the electricity sector one step forward, and adopt international best practice regulatory principles.

### *Biography*

Oscar Arnedillo is director of the electricity practice at NERA Economic Consulting's Madrid office. He advises electricity companies on regulation and competition issues. Oscar can be contacted via email at: oscar.arnedillo@nera.com