



COUNTRY STUDIES

Spain - Regulatory Reform in the Electricity Industry 1999

Introduction

The Review is one of a series of country reports carried out under the OECD's Regulatory Reform Programme, in response to the 1997 mandate by OECD Ministers. This report on regulatory reform in the electricity industry in 1999 was principally prepared by Mr. Peter Fraser for the OECD.

Overview

Related Topics

BACKGROUND REPORT ON

REGULATORY REFORM IN THE ELECTRICITY INDUSTRY*

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1. HIGHLIGHTS

1. The Spanish government has had a strong commitment to liberalisation of the electricity sector. The Spanish electricity reform law passed in November 1997, which built on previous reform efforts over the past decade, created an open wholesale market, introduced choice to the largest electricity customers, and required separation into distinct corporations – albeit with some common ownership and management, for generation, distribution and retail supply. It also mandated price decreases to those remaining under regulated tariffs. Amendments in December 1998 and a further Royal Decree in April 1999 widen choice more quickly to medium-sized consumers and cut regulated prices more deeply than originally planned, and encourage greater activity in the wholesale market by lowering access tariffs. Compared with the minimum requirements of the European Union Directive on the single market in electricity, liberalisation of consumer choice is wider and quicker and the vertical separation of activities is deeper. The government has also sold all its shares in the country's largest utility, Endesa, and has reduced its shareholding in Red Electrica, the national transmission company, from 60% to 25%.

2. In response, there are some positive early signs that the reforms will improve efficiency. Incumbent utilities are implementing plans to trim staff, large foreign companies have announced their intentions to build new generating stations in Spain, and despite a slow start, increasing numbers of customers are opting to purchase power from the market.

3. There are four main issues regarding Spanish electricity market reforms that the government may wish to consider to get the maximum benefit from its efforts to date. The most important of these is the prospect for slow development of competition particularly in the generation market. The largest two utilities, Endesa and Iberdrola, produce 76% of the power in Spain and there are limited prospects for importing electricity, given the technical constraints on the French border. Entry by new competitors is expected to reduce this share only gradually. Market competition concerns conflict with industrial policy considerations that favour strong Spanish electricity companies of larger size. Vertical integration with distribution-supply companies further attenuates competition, though legal and accounting separation might be helpful.

4. The second issue is the role of independent regulation. The Ministry of Industry and Energy is the primary regulator, as it carries out both energy policymaking and the main regulatory activities of setting tariffs and negotiating with the utilities on matters such as the payment of transition costs. The independent electricity advisory body, the CNSE, has primarily contributed to the reform process through its analysis and outspoken advocacy for the consumer. Business, labour and consumer organisations thought highly of it. However, both the CNSE and its replacement, the CNE, have few regulatory powers.

5. The third issue is the extent to which regulated prices reflect costs. There are apparently significant price distortions with some costs incurred for the benefit of industrial consumers being paid for by residential consumers. These price distortions have reduced the effect of the liberalisation because the government has set regulated tariffs for some very large industrial customers below market prices. These very large users, normally enthusiasts for access to competitive wholesale electricity markets, have instead preferred to remain with regulated tariffs.

6. The fourth issue is the level of energy policy costs that the electricity consumer is required to support. Significant premiums are paid for electricity from renewable energy and small cogeneration. Taxes and charges on electricity customers go to subsidising the restructuring of the domestic coal industry. The size of the payments to utilities for the so-called costs of the transition to competition has been controversial and is currently under review by the European Commission. These costs--for energy

policies, costs of transition to competition and so-called capacity payments--constitute about one-third of the total cost of power in Spain.

7. Finally, the fifth issue is the liberalisation of the gas market and its links with electric power. To increase competition in the electricity sector, more should be done to diversify the gas industry given the fact that Gas Natural operates as a de facto monopoly and owns the transportation system and the long-term supply contracts.

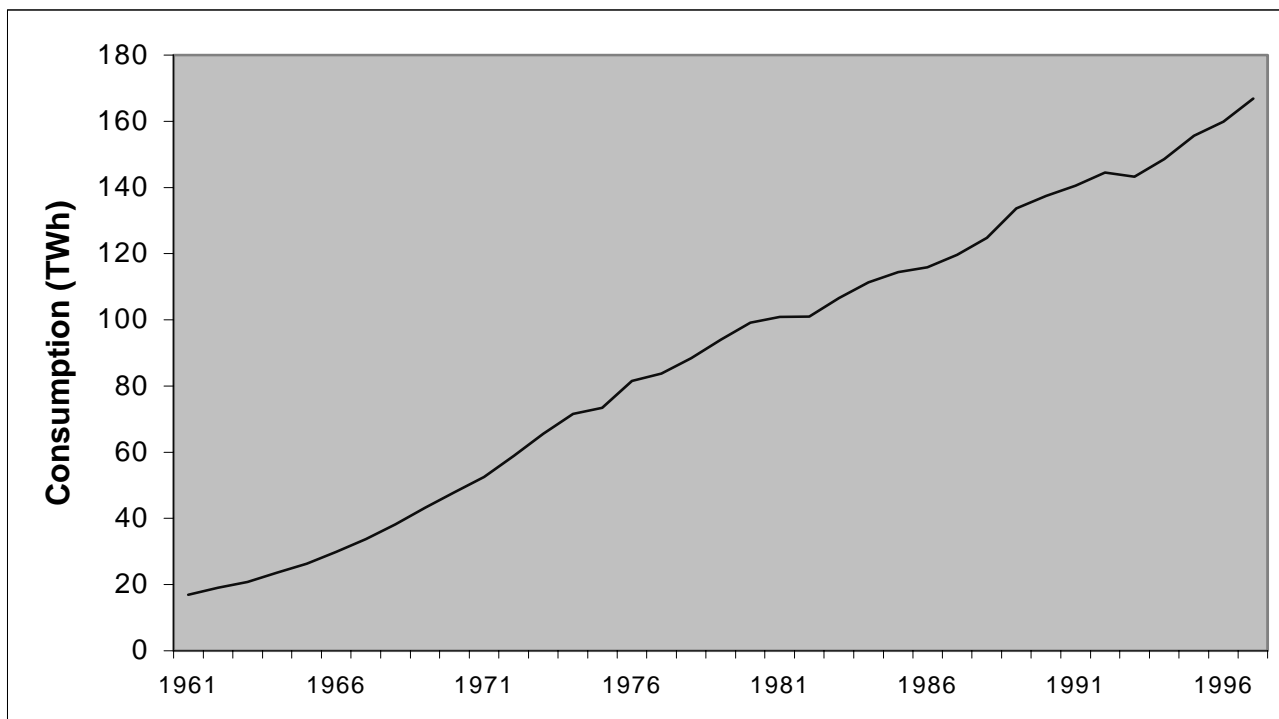
8. This report is structured as follows. Section 2 outlines the current features of the electricity sector, including infrastructure, industry structure, prices and costs. Section 3 gives a context and overview of the latest reforms. Section 4 describes the regulatory framework and identifies the four main issues (described above). Section 5 is a detailed critique of these issues. Section 6 states the conclusions and specific recommendations.

2. CURRENT FEATURES OF THE ELECTRICITY SECTOR

2.1. Capacity and generation

9. Growth in demand for electricity has been accelerating in Spain in recent years after a lull in the early 1990s (see Figure 1). Peak demand in mainland Spain in 1998 was 29.5 GW, an increase of 2.1 GW in one year, and energy supplied increased by 6.5%.

Figure 1. Electricity consumption in Spain

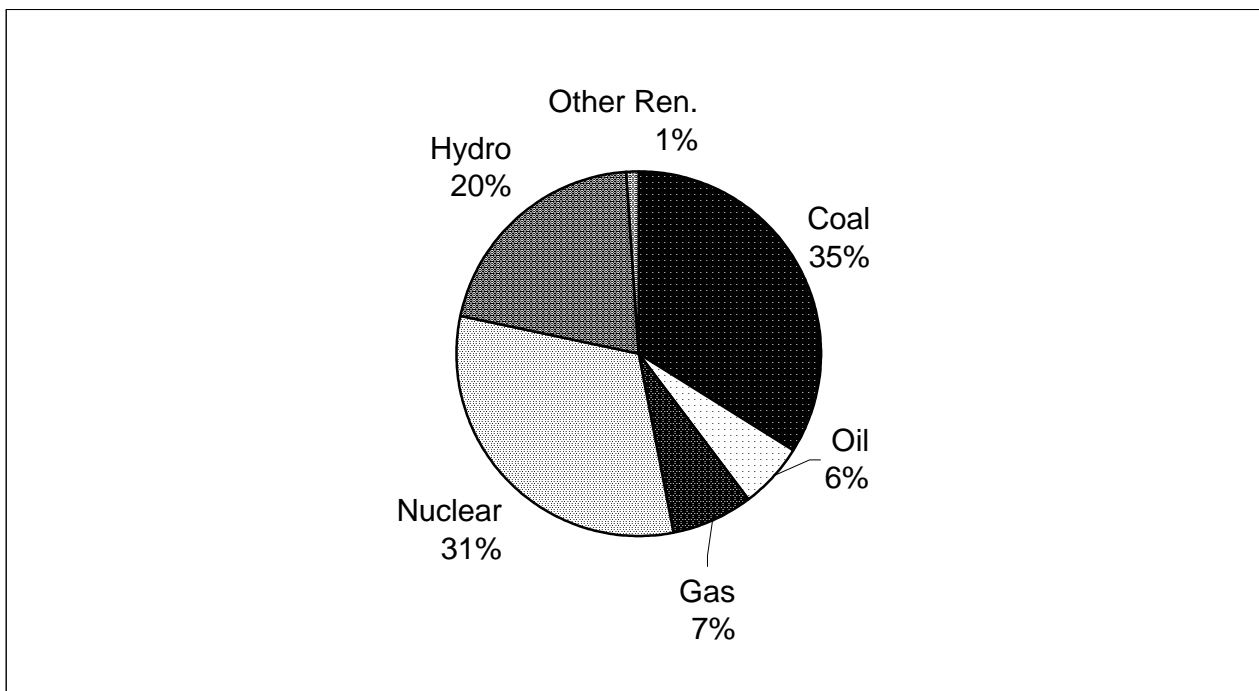


Source: *Energy Balances of OECD Countries 1996-1997*, IEA/OECD, Paris 1999.

10. The capacity available in 1998 to meet this peak demand on mainland Spain was nearly 51 GW. This implies a reserve margin of over 50%. This represents a sizeable surplus over normal planning requirements of 20-25%, even accounting for fluctuations in available capacity from hydroelectric power, which accounts for about one third of total capacity.

11. Fuel mix for domestic electricity generation in 1998 shows a mix of coal (35%), nuclear (31%) hydroelectric (20%), oil (6%), gas (7%), and renewables (1%) (see Figure 2).

Figure 2. 1998 fuel shares in Spanish power generation



Source: Ministry of Industry and Energy

12. Coal supplies 35% of all power generated and is used for baseload and midload operation. Over 80% of coal used for power generation comes from domestic sources of hard coal or black lignite (*lignito negro*) and brown coal (*lignito pardo*).

13. Hydroelectric generation is important for meeting peak demand but highly variable, depending on annual rainfall. Production in 1998 of 36.6 TWh represented a 12% decrease over 1996 but was still 50% higher than in 1995. Electricity production from fossil fuels is increased or decreased to accommodate these changes.

14. Nuclear power produced 31% of all electricity requirements in Spain in 1998 and is used for supplying baseload power. The performance of current plants (as measured by capacity factor) is among the best in OECD countries (see Table 1).

Table 1. Nuclear power production in Spain

Plant	Began operation	Capacity (MW)	1998 Production (TWh)	1998 Capacity Factor (%)
J. Cabrera	1969	160	1.167	83.8
Garoña	1971	466	3.952	96.9
Almaraz I	1981	974	8.29	97.2
Ascó I	1983	973	7.628	89.5
Almaraz II	1983	983	6.070	70.5
Cofrentes	1984	1 025	8.473	95.1
Ascó II	1986	976	7.691	90.3
Vandellós II	1988	1 009	8.716	98.6
Trillo I	1988	1 066	7.015	75.1
Total		7633	59.002	88.4

Source: Ministry of Industry and Energy.

15. Most of the nuclear plants are jointly owned by the utilities in varying shares. The utilities are currently considering options for separating the ownership of each plant.

16. Natural gas and oil-fired plants generate most of the remaining power. Natural gas generating capacity has been expanded in the 1990s as existing gas infrastructure has been enlarged. Independent producers have built gas-fired cogeneration facilities to supply base load generation. Utilities have modified some of their oil-fired capacity to burn natural gas for peaking loads. Oil-fired generation has consequently decreased and is primarily used to supply non-mainland Spain and some peak demand in mainland Spain.

2.2. Transmission

17. Red Electrica de España S.A. (REE) operates the high voltage transmission network in Spain. Created in 1985 and majority owned by Endesa until 1997, it owns 95% of 400 kV lines in Spain and about 30% of the 220 kV (the rest is owned by the utilities). REE is 25% owned by the government; each of the four utilities holds 10%, the maximum now permitted by law. The government has begun the process of privatising REE and sold 35% in 1999 and plans to sell its remaining shares by 2003.

2.3. International trade

18. There are limited interconnections with Portugal, France, Morocco and Andorra. Total import capacity is approximately 1700 MW, about 6% of peak load. Spain is normally a net importer from France and a net exporter to the other countries. Imports in 1998 of 4.7 TWh, principally from France, amounted to 3% of gross demand, about one third of maximum potential annual transfer capability.

Table 2. Spanish electricity interconnections and 1998 trade

Country	Capacity (MW)	1998 Imports (TWh)	1998 Exports (TWh)	Net (TWh)
France	900im-700ex	4.568	0.119	4.449
Portugal	650im-750ex	0.031	0.308	-0.277
Morocco	300im – 350 ex	0.003	0.706	-0.703
Andorra		0	0.115	-0.115
Total	1850im-1700ex	4.687	1.283	3.404

Source: Red Electrica.

2.4. Industry structure

19. Electricity production and distribution in Spain is dominated by two privately-owned utilities, Endesa and Iberdrola, that together produce about 76% of all electricity generated and have 81% of the sales. In 1998, Endesa plants provided the marginal capacity 59.2% of the time whereas Iberdrola supplied the margin 23.7% of the time.

20. Grupo Endesa was originally a government-owned generation company (created in part to use domestic coal resources). It has acquired other electric utilities over the past decade to become the largest utility in Spain. Endesa's generating capacity of 23 GW produced 85 TWh in 1998 and gave it a 48% share of all electricity production in Spain (Endesa is the fourth largest utility in the European Union as measured by generating capacity). Endesa's generating capacity is principally coal and nuclear, with a smaller portion of hydroelectric and gas-fired generation. It sells power to 9.3 million customers, giving it a 42% share of the Spanish market. Endesa is also diversifying its investments into electricity in Portugal and Latin America, as well as other network industries in Spain such as telecommunications and water distribution. In 1998, the government's remaining shares in Endesa were sold. The government retains a "golden share" which protects Endesa from takeover until 2005.

21. Iberdrola is a privately owned company and produces 26% of all electricity. Most of its generating resources are hydroelectric and nuclear power with relatively small contributions from fossil fuel. It serves 8.8 million customers selling 39% of all electricity sold in Spain.

22. The other two utilities are Union Fenosa, which generates 10% of the total and Hidrocanabrico with 4%.

23. Independent power generation now provides 11% of all energy generated, up from less than 2% in 1990. IPP development has been encouraged through the so-called "special regime", which requires utilities to purchase energy produced from cogeneration and renewable energy sources at premium prices fixed by the government. Approximately two thirds of independent power generation is from cogeneration using fossil fuels; the remaining third use renewable energy principally hydropower but also wind and energy from waste. As a result of the "special regime," IPPs choose to sell to utilities, thus do not affect market prices.

Table 3. 1998 Electricity production and sales

Producer	Capacity (GW)	Net Generation (TWh)	Share of generation market (%)	Customers (Millions)	Sales (TWh)	Retail market share (%)
Endesa Group	22.9	85	48	9.4	74	44
Iberdrola	16.3	47	26	8.3	62	37
Fenosa	5.2	19	11	2.8	22	13
Hidrocanabrico	1.7	8	4	0.5	7	4
Total central production/sales	46.2	159	89	20.8	165	98
IPP ("special regime")	5.5	20	11	-	-	-
Small distributors	-	-	-	0.2	3	2
Total	51.7	179	100	21	168	100

Notes: These totals includes 2.7 GW and 8.645 TWh extrapeninsular generation on the Canaries, Balears Islands, Ceuta and Melilla generated by Endesa and 0.155 GW and 0.61 TWh extrapeninsular generation by autoproducers. These totals also include 9 TWh sales by Endesa to 1.3 million extrapeninsular customers.

Sources: Company annual reports, Ministry of Industry and Energy.

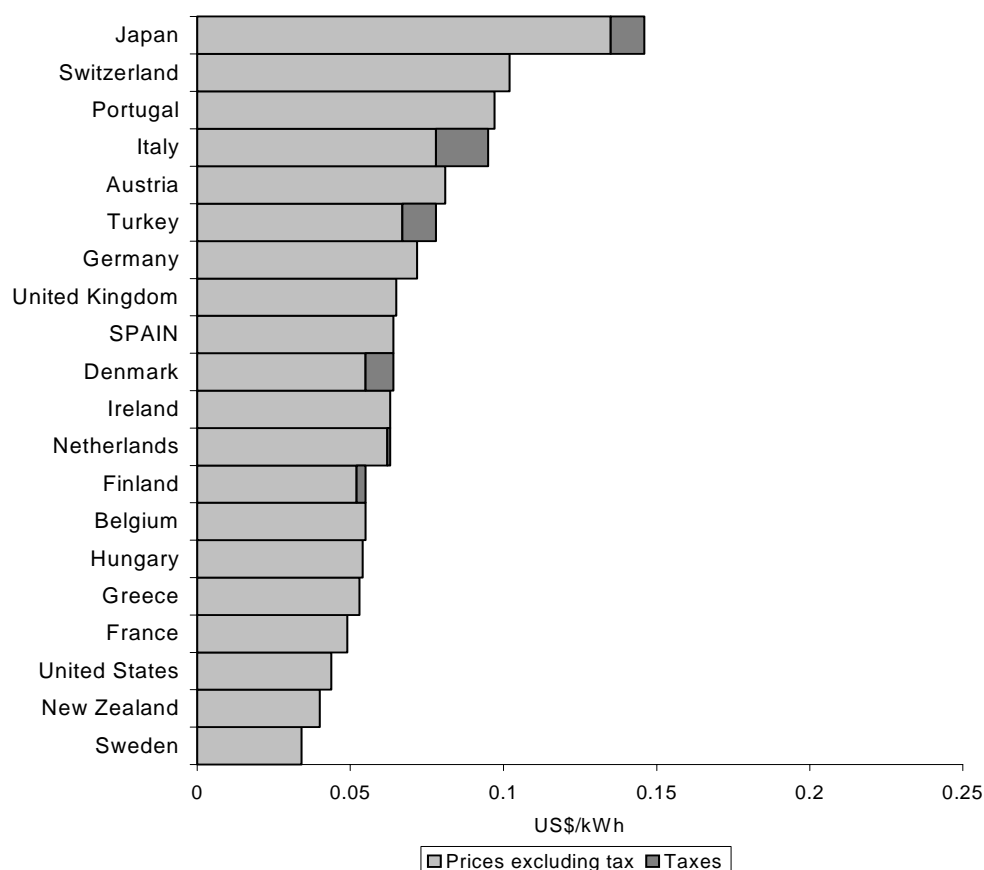
24. Distribution (the low voltage physical transportation of electricity) to 21 million electricity consumers occurs through the utilities operating under a concession granted by the autonomous regional authorities or the national government, in the case of distributors serving more than one autonomous community. There are also 516 small distributors supplying about 200 000 customers through co-operatives, purchasing power from the surrounding utility.

25. UNESA is a utility association that has traditionally played a substantial role in co-ordinating the activities of the utilities, including co-ordinated planning, negotiation of fuel purchases with suppliers, analysis of economic and financial issues, and research and development. It has represented the utilities before national bodies such as the CNSE. Liberalisation of the electricity market requires the utilities to undertake commercial activities such as fuel purchasing separately. Due to such changes UNESA has been required to redefine its activities and change from a corporation to a non-profit association with the potential for much broader membership. UNESA has reduced staff by two thirds.

2.5. Electricity prices and costs

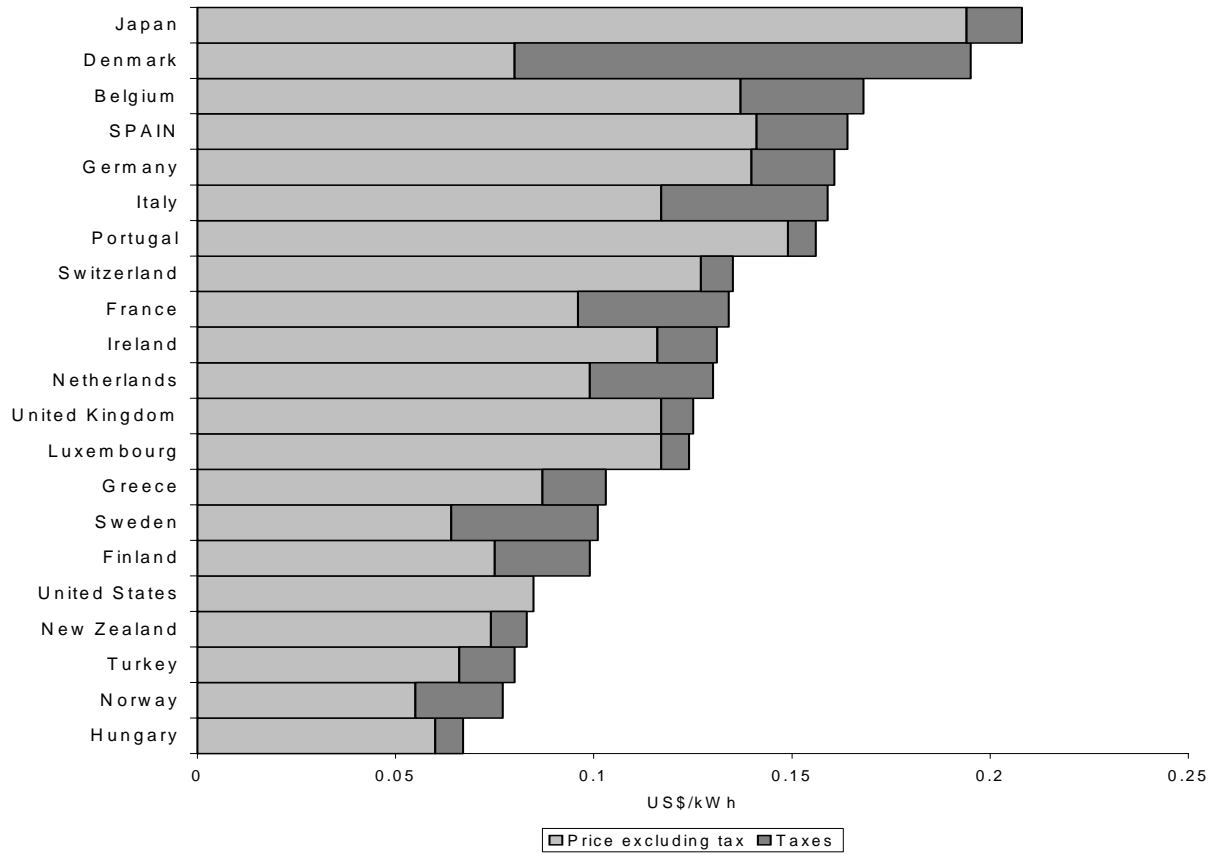
26. Industrial electricity prices in Spain are in the middle among OECD countries (Figure 3). By contrast, domestic prices before tax are among the highest in the OECD (Figure 5).

Figure 3. Industrial electricity prices in selected OECD countries 1997



Source: Energy Prices and Taxes, IEA/OECD Paris, 1998.

Figure 4. Domestic electricity prices in selected OECD countries 1997



Source: *Energy Prices and Taxes*, IEA/OECD Paris, 1998.

27. A breakdown of components of 1999 estimated electricity costs, before taxes, is shown Table 4.

Table 4. Components of projected 1999 electricity costs for Spain

Items	Costs (Ptas billion)	Share (%)
Production and related	1113	56.5
Production and imports	695	35.5
Special regime production (payments to independent producers)	222	11
Capacity payments	196	10
Transmission and related	117	6
Ancillary services	30	1.5
Transmission	87	4.5
Distribution and related	473	24
Distribution	418	21
Retailing	40	2
Quality of service enhancement	10	0.5
Demand management	5	0.25
“Permanent costs”	169	9
System and market operators, CNSE	3	0.15
Costs of the transition to competition (coal related see Section 4.9)	58	3
Costs of the transition to competition (technology related see Section 4.9)	88	4.5
Extrapeninsular system	20	1
Diversification and security of supply costs	87	4.5
Nuclear moratorium (see Section 4.6)	69	3.5
Nuclear fuel cycle	17	1
Other	1	0.1
Total	1 960	100

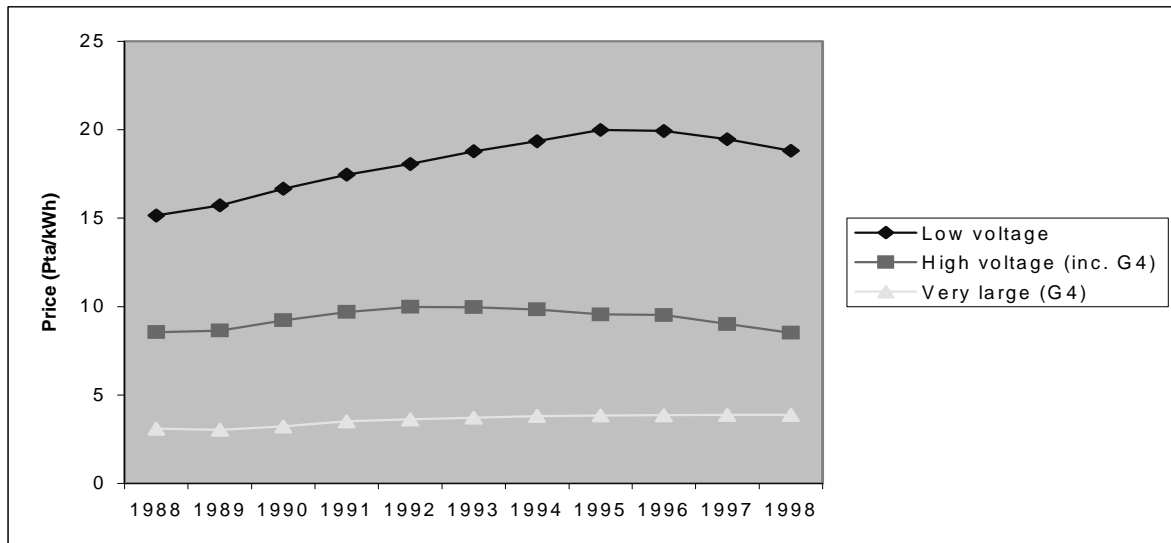
Source: Ministry of Industry and Energy.

28. Energy policy-related costs have been important in pushing electricity costs and prices higher in Spain. These include support for the domestic coal industry through an *ad valorem* tax of 5.113%, compensation to the utilities for the nuclear moratorium and for the costs of transition to competition, subsidies for the special regime production, demand management and quality of service enhancement, and subsidies for the extrapeninsular system, payments for the nuclear fuel cycle and other diversification costs, and the so-called capacity payments. The above factors together constitute one-third of total power costs in Spain and are discussed in more detail in Section 4 below.

29. Two other factors also have contributed to higher prices. Fuel costs have been relatively high because of high cost domestic coal and because natural gas has until recently only been available as relatively expensive liquefied natural gas (LNG). Spain’s nuclear power program has also been relatively expensive.

30. Prices rose more slowly than inflation in the early 1990s and have decreased about 11% from mid-1996 to mid-1999. There are large variations in price by voltage: very large consumers pay less than 4 Ptas/kWh vs. small consumers who pay approximately 20 Ptas/kWh (see Figure 5).

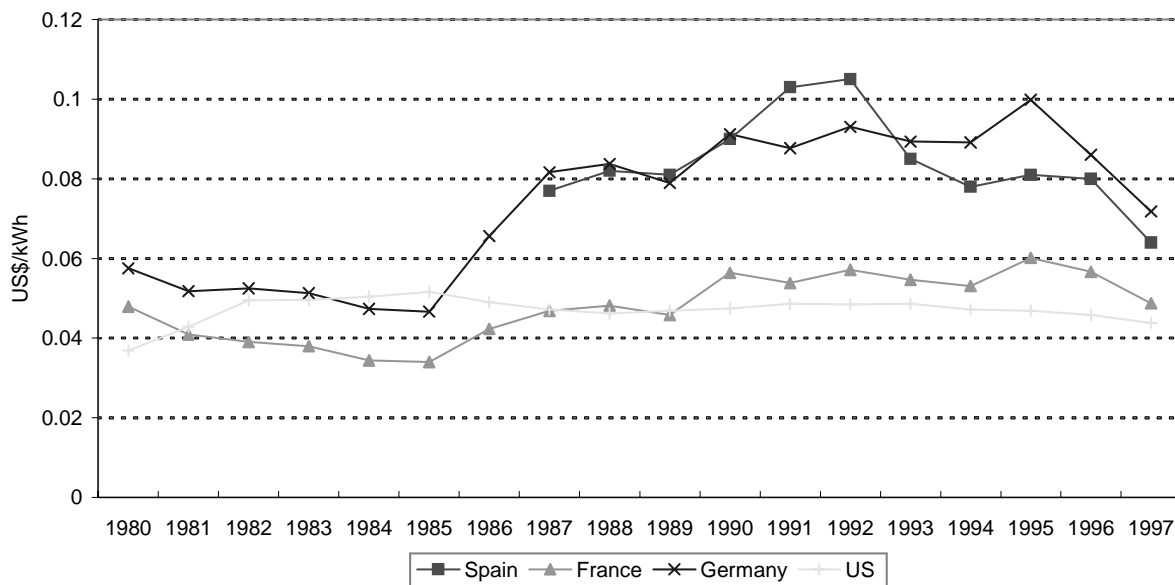
Figure 5. Electricity Prices 1988-1998



Source: UNESA.

31. Regulated prices have declined in line with falling unit costs. These reflect the resumption of robust growth in demand and a fall in interest expenses due to falling debt levels (because of a much lower level of utility borrowing) and a decline in interest rates. The fall in industry price is quite significant compared to other OECD countries (Figure 6).

Figure 6. Industrial electricity prices in selected OECD countries 1980-1997



Source: Energy Prices and Taxes, IEA/OECD, Paris, 1998.

32. Electricity tariffs are the same throughout Spain including the islands. Customers pay different retail electricity tariffs depending on the voltage at which they receive electricity. The basic tariff structure is a two-part tariff. Customers pay for capacity (in kW) and for energy (kWh). In order to increase

economic efficiency, electricity tariff options have been introduced that allow low-voltage customers to pay lower prices at night time than in the day time and also to vary by season (with higher charges in the winter and summer seasons). Approximately 11% of low voltage customers have taken advantage of this tariff option. Large customers can opt for a tariff that varies hourly according to the market price. Tariffs for use of the network vary by voltage, but not by location or by time of use.

33. Medium-voltage and high-voltage customers will also be able to benefit from interruptibility discounts until 1 November 2000. Approximately 37% of the Spanish electricity load benefits from such discounts. These discounts were worth Ptas 49 billion in 1997.

2.6. *Environmental protection*

Acid gas emissions

34. Existing regulations in Spain regulate SO₂ and NO_x emissions in line with the EU Large Combustion Plant Directive (88/609/ECE) through Royal Decree 646/91. Power companies have been reducing their emissions to meet these regulated limits through a combination of substitution of natural gas for oil and to a lesser extent coal, increased use of lower sulphur imported coal, investments in flue gas desulphurisation units at several plants, uprating and improving nuclear power plant performance, and utility demand-side management programs. As a result, SO₂ emissions have fallen by 20% and NO_x by 9% since 1990. The Royal Decree limits for 1998 and 2003 are compared to actual production in 1990 and 1997 in Table 5.

Table 5. **Spanish SO₂/No_x emissions and 1998/2003 emissions limits**

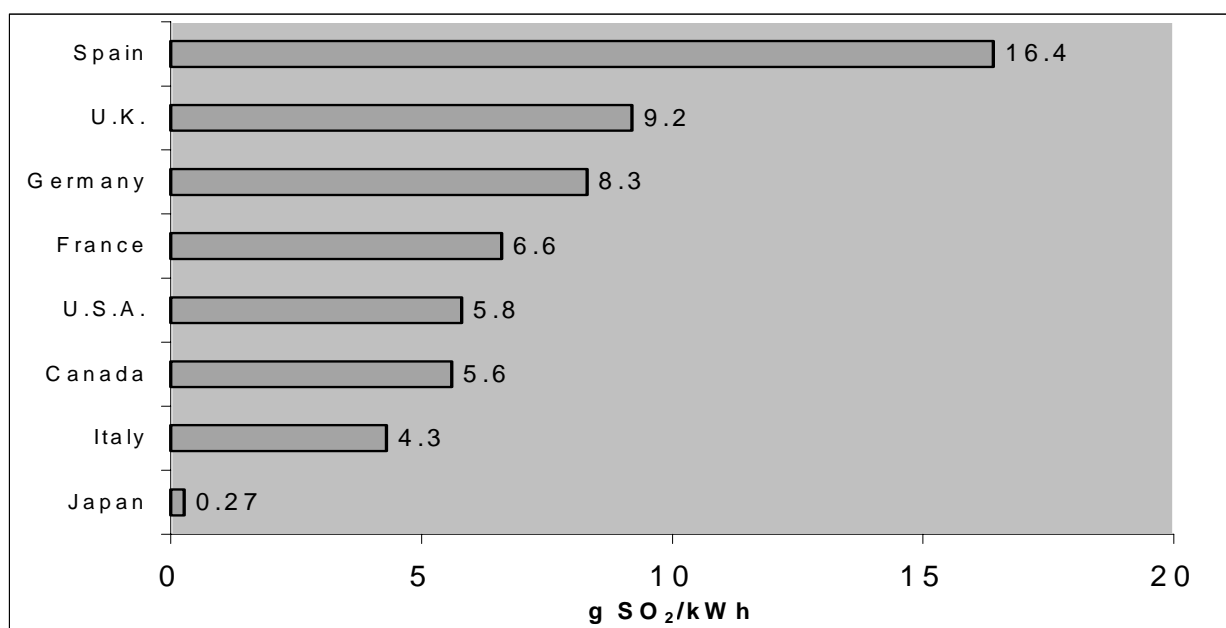
Emissions	1990	1997	1998 Limit	2003 Limit
SO ₂ (kt)	1550	1231	1730	1440
NO _x (kt)	300	274	277	277

Source: CNSE.

35. While SO₂ emissions are well below regulatory limits, NO_x emissions are not. Utilities have made investments in low-NO_x emission burners for the coal-fired power plants to reduce emissions in 1998 by 17% over 1997 despite an increase in fossil-fired generation. As a result, the large combustion plant limits set out by the EU directive are likely to be met.

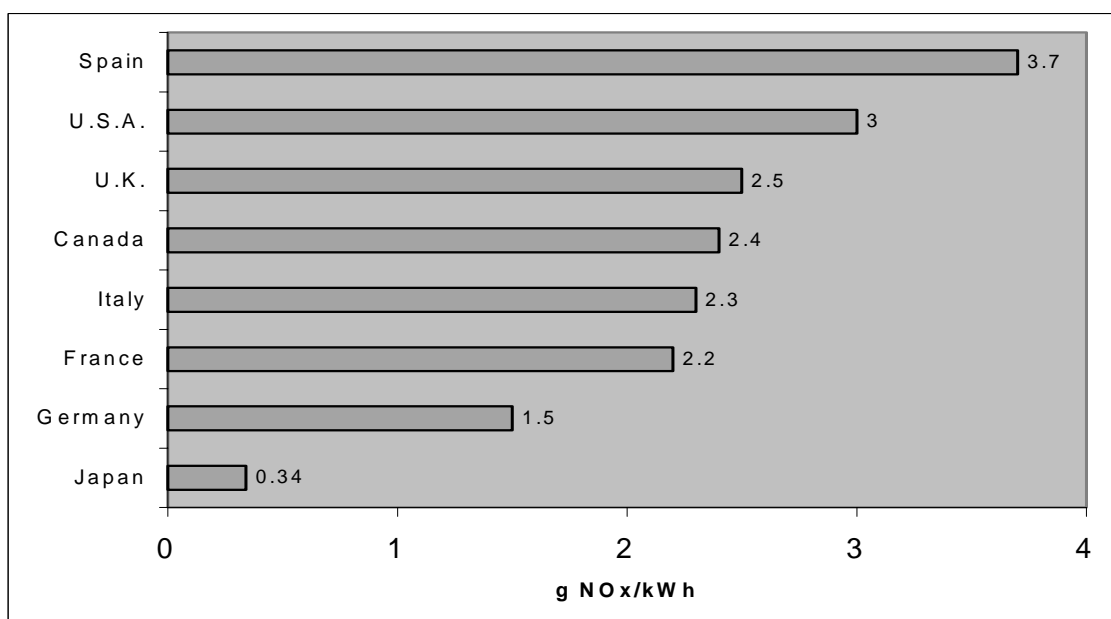
36. Emissions of SO₂ and NO_x per kilowatt-hour produced are very high compared to other OECD countries (see Figures 7 and 8). The lack of emissions control systems on most plants, combined with the poor quality and high sulphur content of domestic coal are primary reasons for these relatively high figures.

Figure 7. Average SO₂ emissions per kWh of thermal power generation in selected OECD countries



Source: OECD/IEA, Federation of Electric Power Companies of Japan, CNSE.

Figure 8. Average NO_x emissions per kWh thermal power generation in selected OECD countries



Source: OECD/IEA, Federation of Electric Power Companies of Japan, CNSE.

Greenhouse gas emissions

37. Spain's target for reduction of all greenhouse gases under EU agreements amounts to an increase in the emission of the basket of greenhouse gases of 15% over 1990 levels during the period 2008-2012. In the shorter term, the Ministry of Industry and Energy had set a target of a 15% increase in energy sector

CO₂ emissions over the period 1990-2000. Power sector emissions account for 25-30% of total carbon dioxide emissions from fuel combustion. Emissions from the power sector in 1998 are slightly below that of 1990, despite a 23% increase in power production, owing to increased generation from hydropower (which was unusually low in 1990), increased nuclear output and increased independent power production much of it using natural gas which displaced utility oil-fired generation. However, increases in emissions from other sectors have boosted total energy-sector CO₂ emissions 15% above 1990 levels.

38. The government is currently developing its national climate change strategy. As part of that the development, the National Climate Change Council, a government advisory body, has identified a number of policy options for combating climate change that would affect the power sector. These options include increased energy efficiency, substitution of natural gas for coal or oil in power generation, and greater use of nuclear power and renewable electricity generation.

Renewable energy

39. The government has ambitious plans for the development of renewable electricity generation. The *Energy Savings and Efficiency Plan* aims to increase capacity of renewable electricity generation to 1188 MW (and annual energy production to 4.2 TWh) by 2000 and a further objective of 12% of all energy demand in 2010 be met by renewable energy. Renewables are promoted by direct government subsidies and a “special regime” which requires the utilities to purchase renewables and cogeneration from independent producers at premium prices. About 30 percent of total production under the “special regime” comes from renewable energy, and the rest from cogeneration. The subsidy cost was Ptas 5.1 billion in 1998. Special regime payments to renewable energy producers (excluding large hydro producers) amounted to Ptas 40 billion in 1997.

40. As a result, there has been a substantial increase in renewable electricity production. Between 1990-96, renewable energy production from non-hydro sources increased at an annual rate of 17.6%. In 1997, special regime generation by small hydro, wind and wastes produced 3.5 TWh. Endesa and Iberdrola own about a third of the 1718 MW of renewable power generating capacity through subsidiaries.

41. Wind-generated electricity capacity has doubled in the past two years to nearly 1000 MW and is expected to continue to increase its contribution to Spanish electricity generation as a result of the favourable subsidies and availability of suitable sites. The Ministry’s Institute for the Diversification and Conservation of Energy (IDAE), whose functions include the promotion of renewable energy, estimates up to 15 000 MW of additional capacity could be constructed under the special regime.

3. REFORM OF THE ELECTRICITY SECTOR

42. The current Spanish electricity reforms have developed in a policy context where industrial policies, security of supply and public service objectives have shaped the efforts to reform the sector. Industrial policy and security of supply, or more specifically energy self-sufficiency, manifest themselves primarily through the support of the domestic coal mining sector, but also through support of nuclear power and the special regime. The main public service objectives are to ensure universal service at a common price with a high standard of reliability throughout the country. These public service objectives reflect the fact that full electrification in Spain has arrived somewhat later than in other European Union countries.

43. Against these long-standing public policy objectives, the main objectives of the 1997 Electricity Act are to lower Spanish electricity prices and improve the quality of service by increasing operational freedom, in a manner compatible with security of supply and environmental protection.

44. Against these public policy objectives, the government of Spain has been engaged in a long process of reforming the electricity sector using a combination of regulation, privatisation, and liberalisation. An early step was the creation of Red Electrica in 1985 as an operationally separate national transmission system and system operator, the first country in the OECD to do so. The 1987 law (*Marco Legal Estable – MLE*) set out a new scheme for regulating the electricity sector based on standard costs that would provide companies incentives to improve their efficiency. The MLE also introduced a new pooling mechanism to account for highly divergent electricity generation costs among the different companies and reformed the financing of the coal and other subsidies. In 1988, Endesa was partially privatised.

45. By 1994, the government recognised the need for liberalisation and greater transparency to further improve efficiency and reduce the cost of electricity. The electricity sector restructuring law (*Ley de Ordenación del Sistema Electrico Nacional - LOSEN*) would have created an independent system, as a parallel system of electric supply that would have operated along with the integrated utility system. Under the independent system, producers and consumers would have been able to have access to the transmission and distribution networks and would have been able to contract freely including imports and exports for the supply of electricity although backup services would have had to have been provided by the integrated system. An important proviso of the law was that the independent system could not have led to price increases in the integrated system, *e.g.*, through loss of customers.

46. The law also required that new generation transmission and distribution assets for the integrated system be procured through an open tender process. Utilities were also required to undertake accounting separation of the generation and distribution activities, to have been followed by legal separation (*e.g.*, putting these activities in a separate subsidiary) by 31 December 2000.

47. The law also established an independent electricity consultative body, the predecessor to CNSE. Its main responsibilities were to act as a consultative body to the government on energy policy matters, make reports on the tender process, determine the allocation of revenues among the companies, act as an arbitration body on quality of service matters, and protect competition through giving advise on mergers and acquisitions. The majority of the regulatory functions such as rate setting remained with the government.

48. The law also set out the amount of compensation electricity consumers would be required to pay utilities for the nuclear moratorium and defined the recovery mechanism.

49. However, the key market-based reform, the independent system, was never actually put in place. A new government elected in 1996 favoured more ambitious reforms consistent with the EU Electricity Directive that was under negotiation at that time. In December 1996, the same month the EU Directive was agreed, the government and utilities reached agreement on a new package of reforms that formed the basis of a new Electricity Law that was passed a year later.

50. The 1997 Act provides the basis for the current system that will lead to a fully liberalised electricity market, with new market institutions, and a mechanism for recovering costs for the transition to competition. Following a further negotiated agreement with the utilities in September 1998, the government made amendments to the legislation that will lead to a more rapid liberalisation of the market and a change in the maximum and minimum costs of the transition to competition. A further tariff

reduction and acceleration of the liberalisation was set by Royal Decree in April 1999. These amendments came a few months after the government had disposed of its remaining shares in Endesa. These reforms are discussed in Section 4.

4. MARKET STRUCTURE AND REGULATORY FRAMEWORK

4.1. Institutions

51. Regulation of the electricity sector is concentrated at the national level, with important additional functions carried out by the autonomous communities and by the European Commission. There are three regulatory bodies that are competent at the national level. The Ministry of Industry and Energy is the principal regulator of the electricity sector. The CNSE (National Electricity Regulation Commission) is an independent body whose principal functions are advisory except for those related to dispute resolution and some mergers. The Spanish Tribunal for the Defence of Competition has the power to apply antitrust rules to the electricity sector. At the regional level, the autonomous community governments have specific regulatory functions with respect to distribution, quality of service and development of independent generation. The European Commission's competition directorate (DG IV) and energy directorate (DG XVII) also have the ability to intervene on certain issues.

52. The Ministry of Industry and Energy is the most important authority in electricity regulation. In addition to having overall policy responsibility for reforms the Ministry:

–Sets tariffs and charges such as:

- Network access tariffs;
- Regulated retail tariffs;
- Prices paid for generation under the special regime.

–Allocates revenues among utilities for different cost components such as:

- ~ Costs for the transition to competition including size of payments for using domestic coal.
- ~ Permanent costs of the system including the cost of market and system operators and the CNSE.
- ~ Costs of demand management and service quality improvement programs.
- ~ Supply diversification costs.

–Regulates the operation of the power market. The Ministry issues licenses to participants, provides authorisations for new generators and exercises authority in the planning process.

–Approves transmission projects.

–Establishes minimum quality and safety standards.

53. By contrast, the sector regulator, the *Comisión Nacional del Sistema Eléctrico* (CNSE) initially created in the 1994 Act, has few powers. Rather, it plays a more important role as advisor and as consultative body. According to the 1997 Act, the principal functions of the CNSE are to:

- Respond to the requests for consultation by the Ministry on any electricity matter.
- Participate through proposal and reports, in the determination of tariffs and remuneration of activities within the electricity sector.
- Participate through proposals and reports, in the development of regulations by the Ministry, electricity planning, authorisation of new generation and transmission facilities.
- Carry out the settlement of costs of transmission and distribution and other regulated costs, and, when requested to do so, inspect “the economic conditions of agents as these affect tariffs and the effective unbundling of the system”.
- Arbitrate disputes between agents.
- Resolve disputes on access to the transmission and distribution networks.
- Approves mergers and acquisitions of transmission and distribution companies. CNSE is empowered not to authorise them or to impose conditions when there may be a negative impact on the performance of the industry.
- Reports to the Fair Trading and Restrictive Practises Services (*Servicio de Defensa de la Competencia*) when it detects the existence of evidence of restrictive practises affecting competition under the Competition Act 1989.

54. A Board composed of a Chairman and 8 commissioners governs the CNSE. The Chairman and commissioners are appointed based on “acknowledged technical and professional ability” by the government after a review by the parliament. Once appointed, the Chair and Commissioners cannot be removed by the Ministry. The Commission and its staff of 73 are financed through a levy on electricity tariffs whose size (0.56% in 1999) is set by the government.

55. To carry out its duties, the CNSE has significant powers to require information to be given to it by the various market participants. Market participants have the ability to appeal these requests to administrative courts. Decisions of the CNSE other than requests for information and dispute resolution rulings are appealable to the Ministry.

56. The CNSE has several mechanisms to ensure the transparency of its activities. First, it has a Consultative Council that acts as an advisory body, with representatives from Autonomous regions, the government, the Nuclear Safety Council, the electric power companies, the market and system operators, consumers and users and other social organisations, and environmental groups. Second, all its decisions are published. Third, the Commission and particularly the Chair has been very active at making the views of the Commission known through other publications put out by the Commission and its staff and other means. Fourth, the Commission maintains an Internet website where many of its publications are available.

57. A new energy advisory body (*Comision Nacional de Energia - CNE*) has been created with jurisdiction over electricity and natural gas and hydrocarbons and has superseded CNSE in the year 2000.

The CNE has much the same legal capability as CNSE had with a few additions. The government is obliged to seek the views of the CNE for all energy laws and regulations proposed but is not obliged to follow this advice. The CNE will also have the power to authorise activities of regulated companies who wish to diversify into other business lines.

58. As noted above, the Spanish competition authority (the Tribunal for the Defence of Competition) does have competence with respect to application of antitrust rules. The CNSE plays a monitoring role in this regard in two different areas. When the CNSE detects restrictive trade practices, it has the duty to notify the Fair Trading and Restrictive Practices Service and provide a report on the matter. The Service must then decide whether to bring it to the attention of the Tribunal. Conduct that is authorised by other law or regulation is excluded from the Competition Act. In the case of mergers generally, the Ministry has complete discretion regarding the referral of to the Tribunal on competition grounds. Nevertheless, in the case of involving electricity companies, the CNSE is required to produce and submit a report to the government on the competition implications. The government can then refer the report to the Tribunal.

59. Several competition cases have already arisen in this sector. The EU is reviewing a joint venture between a Spanish and a Portuguese firm to build a transmission line. The Servicio is supporting the venture, because it creates a new supplier. The competition authority and energy regulator are co-operating in evaluating another joint venture matter. Complaints about access are being filed with the Servicio and reviewed by the Tribunal, which has decided at least three cases in this sector so far. The Gas Natural-Endesa accord was referred to the Tribunal for second-phase investigation into its potential market foreclosing effects. The merger of Gas Natural Endesa's gas distribution assets in Aragón and Andalucía was forbidden by the Government due to its potential market foreclosing effects on the gas distribution market of these two autonomous communities.

60. Autonomous communities have competencies in several areas, including the approval of distribution facilities and other electric facilities "when their use does not affect other regions" (e.g., small generation facilities), the concession rights for electricity distribution, and development of regulations with respect to connection of supply, and the enforcement of regulations with respect to quality of service. The regions are also represented on the consultative council of the CNSE. The autonomous communities also play an important role in supporting the development of independent generation, and have the right to put additional charges on the bills of electricity customers in their region to recover the costs of such support.

61. The European Commission's Competition Directorate (DG IV) also has the ability to intervene on competition issues affecting the Spanish electricity sector. First, it has a role in ensuring that the non-discriminatory open access requirements of the electricity directive are actually being respected, particularly in regard to international access to the Spanish market. Second, it has competence over mergers and acquisitions and their possible competition impacts, when such mergers and acquisitions are international in scope. Third, it has competence over transition costs awarded to utilities by governments and whether such awards constitute state aids and in this regard, it can determine whether such state aids are consistent with Community rules and can require such aids be modified.

62. The Energy Directorate (DG XVII) is responsible for ensuring that provisions of the EU Electricity Directive are being respected.

4.2. Framework for competition

63. The main elements of the Spanish electricity reforms are:

- Phased in access to the power market of electricity customers, starting with the largest customers in 1998 and extending to domestic consumers in 2007.
- Competition in the generation of electricity through an electricity market and contracts between customers and suppliers.
- Non-discriminatory access to transmission and distribution networks.
- Free entry into the generation of electricity.
- Legal separation of network businesses (transmission and distribution) into distinct operationally separate companies from commercial businesses of generation and retail supply.
- Regulation of the network and end-user tariffs by the Ministry.

Liberalisation of retail supply

64. The government plans to liberalise supply to electricity customers in mainland Spain over a 10 year period. Approximately 500 customers above 15 GWh constituting 27% of total electricity demand have been able to choose supplier since January 1, 1998. As a result of an agreement between the government and the electricity companies, the original timetable for larger customers was accelerated. In January 1999, the eligibility limit fell to 5 GWh (1 926 customers purchasing 33% of total electricity sales). As of October 1999, all consumers with annual average demand exceeding 1 GWh are eligible to choose supplier, 4 years earlier than previously scheduled.

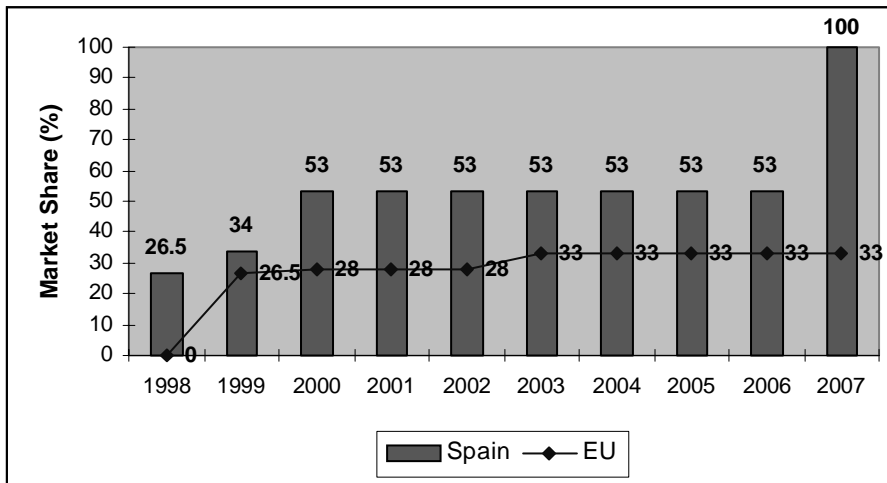
65. In April 1999, the government announced a further acceleration of the electricity liberalisation schedule as part of an inflation-fighting program. As a result all high voltage consumers (using supply above 1 kV) will be eligible to choose supplier as of 1 July 2000. All other customers are scheduled to be able to choose suppliers in 2007, although the Minister has indicated this date could be advanced to 2004 (see Table 6). At this time there is no plan to liberalise extrapeninsular customers because of the limited scope for competition. The schedule for liberalisation is considerably more extensive and more rapid than required by the EU directive (Figure 9).

Table 6. **Schedule for liberalisation of electricity consumers**

Date	Annual energy use (GWh)	No. of consumers	Eligible energy sales (GWh)	Share of market (%)
1 January 1998	> 15	558	40 235	26.5
1 January 1999	> 5	1 926	51 380	34
1 April 1999	> 3	3 254	56 549	37
1 July 1999	> 2	4 706	60 011	39
1 October 1999	> 1	8 274	65 011	43
1 July 2000	> 1 kV	61 000	78 880	53
1 January 2007	All	19.7 million	168 000	100

Source:

Figure 9. Electricity market opening in Spain vs EU directive



Source:

Access to networks

66. All generators are entitled to have access to transmission and distribution networks and compete to sell electricity either through a spot market or through bilateral contracts with customers. Generators operating under the special regime have priority dispatch.

67. The system operator (REE) is required to provide access to the high voltage system and corresponding distribution network managers are required to provide access to the low voltage systems to agents and qualified customers. The system operator or distribution network managers can only refuse access on the grounds of lack of available capacity. Tariffs are regulated by the Ministry. Disputes over the terms of network access contracts are to be settled by CNSE

68. The system operator also has statutory responsibility for transmission system expansion planning and managing expansion of the network. Projects within a single autonomous region require the approval of the regional government (following the receipt of a report prepared by the national government) based on satisfying legal, technical, financial and environmental requirements. Interregional or international projects require approval of the national government. Construction of the transmission lines by competitive tender is permitted.

Market operation

69. The *Compania Operadora del Mercado Espanol de Electricidad, S.A. (COMEESA)* has been created to operate the national electricity market. COMEESA performs its functions under the monitoring and control of a Market Agents Committee. The committee, composed of market participants, monitors the operations of COMEESA and may propose rule changes to the Ministry.

70. Market operation is based on a day-ahead market. The market operator accepts the bids in order of price, modifies the accepted bids in consultation with the transmission network manager (REE) to relieve technical restrictions, and then runs a secondary market for backup power for the day. In addition, there is an intraday market, with up to 6 sessions, which allows further adjustments to the schedule by producers and customers to smooth supply by individual generators and to deal with events on the day

such as generator unavailability. In December 1998 the intraday market was about 6% of the size of the day-ahead market. Ancillary services are acquired by bidding and auction mechanisms managed by the system operator.

71. The main participants in the market are the utilities, the qualified customers, agents authorised to trade electricity, and importers of electricity. The utilities play several roles, acting as generators, distributors, suppliers purchasing power for customers remaining on regulated tariff, and agents acting for liberalised customers with whom they have a contract. Qualified customers can opt to enter as market participant but can also remain with a regulated supplier on a regulated tariff. Ninety retailing companies have been created. Distributors are also eligible to purchase from the market and, to date, 185 distributors have registered to do so. National utilities in Portugal, Morocco, France, and Belgium, as well as the four Spanish utilities, are all authorised importers into the Spanish market. The U.S. company Enron and the Norwegian firm SKS Energy Brokers, Eastern Group of the UK and the Swiss firm Aare-Tessin are also authorised to import and trade.

72. All market participants must register with the Ministry after demonstrating they meet criteria for qualification. For customers the only material criterion is that they purchase enough electricity to qualify. Customers can then purchase power directly from the market, through a contract for differences arrangement with a retailer, or through a physical bilateral contract with a supplier.

Entry

73. Permission to build new power plants is granted under an authorisation procedure consistent with the EU Electricity Directive. Authorisation for new generation plants is required and it is based on technical, safety, environmental, energy efficiency and demonstrated financial, technical and legal capability to carry out the project. Depending on the scope of the generating project, authorisation may be required from either the national or regional government. "Special" electricity generation projects, which include those under 50 MW using cogeneration, renewables or wastes are subject to a separate authorisation by the Autonomous Communities. Hydroelectric projects are subject to additional requirements under the 1985 Water Resources Act.

74. New companies can enter into distribution of electricity, in principle, as distribution networks are allocated by concession. New companies are able to enter the transmission business as construction of new transmission lines has been opened to tender. Customers or generators are permitted to construct and operate their own lines for their facilities.

75. Companies can also enter the retail supply of electricity to liberalised customers under authorisation from the appropriate level of government. Approval of the autonomous community government is required for regional/local retailing. The national government must approve retailers operating in more than one region or internationally. Supply to captive customers is the responsibility of the distribution companies. Statutory obligations on retailers for liberalised customers and distributors for captive customers include the requirement to purchase sufficient electricity to meet their obligations. Distributors are further required to plan for future needs and to secure necessary contracts to meet these needs.

Vertical and horizontal separation

76. Spain's electricity sector has built in vertical separation thanks to the creation of REE in 1985. REE has a significant experience as an operationally independent entity both as a transmission network

manager and as a system operator. Under the 1997 Act, utility shareholdings in REE are limited to 10% each. Each of the four utilities owns its 10% limit, for a total of 40%. As the law limits total share ownership by utilities or other agents carrying out electricity sector activities to 40%, new entrants into the electricity sector wishing to purchase shares in REE will only be able to do so if one of the utilities sells some of its shares. There is a similar share structure and limitations in place for the market operator.

77. The 1997 Act requires the four utilities to “legally” separate generation from distribution activities by 31 December 2000. Furthermore, utility companies who wish to enter the market as retailers may do so only through separate subsidiaries or affiliated companies. Endesa has created a holding company with legally separate subsidiaries for generation, distribution and retailing. Iberdrola and Hidrocanabrico are expected to undertake a similar restructuring. Union Fenosa has already spun off of its generating business and sold a 25% share of the new company to the U.K. generating company National Power.

4.3. Development of the market

Market activity

78. There was very limited switching of electricity suppliers in Spain in 1998: only about 1% of all energy sold was sold to customers through the open market rather than under regulated tariffs even though 26.5% could have switched to the market. The principal reason, according to CNSE analysis, is that prices for many of the qualifying consumers under the regulated tariff are lower than the prices that could be obtained in the market.

79. The government, through its agreement with the utilities in September 1998, decided to encourage increased activity in the market in two ways. First, the timetable for increasing the number of eligible customers was accelerated, enabling more customers paying higher average prices to enter the market. Second, the government has lowered charges to customers accessing the market by cutting network charges by 25% and reducing the capacity payment by 1 Pta/kWh.

80. The short-term impact of the reduction in access tariffs and capacity payment and accelerating consumer choice appears to have had the desired effect. By October 1999, liberalised customers were purchasing approximately 16% of total electricity demand, about 60% of the liberalised load, through the market rather than under regulated tariffs.

81. Activity in the daily market itself was dominated by the two main generators although in slightly different roles. Endesa is largest generator and supplies over half the fossil-fired generation to the market important for both mid- and peaking-load operation. Iberdrola, by contrast, has relatively little coal-fired generation but has the largest share of hydroelectric output which is critical for peaking load. Between them, the utilities control about 85% of the hydroelectric output on mainland Spain and 100% of the oil/gas capacity that is used for peaking as well. According to analysis carried out for the CNSE, Endesa plants provided the marginal capacity 59.2% of the time in 1998, whereas Iberdrola supplied the margin 23.7% of the time.

New entry

There have been many proposals for new gas-fired power plants in the newly liberalised electricity market. Electricity pool prices have been high enough and the costs of power generation by combined cycle gas

turbines low enough at current natural gas prices, to encourage these proposals. All four utilities, Bizcaia Electrica based in northern Spain, and foreign companies, including Enron, AES and Edison have all announced plans to construct a total of 14.45 GW gas turbine power plants in Spain. Endesa and Iberdrola are proposing to build over half of the proposed capacity (see Table 7). Endesa has stated that its capacity expansion will be accompanied by closure of some older fossil-fired capacity.

Table 7. **Proposed power generation projects (as of October 1999)**

Firm	No.	Type	GW	Share
Endesa	5	CCGT	4.32	30%
Iberdrola	6	CCGT	4	22%
U. Fenosa	2	CCGT	2.4	8%
Hidrocantabrico	1	CCGT	0.45	3%
Enron	1	CCGT	1.2	8%
AES	1	CCGT	0.8	6%
Edison	1	CCGT	0.4	3%
Bizcaia Elec.	1	CCGT	0.8	6%
Bizcaia Energia (ESB/Nat.Power)	1	CCGT	0.8	6%
Nueva Generación del Sur	1	CCGT	0.73	5%
Abengoa y PSEG Europe	1	CCGT	0.375	3%
CONUCO	1	CCGT	0.175	1%
Total	22		14.45	100%

Note: Endesa figures include 0.8 GW project with Gas Natural at San Roque. One Endesa project is a gas-fired cogeneration project rather than CCGT.

Source: Ministry of Industry and Energy

4.4. Industry ownership

82. The Spanish electricity sector has greatly consolidated over the past decade. In 1990, the Spanish electricity sector was characterised by over a dozen independent electricity firms. The largest, Endesa, which was majority publicly owned, served less than a quarter of all customers. However, a number of firms experienced financial difficulties in the 1980s because of investments in nuclear power that made them vulnerable to takeovers. In 1991, Iberdrola, was created out of the merger of two companies. In the same year, Endesa acquired significant shareholdings in two of the other three large firms (Sevillana and FECSA). By 1996, Endesa had acquired 75% of the shares in these companies, as well as a 15% stake in the third largest utility, Union Fenosa.

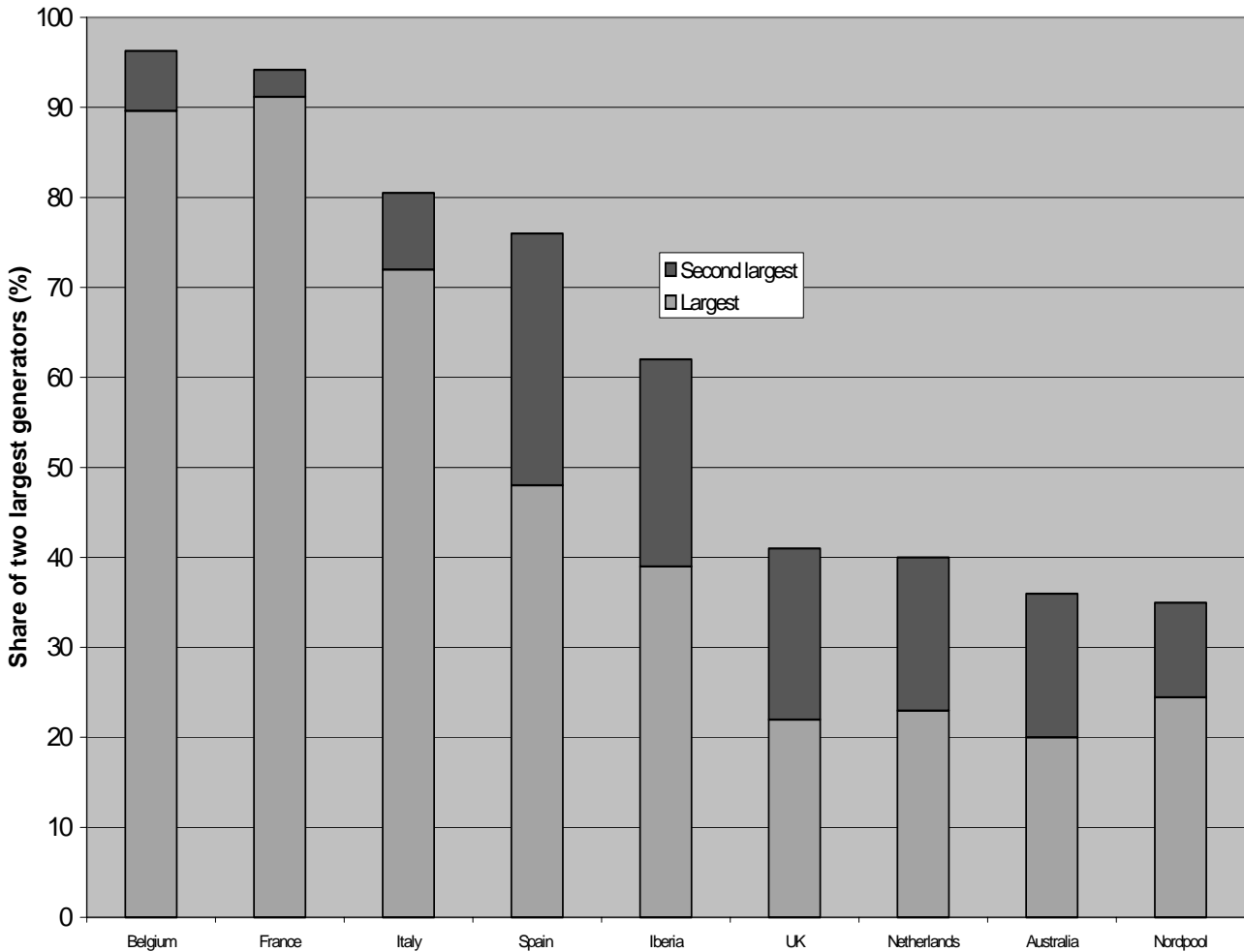
83. The CNSE's predecessor published a report in 1996 on the proposed acquisitions by Endesa of the majority shareholdings in FECSA and Sevillana. The report warned of potential anticompetitive effects of the concentration of ownership in the generating sector and asked that the proposed acquisitions be referred to the competition tribunal for review before a decision was made on the acquisitions. However, the government, weighing these and other arguments, decided that such a review was not necessary.

84. The government privatised its two-thirds holding in Endesa in two tranches in 1997 and 1998. The newly-privatised firm has moved to consolidate its operations by acquiring the outstanding shares in Sevillana and FECSA. It has reorganised itself into functional business lines. While the government had required Endesa to sell its holding in Union Fenosa, Endesa's acquisition of Sevillana and FECSA had made it the fourth largest utility in the European Union. As a consequence of these changes, the dozen independent firms have decreased to four, two of which supply over three-quarters of electricity produced

in Spain. The result is a generation sector that is highly concentrated compared to some (but not all) other OECD countries that have liberalised their electricity markets (Figure 10).

Figure 10. Concentration of generation ownership in Spain vs other OECD countries

Notes: 1998 data. Iberia includes Portugal. UK market England and Wales only. Australia includes Victoria, New South Wales, ACT, and South Australia.



Source: IEA and company annual reports.

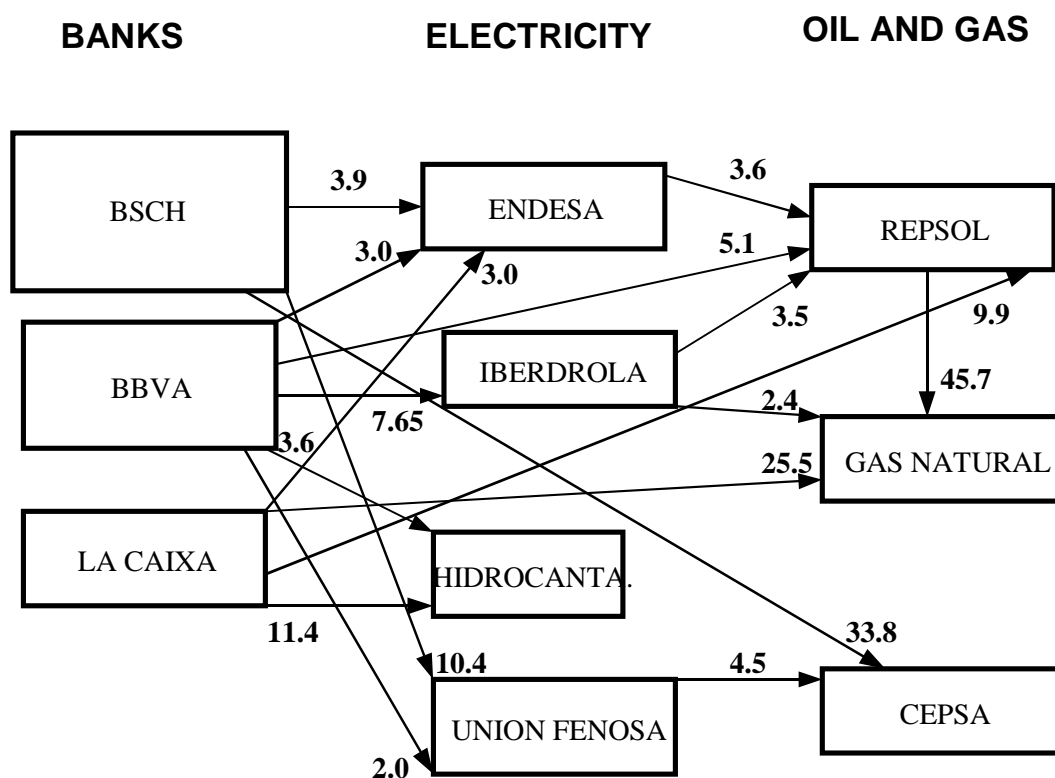
85. In addition to consolidation within the sector, there has been a diversification of the two large companies into other Spanish network industries particularly natural gas and telecommunications. Both companies have also been very active in investing in electric utilities abroad.

86. The major players in the natural gas and electricity sectors in Spain are forming alliances. The link with the natural gas industry is particularly important as natural gas is expected to be the predominant fuel for new power plants in Spain over the next decade. Endesa has entered into an agreement with Gas Natural whereby the two will co-operate on the construction of 3 000 MW of new gas-fired generation. Gas Natural will supply the gas for these projects to Endesa. As well, both Endesa and Iberdrola have

taken a 3.64% stake in Repsol, the petroleum company that owns 45% of Gas Natural. Iberdrola is working in partnership with Repsol on a number of new generating projects and on the development of a new liquefied natural gas import terminal near Bilbao in northern Spain. Iberdrola has also entered into a co-operation agreement with EDP, the Portuguese electric utility.

87. The CNSE has characterised the extensive cross ownership between the different network firms as a common “web of interests” and is concerned that this web may dampen interest by new entrants in challenging the two incumbent utilities. Spanish banks and savings institutions also have significant minority interests in several of the firms (Figure 11). The government has recently implemented new rules to limit cross shareholding by financial institutions in the utility sector. Banks are to hold no more than 3% in any utility company, or be present on the board of two companies in the same sector. As a result, the merged Banco Santander Central Hispano has been required to sell some of its shares in Endesa to comply with this new rule.

Figure 11. Ownership relationships affecting the Spanish electricity sector



Source: CNSE and press reports.

4.5. End user pricing

Tariff setting

88. The 1987 law revised the tariff setting and price regulation systems and introduced a cost pooling mechanism to compensate for the widely divergent costs between companies. “Standard” costs have been calculated for the overall system, including depreciation, operating costs, fuel costs, interest costs, etc. The costs were calculated every year by the Ministry based on a set of assumptions about economic and financial parameters such as the return on capital, inflation and operating costs. The Ministry calculates a tariff for all end users, which results in some utilities receiving more revenue than their standard costs, others less.

89. As revenues received by a particular utility are not matched to the costs of the utility, there is a complex revenue rebalancing process using a method set out by the Ministry and administered by the CNSE. This process ensures that utilities receiving excess revenue transfer this excess to those utilities receiving insufficient revenues. It is also used for revenue reallocation related to energy policy costs.

90. The use of standard costs gives companies incentives to reduce their costs as the revenues they are entitled to receive are fixed by the standard cost formula and they are allowed to keep any cost savings they can make. As generation is no longer regulated since the 1997 law, only network tariffs are based on standard cost formulae.

91. Retail and network electricity tariffs are set by Royal Decree. The process of consultation with the CNSE has varied. Normally, the CNSE is given a draft proposal for review and advice before the Ministry finalises it. On one occasion, the CNSE was asked to issue its own proposal. The rate reduction in April 1999 was a decision of the government done without consulting the CNSE, although the decision did require subsequent ratification in the parliament. Tariffs are to be the same throughout the national territory. The law imposes separate charges for “permanent costs of the system” and supply diversification and security. Electricity purchases are subject to value added tax as well as local or regional taxes. The customer’s electricity bill must include a breakdown of these costs.

92. Rate reductions were initially set out in the 1996 Protocol between the utilities and the government but rates have been reduced further. Rates were reduced 3% in 1997, 3.6% in 1998, and 2.5% in January 1999. The government announced in April 1999 that rates in 1999 would be reduced by a further 1.5% as part of a plan to reduce measured inflation.

Price distortions

93. Large electricity consumers in Spain benefit from a number of price distortions:

–Large consumers on regulated tariffs will be eligible to sign “interruptibility contracts” only until November 2000 that give them discounts on their regular electricity price if they agree to be interrupted should there be a shortfall of electricity supply compared to the total demand. As there is substantial surplus of supply in Spain, most large consumers have been willing to accept this discount. UNESA has estimated that these discounts were worth Ptas 49 billion in 1997.

–Large consumers purchasing from the market do not have to pay for the additional costs associated with independent power production (the so-called “special regime”). The above-

market costs of this power in 1998 was Ptas 88 billion, paid for by all customers under regulated tariff. In 1999, total energy production under the “special regime” reached 23 868 GWh, at a cost of Ptas 233 billion.

94. In 1998, few customers switched because the discounts available under the regulated tariff were often better than market prices, even without having to contribute to the costs of the special regime costs and the lower contribution to the nuclear moratorium costs. As a result, the Spanish government has amended the access tariffs for 1999. This was done in two parts:

–The capacity charge for customers purchasing from the market was reduced from an average 1.3 Ptas/kWh to 0.3 Ptas/kWh. This effectively reduced the cost of generation by 25%.

–The network access tariffs for purchasing from the market were reduced by 25%.

95. Revenues foregone by reducing these charges to customers purchasing from the market (approximately Ptas 53 billion, according to CNSE estimates) are to be recovered from customers on regulated tariffs. The new price distortion reduced the size of the rate cut for the regulated customers.

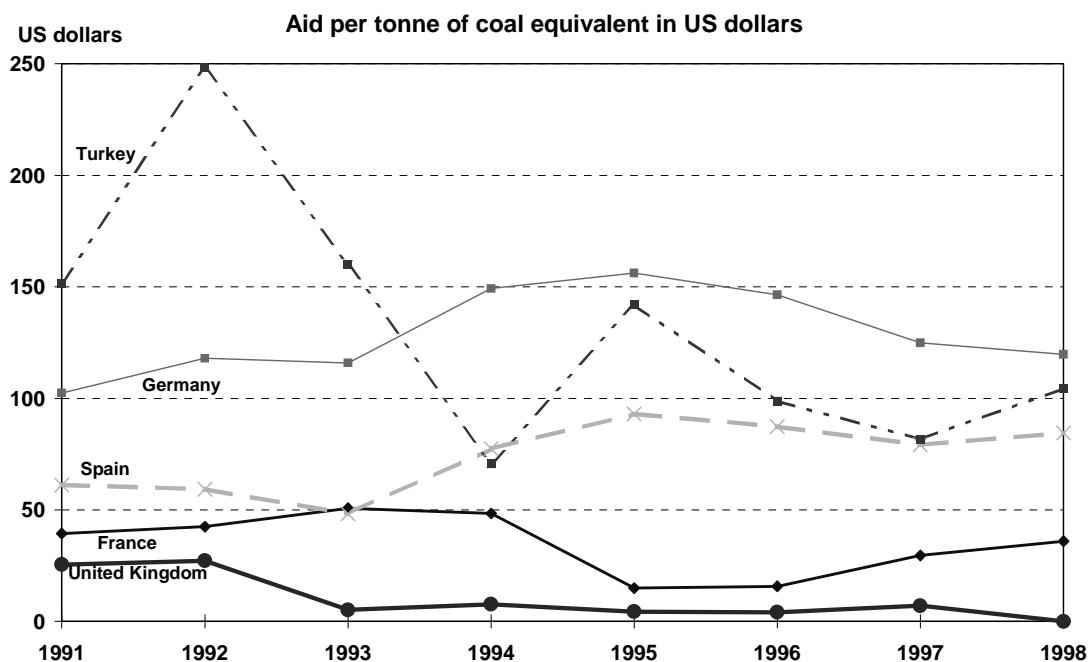
96. The electricity law guarantees that all consumers shall have the right to receive electricity at the same tariff regardless of location. Government regulations set the same quality of service and reliability standards throughout Spain, regardless of differences in the cost of providing it. The cost structure therefore must include a number of price distortions so that equalised rates can be maintained. There is also a mechanism for subsidising extrapeninsular customers, valued at Ptas 20 billion for 1999, as well as an additional charge to fund expansion and improvement in rural electricity service.

4.6. Energy policy costs

97. As noted earlier, costs for support of energy policies such as support for the domestic coal industry, “special regime” for cogeneration and renewable power generation, and the nuclear moratorium add significantly to the cost of electricity in Spain. The support mechanisms are described here in more detail.

98. The Electricity Act allows, consistent with Article 8.4 of the EU Electricity Directive, up to 15% of total primary energy required for power generation to come from domestically produced fuel. In practice, this means domestic coal production is subsidised. Electricity consumers support the use of Spanish coal both directly through a tax on electricity consumption and indirectly in the form of premiums paid to the utilities to use the coal. As a result, the Spanish coal industry receives one of the largest subsidies per tonne of coal among OECD countries (see Figure 12).

Figure 12. Coal subsidies per tonne of coal equivalent in selected IEA countries



Note: France: loans taken out by Charbonnages de France have increased since 1994, as have production costs.

Aid for France for 1997 and 1998 has not been approved by the European Commission.

Source: IEA Secretariat.

99. Electricity consumers support the coal industry directly through an *ad valorem* tax on electricity consumption. This tax raised approximately Ptas 100 billion in 1998. The money raised is paid into general government revenues, rather than directly to the coal industry. Nevertheless, the amount raised corresponds to the budget available to the coal industry to pay for further restructuring and downsizing under a plan approved by the European Commission. The current restructuring plan, the third since 1989, will cut production by about 28% to the year 2005.

100. Electricity consumers support the use of Spanish coal indirectly (Ptas 51 billion in 1998) through part of the competitive transition charge (CTC) which is allocated for premiums paid to the utilities to purchase domestic coal. The utilities are required to purchase this coal through legal obligations under the Electricity Act, based on agreements between the Ministry of Industry and Energy and the coal mining unions¹ which sets out quantities of hard coal to be purchased by power plant. In 1998, 26% of power supplied in 1998 came from domestic coal. While prices for coal are freely negotiated between the utilities and the coal companies based on conditions prevailing in the world market, the utilities are paid a premium through the revenue rebalancing process for using domestic coal at particular plants and for maintaining stocks of domestic coal. The government also pays incentives to use brown coal, lignito pardo, to be consistent with the treatment of hard coal.

101. Electricity consumers under regulated tariff purchase special regime power generation by cogeneration and renewable sources at government-regulated premia above normal power prices. Eligible power plants and premiums for new plants are given in Table 8. Many of the projects have also received subsidies from the national government, the European Union, and autonomous communities. Furthermore, the government does not limit the quantity of power to be accepted in total. As a consequence, there has been a boom in “special regime” generation: it has grown from 2% of all generation in 1990 to 20% in April 2000. More special regime generation has been installed in the past five years than additional utility

generation and continues to grow significantly despite substantial overcapacity. Some autonomous communities levy surcharges on the electricity bill to pay for their subsidies to independent generators.

102. Prices for special regime generation average approximately 10.2 Ptas/kWh compared to a market price in 1998 of 5.8 Ptas/kWh. Premiums paid depend on type of technology and size. The government has no cap on the amount to be acquired from each category, but can change the premia for operating plants. Premiums for renewable energy are among the highest in the EU (see Figure 13)

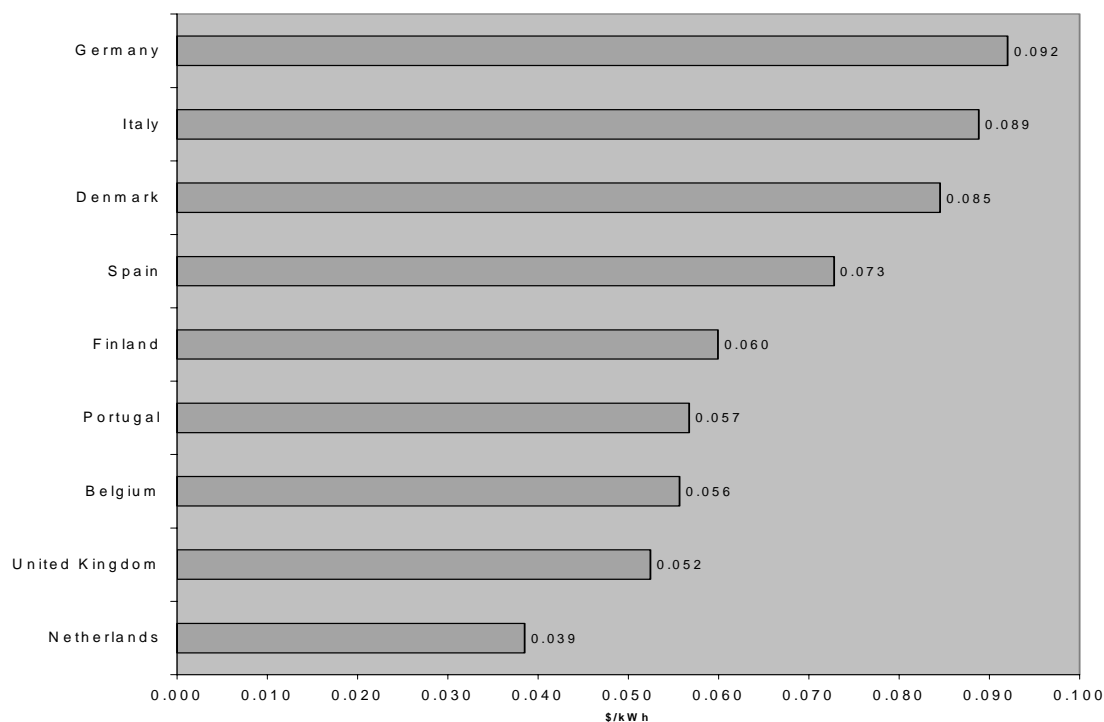
Table 8. 1999 premiums for special regime generation

Type of installation	Size limit (MW)	Premium (Ptas/kWh)
Cogeneration	25	3.2 (under 10 MW)
Solar (photovoltaic)	None	60 (under 5 kW) 30 (over 5 kW)
Wind	None	5.26
Geothermal	None	5.45
Hydraulic	50	5.45 (under 10 MW)
Biomass (primary/secondary)	None	5.07/4.70
Wastes	50	3.7 (under 10 MW)
Farm wastes and other	25	2.5 – 3.9 (under 10 MW)

Note: Premium is defined as a differential above average market price.

Source: Ministry of Industry and Energy.

Figure 13. Renewable energy prices in EU countries, 1997



Source: European Commission.

103. Electricity consumers are also paying for the decision of the Spanish government in 1984 to order the utilities halt construction on five nuclear power plants. In 1994, total compensation to the companies for this moratorium was set at Ptas 729 billion to be recovered through electricity rates over 25 years. In 1999, a charge of 3.54% recovered from all customers will recover Ptas 69 billion.

4.7. Natural gas market

104. The Spanish government has encouraged the increased use of natural gas as a means of encouraging economic growth and increasing energy security and diversity in the power sector. Spain uses relatively little natural gas compared to most other OECD countries, largely because until 1993, natural gas was only imported as relatively high cost liquefied natural gas (LNG) through three terminals. The completion of the relatively small 2 billion cubic metre (bcm) capacity pipeline from France in 1993 and the much larger 8.5 bcm Maghreb-Europe pipeline in 1996, of which 2.0 bcm is allocated to Portugal, has greatly increased Spain's import capacity and made a more economical supply available. The result has been a 53% increase in demand for natural gas in 1998 over 1995.

105. The natural gas industry in Spain is dominated by Gas Natural, a privately owned gas company operating as a de facto monopoly that owns the transportation systems through Enagas and 90% of all gas distribution systems. Gas Natural also controls much of the existing capacity of the import pipelines under long-term supply contracts. Gas Natural is owned 45% by Repsol, who is also involved in production.

106. Long-term availability and deliverability of natural gas is important to new entrants using gas-fired power generation. Enagas expects demand for natural gas to reach 19 bcm by 2005, and already has 17.5 bcm under contract for that year, comparable to existing delivery capacity. However, a more rapid expansion of gas-fired power generation could mean a much larger demand. Each GW of baseload power generation by combined cycle gas turbines requires approximately 1.1 bcm of gas annually, implying that current gas-fired power generation proposals would require a total of 14.4 bcm, more than 1998 natural gas consumption in Spain of approximately 12.9 bcm. Thus additional natural gas capacity could be needed.

107. There is significant potential for expanding the import capability to meet this additional demand, some of which is underway (see Table 9). The LNG terminal expansions at Cartagena and Barcelona will increase annual capacity by 2.1 bcm. A project to develop a fourth liquefied natural gas terminal in Bilbao, in the Basque country, is linked to parallel development of new gas-fired power generation that would consume 1.3 bcm. An additional terminal is being studied for Northwest Spain. Pipeline expansion could come from an upgrading of the Maghreb pipeline capacity, which could add 4 bcm with limited new investment. Doubling the existing pipeline would add an additional 5.5 bcm. The capacity of the pipeline from France could also be increased, adding 1.3 bcm.

Table 9. Natural gas import capacity

Source	Current capacity (bcm)	1998 deliveries (bcm)	Potential Expansion (bcm)
Maghreb-Europe pipeline	6.5	5.0	9.5
France pipeline	2.7	2.3	1.3
LNG	9.9	6.1	3.4
Total	19.1	13.1	14.2

Source: Ministry of Industry and Energy.

108. The Hydrocarbons Law passed in 1998, has liberalised supply to large customers and power generators and provides regulated third-party access to pipelines and LNG terminals. Separation requirements are less stringent than for electricity and are based on accounting separation of functions. Gas Natural will remain the dominant supplier for the foreseeable future because of its existing long-term supply contracts for which it has already booked nearly all of the existing pipeline capacity and a significant fraction of the existing LNG capacity. Power generators needing natural gas supply will either enter into a supply contract with Gas Natural as Endesa has done, purchase gas from Algeria and negotiate an expansion of the pipeline with Gas Natural's transportation subsidiary Enagas, or purchase LNG and arrange delivery through existing LNG terminals.

109. Diversity of natural gas supply sources is also a concern for Spain and could have an impact on power generation. In 1998, two thirds of total gas was supplied by Algeria. The Hydrocarbons law requires that contracts for supply of gas from any one country should not exceed 60% of total imports. An exception for power generation is permitted provided that the company has dual-firing capability. Endesa and Iberdrola already have constructed dual-firing boilers. If new entrants into power generation wish to use Algerian gas, they will be required to ensure that their facilities will be capable of using a second fuel. In practise, this means that new entrants would equip their combined cycle plant so that petroleum distillate could be used.

4.8. *Security of supply*

110. The Spanish government holds security of supply as an important policy objective for the Spanish electricity sector. In the past, national energy plans (PENs) identified security of supply, enhancement of domestic energy sources, and energy diversification as major objectives. Electricity generation played an important role in meeting these objectives. Policies to support the use of domestic coal in power generation have been in place for many years, and are combined with substantial subsidies, as outlined previously. In line with the 1975 national energy plan, Spanish electric utilities invested heavily in nuclear power as well in the 1970s and 1980s to make this a significant source of supply. More recently, the 1991 PEN identified renewable energy sources and cogeneration as priorities and supported these in order to increase security and diversity of supply. As a result of all these actions, domestic coal, nuclear power, hydropower and other renewables now provide 85% of the electricity supply.

111. A second aspect of supply security is the reliability and quality of electricity supply. These are regulated by the national government and the autonomous communities. Spain has lagged behind other European Union members in reliability and quality of electricity supply but has improved markedly. One measure of reliability, average interruption time, has improved 65% since 1989.

112. A third aspect of security of supply is the availability of adequate levels of generating capacity. As noted previously, there is ample generating capacity in the Spanish system.

4.9. *Market transition issues*

113. With significant overcapacity and falling costs, the move to liberalised markets in Spain should lead to much lower electricity prices for both liberalised and captive customers. However, in order to be able to move to liberalised markets quickly, the government reached an agreement with the utilities (the 1996 Protocol) that included the payment of "Costs of the Transition to Competition" (CTC). These charges are primarily designed to compensate the utilities for the impact of lower electricity prices on their expected revenues over the period 1998-2007. The government has also implemented a "capacity payment" mechanism to pay a premium to companies who supply energy to the electricity pool. Finally,

an important transition cost is the cost associated with restructuring the utilities, particularly the costs associated with voluntary staff reduction programs.

Costs of the transition to competition

114. It was recognised in the negotiation of the Protocol in 1996 that electricity prices in the Spanish electricity market might be lower than the values implied by the standard cost methodology established under the 1987 law. For example, the 1998 standard cost for the Trillo nuclear power plant was 12.06 Ptas/kWh, far higher than the expected market price. In the 1996 Protocol, the Spanish government agreed to acknowledge the existence of the “*costes de transición a la competencia*” (CTCs) and to permit these costs to be included in the electricity tariff for a maximum of 10 years. In return, the utilities agreed that the maximum size of such compensation could be reduced compared to the values implied by the old “standard cost” methodology.

115. The calculation of the annual amount of the CTCs was based on the difference between the expected revenues from generation under the standard cost methodology and the anticipated revenues from generation (including the capacity payment and the ancillary service payments) in the market. To calculate the maximum size of this compensation over the ten year period, the following approach was used., The standard costs of the plants were projected out to the end of the economic lifetime, along with a forecast of power production from each of the facilities. The revenues were then estimated assuming a market price for power of 6 Ptas/kWh (based on an estimate of the long-run marginal cost of power). The annual net cash flows were then discounted at a rate of 5%. Following some adjustments, the net discounted cash flow for all the plants was reduced by 32.5% to account for assumed efficiency improvements. This yielded the maximum allowable CTCs that could be recovered from electricity consumers of Ptas 1 693 billion. Adding in the allowance of Ptas 295 billion for domestic coal consumption incentives, yielded a total maximum CTC recovery of Ptas 1 989 billion.

116. The actual CTC to be paid to the utilities depended upon actual prices in the market. Thus if market prices were higher than expected, the CTC would be reduced and vice versa.. Thus, the CTCs also ensured against the risk that consumers would face high prices.

117. In September 1998, the Government and the utilities negotiated a new agreement, ratified by the Spanish parliament in December 1998, that changed both the maximum to be recovered and the procedure for recovery. The new procedure involved four new elements:

- A reduction in the maximum amount to be collected by Ptas 250 billion (to a net value of slightly more than Ptas 1 300 billion plus the Ptas 295 billion for coal).
- Approximately Ptas 1 000 billion is to be guaranteed to be paid to the utilities that they will receive by 2007 regardless of circumstances. This guarantee will allow utilities to issue highly rated securities against this guaranteed cash flow. Hence this guarantee is often referred to as securitisation.
- Approximately Ptas 250 billion will be available to “top up” the CTC compensation if circumstances warrant it.
- If by 2007, it is determined that the utilities have received more compensation through the securitisation than the total stranded cost, the government will establish a procedure to ensure customers are compensated.

The CTC payment mechanism for the coal-related items was not affected by these changes.

118. The CNSE has issued a report that was highly critical of the securitisation. The report criticised the process leading to the new agreement as secretive and that the amount granted in securitisation was excessive with consumers paying too much compensation to the utilities: it suggested that a figure of Ptas 480 billion was more appropriate. In addition to the excess costs to consumers, the CNSE noted that excess payments might damage the prospects for competition by providing a financial weapon to the utilities to defend themselves against new entrants. The CNSE also argued that the government did not get sufficient compensating benefits for electricity consumers in return. The report suggested that the government should have used the offer of securitisation to induce the two large utilities to take steps to reduce their market power, for example by selling some of their generating assets. The report points to some U.S. states where this leverage has been used.

119. The revision was subject to a very vigorous political debate before being passed by the Parliament in December 1998. The new legislation requires approval by the European Commission competition directorate, which has indicated that they are reviewing the eligibility of this payment under state aid rules.

Capacity payments

120. The Protocol and the Electricity Act make provision for a capacity payment. The capacity payment is a payment to generators by electricity customers for electrical energy made available to the market. The stated purpose of a capacity payment is to raise revenues for generators and thus encourage early new entry into generation, which it is felt might not otherwise have occurred in time to avoid capacity shortfalls. The government has indicated in the Protocol that the measure is transitional, and the need for it should be studied after 2001.

121. The size of the payment to generators is set by the Ministry and was calculated on the basis of an engineering estimates of the costs of production, which indicated that short-run marginal costs would be lower than long-run marginal costs by 1.3 pesetas per kilowatt-hour. In 1998, costs for the capacity payment were recovered equally from all consumers through tariffs. In effect each consumer paid an average of 1.3 Ptas/kWh for capacity although the actual charge depended upon time of use. The system was revised for 1999. Customers purchasing from the market pay 0.3 Ptas/kWh. The average payment for the regulated customers will be increased to make up for the loss in revenue.

122. Payments are made to the four utilities according to the energy supplied to the market during peak and mid-demand periods. No payment is made for energy supplied during low demand periods. The capacity payment has the same effect as the CTC – it provides financial support to the existing generators to offset risks of lower revenues from low market prices. In 1998, average revenue to generators including the payment was 5.8 Ptas/kWh, close to 6 Ptas/kWh level used in estimating the CTCs.

Employment implications

123. Labour productivity improvements have occurred, perhaps more the result of industry consolidation than liberalisation. Between 1990 and 1996, staff levels of the utilities declined by 15%, despite a 5% increase in energy production and a 10% increase in number of customers served. Utilities are continuing to trim staff – Endesa has reduced staff from 24 500 in 1996 to 19 500 in 1998 and has plans to reduce staff to 15 500 by 2002. As a result of an agreement negotiated between the utilities and

the key labour unions, downsizing is to be achieved through voluntary programs, principally early retirement packages. Endesa has a target to reduce operating costs by 2006 to one-half of 1996 levels.

124. The reforms put additional pressure on the coal mining sector as all output from the coal mines is used by the electric power sector. The current agreement between the unions and the coal companies will reduce mining employment from 24 500 to 17 500 by 2005.

5. CRITIQUE

5.1. *Development of competition*

125. At first glance, the transition to a fully competitive electricity market in Spain appears to be going well for all concerned. Liberalisation of high voltage customers continues to accelerate. In response eligible consumers are taking advantage of the reduced access tariffs and moving into the market to benefit from lower prices (more than 15% on average under their regulated prices, according to a Ministry estimate). Small consumers are seeing lower regulated tariffs. The utilities remain profitable, are making efforts to improve their efficiency through restructuring, and have announced plans to expand their investment in new generating capacity. While the number of employees may be falling, those departing are receiving relatively generous severance benefits. New foreign entrants have also announced plans to invest in gas-fired generating capacity in Spain.

126. However, this series of events is not the result of a well-functioning competitive electricity market. Spanish electricity system unit costs are falling primarily because of the increase in demand, the fall of interest rates and the relatively low new investment by the utilities in recent years. The first two factors depend on the business cycle and could be reversed.

127. During the transition, the Ministry as regulator is in a position to ensure that costs savings are in fact shared out among utilities (and their employees) and consumers. The government determines how these savings are to be shared through negotiations with the utilities. Once the end of the transition period is reached, however, competitive market mechanisms will be needed to ensure that consumers are receiving the benefits of cost reductions by the firms.

128. The acceleration of the liberalisation will be a positive force for the development of competition. It is expected that as a larger share of consumers become eligible, far greater numbers will wish to move into the market as current market prices are lower than regulated tariffs. Potential numbers of participants could be further increased by allowing groups of low voltage customers to become eligible if they purchase power together. Conversely, if consumers do not find that prices are lower in the market, there will be increased focus on whether there is adequate competition in generation.

129. Unfortunately, the structure of the Spanish electricity industry makes the development of competition in generation very difficult. Two firms, Endesa and Iberdrola, control 76% of the production and even larger share of mid-range and peaking capacity. Furthermore, existing independent power generators (11% of the market) are selling power at regulated premium prices, and hence are not in a position to influence market prices. Such a substantial market share give Endesa and Iberdrola effectively a duopoly over the power market, raising concerns that the two utilities could abuse their position and raise prices above competitive levels.

130. The duopoly character of the Spanish system resembles the duopoly of National Power and PowerGen in the England and Wales electricity pool, although the U.K. duopoly currently has a much

smaller share of their overall market, but a majority share of the critical mid-range and peaking capacity market. The U.K. experience shows that prices have probably been set higher than under fully competitive conditions sheltering the entry of new combined cycle gas turbines, the so-called “dash for gas” (see the IEA in-depth review for United Kingdom). The U.K. experience also showed that new entrants tended to aim for the baseload market, leaving price setting in the mid-range and peaking capacity in the hands the incumbents.

131. The market power of the two firms could be mitigated either by competition from imports, by new entrants into the Spanish market, by further liberalising the gas sector, or by structural reforms of the two dominant firms. While the Spanish government’s decision not impose reciprocity requirements for the time being on utilities in neighbouring countries will be helpful, the very limited interconnections between Spain and other countries means that imports currently have limited competitive influence on prices. Existing contracts further reduce the available capacity for competitors. A report² released by the CNSE in 1999 identified a potential problem with access to the interconnection with France, as a substantial fraction of the interconnection capacity is already allocated to an existing contract between Electricité de France and REE for 550 MW until 2010. The likelihood of a substantial increase in the interconnection capacity between Spain and France depends on the corresponding network expansion investments in France, which to date have not been possible due to local environmental opposition. As prices in Portugal and Morocco are higher than in Spain, the prospects for competition from these countries are limited. In other words, the geographic scope of the Spanish market is limited to Spain or, at most, the Iberian peninsula.

132. Market power could also be mitigated by substantial new independent entry into the Spanish electricity market. As noted above, several firms from outside the Spanish power sector have proposed over 40% of the 14.45 GW of new capacity over the next few years. However, the two dominant firms have proposed the majority of the new capacity, meaning that their share of the market would still exceed two-thirds of the total when all these new stations are completed. Given the excess capacity in the Spanish system, the large amount of proposed new capacity could be the result of higher prices that do not reflect the demand and supply conditions.

133. An analysis of the Spanish electricity market prepared for the CNSE, which took into account competition from imports, suggests that market power in the Spanish market could be exercised either by Endesa or Iberdrola operating on their own or in collusion³. The analysis concludes that there would be, in principle, nothing to limit the joint exercise of market power by the two firms until substantial new capacity is built that would reduce the market share of these two firms. Similarly, under particular conditions either Endesa or Iberdrola could be in a position to raise prices in the market. A separate analysis by CNSE⁴ suggested that such behaviour could lead to an average price markup of 39% above marginal costs. Prices in the electricity market, about 5.8 Ptas/kWh with the capacity payment, are well above marginal fuel costs of approximately 3 Ptas/kWh.

133. More recent work for the CNSE has studied actual Spanish market operation and identified some market power problems. A study done for the CNSE by London Economics⁵ for CNSE reached similar conclusions after studying the behaviour of the Spanish market in 1998. In July 1999, the CNSE released two reports identifying specific generation market power problems in 1998 where Endesa and Iberdrola offered very high prices to the market for generators located in areas of high consumption and low generation⁶.

134. While it is clear that regulatory authorities are monitoring the situation, what remedies would be available? The most effective means of addressing the problem of a concentrated generating sector is the divestiture of generating assets into several independent generating companies. In some countries where

publicly-owned electricity systems have been reformed, such as the United Kingdom (England and Wales), New Zealand, and Australia (three largest states), governments have decided to divide the generating capacity of large publicly-owned utilities into several generating companies to create more effective competition. In the United Kingdom and the United States, privately-owned utilities have, in response to incentives, agreed to sell generating assets to address regulatory concerns about the concentration in the generation market.

135. However, should either the CNSE or the competition tribunal recommend that divestiture is needed it is not clear how the government will balance these competition concerns against the impact of divestiture on Endesa and/or Iberdrola. Considerations about divestiture can be influenced by the situation in neighboring countries. What is clear is that divestiture is not an option currently under consideration. There are other possible remedies to reduce the concentration in the generating sector without divesting generating assets. One possibility is to limit the construction of new generating capacity by the two largest firms. This would allow smaller utilities and new entrants to increase their market share more quickly than now expected. Such an approach was tried in New Zealand, where the largest firm (ECNZ) was restricted from building new capacity.

136. A second nonexclusive alternative is to require the large utilities to lease some of their capacity to independent firms as was done in the UK market. Given an appropriate portfolio of capacity, the new firms would help create a market that would be workably competitive. Furthermore, the revenues gained from such leases would guarantee the continued financial strength of the two large utilities.

137. One variant of a leasing arrangement is known as the auctioned biddable contract. Under such a system, the existing generation owners would continue to operate their generating plants but would auction off the rights to the output into portfolios of auctioned bidding contracts. The holders of these contracts would be able to dispatch the plants and bid the energy into the market in return for a fixed upfront payment and a monthly variable payment based on output. The holders of these contracts then compete against each other to supply the market. This theoretically ensures an active competitive wholesale market without requiring utilities to give up title to their generating assets as long as new competitors can be created that own assets as well as these rights. This system is currently being implemented in the electricity market of the province of Alberta, Canada in order to deal with a situation where the largest two utilities controlled over 80% of the power capacity. It may be a worthwhile option for Spain to consider.

138. The development of competition may also be affected by capacity payments. In the Spanish market, the capacity payment acts as an additional payment to the utilities, in effect another CTC. Over the medium term, the capacity payment can be effective in encouraging new generation investment if there is a firm commitment to keep it in place for a number of years. This would encourage new entrants to build new plant on the expectation that they would receive revenue from the payment once their plant is in operation. At present, there is no such commitment to retain the capacity payment as the need for it will be reviewed after the year 2001.

139. The alliances between major players in the natural gas and electricity sectors raise important concerns. The first is that the two electricity firms, by working with the two largest oil and gas firms, have eliminated possible competitors in electricity generation. The second concern is whether new entrants into electricity generation who plan to use natural gas, will have it available on the same terms as the two dominant electricity companies. The development of the natural gas market will need to be monitored very carefully to ensure that all entrants into gas-fired generation have equal access to gas supply. The decision of the government to create a single regulator, CNE, to monitor both sectors is a positive development in this regard. The government has also blocked further reductions in competition in this sector by blocking

the Endesa-Gas Natural merger of gas distribution assets and it has increased the number of licensed traders in the natural gas sector.

134. The role for competition in the distribution sector should also be re-examined. There appears to be limited scope for franchise competition between the two large distributors. The use of regulation that induces efficiency has therefore been imperative. The “standard cost” methodology has provided Spanish utilities with opportunities to improve efficiency – however, given the remaining scope for further efficiencies in both generation and distribution (as Endesa estimates it can cut operating costs by half between 1996 and 2006), there is scope for improved regulation in this sector. Perhaps greater use of international competitive benchmarks in comparing costs would help encourage distributors to improve their efficiency and cut the prices they charge. Other means of increasing the number of benchmarks could also be explored.

135. Vigilance on the part of the regulator will also be required to see if the legal separation of retailing activity from distribution activity is effective in preventing the retailing businesses of the utilities from taking undue advantage of their incumbent position. They could do this, for example, by passing on retail supply costs to captive customers or by having privileged access to information about customers or about the distributor’s tariffs. Transparency in the distribution company’s activities and well-defined rules on its relationships with all retail suppliers, such as a code of conduct, would help the regulator in monitoring the situation.

5.2. *Regulatory institutions*

136. There is one major issue with respect to electricity sector regulatory institutions: the allocation of responsibilities between the Ministry and the CNSE. The current situation, where the Ministry has most of the significant regulatory powers, leaves the government with considerable flexibility in adjusting tariffs, the rate of liberalisation, or transition cost compensation in a manner consistent with overall government policy.

137. However, retaining major regulatory responsibilities within the Ministry also responsible for policymaking means that the perception of its role as an impartial regulator could be damaged. For example, last September’s agreement with utilities that led to the securitisation of the CTCs was criticised for being conducted in secret and without consulting either the CNSE or other affected parties. Similarly, although the Ministry has the responsibility to review the advice given to it by the CNSE on tariffs, the Ministry does not have to publish a detailed explanation of its own tariff making decisions and how they may have varied from tariffs requested by the utilities or recommended by the CNSE. Investors see regulatory risk as a key risk factor in generation sector investments and see independent regulation as a positive factor. Notwithstanding the substantial outside investor interest in the Spanish sector to date, retaining the regulatory powers within the Ministry may act as a disincentive for new investors, particularly if they were to perceive Ministry decisions are favouring the incumbent utilities.

138. The CNSE has most of the necessary tools to be seen as independent but has few regulatory powers and has seen its budget cut. Consumer groups, unions, and employer groups have praised its openness, transparency, and activism on behalf of electricity consumers. However, the Ministry and the utilities have less appreciated its activism, particular on the issue of CTC securitisation.

139. Empowered independent sector regulators are used in many OECD countries including Australia, Finland, Italy, Norway, Sweden, the United Kingdom and the United States. These regulators,

unlike the CNSE, have significant regulatory powers such as tariff setting. They also have transparency and accountability requirements.

140. As the transition to competition proceeds there is less to be gained by leaving primary regulatory responsibilities within the Ministry. In the short run, all market participants would benefit from greater transparency in the Ministry's regulatory activities, such as publishing detailed explanations for their tariff setting decisions. Moving the regulatory activities such as tariff setting from the Ministry to the newly created CNE would boost confidence in the independence of the decisionmaking.

5.3. Energy policy costs

141. The Spanish electricity consumer is paying a significant proportion of the total bill for various energy policies. These include premiums paid to use domestic coal through the CTC (Ptas 51 billion) the revenues raised by electricity tax (Ptas 100 billion), above-market costs for the support for the special regime (Ptas 88 billion), costs of the nuclear moratorium (Ptas 69 billion), nuclear fuel cycle and other (Ptas 18 billion). This constitutes about 16% of the total Spanish electricity bill before value-added tax is included.

142. Nearly half of these costs can be attributed to coal. Premiums are paid to utilities to use domestic coal which are then recovered through CTCs. An electricity tax on consumers, while it goes into general revenues, offsets government support for the coal industry. While the coal industry is cutting staff under the current coal mining restructuring plan, many of the Spanish coal mines will remain uncompetitive. The restructuring plan also commits the utilities to purchase a certain quantity of coal for each coal-fired generating station out to the year 2005 at prices that are supposed to be freely agreed between the contracting parties in light of the conditions prevailing in the world market. In practise this means utilities pay a price for domestic coal based on the cost of purchasing and delivering imported coal to the same inland power stations. High transportation costs to these inland power stations means that domestic coal prices are well above prices for imported coal delivered to coastal power stations. Thus, the quantity obligations increase electricity costs by restricting the ability of the existing utilities to optimise their fuel mix. Otherwise, utilities would find it cheaper in the short term to burn more imported coal at power stations on the coast where fuel costs are much lower.

143. While changes in the way coal is subsidised have increased transparency and will reduce the total subsidy received from electricity consumers, domestic coal use in power production needs to be reduced to economically sustainable levels. Furthermore, the agreement with the utilities provides no flexibility in quantities taken from particular mines, removing incentives for individual mines to improve productivity. Such incentive mechanisms in the agreements could be used to encourage the coal companies to lower their costs.

144. Another apparent difficulty is the use of the electricity tax to pay for restructuring of the coal industry. While industrial adjustment policies for the coal mining regions are needed, it is not clear why taxpayers should pay for the restructuring of the coal industry on the basis of electricity consumption, rather than through a more general tax.

145. The second major energy policy cost is the subsidy for special regime generation. Here the principal difficulty is the extent to which cogeneration is subsidised under the special regime, which has contributed to the current excess capacity at a relatively high cost. Cogeneration technology is sufficiently developed that it should not require any subsidy to compete in the Spanish electricity market, even in the under 25 MW category. The objective should be to phase out price supports to existing cogenerators, so

that they receive market prices for the electricity they deliver to the market. Furthermore, prices for network services used by cogenerators should reflect costs. The only condition to be safeguarded is the access to gas at competitive supply prices.

146. Subsidies to renewable energy generation also appear to be substantial although not disproportionate to other EU countries. However the current mechanism of a fixed premium is not efficient: there will likely be the continuation of the high growth rate for renewable energy projects, leading to additional burden on the Spanish electricity consumer. Mechanisms for acquisition of renewable energy that would require renewable power producers to compete with one another could increase their cost effectiveness.

147. With respect to the nuclear-related costs, utilities using nuclear generation do not pay fully the costs related to keeping adequate supplies of nuclear fuel or related to the nuclear fuel cycle. Nuclear fuel inventory costs are expected to be internalised beginning in 2000. Internalising other fuel expenditures would be consistent with assuring a level playing field among competing generators.

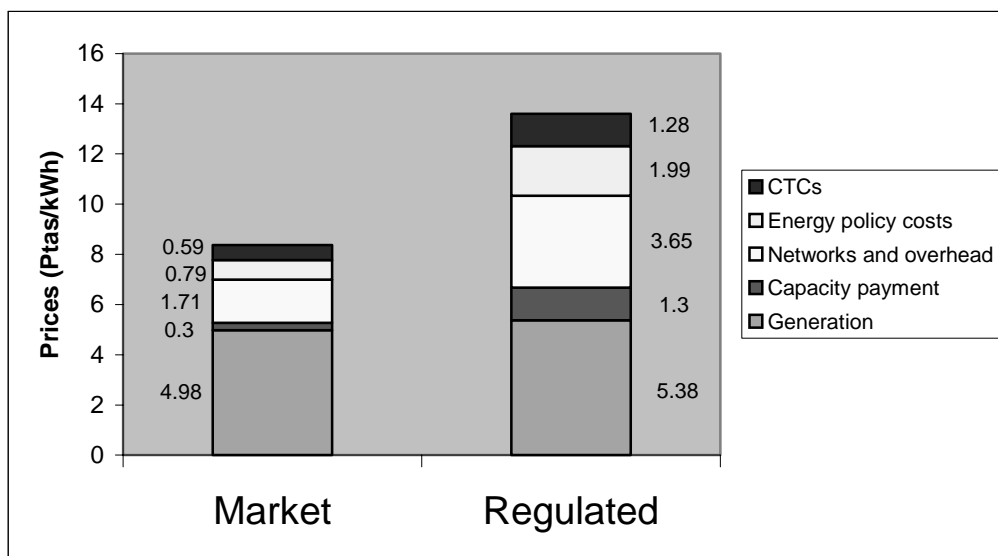
5.4. *Cost-reflective pricing*

148. There are a number of price distortions in the Spanish electricity system. Cross-subsidies to large consumers under regulated tariffs have benefited industrial competitiveness but come at the expense of the smaller business and residential consumer. This price distortion also meant that despite their liberalisation, large customers were content to remain with their regulated tariffs despite the possibility of lower production costs being available in the market.

149. In order to boost activity in the market, the Ministry has, in effect, replicated the price distortion in the regulated retail tariffs into the tariffs paid by large liberalised customers. While this measure is expedient and is having the effect of encouraging more market activity, it is not sustainable, as more and more customers become eligible. As more customers opt for the market, captive customers must carry the additional cost burden for the revenues lost by lower capacity and access tariff payments by eligible customers, the higher costs associated with purchasing special regime power generation, and a larger share of nuclear moratorium costs.

150. As a result, customers under regulated tariffs are already paying substantially more for electricity than those who are able to go to market. Figure 14 compares the costs by category: generation, network and overheads, energy policy costs and CTCs for the group of customers able to go to the market compared to those who remain on regulated tariff. Generation costs include estimated market prices for generation, capacity payment, and ancillary services and are much higher for the customers under regulated tariff because of difference in demand pattern. Overhead costs include retailing and administration costs, charges for the system operator, market operator, and the CNSE. Energy policy costs includes special regime premiums, energy diversification costs, subsidy for the extrapeninsular systems, demand management, quality of service enhancement, and the energy tax used to support the coal industry.

Figure 14. **Estimate of average prices: market vs regulated tariff**



Source: IEA Secretariat based on information provided by CNSE.

151. Altogether, energy policy costs and CTCs add <16to the bill of the market customer and <24%> to the bill of customers under regulated tariff. Capacity payments add a further 4% and 9% respectively. As more customers move to the market, this difference, combined with the lower access fees and capacity payments could lead to an increase in unit costs for the captive customers of several per cent. While the current rate cap guarantees that this shift in costs will not result in rate increases before the end of 2001, the higher underlying costs would mean that rates to captive customers would be higher after 2001 than with a more equal distribution of these costs.

152. A further distortion exists because prices in the market fully reflect different costs according to time of use but standard retail end-user tariffs do not. Some customers able to access the market may choose not do so because they would pay more in the market versus their time-averaged standard tariff. Changing standard tariffs to reflect time-of-use would remove this distortion and lead to a more economically efficient use of electricity by consumers.

153. A preferable approach would be to move away from such price distortions and instead move towards tariffs for access that reflect costs, and that share out all subsidies such as for the special regime in a more equitable manner. In this system, the customer would pay the same for transmission and distribution regardless of whether the customer is under a regulated tariff or purchasing from the market. Similarly, subsidies such as the special regime power generation could be shared more equally.

154. The discounts for interruption of electric power are far too high given the existing surplus capacity and hence the unlikelihood that supplies would actually be cut. This discount should be reduced to reflect the market value of this capability or cancelled altogether when there is clear evidence that the customer cannot be interrupted

155. Another significant price distortion is the requirement that all consumers including extrapeninsular consumers using the same voltage pay the same tariffs, regardless of cost of service. Similarly, all producers pay the same fee with regard to location. This can have serious distortionary effects on the need for new transmission capacity. For example, a significant proportion of the new generating capacity is proposed for Southwest Spain, close to both a natural gas pipeline and an LNG facility. The construction of many such generating plants, which may be sensible in terms of costs of acquiring gas, may impose excessive costs on the electricity system because the need to construct

additional transmission capacity. A system whereby the tariffs for electricity transmission varied by location would eliminate this prospect.

5.5. *Costs of the transition to competition*

156. A number of electricity reforms in OECD jurisdictions have included compensation payments to utilities. These payments called in Spain CTCs are commonly referred to as stranded costs. Stranded cost recovery can allow market liberalisation, particularly to allow privately owned utilities, to move forward more quickly. Thus, the decision of the government to permit CTC recovery in the Protocol agreement and the original formulation of the CTCs was set out in the 1997 legislation is consistent with the approach taken in some other jurisdictions. Furthermore, the process by which the original approach was settled was subject to extensive consultation with the utilities, with the CNSE, and with customer groups.

157. The approach adopted in the 1997 law had a number of advantages. It made the size of these costs transparent, it effectively hedged against the volatility of market prices, and it gave the utilities relatively stable profits and the customers relatively stable prices during the transition period. It also avoided the risk of excessive payments being made to the incumbent utilities which could, in principle, assist them in defending themselves against new entrants. The Ministry as regulator also gains flexibility with this method, and can use the transition period to restructure tariffs in a way that removes cross-subsidies, or provide incentives to the utilities to further restructure to address problems with concentration in the generation sector.

158. The main drawback of this approach is that it reduces incentives for generators to behave efficiently, as total compensation for their plant is not affected by market prices for generation so long as generation prices are below Ptas 6 per kWh. In practice, the stranded cost arrangements discourage generators from raising prices above Ptas 6 per kWh, as to do so would lead to a reduction in the maximum amount of stranded cost compensation that could be received⁷. As noted above, the amount of CTC is made to vary inversely with the market price, enabling generators to operate under the “umbrella” of the Ptas 6 price which reduces pressure to reduce costs. In addition, in other jurisdictions such as some states in the United States, the value of the generating assets, for which stranded cost recovery was allowed, was actually market tested through sale, rather than relying on negotiation and estimation.

159. The decision to securitise the CTCs is not unprecedented; a similar approach having been taken in a number of U.S. jurisdictions have used this as a mechanism to convert cash flows into lump sums for the affected utilities. However, the securitisation proposal created a contentious debate on whether the amount securitised was excessive, and whether this gave the utilities an unfair advantage against new entrants into the Spanish market.

160. Depending on the outcome of the review of the CTC plan by the European Commission, the government may have to make revisions. The government would then have an opportunity to conduct a more open consultation on a plan that meets the needs of consumers and utilities. In particular, the plan should ensure that there are sufficient incentives to minimise overall costs to the consumer. It could also be an opportunity, as has been seen in some U.S. jurisdictions, to negotiate further structural reforms.

5.6. *Air emissions regulation*

161. Emissions of SO₂ and NO_x are regulated in the power sector according to the requirements of the European Large Combustion Plant Directive. Total Spanish emissions of NO_x are limited to 277 000

tonnes as of 1998. Emissions in 1998 were 250 000 tonnes. This limited room for growth in NO_x emissions could require significant new investments in pollution control equipment. These limits could be further restricted under new EU Large Combustion Plant Directives currently under consideration.

162. There is an opportunity to minimise the additional cost and environmental impact of meeting the NO_x emissions regulation through the use of market-based policies. One example of such a policy would be an emissions cap on all stationary sources of NO_x, with sources issued a fixed amount of tradable emissions permits. Market-based policies could significantly reduce the costs of compliance for the utilities and, if new generators were included, it would also assure a level playing field for controlling emissions in the power sector.

6. CONCLUSIONS AND RECOMMENDATIONS

163. The Spanish government has substantially liberalised large parts of its electricity sector over the past decade. The major change is to allow the high voltage electricity customers, and to commit to a schedule for all customers, to choose their electricity supplier. The transmission network is largely, and the system operator and market operator are entirely, separated from the vertically integrated utilities. The government has also sold all its shares in the country's largest utility and plans to dispose of its majority shareholding in the national transmission company. The CNSE has provided additional transparency to the reform process and is a strong advocate of greater competition. The government has taken many of the steps needed to develop a competitive electricity market.

164. In response, there are some positive early signs. Incumbent utilities are implementing plans to increase the efficiency of their operations. Other companies have announced their intentions to build new generating stations in Spain. Regulated end-user tariffs have been falling and increasing numbers of liberalised customers are opting to buy from the wholesale market rather than remain under regulated tariffs.

165. However, not all of these positive signs can be attributed to increased competition in the electricity sector. Falling interest rates and booming demand driven by a strong economy are causing unit electricity production costs, and hence regulated rates, to fall. A government decision to cut substantially charges to liberalised customers has been the main factor behind increased market participation. There are four main areas where further reforms should be considered by the government to get the maximum benefit from its efforts to date. The most important of these is the structure of generation in the sector. The largest two utilities produce 76% of the power in Spain. There are limited prospects for importing electricity and despite substantial independent entry, the two largest firms are expected to continue to have a dominating share of the market for a number of years. These two firms also have close alliances with large domestic oil and gas firms. Therefore the two largest firms have significant market power and effective competition in generation is likely to develop slowly. Further liberalisation of the gas sector would make entry easier, thus facilitating the development of competition. This implies that while the government will be able to reduce costs through effective regulation during the transition to competition, competition will not be effective at holding prices to consumers down nor promoting economic efficiency once this regulation is removed.

166. The second conclusion is that regulation of the Spanish electricity sector is not sufficiently independent or transparent. The Ministry, the most important regulator, is not independent from day-to-day political pressures. The independent regulator, although well regarded, has few powers. Greater independence and transparency in final regulatory decisions is desirable in order to build confidence in the development of a truly competitive market. Furthermore, as discussed in the background report to

Chapter 3, stronger competition law enforcement in the energy sector would help the attainment of consumer benefits and economic efficiency.

167. The third conclusion is that regulated prices do not reflect costs and are distorting the development of competition and shifting additional costs to captive consumers. There are apparently significant price advantages being given to industrial consumers at the expense of residential consumers. The government has set regulated tariffs below market prices for some industrial customer classes. Furthermore, tariffs for use of the network by consumers or power producers do not reflect the different costs for different locations, encouraging inefficient development of the network. With the present pricing formula, the steps to accelerate liberalisation will add some cost burdens to the captive consumers. The effect of these price distortions is to distort choices about energy use as well as decisions about investments in energy efficiency.

168. Finally, inclusion in the electricity tariff of transition payments (CTCs and the capacity payment) and energy policy costs particularly for the support of the coal industry and for the “special regime”, are a substantial burden on the electricity consumer. The size of the payments to utilities for the transition to competition has been controversial. The capacity payment mechanism acts in effect as a further stranded cost payment to the utilities. These costs--for energy policies, costs of transition to competition and so-called capacity payments--constitute about one-third of the total cost of power in Spain. Measures need to be taken to ensure that the benefits of these energy policies exceed their costs, and that there are incentives in place to minimise the overall cost of these burdens on electricity consumers.

169. Recommendations follow under the following five themes.

- *Develop greater opportunities for competition*

170. Take steps to improve competition in generation, including divestiture of generating assets, leasing/operating agreements, and caps on capacity expansion by dominant firms.

171. Eliminate the capacity payment and review electricity market trading arrangements in light of experience with current market prices. Provide retail supply monopolies with incentives to procure least cost supplies.

172. Carefully monitor developments in the natural gas market and, if necessary, intervene to ensure that all potential competitors including cogenerators have equal access to natural gas supply at cost-reflective prices.

173. Intensify efforts to strengthen electricity interconnections to neighboring countries.

174. Aim to introduce full retail competition sooner than currently targeted. In the interim, consider allowing groups of low voltage customers to become eligible for the market through aggregation.

175. Strengthen the ability of the regulator to monitor the effectiveness of the legal separation of distribution activities from the unregulated activities of generation and retailing. Be ready to use stronger options for separation if monitoring indicates a need.

- *Strengthen the role of the independent energy body*

176. Shift essential regulatory responsibilities from the Ministry of Industry and Energy to an independent, accountable regulator. In particular examine the potential for making the CNE responsible

for regulation of the network, including transmission tariffs, terms and conditions and the calculation of the rebalancing payments between utilities, regulating captive consumers' tariffs and new plant licensing.

177. For matters remaining under the final responsibility of the Ministry, ensure that the Ministry consults the CNE on all major policy issues and that all published Ministry decisions include explanations of the reasons for the decisions.

178. Strengthen the independence of CNE. Review procedures for selecting commissioners to ensure that they may act without undue concern of short-term political pressures or allegiances.

179. Strengthen competition law enforcement in the energy sector, particularly with respect to market access and anticompetitive conduct and the effects of cross ownership on the electricity and natural gas markets.

- *Make prices more cost-reflective*

180. Ensure that network and end-user tariffs are cost reflective and do not discriminate between suppliers or between customers remaining on tariffs or opting to use the market. Standard end-user tariffs should reflect costs by time of use.

181. Consider the introduction of geographic differentiation of tariffs, according to cost of supply.

182. Review the existing arrangements and calculations for apportioning costs due to policy actions. Make sure that they do not discriminate between customers remaining on regulated tariffs or choosing to enter the market.

- *Moderate special support mechanisms*

183. Reduce the size of subsidies to the coal industry by providing incentive mechanisms for the coal companies to minimise restructuring costs and improve productivity.

184. Phase out or eliminate price subsidies to all cogeneration regardless of size.

185. For renewable energy generation, examine more cost-effective approaches of meeting renewable energy objectives such as competitive tendering.

- *Increase efficiency of environmental regulation*

186. Evaluate the feasibility of market-based approaches for controlling emissions of NO_x to ensure that control is achieved in the most cost-effective way.

NOTES

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2. CNSE (1999), Informe en relación con hechos acontecidos en la gestión de las interconexiones internacionales y sus implicaciones en el funcionamiento del mercado, Madrid, 27 July 1999.
3. Frankena, Mark (1997), *Market Power in the Spanish Electric Power Industry*, Report prepared for the Comisión del Sistema Eléctrico Nacional, Madrid, March.
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6. CNSE (1999), Análisis de la participación de Endesa en ciertos episodios anómalos en los mercados de energía eléctrica gestionados por el operador del sistema and Análisis de la participación de Iberdrola en ciertos episodios anómalos en los mercados de energía eléctrica gestionados por el operador del sistema, Madrid, 28 July.
7. See CNSE (1998), *Report on Securitisation of Stranded Costs*, IE 005/98, September 28, pp. 13-14.

