

THE FIRST YEARS OF THE SPANISH ELECTRICITY MARKET (1998-2008): AN EXPANSION PERIOD

AleaSoft, October 17, 2019. AleaSoft analyses the Spanish electricity market in its early years until the beginning of the crisis, from 1998 to 2008, as part of a series of articles on the market, to celebrate the 20th anniversary of its foundation as a leader in the forecast field for the sector. This period was characterised by the increase in the demand and the installed capacity of combined cycle gas turbine and wind energy. The price of the fuels grew during this stage, in which the CO₂ emission rights market also emerged.

On October 8, [AleaSoft celebrated 20 years](#) as a leading company in the field of forecasts for the energy sector. To celebrate it, the consultant is publishing a series of articles on the Spanish electricity market, one of the markets in which it specialises. A few days ago, it published an [article describing the operation of the market](#) and the following articles will focus on the analysis of different periods. On this occasion the analysis of the first years of the market is carried out until the beginning of the economic crisis, between 1998 and 2008. The analysis is focused on the behaviour of the market prices, the electricity demand, the installed capacity and the production by technologies, the international exchanges and the fuels and CO₂ prices.

Spanish electricity market prices

The **prices of the Spanish electricity market** increased gradually since it came into operation in 1998. The variations in the market prices during the period from 1998 to 2008 were closely related to the behaviour of the **hydroelectric energy production**, of the **thermal gap**, of the prices of the main **fuels for electricity generation**, gas and coal, and the prices of the **CO₂ emission rights**.

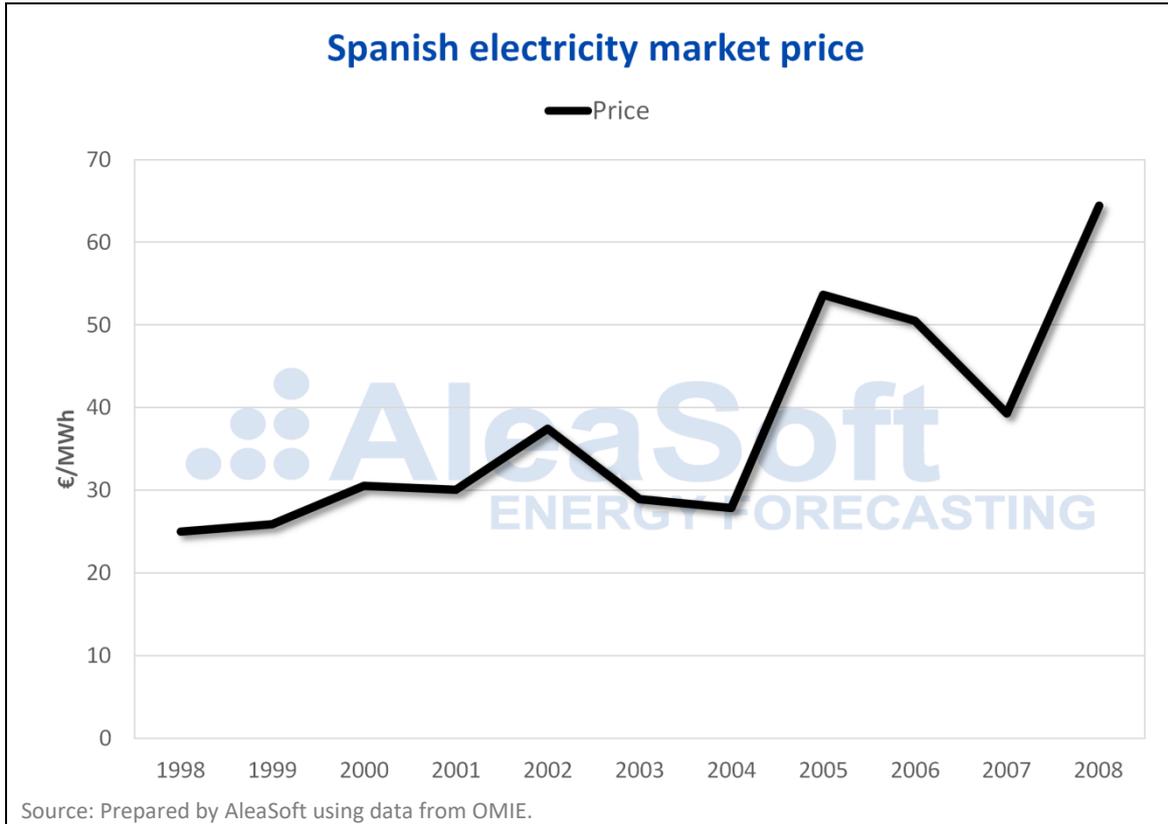
In the first year of operation of the market, 1998, the average price was €25.06/MWh, a price that is almost a half of the prices that are being registered in the last years. Between 1998 and 2001, the price rose by 20% to over €30/MWh.

In 2002, the 1.9% increase in the **electricity demand**, together with the largest drop in the hydroelectric energy production recorded in the analysed period, of 48%, increased the electricity market prices, which closed with a annual average of €37.48/MWh, €7.41/MWh higher than the previous year. The following year, in 2003, the recovery of the hydroelectric energy production, of 89%, caused the average price for that year to register the most significant drop in this first half of the market's history, of 23% compared to the previous year.

The largest annual increase in the market prices was registered in 2005, coinciding with the CO₂ emission rights market getting into operation. In that year, the average price was €53.68/MWh, 92% above the previous year. This increase was favoured by the 41% drop in the hydroelectric energy production, in addition to a 6.2% increase in the electricity demand, the increase in the fuel prices, mainly the gas, of 55%, also of the **Brent oil** price, which registered a 42% increase that year, and the strong influence that the CO₂ emission rights market began to exert on the Spanish electricity market.

In the following years the price fell compared to 2005, with decreases of 5.9% and 22% for 2006 and 2007, following a slight recovery in the hydroelectric energy production and decreases in the CO₂ prices of 3.6% and 28%, respectively. In 2007, the gas prices fell 27%, which also favoured the decline in the electricity market prices.

Almost at the beginning of the global economic crisis in 2008, after a 76% increase in the prices of the CO₂ emission rights market and a 15% drop in the hydroelectric energy production, the Spanish electricity market prices suffered an increase of 64% over the previous year. This increase was also favoured by a significant increase in the fuel prices for electricity generation. In 2008, the gas prices increased 64% and the coal prices 61%. In the same context, the price of a barrel of Brent oil also increased by 34%. The average price for 2008 in the electricity market in Spain was €64.43/MWh, the highest value recorded since the market entered into operation until the end of 2018. Between the year of getting into operation, 1998, and ten years later when the most expensive year was recorded, 2008, the price grew 157%.

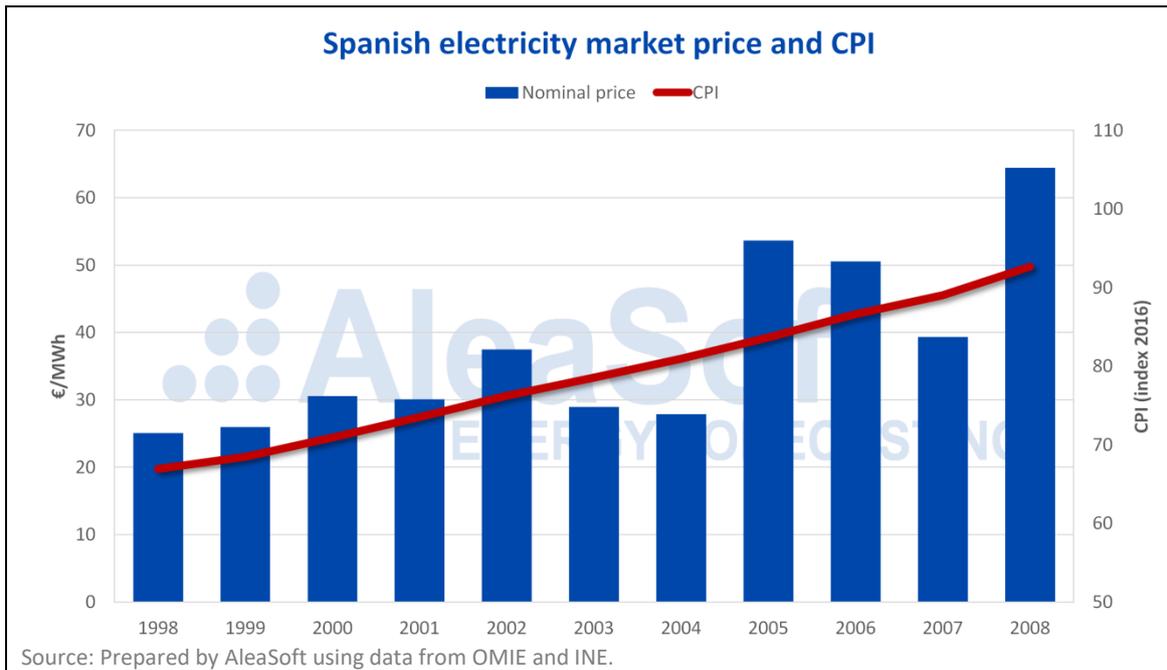


As for the hourly market prices, with the entry of wind energy in the Spanish electricity mix, the first hours with price €0/MWh occur, on December 31, 2002 at the hour 23 and January 1, 2003 at the hours 9 and 10. The hour with the highest price of the analysed period was the hour 20 of January 10, 2002 with a price of €135.41/MWh.

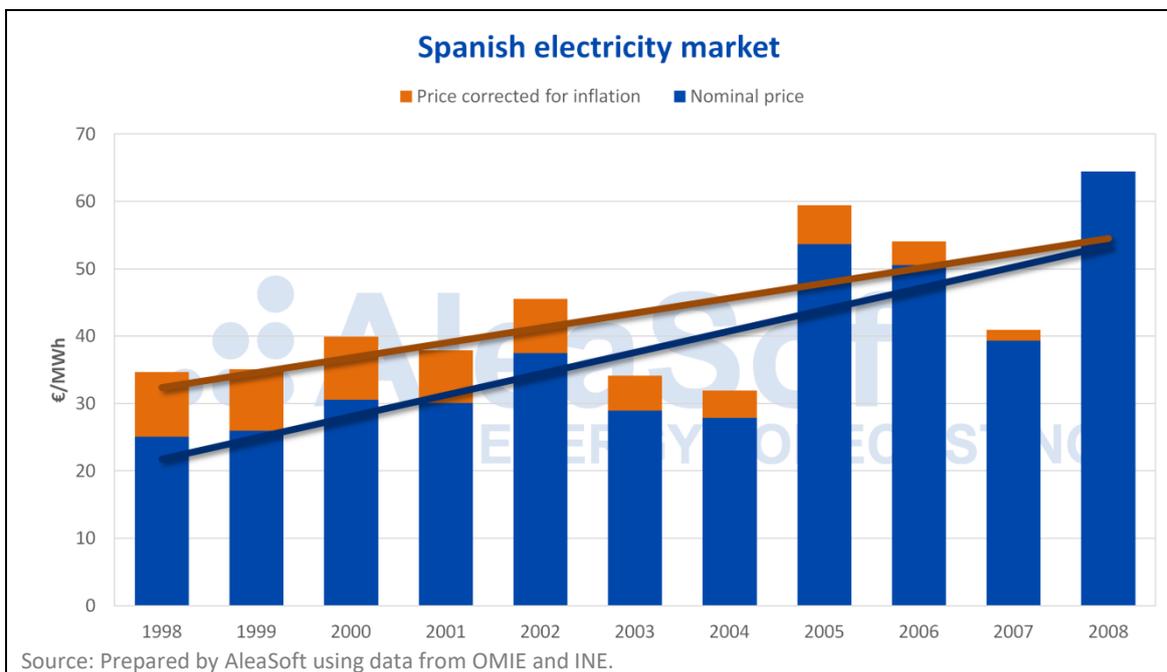
On July 1, 2007, the Spanish electricity system was integrated with the Portuguese one, with the **MIBEL electricity market** emerging. In the second half of 2007 the coupling of the Spanish and Portuguese markets occurred 19% of the hours and in 2008 it increased almost the double, up to 38% of the hours.

Electricity market price and inflation

During the period between the beginning of the market until 2008, the consumer price index (CPI) increased by 39%. If we correct the market price with the inflation, the increase in the Spanish electricity market in that period falls from 157% to 86%.

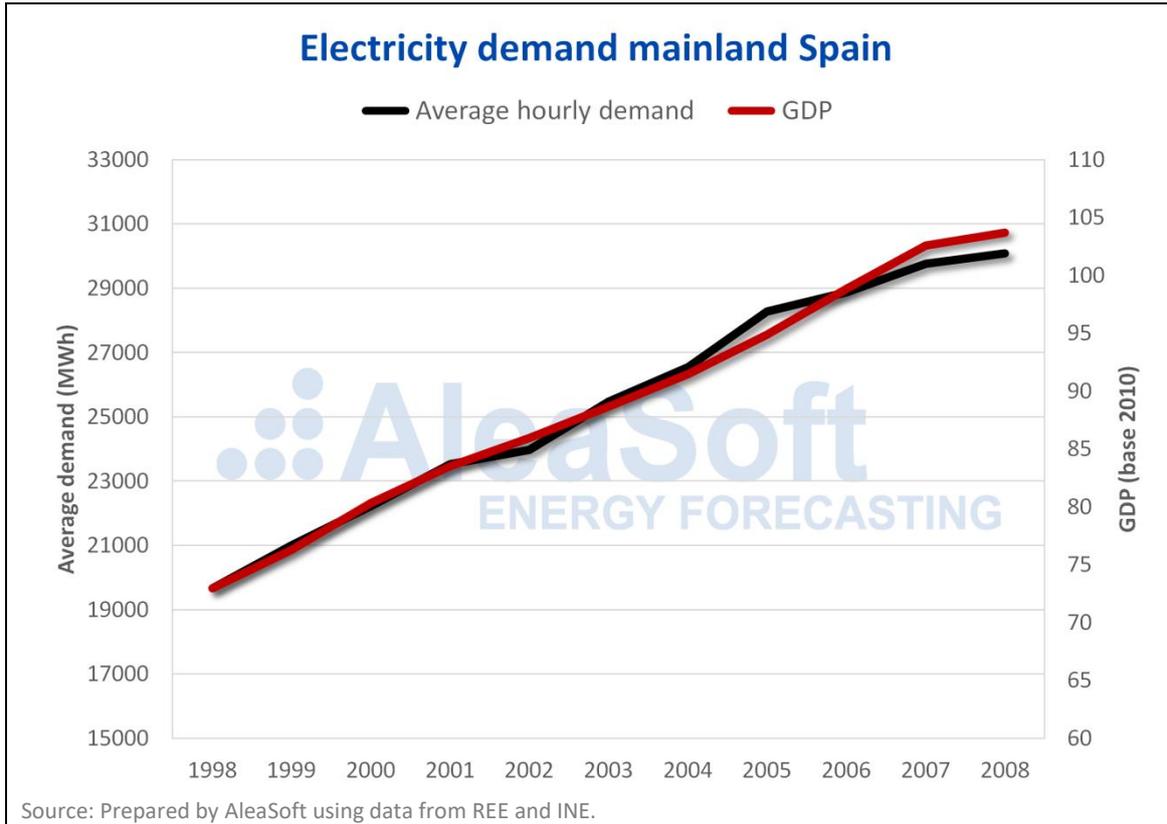


It must be taken into account that 1998 was the year with the lowest price, and that 2008 was a punctually expensive year where coincided a low hydroelectric energy production and a high price of a barrel of Brent oil and CO₂ emission rights. If the market price trend during this period is analysed, eliminating year-to-year price fluctuations, the conclusion is that during this first half of the history of the Spanish electricity market the price rose 145%, which when corrected with inflation it drops to 68%.



Electricity demand of Mainland Spain

From the entry into operation of the Spanish electricity market in 1998 until the end of 2008, when the economic crisis began, the **electricity demand** in Spain grew by 53%. During this period the increase in the electricity demand was directly linked to the growth of the Gross Domestic Product (GDP) of the country, which increased by 42%.

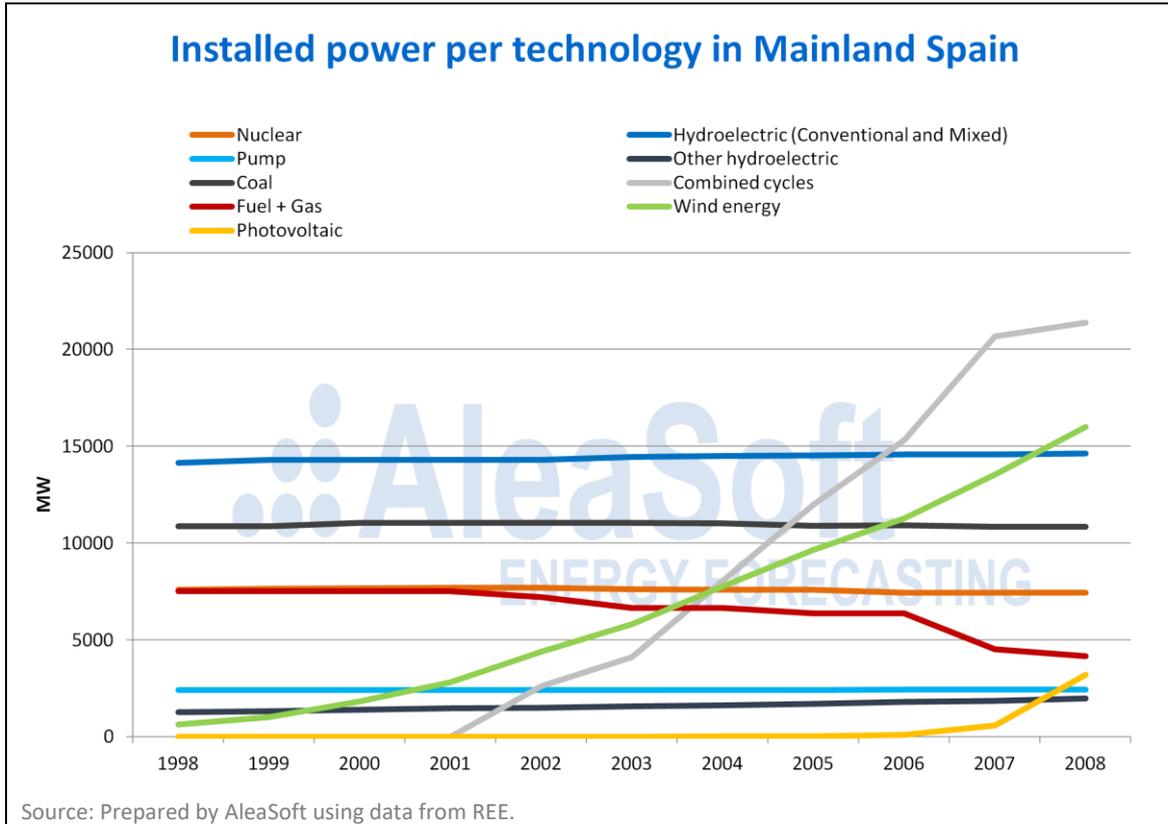


The greatest growth in the electricity demand, during the period from 1998 to 2008, was in the year 1998, with a variation of 7.9% compared to the previous year. The year 2008, in which the global economic crisis began, was the one with the lowest growth recorded of the analysed period, with a more moderate variation of 1.4%.

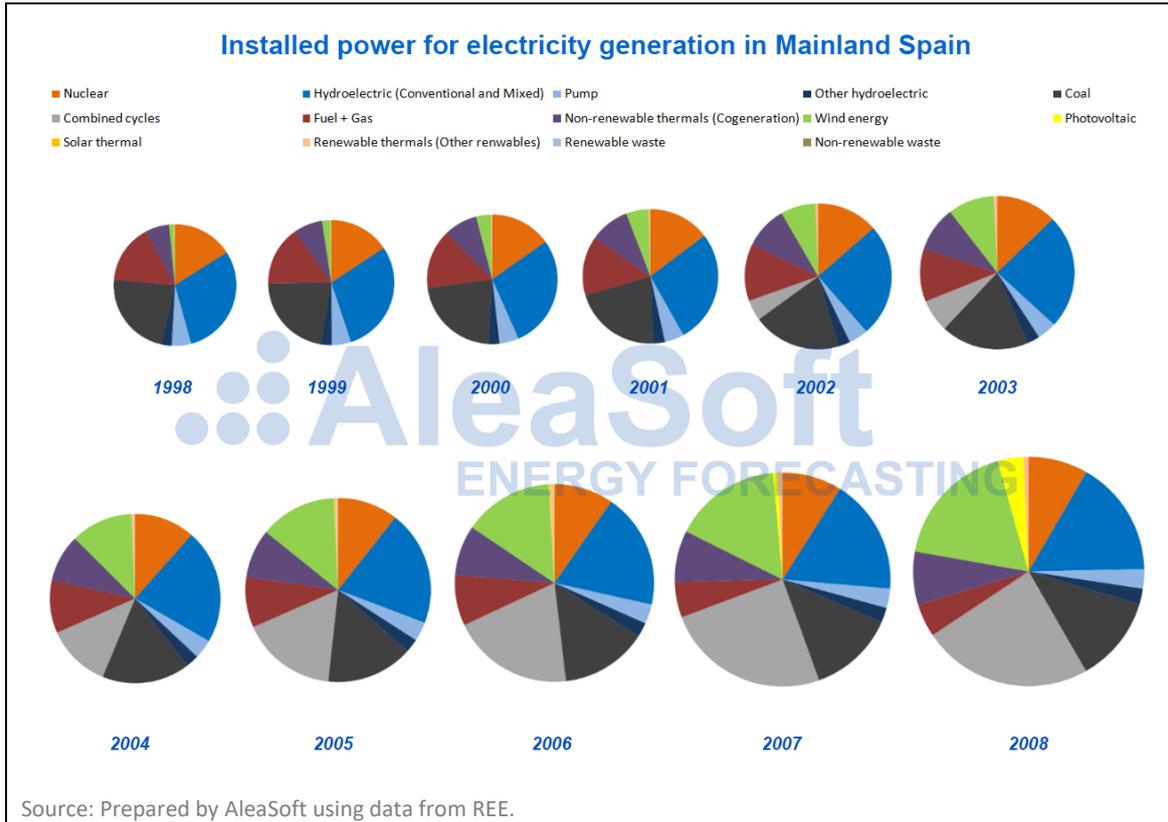
Installed capacity and energy production per technology in Mainland Spain

At the beginning of the analysed period, with the emergence of the electricity market, the set of technologies for the generation of electricity in Spain was quite diversified. In 1998 the main resource available for generation was the hydroelectric. The installed capacity of this technology, among its different variants: pumping, reservoirs and flow, reached almost 40% of all generation capacity in Spain. It was followed by **coal generation**, with 23% of the total capacity, and **nuclear generation**, with 16%. However, the technology that generated the most electricity in Spain was coal, followed closely by the nuclear energy.

Another source of renewable energy available that year was **wind energy**, but with a very discreet participation, since only 1% of the generation capacity was from this source. However, in the period 1998-2008 an average of approximately 1.5 GW of wind power was installed in Spain each year. This growth rate was only surpassed by the installation of **combined cycle gas turbine plants**. Being a more efficient technology and with less environmental impact than traditional thermal generation, the combined cycle gas turbines debuted in the Spanish market in 2002, surpassing in installed capacity the generation with fuel and gas in just four years. During the period analysed, this was the fastest growing technology, with an average of more than 3 GW installed every year from 2002 to 2008.

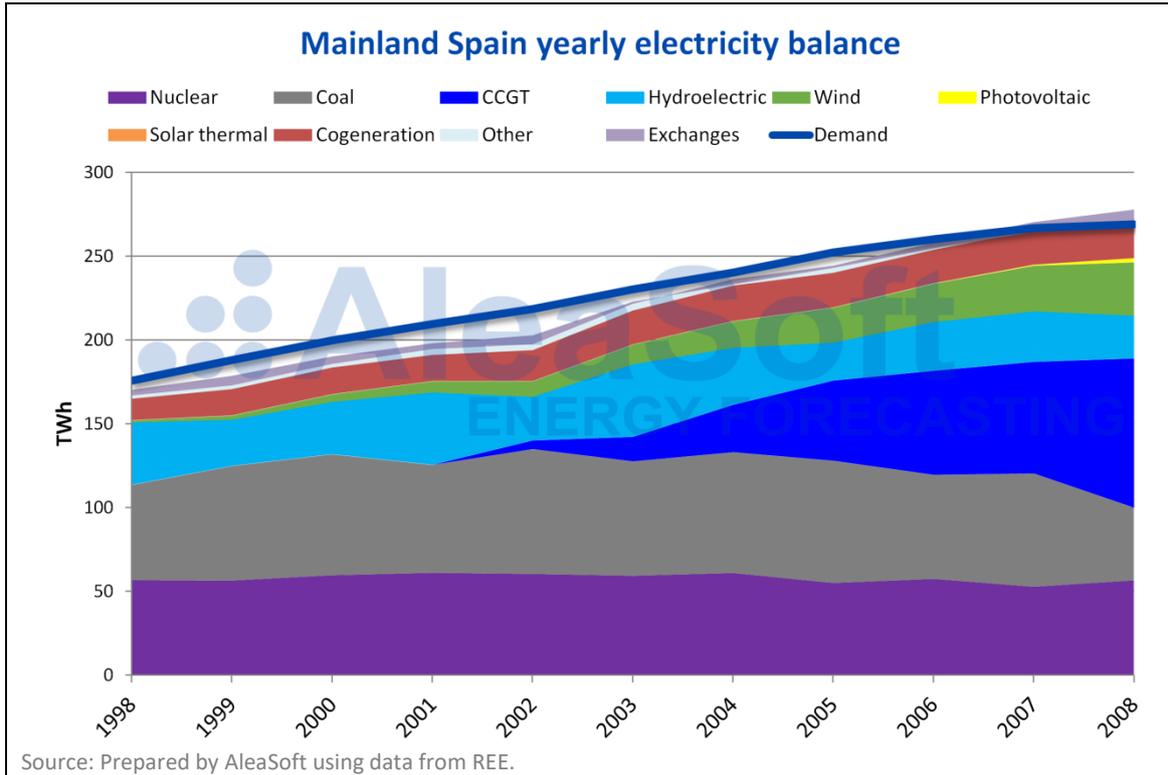


On the other hand, the total power of electricity generation in the Mainland Spanish system grew every year during the analysed period, most notably since 2002, coinciding with the entry of the combined cycle gas turbines. The **Mainland Spain electricity system** almost doubled its installed capacity from approximately 47.54 GW in 1998 to around 89.54 GW in 2008. The share of each technology in the electricity generation park in this period was also modified. The park went from being dominated by hydroelectric power to having a more equitable distribution among the main technologies in 2008: combined cycle gas turbine, hydroelectric and wind energy.



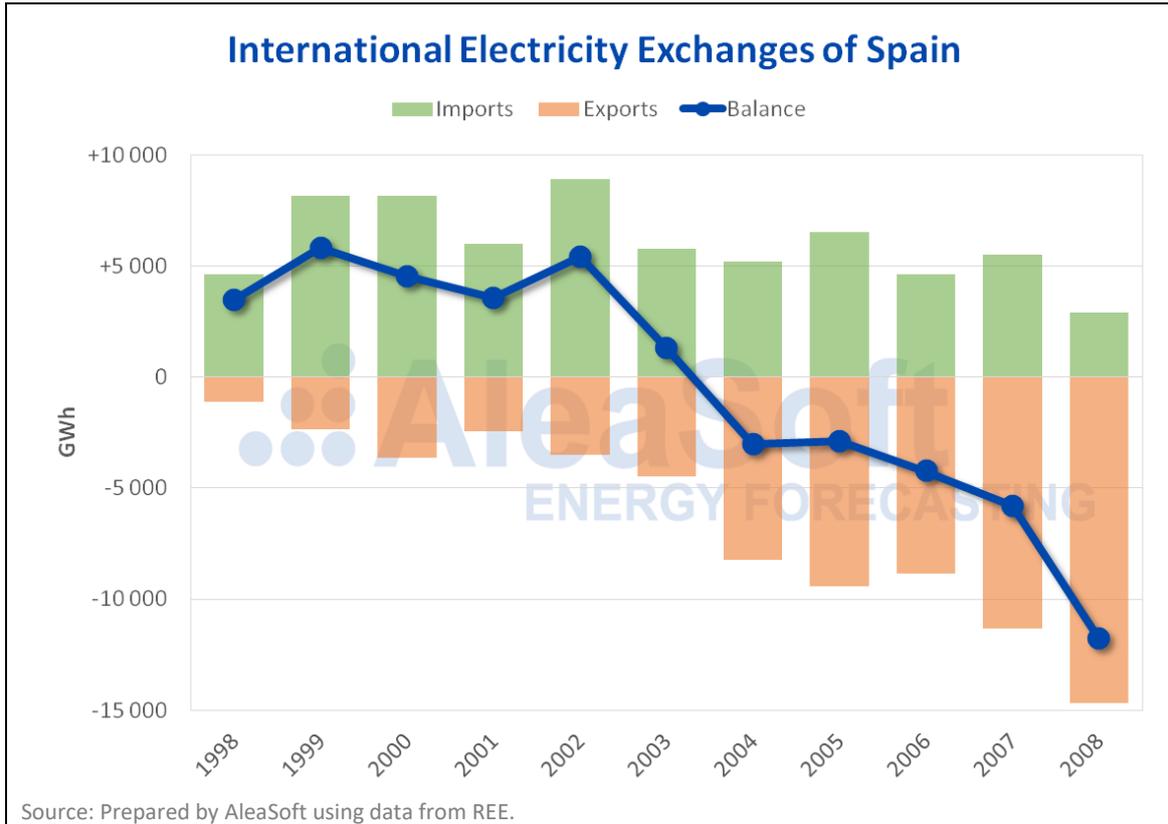
The installed capacity of **solar energy** was very discreet throughout the period. In 2008 the **photovoltaic** capacity was barely 4% of the total system and by that date the installed **solar thermal** power was negligible compared to other technologies.

The production with combined cycle gas turbines, being the technology with the highest power growth, at the end of the period analysed had already unquestionably displaced coal generation, and even the production with this last technology was reduced despite the fact that the installed capacity in the country remained constant. This phenomenon occurs mainly when being displaced in the market by other more profitable and less polluting technologies.

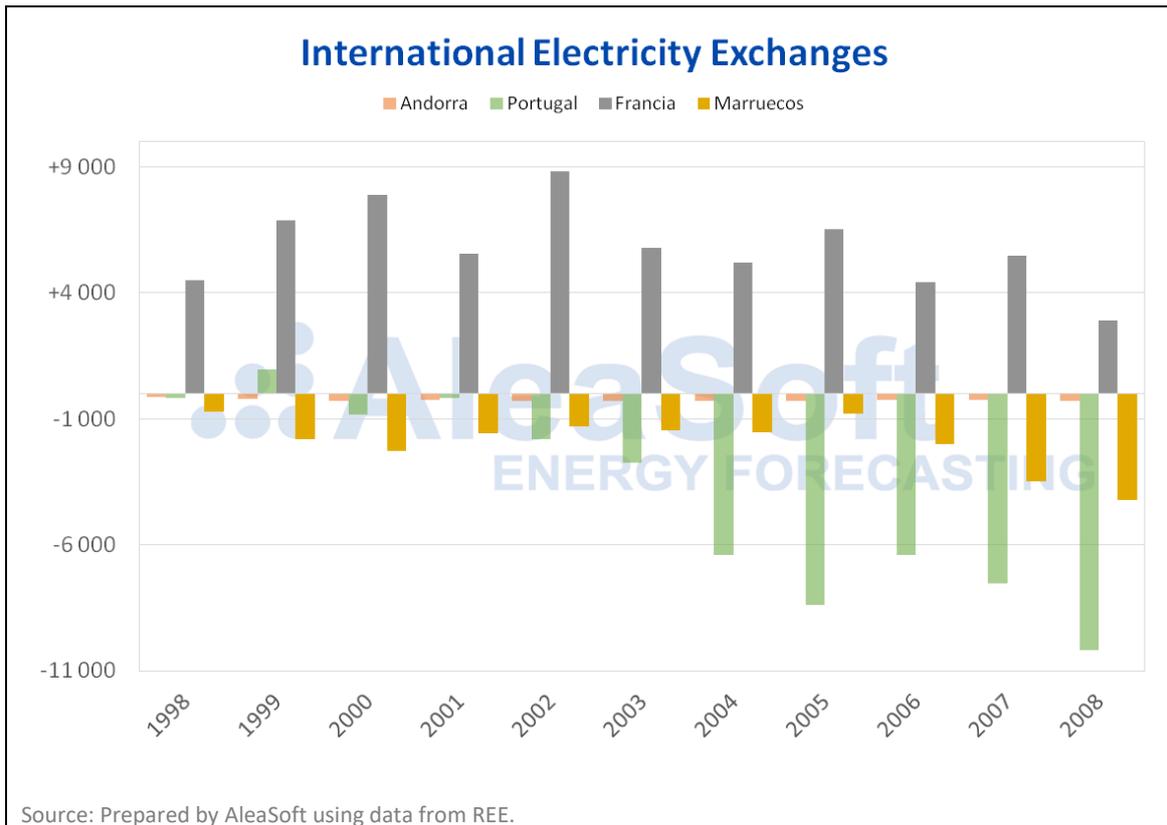


International exchanges

In the period from 1998 to 2008, the **international energy exchanges** of the electricity system of Mainland Spain were characterised by a continuous increase in exports. Towards the end of 2003, total exports exceeded total imports, with a change in the overall behaviour of the exchange flows, going from being importer to being clearly exporter from 2004.



This effect is directly associated with increased trade flows to Portugal and to a lesser extent to Morocco, which were mainly exporters, while the importer flow from France remained stable. The annual total flows, both export and import, were gradually increasing, but in this period there was a significant increase in the exchanges between Spain and Portugal, becoming in 2008 the 58% of the total exchanges recorded that year. The entry into operation of the MIBEL market on July 1, 2007 was one of the reasons that favoured the increase in exports from Spain to Portugal. In the second half of 2007, the exports to Portugal grew by 60% compared to the first half of that year and 73% compared to the same half of the previous year.



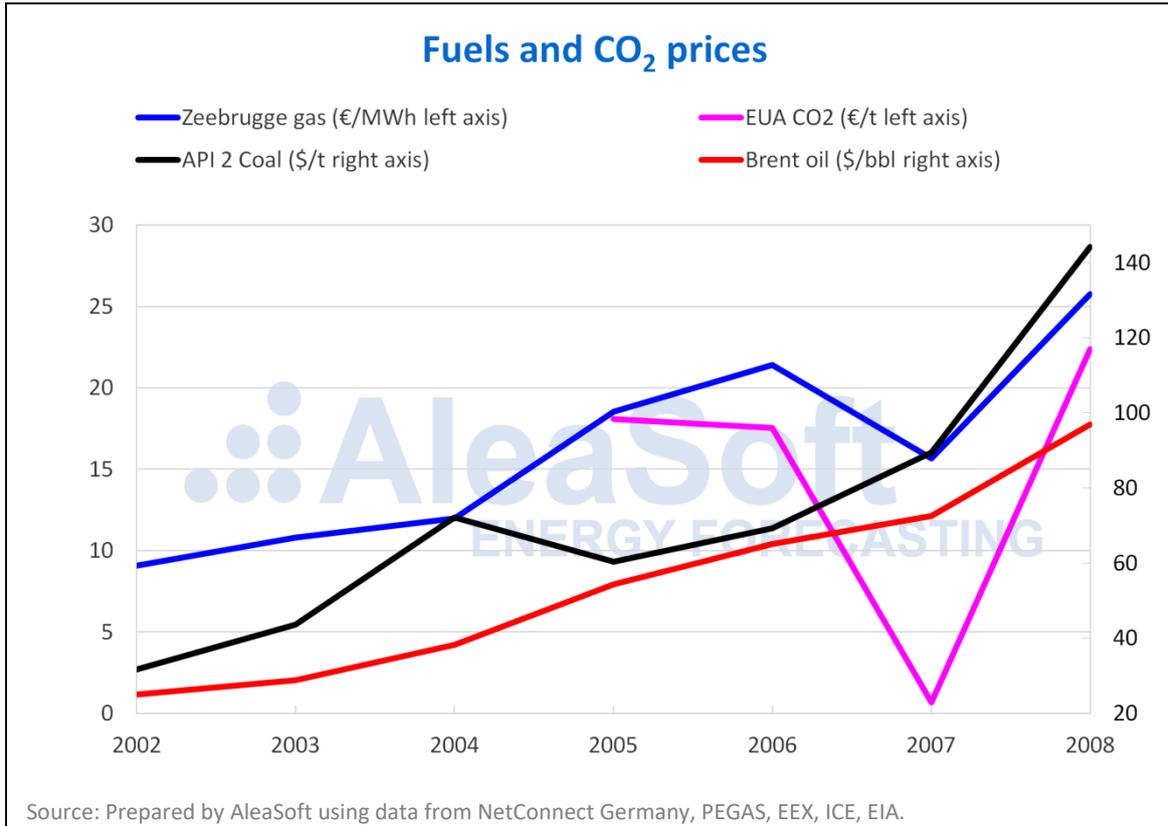
Brent, fuels and CO₂

The **Brent oil** prices in the spot market, from 2002 to 2008, increased continuously. The annual average price of Brent oil went from \$24.99/bbl in 2002 to reach a value almost four times higher in 2008, \$96.85/bbl. The most pronounced price increase was that corresponding to 2005, when an average price of \$54.38/bbl was reached, 42% higher than the average price of the previous year, \$38.22/bbl.

In the period 2002-2008, the **Zeebrugge gas** prices in general maintained an upward trend, with the exception of 2007. This year the average price of gas was €15.66/MWh, 27% lower than the price of the previous year, €21.40/MWh. As a result of the upward trend experienced, the Zeebrugge gas price went from €9.09/MWh in 2002 to €25.74/MWh in 2008, with the most significant rise occurring in 2008, of 64% compared to 2007.

In the case of the **API 2 coal** prices, as in the case of other fuels, they increased since 2002, when the average price was \$31.62/t, until 2008, when the average price was \$144.15/t. The prices increased year after year, except in 2005, when with an average price of \$60.36/t there was a decrease of 16% compared to the price of 2004, \$72.15/t. This average price for 2004 was reached when the highest price increase of the analysed period was recorded, of 66% compared to the value of 2003, of \$43.57/t.

The **CO₂ emission rights (EUA)** market began in 2005 to accomplish the obligations contracted in the Kyoto protocol. This year the average price reached for the CO₂ emission rights was €18.08/t. Between 2005 and 2007, the first phase of the **European Emissions Trading System (EU ETS)** was developed, in which EUAs were over-allocated, causing an excess of supply that, together with the fact that the EUAs had an expiration date, led to the fall in prices from May 2006, until reaching values close to zero in 2007. In 2008, the second phase of the EU ETS began, in which the EUAs were adjusted and the prices rose again, reaching an annual average of €22.38/t that year.



The first half of the Spanish electricity market

This first stage of the Spanish electricity market, which goes from its beginning until just before the explosion of the economic crisis, can be summarized as a period of rapid growth. The main factor was the significant growth in the electricity demand during this period of economic boom, which resulted in an increase in the electricity price. During these first ten years of the market, the generation park was modernized with the entry of the combined cycle gas turbine and the wind energy.

In the next part of this series of articles on the electricity market in Spain, we will analyse how the economic crisis completely halted the growth of the electricity demand, how the renewable technologies continued to make their way into the mix and how, little by little, the Iberian market is integrated with the rest of European electricity markets thanks to the increased capacity of the interconnections between countries.

Source: **AleaSoft Energy Forecasting.**