Deloitte.

European energy market reform
Country profile: Spain

Contents

Current situation

Energy consumption and trade balance

In 2012, Spain's primary energy consumption (PEC) amounted to 127 Mtoe.[1] More than 75% came from fossil fuels. Petroleum products (54 Mtoe in 2012) represent the main source of energy consumption, followed by natural gas (28 Mtoe in 2012).

Figure 1. Primary energy consumption in 2012 (127 Mtoe)[2]

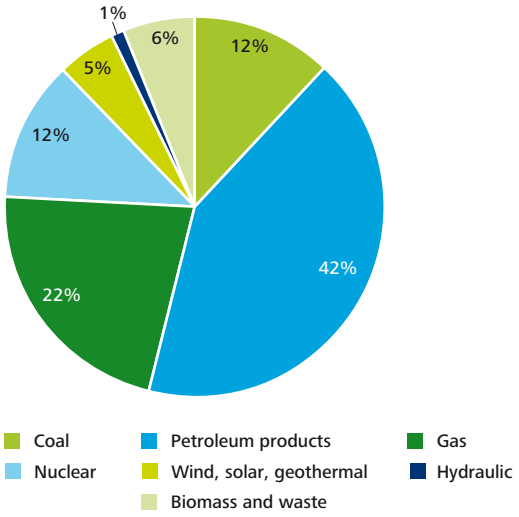
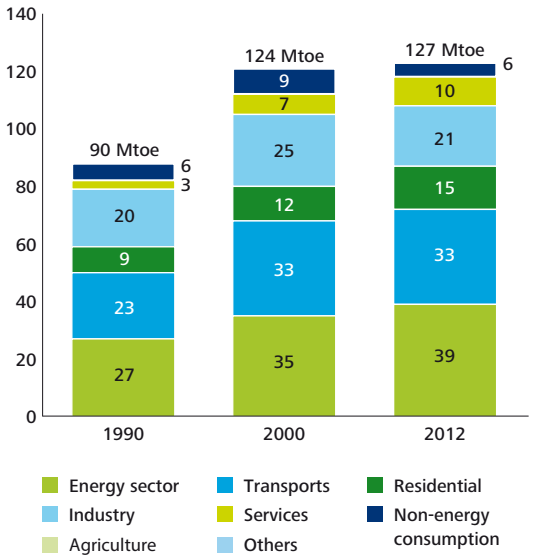


Figure 2. Primary energy consumption by sector (in Mtoe)[2]



Primary energy consumption sharply increased between 1990 and 2000 (+37%), although it grew by only 3% between 2000 and 2012. This slowing trend is mainly due to an 18% decrease of primary energy consumption in the industrial sector, which has been more than offset by a growth in the energy sector (+11%), in services (+50%) and in the residential sector (+29%). As a result, Spain's energy intensity (primary energy consumption/GDP) dropped by 15% between 2000 and 2012 (with a peak in 2004).

The energy sector represented 31% of primary energy consumption in 2012 and has grown by 11% since 2000, mainly as a result of a rapid increase in power generation. Transport is the second largest consumer, contributing 26% of primary energy consumption in 2012, although remaining stable in volume between 2000 and 2012.

Key figures:

Population (2013):
46.5 m cap.

GDP (2013):
€ 1,049 bn €

GDP/capita (2013):
€ 22,559

GDP/PEC (2012):
8.1 €/kgoe

PEC/capita (2012):
2.72 toe/cap.

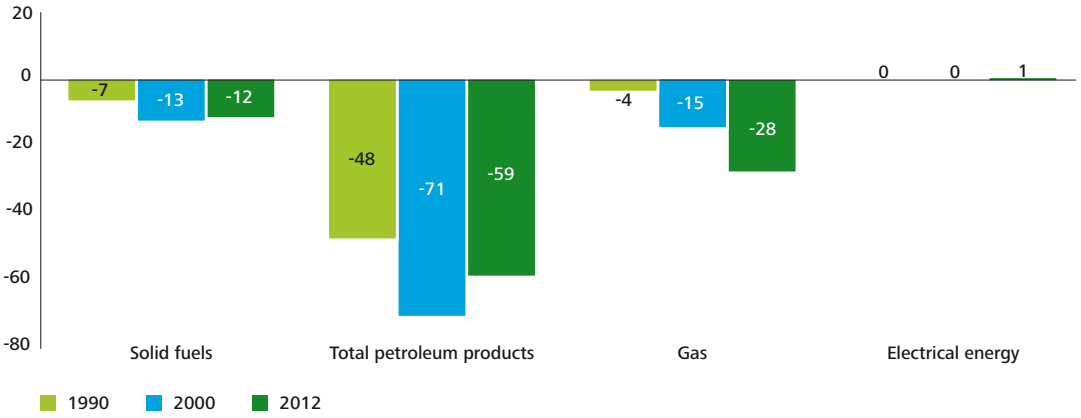
Spain's energy dependence was estimated at 73% in 2012, which is higher than the EU's energy dependence (around 50%).

The energy and transportation sectors are the largest primary energy consumers, and are highly dependent on fossil fuels.

1 The primary energy consumption value presented refer to 'Gross inland energy consumption by fuel type' in Eurostat (Data Table: tsdcc320) Source: Eurostat. © European Union, 1995-2015

2 Source: Eurostat. © European Union, 1995-2015

Figure 3. Energy trade balance (Mtoe)[2]



Spain depends heavily on fossil fuel imports (petroleum products, coal and natural gas). In total, the volume of imported energy remained steady between 2000 and 2012 (99 Mtoe in 2000 and in 2012).

Between 2000 and 2012, petroleum product imports decreased from 71 Mtoe to 59 Mtoe, while natural gas imports rose from 15 Mtoe to 28 Mtoe. Coal (solid fuel) imports were relatively stable in euros over the same period: 13 Mtoe in 2000 and 12 Mtoe in 2012. However, the development of shale gas in the US has resulted in cheap coal entering the market, which seems to have impacted European coal imports. A 28% increase in Spain's coal imports was observed in 2012 compared to 2011,[3] although imports dropped again in 2013.

Power generation

Renewable energies grew rapidly over the last 10 years. Spain has 51 GW of renewable power generation capacity (47% of total installed capacity), accounting for 41% of electricity production. Wind and solar PV installed capacity were respectively 23.0 and 4.7 GW (26% of electricity capacity in 2013), generating 20% and 3% of overall electricity. Hydropower (19% of installed power capacity and 15% of production) and other renewables (3% of installed power capacity and 3% of production) – mostly solar thermal power – complete the renewable electricity generation mix.

Fossil fuels still represent 40% of electricity production. Nuclear power plants generate 21% of electricity output with 7% of the capacity mix. Currently, there are six nuclear power plants in operation in Spain, and a total of eight reactors. They were built in the 1970s and '80s and their licenses expire between 2021 and 2034. Furthermore, one reactor (Zorita) has been deactivated due to its age and another (Vandellos) is in its final phase of being dismantled after an accident occurred in 1989.[4]

Spain has 51 GW of renewable power generation capacity (47% of total installed capacity), accounting for 41% of electricity production. There is significant excess capacity in power production.

Spain, continental system, currently uses only half of its installed capacity during peak demand (101,828 MW vs. 43,010 MW).

Figure 4. Electricity capacity – 108 MW (2013)[3]

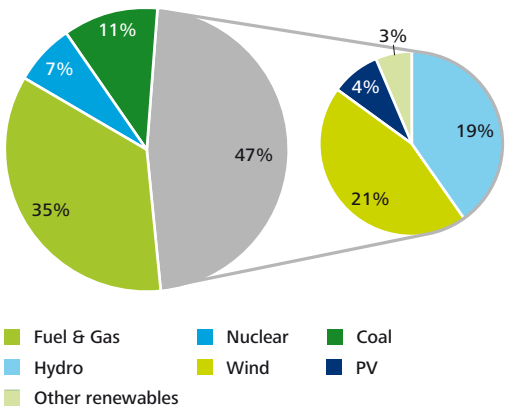
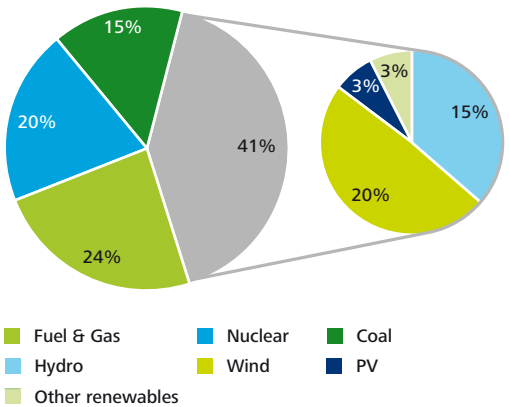


Figure 5. Net generation – 274 GWh (2013)[3]

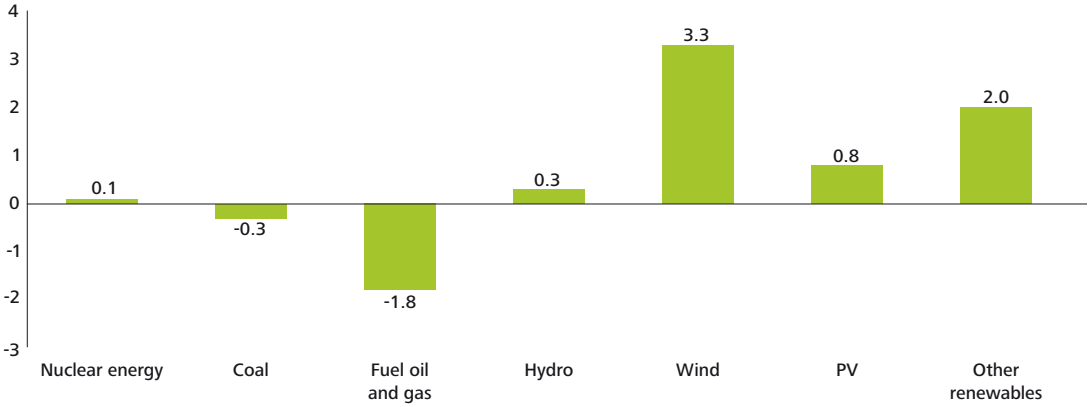


3 El Sistema Electrico Espanol 2013, Red Electrica de Espana

4 Ministerio de Industria, Energia y Turismo (2014): http://www.minetur.gob.es/energia/nuclear/Centrales/Paginas/ListadoCentrales.aspx

Wind power development began in 1997 when the Spanish government introduced incentives.

Figure 6. Electricity capacity change from 2010 to 2013 (in GW)[3]



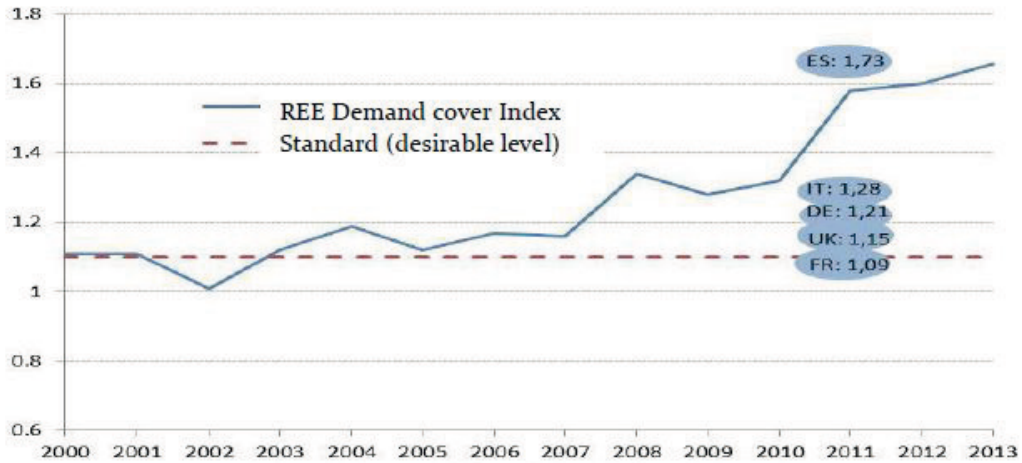
The objective in 1999 was to have 9 GW of wind power installed by 2011. This target was met in 2005 and the government set a new target of 20 GW of installed wind power capacity by 2011, which was also met on time.

20% of renewable capacity (6.1 GW), excluding hydropower, was installed over the last three years, while 1.8 GW of power stations using fuel oil and natural gas were deactivated.

Spain has significant excess power capacity: even during peak demand, roughly only 42% of Spain's power capacity is used.[4] The following figure shows the evolution towards excess capacity.

The forecasts from the mid-2000s led to large investments in renewable energies, combined heat and power (CHP) generators, and combined cycle gas turbines (CCGT).[5]

Figure 7. Evolution of the ratio between installed electricity production capacity and peak used capacity. Comparison with other member states



These investments and the associated excess capacity are one of the reasons for higher power prices.[6]

5 Ministerio de Industria, Energia y Turismo (2013) The reform of the Spanish power system: towards financial stability and regulatory uncertainty

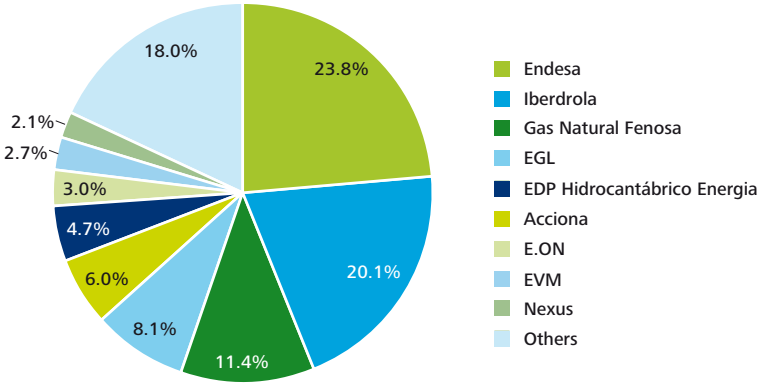
6 See "Power prices" section below

There are numerous players in Spain's power generation market, but the three largest companies have more than 55% of the market share.

Power market: main actors

Spain's electricity market was deregulated in 1998 and integrated with the Portuguese electricity market in 2007. There is a relatively high degree of concentration in the Spanish electricity market, as a few players have dominant roles.

Figure 8. Market share of electricity generation (2012)[7]



The main companies and their respective market share of electricity generation are: Endesa (23.8%), Iberdrola (20.1%), Gas Natural Fenosa (11.4%), EGL (8.1%), EDP Hidrocantábrico Energía (6.0%), Acciona (4.7%), E.ON (3.0%), EVM (2.7%) and Nexus (2.2%).[7] Smaller players, however, sell around 18% of electricity. Electricity is traded in the Mercado Ibérico de la Electricidad (MIBEL), which also includes Portuguese players.

Red Eléctrica de España (REE) is the single transmission system operator for Spain, owned by REE Group, and is neither involved in power generation nor supply.

There are more than 50 DSOs, the main ones being owned and operated by Endesa, Iberdrola, Unión Fenosa, Hidrocantábrico and E.ON.

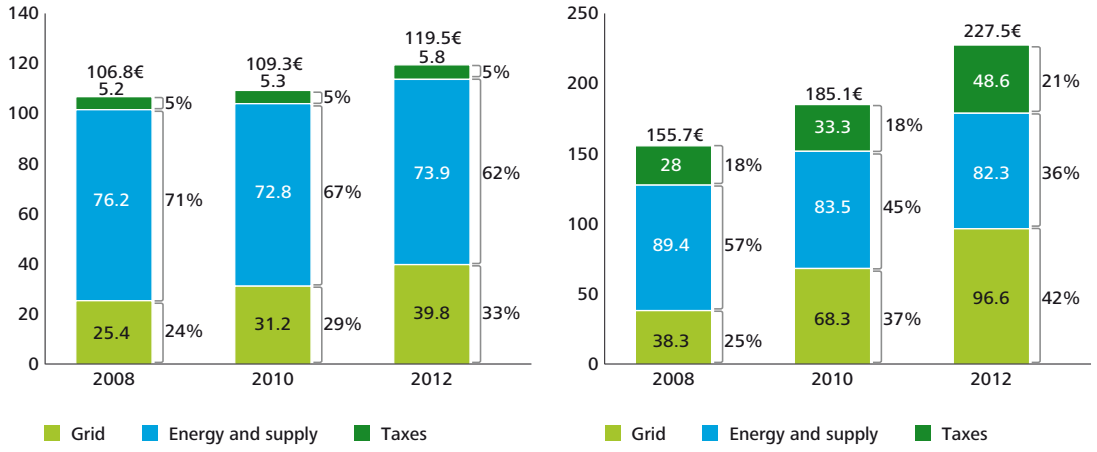
7 Comisión Nacional de Energía (CNE)

Power prices

In 2012, retail prices for industrial users were around 120 €/MWh, slightly below the European average (125 €/MWh). Prices increased by 12% between 2008 and 2012 (+13.3 €/MWh), mostly due to rising grid costs (+14.4 €/MWh), as shown in the graph below. In the figures published by Eurostat for Spain, incentives to promote renewables and other costs of the electricity system are included in grid tariffs.

In 2012, retail prices for residential customers reached 228 €/MWh, which is higher than the European average (200 €/MWh). Prices rose by 46% between 2008 and 2012 – grid costs were 152% higher in 2012 compared to 2008 and taxes were 73% higher.

Figure 9. Retail prices for industrial (left) and residential (right) users (€/MWh)[8]



Electricity prices are sharply on the rise (+46% for residential prices between 2008 and 2012), while the country struggles with a heavy tariff deficit (€ 30 billion over the last 15 years).

Strong financial incentives were implemented to support the development of renewables and are reflected in the grid component of the tariffs. According to a recent study published by Eurelectric,[9] taxes and levies represented 50% of Spain's household prices. They include policy support costs which were at 66 €/MWh, the highest level in Europe (the European average was 25 €/MWh in 2012).

For industrial users, taxes and levies were 32 €/MWh in 2012 (or 27% of the price), with 27 €/MWh to cover policy and support costs (slightly above the EU average of 21 €/MWh).

The costs of public support for renewables were supposed to be covered by a third-party access tariff, paid by consumers. However, the rapid expansion of renewable energy increased the costs higher than expected and **the third-party access tariff paid by consumers did not cover all costs**. This was one the main elements that led to an accumulated tariff deficit of € 30 billion over the last 15 years,[10] which is, at the moment, financed through a debt held by Spain's five largest energy companies and, accordingly, not reflected in the actual electricity tariffs.

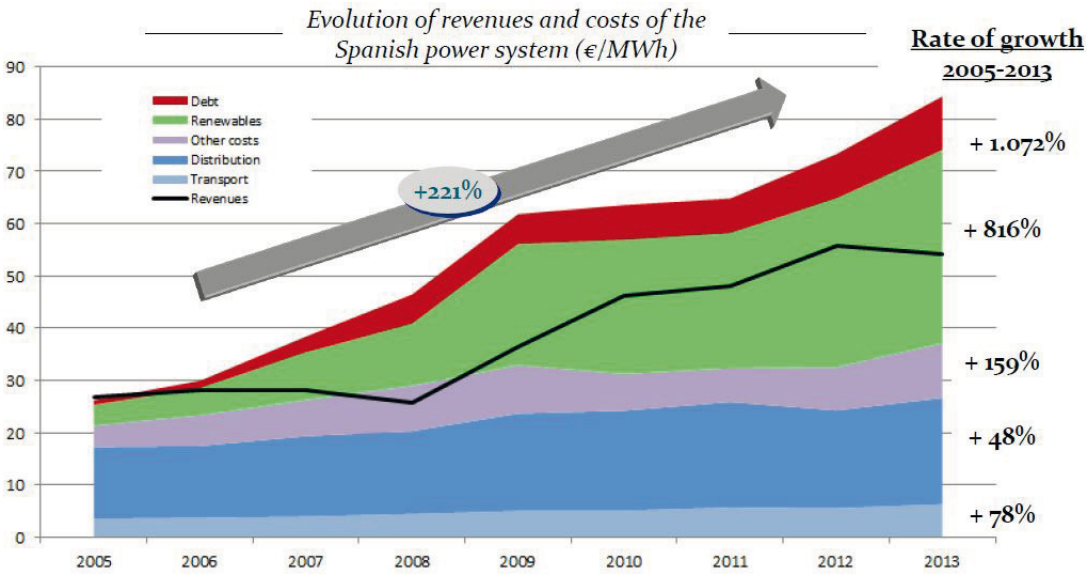
8 Source: Eurostat. © European Union, 1995-2015

9 Eurelectric (2014) Analysis of European Power Drivers

10 David Robinson (2013) Pulling the plug on renewable power in Spain. The Oxford Institute for Energy Studies

The Spanish government has been struggling to redesign electricity markets, to reduce the deficit: in recent years, support and incentives for renewable energy were not fully passed through to customers through regulated tariffs, leading to a deficit. The government has been operating the power system at a loss. Recently, it changed the feed-in-tariff system for renewables – the figure below illustrates the difference between the revenues and costs of the power system, and the country's debt accumulation.

Figure 10. Evolution of revenues and costs of the Spanish power system (€/MWh)



A series of measures has been implemented to prevent the tariff deficit from growing. This should be achieved by charging increased access tariffs to the final customers, reducing remuneration paid to network operators and cutting incentives, including those for renewable power (reduction of feed-in tariffs).

Targets for 2020

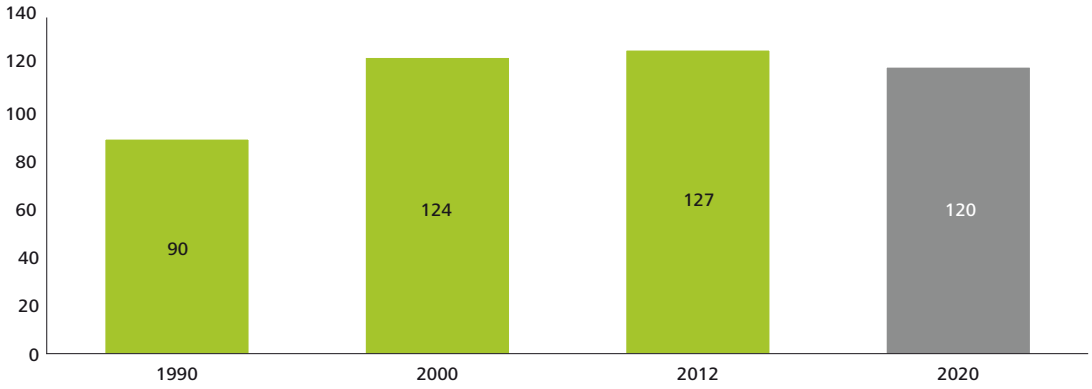
Spain's energy and climate targets for 2020 are to be met pursuant to several national action plans (the National Energy Efficiency Action Plan or NEEAP, updated in 2014; and the National Renewable Energy Action Plan or NREAP, updated in 2011 as the Renewable Energies Plan)[11]. They include:

- a 26.4% reduction of its primary energy consumption compared to the business as usual scenario;
- a 20.8% share of renewables in final energy consumption (20.8% being a national target; the EU target for Spain's renewables is 20%); and
- a 10% reduction of GHG emissions in the non-ETS sector and an 21% reduction of GHG emissions in the ETS sector.

Energy efficiency targets

Spain recently presented its NEEAP 2014-2020. Since energy consumption has been dropping as a result of the economic crisis, new targets were defined requiring supplementary efforts for energy efficiency.

Figure 11. Primary energy consumption (Mtoe)[27]



The target for primary energy consumption in 2020 is 119.9 Mtoe, which represents a 26.4% reduction in relation to a business as usual scenario (in which the primary energy consumption was expected to be 162.8 Mtoe in 2020).

The 2020 target represents only a 6% reduction in primary energy consumption compared to 2012 (127 Mtoe). But in its projections for 2020, the Spanish government assumes a country-wide economic recovery, as indicated by the expected GDP evolution for the coming years:

Table 1. Projected GDP evolution for Spain used in the energy efficiency target calculation (Source: Ministerio de Economía y Competitividad – Spain)

2012	2013	2014	2015	2016	2017	2018	2019	2020
-1.6%	-1.2%	0.7%	1.0%	1.4%	1.8%	2.0%	2.2%	2.4%

20-20-20 EU targets: what is Spain committed to in 2020?

- **Reduce its primary energy consumption by 26.4% compared to the business as usual scenario.**
- **20% share of renewables in final energy consumption.**
- **10% reduction of GHG emissions in the non-ETS sector.**
- **21% reduction of GHG emissions in the ETS sector.**

In 2012, Spain was close to reaching its 2020 target for primary energy consumption (119.9 Mtoe) but supplementary energy efficiency policies will be necessary if the expected economic recovery occurs.

Most of the reduction in primary energy consumption is due to economic recession. If the economic recovery occurs as planned, new efforts will have to be undertaken to reach the 2020 target.

Several measures are already planned but it is too soon to estimate whether they will yield the expected savings by 2020.

11 IDAE (2011) Plan de Energías Renovables 2011-2020

If the GDP evolution follows this expected trend, the country's energy efficiency targets appear ambitious. The Spanish government believes this may represent a threat to the country's economic recovery. Moreover, the NEEAP notes that a 26.4% reduction is much higher than the 20% overall reduction required for the EU as a whole.

The energy efficiency measures implemented so far resulted in final energy savings in 2012, with 2007 as a reference year, of only 2.5 Mtoe (source: NEEAP 2014). Most of this reduction in energy consumption is attributed to the economic crisis. If Spain realizes the economic growth projected in Table 1, it seems rather unlikely that the country will achieve its energy savings target unless energy efficiency policies make much additional progress. This raises speculation regarding the extent to which existing policies are compatible with the country's economic growth projections and energy efficiency targets.

Transport represents 26% of primary energy consumption and is the largest energy-consuming sector. Different policy measures have been taken:

- Economic incentives for the purchase of efficient vehicles (emitting less than 160 g of CO_2/km) to replace older ones (10 to 12 years old, depending on vehicle category).[12]

- Incentives for the use of electric vehicles: lower electricity prices during the night for vehicle battery recharge; subsidies for the purchase of electric vehicles that may reach € 6,000 for private users and € 15,000 to € 30,000 for buses and trucks, depending on the vehicle used.[13]

- Training programs to improve driving efficiency.[14]

In the **building** sector, various measures have also been implemented to retrofit existing buildings. The residential sector has mandatory energy performance certification for buildings of more than 1,000 m^2 but there are no sanctions in case of non-compliance. Special loan terms are proposed for household owners willing to optimize thermal insulation, substitute energy sources for heating installations (conventional energy source by biomass or geothermal energy) and enhance lighting efficiency. [15]There are also specific programs focused on the hospitality industry (e.g. hotels).[16, 17]

For the **industrial sector**, economic incentives (€ 120 million per year) for investments in more energy-efficient technologies have been implemented with the NEEAP and mandatory energy management systems are expected to be introduced in the near future. That said, energy savings targets for individual companies are still lacking.

Additionally, Spain decided to strengthen its policy to encourage energy savings:

- Energy Efficiency Obligations (trading certificates scheme) targeting retailers of electricity and of fossil fuel-derived products (including those used in transportation) should be operational in 2015-2016, but have yet to be developed)

- A National Energy Efficiency Fund, funded through contributions of obligated parties, is also under discussion

Renewable energy targets

In 2012, the share of renewables in Spain's final energy consumption amounted to 14.3% and the target set by the European Commission for 2020 is 20% (with a more ambitious target of 20.8% set at the national level). The share of renewables has been steadily increasing (8.3% in 2004, 10.8% in 2008, 13.8% in 2010 and 14.3% in 2012) and Spain met its indicative trajectory (presented in the NREAP) for the year 2012. This was **one of the fastest progressions in the share of renewable energies in Europe** (behind Estonia and Austria).[18] Even though the renewables target set by the EU is 20%, the NREAP set a 22.7% goal from 2010. This target was revised in 2011 and set at 20.8%.

12 PIVE (Programas de Incentivos al Vehículo Eficiente)

13 Proyecto MOVELE

14 onvenios IDAE-DGT conducción eficiente del vehículo turismo, camiones y autobuses

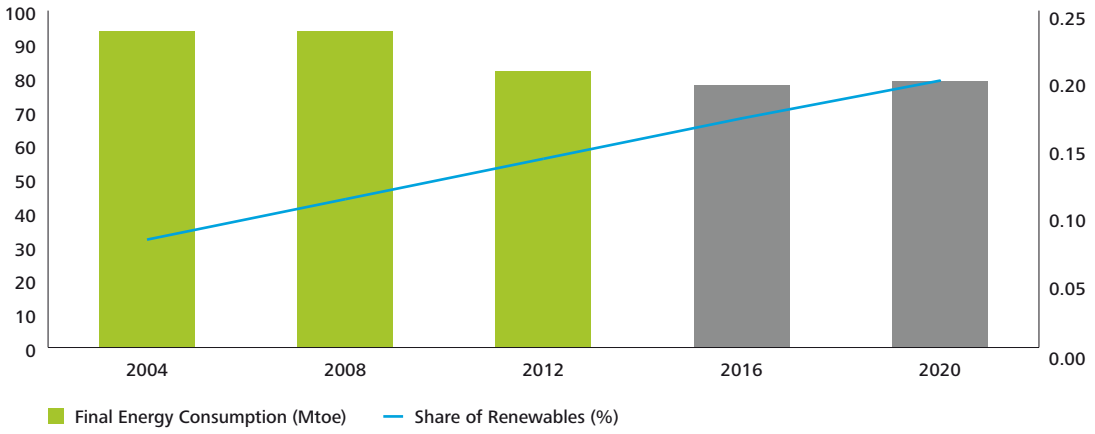
15 PAREER (Programa de Ayudas para la Rehabilitación Energética de Edifícios Existentes)

16 PIMA SOL (ayudas para proyectos de rehabilitación energética de las instalaciones del sector hotelero)

17 If we consider final energy consumption instead of primary energy consumption, the corresponding target is 80.1 Mtoe of final energy consumption in 2020 (in the business as usual scenario, the final energy consumption is 103.4 Mtoe). This target represents a 23.3 Mtoe reduction compared to the business as usual scenario. The above mentioned programs (amongst others already implemented in 2014) are expected to save 1.7 Mtoe by 2020 – only 7.3% of this target

18 European Environment Agency (2013) Trends and projections in Europe 2013: Tracking progress towards Europe's climate and energy targets until 2020

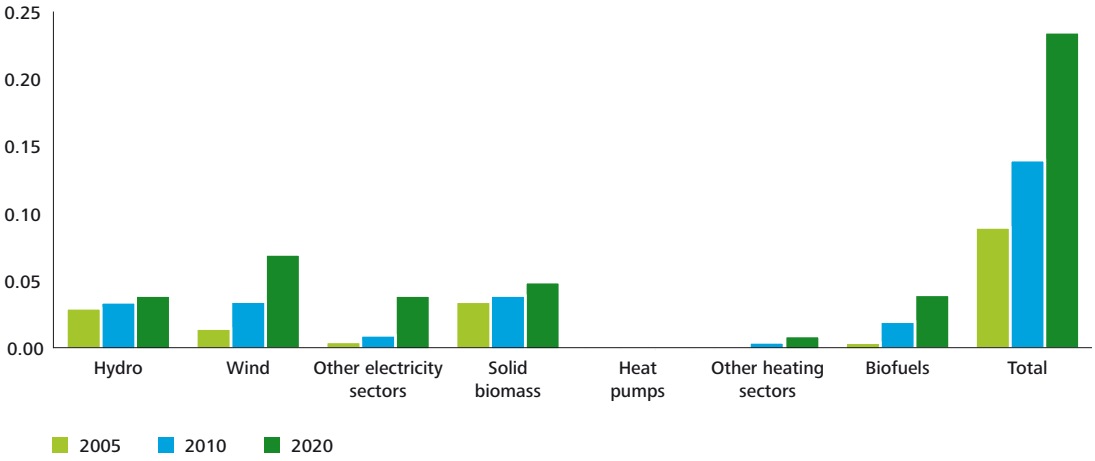
Figure 12. Renewable energy share of final energy use (Mtoe)[19] between 2004 and 2012, and targets for 2016 and 2020



With around 70% of its target already achieved, Spain seemed to be on track to reach its renewable energy target.

In the aftermath of the economic crisis, however, the Spanish government is reorganizing the power sector and has cut financial support for renewable energies. This could slow down the development of renewables.

Figure 13. Renewable energy share of final energy use by type, in 2006 and 2011, and target for 2020, in %



If the same trend continues, this target should be easily achieved. However, new legislation reducing/phasing out renewable energy generation incentives in order to reduce the tariff deficit (which got as high as € 30 billion – see section on 'Power prices') represents an obstacle to this target. A series of measures was adopted to reduce the tariff deficit. These started with the introduction of caps for CSP, wind power and PV projects in 2010 (Royal Decree (RD) 1614/2010, Royal Decree Law (RDL) 14/2010), and the introduction of a 7% tax on all electricity sales (RDL 2/2012). These measures were later expanded with the progressive phase out of all other renewable energy incentives (RDL 1/2012, RDL 2/2013, RDL 9/2013), including the removal of incentives for cogeneration and the abolishment of electricity price regulation (guaranteed feed-in tariffs and bonus / premium). Moreover, measures forcing renewable energy producers to compete with traditional source producers on a level playing field were introduced as well (Law 24/2013, RD 413/2014).

As a result of the implementation of these measures, the annual electricity tariff deficit was 'only' € 3.6 billion in 2013,[20] which marks a partial success given the government's goal of a zero deficit for this period. On the other hand, the number of new measures, sometimes introduced with no previous stakeholder consultation, has created a lot of uncertainty in the electricity generation sector. **Investments in the sector are seen as highly risky and renewable energy deployment has slowed down significantly.**

19 Source: Eurostat. © European Union, 1995-2015

20 Source: Linden, A. J., Kalantzakis, F., Maincent, E. & Pienkowski, J., European Economy. Electricity tariff deficit: temporary or permanent problem in the EU?, Economic Paper 534. © European Union, 2014

Due to the economic situation, GHG emissions are currently below 2020 targets.

However, according to EEA (2013), if economic growth is in line with expectations, it will be difficult to achieve these targets considering existing and upcoming policies.

As mentioned earlier, this debt is held by the five main Spanish electricity companies, which have started to pass it on to consumers. It is estimated that the debt contributed to around 8% of consumer electricity bills.[21]

In the **power** sector, Spain's Renewable Energies Plan (2011) set a target of 38.1% of renewables in final electricity generation. Currently, that share is 31% even though renewables represent half of installed capacity. Spain believes significant progress can be achieved by optimizing the use of pumped storage hydroelectricity (power from intermittent sources should be more efficiently used to pump water so it can be stored and used later for electricity production in hydroelectric power stations). By 2020, the installed capacity for wind power and solar power should be 35 GW (vs. 22.7 GW in 2013) and 12 GW[22] (vs. seven GW in 2013) respectively. However, renewable energy producers face significant uncertainty (especially in the power sector) due to new legislation (see 'Power prices' section) and new investments are slowing down. For instance, Spain installed 1,110 MW of new wind capacity in 2012 and just 175 MW in 2013.[23]

For **transport**, the target is 11.3%[24] of renewables share by 2020 (mainly achieved through the use of biofuels: 9.2%). According to our own calculations,[25] biofuels accounted for 6.3% of transportation fuels in 2012.[26] In 2014, there was a sharp drop in biofuel consumption due to a government decision to reduce incorporation targets for biodiesel and ethanol to 4.1% and 3.9% respectively.

CO_2 emissions and targets

Targets for GHG emissions reduction are split between the ETS (emission trading scheme) sector (essentially power generation and heavy industry) and the non-ETS sector (buildings, transports, agriculture, etc.).

- Non-ETS sector: in 2005 (base year for the calculation of emission reductions), GHG emissions in Spain amounted to 240 Mt CO_2eq. The target for 2020 is 216 Mt CO_2eq, which represents a 10% reduction. In 2012, emissions amounted to 207 Mt CO_2eq and were already below the target (they decreased further to 196 Mt CO_2eq in 2013).

- ETS sector: in 2005, emissions amounted to 193 Mt CO_2eq. The target for 2020 is a 21% reduction, which is equivalent to 152 Mt CO_2eq. In 2012, emissions amounted to 134 Mt CO_2eq, already below the target, as in the non-ETS sector.

To a great extent, this quicker than expected progress can be attributed to the economic crisis. And, according to EEA, **if economic growth is in line with expectations, the existing and upcoming policies are probably not ambitious enough to avoid an increase in emissions that would prevent Spain from reaching its 2020 target**.[27]

Figure 14. GHG emissions and targets in the non-ETS sector (Mt CO2 eq.)[27]

Figure 15. GHG emissions and targets in the ETS sector (Mt CO2eq.)[19]

21 El País (2014) The shocking price of Spanish electricity (01/01/2014) http://elpais.com/elpais/2014/01/01/inenglish/1388590410_230748.html

22 In the NREAP sent to the European Commission in 2010, the target for solar power was 13 GW; this target was updated to 12 GW one year later in the IDEA (Plan de Energias Renovables 2011-2020)

23 Global Wind Energy Council (2013) Global Wind Report 2013 – Annual Market Update

24 IDAE (2011) Plan Energias Renovables

25 In 2012, Spain reported this share to be 0.4% in its "Report on progress in the promotion and use of energy from renewable sources pursuant to article 22 of Directive 2009/28/EC". This figure is erroneous since the biofuels incorporation mandate was 7% in diesel fuel and 4.1% in petrol at the time

26 EurObserv'ER reports 201 455 toe of ethanol consumption and 1 899 294 toe for biodiesel in 2012. Final energy consumption in the transports sector in Spain was 33 348 000 toe (Eurostat) in 2012

27 European Environment Agency (2013) Trends and projections in Europe 2013 – Tracking progress towards Europe's climate and energy targets until 2020

Road ahead and main challenges: the way to 2030 and beyond

Today in Spain, decisions in general (including policies in the energy sector) are driven by the country's economic crisis. GDP dropped by 16% between 2008 and 2013[28] and the unemployment rate is around 25%.[29] All of the indicators in the energy sector have been strongly affected by the macroeconomic situation and this blurs visibility for the coming years. Energy dependence has been steadily dropping (but is still above the European average), final energy consumption in 2012 was only 3.7% higher than the 2020 target, and both the ETS and non-ETS sectors' GHG emissions are already below 2020 targets. It is hard to quantify how much of Spain's progress towards its 2020 objectives is attributable to policies designed specifically for these targets, given that the economic recession probably had a stronger impact than the policies.

Strongly hit by the economic crisis, Spain has not defined policies in the energy sector beyond 2020.

Current policies focus on mitigating the economic crisis and the lack of long-term planning in the energy sector is evident.

Moreover, Spain has not formally adopted any energy policies for the period after 2020. This reflects a need for better long-term planning. Modelling activities, with the aim of investigating the economic, social and environmental impacts of energy policies, are essential for the country's long-term planning. Establishing roadmaps is also an important step to reduce investment uncertainty.

One of the main concerns in the power sector is overcapacity and, accordingly, the very low load factors for gas-fired power plants, which produce an average of 800 hours per year (which means that they lose money).

Energy dependence

One of the main characteristics of the Spanish energy sector is its dependence on fossil fuel imports (oil, coal and gas). Spain's energy dependence[30] (the extent to which it relies on imports to meet its energy needs) peaked in 2006 (82%) and has been steadily decreasing since 2008. By 2012, it was estimated to be around 73%. By means of comparison, the average European energy dependence is 50%.

Spain's energy dependence is very high and current measures do not aim to reduce it.

Even if this indicator's decline has been mainly due to a slowdown in industrial activity as a result of the economic situation, supplementary efforts are necessary to achieve energy independence, especially in the transportation sector. However, biofuel incorporation targets were significantly reduced in 2014. The main objective of these new targets is to reduce the price of fuel in order to reactivate the Spanish economy. **This clearly illustrates the trend of decision-making driven by the economic crisis instead of the European objectives for the energy sector.** Besides the development of new biofuel technologies, the market uptake for electric cars is another potential way to diversify the energy carriers used in Spain's fleet and to channel its current excess power capacity. Electric cars would be able to take advantage of the already-installed renewables capacity for power generation – especially by charging batteries during off-peak periods.

Furthermore, coal imports have increased as a result of the US shale gas boom. Coal consumption (hard coal and lignite) rose by 28% in Spain in 2012.[31] US coal has been exported mainly to Europe at cheap prices, leading to coal power plants being more competitive than gas-fired ones. As a result, carbon market prices do not send the correct price signals. Beyond drawing attention to the Spanish dependence on foreign energy sources, this fact negatively affects the country's efforts to reduce GHG emissions.

28 World Bank

29 Trading economics – http://www.tradingeconomics.com/spain/unemployment-rate

30 Following Eurostat's methodology

31 Source: http://ec.europa.eu. © European Union, 1995-2015

The development of a cross-border energy transport network is key, both if Spain wants to export its excess power and if it wants to play a key role as an energy bridge between North Africa and Europe.

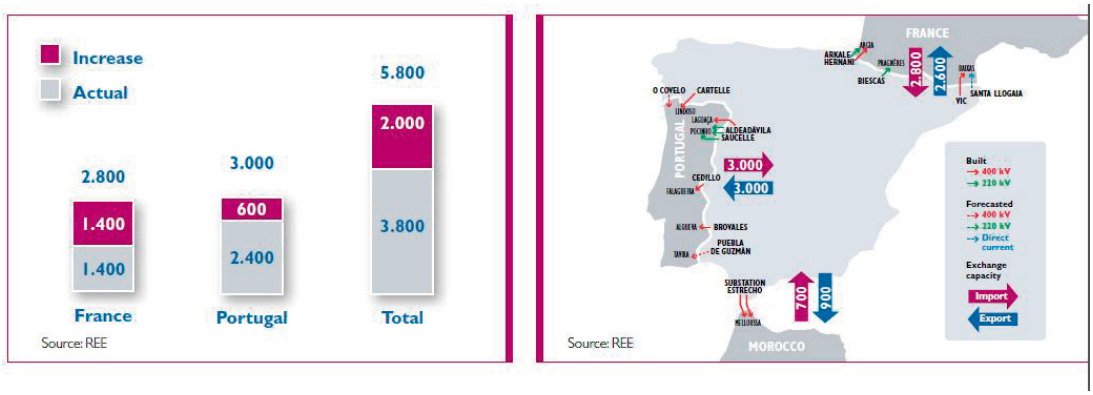
International energy trade

Spain also has an important role to play in reducing Europe's energy dependence. Efforts are needed to diversify supply options and this involves North African natural gas passing through Spain. Investments in gas transportation infrastructures (increasing flow capacity) may be very useful in the coming years.[32] Furthermore, Spain is the European leader in LNG storage (3 Mm3) and regasification (52 bcm/year) capacity, accounting for around 40% and 32% of Europe's total capacity respectively.[33] With an increase of interconnections in Europe, Spain should play a key role for the diversification of gas supplies.

Transmitting power to other countries could also be the focus of new investments, to take advantage of Spain's excess power generation capacity. Currently, the ratio between peak demand and available permanent capacity (not taking into account intermittent power sources) is 1.3-1.4 and Spain cannot export more than 1,400 MW to France, 2,400 MW to Portugal and 900 MW to Morocco. Power exchange capacity is expected to grow in the coming years, especially with France (2,800 MW forecasted for 2016 – see the following figure) but this is still a far cry from the minimum established by the EU (10,000 MW). Expanding interconnection capacity has been an historical challenge for Spain since France has been reluctant to expand its infrastructure in order to protect its nuclear industry from the competition posed by Spain's renewables.

An ambitious energy efficiency policy has to be implemented, lest the potential economic recovery make the recent reduction of energy consumption disappear.

Figure 16. Expected growth in interconnection capacity in Spain (Source: REE)



Energy efficiency

As mentioned earlier, the significant decrease in energy consumption was mainly driven by the economic crisis. In a scenario with an improved economic situation, both existing and future energy efficiency measures are unlikely to be sufficient for Spain to achieve its 2020 targets. Moreover, according to energy efficiency experts, the Spanish NEEAP "lacks a long-term vision until 2050."[34]

Renewable power generation

Spain has seen a strong progression of renewable penetration in its energy mix (the share of renewables in final energy consumption rose from 8.3% in 2004 to 14.3% in 2012). **The main reasons for this increase were the policies providing financial support for these sources.** The relatively good availability of solar and wind resources is also a factor that should not be forgotten. The Spanish case is a relevant example for other EU countries that will experiment with a high level of renewables penetration in the short and mid-terms.

32 SUSPLAN (2011) Development of regional and Pan-European guidelines for more efficient integration of renewable energy into future infrastructure – D5.2 Report on implementation strategies for technical and system solutions and recommendations for policy makers

33 Council of European Energy Regulators (2013) CEER Status Review and evaluation of access regimes at LNG terminals in the EU

34 Energy Efficiency Watch (2013) Energy efficiency in Europe – Assessment of energy efficiency action plans and policies in EU Member States – Spain Country Report

As already noted, the combination of declining energy demand and the fast increase of renewables in the energy mix, along with a badly designed feed-in tariff, has resulted in a € 30 billion tariff deficit for Spain. In 2008, this tariff deficit had already reached € 15 billion. In the last few years, in an attempt to deal with this deficit, the government introduced a series of regulatory changes, including retroactive actions (i.e. introduction of a 7% tax on all electricity sales – conventional and renewable; abolishment of the so-called "premium option," which allowed renewable power producers to sell their electricity directly into the market at premium prices; abolishment of feed-in tariffs that grant above-market rates for power from clean sources; cap for incentives). These changes have created uncertainty for existing and future projects, and investments have come to a complete standstill (-96% in the first quarter of 2013 compared to the first quarter of 2012).[25] These developments have even caused reputational damage for the renewable energy industry worldwide[35] and have been the subject of legal actions against the Spanish government from investment funds.[36] Moreover, the debt has been reflected in the electricity bills of consumers (around 8%, as mentioned in the 'Renewable energy target' section).

With an excess of power production capacity and budgetary capacity hindered by the economic crisis, Spain has to find new ways to promote renewable energy.

Today, **uncertainty remains high but there are still options for the development of renewable energies**. Producers should stop relying on unpredictable government decrees in the development of their business models. For instance, they can develop projects with off-take agreements signed with consumers willing to consume renewable power for sustainability reasons.

Similarly, if the power generation sector shows excess capacity, there is a potential for development of renewables in the transport sector since the share of biofuels is not very high and the dependency on fossil fuel imports is significant.

Future policy support for renewable energies should be carefully designed to prevent over-compensation and uncontrolled deployment.

Conclusion

Spain's pathway towards its 2020 targets has been masked by the country's economic situation and there is considerable uncertainty about the country's ability to reach these goals. There is little to no planning for the period beyond 2020. Spain would benefit from policies in the energy sector focusing on long-term sustainability rather than on short-term actions to mitigate the effects of the economic crisis.

Many questions remain unsolved. Major concerns still need to be addressed regarding the future of Spanish nuclear power plants, dependency on coal and electricity generation overcapacity, especially with regard to the low load factors of gas-fired power plants. This makes energy planning for the coming years key.

35 Bechberger M (2013) Pain in Spain: New retroactive changes hinder renewable energy. Renewable Energy World. http://www.renewableenergyworld.com/rea/news/article/2013/04/pain-in-spain-new-retroactive-changes-hinders-renewable-energy

36 Coats C (2014) Spain deals another blow to renewable power. Forbes. http://www.forbes.com/sites/christophercoats/2014/06/12/spain-deals-another-blow-to-renewable-power/

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