

ENERGY 2.9



At the end of 2011, the EU Commission launched the “Energy Road Map 2050”, a communication analysing the challenges of decarbonising the EU, while at the same time ensuring security of energy supply and competitiveness. This communication continues the EU's energy commitment, which at the end of 2010 targeted guaranteeing a sustainable energy supply and supporting economic growth over the next decade, setting objectives regarding the 20% reduction of primary energy consumption by 2020 (Strategy “Energy 2020”). Furthermore, the “Energy Efficiency Plan 2011” (March 2011) is considered a basic tool for the full realisation of these objectives and acknowledges that the greatest potential for energy savings is in buildings and transport.

In order to change to the energy system proposed, a series of conditions must be fulfilled. These include making the energy system and society as a whole more efficient in terms of how they use energy and increasing the development of renewable energies.

Despite having energy characteristics in common with the EU, there is a much greater presence of oil and its derivatives in Spain's primary energy consumption than the average for Europe and Spain is highly dependent on foreign suppliers. Domestic energy production in Spain mainly comprises renewable energy sources,



nuclear power and a small contribution from national coal. Spain's level of self-sufficiency in energy production (ratio between domestic production and total energy consumption) is low and stood at 26.1% (in Ktep) in 2010, up slightly on the figure recorded in 2009 (22.9%).

The National Renewable Energy Action Plan (PANER) covers the period 2011-2020 and constitutes the strategic framework to boost and develop renewable energy in Spain.

KEY MESSAGES

Spain reduces its primary energy intensity and approaches EU levels: Spain consumes less energy to produce one unit of economic growth. This decrease is clearly visible between 2004 and 2009. However, provisional data for 2010 predict a slight increase.

Energy-related GHG emissions intensity continues to decrease; these emissions were 44.2% less in 2009 than in 1990.

Primary energy from renewable sources is increasing. The contribution of renewable energy sources to power generation in Spain is one of the largest in the UE-27. In 2010, this source accounted for 32.4% of total consumption of electricity.

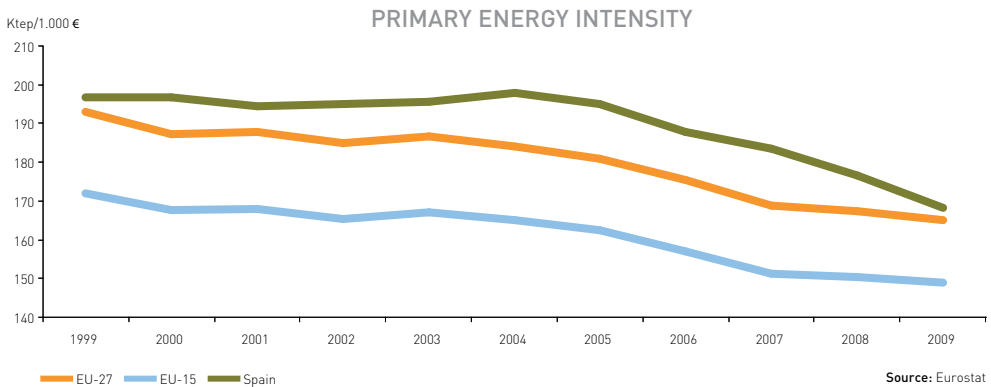
Since 2007, economic growth, affected by the financial crisis, appears to have delinked from the primary energy consumption and, above all, GHG emissions from the production of energy, marked by a sharp decline of more than 40% in recent years.

INDICATORS

- Primary energy intensity
- Energy-related GHG emissions intensity
- Renewable energy
- Eco-efficiency in energy

Primary energy intensity

Spain's energy efficiency continues to improve and approaches EU-27 levels



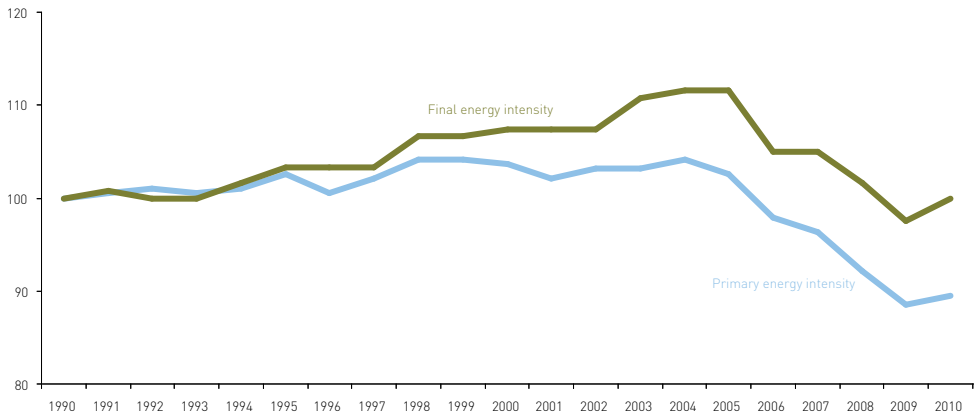
Primary energy intensity in Spain (which measures energy efficiency by relating primary energy consumption to economic growth) has remained above the average for the European Union in recent years. However, it reached 168.14 ktep/1,000 € in 2009, very close to the 165.2 ktep/1000 € recorded by the EU-27 that same year. Only ten of the EU-27 countries registered lower primary energy intensity than Spain in 2009.

Energy intensity has decreased 15% since 2004, which shows an improvement in the efficiency of energy consumption that is bringing Spain's figures in line with those of the UE-27, where a decrease of 10.2% (and 9.9% in the EU-15) was recorded. This reduction was due, among other things, to technological improvements that increased energy efficiency on the one hand, and the downturn in industrial production as a result of the economic crisis on the other. Both factors have contributed to reducing energy consumption.

In 2009, primary energy intensity decreased by almost 5% in Spain and by slightly more than 1% in the EU-27.

The progress made by the Institute for the Diversification of Energy (IDAE) reveals, on the basis of provisional data, a change in the trend of recent years. Primary energy intensity is forecast to rise by 1.36% in 2010 and final energy intensity by 2.45% in regard to data for 2009.

ENERGY INTENSITY IN SPAIN (Data for 2010 are provisional)



Source: IDAE, MINETUR

SOURCES

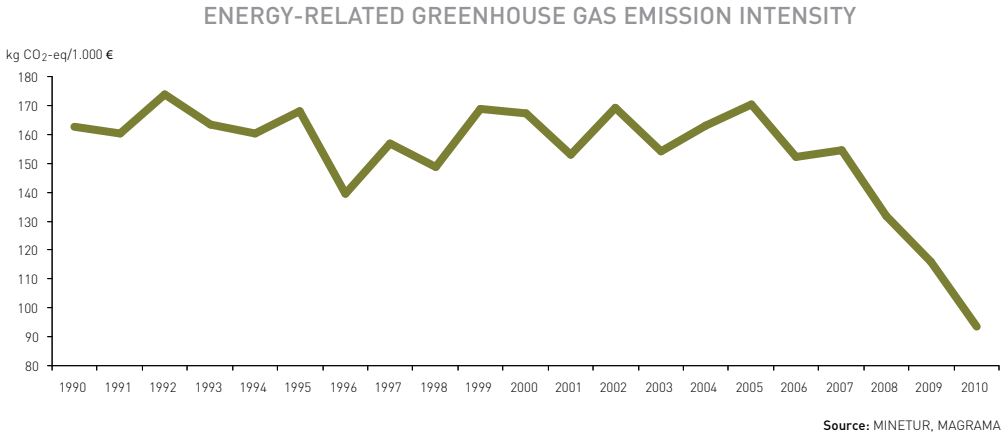
- EUROSTAT, 2011. Web page consultation. Eurostat/Statistics/Statistics by theme/Energy/Database/Main indicators.
- Ministry of Industry, Energy and Tourism, 2011. Energy in Spain 2010.
- Institute for the Diversification of Energy. Energy News Bulletins and Energy Reports

FURTHER INFORMATION

- <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>
- <http://www.minetur.es>
- <http://www.idae.es>

Energy-related GHG emissions intensity

The intensity of energy-related GHG emissions fell by 19.2% in 2010, continuing the marked downward trend that began in 2008



The 19.2% decrease in 2010 can be highlighted as the largest in GHG emission intensity. This figure even surpasses the reductions recorded in previous years, which in the case of 2008 and 2009 were significant.

The trend of the annual ratio between the emissions of greenhouse gases (expressed as CO₂ equivalent) into the atmosphere by the energy industry and Gross Domestic Product at constant prices has been largely irregular, registering ups and downs influenced to a great extent by hydroelectric power generation. The influence of yearly rainfall in electricity generation plays a prominent role in this trend. In this sense, 1996, 2001, 2003 and 2006 can be highlighted as lows and 1995, 2002 and 2005 as highs.

However, a decrease has been observed in this ratio since 2005 that has only been interrupted by a slight increase in 2007. Between 2005 and 2010, intensity has decreased by 45%.

Over the period 1990-2010, energy-related GHG emissions intensity decreased by 42.4%. This change has been largely due to the marked 62% increase in Spain's GDP in recent years (although it decreased in the last few years and even displayed negative variations in 2009 and 2010). The 6.8% decrease in emissions observed at the end of the period also favoured and influenced the final distribution of intensity.

Thermal power stations play a highly important role in the final result of these emissions. In reference to these power stations, three distinct periods can be observed: The period dating from 1990 to 1998, which was relatively stable with moderate growth; the 1998-2007 period with a significant growth rate in line with the electrical energy requirements of economic growth; and the 2007-2010 period in which there is a sharp drop in emissions as a result of the change in the fuel mix in electricity generation in thermal power stations with a very significant decrease in the use of coal.

The reduction in 2008-2010 was caused by the change in the sources of energy used to generate electricity and the marked relative decline in the energy produced by conventional coal-run power stations, accompanied by a decrease in the use of fossil fuels to generate electricity between 2009 and 2010.

NOTES

- For the purpose of calculating this indicator, CO₂-equivalent emissions refer to total emissions from combustion in the energy-sector industries included under the Energy heading (as per the IPCC categories) and comprise the six greenhouse gases expressed as CO₂-equivalent. The Energy category includes combustion processes, among them electricity generation, combustion at refineries and transformation of combustible fuels, as well as combustion in mining. The emissions considered are those in the "1.A.1. Group of Energy Industries" according to the CRF classification, which includes thermal power stations, oil refineries and fuel transformation.
- The six main greenhouse gases covered by the Kyoto Protocol are, in order of importance, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and fluorinated gases, which include perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆), although the latter have no impact in the energy sector as they are only emitted in industrial processes.

SOURCES

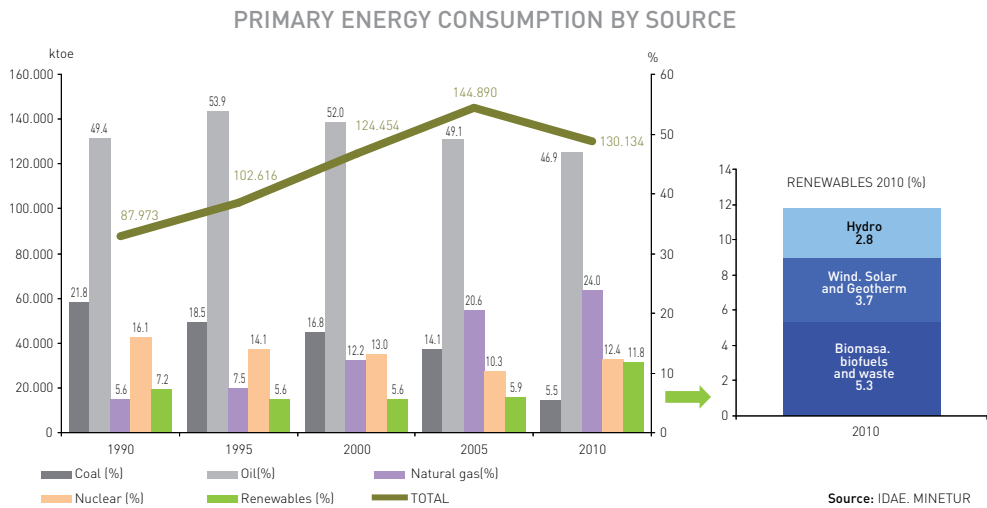
- Emissions Data: Ministry of Agriculture, Food and Environment, 2012. Inventory of Greenhouse Gases in Spain. Issue 2012 (1990-2010 series). Summary of results. Directorate-General for Environmental Quality and Assessment and the Natural Environment.
- GDP data: Ministry of Industry, Energy and Tourism, 2011. Energy in Spain 2010.

FURTHER INFORMATION

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- <http://www.idae.es>

Renewable energy

In 2010, renewable energy sources accounted for 11.8% of the primary energy consumed



Primary energy consumption in Spain displays a significantly upward trend, increasing by 47.9% between 1990 and 2010 and reaching a total of 130,133.6 ktep. However, a change has occurred since 2005, with a decrease of 10.2% recorded between that year and 2010.

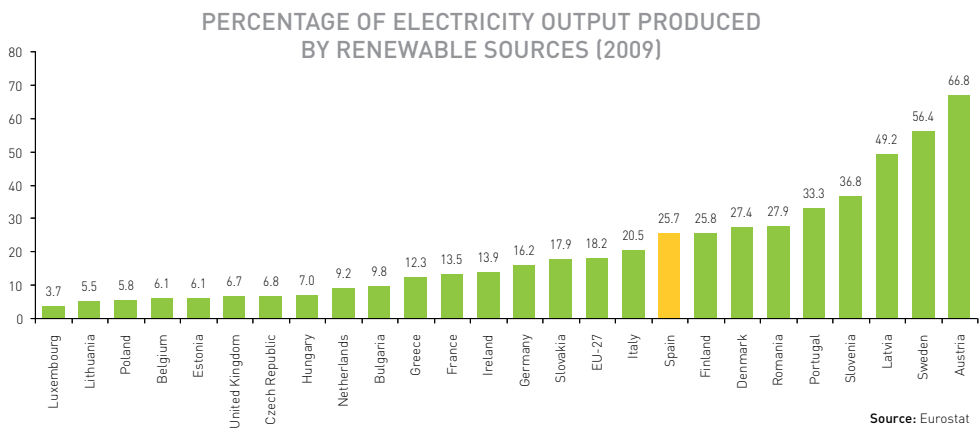
Analysis of the primary energy sources reveals a change in the "energy mix" with renewable sources becoming increasingly important. Coal displays a significant reduction in use, from slightly more than 20% in 1990 to only by 5.5% in 2010. Nuclear energy also registers a decrease from 16% in 1990 to 12.4% in 2010. Oil remains relatively stable, contributing between 40% and 50% of energy. Only natural gas has increased its share, which stood at 24% in 2010 compared to 5.6% in 1990.

As mentioned previously, considerable development has taken place in renewable energy in recent years, with an increase of 145.3% between 1990 and 2010. Its contribution to primary energy consumption, despite rising steadily, was 11.8% in 2010. It is true that this contribution has risen by 79% since 2005, the 16.4% increase in 2009 and above all the 21.43% upturn in 2010 figuring prominently. As regards the last year of the period, it is worth highlighting the role of biomass, biofuels and waste, which almost generated 6,895 ktep (5.3% of primary energy consumed). This was also the case of the group comprising wind, solar and geothermal power,

which produced 4,834 ktep (3.7% of total primary energy consumed). Hydroelectric power stations produced slightly less in 2010 (3,636 ktep and 2.8%). All these energy sources recorded increases in production over time, except in the case of hydroelectric power stations, as their dependence on yearly rainfall influences their characteristic annual fluctuations.

The amount of electricity generated by renewable sources continues to rise in Spain. Renewable sources accounted for 32.4% of total consumption in 2010, surpassing the figure recorded in 2009 (25%) and exceeding the contribution made by the rest of the sources.

Spain holds a stand-out position in the UE-27 in terms of the proportion of electricity output produced by renewable sources and is only surpassed by eight countries. In 2009, 25.7% of the electricity generated came from a renewable source. This figure is higher than in 2009 and also above the average for the EU-27, which stood at 18.2%.



NOTES

- The sources included as renewable are: biomass, biofuels, urban waste, wind, solar, geothermal and hydroelectric.

SOURCES

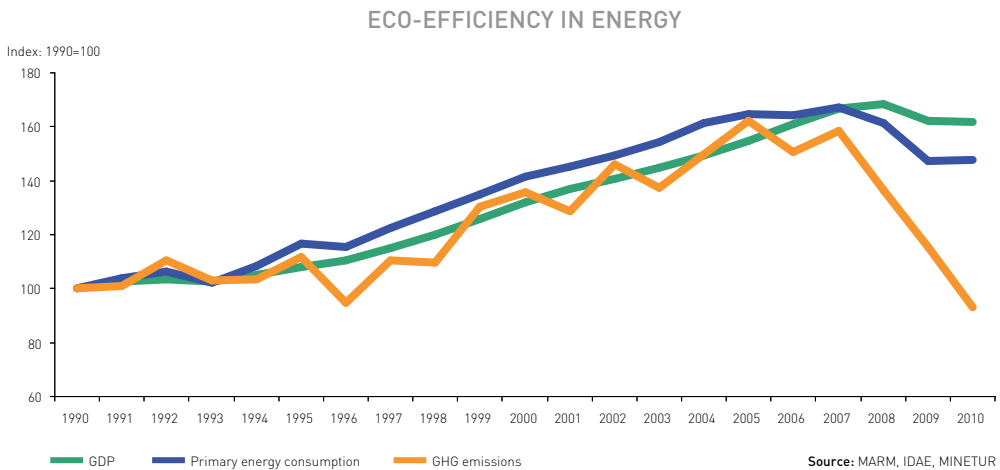
- IDAE, 2012. "Energy news bulletin. Fourth quarter of 2011." Web page consultation.
- Eurostat Statistics. Database by subject/Environment and energy/ Energy/Main indicators- Energy statistics/Energy Statistics - Structural Indicators in energy - annual data / Electricity generated from renewable sources.

FURTHER INFORMATION

- <http://www.idae.es>
- <http://www.minetur.es>
- <http://epp.eurostat.ec.europa.eu>

Eco-efficiency in energy

GHG emissions stemming from primary energy generation have decreased by more than 40% in recent years



Growth in greenhouse gas emissions in the energy sector and primary energy consumption has been very similar, as might be expected given the relationship between both variables. In turn, the trend in gross domestic product (at constant 2000 prices) is also linked quite closely to these two variables, at least until 2005, which appears to be the start of two different trends: on the one hand, the marked reduction in greenhouse gas emissions, which fell from 126,019 kt CO₂-eq in 2005 to 71,418 kt CO₂-eq in 2010, a decrease of 42.5% and the relative decline in the consumption of primary energy, which fell by 10.2% (from 144,890 ktep to 130,134 ktep) in the same period. Meanwhile, GDP at constant prices continued to grow until 2008, contracting by 3.7% in 2009 and by 0.1% in 2010.

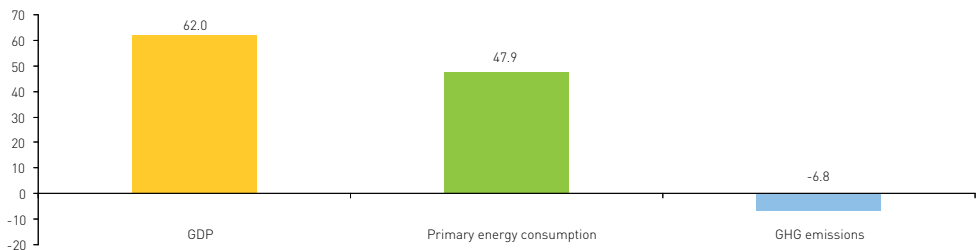
Therefore, between 2005 and 2007 economic growth, primary energy consumption and, above all, energy-related GHG emissions began to decouple. While economic growth clearly reflected the impact of the financial crisis from 2008 onwards, primary energy consumption decreased in 2008 and 2009 before increasing slightly in 2010, while energy-related GHG emissions have registered a drastic decline of more than 40% in recent times (41.2% between 2007 and 2010).

Overall, GDP grew by 62% between 1990 and 2010 outpacing primary energy consumption, which rose by 47.9%, while greenhouse gas emissions not only did not

grow, but actually decreased by 6.75% after a few years of growth, with annual variations, up to 2005.

If, in order to analyse this efficiency, we also considered growth in the consumption of primary energy produced by renewable sources, it is apparent that over the period as a whole (1990-2010), this energy source has increased by 145.3%. One of the most significant increases (approximately 21.4%) was recorded in the final year of this period.

ECO-EFFICIENCY IN ENERGY. CHANGES BETWEEN 1990-2010 (%)



Source: MAGRAMA, MINETUR, IDAE

NOTES

- The Greenhouse Gas Emissions considered to calculate the indicator refer to total emissions of fuel combustion activities performed by the energy industries included in the energy transformation category (IPCC) and caused by the six GHG covered by the Kyoto Protocol, expressed as CO₂ equivalent. The emissions considered correspond to "1.A.1 group of energy industries in the CRF nomenclature", which includes thermal power stations, oil refineries and fuel processing.

SOURCES

- Emissions Data: Ministry of Agriculture, Food and Environment, 2012. Inventory of Greenhouse Gases in Spain. 2012 issue (1990-2010 series). Summary of results. Directorate-General for Environmental Quality and Assessment and the Natural Environment.
- GDP data: Ministry of Industry, Energy and Tourism, 2011. Energy in Spain 2010.
- Data on primary energy consumption: IDAE, 2012. "Energy news bulletin. Fourth quarter of 2011." Web page consultation.

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