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**Fighting climate change:
Human solidarity in a divided world**

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OCCASIONAL PAPER

Spain Country Study

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EXECUTIVE SUMMARY

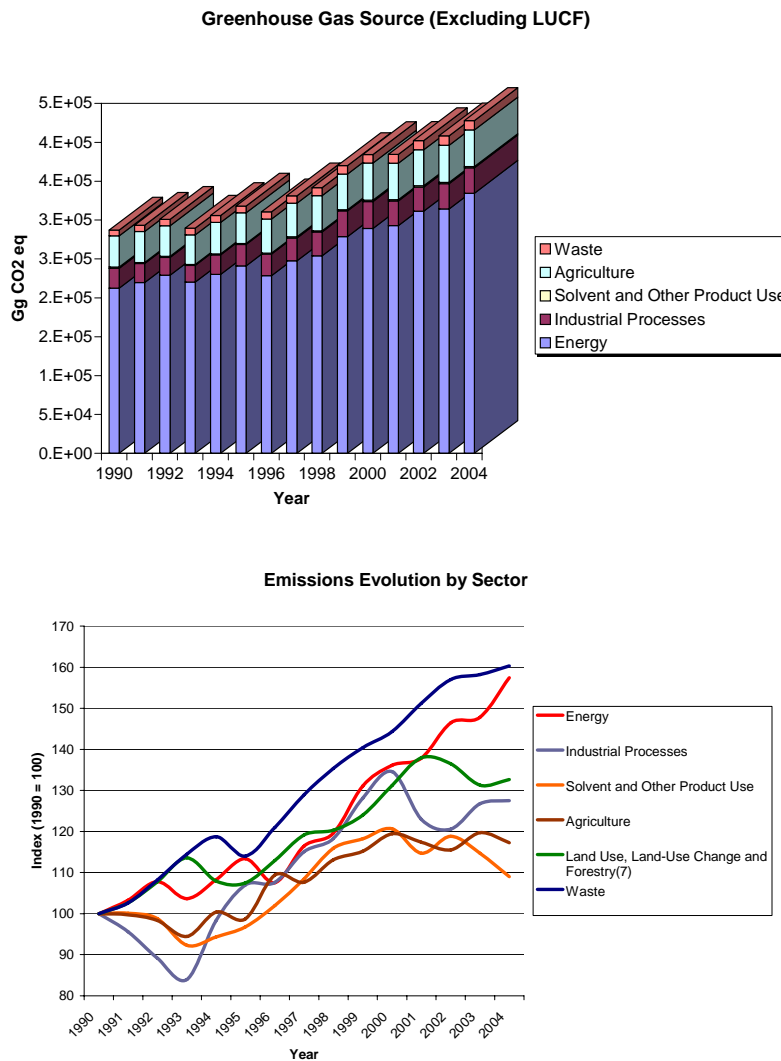
Spain's rapid economic growth over the last ten years has contributed to an increase in greenhouse gas emissions to a level already considerably above the 15% target established within the EU Burden Sharing Agreement, under Article 4 of the Kyoto Protocol. The main issue for Spain is how to reduce Greenhouse Gas emissions (and therefore meet its international commitments) without imposing an excessive burden on the economy.

Given the significance of energy-related activities in producing these emissions, the focus of most emission reduction efforts should be optimization of energy consumption. However, the outlook for meeting the Kyoto commitments is not optimistic. According to the National Allocation Plan, issued in November 2006, emissions by 2012 would increase by 50% even with the already implemented measures undertaken by Spain's government. Therefore, despite the adopted policies aimed to reduce GHG emissions in Spain, evidence and projections show the necessity of more and more effective measures not only to achieve Kyoto targets, but to face more aggressive emission reduction commitments in Post Kyoto scheme.

I. Greenhouse Gas Emissions Overview in Spain

Greenhouse Gas (GHG) emissions in Spain grew 50.4% from 1990 to 2004¹. Carbon dioxide accounts for more than 80% of GHG emissions being energy sector the responsible for nearly 80% of such emissions. However, as shown in Figure 1, all sectors have increased their emissions since 1990 despite the measures Spain government has implemented¹.

Figure 1.- Evolution of Greenhouse Gas Emissions in Spain by Sector



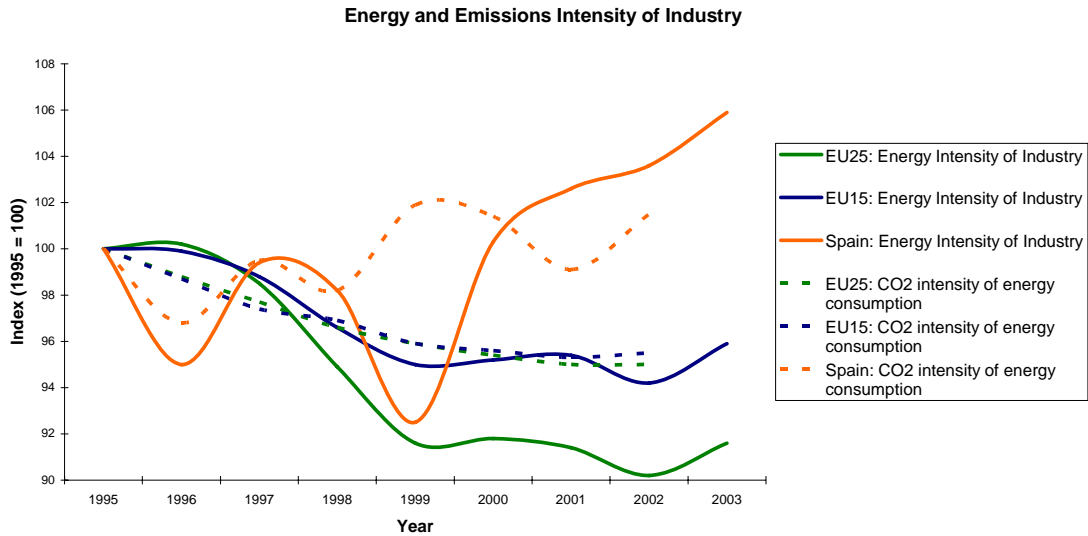
Source: Authors' elaboration based on UNFCCC data, 2007

Of the total amount of emissions associated with the energy sector, 37% of them are generated by energy industries (public electricity and heat production accounting for 88% of this sub sector), followed by 30% generated by transport sector. 90% of the transport sector emissions come from road transportation mode.

¹ Including emissions effect from Land Use, Land-Use Change and Forestry

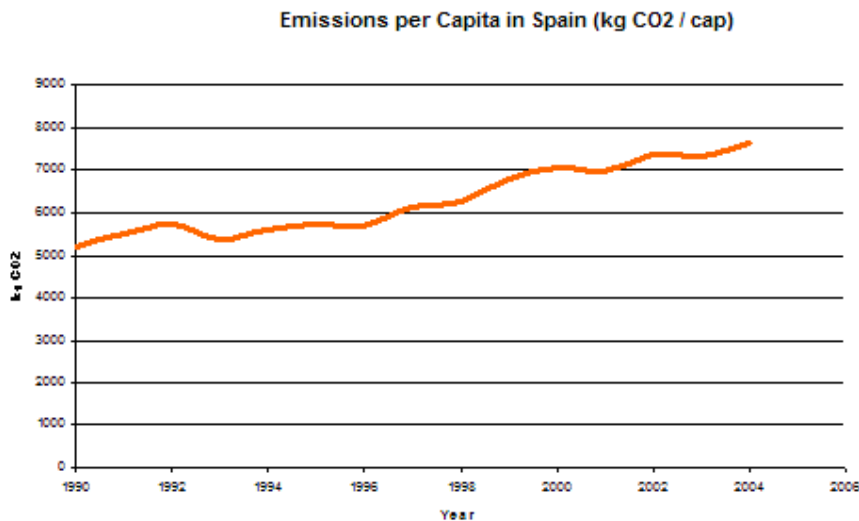
According to last data available from the Statistical Office of the European Communities (Eurostat²), after year 2000, Spain has shown an increasing trend in the following two indexes: Energy Intensity of Industry (EII) and CO₂ Intensity of Energy Consumption (IEC). The first refers to the amount of energy that is required to produce an economic output, and the latter to the associated emissions. As shown in Figure 2, in the period analyzed Spain was below European Community as a block in terms of industry efficiency. Additionally, Spain has experienced a steady increase in CO₂ emissions per capita (Figure 3).

Figure 2.- Energy and Emissions Intensity of Industry in Spain



Source: Authors' elaboration based on Eurostat data, 2007

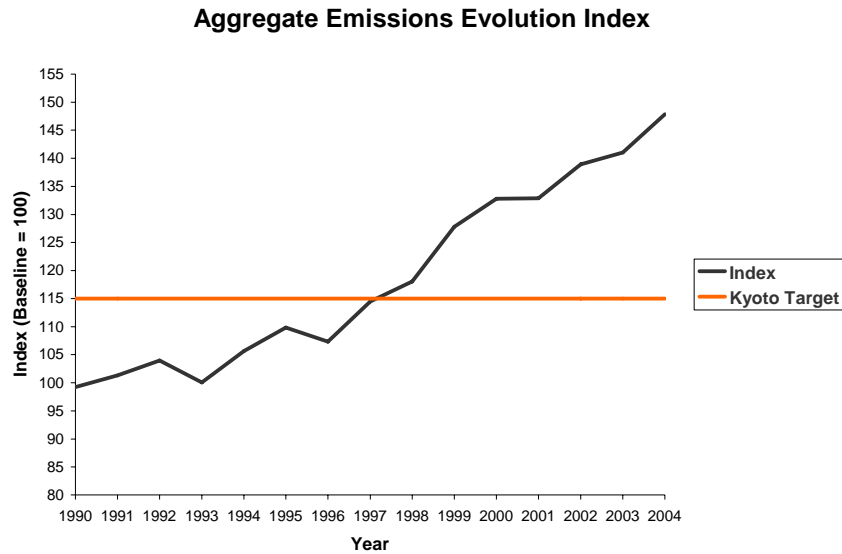
Figure 3.- Trend of emissions per capita in Spain



Source: Authors' elaboration based on Eurostat data, 2007

Regarding future emissions, it is unlikely that Spain will achieve the Kyoto target with domestic measures³. Kyoto target allows Spain to increase GHG emissions by no more than 15% compared to baseline emissions. As shown in Figure 4, by 2004 Spain had already increased its emissions by almost 48% and the trend had been unequivocally increasing.

Figure 4.- Evolution of GHG Emissions Level in Spain

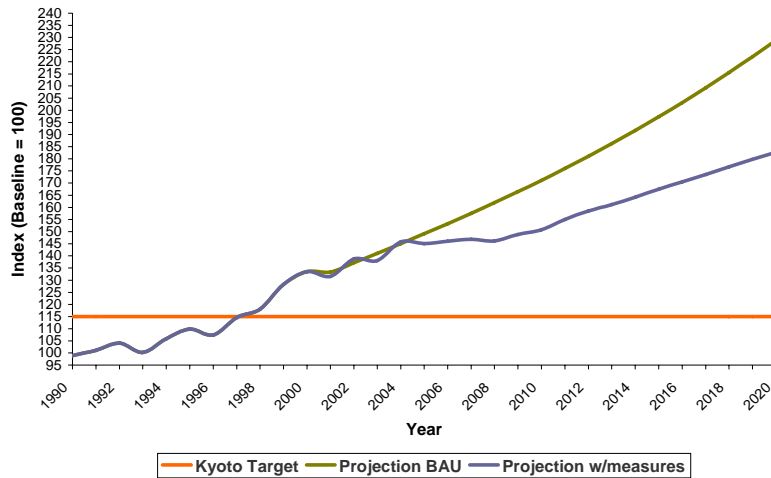


Source: Authors' elaboration based on UNFCCC data, 2007

In the Fourth National Communication Report submitted to UNFCCC, Spain developed projections of GHG emissions up to year 2020 showing an increasing trend of emissions attributed mainly to economic and population growth (Figure 4). According to these projections, by 2020 Spain would have increased its emissions by 83% compared to Kyoto baseline. However such projections do not consider more recently adopted measures such as the National Allocation Plan aimed to stabilizing GHG emissions at 37%⁴ over Kyoto baseline by 2008-2012.

Figure 5.- Spain Emission Projections to 2020

Aggregate Emissions Index Projection

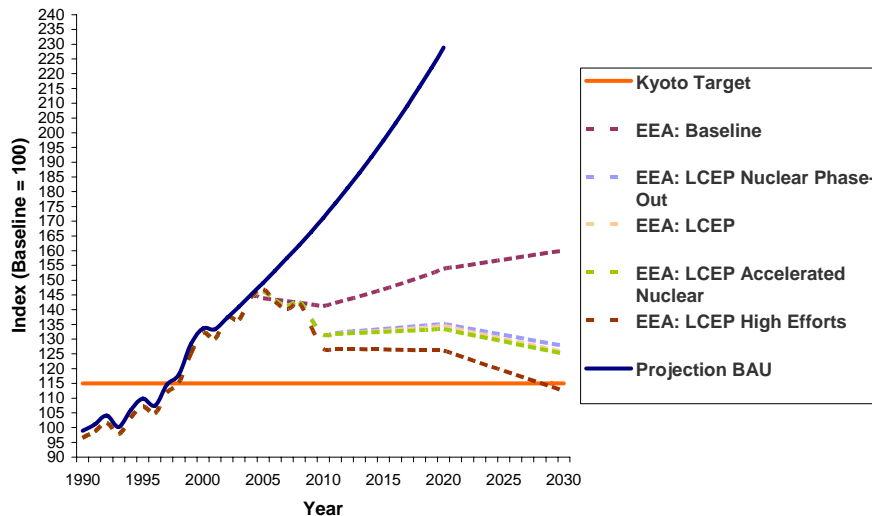


Source: Authors' elaboration based on UNFCCC data, 2007

Finally, the European Environmental Agency⁵ (EEA) developed some projections (Figure 5) for EU member states under different scenarios. These scenarios include a series of policies ranging from mainly energy efficiency improvements in a Low Carbon Emissions Pathway (LCEP) to an increased share in Renewables (LCEP High Efforts). The projections include variations of nuclear power policies ranging from phase-out policies (LCEP Nuclear Phase-Out) to an accelerated investment in nuclear power stations after 2015 (LCEP Accelerated Nuclear). However, despite being a valuable document to assess the impact of different energy policies, the baseline shown differs by far with the Business-As-Usual (BAU) scenario presented by Spain in its National Communication making emission projections included in the EEA report questionable.

Figure 6.- EEA Emission Projections of Spain to 2030

Aggregate Emissions Index Projection



Source: Authors' elaboration based on EEA Projections, 2006

II. Carbon target-setting and Policy Framework in Spain

In September 2004, Spain government enacted a Decree Law (1866/2004⁶) enabling the National Allocation Plan 2005 – 2007. According to this decree, Spain GHG emissions for the period 2008-2012 should not exceed 24% the emissions considered for Kyoto baseline. In this first document, the percentage of emission reductions to be obtained by a flexible mechanism should not exceed 7%.

However, in November 2006, Spain government issued a new Decree Law (1370/2006⁷) containing the rules for the National Allocation Plan (NAP) 2008-2012. In this new document the target for the period 2008-2012 changed from 24% to 37% compared to Kyoto baseline. The amount of emissions to be accredited using flexible mechanisms increased from 7% to 20%.

It is important to mention that the purchase of emission reduction credits in the international market is considered as an acceptable option as long as it is compatible with economic and budgetary stability of the country.

According to this document, in the Business-As-Usual scenario 2008-2012, emissions would reach a 75% increase compared to the baseline scenario. With the measures and policies adopted, the increment would reduce to 50%. To achieve the 37% increase target, additional policies and measures are to be implemented by Spanish government especially in the residential and transport sectors (where emissions are expected to increase by 65% compared to baseline emissions level).

In these two particular sectors more measures are required. In the case of residential sector (discussed in detail below) a new Technical Code of Buildings came into force in 2006, and is expected to have significant emission reductions in new and existing buildings. This is indisputably a good first step; however, additional measures are required to increase energy efficiency in existing dwellings.

III. Role of the Government

Spain ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1993, and the Kyoto Protocol in 2002. Even before the ratification of the UNFCCC, and understanding the need to promote and develop research that could bring light on what the implications and possible environmental, social and economic impacts climate change could have on the country, a series of efforts made by the government started with the creation of the National Climate Commission (Comisión Nacional del Clima) in 1992. Since then, a series of changes in the structure of the Commission took place to eventually give way to what now is the General Secretariat for Pollution Prevention and Climate Change⁸. Under the Secretariat, the Spanish Council for Climate Change works as the main body that coordinates, among the different existing agencies², the general policies to address climate change.

Although the government has not spared resources and has been able to build a solid coordinated structure to address the myriad of topics climate change covers, it has been criticized for its lack of commitment as it has been said recently that Spain will not

² The agencies that work under the Spanish Council for Climate Change are: The National Weather Council, The Coordinating Council for Climate Change Policies and the Inter-Institutional Group for Climate Change.

be able to comply with its Kyoto targets. Conversely, the recently approved and published Climate Change Strategy⁹ recognizes, firstly, Spain's green house gases increase trend, and secondly, the need to establish additional measures in order to comply with its reduction commitments.

A factor that is important to point out is the role that other levels of government play, particularly in the Autonomous Communities and to a lesser extent in local entities, given their serious competences in important matters relevant to the federal efforts to mitigate Climate Change. One example of this is the administrative procedures required at the local, regional and federal level in order to install a new wind farm. An effort to streamline the administrative process will certainly remove institutional barriers to the promotion of wind farms and will contribute to meeting the target of renewable energies set by the federal government.

Finally, it is necessary to recognise the unquestionable effort that the Spanish government has made in designing a number of policies aimed at reducing greenhouse gas emissions and promoting energy efficiency (i.e. Strategy for Energy Saving and Efficiency in Spain 2004-2012; Technical Code for Buildings; etc.). Nonetheless, more and more aggressive measures are required in order to develop 1) the adequate infrastructure and 2) awareness among society in order to facilitate the transition to a low-carbon economy.

IV. Prescriptions

The geographic location of Spain within Europe gives it a comparative natural advantage in wind and solar resources. Not surprisingly, Spain is second in Europe in installed capacity of photovoltaic and wind power (only behind Germany).^{10 11} However, the difference in installed capacity between Spain and Germany in both technologies, suggests that more aggressive policies should be pursued in Spain to realise its natural potential. This along with other policies aimed at promoting energy efficiency and conservation and reducing the emissions associated with the transport sector.

One of the main barriers to wind energy is the administrative bureaucracy required to install wind farms (over 60 different regulations involving 40 different procedures causing lead times of 4 to 8 years¹²). A streamlining of these procedures is much needed. Also, a better access to the grid infrastructure and an adequate feed-in tariff that balances the access of renewables to the grid with protection of the grid security is required.

In the case of photovoltaic (PV) energy, special efforts should be made to decrease investment risks and payback periods¹³ and also to make more efficient the granting of investment subsidies¹⁴. A critical aspect of photovoltaic energy promotion is the qualification of installers which plays an important role in the public perception of the technology. For this reason, it is very important to develop the proper infrastructure (i.e. training) to make effective the Royal Decree 1633/2000 that requires PV installers to be qualified. These two prescriptions related to PV energy are particularly important given the boom of the construction sector and the adoption of the Technical Code of Buildings (See Case Study below).

Equally important is the promotion of efficiency measures in the industrial sectors. Particular attention should be paid to those industrial sectors that are highly CO₂ intensive and are related to the growing construction sector (i.e. cement). Although many companies have reduced their energy intensity (and presumably their GHG

emissions) efforts should be continued to promote the adoption of energy efficient equipment in these (and others) industrial sectors¹⁵.

Finally, and perhaps the most critical and needed policies in Spain, are those aimed at promoting energy conservation and behavioural change within the population. The relevance of these policies relies on the fact that Spanish economy and population have grown rapidly in recent years and will continue to grow in the coming years. The Spanish government has approved the Action Plan for the Spanish Strategy on Energy Efficiency 2005-2007 and the Renewable Energy Plan 2005-2010 however beyond the approval of such plans their effective implementation remains of extreme importance. In the case of the residential sector, more policies are required to promote an effective change, especially legislative-normative, legislative-informative and informative-educative policies where Spain ranks lower than other European (EU15) members¹⁶.

In contrast, in the transport sector, Spain has relatively good informative-educative measures (i.e. efficient-driving programs) but lacks of other fiscal and legislative measures. Besides, more efforts are particularly required in the development of adequate infrastructure that facilitates and encourages the use of public transport.

CASE STUDY: CONSTRUCTION SECTOR

Among Annex I countries, Spain has experienced the second largest increase in GHG emissions since 1990.¹⁷ These emission trends largely reflect the overall improved socio-economic situation in Spain during the 1990s which was characterized by strong economic growth, a construction boom (150,000 new buildings every year), an increase in the size of houses, an increase in the overall use of domestic electrical appliances, the introduction of domestic central heating systems, and the resulting continuously increasing demand for electricity consumption, including significant additional energy demands resulting from tourism.

The main measures in the residential, commercial and institutional sectors are related to the normative preparation and regulation process to obtain more efficiency and energetic savings in new and existing buildings. Among those rules it has to be emphasized those linked with the 2002/91/CE Directive about energetic efficiency of buildings, with are specified in the Technical Code of Buildings (Código Técnico de la Edificación), the overhaul of the Regulation for Thermal Installations of Buildings (Reglamento de Instalaciones Térmicas de los Edificios), and the Energetic Certification of Buildings (Certificación Energética de Edificios). The Action Plan 2005-2007 of the Energy Efficiency Strategy for Spain sets measures to reduce the energetic costs, focusing in three sub sectors: construction, public services, and residential and IT equipment. These measures promote the increase of the energetic efficiency of buildings, particularly those of new construction, as well as the public lighting, installations for water cleaning processing and a plan for the updating of electrical appliances stimulating the use of efficient equipment in new buildings and in the public administration.

The Technical Code of Buildings establishes three strategic measures:

1. Renovation of thermal envelope of existing buildings and limiting energy demand for new buildings.
2. Improvement of energetic efficiency of existing heating, lighting and air – conditioning systems.
3. Use of PV solar energy to produce electricity.

The implementation of such measures may result in up to a 40% saving for each building and a CO₂ emission reduction of up to 55%¹⁸.

The energetic labelling of buildings is also part of the 2002/91/CE directive. Such initiative enables users to know the energetic performance and characteristics of new built buildings. Such information aims to set a market and add value to those buildings with high energetic efficiency and, thus, promote investments in energy saving during the construction process.

References

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- ¹ Ministerio de Medio Ambiente. (2006). Inventario Nacional de Emisiones. Madrid: España. Madrid: España.
- ² Statistical Office of the European Communities Data Retrieved January 25th, 2007, from <http://epp.eurostat.ec.europa.eu/>
- ³ European Environmental Agency. (2006). Greenhouse gas emission trends and projections in Europe 2006. Copenhagen: Office for Official Publications of the European Communities.
- ⁴ Ministerio de la Presidencia. (2006). REAL DECRETO 1370/2006, de 24 de noviembre, por el que se aprueba el Plan Nacional de Asignación de derechos de emisión de gases de efecto invernadero, 2008-2012. Madrid: España.
- ⁵ European Environmental Agency. (2005). Climate change and a European low-carbon energy system. Copenhagen: Office for Official Publications of the European Communities.
- ⁶ Ministerio de la Presidencia. (2006). REAL DECRETO 1866/2004, de 6 de septiembre, por el que se aprueba el Plan nacional de asignación de derechos de emisión, 2005-2007. Madrid: España.
- ⁷ Ministerio de la Presidencia. (2006). REAL DECRETO 1370/2006, de 24 de noviembre, por el que se aprueba el Plan Nacional de Asignación de derechos de emisión de gases de efecto invernadero, 2008-2012. Madrid: España.
- ⁸ Spanish Ministry of the Environment, http://www.mma.es/portal/secciones/el_ministerio/estructura/organigrama/seg2_cam_clim.htm. Retrieved February 20, 2007
- ⁹ Spanish Strategy for Climate Change and Clean Energy 2007
- ¹⁰ Photovoltaic Energy Barometer, Systemes Solaires No 178, April 2007
- ¹¹ Wind Energy Barometer, Systemes Solaires No 177, February 2007
- ¹² Del Rio P. and Unruh Gregory (2005) Overcoming the lock-out of renewable energy technologies in Spain: The cases of wind and solar electricity. Renewable and Sustainable Energy Reviews 11 (2007) 1498–1513.
- ¹³ Del Rio P. and Unruh G. (2005) Overcoming the lock-out of renewable energy technologies in Spain: The cases of wind and solar electricity, Renewable and Sustainable Energy Reviews 11 (2007) 1498–1513.
- ¹⁴ Del Rio P. and Gual M. A. (2007). An integrated assessment of the feed-in tariff system in Spain. Energy Policy 35 (2007) 994-1012.
- ¹⁵ Tarancon M. A. and Del Rio P. (2007). CO2 emissions and intersectoral linkages. The case of Spain. Energy Policy 35 (2007) 1100-1116.

¹⁶ Mure-Odysee (2006). Energy Efficiency Policies and Measures in Spain 2006. Madrid, 2006

¹⁷ Organisation for Economic Co-operation and Development. (2004). Environmental Performance Reviews: Spain. Paris: France.

¹⁸ Nieto. J. and Santamaría J. (2006). Evolución de los gases de efecto invernadero en España 1990-2005. Confederación Sindical de Comisiones Obreras, Departamento de Medio Ambiente: España.