

SPAIN

Country at a glance

- Population: 46.1 million (2010) [1]
- Total area: 505,370 sq. km [2]
- Carbon emissions per capita: 5.82 metric tons (2010) [3]
- Energy consumption per capita: 32.2 MWh (2010) [4]
- Percentage of global carbon emissions: 0.89% (2010) [3]



Wind farm in Tarifa, Andalusia, Southern Spain

These wind turbines are supported on open steel girder pylon towers. Usually wind turbine towers are reinforced concrete circular posts. The steel girder pylon design is stronger and enables higher towers to place the turbines higher up into the faster and steadier air stream.

Wind Farm by Coda. Permission under CC BY-NC-SA 2.0 farm1.staticflickr.com/1/564651_e1c4a55381_m.jpg

Table 1 Breakdown of energy use, electricity and heat generation, 2010

	Primary energy sourced within country		Energy imports minus exports	Primary energy used within the country ^(a)			Electricity Generation ^(b)		Heat Generation ^(c)		
	unit	ktoe		%	ktoe	GWh	%	GWh	%	GWh	%
Coal, including brown coal & peat		3,034	9	6,732	7,675	89,265	6	26,323	9	0	0
Oil fuels		125	0	69,466	58,162	676,421	45	16,562	6	0	0
Natural gas		51	0	30,941	31,179	362,611	24	96,618	32	0	0
Nuclear		16,155	47	0	16,155	187,882	13	61,990	21	0	0
Hydroelectric		3,636	11	0	3,636	42,286	3	42,278	14	0	0
Biofuels and waste		6,403	19	421	6,815	79,264	5	4,676	2	0	0
Solar photovoltaics		552	2	0	552	6,414	0	6,413	2	0	0
Solar thermal		468	1	0	468	5,443	0	692	0	0	0
Tide, wave and ocean		0	0	0	0	0	0	0	0	0	0
Wind		3,798	11	0	3,798	44,173	3	44,165	15	0	0
Geothermal		16	0	0	16	186	0	0	0	0	0
Electricity (imported)		0	0	-717	0	0	0	0	0	0	0
Sub total Renewables		14,872	43	421	31,440	177,765	12	98,224	33	0	0
Totals		34,238	100	106,843	128,456	1,493,944	100	299,717	100	0	0

Source: Based on World Energy Statistics and Balances Database 2012, "World Energy Balances." © OECD/IEA, 2012.

Notes:

Standard conversion used is 1 ktoe = 11.63 GWh

(a) Sum of energy sourced within country, energy imports minus exports, international marine and aviation bunkers and stock change flows.

(b) Includes all electricity generation, including any exported.

(c) Does not include electrical heating. Includes waste heat recovery from electricity generation plants.

Table 2 Breakdown of transport fuel use, 2010

	Total transport mix	%	Domestic aviation	Road	%	Rail	Pipeline transport	Domestic navigation	Non-specified (transport)
(in ktoe)									
Oil products	32,082	95	2,353	28,048	95	631	0	1,050	0
Natural gas	93	0	0	56	0	0	0	0	37
Biofuels and waste	1,436	4	0	1,436	5	0	0	0	0
Electricity	279	1	0	0	0	267	0	0	12
Sub total Renewables	1,436	4	0	1,436	5	0	0	0	0
Total	33,889	100	2,353	29,539	100	898	0	1,050	49

Source: Based on World Energy Statistics and Balances Database 2012, "World Energy Balances." © OECD/IEA, 2012.

Stand on climate change

Spain signed the Kyoto Protocol on 29 April 1998. They ratified the protocol as an Annex I country on 31 May 2002 and it was later enforced on 16 February 2005. Being an Annex I country to the protocol, Spain is subject to an emissions reduction of 1.6% from the 1990 level.

National climate change programmes

The Spanish Government adopted the adaptation strategy, i.e. the National Climate Change Adaptation Plan (PNACC, in Spanish), in 2006, when it received full support from the Council of Ministers of Spain [5].

The National Climate Change Adaptation Plan is a framework for coordination between public administrations in the activities of assessing impacts, vulnerability and adaptation to climate change in Spain. The Plan was presented to the Policy Coordination Committee on Climate Change under the National Council for Climate and Environment Sector Conference in February 2006. Subsequently, the plan underwent a public consultation process in which various inputs and feedback were integrated from various autonomous communities and public agencies as well as non-governmental organizations and social partners. These comments were the basis for over fifty amendments to the text of the Plan.

The Plan was approved in conjunction with the Work First Programme in July 2006 by the Policy Coordination Committee on Climate Change and the National Climate Council, and the Council of Ministers took note of it on 6 October 2006. The Second Work Programme was adopted in July 2009.

The National Adaptation Plan or PNACC broadly encompasses the following sectors [6]:

- Biodiversity
- Water Resources
- Coastal areas
- Forests
- Agriculture
- Human health
- Tourism
- Soils/desertification

To date, two PNACC Work Programmes have been adopted as following:

- First Work Programme (WP1):

Adopted in 2006, the WP1 focused on developing a national programme on regionalized climate change scenarios based on the assessment of climate change impacts. Vulnerability in sectors was considered key and horizontal to other sectors. The main focus areas of WP1 were water resources, biodiversity and coastal areas.

- Second Work Programme (WP2):

Adopted in 2009, in continuation with WP1, the WP2 set additional and ambitious goals to address climate change adaptation in Spain. The WP2 was structured in four following axes for action and implementation:

- Sectoral impacts and vulnerability assessments
- Mainstreaming climate change adaptation into sectoral regulations and planning tools,
- Mobilizing sectoral stakeholders, and
- Setting up of an indicator system on climate change impacts and adaptation.

Additionally, the WP2 builds on two basic pillars:

- (1) Promoting R&D+I (Research & development & investment) activities, and
- (2) Reinforcing the coordination between all the administrative levels with responsibility for adaptation to climate change.

Some other notable policies highlighted in the PNACC:

Energy Sector

The Spanish Strategy of Climate Change and Clean Energy (EECCCEL) is part of the Spanish Sustainable Development Strategy. This strategy allows stability and coherence to Climate Change policies. The EECCCEL defines the basic guidelines considering a medium-long term approach (2001-2012-2020), including a range of measures that entail a direct or indirect reduction of greenhouse gases and the adjustment to its effects [7].

The Spanish Energy Policy: The Spanish Energy Policy is based on three axes:

- Security supply
- Competitiveness, and
- Sustainability

Furthermore, the Strategy for Energy Savings and Efficiency in Spain 2004-2012 (PER) covers a whole range of renewable energy sources targets such as to meet at least 12.1% of the total primary energy demand in 2010. In this context, many efforts have been made, which set Spain as a world reference regarding renewable energies. The investment effort in clean electric generation has been remarkable, both in cogeneration and renewable energies. The cogeneration installed power capacity has increased from 488 MW in 1991 to 6063 MW in 2007. Furthermore, the investment and support given to renewable sources have meant that around 20% of the electricity generated, that is 7% of primary energy, comes from these renewable sources [8].

Transport Sector:

In April, 2009, the “Spanish Strategy for Sustainable Mobility, was also adopted, setting up the guidelines and measures regarding land use planning, transport and infrastructures, climate change and reduction of energy dependence, air quality and noise, security and health and demand management, giving special attention to fostering alternatives to private vehicles and the use of more efficient and sustainable ways of transport [9].

Residential/Commercial/Institutional Sector:

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 buildings. The Technical Code for Building (Real Decreto 314/200), sets the duty to include energy efficiency criteria and the use of solar, both thermal and photovoltaic energy in those new buildings or those which are being restored. Moreover, the new Regulation for Thermal Installations of Buildings, approved in July, 2007 and the Energetic Certification of Buildings (Real Decreto 47/2007), with a major target of improving energy efficiency in both, new and existing houses. Moreover, in terms of the Housing Plan, the State Housing and Restoring Plan, approved in December, 2008 includes as one of its main axes, to improving energy efficiency in both, new and existing houses [10].

Forestry Sector:

Spain’s Forestry Plan includes actions to increase carbon dioxide absorption in Spanish forests, like reforestation, agricultural lands forestation and hydrologic-forest restoration. The Research Institute of Climate Change in Zaragoza will be the cornerstone of a network of Excellence Centres, with the aim of fostering existing Spanish know-how and working with Germany and Denmark of the International Agency of Renewables Energies (IRENA). The main objective is to support, promote and spread the use of renewable energies globally, to create an energy system that meets the current challenges raised by climate change.

Local Governments:

Local government and entities are also studying climate change and adaptation to its effects. Part of these activities are developed on a network framework, such as the Spanish Network of Cities for Climate Change (RECC), made up of Local Entities which are integrating the protection of climate in their municipal policies. This network was created in June 2005 as a result of a collaboration agreement between the Spanish Federation of Provinces and Municipalities and the Ministry of Environment, in order to take advantage of the synergies and economies of scale due to the common methodologies and experiences.

European ETS (Emissions Trading Scheme):

The European Union strongly believes in the emission allowances market as a mechanism to promote the reduction of the GHG emissions in an effective and economically efficient way. The emission allowances market was launched in 2005 and covers around 1,000 installations, which account for more than 45% of the total national GHG emissions. In a relatively short period of time, the legal framework necessary to give legal coverage to all the elements of this new instrument have been developed: Ruling Law for the trading of emissions allowances regime (Ley 1/2005), including an amendment to extend its application field, the National Allocation Plan, the National Registry for Greenhouse Gas Emission Allowances, normative bases to prove and verify the emissions following the European Directive.

Ministries involved in climate change/energy policy making:

Ministries involved	Web links
Ministry of Foreign Affairs and Cooperation	www.exteriores.gob.es/Portal/en/Ministerio/Paginas/inicio.aspx
Ministry of the Interior	www.interior.gob.es/
Ministry of Education, Culture and Sport	www.mecd.gob.es/portada-mecd/
Ministry of Agriculture, Food and Environmental Affairs	www.mapausa.org/indexeng.htm
Ministry of Industry, Energy and Tourism	www.minetur.gob.es/en-US/Paginas/index.aspx

Education institutes involved in climate change/energy policy making:

Education Institutes involved	Web links
Center for Climate Change	www.c3.urv.cat/
Institute for Prospective Technological Studies	ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2879
Catalan Institute for Climate Sciences – Universitat de Barcelona	www.ub.edu/web/ub/en/recerca_innovacio/recerca_a_la_UB/instituts/institutsparticipats/ic3.html
Basque Center for Climate Change	www.bc3research.org/anil_markandya.html

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