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Preface

This third *OECD Environmental Performance Review of Spain* assesses progress achieved since the last review carried out in 2004. It demonstrates the impressive progress made in many aspects of environmental performance, including declines in the carbon, energy and resource intensity of the economy, as well as the significant expansion of protected natural areas. Overall, the Spanish population is satisfied with the quality of its environment.

Nevertheless, this *Environmental Performance Review* highlights that important environmental pressures remain, driven in part by land conversion during the construction boom of the early 2000s and the rise in population, which has been significant in some coastal areas. It calls for further efforts to decouple environmental pressures from economic growth.

Spain's dynamic economy was hit hard by the global economic crisis, resulting in stringent budget cuts and high unemployment. Yet the economic recovery has opened up opportunities for greener, more sustainable growth. Although Spain's industrial sector has a smaller environmental footprint than many other countries, environmental pressures from industry are likely to increase as the economy recovers. The *Review* recommends that environmental considerations be further integrated into recent policies to spur the economic recovery, including advancing a green tax reform agenda. In addition, it calls for continued efforts to capitalise on the economic opportunities provided by eco-innovation and an expanding environmental goods and services sector.

The *Review* also provides useful guidance on how to continue improving the process of environmental policy-making. Over the past decade, Spain has consolidated its environmental policy, streamlined regulations to reduce the burden on firms and strengthened co-ordination among levels of a highly decentralised government. The *Review* takes stock of progress on all of these fronts and recommends reinforcing and advancing such efforts, without compromising environmental ambitions. It also points out that Spain has made significant investments in promoting renewable energy and improving energy efficiency, which have imposed a heavy financial burden. The *Review* recommends that the government's ongoing reform of the electricity system should aim to provide a clear and stable framework for the further development of the renewable energy sector.

This *Review* presents 28 policy recommendations, with a particular emphasis on the conservation and sustainable use of the marine and terrestrial environment, and the environmental performance of the industrial sector. As one of the world's biodiversity hotspots with remarkable landscapes, Spain has relied on rich natural endowments to support a strong tourism sector. To protect this heritage, the country has one of the most ambitious biodiversity laws in the OECD and has made significant strides in developing an inventory and data bank to address the major challenge of inconsistent and incomplete data on biodiversity resources. Spain has actively supported international and regional initiatives on biodiversity and was recognised for such efforts as one of the first recipients

of the Natura 2000 awards in 2012. However, the implementation of these ambitious policies and initiatives has faced challenges, including reductions in public budgets. The *Review* recommends that existing resources are used more effectively and alternative economic instruments are developed. Such instruments can provide incentives for the sustainable use of biodiversity as well as revenues to support such efforts.

This *Environmental Performance Review* is the result of a constructive policy dialogue between the Spanish authorities and the other members and observers of the OECD Working Party on Environmental Performance. Spain's experience provides a number of valuable lessons for countries promoting greener and more sustainable growth. I am confident that this collaborative effort will help to improve our understanding of how to tackle the many shared environmental challenges faced by OECD members and its partner countries.



Angel Gurría

OECD Secretary-General

Foreword

The principal aim of the OECD Environmental Performance Review programme is to help member and selected partner countries improve their individual and collective performance in environmental management by:

- *helping individual governments assess progress in achieving their environmental goals*
- *promoting continuous policy dialogue and peer learning*
- *stimulating greater accountability from governments towards each other and public opinion.*

This report reviews the environmental performance of Spain since the previous OECD Environmental Performance Review *in 2004. Progress in achieving domestic objectives and international commitments provides the basis for assessing the country's environmental performance. Such objectives and commitments may be broad aims, qualitative goals or quantitative targets. A distinction is made between intentions, actions and results. Assessment of environmental performance is also placed within the context of Spain's historical environmental record, present state of the environment, physical endowment in natural resources, economic conditions and demographic trends.*

The OECD is indebted to the government of Spain for its co-operation in providing information, for the organisation of the review mission to Madrid and Valencia (25-29 November 2013) and for facilitating contacts both inside and outside government institutions.

Thanks are also due to all those who helped in the course of this review, to the representatives of member countries participating in the OECD Working Party on Environmental Performance and especially to the examining countries: Chile and France. The team that prepared this review comprised experts from reviewing countries: Mr Sebastián Avilés Bezanilla (Chile) and Mr Philippe Puydarrieux (France); members of the OECD Secretariat: Ms Kathleen Dominique, Mr Brendan Gillespie, Ms Nathalie Girouard, Ms Eva Hübner, Mr Krzysztof Michalak, Ms Sara Moarif, Ms Alexa Piccolo; and Mr Andreas Kontoleon and Mr Roberto Martín-Hurtado (consultants). Ms Carla Bertuzzi, Ms Clara Tomasini (OECD Secretariat) and Mr Mark Foss (consultant) provided statistical and editorial support during the preparation of the report. Preparation of this report also benefited from comments provided by other members of the OECD Secretariat.

The OECD Working Party on Environmental Performance discussed the draft Environmental Performance Review of Spain *at its meeting on 29 October 2014 in Paris, and approved the Assessment and Recommendations.*

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General notes

Signs

The following signs are used in Figures and Tables:

. . : not available

– : nil or negligible

. : decimal point

Country aggregates

OECD Europe: This zone includes all European member countries of the OECD, *i.e.* Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

OECD: This zone includes all member countries of the OECD, *i.e.* the countries of OECD Europe plus Australia, Canada, Chile, Israel, Japan, Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

Currency

Monetary unit: Euro (EUR).

In 2014, USD 1.00 = EUR 0.75

Cut-off date

This report is based on information and data available up to the end of July 2014.

Executive summary

A dynamic country with rich natural endowments

Spain is one of the world's biodiversity hotspots, with stunning coastal and terrestrial landscapes. From 2000, the Spanish economy was one of the most dynamic within the OECD, until the global economic crisis hit the country hard. The economy has since shown signs of stabilising and recovery programmes have opened up opportunities for greener, more sustainable growth.

Spain has made impressive progress in many aspects of its environmental performance since 2000. The carbon intensity of the economy has declined, as has municipal waste generated per capita. Emissions of major air pollutants and air concentration of particulates have fallen significantly, although exposure to urban air pollution from ozone is still higher than the EU average. As a country with medium-high water stress, Spain has one of the highest intensities of water use in the OECD. The majority of bathing waters, important assets for tourism, are of excellent quality. Overall, the Spanish population is satisfied with the quality of its environment.

A highly decentralised system presents challenges for co-ordination

Spain's environmental management system, like the rest of the country, is highly decentralised. This provides broad scope for the 17 Autonomous Communities to tailor policies to local needs, yet presents a challenge to establish a coherent environmental framework and implement environmental requirements consistently across regions. To strengthen co-ordination, several mechanisms, such as the Sectoral Conference on the Environment, have been established. Reinforcing these mechanisms could improve their effectiveness. European Union requirements have helped to drive the consolidation of environmental policy, yet the transposition of directives has often been late, resulting in a particularly high number of infringements. The government has recently taken a number of initiatives to streamline regulations and reduce the regulatory burden on firms. Further efforts are needed, without compromising environmental ambitions.

A recovering economy creates new opportunities for green growth

Recent policies to spur the economic recovery aim to better mainstream environmental issues into economic policy, but there is scope for further integration. Pursuing a green tax reform agenda, as set out in the 2014 "Lagares" report, would provide one such opportunity.

Currently, revenue from environmentally related taxes is among the lowest of the OECD EU members. Although Spain's overall innovation performance is weak, the country invested a relatively high share of public R&D in the energy and environment sector. Public R&D spending was subject to steep cuts in 2010-11, but in 2014, the total budget for R&D increased by 5% compared with 2013. Further efforts should focus on areas where Spain has a competitive advantage, including the SME sector. The government should also capitalise on the economic opportunities that eco-innovation can provide.

Spain has invested significantly in improving energy efficiency and promoting renewable energy. Energy efficiency action plans (2004-12) targeted buildings and transport, key obstacles to reaching GHG reduction targets for 2020, yet would have been more cost-effective had stricter building codes and energy performance certificates been introduced earlier. New instruments, such as the Energy Efficiency Fund, should be subject to a thorough assessment of their costs and benefits. Substantial financial support to the generation of electricity from renewable sources resulted in a significant increase in the share of renewable energy and the development of a competitive industry. However, the costs have imposed a heavy financial burden, leading to a large funding deficit in the electricity system. In response, the government is reforming the electricity system with the aim of better balancing revenues and costs, while ensuring a reasonable return for investors. Details of the reform should be finalised rapidly, so as to provide a clear and stable framework for the further development of the renewable energy sector.

Ambitious policies help to protect one of the world's biodiversity hotspots

The shares of protected areas are among the highest in the OECD, with about 29% of Spanish land area and 8.4% of territorial waters under some form of nature protection. However, the conservation status of almost 40% of habitats and species is relatively unfavourable. Land conversion and population increase (significant in coastal areas) are key factors driving these trends.

Responding to these pressures, the government has significantly strengthened its legal framework, including enacting a comprehensive biodiversity law that is among the most ambitious in the OECD. The establishment of Natural Heritage and Biodiversity Inventory and the Nature Data Bank were among the key biodiversity achievements of the last 10 years. They aim to address the major challenge of dispersed, inconsistent and incomplete data on biodiversity resources across the autonomous regions. These ambitious policies have met with a number of implementation challenges, including reductions in public budgets. Addressing these challenges requires more effective use of existing resources, as well as developing alternative economic instruments that can provide both incentives for conservation and sustainable use of biodiversity and revenues that can be used for that purpose.

Further efforts are required to minimise environmental impacts as the industrial sector expands

Impressive progress was made in reducing the environmental impact of the industrial sector across a range of environmental indicators, driven by the implementation of

mandatory environmental requirements, investments in new technologies as well as the impact of the global economic downturn. Spanish industry has become a leader in the adoption of environmental management systems and has been very active in eco-labelling and corporate social responsibility reporting. While such systems can help to strengthen environmental management procedures, their impact on environmental outcomes is less clear. Frequent use is made of financial incentives or tax breaks to promote more environmentally friendly practices, although these are generally less effective than environmentally related taxes and other policy instruments.

Despite this progress, environmental pressures from industry are likely to increase as the economy recovers. To avoid this, it will be important for the Spanish government to further integrate industrial and environmental policies, and to ensure the implementation of a robust system of environmental protection.

PART I

Progress towards sustainable development

PART I

Chapter 1

Key environmental trends

Spain has made significant progress in overall environmental performance since 2000. This chapter provides a snapshot of key environmental trends in Spain over the past decade. It highlights some of the main environmental achievements and remaining challenges on the path towards a greener economy. The chapter describes Spain's progress in reducing the carbon, energy and material intensities of its economy; in managing its natural asset base; and in improving the environmental quality of life.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1. Introduction

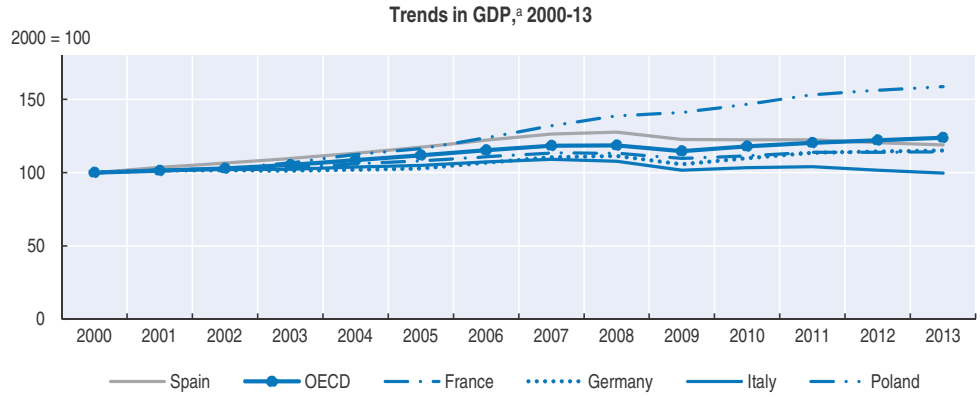
This chapter provides a snapshot of key environmental trends in Spain. It highlights some of the main environmental achievements and the remaining challenges on the path towards green growth and sustainable development, focusing on the period since 2000. Drawing on indicators from national and international sources, it broadly follows the OECD framework for monitoring progress towards green growth (OECD, 2011). After a brief overview, the chapter describes Spain's progress in using energy and natural resources efficiently, in managing its natural asset base and in improving its people's environmental quality of life. To the extent possible, it compares the state of the environment and key environmental trends with those of other OECD member countries and in relation to Spain's national and international commitments. It therefore provides a baseline for subsequent chapters that assess the effectiveness of Spain's environmental policies in influencing these trends and in using environmental objectives to generate economic opportunities.

Until 2008, the Spanish economy was regarded as one of the most dynamic within the OECD. Between 2000-08, gross domestic product (GDP) grew by almost 30%, and the population increased by 16%. This economic vitality helped to narrow the gap in income between Spain and the most economically advanced OECD member countries. During the peak years, tourism and construction contributed more than one-quarter of GDP and one-fifth of employment and underpinned a huge bubble in the housing market. This left the economy very vulnerable to the global economic crisis of 2008/09 that hit the country hard, resulting in reduced economic activity, a sharp increase in unemployment and stringent budget cuts. Following implementation of a recovery programme, growth resumed in 2013, and economic performance has shown signs of stabilisation. Nevertheless, unemployment, inequality and poverty rates remain high compared to other OECD member countries.

The carbon intensity of the Spanish economy has declined by more than 20% since 2000; in 2012, it was lower than the OECD average. This reflects the increasing share of renewables in the country's electricity generation and more stringent energy efficiency measures, as well as the impact of the global economic downturn. Nevertheless, greenhouse gas (GHG) emissions have only slightly decreased since 2000. Although Spain did not achieve its GHG emission reduction targets under the Kyoto Protocol, it has fulfilled its commitment by using the flexible mechanisms. The energy intensity of the economy decreased by more than 15% between 2000-12. Industry, including the energy sector, and the transport sector are the largest consumers of energy and major sources of GHG emissions.

Spain has made progress in improving the material productivity of its economy, i.e. the economic output generated per unit of material used. This is due mainly to the tripling of material recycling since 2000. Material productivity remains higher than the OECD average. Municipal waste generated per capita decreased by 23% in 2000-12, remaining well below levels in other OECD member countries.

Figure 1.1. **Economic growth in Spain and in selected OECD member countries**



a) GDP at 2005 prices and purchasing power parities.
Source: OECD (2014), *OECD Economic Outlook No. 95* (database).

StatLink http://dx.doi.org/10.1787/888933182722

Around 34% of the country's area is used for agricultural purposes and about 20% is permanent grassland. Forests cover one-third of the country, and this area has increased since 2000. Although the total growing stock in forests and other wooded land is above the EU and OECD average, it remains among the lowest in terms of the growing stock per hectare. About 29% of Spanish land area and 8.4% of territorial waters are under some form of nature protection. This is among the highest shares in the OECD, exceeds the Aichi targets for terrestrial protected areas and is close to achieving the marine target. However, the conservation status of almost 40% of habitats and species is relatively unfavourable. In the first part of the 2000s, Spain had the highest annual rate of urban land take among OECD member countries. However, only 2% of total land is covered by artificial surfaces, well below the EU average of 4.6%.

Spain has one of the highest intensities of water use in the OECD and is considered to be medium-high water-stressed, i.e. abstracting around 30% of its total available renewable resources. Two-thirds of the country suffers from infrequent rainfalls. Nitrogen and phosphorous surpluses have declined more than in other OECD member countries, partly due to the growth of organic farming; however, the amount of nitrogen fertiliser used per square kilometre of agricultural land is higher than the OECD average. Dams and related infrastructure, which play a key role in hydropower generation, irrigation, water supply and flood control, have exerted pressures on surface bodies, 14% of which are considered to be heavily modified. Groundwater is widely used and its quality is affected by the salinisation of aquifers and agricultural run-off. The majority of bathing waters are of excellent quality and are important assets of the tourism sector.

Overall, satisfaction levels with national environmental quality are higher in Spain than among other European countries on average. The burden of disease attributable to the environment is among the lowest in the European region. Although emissions of major air pollutants and air concentration of particulates have fallen significantly as a result of the strengthened regulatory framework, investments in cleaner technologies and the economic downturn, exposure to urban air pollution from ozone is still higher than the EU average. The share of the population that complains about local environmental quality is generally low, though slightly higher than the EU average on quality of drinking water and lack of access to green spaces or recreational areas.

Box 1.1. **The economic and social context**

The economy

- With gross domestic product (GDP) per capita of USD 32 614 in 2013,* 2.8% higher than in 2000, living standards in Spain are in line with the OECD Europe average (Annex I.A).
- Almost 60% of the total GDP and population are concentrated in 4 of 17 regions (Autonomous Communities of Andalusia, Madrid, Catalonia and the Valencian Community). There are large differences in per capita income, with those at the top capturing almost twice as much as those at the bottom (OECD, 2014b).
- Between 2000-08, Spain's economy grew faster than the OECD average, increasing by almost 30%, compared with an average growth within the OECD of less than 20%. The economy faced a severe drop in 2009, with real GDP decreasing by 3.8% in just one year. The provision of EUR 100 billion of rescue loans to the Spanish banks from euro area funds and an economic recovery programme helped stabilise the economy. It started recovering in 2013, and annual growth is expected to reach 1% in 2015 (OECD, 2013b).
- Services account for around 72% of GDP; industry and construction for around 25%; and agriculture nearly 2.6%. All shares are close to the OECD average (OECD, 2012b).
- Spain experienced a property boom from 1997-2007. At its peak in 2007, construction had expanded to a massive 16% of the total GDP of the country and 12% of total employment.
- Between 2004-09, the contribution of the industrial sector to the Spanish economy decreased from 18.5 to 15.5% of total gross value added (GVA).** Since then, the share has rebounded to 17.4% of total GDP. The sector is characterised by the small size of its enterprises; while large and medium companies represent 0.85% and 3.87% of the enterprises in the European Union respectively, the corresponding figures for Spain are 0.47% and 2.82%.
- Spain's foreign tourism industry has grown into the second biggest in the world in terms of receipts, and the fourth largest destination globally in terms of arrivals (57.7 million foreign visitors in 2012). It accounts for 11% of GDP and 11.8% of employment (OECD, 2014c).
- In 2012, exports from Spain amounted to some 33% of GDP, while imports represented about 32%, well below the OECD Europe averages of about 45% for both (Annex I.A).
- With just over 54% of working-age adults in the labour force, employment is the third lowest among 34 OECD member countries (the OECD average is 65%). The unemployment rate soared to 25% in 2012, compared to an OECD average of nearly 8% (Annex I.B). In 2012, youth unemployment exceeded 50% for the first time and has increased further since.
- Both income inequality (as measured by the Gini coefficient) and relative poverty are relatively high compared to many other OECD member countries (Annex I.B). Incomes of Spanish households fell by some EUR 2 600 per person between 2008-12, the biggest drop in the euro area.

Public finance

- The fiscal balance of Spain worsened during the economic crisis to a deficit of 11% of GDP, higher than the OECD average of 8.5%. Consolidation started in 2012* and is projected to continue in 2014-15. The accumulated public debt has increased since 2011, reaching almost 100% of GDP in 2013 (OECD, 2013b).

Box 1.1. **The economic and social context** *(cont.)*

- General government spending has generally been high in the last decade, accounting for about 44.8% of GDP in 2013. A large share of public expenditures is managed at the sub-national level: 34% by the Autonomous Communities and 12% by the local administrations (OECD, 2014b).
- Spanish taxation levels are lower than those in other OECD member countries. In 2011, the tax-to-GDP ratio stood at 32.2%, compared to the OECD average of 34%.
- In 2012, environmental protection accounted for some 2% of total general government expenditure, slightly declining after 2009. Environmentally related taxes account for around 1.6% of GDP, a level lower than in other European countries. They consist mainly of energy taxes (Chapter 3).

The population

- The population in Spain is about 46.2 million (2012) and its size has increased by 15% since 2000 mostly due to international migration. The country's population density is 91.3 inhabitants per square kilometre (km^2), lower than the OECD Europe average of about 109. However, the population distribution across the country is uneven with high concentrations around Madrid and along the 7 300 km of the Atlantic and Mediterranean coastlines.
- Nearly 50% of the population lives in urban regions, which occupy only 14% of Spain's area; the remaining territory is almost equally divided into intermediate and rural areas, home to about 38% and 13% of the population, respectively.
- Life expectancy at birth was 81.8 years in 2012, higher than the OECD average of 80.2 years (OECD, 2012b). The total fertility rate is among the lowest in the OECD, accounting for 1.32 children per woman in 2012.
- The Spanish population is ageing: the share of people aged 65 and over has increased by 4.4% since 2000 and reached more than 17.6% in 2012, higher than the OECD average of 15%. Youth (under the age of 15) represent about 15.3% of the total population, compared to an OECD average of 18%.
- Only 54.6% of the working-age population (25-64 year-olds) has at least upper secondary education, among the lowest rates in the OECD (Annex I.B). The share of tertiary graduates within the same age group (32.3%) is at the level of the OECD average. However, the percentage of youth neither in employment nor in education nor training (NEET) is close to 20%, one of the highest rates in the OECD.

* In current prices and purchasing power parity.
** The reduction was led by manufacturing, which experienced an even larger decline from 15.7 to 12.3%.

2. Transition to a low-carbon, energy- and resource-efficient economy

2.1. Carbon and energy intensities

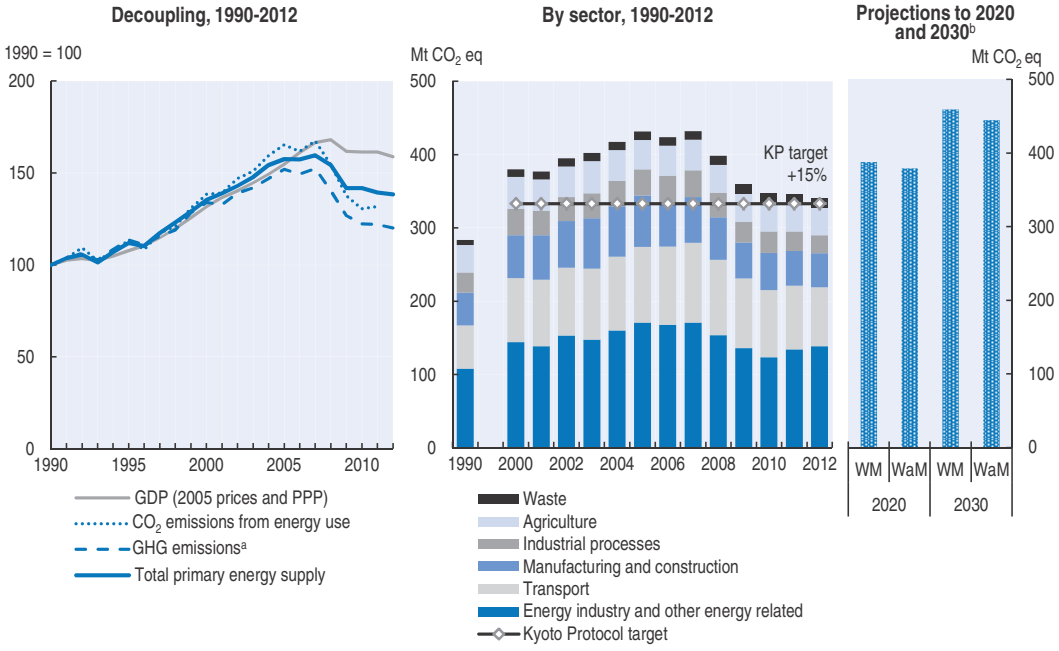
Greenhouse gas emissions

- Emission intensity of Spain's greenhouse gas emissions (GHG) is low, at 283 grams (g) of CO_2 equivalent (CO_2eq) per USD of GDP (at 2005 purchasing power parity (PPP)) in 2012, compared with the OECD average of over 400 g. Its low level and recent decline were driven by changes in economic structure and the economic slowdown that started in 2008. Efficiency improvements in nearly all economic sectors, particularly in electricity

generation, and increased use of natural gas and renewable energy, were also factors (IDAE, 2012).

- CO_2 accounts for more than 80% of GHG emissions. Its intensity (the ratio of CO_2 emissions from fuel combustion over GDP) has decreased by more than 20% since 2000, placing Spain among the 10 OECD member countries with the lowest CO_2 intensities (Annex I.C).
- Since 2000, GHG emissions[1] have exceeded, on average by 26% every year, the emissions level set under Spain's Kyoto Protocol target for 2008-12 (15% above the 1990 level) (MAGRAMA, 2013a). However, the excess amount of emissions dropped significantly in 2008-12 (Figure 1.2).

Figure 1.2. **GHG emissions and Kyoto Protocol target**



a) Excluding emissions/removals from land use, land-use change and forestry.
b) National projections based on scenarios with existing measures (WM) and with additional measures (WaM).
Source: IEA (2014), *IEA CO_2 Emissions from Fuel Combustion Statistics* (database); IEA (2014), *IEA World Energy Statistics and Balances* (database); OECD (2014), *OECD Economic Outlook No. 95* (database); UNFCCC (2014), *GHG Data Interface* (database).

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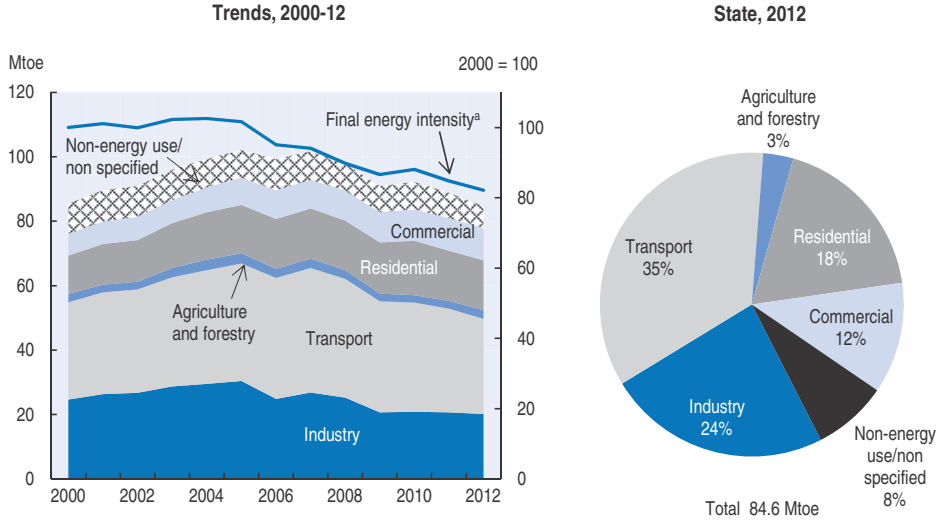
- Energy industries and transport are the main sources of GHG emissions, accounting for 41% and 24% of total emissions in 2012 (Figure 1.2).[2] Up to 2007, emissions from both sectors increased and then declined significantly, returning to their 2000 levels. Emissions from the third largest source, manufacturing and construction, began declining somewhat earlier, in 2005; in 2012, they were 21% below the 2000 level.
- Although the 2013 target for sectors outside the EU emissions trading system (EU ETS) was overachieved by 13%, projections indicate that Spain will need to implement additional measures to achieve its 2020 GHG reduction target, of 5% below 2005 levels; Spain currently expects 2020 emissions to be 9% above the target (EC, 2014b).

Energy intensity

- Energy consumption followed the "boom and bust" cycle of the economy: it increased sharply to 2007 (+19%), and then declined nearly as sharply; in 2012, it was 1% lower than in 2000 (Figure 1.3).
- Overall, the energy intensity (measured as the amount of primary energy used per unit of GDP) decreased by more than 15% between 2000-12 (Figure 1.4), and to an extra 5% in 2013; this level is lower than the OECD average (Annex I.A). Energy use began decoupling from economic growth in 2004.
- Contrary to energy trends, electricity use has continued to increase and was 27% higher in 2013 than in 2000, leading to stabilisation of electricity intensity starting in 2007. Electricity consumption increased particularly in the domestic and commercial sectors.
- Energy savings achieved by 2010 pursuant to the EU Directive on Energy End-Use Efficiency and Energy Services (2006/32/EC) were double those of the intermediate target of 3%. Spain has forecast savings of 18% in 2016, double the official target of 9% (EC, 2013a).

Figure 1.3. **Final energy consumption**



a) Index of relative change since 2000 of total final consumption of energy per unit of GDP at 2005 prices and purchasing power parities (right axis).
Source: IEA (2014), *IEA World Energy Statistics and Balances* (database); OECD (2014), *OECD Economic Outlook No. 95* (database).

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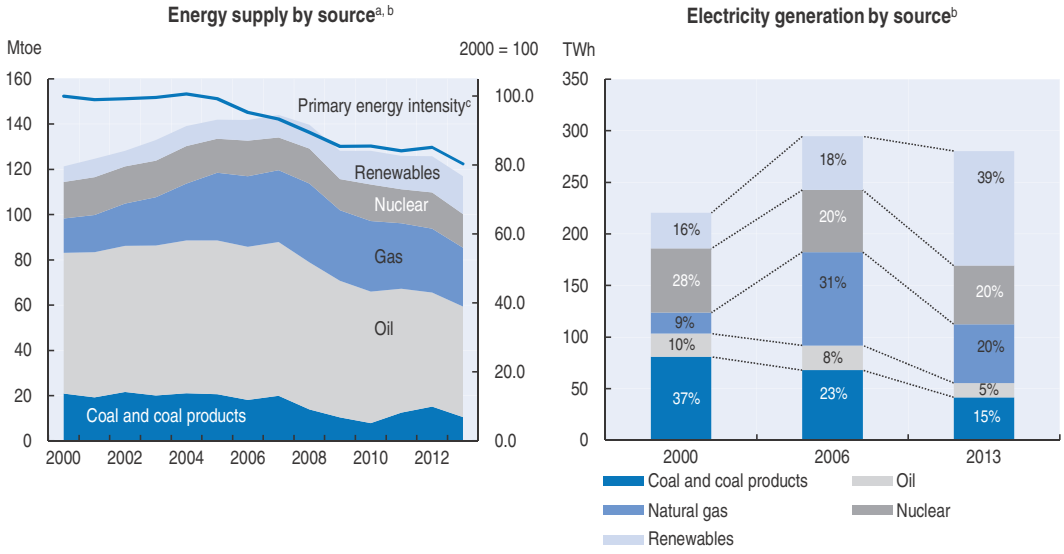
Energy mix

- As in most OECD member countries, Spain's energy mix is made up primarily of fossil fuels; oil and gas are the largest sources at 42% and 23% respectively. The remainder is made of nuclear, coal and renewable energy sources (Figure 1.4). While total energy supply began decreasing in 2007, the shares of gas and renewables increased at the expense of coal and oil.
- However, in 2009-12, the use of coal increased in Spain. This was due to a combination of factors, including high gas prices that have made coal the cheapest fossil fuel for baseload power, and low prices of carbon emission permits.

Figure 1.4. **Energy structure and intensity in 2000-13**



a) Total primary energy supply. Breakdown excludes trade of electricity and heat.
b) Excludes negligible quantities of waste (non-renewable).
c) Index of relative change since 2000 of primary energy supply per unit of GDP at 2005 prices and purchasing power parities (right axis).
Source: IEA (2014), *IEA World Energy Statistics and Balances* (database); OECD (2014), *OECD Economic Outlook No. 95* (database).

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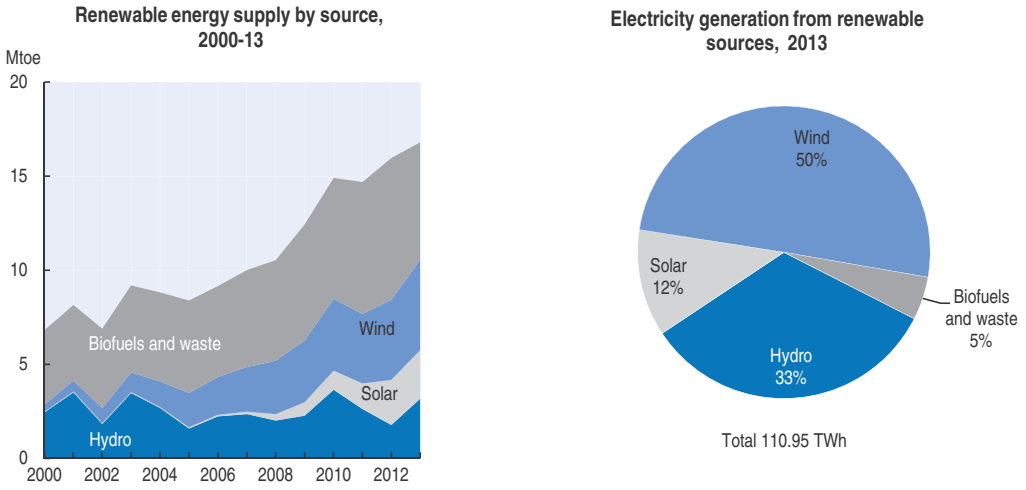
- Renewable energy supply has increased by a remarkable 147% since 2000 and accounted for approximately 14% of primary energy supply in 2013. The increase accelerated after 2005, as a result of the fast development of wind and solar capacity for electricity generation. Supply has also increased from biomass and biofuels, while it has remained relatively steady for hydropower (Figure 1.5).
- The energy mix used for electricity generation has significantly changed since 2000 when coal and nuclear accounted for 65% of the total. In 2013, renewable sources generated 39% of electricity, gas and nuclear power each contributed 20%, and coal had only 15% (Figure 1.4).
- Wind and solar power together accounted for 62% of renewable electricity generation in 2013. Electricity generation from wind power has increased significantly since 2000, and surpassed the quantity of electricity generated from hydropower in 2008.
- Electricity generation from solar PV, although it remains a small share of total generation, has increased dramatically over recent years, growing from 41 to 8 501 gigawatt hours (GWh) between 2005-13.
- In terms of its renewable energy targets under the EU's Renewable Energy Directive (2009/28/EC), Spain's results have been mixed. It is generally on track to meet the target of making renewable energy up to 20% of final energy consumption in 2020; it surpassed its interim 2011/12 target of 10.9%, reaching 13.8% in 2010. However, it failed to achieve its 2010 indicative target of renewable energy accounting for 5.75% of final consumption in the transport sector (EC, 2013b).

Figure 1.5. **Energy from renewable sources**



Source: IEA (2014), *IEA World Energy Statistics and Balances* (database).

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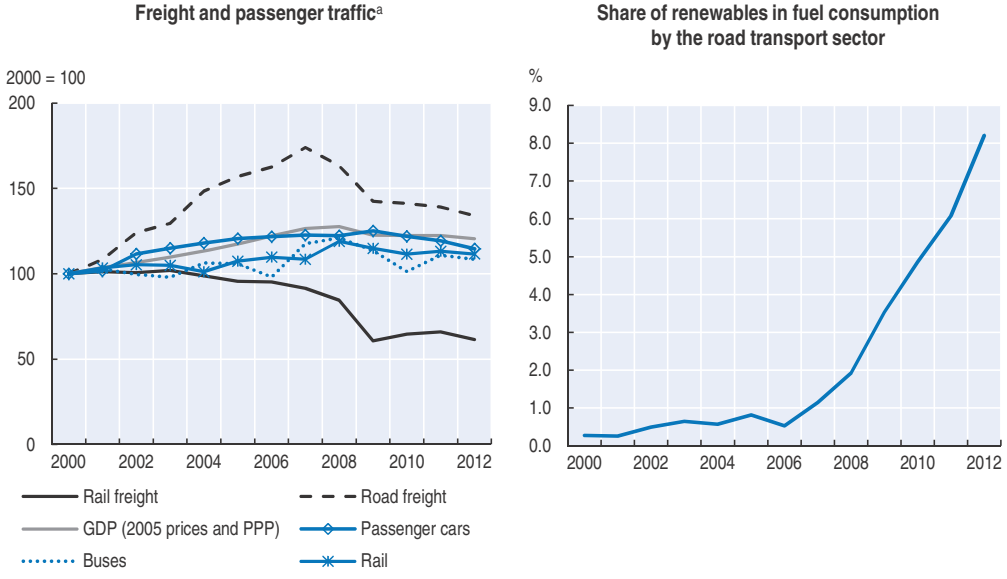
Transport

- The transport sector is the largest consumer of energy in Spain (36% of total final consumption), and consequently a major source of GHG emissions.
- As in other countries, road transport accounts for the vast majority of the sector's energy use (88%) and a significant share of GHG emissions (24%). Both road freight transport and the use of private cars grew faster than GDP until 2007. The decline in freight traffic since 2007 and in the use of private cars since 2009 can be largely attributed to the economic slowdown.
- Despite the decline since 2007, road freight volumes in 2012 were nearly 34% higher than in 2000, while the use of rail for freight transport declined 39% over the same period.
- Over 90% of freight transport in Spain is by road, one of the highest shares among OECD member countries (Annex I.A). Passenger transport is also largely dominated by road, at a little over 94%,[3] similar to that of many OECD member countries (Annex I.A). Road passenger transport volumes were 14% higher in 2012 compared to 2000. However, the use of rail also increased over the same period, as did the use of buses and coaches to a lesser extent (by 13% and 11% respectively).
- At 48 private cars per 100 persons, Spain's car ownership rates are below the OECD average of 49, although the total road vehicle stock per 100 persons is above average (Annex I.A).
- Carbon dioxide emissions from new vehicles have been falling steadily, particularly since 2007, when registration taxes were linked to CO_2 emission levels. In 2013, average CO_2 emissions from new passenger vehicles fell below the EU 2015 target level of 130 g CO_2/km, reaching 122.4 (EEA, 2013b).
- The total stock of passenger vehicles in use has shifted towards diesel fuel. In 2000, over 70% of vehicles ran on petroleum; in 2011, this share had decreased to 47% (Eurostat, 2013).[4] Due to lower taxation rates, end-use prices of diesel remain below those of gasoline, even though the environmental impacts are greater (Chapter 3).

- Spain is the third largest consumer of biofuel within the EU, after Germany and France. In 2012, the biofuel incorporation rate in transport reached 8.2%, the highest in the EU (Figure 1.6). Biodiesel consumption followed an upward trend driven by mandatory requirements introduced after 2009 to meet EU targets. Biodiesel, the production of which relies heavily on imports of raw materials, is the main biofuel consumed by transport (90%).[5]

Figure 1.6. **Transport trends in 2000-12**



a) Index of relative change since 2000 of volumes of rail and road traffic based on values expressed in total tonne/km and passenger/km.
Source: IEA (2014), *IEA World Energy Statistics and Balances (database);* OECD (2014), *OECD Economic Outlook No. 95* (database); OECD (2014), *OECD Environment Statistics* (database).

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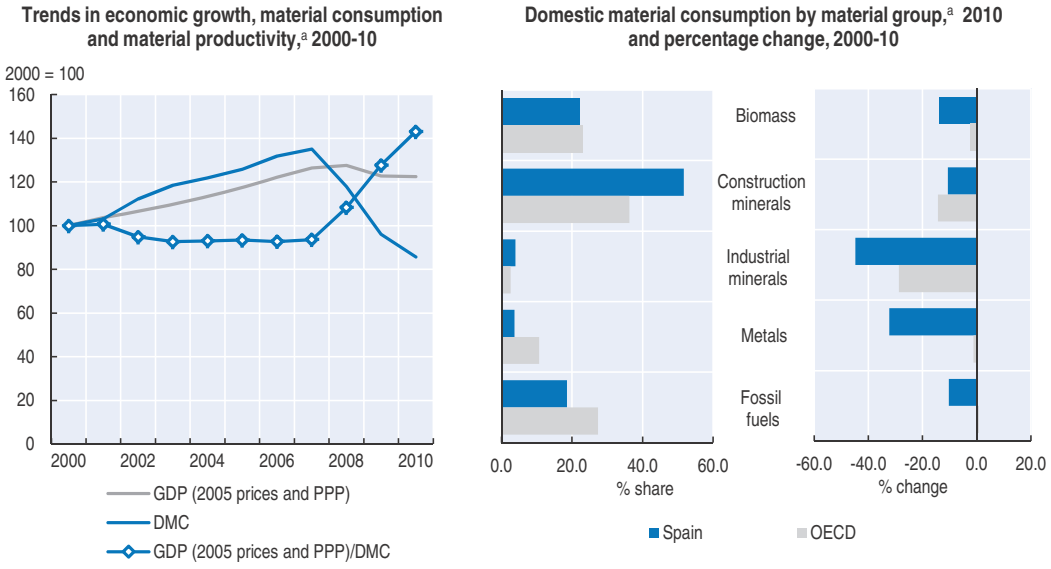
2.2. Resource efficiency

Material productivity

- Minerals are still mined in many areas of Spain, but their economic importance has diminished; Spain increasingly depends on imports of raw materials. The production of copper, nickel and gold from the Aguablanca mine in Extremadura, hard coal (which accounts for about one-third of total coal use) and construction minerals constitute the country's most important mineral and energy assets. The country has negligible indigenous production of oil and natural gas, but in 2014 Spain announced test drilling for oil in the Canaries archipelago.
- Domestic material consumption (DMC)[6] per capita was 12.9 tonnes in 2010; this was lower than the OECD average (16.6) and the OECD Europe average (13.8). Overall, DMC decreased by 14% between 2000-10 compared to a 7% decrease for the OECD average. The decrease was mostly due to decline in the construction sector, which accounted for more than half of DMC (Figure 1.7).
- Between 2000-10, the material productivity of Spain, defined as the amount of economic wealth generated per unit of material used, grew by 43%, significantly higher than the OECD average of 26% (Annex I.C). However, relative decoupling occurred only recently:

Figure 1.7. **Resource productivity**



a) Material productivity designates the amount of GDP generated per unit of materials used. It refers to the ratio of GDP to domestic material consumption (DMC), where DMC is the sum of domestic extraction of raw materials used by an economy and its physical trade balance. A rise in material productivity is equivalent to a decline in material intensity (i.e. DMC/GDP).

Source: OECD (2014), *OECD Environment Statistics* (database); OECD (2014), *OECD Economic Outlook No. 95 (database).*

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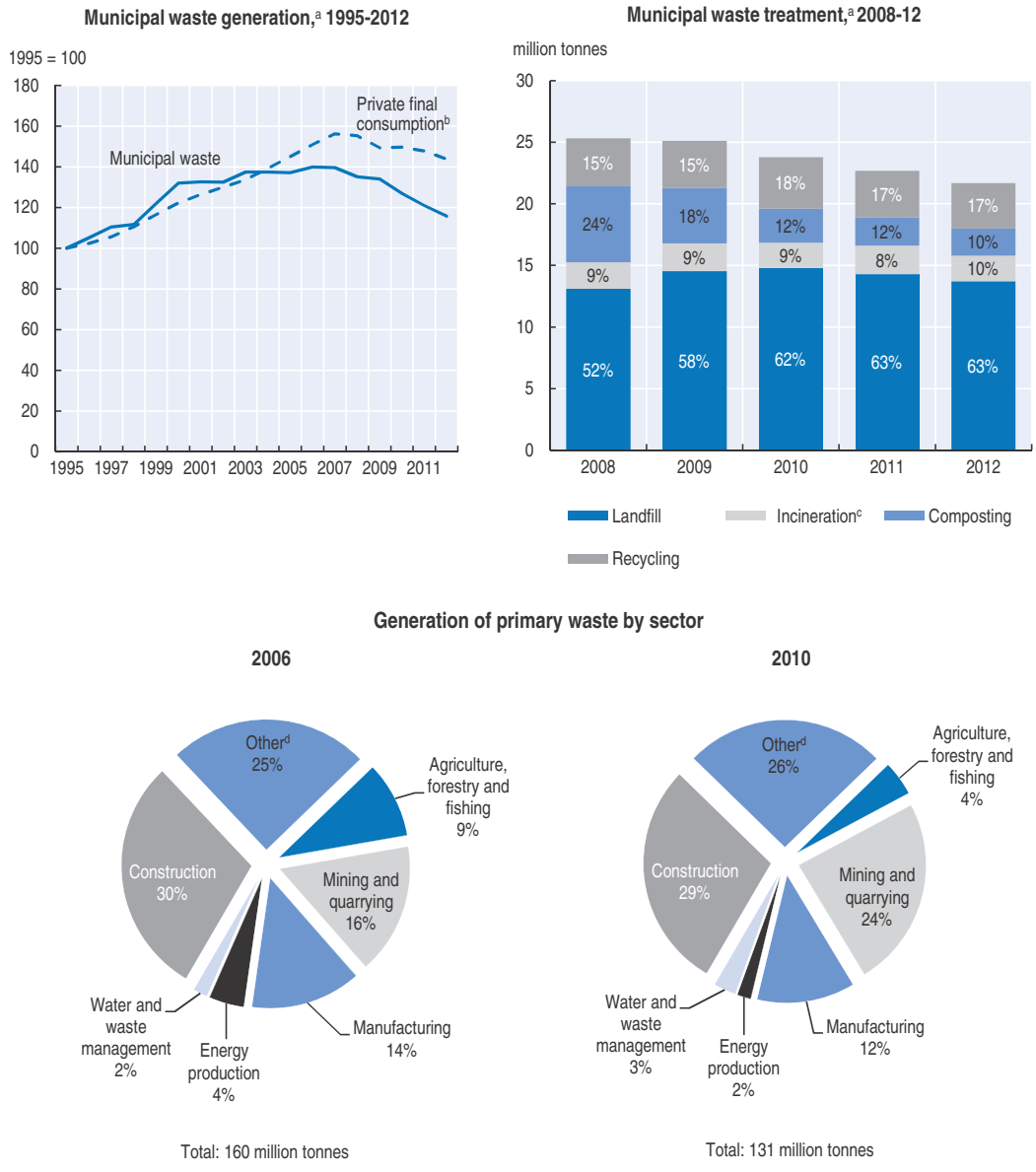
for most of the review period, DMC increased at a higher rate than GDP (35% compared with 26% in 2000-07) and dropped well below GDP between 2007-10 (-37% compared with -3% respectively) (Figure 1.7).

Waste generation and recovery

- Spain generated over 131 million tonnes of primary waste in 2010, 18% less than in 2006.[7] The construction sector is responsible for the largest share, accounting for almost 30% of total waste. The service and households sectors account for 26%, while the mining and quarrying sector represents a further 24%. The remainder is made up of waste from manufacturing, agriculture, water management and energy production (Figure 1.8).
- Generation of municipal waste decreased by 12% in 2000-12. A significant decoupling from private final consumption was achieved during and after the economic downturn, when municipal waste generation fell by some 17% (2007-12) (Figure 1.8).
- Municipal waste per capita has decreased by 23% since 2000, reaching 470 kg in 2012 against an OECD average of 530 kg (Annex I.C).
- Landfilling remains the main treatment method for municipal waste, accounting for almost two-thirds of total municipal waste treatment. Incineration with energy recovery increased only slightly and much less waste is composted (Figure 1.8).
- More than 17% of municipal waste was recycled in 2012. The implementation of EU waste-related legislation has helped increase the rate of recycling of some waste streams. In 2011, for example, Spain's paper and cardboard recycling rate of almost 80% exceeded the EU average by 10%.[8]

Figure 1.8. **Waste management**



a) Waste collected by or for municipalities, including household, bulky and commercial waste, and similar waste handled at the same facilities.
b) At constant 2005 prices.
c) Mainly incineration with energy recovery.
d) Services and household waste.
Source: Eurostat (2014), *Environmental Data Centre on Waste* (database); OECD (2014), *OECD Environment Statistics* (database).

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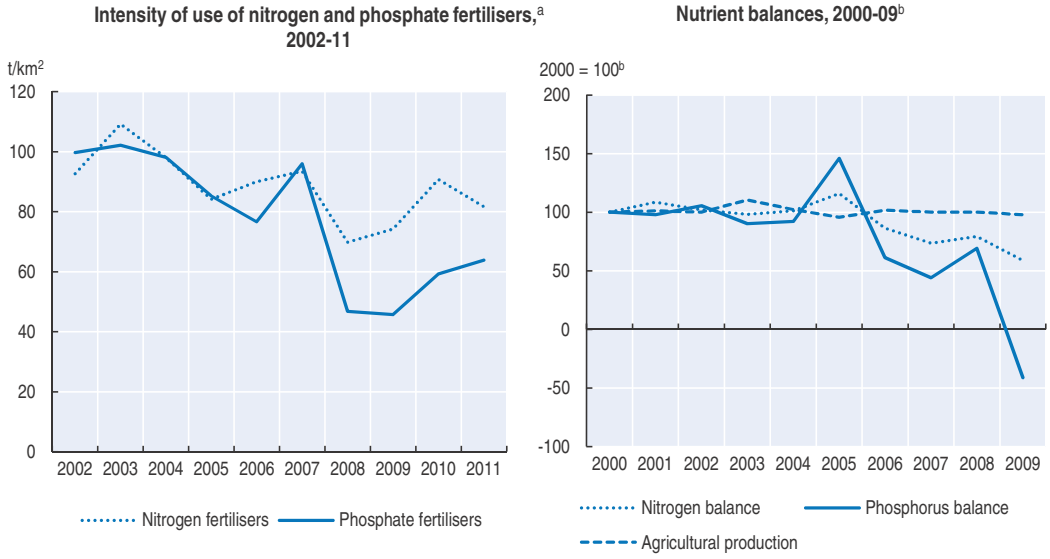
Nutrient balance and agricultural inputs

- While agricultural production has remained stable since 2000, phosphorous and nitrogen balances dropped significantly, which generated a positive impact on water quality. Phosphorous surplus declined by 15% per year between 1998-2000 and 2007-09, more than the OECD average of -5.4%. The nitrogen surplus declined more slowly (Figure 1.9) (OECD, 2013c).

Figure 1.9. **Trends in agricultural inputs**



a) Apparent consumption of fertilisers per km^2 of agricultural land.
b) Based on index numbers normalised to the period 2004-06.
Source: FAO (2014), *FAOSTAT* (database); OECD (2014), *Agri-environmental Indicators* (database).

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- The positive balance trends were due to a decrease in the intensity of use of nitrogen and phosphorous fertilisers (12% and 36% respectively between 2002-11) (Figure 1.9). Yet the amount of nitrogen fertiliser used per square kilometre of agricultural land is higher than the OECD average (Annex I.C). The regions with the highest level of fertiliser use are the Canary Islands, Valencia, Murcia and La Rioja, due to their relatively more intensive agriculture (MAGRAMA, 2013b).
- The quantity of pesticides sold increased by 13% over 2000-10, but their use per square kilometre of agricultural land is in line with the OECD average (OECD, 2013c).
- Decline in the use of agricultural inputs is also due to the growth of organic farming. The agricultural land area under certified organic management almost doubled between 2002-10; the share in 2008-10[9] was higher than both OECD and EU-15 averages (5.3% against 2% and 5%) (OECD, 2013c). Organic livestock farming has also been growing in recent years.

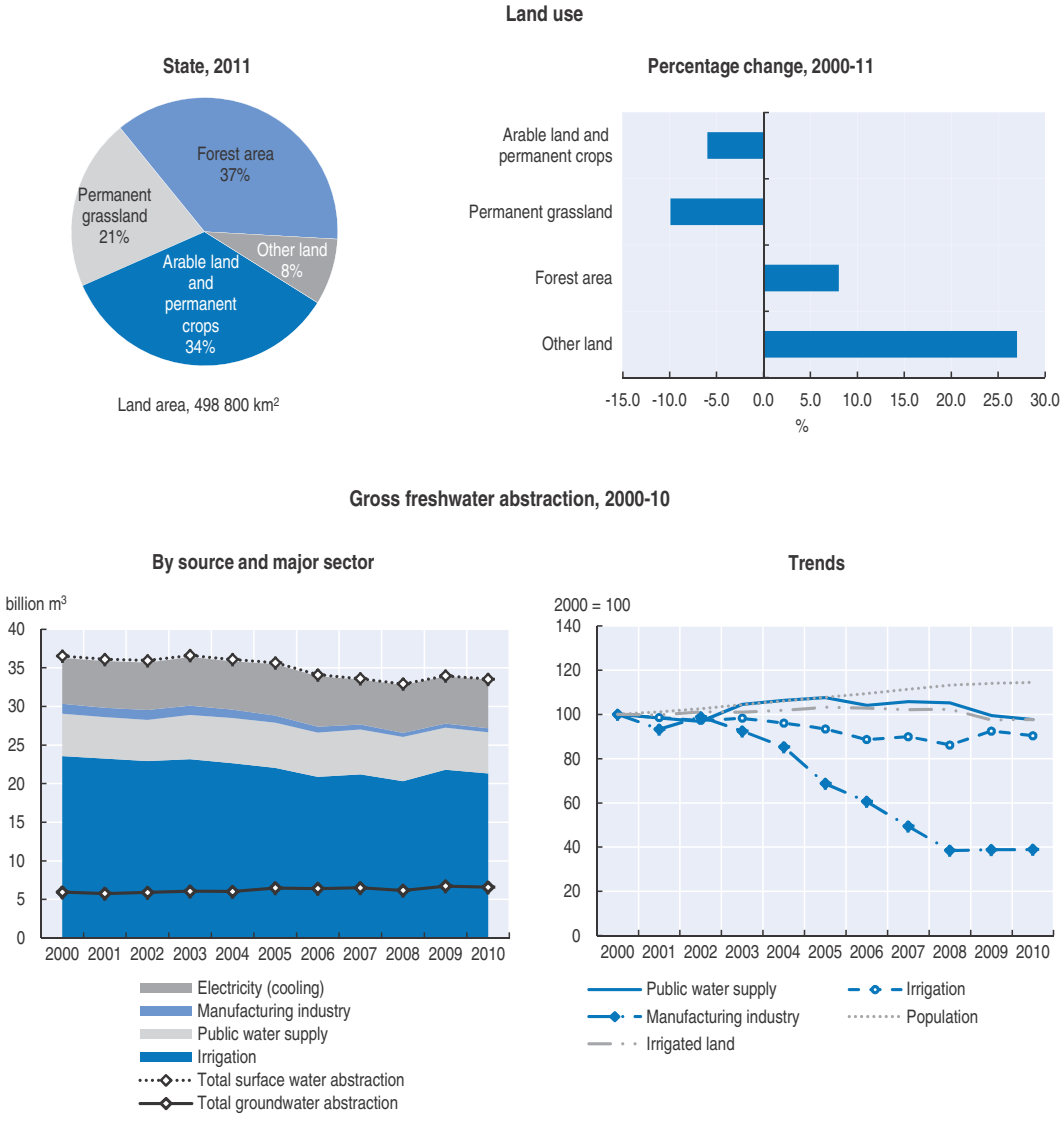
3. Managing the natural asset base

3.1. Biodiversity and ecosystems

Land use and forests

- Farmland and grassland areas, which cover 55% of the country, are in continuous decline, by 6% and 10% in 2000 and 2011 respectively (Figure 1.10).
- Only 2% of total land is covered by artificial surfaces, well below the EU average of 4.6%. Artificial areas increased, in particular between 2009-12 (by 12%), mostly due to the expansion of the transport infrastructure, and construction sites. The most affected regions are Asturias, Murcia, Extremadura and Galicia, while the Basque Country and Navarra do not experience similar trends (MAGRAMA, 2013b).

Figure 1.10. **Natural assets base**



Source: FAO (2014), *FAOSTAT* (database); OECD (2014), *OECD Environment Statistics* (database).

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- 37% of Spain's territory is covered by forests of which more than two-thirds are privately owned.[10] Forest area grew by 8% over 2000-11, mainly on former extensively grazed land, with protective as well as productive (wood and pulp supply) objectives.
- However, the growing stock in forests and other wooded land is among the lowest in OECD member countries (Annex I.C). Fellings increased by almost 20% between 2000-11, partly due to preventative felling measures and damage caused by water shortages (MAGRAMA, 2013b).
- Only around 14% of forests are subject to management plans, one of the lowest shares among EU countries. Navarre has the largest area subject to forest management (MAGRAMA, 2012a, 2012c). In 2012, 1% of total forest area (almost 28 million ha) was

certified under the Forest Stewardship Council (FSC) system and 6% under the Programme for the Endorsement of Forest Certification (PEFC).

- Like other Mediterranean countries, Spain is prone to forest and scrubland fires. In 2008-10, about 12 000 forest fires were recorded per year, which affected on average 75 000 ha (MAGRAMA, 2012a). About 95% of fires in Spain are human-induced; uncontrolled legal and illegal scrub burning by farmers is a major cause. Arson, while still a significant factor, has diminished.
- Around 13% of the country suffers from acute soil erosion. The National Soil Erosion Inventory identifies Andalusia, Catalonia, Cantabria and Asturias as most affected by high degrees of soil erosion (MAGRAMA, 2013b). Spain is affected by desertification and is included in Annex IV of the UN Convention to Combat Desertification.[11]

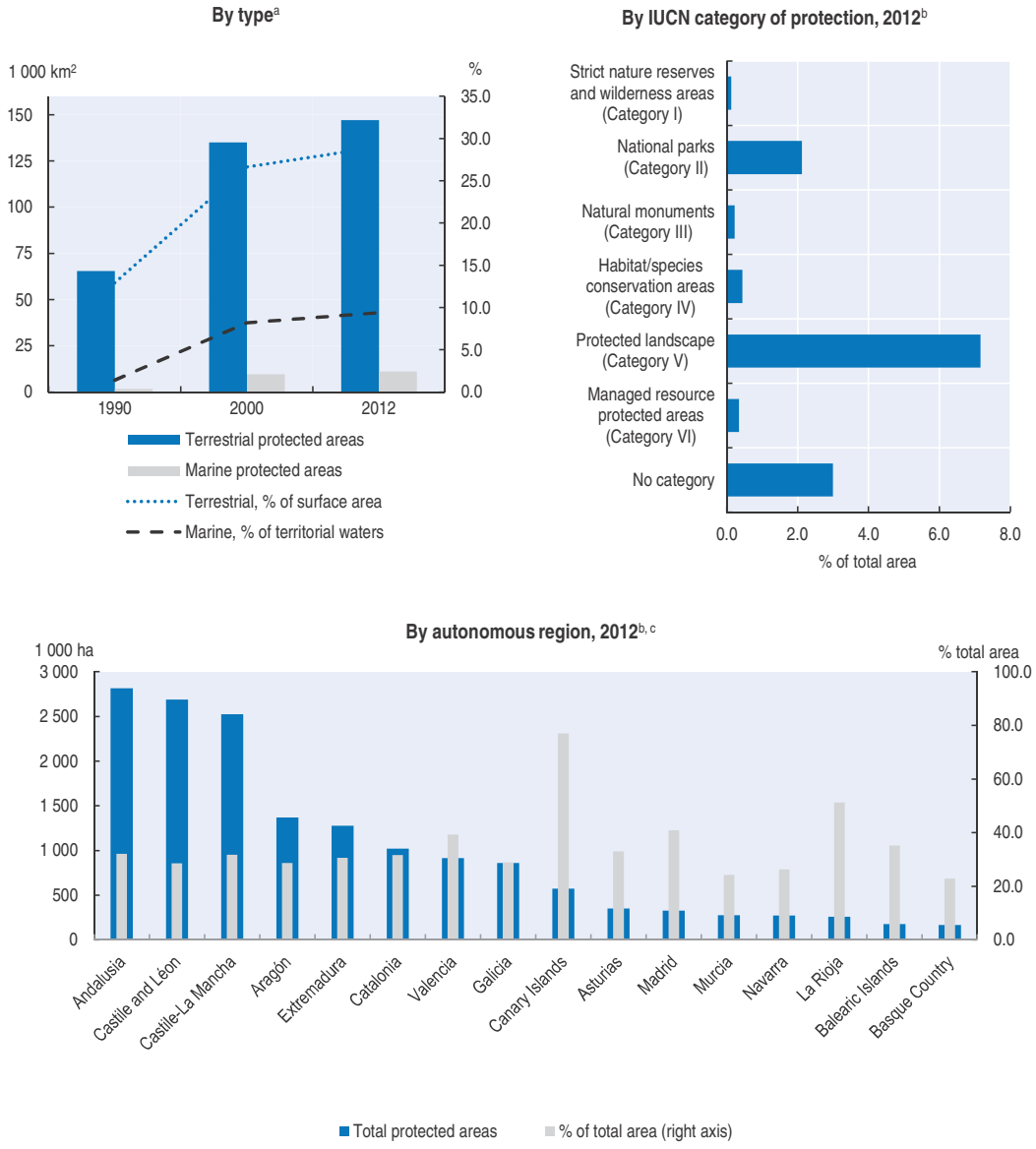
Protected areas

- In 2012, about 29% of Spanish land area was under some form of nature protection, while the percentage of territorial waters[12] protected reached 8.4% at the end of 2014. This is one of the highest shares among OECD member countries (Annex I.C) and exceeds the 2020 Aichi biodiversity targets for terrestrial protected areas and is close to achieving it for marine areas.[13]
- After a significant increase between 1990-2000 (106%), the terrestrial area subject to nature protection increased by only 9% between 2000-12. Protected areas include a variety of legal designations. Around 13% is protected under Spanish legislation, 8% under the international legal framework and 27% is covered by EU Nature 2000.[14]
- About 13% of the country's total area is protected according to IUCN (International Union for Conservation of Nature) categories, which classify protected areas according to their management objectives (Figure 1.11). Protected landscapes and seascapes represent the largest category, extending more than 7% into the Spanish territory, followed by national parks (2%), which, in turn, account for more than half of total natural protected areas.
- Autonomous Communities that contribute most to protected areas are Andalusia, Castile and León and Castile-La Mancha. Communities with the highest share of protected areas within their boundaries are the Canary and Balearic Islands and La Rioja (Figure 1.11) (MAGRAMA, 2013b).
- The size of marine protected areas has increased by 15% since 2000 after an expansion by a factor of six between 1990-2000 (Figure 1.11).

Ecosystems and species

- The conservation status of almost 40% of habitats and species listed in the EU Habitats Directive is unfavourable.[15] Habitats particularly affected include wetlands (87% are unprotected), forests, mountain areas and grasslands (Figure 1.12). The strongest pressures stem from land-use changes, exploitation of natural resources, agriculture and forestry, housing and tourism (Chapter 4).
- Around 13% of mammals and vascular plants are threatened, which is lower than in many other OECD member countries. However, the share of threatened birds (27%) and of freshwater fish species (51%) is comparatively high (Figure 1.12) (Annex I.C). The decline in farmland bird species in 2000-11 was more pronounced than for the EU as a whole.

Figure 1.11. **Protected areas**



a) Nationally designated protected areas recorded in the World Database on Protected Areas (WPDA). National classifications may differ.
b) Nationally designated protected areas according to L. 42/2007 of 13 December on Natural Heritage and Biodiversity.
c) Includes EU Natura 2000 sites and protected areas under international conventions.
Source: Country submission; MAGRAMA (2013), *Informe 2012 sobre el estado del Patrimonio Natural y de la Biodiversidad en España* [2012 Report on the State of the Natural Heritage and Biodiversity in Spain]; UN (2014), *Millennium Development Goals Indicators* (database).

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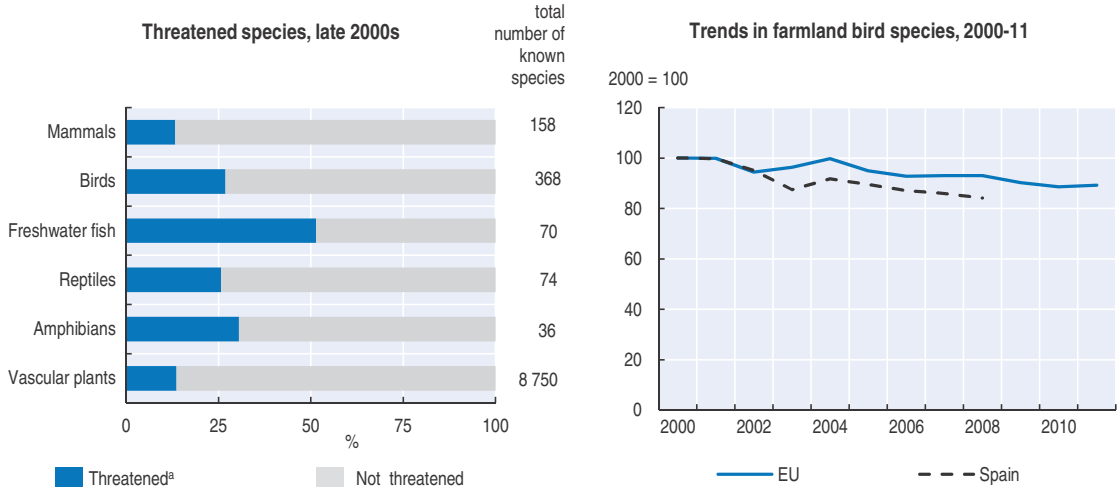
3.2. Water resources

- Spain's natural water endowment is well below the OECD average and very unequally distributed across space and time. Two-thirds of the country has a semi-arid climate with several regions being affected by recurring droughts.[16]

Figure 1.12. **Species of flora and fauna**



a) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of known species.
b) The composite EU index covers 39 common species of birds that depend on farmland.
Source: Eurostat (2014), *"Biodiversity", Environment Statistics* (database); OECD (2014), *OECD Environment Statistics* (database).

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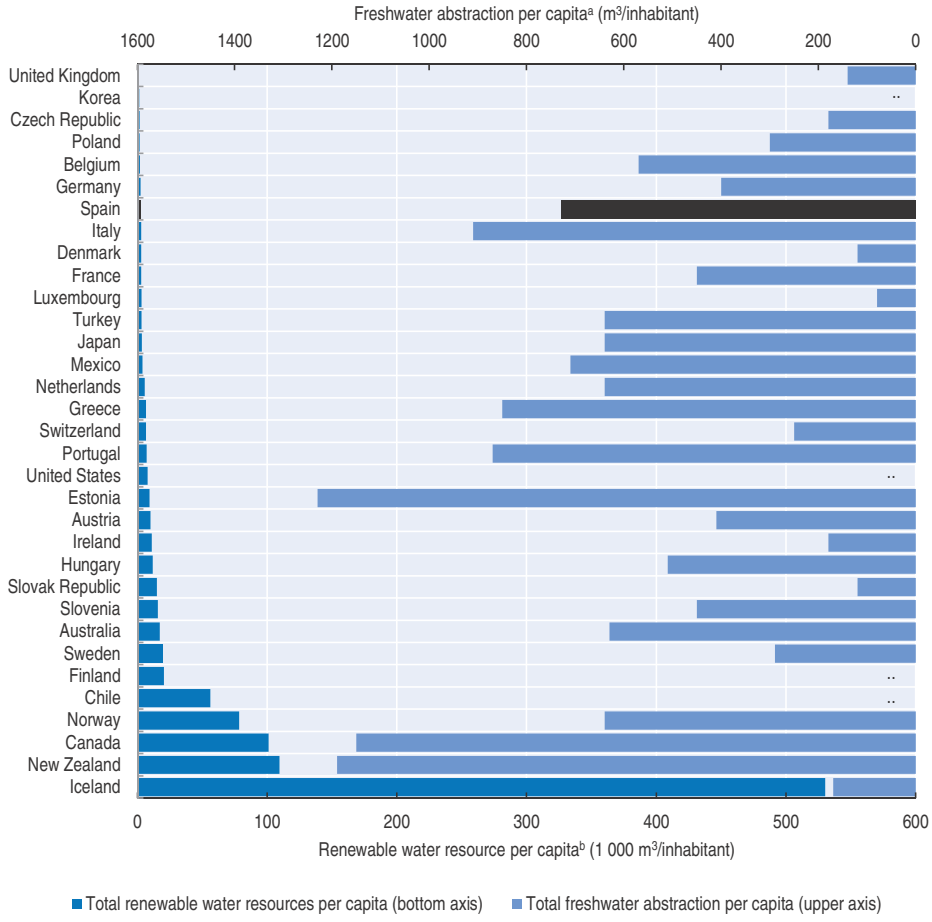
- Irrigation accounts for the largest share of water demand (63%), followed by cooling in electricity generation (19%) and public water supply (16%). Industry's use of water represents only a minor share. Water withdrawals have decreased in agriculture (-10%) and industry (-60%) between 2000-10 (Figure 1.10).
- Although gross water abstraction decreased by 8% during the last decade, Spain's intensity of water use remains one of the highest in the OECD area. The country is classified as medium-high water-stressed, i.e. abstracting about 30% of total available renewable freshwater (Figure 1.10) (Annex I.C).
- In view of declining natural water availability and the limits to raising the amount of abstracted conventional freshwater water resources, reused water and desalination have been playing an increasing role. In 2008, the capacity of desalination of sea water increased markedly, including with the construction of Europe's biggest plant in Murcia, in south-eastern Spain (MARM, 2008).
- The use of groundwater has increased by 11% since 2000. It accounts for around 20% of total abstractions on average, but by as much as 75% in some Mediterranean basins. Three-quarters of this resource is used for irrigation. Some regions, such as the Upper Guadiana basin, experienced intensive (and often uncontrolled) groundwater abstraction that contributed to the degradation of wetland ecosystems.
- Freshwater abstraction for public water supply has remained constant since 2000, but Spain is among the 10 OECD member countries with the highest levels of abstraction for public supply per capita (OECD, 2013d) (Figure 1.13). The average level of non-revenue water was estimated at 24% in 2007, including actual physical losses of 16% and losses due to improper measurement or payment of 8%.
- The quality of surface water has improved and is generally better than in many European countries. However, nearly 40% of surface water was classified as having less than good ecological status in 2009 (Figure 1.14). According to a preliminary assessment

Figure 1.13. **Water resources and abstraction in 2012**



a) 2012 or latest available year.
b) Net result of precipitation minus evapotranspiration plus inflow. Long-term annual averages.
Source: OECD (2014), *OECD Environment Statistics* (database).

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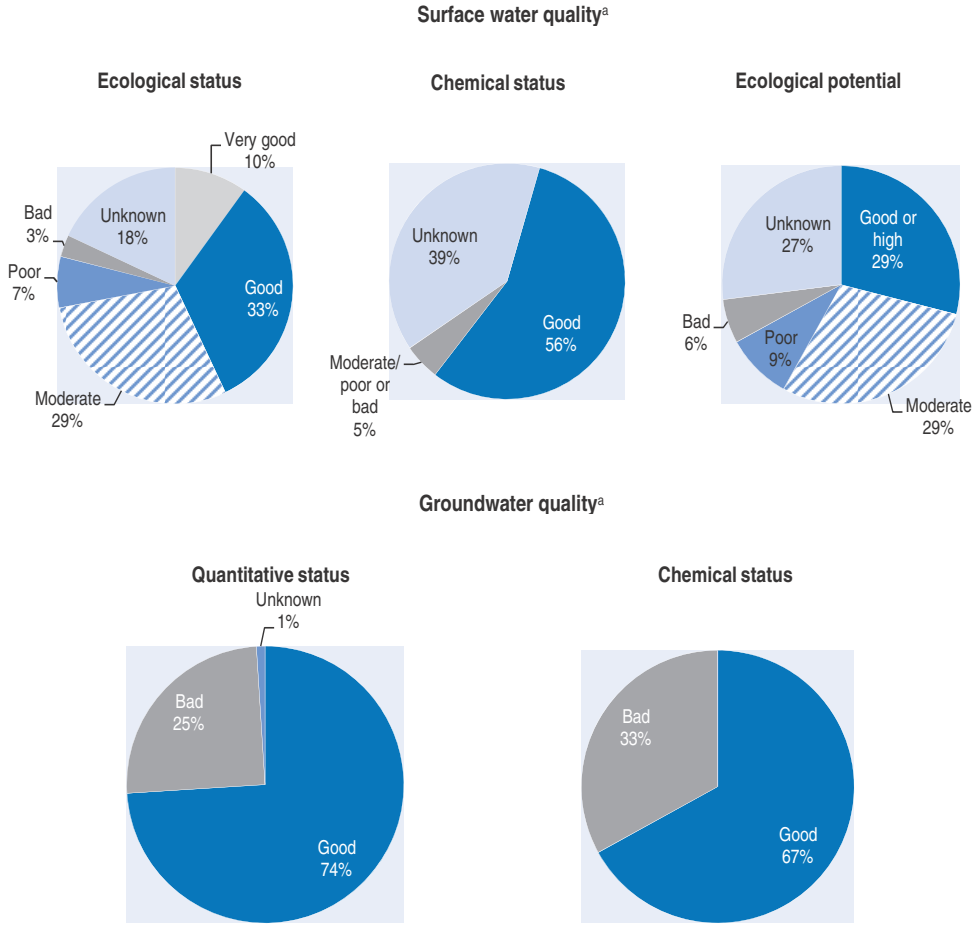
of Spanish River Basin Management Plans (RBMPs), the expected ecological and chemical status of surface water bodies increases by almost 20% in 2015. The Guadiana River, flowing through Castile-La Mancha and Extremadura, showed higher levels of pollution, with up to 70% of its waters having a less than good status (EC, 2012).

- The hydromorphological pressures on rivers and lakes are reported to be among the least severe among the European river basin districts. The main pressures are exerted by dams and related infrastructure, which play a key role in hydropower generation, irrigation, water supply and flood control. With over 1 300 dams, Spain is estimated to be the country with the fourth largest number of dams in the world, after the United States, India and China (OECD, 2010).
- On average, 30% of groundwater is classified as having poor chemical status, but the quality varies between river districts. The driest river basins in the South are much more heavily affected by high concentrations of pollution than the national average.[17]
- Groundwater quality is also affected by saltwater intrusion due to overexploitation in coastal areas. High salinity affects groundwater in the driest water basins such as Júcar and Segura (MAGRAMA, 2013b).

- Spain accounts for about 10% of the reported bathing waters of the European Union. The country has been successful in implementing the EU Bathing Water Directive at coastal sites. In 2013, water quality of 97.1% of coastal bathing waters was at least sufficient and 90% of sites showed excellent quality. Less progress has been made on inland bathing waters where 83% satisfy mandatory values and 50% have excellent quality or comply with guide values (EEA, 2013c).
- Climate change is expected to reduce precipitation and increase the frequency of droughts (Iglesias et al., 2010). The natural availability of water resources through surface run-off, aquifer recharge and rainfall has already fallen by 5% between 1985-2005 (MARM, 2008a). Water resources are projected to decrease mainly due to the reduction in rainfall. Estimations for the period 2011-40 project that water resources will decrease by a further 5%, with the south-eastern and insular areas of the country being the most affected (MAGRAMA, 2012b).

Figure 1.14. **Water quality**



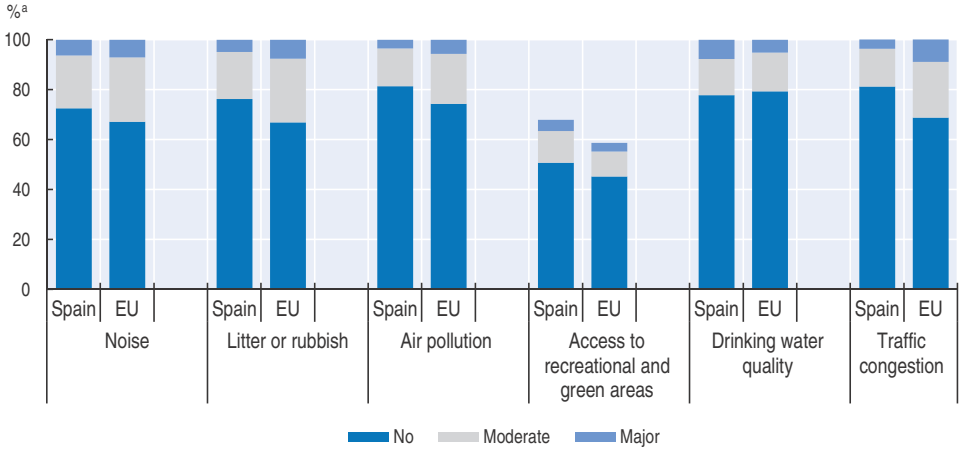
a) Data refer to the hydrological planning period 2009-15 of the EU Water Framework Directive.
Source: MAGRAMA (2013), *Informe 2012 sobre el estado del Patrimonio Natural y de la Biodiversidad en España* [2012 Report on the State of the Natural Heritage and Biodiversity in Spain].

4. Improving the environmental quality of life

4.1. *Environment and well-being*

- In recent surveys, 95% of respondents reported that protecting the environment is important for them personally and 65% indicated they are concerned about the state of the environment in Spain (EC, 2011; Government of Spain, 2013). However, only 0.1% of Spaniards perceived the environment as one of the three most important issues in the country in 2012 compared with 2-5% in 2005-06 (Government of Spain, 2013).[18]
- Spanish people consider air pollution and climate change as the environmental issues that affect them or their families most; a large share (75% in 2012) considered that air quality deteriorated in the 2000s. Spaniards are also concerned about impacts of water scarcity and pollution and the depletion of natural resources. One-third of the population would be willing to pay higher prices for the protection of the environment, while half of respondents think that environmental protection should not be prioritised over economic growth (Government of Spain, 2013).
- Overall, the Spanish people appear to be satisfied with their country's environmental quality, with more than 70% not complaining about the quality of air and drinking water, noise levels, traffic congestion, access to green areas or litter in their neighbourhood (Figure 1.15) (Eurofound, 2014).

Figure 1.15. **Assessment of the environmental situation in Spain and in the EU in 2012**



a) Percentages of the people that answered "major", "moderate" or "no" when asked about environmental problems in their neighbourhood.
Source: Eurofound (2014), *European Quality of Life Survey 2012.*

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4.2. *Air emissions and air quality*

Air emissions

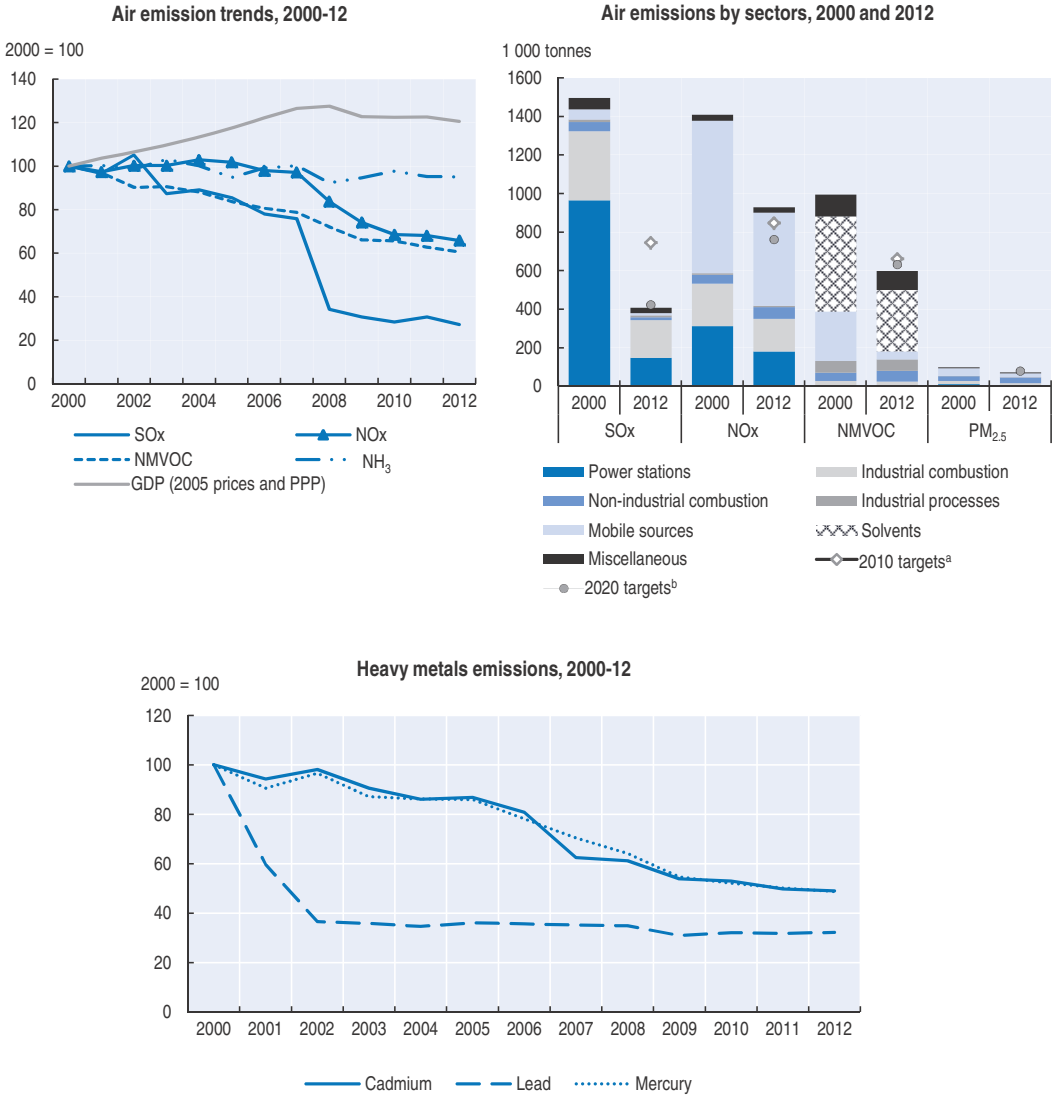
- Overall, emissions of air pollutants have decreased since 2000 due to a combination of factors, including changes in Spain's energy mix (increased use of natural gas and renewable energy sources), better quality fuel (especially lower sulphur content), abatement measures in industry and the power sector (e.g. flue-gas desulphurisation, reduced solvent use) and improved vehicle emission standards. Emission reductions accelerated after 2007 following the economic slowdown (Figure 1.16).

- Important progress was made on reducing emissions of SO_x, which declined by more than 70% over 2000-12, faster than the OECD average. Such a significant reduction was due to the change in structure of the electricity sector, including the installation of combined cycle power stations, as well as the decreased use of coal and greater use of natural gas in final demand sectors.[19] Emissions of NO_x, mostly from road transport and other mobile sources and also from fuel combustion in power plants and industry, were reduced by about 34%, in line with the OECD average. Emissions per capita are below the OECD average for both SO_x and NO_x, and slightly higher than the OECD average for NO_x/GDP (Annex I.C).
- Spain met its targets under the EU National Emission Ceilings (NEC) Directive in 2010 for both SO_x and non-methane volatile organic compounds (NMVOCs) (Figure 1.16). Although NO_x emissions decreased, emissions still exceeded the 2010 target set by the NEC Directive, by 16% in 2010 and 10% in 2012.
- Emissions of particulate matter showed important decreasing trends: $PM_{2.5}$ and PM_{10} emissions were 27% lower in 2012 compared to 2000. The highest reductions were achieved in transport and in the energy industries (particularly due to the reduction in activity at coal-fired power stations – albeit with a moderate increase in 2011 and 2012 compared to 2010) and in transport.
- Emissions of heavy metals have also decreased since 2000. Lead emissions declined significantly in 2002, principally due to the reduction of emissions from transport. Between 2000-11, Spain's share of those emissions within the EU also dropped from 12% to 7%.[20] Cadmium emissions declined 51%, and while nickel emissions dropped over 54%, Spain still produced 19% of all EU nickel emissions, mostly from mining and refining activities (EEA, 2013d).
- Emissions of ammonia (NH_3) have declined only slightly since 2000, and exceeded NEC Directive ceilings in both 2010 and 2012, by 10% and 7% respectively. Spain's ammonia emissions stem largely from the agricultural sector, through use of nitrogen fertilisers and increasing the number of livestock (Eurostat, 2012).
- In terms of emissions of various persistent organic pollutants (POPs), hexachlorobenzene (HCB) emissions dropped over 97% between 2000-12, while those of polycyclic aromatic hydrocarbons (PAHs) increased by 2%. Spain accounted for 19% of PAH emissions and over 18% of HCB emissions in the EU in 2011, the highest share of all EU member states (EEA, 2013d).

Air quality

- The air quality in Spain has improved and is generally good in most urban areas. The percentage of the urban population exposed to PM_{10} emissions above EU daily limit values (50 micrograms per cubic metre [$\mu g/m^3$]), has declined significantly since 2006, and fell below the EU average in 2010 (Figure 1.16). However, exposure to urban air pollution from ozone (O_3) has been consistently higher than the EU average since 2009, following some reduction and stabilisation between 2004-08 (Figure 1.17).
- Large cities, Madrid and Barcelona in particular, experience a significantly higher number of days when air pollution limits for ozone and NO_2 are exceeded due to emissions from transport combined with particular meteorological conditions (EEA, 2013f; MAGRAMA, 2012d).

Figure 1.16. **Air emissions**



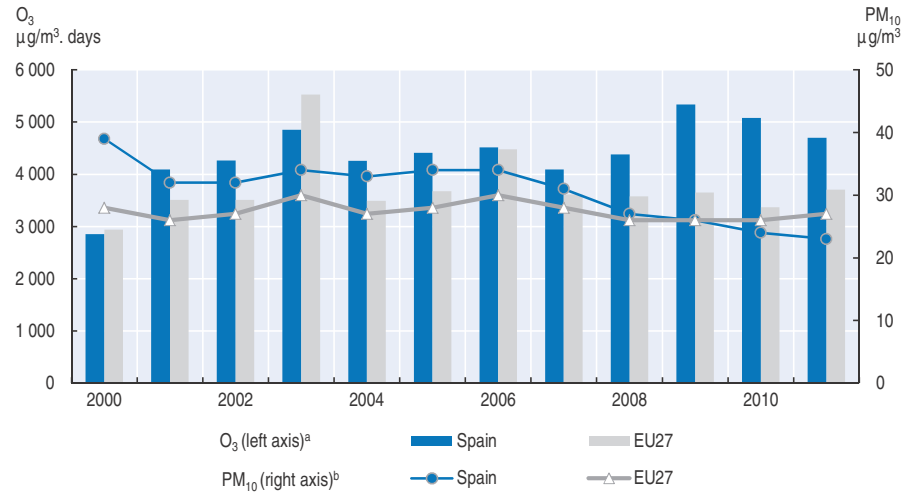
a) Targets set by EU Directive 2001/81/EC (NEC Directive) on national emission ceilings for certain atmospheric pollutants (applying to the European part of Spain).
b) Targets set by the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (applying to the European part of Spain).
Source: OECD (2014), *OECD Economic Outlook No. 95 (database);* OECD (2014) *OECD Environment Statistics* (database); UNECE/EMEP (2014), *WebDab* (database).

StatLink http://dx.doi.org/10.1787/888933182876

4.3. *Water supply and sanitation*

- Surface water is the principal source of drinking water (37%), while 61% comes from groundwater and 2% from desalination of seawater and brackish water. There has been an increase in the use of groundwater for public supply stemming from improved access in rural areas (MSSSI, 2012). The production capacity of desalinated water almost doubled between 2000-06.
- About 91% of people obtain their drinking water from collective water supply facilities.[21] In 2012, 99.3% of the analysis conducted by the National Information System on Drinking

Figure 1.17. **Urban exposure to air pollution by ozone and particulates**



a) Population-weighted annual sum of maximum daily 8-hour average ozone concentrations greater than 70 µg/m³ at urban background stations in agglomerations.
b) Population-weighted annual mean concentrations of particulate matter at urban background stations in agglomerations.
Source: Eurostat (2014), *Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933182887

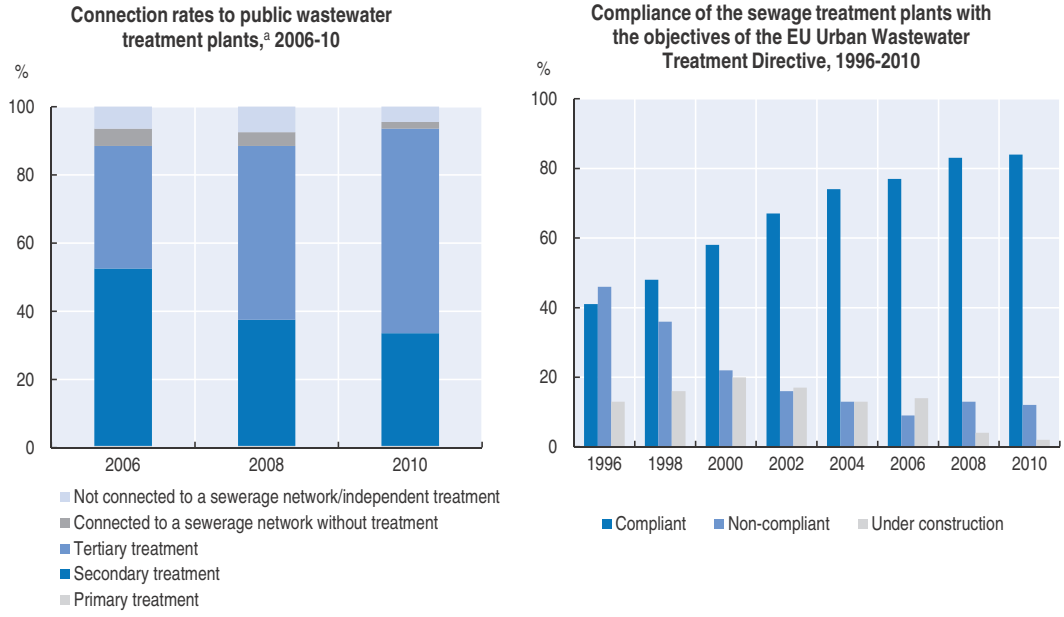
Water (SINAC) registered suitable sanitary levels of drinking water.[22] The information collected concerns more than 90% of the population, which corresponds to more than 80% of municipalities (MSSSI, 2012).

- The connection rates of the urban wastewater treatment system almost doubled since the beginning of the 1990s (OECD, 2013d). Almost all wastewater treatment plants provide secondary and/or tertiary treatment (Annex I.C) and more than 80% comply with the EU Urban Wastewater Treatment Directive (Figure 1.18).

4.4. *Health impacts*

- The latest assessment by the World Health Organization (WHO) indicates that the burden of disease attributable to environmental factors in Spain is 14%, unchanged from the previous assessment of 2007. This is among the lowest levels in the European region (WHO, 2009, 2007).
- The share of the burden of disease associated with water sanitation and hygiene corresponds to the world's lowest rate.
- The WHO estimates the number of deaths due to outdoor air pollution fell by 8% in Spain between 2005-10, from 16 182 to 14 938 respectively; this remains higher than the OECD average. According to the OECD's Value of Statistical Life,[23] the health cost of air pollution in Spain (including deaths and illness) was about USD 45 billion in 2010. Available evidence suggests that road transport accounts for about 50% of this cost in the OECD, or close to USD 23 billion (OECD, 2014d).
- Natural disasters caused 654 fatalities in Spain between 2000-12. Deaths caused by floods (mainly freshets), storms (including impacts of maritime storms on land), forest fires and heat waves account for the large majority, but Spain's population was also affected by landslides, episodes of cold weather and earthquakes. Some of these effects

Figure 1.18. **Wastewater treatment**



a) Expressed in terms of population equivalent.
Source: Country submission; OECD (2014), *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933182893

may be amplified by the impacts of climate change, as the country is characterised by complex climate patterns due to the presence of mountain ranges, the Mediterranean Sea and the Atlantic Ocean.

Notes

1. Excluding land use, land-use change and forestry.
2. Energy industries account for a somewhat greater share of CO_2 emissions (37.4%, compared with 34% for transport).
3. Including buses.
4. Diesel vehicles have accounted for approximately 70% of new vehicle sales since the middle of the 2000s (ICCT, 2012). However, diesel consumption for road transport decreased by 23% between 2007-13.
5. Bioethanol accounts for the remaining 10%.
6. DMC is the sum of domestic raw material extraction used by the economy and its physical trade balance (imports minus exports of raw materials and manufactured products).
7. A break in time series in 2006 does not allow comparisons with the previous period.
8. Around 60% of companies participating in the Ecoembes integrated system for the design and implementation of recovery of wastepaper were from Catalonia, Valencia, Madrid and Andalusia (MAGRAMA, 2013b).
9. Data for the 2008-10 average are equal to the 2007-09 average for Austria, Canada, Chile, Denmark, Iceland, Israel, Korea, Mexico and Spain; the 2007-08 average for Italy; 2007 for Greece (OECD, 2013c).
10. The most common forest type in Spain is pine, which covers 28.6% of the total forest area. Other forest types include coniferous and holm oak.
11. Annex IV provides guidelines and arrangements for the effective implementation of the convention in affected country parties of the Northern Mediterranean Region.

12. In the calculation of territorial waters by the MAGRAMA, the provisions of the exclusive economic zone (EEZ) are applied, according to which the EEZ shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured. Protected marine areas include proposed areas for 2014.
13. Aichi biodiversity targets envisage establishing a system of protected areas and other area-based conservation measures covering at least 17% of terrestrial and inland water and 10% of coastal and marine systems (CBD, 2014).
14. This includes Sites of Community Importance (SCI) and Special Protection Areas (SPAs) for wild birds under the EU Habitats and the Birds Directives.
15. This means that habitat areas are unstable and decreasing, and the conservation status of their typical species is endangered.
16. Water supply problems regularly occur in the Jucar and Segura basins during summer. In 2007-08, the city of Barcelona was forced to import water from Marseille in France. The hydrological year 2011/12 registered a 75% decrease in precipitation compared to the historical average. Basins like the Duero and Ebro were particularly affected and experienced severe droughts (MAGRAMA, 2013b).
17. For example, almost half of groundwater bodies in Catalonia experience nitrate concentration over 50mg/l due to intensive use of fertilisers, cattle-raising and, to a lesser extent, urban housing. Conversely, the river basin districts in the North show good chemical status (MAGRAMA, 2013b).
18. The top three were: unemployment (important for 80% of respondents), corruption and fraud (36%) and economic crisis (29%).
19. In addition, at coal-fired power stations, progress has been made in the introduction of secondary desulphurisation techniques, as reflected in the decline in emissions of this pollutant in the power generation sector. Sulphur contents in certain oil-derived products have also been progressively reduced, including automotive gasoline, gas-oil and residual oil.
20. Spain phased out sales of leaded petrol at the end of 2002 following a derogation granted by the European Commission from the obligations of Directive 98/70/EC, which prohibited the sale of leaded petrol from 1 January 2000.
21. Drinking water provision is the responsibility of 8 000 municipalities that provide services directly or through a municipal public company (54% of market share), through concessions to a mixed public-private company (13%) or through concessions to a private company (33%) (Hurtado et al., 2011).
22. Parameters with a lower compliance included: sulphates (89%), chloride (93%) and sodium (95%), as well as nitrate and fluoride (98%).
23. The calculation of cost using a concept known as the value of statistical life (VSL) derives from what people say (in surveys) they would be willing to pay to reduce the chances of them dying prematurely. Generally, the value of a statistical life increases with income per capita.

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PART I

Chapter 2

Policy-making environment

Over the last decade, Spain has continued to strengthen its environmental policy framework and improve co-ordination in a highly decentralised context. This chapter examines Spain's environmental governance and policy framework for environmental management. It reviews the main strategies and initiatives that were launched during the past decade in the areas of sustainable development and environmental management. It also discusses the mechanisms in place to improve horizontal and vertical co-ordination, as well as the instruments used to ensure compliance with environmental requirements. Progress in promoting environmental democracy through open access to information and improved public participation in decision making is also discussed.

Assessment and recommendations

Over the last decade, Spain has continued to consolidate its environmental policy framework, largely driven by EU requirements. While further progress was made in harmonising the laws with the EU *acquis communautaire*, the transposition of EU directives has often been late. Environmental infringements were above the EU average between 2007-13, and the highest among EU members in 2012 and 2013. Even when laws were adopted, they were often not supported by implementing regulations.

The many laws and regulations enacted during the last decade have increased the complexity of the environmental regulatory framework and increased the related costs of compliance. However, the government has recently taken a number of initiatives to reduce the regulatory burden on firms. This included the 2012 Law on Urgent Environmental Measures that significantly reformed the permitting, licensing and planning requirements. Following the creation of the Commission to Reform Public Administrations in 2013, new laws were enacted to further reduce administrative burdens, including those related to environmental impact assessment (EIA), environmental liability and the coastal zone management. It is important that streamlining regulations leads to a strengthening of environmental objectives.

Spain's environmental management system operates in a quasi-federal system with a high level of decentralisation. The 17 Autonomous Communities (ACs) now have strong regional and political identities, and are effectively autonomous in their areas of acquired competence. On the one hand, this enables the trade-offs on environmental and other issues to be tailored to local needs. It has also allowed some innovative environmental initiatives to be developed in some of the better-resourced regions, for example on strategic environmental assessment, environmental monitoring and reporting. But on the other hand, Spain's decentralised system has made it difficult to establish a coherent environmental framework, to address ambiguities, gaps and inconsistencies in institutional roles and responsibilities, and to apply environmental requirements consistently across regions. This institutional fragmentation has been particularly problematic in areas that require a national approach (such as environmental information) or action across administrative boundaries (such as water and biodiversity). The steep cuts in public budgets have also reduced institutional capacities and further impeded co-ordination efforts.

Several mechanisms, such as the Sectoral Conference on the Environment, the Environment Advisory Council and the National Council on Water, have been established to strengthen co-ordination between the national authorities and ACs. The work of the Sectoral Conference on the Environment, supported by specialist working groups, has resulted in more co-operation agreements than similar bodies in other sectors. However, the voluntary status of such mechanisms and continuing jurisdictional disputes have limited their effectiveness. Consideration should be given to how they could be strengthened, for example by making joint plans and programmes more binding,

improving the territorial assignment of budgets to finance joint agreements, convening more regular meetings and strengthening horizontal collaboration mechanisms. Some other European countries have established environment agencies to consolidate and support implementation efforts.

The relatively recent Environmental Inspection Network has provided a useful forum for regional authorities to prepare guidance documents and standards for carrying out environmental inspections and facilitated inspectors' training. This has helped to improve consistency and coherence in the interpretation and enforcement of environmental legislation. Allocation of sufficient and stable financing and dedicated, long-term staff would help to strengthen the effectiveness of this network.

There are more than 8 000 municipalities in Spain, 84% of them with less than 5 000 inhabitants. Environmental responsibilities vary. While most are responsible for the provision of water and waste management services, the larger municipalities have also environmental regulatory functions, such as permitting. Uncertainties about the roles of municipal, provincial and regional levels of government, and capacity and resource constraints, have impeded attempts to improve environmental conditions in some urban areas, particularly air and water quality. A recent reform of local government that encourages voluntary mergers of adjacent municipalities within the same province provides an opportunity to achieve economies of scale in the provision of environmental services. Co-operation among municipalities should also be fostered through national and international networks, such as the Network of Spanish Cities for Climate and the European Covenant of Mayors.

Some impressive efforts have been made in recent years to improve the collection and dissemination of environmental information at both national and AC levels. Topic-focused databases, registries and inventories have been established, for example in the field of biodiversity, which constitute major advances. The National Statistics Institute has also consolidated the system of environmental statistics in line with EU requirements. Some progress has been made in harmonising biodiversity-related data. Building on this progress, further steps are needed to make environmental information more consistent across regions. Differences in methodologies limit inter-regional comparison and the analysis of trends. The preparation of a comprehensive national assessment of the state of the environment will substantially benefit from the production of more comparative information. There is limited capacity for the economic analysis of environmental issues, which constrains efforts to develop cost-effective environmental policies and to integrate environmental considerations into other policy sectors.

Spain ratified the Aarhus Convention in 2004. Access to environmental information has been strengthened, including by the production of user-friendly state of the environment and indicator reports that make use of modern information technology. However, in practice, requests for information are not always answered within prescribed time limits and redress through the courts is slow. Opportunities for public participation have been broadened, particularly in areas like environmental impact assessment and permitting. Further steps could be taken to broaden participation in the development of policies and strategies. The legal framework for access to justice in environmental matters is well established, and environmental groups have broader legal standing than in many other OECD countries. Not-for-profit organisations are entitled to free legal aid, although they may be liable to pay costs if they lose a case. This, together with long delays in legal proceedings, limits the effectiveness of access to justice.

Recommendations

- Promote a debate among all stakeholders with a view to developing clear national strategies for issues that require common or consistent approaches at the regional and municipal level (e.g. water, waste management, environmental information).
- Conduct an independent assessment of existing mechanisms for co-ordinating environmental policies between national and sub-national levels of government; identify ways in which co-ordination could be improved, including by strengthening the Sectoral Conference for the Environment and its subsidiary bodies, and the possible establishment of an Environment Agency.
- Reinforce support for the Network on Environmental Enforcement with a view to strengthening capacity and providing a platform for sharing good practices, developing support tools and benchmarking performance; strengthen co-operation between the Network and the SEPRONA, an environmental unit of the Civil Guard.
- Provide support, including financial incentives, to groups of municipalities to co-operate in delivering water, waste and other environmental services more efficiently and effectively.
- Further reduce potential risks to human health from hazardous air pollutants by strengthening policies to reduce emissions from both stationary and mobile sources, and their implementation.
- Strengthen capacity for conducting *ex ante* and *ex post* economic analysis of environmental policies and regulations; establish closer links between the administration and the research community in this regard; systematically conduct regulatory impact assessment for major regulatory initiatives and develop guidance for how to integrate the valuation of environmental impacts into the analysis.
- Consider how compliance with the Aarhus Convention could be strengthened, including by: reinforcing efforts to respond to citizens' requests for environmental information; strengthening consultation on the development of strategies and policies, including through the Environmental Advisory Council; and considering how obstacles to access to justice (costs, delays in legal proceedings) could be overcome.

1. Spain's governance system

The decentralisation of powers and competences, which started with the approval of the Constitution in 1978, has transformed Spain from one of the most centralised countries in the OECD into a quasi-federal system with a high level of decentralisation. The speed and scope of decentralisation have varied, but today all 17 Autonomous Communities (ACs) have a strong regional and political identity, and are effectively autonomous in their areas of acquired competence. Each AC has established its institutions (a president, a democratically elected legislative assembly[1] and a government with executive and administrative functions) and legal and regulatory frameworks (Box 2.1).

Box 2.1. **Spain's multi-level governance**

The 1978 Constitution enshrines respect for linguistic and cultural diversity within a united Spain. The country is divided into 17 Autonomous Communities (ACs),* which each comprise several provinces; there are 50 provinces spread across the national territory. Each province is divided into various municipalities, totalling 8 111.

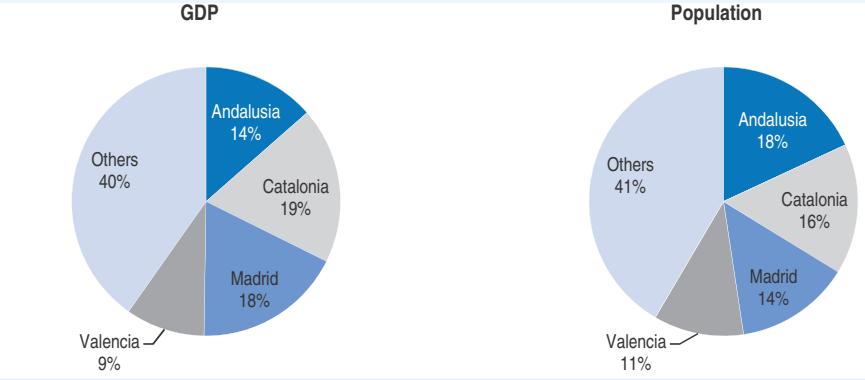
ACs differ significantly in aspects such as gross domestic product (GDP), income per capita, population density, territory, competences and historical profile. Four ACs – Andalusia, Madrid, Catalonia and the Valencian Community – make up almost 60% of total GDP and population (Figure 2.1). Income per capita reveals wide differences between ACs (Table 2.1). ACs with the highest income per capita, such as the Basque Country and Madrid, double those with the lowest, such as Extremadura and Andalusia.

The Spanish Constitution declares that all the entities of the state should enjoy autonomy with regard to the administration of their respective interests. However, the level of autonomy afforded to each region is far from uniform. For example, Catalonia, the Basque Country and Galicia have special status with their own language and other rights. Andalusia, Navarra, Valencia and the Canary Islands, in turn, have more extensive powers than some other regions. Asturias and Aragón have taken steps to consolidate language rights. In 2006, Catalonia's Statute was passed, giving the region greater autonomy. The region's parliament gained extra powers in taxation and judicial matters, although the deepening recession and Catalonia's high indebtedness have spurred calls for independence from Spain. The country's regional picture is a complex and evolving one.

The competence system distinguishes between exclusive competences of the state and of the ACs (*competencias exclusivas*), and shared (*competencias compartidas*) or concurrent (*competencias concurrentes*) competences. The Constitution explicitly (albeit generically) lists the exclusive competences of the state. The exclusive competences of each AC are listed in their Statutes of Autonomy.** Concurrent competences relate to those in which state power is limited to framework legislation (e.g. labour legislation and intellectual property law) or to determining the principles and essential aspects underpinning certain matters (such as environmental regulations). In such cases, the ACs implement the regulatory framework through further laws and regulations, provided they meet the regulatory "minimum common denominator" set by the state in the framework law. In general, ACs provide major public services in such areas as education, health and environment, administering a significant portion of public spending (close to 40% of the total). The size of the regional civil service is significantly greater than that of the state.

The autonomous state configuration establishes an administration that is closer to citizens. Combined with the principle of solidarity prescribed in the Constitution, this configuration provides citizens with access to essential public services under conditions of equality across the whole territory. However, the constitutional system is particularly complex in the attribution of competencies, and most policy areas are a shared responsibility of two or more administrations, which weakens accountability and consistency, and encourages duplication. The principle of "one administration, one competence", which guides decentralisation in many other countries, is not included in the Spanish constitutional system.

Figure 2.1. **Distribution of GDP and population by autonomous community**



Source: INE (2014), "Monthly Statistical Bulletin", July 2014 and "Spanish Regional Accounts", *INEbase* (database).

Table 2.1. **Population, unemployment and GDP by autonomous community**

	Population (1 000, July 2013)	GDP per capita (EUR, 2013)	Unemployment rate (%, 2014 Q1)
Andalusia	8 298	16 666	35
Aragón	1 304	24 732	23
Asturias	1 040	20 591	23
Balearic Islands	1 112	23 446	27
Canary Islands	2 135	18 873	33
Cantabria	575	21 550	21
Castile and León	2 444	21 879	22
Castile-La Mancha	2 024	17 780	30
Catalonia	7 221	26 666	22
Valencia	4 991	19 502	28
Extremadura	1 078	15 026	32
Galicia	2 706	20 399	23
Madrid	6 339	28 915	20
Murcia	1 472	17 901	28
Navarra	619	28 358	17
Basque Country	2 096	29 959	17
La Rioja	307	25 277	20
Ceuta	78	18 771	32
Melilla	79	16 426	24
Total	45 918	22 279	26

Source: INE (2014), "Monthly Statistical Bulletin", July 2014 and "Spanish Regional Accounts", *INEbase* (database).

* The territory of Spain also includes two Spanish-administrated cities of Ceuta and Melilla located on the north coast of Africa, sharing a border with Morocco.

** The latter may include all the powers not expressly attributed to the state by the Constitution, but the ACs are not obliged to take up these powers.

2. Policy framework for sustainable development

The development of the Sustainable Development Strategy (SDS) in 2001 attempted to create a strategic national policy framework for sustainable development based upon a transparent and open participatory process involving Autonomous Communities, local administration and nongovernmental organisations (NGOs). The task of drafting the strategy was assigned to an inter-ministerial group co-ordinated by the Cabinet of the President of the Government. Although a draft strategy was completed in 2002, its adoption was delayed due to numerous problems related to vertical and horizontal co-ordination. The participatory process was criticised by NGOs and some Autonomous Communities, which found the consultation process inadequate. The strategy was officially adopted by the Spanish Council of Ministers only in November 2007. It included seven high-priority areas: climate change and clean energies; sustainable transport; sustainable production and consumption; public health challenges; management of natural resources; social inclusion, demography and migration; and the fight against world-wide poverty. A periodic review and evaluation process based on a set of specific indicators was established under the Inter-Ministerial Group. The priorities reflected those of the 2006 EU Sustainable Development Strategy and were linked to the National Reform Programme (NRP). However, the economic crisis that hit Spain in 2008 effectively sidelined the SDS as a source of policy guidance for the government and society. However, several ACs, such as Galicia, the Basque Country and, more recently, Catalonia, adopted regional Sustainable Development Strategies.

The idea of sustainability re-emerged with the Sustainable Economy Law, adopted in 2011. This law explicitly defined the sustainable economy as one that reconciles economic, environmental and social development (Chapter 3). While a welcome articulation of what a sustainable economy might mean in the Spanish context, the Sustainable Economy Law generally reaffirms previously existing commitments, with environmental actions implemented separately from other action areas covered by the law.

3. Policy and legal framework for environmental management

Spain does not have a consolidated national environmental policy. The environmental policies of the European Union have provided unifying guidance for a multitude of strategies and programmes. An accelerated development of new EU requirements during the last decade stimulated a number of sector- and media-specific documents that established objectives, goals and specific targets on key environmental issues. The major strategic documents adopted during the last decade included: the Integrated Waste Management Programme, the National Air Pollution Reduction Plan, the Hydrological Water Plan, the 2007 Climate Change and Clean Energy Strategy (EECCEL), the Climate Change Roadmap and the National Climate Change Adaptation Plan. All have been subject to regular reviews and revisions that took account of progress, budgetary cycles and new requirements stemming from international initiatives.

Similarly to the policy framework, environmental requirements are included in a wide range of legislative instruments rather than in a single environmental law. A number of media-specific laws adopted during the last decade brought the Spanish environmental regulations closer to EU requirements. Progress has been made regarding laws that focused on specific environmental issues, such as the Clean Air Law and the Water Law. At the same time, cross-sectoral laws have environmental considerations, including the Planning and Building Law and the Business Licensing Law.

Although significant progress was made to harmonise the legal framework with the EU *acquis communautaire*, the transposition of EU directives has often been late, and has not resulted in a coherent and comprehensive body of environmental legislation. In many cases, the legislation was not followed by implementation regulations, which contributed to widening of the implementation gap. As a result, the number of environmental infringements in Spain was above the EU average between 2007-13 and Spain was the country with the highest number of infringements of all EU countries in 2012 and 2013, accounting for 11% and 8% of the total respectively. In 2013, Spain accounted for the highest number of infringement cases related to Article 260, which are opened when a member state fails to comply with a judgement of the European Court of Justice that found it had failed to fulfill an obligation under EU law.[2]

The high number of Article 260 infringements is primarily linked to ACs being late in issuing their own relevant laws and implementing their provisions. At the same time, the many regulations enacted during the last decade led to growing complexity in the legal system overall, and with regard to the environment in particular. Concerns have been expressed by decision makers and business about the regulatory burden and its effects on the competitiveness of the Spanish economy. Many rules are considered obsolete, and changes are frequent. Many entrepreneurs complain about problems with understanding the necessary requirements. At the local level, public opinion refers to "regulatory icebergs", which illustrates the proliferation of rules of all types and sources at various levels of the administration (OECD, 2014).

Responding to these concerns, the Spanish government sought to enhance the quality of laws and reduce administrative burdens on business. An Action Plan for the Reduction of Administrative Burdens approved by the Council of Ministers in 2008 was one of the first comprehensive initiatives in this regard. It initiated a number of institutional and regulatory changes to simplify the rules and procedures and facilitate business development. Among other initiatives, a pilot project related to the procedure for waste shipments within the state was carried out, with the aim of proposing simplification measures. The project engaged both the state (the environment ministry and what was then the public administration ministry), as well as the environment departments in each AC. In accordance with these initiatives, the Law on Waste and Contaminated Soils (22/2011), which transposes the EU Waste Framework Directive, included simplification measures to reduce the administrative and economic burden on companies. The Law on Urgent Environmental Measures (11/2012), which amends the Law on Waste (22/2011) included further simplification measures. It significantly reformed the permitting, licensing and planning documents and procedures not only in the field of waste management, but also in water and biodiversity management.

The simplification efforts were most recently reinvigorated by the creation of the Commission to Reform Public Administrations (Comisión para la Reforma de las Administraciones Públicas, CORA) in 2013. Its report included 217 proposals (78 concerned the central administration and 139 touched on both the central administration and ACs) that aimed to make public administration more austere, useful and effective. A number of new legal acts were enacted at the end of 2013 and 2014, including on environmental impact assessment (EIA), environmental liability and coastal zone management. These introduced far-reaching regulatory changes that cut red tape.

Despite progress, the environmental legal framework is still in need of an in-depth review. On the one hand, many legal acts do not fully conform with the EU *acquis*. On the other, they are an excessive burden on the regulated community. Reform of Spain's environmental legal system should move away from *ad hoc* legal fixes towards establishing a stable mechanism for regulatory improvement that allows wide consultations within the government and with other key stakeholders. Spain could consider developing an Environmental Code to consolidate the numerous acts that regulate separate environmental domains (waste, water, air). The consolidation would provide an opportunity to review a vast regulatory framework to identify redundancies and overlaps, and identify areas that had not been previously regulated. This process could be associated with a comprehensive strategy that would present the country's environmental vision, provide guidance for ACs and establish new specific objectives and targets that reflect both country-specific conditions and EU requirements.

4. Key environment-related strategies and regulations

4.1. *Water management*

The Water Law (Texto Refundido de la Ley de Aguas, TRLA) is the legal framework for water management in Spain. Legal amendments to the Water Law introduced in 2004 and 2005 (Royal Decree 2/2004 and Law 11/2005) transposed the requirements of the EU Water Framework Directive (WFD) and launched the development of River Basin Management Plans (RBMPs) in each of the 25 river basin districts. The 2004 Plan AGUA (Actuaciones para la Gestión y la Utilización del Agua) significantly adjusted the approach to water management adopted by the 2001 Spanish National Hydrological Plan (NHP). The new plan shifted emphasis from developing artificial water reservoirs and transfer schemes, especially the highly disputed 914 km-long water transfer scheme from the lower Ebro River in the northeast of Spain to the regions along the Mediterranean coast. It also emphasised demand management approaches, wastewater recycling and reuse, and strengthened water governance, as well as the need to build desalination plants for augmenting water supply.

The 2012 Law on Urgent Environmental Measures consolidated the Water Law and introduced measures to speed up the development of the RBMPs. Thus far, 17 RBMPs have been approved by Royal Decree. They include the 10 inter-community plans, which encompass the territory of more than one AC and fall under the jurisdiction of the state; 5 of the 13 intra-community plans, whose territorial scope remain within the territory of one AC and fall under the jurisdiction of that AC; and the 2 plans of the autonomous cities of Ceuta and Melilla.[3] Eight plans are still pending formal approval.[4]

The adoption of the RBMPs in Spain is a legally binding process that results from a broad process of consultation with stakeholders. The approved plans have gone through a six-month period of public participation, have passed the consultation boards of the river basin districts, and then the National Council of Water, which includes representatives of the central and regional governments. The RBMPs then go through the administrative process of adoption as legal text, are informed by the Council of the State and are finally passed as a Royal Decree before being officially published.

The adoption of the RBMPs during the WFD's first planning cycle was possible following agreements reached in the last two years. In a few cases – Tagus, Segura and Júcar – strenuous negotiation over some substantial aspects of the RBMP between the

central government and affected regions was required. These delays led to legal actions by the EC against Spain (in 2010 and 2011). As a result of delays, the six-year implementation period of the first planning cycle will be significantly reduced in most of the river basins, thus curtailing the effectiveness of the RBMPs. Nevertheless, the second planning cycle is now running on schedule.[5]

Spain also emphasised improved drought management practices requiring the elaboration of Drought Management Plans at the river basin level and Drought Emergency Plans for cities of more than 20 000 inhabitants. The approach was shifted from simply reacting to cyclical droughts to anticipatory management approaches in line with recommendations of the 2007 EC Communication on Water Scarcity and Droughts. The updating of the Drought Management Plans is being carried out in the second planning cycle and will be part of the RBMPs. Efforts have been made to tackle in a comprehensive and participatory way the problems of uncontrolled groundwater use in a region where intensive (and often uncontrolled) groundwater development beginning in the 1970s contributed to the degradation of protected wetland ecosystems.

The Wastewater Discharge Programme was introduced to reduce the pollution and negative effects of wastewater on the aquatic environment. Under this programme, wastewater must be returned to the natural environment (rivers or aquifers) under quality conditions prescribed by discharge permits. These permits, which must be compatible with the receiving environment, are regulated by a list of "limit concentration values" for the main physical-chemical parameters. The requirements take into account the best available technologies (BAT) and the environmental quality standards (EQS). The discharge permits are registered in a "Wastewater Census" and are subject to the payment of a wastewater control fee.

Although some progress was made to comply with the EU Directive for Protection of Waters against Pollution caused by Nitrates from Agricultural Sources (91/676/EEC) and the Wastewater Treatment Directive (91/271/EEC), Spain encountered problems in ensuring that wastewater from agglomerations with more than 10 000 inhabitants that discharge into sensitive areas is properly treated. The lack of adequate treatment systems, which should have been in place since 1998, poses risks to human health, to inland waters and the marine environment. Residents in some localities have suffered from drinking water that is not fit for human consumption.

4.2. Climate change and air pollution reduction

Spain is a party to the Kyoto Protocol. The related EU Burden-Sharing Agreement (2002/358/EC) limited greenhouse gas (GHG) emissions to an average of 15% above 1990 levels from 2008-12. To meet this objective, a comprehensive set of climate change policies was developed by the central government and Autonomous Communities. The 2004 Spanish Strategy for Meeting Objectives under the Kyoto Protocol and the 2007 Spanish Strategy for Climate Change and Clean Energy defined the basic framework for medium-long term actions, including measures for a direct or indirect reduction of greenhouse gases and adjustment to their effects. The policies were reinforced by specific plans and initiatives on energy (e.g. the 2006 plan to phase out support to coal, the 2007 decree on the promotion of renewable electricity and the 2008-12 Action Plan of the 2004-12 Strategy for Energy Saving and Efficiency in Spain) and transport (e.g. 2009 regulations setting CO_2 emission performance standards for new passenger cars or the promotion of biofuels in road traffic based on the National Action Plan for Renewable Energies 2011-2020). The EU

Emissions Trading System (EU ETS) was implemented starting in 2005. For non-ETS sectors, Spain has developed several programmes and projects since 2012. Examples include the Climate Project Programme, in which the government acquires verified CO_2 equivalent emissions reductions from projects in Spain, as well as PIMA SOL, which promotes the reduction of GHG emissions in hotels and other tourism facilities through energy efficiency improvements.

Spain's deployment of renewable energy has helped reduce reliance on imported fuels, and spurred the development of industry leaders in the wind and concentrated solar power sectors (Chapter 3). The most recent National Plan for Scientific Research, Development and Technological Innovation (2013-16) establishes a state R&D programme with a major focus on clean energy and transport, and climate change.

Spain also developed the National Climate Change Adaptation Plan (Plan Nacional de Adaptación al Cambio Climático, PNACC) in 2006. The PNACC remains the framework for the co-ordination of public efforts to assess impacts, vulnerability and adaptation options for addressing the impacts of climate change on sectors and natural resources. At the regional level, most ACs have developed their own climate change adaptation plans or strategies, either as individual strategies or within general climate change programmes.

Spain's regulatory framework for addressing GHG emissions was accompanied by efforts to reduce local air pollution. Two principal measures were the Law (34/2007) on Air Quality and Protection of the Atmosphere and the National Plan for Air Quality and Atmosphere Protection 2013-16, referred to as "Plan Aire". The law made it mandatory for ACs and cities with over 100 000 inhabitants to develop and adopt programmes to improve air quality and comply with targets set for their territory. Plan Aire provides a reference framework to improve air quality in Spain through specific measures, as well as through co-ordination with other sectoral plans. Spain also launched three programmes to support cleaner vehicles: the five-phase Efficient Vehicle Incentives Programme (PIVE) that aimed to modernise the nation's motor vehicle stock (Box 2.2); the 2010-14 Action Plan to Promote Electric Vehicles (Plan MOVELE), which established a target of having 250 000 electric vehicles on Spanish roads by the end of 2014; and the Plan to Promote the Environment (PIMA Aire), which aims to renew the commercial vehicle fleet with more efficient and less polluting vehicles.

Despite progress, Spain experienced problems in complying with EU air quality limit values for airborne particles known as PM_{10} between 2000-09. However, air quality has improved significantly since 2006 and the percentage of the population exposed to PM_{10} above the limit values fell below the EU average from 2010 (Chapter 1). In 2010, the European Court of Justice condemned Spain as more than 100 plants continued to operate without updated permits that comply with EU rules to prevent industrial pollution.

4.3. *Waste management*

The first National Municipal Solid Waste Management Plan (2000-06), as well as the Integrated National Plan on Waste (PNIR) (2008-15), launched several initiatives ranging from separate collection of recyclables to upgrading of recycling facilities. The PNIR analysed waste management systems comprehensively, and in comparison with the previous plan, established a number of qualitative and quantitative targets for managing additional waste streams, as well as targets applying specifically to ACs. In 2011, the new

Box 2.2. **Efficient-Vehicle Incentive Programme (PIVE)**

PIVE was approved by the Spanish government in September 2012 with an initial budget of EUR 75 million. The programme aimed to replace passenger vehicles over 10 years old and light-commercial vehicles over 7 years old with high-efficiency models that consumed less fuel and generated fewer CO_2 emissions.

New cars eligible for the purchase subsidy had to meet the following criteria: i) be registered with the Institute for Diversification and Saving of Energy (IDAE) of the Ministry of Industry, Energy and Tourism; ii) have the Class A or B energy-saving label, i.e. emitting less than 160 grams of CO_2 per kilometre; and iii) have the price below EUR 25 000 before VAT.*

Public aid amounted to EUR 1 000 per vehicle (EUR 1 500 for large and adapted vehicles). The manufacturer, importer or car dealer were committed to contribute an additional discount of EUR 1 000. PIVE, managed by the IDAE, was opened to all car distributors on a voluntary basis. As of mid-2014, 2 885 car dealers had been registered as collaborators.

The programme's reported success, along with the market forecast, resulted in its extension for an additional four phases (PIVE 2 launched in February 2013 with a budget of EUR 150 million; PIVE 3 in July 2013 with EUR 70 million, PIVE 4 in October 2013 with EUR 70 million and PIVE 5 in January 2014 with EUR 175 million) with slight amendments in the eligibility criteria for grant support, such as the age reduction of the vehicle to be scrapped.

As in other countries, fleet renewal schemes have often been introduced to stimulate consumer spending and/or assist car manufacturers and dealers in times of economic duress. In this regard, the programme was important in Spain since it is the third largest European manufacturer of cars (accounting for nearly 11% of cars produced in Europe) and the largest European manufacturer of light commercial vehicles (accounting for 27% of European production). Moreover, the Spanish scheme was also expected to deliver significant CO_2 and pollution reduction benefits. To date, nearly 365 000 passenger cars and light commercial vehicles have been replaced within the programme. An initial evaluation of the PIVE plans indicated the estimated accumulated fuel saving is close to 127 million litres a year and reduced emissions of some 262 000 tonnes CO_2/year.

Spain has yet to carry out an in-depth evaluation of the programme. The 2011 OECD/International Transport Forum study of the effectiveness of fleet renewal schemes in reducing CO_2 and NO_x emissions underlined the need for targeted incentives and sufficient differentiation. These policies would capture CO_2 or fuel economy benefits, but more importantly, they would also capture NO_x and safety benefits; the latter tend to outweigh the former for cars targeted by fleet renewal schemes. Another finding was the need to design schemes that target older vehicles still in use; retiring barely used vehicles provides minimal benefits. Finally, the study highlighted the complexity of potential environmental and safety trade-offs in developing effective fleet renewal schemes. Schemes seeking principally to reduce CO_2 emissions or improve fleet-wide fuel economy should, perhaps counterintuitively, target more recent vehicles since their higher vehicle kilometre travel outweighs the per-kilometre emissions of older, less-used vehicles. It also underscores the need to control for the type of replacement vehicle chosen in the fleet renewal scheme.

* For electric, plug-in hybrid and range-extended vehicles, the limit is set at EUR 30 000. Such a limit was also applied to vehicles of over five seats being purchased by large families or adapted vehicles being purchased by disabled persons.

Source: IDAE (2014).

law on waste and contaminated soils transposed the Waste Framework Directive (2008/98/EC) into Spanish legislation and adopted all related targets and objectives.

The regulatory changes at the national and regional level allowed for wider use of waste collection charges, and several regions applied taxes on the landfilling of industrial and/or construction waste. Some ACs also applied both landfill and incineration taxes on municipal solid waste, which have successfully increased separate collection of waste. Certain municipalities in Catalonia have also implemented "pay-as-you-throw" systems.

During Spain's decade of intense construction activity, which ended in 2007, construction and demolition waste often ended up in illegal dumps. This was addressed through a 2008 government decree that required developers and construction companies to properly dispose of construction waste through payment of a deposit fee, which had been successfully tested and piloted in Sevilla.

4.4. *Biodiversity*

Spain has made significant advances in the last 10 years with respect to developing its legislative framework for biodiversity conservation. The 2007 comprehensive Natural Heritage and Biodiversity Law, which transposed the Habitat Directive (92/43/ECC) and consolidated a number of previous biodiversity laws, became the key basic legal framework for the conservation, sustainable use, restoration and enhancement of biodiversity and ecosystem services. The law, and the accompanying Natural Heritage and Biodiversity Strategic Plan (2011-17), set out key biodiversity targets. These targets, which included those made under the Convention on Biological Diversity (CBD), had a timeframe for implementation in some cases. Many of them go beyond the requirements of the EU *acquis communautaire* (Chapter 4).

Another important piece of legislation that emerged during the last 10 years is the Law 41/2010 on the Protection of Marine Environment, which implements the EU's Marine Strategy Framework Directive (2008/56/CE). This law clarified and classified marine-demarcated areas. It also created the Spanish Protected Marine Areas Network, including Natura 2000 sites and marine reserves for sustainable fishing. Management plans for particular marine areas are currently under development. Other relevant policies include Recovery and Conservation Plans for the Threatened Marine Species and National Strategies for the Conservation of Threatened Marine Species such as sea turtles, the Balearic shearwater, the Ferruginean limpet and the killer whale of the Gulf of Cádiz. In addition, Spain has a National Strategy for Reducing By-catch of Vertebrates (Sharks, Sea Turtles, Seabirds and Cetaceans) in Fishing Gears.

4.5. *Coastal zone management*

Spain attracts nearly 60 million international tourists annually. The coast is one of the country's main attractions, drawing tourists who want to experience the quality of the coasts and beaches. In the early 1980s, the need to protect its coastline from overly aggressive tourist construction pushed the Spanish government to regulate construction on the seafront through the Law of the Coasts (22/1988). Subsequently, the Law for the Protection and Sustainable Use of the Coast (2/2013) modified the concept of maritime-terrestrial public domain to reinforce legal safeguards in favour of coastal protection. The law also aimed to harmonise public domain in all of Spain's ACs and provides guidelines for concessions related to the sustainable use of coastal areas. The new law provides

greater legal certainty, ends irregular situations that still existed along the coast and, ultimately, ensures protection of the coast.

However, the adoption of the new law has been controversial, resulting in various appeals alleging unconstitutionality. Critics argued the law legitimised previous transgressions and reduced the size and stringency of the protection easements strip. Yet the law aimed to retain the same size of coastal protection zone (100 m) for the majority of coastal areas and only allowed special provisions for reducing it (to 20 m) in areas that had urban character before 1988. It extended concession deadlines and also expanded the legal definition of the "seashore". In effect, this left areas of significant environmental value out of the public domain, while introducing new technical criteria for defining the limit of the public domain. In addition, 12 urban areas (which had an urban character before 1988) have been excluded from the public domain. It is too early to evaluate the actual effects of reform. While the law was being formulated, no evaluation was published on the possible consequences of reducing the protection zone or of changing criteria for demarcating the public domain.

5. Institutional and co-ordination framework for environmental management

5.1. *Key institutions*

The national level

The national administration determines the principles of environmental policies and develops framework environmental legislation and plans. In all cases, objectives are set by the central authorities in co-operation with the ACs. National authorities are also responsible for transposing EU environmental regulations into Spanish law and establishing national strategies to guide implementation of regional and local environmental policies. In a few areas, such as coastal zones, marine waters, climate change or international relations, national authorities have an exclusive role for management and implementation.

Between 1996-2008, the Ministry of the Environment (Ministerio del Medio Ambiente, MMA) was the main national-level governmental body in charge of developing environmental policies and framework regulations. The ministry was also in charge of co-ordinating environmental policies within the EU and at other international forums. As one of its principal tasks, it ensured the Spanish environmental legal framework was harmonised with that of the EU and ensured the ACs pursued this harmonisation.

Following governmental restructuring in April 2008, the MMA merged with the Ministry of Agriculture, Fisheries and Food to form the Ministry of the Environment and Rural and Marine Affairs and renamed the Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente, MAGRAMA) in December 2011. The new ministry acquired the responsibility for protection of the sea, and strengthened policy links between the environment, agriculture and rural development.

A handful of specialised agencies support the Secretariat of State for Environment. One such example is the National Parks Autonomous Organisation (Organismo Autónomo Parques Nacionales, OAPN), which supports and co-ordinates a Network of National Parks managed by the ACs, co-ordinates the Man and Biosphere (MaB) Programme and manages the National Center for Environmental Education (CENEAM). Another example is the Biodiversity Foundation, a non-profit public organisation set up by the Ministry of Environment in 1998. The Biodiversity Foundation has become an important source of

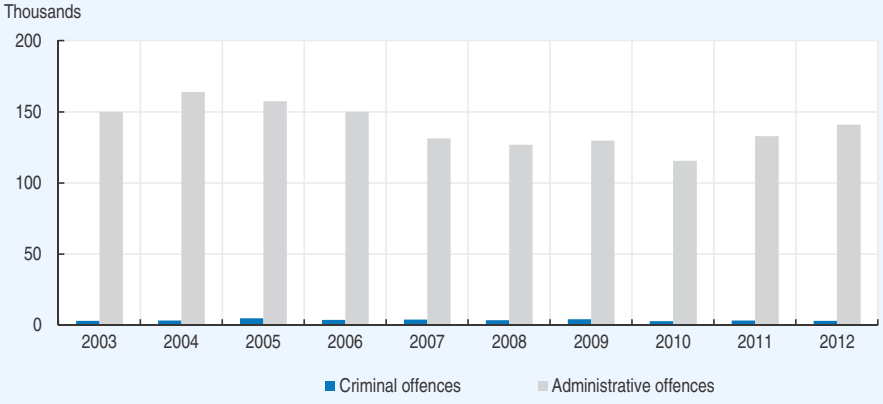
independent expert advisory services and public awareness-enhancing activities related to biodiversity conservation (Chapter 4). The SEPRONA, an environmental unit of the Civil Guard (a military public security body), provides an important support to the enforcement of biodiversity and waste-related legislation (Box 2.3).

Box 2.3. **Fighting environmental crimes**

The Nature Protection Service (Servicio de Protección de la Naturaleza, SEPRONA) was created in 1988 as part of the Civil Guard. Its core objectives are to monitor compliance and enforce the national provisions related to nature conservation, including illegal trade of protected species, illegal releases of pollution to waterways and soil, illegal logging and arson, poaching and animal welfare. The SEPRONA is also involved in investigating illegal handling, treatment and disposal of dangerous substances and waste.

The SEPRONA, with its 1 700 officers, addresses between 115 000-160 000 cases every year, including administrative and criminal infringements (Figure 2.2). The largest proportion of complaints is connected with infringements of wildlife legislation (50 000 complaints relate to wild animals), as well as inadequate waste management. About half of criminal offences related to arson. Between 300 and 1 000 people are arrested every year for criminal offences against environment regulations. Although the SEPRONA's responses to complaints decreased during the economic crisis, they have increased again since 2010. Citizens play an important role in detection of environmental infringements by reporting offences through calls and emails.

Figure 2.2. **Trends in the SEPRONA's interventions concerning environmental matters**



Source: MAGRAMA (2013), *Environmental Profile of Spain 2012.*

StatLink http://dx.doi.org/10.1787/888933182911

Various mechanisms have been considered to strengthen the institutional framework for environmental management in Spain. One option included creating a national environmental agency to provide technical support for the MAGRAMA's work on developing environmental policies and legislation, and strengthen co-ordination of environmental monitoring activities. It could also facilitate the coherent implementation of national environmental policies through scientific and technical co-ordination with the 17 environmental offices at the Autonomous Community level. Adoption of the Law of State Agencies in 2006, which created a new organisational and management model for

central government, provided an opportunity to create such an institution. On the one hand, it allowed a high degree of autonomy for state agencies. On the other, it strengthened mechanisms for evaluation and accountability that were focused on results. However, an early assessment concluded that the new agencies increased spending, mainly due to variations in personnel costs, an important consideration in the context of reduced public spending. Since then, the creation of new agencies has been subject to annual limits. Still, the environment ministry was successful in creating the State Meteorological Agency in 2008. Recognising these difficulties, a feasibility study could assess the advantages and disadvantages of creating an environmental agency to help the MAGRAMA carry out its functions and support policy implementation at the sub-national level. The experience from other OECD member countries, such as Italy and the UK, could provide important insights with respect to costs and benefits of such institutions, their management structures and relations with different levels of government.

Autonomous Communities

The national administration is responsible for basic legislation and national planning, coastal zone management and maritime. However, the ACs have become primarily responsible for implementing environmental policies and enforcement (Box 2.1). These administrations issue permits that adapt nationally legislated objectives into a regional context. They can also define priorities for environmental action within their jurisdiction, introduce specific policy instruments, carry out investment programmes, monitor environmental performance and respond to non-compliance. Each AC has an environmental department/ministry (*Consejería*) usually combined with agriculture, water, rural affairs or territorial planning. The departments' environment-related operations are in many regions supported by specialised organisations, including the Environmental Management Company (Ihobe) in the Basque Country, the Environment and Water Agency in Andalusia, the Environmental Management and Development (Gedesma) in Madrid or the Waste Agency in Catalonia. They provide important technical and staff support for policy planning and facilitate implementation.

Special institutional arrangements are applied in the water sector where the central government manages marine and inter-regional waters and ACs manage intra-regional waters. If a river basin crosses a regional border, it falls under the jurisdiction of the state; and the water is administered by 1 of the 12 river basin authorities that operate under the MAGRAMA. The river basins that remain within the administrative boundary of individual regions are administered by 1 of the 13 autonomous regional water agencies. Authority over groundwater, which became a public good in 1985, is connected within the respective river basin authorities or regional water agencies. The National Water Council oversees the drafting and monitors implementation of the National Water Plan and Basin Management Plans. It consists of representatives of relevant national administration, ACs, local authorities and major water-users associations. Coastal and marine water resources are governed nationally by the Directorate-General for Coastal and Marine Sustainability of the MAGRAMA. However, sectors such as shipping, fishery and ports have their own systems for environmental regulations and management.

The municipal level

The law, although imprecise, obliges municipalities to provide certain minimum services, differentiating obligations in accordance with the population. Municipalities with

more than 50 000 inhabitants (136 of 8 111) are entrusted with general environmental powers subject to prescriptions set out by national or regional authorities. These bodies participate in granting environmental authorisations, including integrated permitting in cases where the AC delegates this responsibility to them. Municipalities also regulate environmental impacts in the context of town planning rules.

There are a large number of small municipalities (60% count less than 1 000 inhabitants and 84% less than 5 000[6]), which are distributed unequally across the country. As a result, environmental responsibilities in municipalities vary. While most provide water services,[7] some carry out environment protection activities. In many cases, they are forced to implement these competences because higher levels of government failed to provide them. Environmental management can also be entrusted to provinces that provide services such as water supply or waste management to several municipalities. In such cases, each provincial government issues annual provincial plans for the co-ordination of works and services provided to municipalities. The plans, prepared with the participation of municipalities, must be accompanied by reports indicating the objectives and criteria for the allocation of funds. Their development is co-ordinated at the AC level and may be funded by the province's own budget, through municipal contributions, or by the AC and the state.

The Law on Rationalisation and Sustainability of the Local Administration, approved in July 2013, aims at an in-depth reform of the organisation and competences of local governments and provinces in Spain. In particular, the law should help clarify and simplify the competences of municipalities to avoid duplication with other levels of government, and rationalise the structure and organisation of the local administration. The new regulations will, in particular, encourage voluntary mergers of adjacent municipalities within the same province and promote shared provision of services for several municipalities. This provides an opportunity to achieve economies of scale in the provision of environmental services.

5.2. *Horizontal and vertical co-ordination*

Horizontal co-ordination at the national level

Inter-ministerial co-ordination is carried out through a number of committees. Some have a long history, such as the National Large Dams Committee established in 1955, but several have been established recently. For example, the Inter-ministerial Commission on Climate Change, established in 2011 and chaired by the MAGRAMA, brings all relevant ministries together to discuss policies and measures regarding climate change and to monitor their implementation. In addition, the Inter-ministerial Commission on Marine Strategies (CIEM), established in 2012, co-ordinates the various marine strategies between central government agencies dealing with the marine sector. The creation of these bodies aimed to better address multiple EU and international marine commitments.[8]

Vertical co-ordination between administrative levels

Most interaction between different levels of administration takes place in the context of "sectoral conferences", which are established for each of Spain's 38 economic sectors. The Sectoral Conference on the Environment (Conferencia Sectorial de Medio Ambiente, CSMA) brings together heads of environmental departments/ministries of all ACs and the MAGRAMA. Other political and administrative authorities can participate, but only as

observers. The main functions of the CSMA are to agree on national legislation that affects regional powers; to approve and monitor plans and programmes whereby the central administration and regional governments decide to co-operate for a specific period; to exchange information between central-state and regional governments; and to formulate joint positions at the international level, including the EU.

Environmental policy encompasses a wide range of concurrent responsibilities between the national and regional level. Moreover, the ACs' competencies are usually affected by EU decision-making, which is co-ordinated at the national level. Consequently, the CSMA has developed into an important forum for co-ordination of activities between the ACs and the MAGRAMA. The meetings, organised at least twice a year, focus on selected themes of common interest and allow the regions to communicate their concerns and interests to the central government. The forms of co-operation include "general protocols" that establish a general political orientation or a general framework and a methodology for collaboration, as well as "joint plans and programmes" or "co-operative covenants" (*convenios*) to achieve common objectives in matters where the state and the ACs have concurrent competences.

Over time, a system of more specialised multi-level co-ordination bodies on specific issues emerged supported by the lower level working groups of various forms and mandates. These included the National Council on Water (2001); the Climate Change Policy Co-ordination Commission and its working groups (2005); the State Commission on Natural Heritage and Biodiversity (2007); and the Waste Co-ordination Commission (2011). In the case of water, for the management of river basin districts that cross a regional border, there is intensive co-ordination among the state and the ACs. The creation of the Environmental Policy Advisory Council for European Community Affairs in 2012 was an important step towards strengthening the implementation of EU environmental policies. The other form of co-operation includes "bilateral co-operation commissions" (Comisiones Bilaterales de Co-operación). These are similar to the sectoral conferences, but are established between the state and a single AC to solve co-ordination problems in a more focused and timely manner. A successful model developed in the environmental field has been extended to other sectors.

Despite this comprehensive system, the sectoral conferences have been criticised for being strongly influenced by political dynamics and having weak decision-making powers, as decisions are not binding for regional governments.[9] In 2008, the Council of States noted there were no conflict prevention mechanisms to avoid disputes, or to resolve simple contradictions and overlaps between the state and the ACs. The creation of more specialised and targeted committees improved co-ordination, but unresolved issues related to unclear division of state-regional relations still lead to a number of constitutional disputes; these end up in court, adding to the congestion of the judicial system. Several cases have been related to water management. For example, ACs have appealed to the Constitutional Court because their respective boundaries do not coincide with those of the river basins. The central administration could be more proactive in developing principles and leveraging existing multilevel dialogue platforms to improve policy and regulatory co-ordination; increasing requests for autonomy from the ACs, however, is an important limiting factor.

Although the CSMA has produced the highest number of co-operation agreements signed between the regions and the national administration, there is scope for improving

its effectiveness. Specific measures include giving more relevance to the CSMA's joint plans and programmes as binding mechanisms for implementation, improving the territorial assignment of budgets to finance those joint plans and programmes, ensuring more regular meetings and strengthening horizontal collaboration mechanisms (OECD, 2014). Establishing a permanent secretariat to deal with conference organisation and follow-up could strengthen the CSMA's role and impacts.

Specialised co-operation networks

Two separate networks provide an important support to environmental offices of the ACs. The first – Environmental Authorities Network (Red de Autoridades Ambientales, RAA) – is a forum for co-operation between the regional environmental authorities and the authorities responsible for programming and management of EU funds. The network is co-financed by the European Regional Development Fund (ERDF) in the framework of the EU Technical Assistance Operational Programme. It serves as a platform to exchange experience and disseminate good practice related to the preparation and implementation of EU-funded projects, analyse impacts of EU funds on the development of environmental policies and anticipate potential risks that may require funds reprogramming. Since its inception in 1997, the RAA has established thematic working groups that develop proposals for the integration of environmental concerns into sectoral policies.

The second network – Environmental Inspection Network (La Red de Inspección Ambiental, REDIA) brings together enforcement officers from regional environmental authorities and the MAGRAMA. This relatively new network has become instrumental in promoting the exchange of information and experiences between environmental authorities of the AC on environmental inspections and developing joint technical projects in this field. The network, which co-operates closely with the European Enforcement Network (IMPEL), has produced guidance documents and standards for carrying out environmental inspection and facilitated inspectors' training. REDIA's activities help improve consistency and coherence in the interpretation and application of environmental legislation. Allocation of sufficient and stable financing and dedicated long-term staff, however, would help strengthen its effectiveness.

The Spanish Federation of Municipalities and Provinces (FEMP) has been mobilising environment-related activities at the local level. In 2006, the FEMP established a network of Local Authorities on Biodiversity that supports municipalities in projects related to the conservation and enhancement of biodiversity in urban environments, and restoring damaged or degraded areas. In 2013, the MAGRAMA signed a three-year agreement with the FEMP to collaborate on climate change mitigation.[10]

Sub-national co-ordination

Horizontal co-operation between ACs is less formal than between ACs and the national level, relying often on personal contacts and voluntary initiatives. Some ACs are successfully using an informal network for mutual support and advice. Co-operation may take the form of "relationships of special co-operation", which vary because of historical, cultural or geographical factors. Such relationships are usually reflected in the corresponding statutes. This is the case for Andalusia with Ceuta and Melilla, and for the Balearic Islands with the ACs in which Catalan is a shared official language. ACs may also sign "agreements" and "co-operation agreements" regarding the management and

provision of services, which must be communicated in advance to the general parliaments of the ACs. Agreements have to be communicated to the Senate and published in the Official Bulletin.

6. Environmental policy and performance evaluation mechanisms

Environmental monitoring and reporting

The collection of primary environmental data remains the responsibility of the ACs. Several ACs have developed extensive environmental information systems and networks related to their respective territories, with a number of topic-focused databases, registries and inventories. Most, but not all, produce regular reports on the state of the environment with detailed statistical information on various elements. In many cases, environmental statistics are supplemented by environmental or sustainability indicators and thematic reports that also contain policy analysis. The reports and databases are available on the Internet, where large municipalities present "near-to-real" time information concerning environmental problems, especially air quality. These products allow the environmental offices of the ACs to disseminate regional and local data to the public; by developing and reviewing information, they contribute to policy planning and implementation at the local and regional level.

Considerable progress has been made over the last decade in developing integrated information systems on specific issues at the national level. For example, the Natural Heritage and Biodiversity Spanish Inventory and the Nature Data Bank, made operational in 2011, are the main information knowledge tools for supporting the objectives and targets of Spain's biodiversity policy. Similarly, the integrated system of water information (El Sistema Integrado de Información del Agua, SIA) collects information related to water management in a centralised and harmonised information system,[11] while the National Drought Observatory publishes regular reports on the situation in inter-regional river basins.[12] The reporting requirements to international obligations, such as the EU NEC Directive, the UN Convention of Transboundary Air Pollution, the UN Climate Change Convention or the OSPAR Convention, helped consolidate regional data on air emissions under the Spanish Inventory System and Projections Pollutant Release to Atmosphere (El Sistema Español de Inventario y Proyecciones de Emisiones de Contaminantes a la Atmósfera, SEIPECA). The system allows a regular collection of anthropogenic emissions by sources and removals by sinks and helps in projecting future trends under different scenarios. The environmental information system is being integrated into implementation of the 2007 EU INSPIRE Directive (2007/2/EC), which establishes an infrastructure for spatial information in Europe. As an interactive geoportal based on GIS technology launched in 2011, the MAGRAMA is a good example of bringing together national geographic information of an environmental nature into the GIS system.

The National Statistics Institute (INE) also collects information at the national level. It carries out annual or biannual surveys in three thematic blocks: water (including water supply and treatment, and water use in agriculture), waste and environmental protection expenditure. More recently, the INE developed a set of environmental accounts, including material flows, forestry and a pilot study on environmental goods and services. Energy accounting is under development. Estimates for the environmental accounts have been made possible through the consolidation of the INE's system of environmental statistics; this provides a strong basis for future requirements to comply with the European Statistical System (ESS) Economic-Environmental accounting regulations.

In addition to the state of the environment reports at the regional level, a number of regular reports are produced at the national level. Since 2004, the "Environmental Profile of Spain" has provided an annual snapshot of the country's environmental situation, analysing major pressures on the environment and monitoring effectiveness of policies. This series aims to fulfil the requirements of the Aarhus Convention regarding the dissemination of environmental information. The methodology employed to produce the reports is similar to that used in reports published by the European Environment Agency (EEA) and the OECD. The 2012 edition is available in an interactive electronic version that can be downloaded on mobile devices. Since 2008, the MAGRAMA has produced a separate detailed annual yearbook that offers detailed regional and national statistics on various aspects of the environment. The Public Data Base on Environmental Indicators, which lists 68 key environment indicators selected in co-operation with the European Environment Information and Observation Network (Eionet), is also available from the MAGRAMA's website.

These developments are impressive, but Spain's information system could still be strengthened, especially by ensuring that all ACs contribute to data collection and that regional information is harmonised and up-to-date. Despite important progress, many inventories remain incomplete, inconsistent or heterogeneous across regions. This makes a comprehensive national assessment of the state of Spain's environment difficult. Differences in methodologies do not allow analysis of trends. More efforts are needed to consolidate methods and statistical techniques for the systematic production of environment-related information, reports and surveys; improve timeliness, coverage and quality; and link environmental outcomes with policies. All efforts should be based on careful review of funding, which becomes difficult to ensure in light of budgetary constraints. For example, the Spanish Sustainability Observatory, created by the environment ministry in 2006 to develop and present annual reports based on indicators of sustainable development, was closed in 2013 due to lack of funds.

Although progress has been made in collecting information related to the economic aspects of environmental policies, data are still far from complete, especially regarding environmentally harmful subsidies, the cost of inaction or benefits of environmental policies. To address these challenges, the MAGRAMA should work closely with the INE, regional authorities and the scientific community, providing them with more guidance to co-ordinate collection methods, data characteristics and data flows. The most recent work on green growth indicators should be expanded to link environmental and economic policies more closely. More targeted capacity building is also needed for less advanced regional offices. The Environmental Agencies Network should be actively used to transfer experience from more advanced regions and to co-ordinate activities across the country.

Regulatory impact assessment

Appropriate assessment of costs and benefits during the legislative process, known as the regulatory impact assessment (RIA), can bring significant improvements in the quality of new regulations. This refers to the impacts of environmental regulations on the economy and of economic regulations on the environment.

In Spain, impact assessment of legislative and secondary regulatory proposals has been enshrined in the legal system for a number of years. Since 1997, the development of legislative proposals included *memorias*, which comprised studies on the need and appropriateness of the proposal, an economic report with estimated costs (introduced in

2003) and a report on the gender impact of the measures. The *memorias* did not, however, represent a fully-fledged impact assessment process. For instance, there were no standard analytical methods, such as a cost-benefit test. The approach to analysis and the presentation of results was left to the discretion of each ministerial department. As a consequence, impact assessments of national legislation were produced at the very last stages of the drafting process, and with varying degrees of quality and completeness. It was broadly acknowledged within the administration that RIA was not working, not least because ministries needed help to tackle impact assessments.

In 2009, the system was significantly improved by introducing a mandatory *ex ante* impact assessment. In line with OECD best practices, it allows regulators to concentrate their resources on high-impact regulations by allowing a simplified analysis of low-impact regulations. The supporting guidelines on RIA presented a unified evaluation methodology and set the basis for systematic *ex post* evaluation. In terms of institutional set up, the functions of co-ordinating, promoting and monitoring developments are assigned to the State Secretariat of Public Administration (Secretaría de Estado de Administraciones Públicas, SEAP) at the Ministry of Finance and Public Administration.

The MAGRAMA, like all other governmental bodies, is required to carry out the RIA on proposed regulations, but progress has been limited by the ministry's lack of capacity for analysis. There are still no explicit and formal provisions for quality control and effective support (i.e. capacity building) for officials. Overall, the RIA has met with serious challenges as analysis is often prepared late in the legislative process after proposals have been drafted. Although the new guidelines stress economic impacts (i.e. on prices, employment, small and medium-sized enterprises, and competition) and measuring administrative burdens, the RIA remains relatively narrow. The guidelines do not provide any orientation on data collection and ignore environmental impacts. As a result, the RIA continues to be largely perceived as a procedural burden by most regulators, limiting its added value. There is a need to significantly upgrade the RIA system and promote a culture of *ex ante* evaluation from the early stages of the policy-making process. Furthermore, upgrading the RIA system would pave the way to use this tool *ex post* to evaluate the effects of regulations.

Efforts to embed an evaluation culture into public administration have been made in the past, for example, through the Agency to Evaluate Public Policies and the Quality of Services (Agencia Estatal de Evaluación de las Políticas Públicas y la Calidad de los Servicios, AEVAL). In operation since January 2007, the agency promotes and conducts evaluations and impact analyses of the Spanish government's public policies and programmes, as well as of its management of service quality, while promoting the rational use of resources and accountability to citizens. The AEVAL has a dedicated environmental policies division that evaluated the National Registry of Greenhouse Gas Emissions Allowances (RENADE) in 2007; actions financed by the national budget in areas of socio-economic influence for national natural reserves in 2008; and management and functioning of hydrographic basins in 2009. However, this agency no longer plays a prominent role in the policy-making process. Strengthening the AEVAL's role in reviewing national policies, including the quality of the RIA and evaluating general compliance with this tool, could help strengthen evaluation as a routine part of policy making. Other institutions that should also contribute to evaluating environmental policies and their implementation include the Spanish Court of Audit (Tribunal de Cuentas de España, TCE).

Strategic environmental assessment

Strategic environmental assessment (SEA) of plans and programmes was already carried out in Spain in the 1990s, making the country one of the early adopters of the concept. Municipal land-use plans have been subject to environmental assessment in several ACs, like Andalusia or the Basque Country. SEA procedures, developed by the Spanish Environmental Authorities Network, were carried out at the regional level to evaluate community development programmes. A limited number of national plans were also assessed on a voluntary basis, including on water and road infrastructure development.

The SEA procedures became obligatory following the adoption of the Law on the Assessment of the Effects of Certain Plans and Programmes on the Environment (9/2006). The law transposed the EU SEA Directive (2001/42/EC) into Spanish law, two years after the EC deadline. In addition to the basic requirements applying to the whole territory, the law also allows the ACs, in the framework of their competencies, to develop their own SEA legislation with additional requirements. For example, the Catalan legislation sets out a more complex version of the SEA that includes a preliminary sustainability report, followed by the mandatory sustainability report called for in the SEA Directive. Private plans and programmes are also included in the scope of the Catalan SEA. However, in most ACs, SEA provisions were added to a traditional environmental impact assessment. In those ACs, SEA and EIA processes are bound together in the same legislation (Chapter 5).

According to the Environmental Assessment Law, an administrative body (Órgano Ambiental, OA) supervises the SEA process, including submitting the scoping document to the promoter of a plan or programme, determining the Environmental Report content, consulting with parties and defining the information process (time frame, scope, modes). The Ministry of Agriculture, Food and Environment is the OA for the SEA at the national level, while each Autonomous Community has a specified OA for these purposes. In most cases, the SEA process at the regional level follows the nation-wide scheme: the OA guides and supervises the SEA process.

In each SEA procedure, the scoping document defines the scope and level of detail of the information to be included by the developer in the Environmental Report. Many ACs have developed their own methodologies. For example, the governments of Catalonia, Valencia and La Rioja issued specific guidelines, including for individual sectors such as urban planning, water, energy and mobility. Although these guidelines are useful for promoters, SEAs often lack a clearly identified methodology, especially for complex and overlapping impacts and cumulative effects. As a result, SEAs are implemented in a similar way as EIAs are prepared at the project level, especially when municipal and intra-regional plans and programmes are considered. Most SEAs have a qualitative character and include comparative matrices of environmental impacts of planned activities. Some quantitative approaches have emerged, especially in the context of spatial planning. For example, a specific evaluation software (AMBIMOU-B) was developed to assess the Barcelona Metropolitan Area Mobility Plan; it allowed modelling of detailed environmental impacts of different transport modes.

The main consultations, including with the public, typically occur right before the final Environmental Report is issued. In addition, the Environmental Assessment Law obliges consultations at the screening and scoping phases. In some ACs, the environmental authority (along with the OA) supports participation by allowing promoters and

practitioners to hold meetings and workshops at the regional and municipal levels in co-ordination with local authorities. This is especially the case with large-scale (e.g. regional planning) or strategic (e.g. energy or transport plans) programmes.

The results of SEA implementation showed some challenges, such as restricted participation during consultations (mostly due to the novelty of the participation process), superficial analysis of alternatives, lengthy procedures and difficulties with integrating the SEA results into plans and programmes. It also demonstrated the need for standard criteria to assess the effectiveness of the entire SEA process. SEA authorities also suffer from funding and capacity constraints that prevent appropriate support for promoters, consultants and other interested parties involved in participation. Only large plans and programmes, such as the Barcelona Metropolitan Area Mobility Plan, include a thorough participation plan in the Environmental Report.

The Law on Environmental Assessment (21/2013) reviewed SEA procedures with a view to addressing these challenges. By combining the former laws on SEA and EIA, it seeks to streamline environmental assessment procedures, increase legal security via a clear and standardised legislation across Spain, promote market unity and boost sustainable development.

The experience of applying SEA at the regional level provided a good foundation for developing support tools to strengthen coherence between regional approaches. A working group involving the state and the ACs was set up to exchange experiences and develop more consistent SEA methodologies across regions that could strengthen the assessment of plans and programmes.

7. Promoting environmental democracy

Spain facilitates access to environmental information, public participation in environmental decision making and access to justice through regulations developed since 1978. These three rights were reaffirmed by the ratification of the Aarhus Convention in December 2004 and the passing of a law regulating these rights (27/2006). Its provisions also aimed to transpose two EU directives, the Directive on Public Access to Environmental Information (2003/4/EC) and the Directive on Public Participation in respect of the drawing up of Certain Plans and Programmes relating to the Environment (2003/35/EC).

7.1. Access to environmental information

Over the last few years, substantial efforts have been made to enable the public to access information. In addition to establishing Information and Citizens Service Offices at national, regional and local levels, a large number of environmental documents and relevant information was digitised and put online. Particular progress was made in sharing information about the state of pollution and state of the environment (Section 5). A number of electronic channels were opened for requesting information and communication with the authorities. Statistical reports on the number of requests received, the number of refusals and their reasons, and other related information are available from the MAGRAMA website. In addition, training programmes for public employees have publicised the content of Law 27/2006.

The MAGRAMA and the ACs have used Internet-based social networks to disseminate environment-related information and seek public opinion. For example, Biodiversia is a social network project promoted by the MAGRAMA and the Biodiversity Foundation, with

the support of the Ministry of Industry, Energy and Tourism's Avanza Project. A virtual space for all official information related to the Spanish Inventory of Natural Heritage and Biodiversity, it aims to foster environmental education and raise awareness (*www.biodiversia.es*).

In some cases, however, the execution of rights to access environmental information faces practical obstacles. Most relate to the consideration of the "non-environmental" nature of the information requested, or to a broad interpretation of exceptions to the access to information established by law. In some cases, no reasons for refusal are provided. Although the public can appeal, it can take the courts from five to eight years to issue an enforceable decision. The drawn-out procedures are the main reason that few cases are heard despite the favourable and broad interpretation of Spanish courts on the right to access to environmental information. In most cases, appeals are submitted by environmental NGOs rather than individuals, who seem reluctant to seek judicial redress for their rejected or ignored environmental information requests.

The MAGRAMA is working on the Plan of Measures to Promote Better Use of Information. The plan should stress the need for a better understanding of the rights of access to information in public administration, especially at the local level given its proximity to citizens. Given their rise in popularity, social networks could be used more widely to communicate with the public.

Access to information was recently reinforced by the approval of the Law for Transparency, Access to Public Information and Good Governance. The law was adopted in 2013 as part of a major reform process begun in 2011 to improve the quality of Spanish public services.[13] It introduced provisions for information to be made available without the need for a specific request and provided a comprehensive list of what information could be published and where, as well as principles the information should respect. Information is made freely available through a unified Transparency Portal, managed by the Ministry of the Presidency. The newly created Council of Transparency and Good Government (Consejo de Transparencia y Buen Gobierno) oversees compliance with proactive disclosure obligations.

7.2. Public participation in environmental decision making

Although the Spanish Constitution placed the right to participate in public affairs among the fundamental rights of citizens, Spain did not have a strong tradition of public participation in environmental policy making at the national level. One of the key objectives of the 27/2006 law was to promote transparency of public decision making and civic participation in policy development and evaluation. The law modified the existing framework to comply with provisions of the Aarhus Convention, particularly by redefining "public" and "public concerned" and strengthening provisions for early participation in the policy-making process. In particular, the regulatory framework for SEA, EIA and environmental permitting introduced ways to enhance how the public can influence final decisions. This includes extending the duration of consultations and using electronic means to access documents and provide comments. Similar provisions have been applied at the regional level (Chapter 5).

Several consultative bodies to the MAGRAMA engage representatives of the public, including NGOs, in defining environmental policies. The Environmental Advisory Council (CAMA), for example, consists of 15 members appointed for a two-year term, including

nongovernmental organisations (NGOs), trade unions, businesses, farming and municipality associations. The Council makes publicly available all draft legislation before its approval. Prior to international meetings, such as the Conference of the Parties to multilateral environmental agreements in which Spain is represented, the MAGRAMA maintains permanent contacts with NGOs and other representatives of civil society.

Although Spain expanded a range of instruments that facilitate public participation in environmental decision making, challenges still remain, especially at the national level. Increased participation can result in longer and more complex processes for approving reform. At the same time, it can also make reform easier, in particular when implementation partly depends on the approval or actions of sub-national entities. The national government may need to revisit the mechanisms for public consultation and participation relating to strategies and policy documents. In particular, CAMA should become a key forum for dialogue on environmental priorities. Further development of guidance for public participation and better oversight of its implementation could also increase coherence between regional approaches.

7.3. Access to justice

The legal framework for access to justice in environmental matters is well established. The effective protection by the courts in exercising rights and legitimate interests is a fundamental right prescribed in the Spanish Constitution. Citizens also have rights to challenge an activity that affects a collective interest, including the protection of the environment, through *actio popularis* (or "popular action"). General regulations on the resolution of administrative appeals and judicial reviews established guarantees for ensuring the efficacy and public disclosure of adopted decisions. The procedures include the possibility of adopting injunctive measures. Finally, the Constitution guarantees free access to justice when the law so provides and for those who have insufficient means to litigate. These rights have been reinforced by the adoption of Law 27/2006, which was followed by subsequent laws and regulations that strengthened the exercise of these rights at national, regional and local levels.

Every citizen has the right to exercise *actio popularis* to challenge public administration acts and omissions that violate environmental law. Citizens can also appeal administrative decisions to the Ombudsperson. At the national level, the possibility of an appeal is recognised in areas such as urban planning, coastal protection, cultural heritage or national parks; at the regional level, ACs such as the Basque Country and Navarra have established public actions for general protection of the environment. Similar actions are possible with respect to criminal offences whenever a public authority or a natural or legal person commits a breach of the Criminal Code or any specific criminal law. Individuals and NGOs can become party to criminal proceedings by being a party to a criminal suit, acting as a private prosecutor, assisting the public prosecutor in the investigation of offences and even acting in the role of public prosecutor.

The 27/2006 law specified certain criteria for an association, including the need for its objectives to include environmental protection, to have been legally established at least two years before the action is brought and been actively pursuing these aims, and to perform its activities in a territory affected by the administrative act.

The law provides that non-profit organisations are entitled to obtain free legal aid. This provision is intended to establish an assistance mechanism to help reduce financial

barriers in access to environmental justice, as required by Article 9(5) of the Aarhus Convention. However, a plaintiff often has to pay a bond/security or cross-undertakings in damages to obtain an injunction of an environmental decision or activity. If the requesting party ultimately loses the case, the bond is used to pay any damages to the other party incurred from the delay in the activity. Together with the slowness of the procedure, the high costs connected with such a system can represent a significant burden for members of the public challenging acts or omissions by the administration.

Due to ineffective means for injunctive relief, high costs for cross-undertakings in damages and/or time-consuming procedures, several cases have been "won in court, lost on the ground"; judges may have quashed certain projects, but delivered their decisions after the project had already begun. The construction of the M-30 Highway in Madrid and the hotel El Algarrobico in Almeria are cases in point. Another trend is the legal validation of projects already declared incompatible with the environmental administrative law courts. In 2010, ACs approved several laws to declassify protected habitats in order to help build a harbour, modify a nature-protected site to allow construction of a ski resort previously prohibited and legalise an important number of construction projects affecting the maritime domain, the demolition of which had previously been ordered by courts.

The complexity of the environmental legislation and procedures, as well as lack of confidence in the courts, are also highlighted as obstacles to the public's access to justice. Finally, the duration of administrative proceedings can be very long: a proceeding before the administrative court can easily take 10 years or more, although administrative proceedings have a better standard of efficiency than civil and criminal proceedings.

Notes

1. Legislative assembly of each Autonomous Community is represented in the upper house of the Spanish Parliament (one Senator per 1 million citizens, rounded up).
2. If a member state does not comply after a judgement, the Commission would bring the case again before the court, which may impose fines on that member state.
3. The River Basin Management Plans that have been approved include: (inter-community) Cantabrian Oriental, Western Cantabrian, Miño, Duero, Tajo, Guadiana, Guadalquivir, Ebro, Segura, Júcar, Ceuta and Melilla; and (intra-community) Balearic Islands, Galicia Coast, Tinto-Odiel-Piedras, Guadalete-Barbate, Andalusian Mediterranean Basin.
4. The River Basin Management Plans that are pending approval include: the Internal Basins of Catalonia and the Canary Islands (La Palma, Hierro, La Gomera, Tenerife, Gran Canaria, Fuerteventura and Lanzarote).
5. Many desalination plants are operational, but desalinated water is heavily subsidised to make it affordable for farmers. In addition, plants are significantly underused (some operating at 20% of their capacity), and farmers continue to rely on regulated or unregulated groundwater resources, aggravating the situation of many intensively used aquifers along the coast.
6. Castile and León is typical, with 80% of its 2 200 municipalities counting less than 100 inhabitants.
7. Municipalities can provide services: directly or through a municipal public company (54% of market share), through concessions to a mixed public-private company (13%) or through a private company (33%). Public companies serve all large cities except Barcelona and Valencia.
8. The MAGRAMA's Secretary of State for the Environment chairs the CIEM, which is composed of another 13 Directors General of the following ministries: Public Works and Transport; Industry, Energy and Tourism; Economy and Competitiveness; Defense; Foreign Affairs and Co-operation; Interior; Finance and Public Administration; Education, Culture and Sports; and, Health, Social Services and Equality.

9. This stems from a jurisprudence of 1983 that established the principle of voluntariness of inter-administrative collaboration and therefore limited the binding character of resolutions passed.

10. This aims to promote and facilitate the development of local initiatives on climate change, and foster active involvement of local governments in seeking opportunities offered by a low-carbon economy. The collaboration will include reviewing progress of local climate policies for municipalities that make up the Spanish Network of Cities for Climate, and calculating the EU indicator of local contribution to global climate change for 2005-12. It will also allow assessing the functioning of the Covenant of Mayors that is part of the Network that committed their cities to reach the EU target to reduce by 20% CO_2 emissions by 2020.

11. To facilitate use of water data by decision makers and the public, the system uses four tools: the Geographic Location Viewer to access disaggregated data; the Digital Book of Water to access structured and plain language information about water; the System of Water Indicators to access aggregated data in the form of selected indicators showing the most important aspects of water in Spain; and SIA Downloads of raw data to analyse and study advanced information.

12. Summaries of the status of hydrological drought are published periodically together with maps of impact on farming systems in inter-regional basin districts. The evolution of the water stored in reservoirs and other hydrologic data is available weekly in the Hydrological Bulletin.

13. This reform process was articulated through the creation of the Commission for Public Administration Reform (CORA). It carried out a comprehensive review of public administration to achieve improvements in the effectiveness and efficiency of public activity, lowering costs without decreasing quality of services.

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PART I

Chapter 3

Towards green growth

This chapter reviews Spain's efforts to mainstream environmental considerations into economic policy and promote the greening of the economy. It analyses the use of taxation policy to pursue environmental objectives and progress in removing fiscal incentives that can encourage environmentally harmful activities. The chapter also examines Spain's efforts to promote renewable energy and to improve energy efficiency. The role of the environmental goods and services sector as a source of employment and green growth is also discussed. Finally, it examines the country's eco-innovation performance and R&D spending, as well as efforts to mainstream the environment into development co-operation programmes.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Assessment and recommendations

The Spanish economy has returned to moderate growth following a protracted recession that began in 2008. In response to the economic downturn, Spain implemented a wide range of measures to consolidate its fiscal position, stimulate economic growth, and diversify its economy beyond construction and tourism. The National Reform and Stability programmes under the European Semester process, and the 2011 Sustainable Economy Law, recognised that building a more resilient economy also requires putting a greater emphasis on environment and energy issues. They included provisions for better mainstreaming environmental issues in economic policy. However, this objective needs to be more specifically defined and appropriate indicators developed to track progress. More broadly, environmental considerations should be fully integrated into the post-crisis reform agenda to avoid returning to a growth model that was both economically and environmentally unsustainable.

Revenue from environmentally related taxes has fallen steadily since 2007. Over the last decade, it declined both as a share of total tax revenue and gross domestic product (GDP); it is currently among the lowest of the OECD EU members. The tax burden on energy has also declined, while the tax burden on labour has slowly increased. The financial constraints of the economic recession stimulated wider use of some environmental taxation, including a range of electricity-related taxes, and a new tax on fluorinated gases. A 2014 report on fiscal reform – the "Lagares" report – proposed to simplify, consolidate and reform existing environmental taxes to better capture environmental externalities and reduce the tax burden on labour. It provides a good basis for developing a green tax reform agenda. Its implementation would require close co-ordination between the central government and Autonomous Communities.

Reforming taxes on fuel used outside the sectors covered by EU Emissions Trading System is also an important means for achieving Spain's climate mitigation policy objectives. However, the environmental effectiveness of tax measures is weakened by several partial or total exemptions related to different uses of fuel. These exemptions lower end-use prices, reduce incentives to use energy efficiently, and result in significant revenue losses. For example, several categories of users in agriculture, mining, aviation, navigation and railway transport are exempted from fuel tax or the excise duty on electricity, or receive refunds or reductions related to the use of diesel. Since 2011, certain electricity producers are obliged to generate electricity using domestic coal. Spain also continues to subsidise coal production, although this has decreased significantly since 2004 and will be phased out over the next few years.

Government spending on environmental protection has remained relatively stable over the past decade both as a share of GDP and as a share of total government expenditure, though recently it declined on both measures. While these expenditures have helped to expand waste management, water supply and sanitation infrastructure, new investments will be required over the next several years. As funding from EU sources

declines for traditional environmental infrastructure, urban water, waste and sanitation tariffs will have to provide a greater share of finance; currently they are too low and should be established in a more transparent manner. In the 2014-20 financing period, energy efficiency and alternative sources of energy will become the major focus of EU support. However, the lessons from the previous financing period, such as the need for improved public procurement practices and strengthened administrative capacity, should be actioned so that funds are disbursed more efficiently and effectively.

The implementation of the Energy Efficiency Action Plans (2004-12) has targeted investment in the sectors that are the main obstacles to achieving GHG reduction targets for 2020: buildings and transport. However, it is not clear whether all investments were cost-effective, and in some cases policies were insufficient to make broader economic investments more sustainable. For instance, the earlier introduction of stricter building codes and energy performance certificates would have allowed energy efficiency in buildings to have been achieved more cost effectively. The economic and environmental benefits of vehicle replacement programmes usually are limited at best. The Energy Efficiency Fund and the Diffuse Sectors Roadmap are new instruments to promote energy efficiency. In the current budgetary context, these and similar programmes should be routinely subject to a thorough assessment of their costs and benefits.

Spain has also provided significant financial support to the generation of electricity from renewable sources. The costs have been partly covered by end-user prices, and partly included in the accumulated electricity tariff deficit, which will be paid back by end-users over the next 15 years or so. This support resulted in a significant increase in the share of electricity generated from renewable sources, reduced energy intensity and stimulated the development of a competitive industry and related research and development (R&D). However, the initial tariffs for some technologies, primarily solar, were overly generous and were not reduced following rapid decreases in technology costs. The costs of support together with other system costs (such as transmission and distribution) increased faster than electricity tariffs were allowed to rise. This led to a large funding deficit in Spain's electricity system for which the government is now liable. In the context of Spain's severe budget crisis, the government responded by significantly reforming the electricity system, including support to renewable electricity generation. A new regime is being designed to better balance revenues and costs, eliminate the tariff deficit and also ensure a reasonable return for investors. Details of how the regime will function are currently the subject of debate and judicial review. They should be finalised rapidly so as to provide a clear and stable framework for the further development of the renewable energy sector.

Spain's overall innovation performance is weak, characterised by low levels of public and private investment in R&D, poor co-ordination and relatively few patent applications. Against this backdrop, Spain invested a relatively high share of public R&D in the energy and environment sector. More patents were recorded in this sector than in any other. Patent applications for energy from renewable and non-fossil fuel sources increased significantly since 2000, peaking at nearly 7% of total patent applications in 2009. R&D, support measures and increased national and international demand for renewable technologies were key factors stimulating more patent applications. However, public R&D was significantly cut in 2010-11, with impacts on energy and environment. In 2014, the total budget for R&D increased by 5% compared with 2013. Further efforts should focus on areas where Spain has a comparative advantage, including the SME sector, promoting

better co-ordination between government, business and the research community, and strengthening demand for green goods and services.

Spain's net official development assistance (ODA) fell by 25% between 2003 and 2012, and by two-thirds between 2008 (the peak year) and 2012. It amounted to 0.16% of gross national income in 2012, well below the OECD-DAC average of 0.31%, the EU target of 0.51% in 2010, and the international commitment of reaching 0.7% by 2014. Spain has made important progress in mainstreaming the environment, including climate change, in ODA. It developed a clear strategic framework and guidelines to integrate environmental concerns into country framework partnerships and development co-operation projects. In 2012, approximately 20% of ODA targeted the environment as a significant or primary objective. Spain also devotes a greater share of its ODA budget to the water and sanitation sector than many other donors. Following the deep budget cuts, the main challenge is to concentrate resources so as to maximise their impact.

Recommendations

- Integrate green growth objectives and indicators into Spain's Stability and National Reform Programmes within the European Semester process, as well as in sectoral planning documents (for example, on energy and electricity infrastructure development); establish an independent, robust mechanism to monitor progress, and make recommendations to stay on track to achieve objectives.
- Extend and refine the use of environmentally related taxes in the framework of a comprehensive tax reform including by: specifying a carbon component in the tax on fuels used in the sectors not covered by the EU emissions trading system; increasing the tax on diesel used in transport to at least the same level as that for gasoline; further restructuring the annual vehicle circulation tax to better reflect the environmental cost of vehicle use; considering the reform of existing, or the introduction of new, environmental taxes on resource use and pollution (e.g. on water abstraction, wastewater discharges, pesticides, fertilisers); and introducing a distance-based component in the taxation of company cars.
- Strengthen the co-ordination of environmental taxes between regional governments (Autonomous Communities) and the central government; consider how the Fiscal and Financial Policy Council could help in this regard.
- Identify and remove fiscal measures and subsidies that are environmentally harmful and economically inefficient, taking account of potential social impacts; in particular those related to domestic coal production and coal-fired electricity generation, residential electricity tariffs, fuel for the mining and agriculture sectors, and maritime, air and rail transport.
- Strengthen procedures for disbursing EU support for environmentally related investments so that they are used more efficiently and effectively, including by: strengthening public procurement procedures; simplifying disbursement procedures and making them more transparent; linking the disbursement of funds to the fulfilment of preliminary conditions (e.g. sound sectoral plans and regulatory frameworks, sufficient matching finance) and to the achievement of measurable targets for the provision of environmental services.

Recommendations *(cont.)*

- Better target public support for eco-innovation so as to facilitate the commercial application of innovations; and strengthen demand-side measures (e.g. innovation-oriented standards, economic incentives, green public procurement requirements and promotion of public awareness).
- Enhance domestic markets for green goods and services by increasing consumer awareness and improving the reliability of consumer information; and assessing green employment and green entrepreneurship programmes with a view to drawing lessons and broadening their scope and coverage as appropriate.
- Further strengthen the environmental component of ODA by focusing on fewer countries and themes where Spain has a comparative advantage; strengthen co-operation with other development partners; as the economy recovers, gradually increase the ODA budget in line with EU and international obligations.

1. The economy and the environment

1.1. *Key economic trends*

In 2008, after a decade of rapid growth, Spain entered a recession of unprecedented depth and length. The recession was triggered by the global crisis, compounded by the sharp domestic adjustment of the oversized residential construction industry. Spain's gross domestic product (GDP) dropped dramatically in 2009 (by 3.8% in just one year). While the depth of the recession in terms of real GDP was similar to other advanced OECD economies, it has led to a much larger increase in unemployment and a sharper deterioration in government finances in Spain, both to a large extent structural. The contraction in household incomes, combined with austerity measures, heavily affected the livelihood of Spanish citizens. From a social perspective, Spain's low-income households were hit particularly hard by the crisis relative to other OECD member countries (OECD, 2013a).

The provision of EUR 100 billion of rescue loans from Eurozone funds and an economic recovery programme implemented in 2010-12 helped stabilise the economy. Decisive government actions have restored the banking sector and the fiscal deficit is on a downward trajectory. Economic growth turned positive at the end of 2013, unemployment began to decline, strong exports significantly reduced the structural current account deficit and annual growth is expected to reach 1% in 2015 (Chapter 1).

1.2. *Green economy initiatives*

In 2007, Spain adopted the Sustainable Development Strategy (SDS) with the aim of creating a strategic approach for better integrating environmental and economic objectives (Chapter 2). This built upon a number of measures taken since the early 2000s to make environmental and economic objectives more complementary. In 2004, the energy system was subject to reform of feed-in tariffs for electricity from renewable energy sources, while cost recovery was introduced into water pricing systems. The European Union emissions trading system (EU ETS) was successfully implemented starting in 2005. Spain's strong performance in the deployment of renewable energy, articulated primarily as a climate change mitigation policy, has reduced reliance on imported fuels and spurred the development of industry leaders in the wind and concentrated solar power (CSP) sectors.

The Green Jobs programme (*Empleaverde*) run by the Biodiversity Foundation, which explicitly aims to develop skills and new businesses linked to the green economy, was launched in 2007. Measures to improve environmental performance in Spain's major economic sector, construction, were taken up after 2007, but measures to tackle the environmental performance of road transport have been lacking.

The 2008 economic crisis undermined the influence of the SDS as a source of policy guidance for the government and society. However, the economic stimulus programmes introduced after the 2008-09 recession included several environmental measures. As part of the Economic and Employment Stimulus Plan of 2008 (Plan E), a EUR 3 billion Fund for Promoting the Economy and Jobs allocated EUR 575 million to environmental projects of national importance in 2009. These targeted water management and water infrastructure; preservation of coastal areas; conservation in rural areas; and forests (including reforestation and afforestation). The same fund also provided EUR 800 million to support the automotive industry, in part through a car scrapping scheme that included some environmental criteria. In addition, EUR 490 million was allocated to research, development and innovation (RD&I). The bulk of the stimulus funding under Plan E was awarded to municipal governments through the EUR 8 billion Local Investment Fund, capitalised by an additional EUR 5 billion in 2010. The second round of funding, known as the Employment and Local Sustainability Fund, directed investments particularly towards projects promoting longer-term objectives, including environmental sustainability, energy efficiency and vocational training (OECD, 2011a). Approximately 3% of the Local Investment Fund was spent directly on environmental services, energy efficiency and energy saving. In contrast, nearly 27% of the Employment and Local Sustainability Fund went towards environmental sustainability, including water management, energy efficiency and savings, urban transport and nature conservation (MINHAP, n.d.).

Under the European Semester process that began in 2011, Spain's National Reform and Stability programmes pursued further reform in the energy, environment and RD&I sectors. This has included further liberalising the electricity market, allowing for tariffs to better reflect underlying costs; ensuring that investment and operational costs of water infrastructure are recovered through service charges; and, since 2013, levying taxes on previously exempt energy products. This process was supported by the Sustainable Economy Law passed in March 2011, which explicitly defined the sustainable economy as one that reconciles economic, environmental and social development (BOE, 2011a). The law includes provisions for a sustainable energy system; reaffirms Spain's commitments to improve energy efficiency and reduce GHG emissions in line with its 2020 targets (Chapter 1); and emphasises sustainable mobility, buildings and urban planning. The law also requires that environmental concerns be integrated into electricity, infrastructure and transport planning. However, while the Sustainable Economy Law is a welcome articulation of what a sustainable economy might mean in the Spanish context, it generally reaffirms previously existing commitments, with environmental actions implemented separately from other action areas covered by the law. It does not integrate environmental, economic and social issues in a strategic and coherent manner.[1]

The Stability and National Reform Programmes within the European Semester process are potentially important vehicles for integrating environmental and green growth objectives into Spain's economic strategy. The inclusion of green growth objectives with corresponding indicators and an independent, robust mechanism to monitor progress,

perhaps overseen by the Ministry of Economy and Competitiveness, would be a useful step in this direction. Opportunities also exist to integrate green growth objectives into sectoral plans such as energy and electricity infrastructure development.

2. Greening the tax system

2.1. Overview

The ratio of tax revenue to GDP in Spain has remained below the OECD average for most of the 2000s, and reached 32.2% in 2011 compared with the OECD average of 34.1%. Spain also had the lowest share of indirect taxes and value added taxes (VAT) relative to GDP out of all EU countries in 2011; while taxes on labour as a share of GDP were average, taxation of consumption was the lowest within the EU. However, since July 2012 Spain has increased its VAT rate, which is now in line with the EU average. The tax burden on labour has been slowly increasing since 2000, other than a period of decline from 2007-09; the burden on energy has generally declined, except for an increase from 2008-09 (Figure 3.1).

Following the trend prevalent across OECD member countries, revenue from environmentally related taxes as a share of GDP has declined in real terms since 2000, reaching 1.62% in 2012 above the weighted OECD average (1.59%) (Figure 3.1). These taxes made up approximately 4.94% of total tax revenue in 2012, below the weighted OECD average of 5.21% and lower than in 2000 (6.54%). Spain's environmentally related taxes are the lowest as a share of GDP compared with the average for the EU27 member states (2.4%) (EEA, 2013a). In both 2011 and 2012, the European Council recommended that Spain shift taxation away from labour and towards consumption and environmental taxation; a range of new taxes passed in 2012, notably on energy, came into effect the following year (European Council, 2013, 2012, 2011). These most recent changes should improve Spain's low level of environmental and other indirect taxes as a share of GDP relative to labour taxes.

As in all other OECD member countries, environmentally related taxes are primarily levied on energy products and vehicles. In nominal terms, revenue from energy taxes increased approximately 17% from 2000 to 2012, although the trend was non-linear. In real terms (at 2005 prices), energy tax revenue has dropped steadily since 2004. Revenue from other environmental taxes has slowly declined since 2007, mostly affected by the drop in revenue from non-fuel transport and vehicle taxes. In the case of the transport duty, this decline partly reflects the drop in new vehicle registrations and the increase in the number of vehicles that pay no registration tax because they meet specific environmental criteria; revenue from this tax dropped 36% from 2008 to 2009 and has declined every year since then.

In Spain, pollution and resource taxes not based on energy or transport made up approximately 5.6% of environmental tax revenue in 2012, a share that has increased since 2000. These are primarily levied at a regional (Autonomous Community) and municipal level on water use (which can be classified as charges), disposal and treatment of waste and wastewater, air pollution, and hunting and fishing.

Beginning in 2001, and particularly after 2003, revenues from environmentally related taxes have accrued primarily to the regional rather than the central level of government.[2] Tax revenue from vehicle registration was allocated almost completely to regional governments in 2002, with the tax on electricity bills following the same pattern. Revenue receipts increased steadily to regional governments until 2007, after which they declined

until 2011; the reversal in that year stemmed primarily from allocating revenue related to the hydrocarbon tax to regional governments. Revenue to sub-regional governments (provinces and municipalities) has increased slightly and steadily since 2000, declining somewhat between 2010 and 2011. The largest share of municipal-level environmental revenue comes from vehicle circulation taxes.

2.2. Environmentally related taxes on energy products and electricity

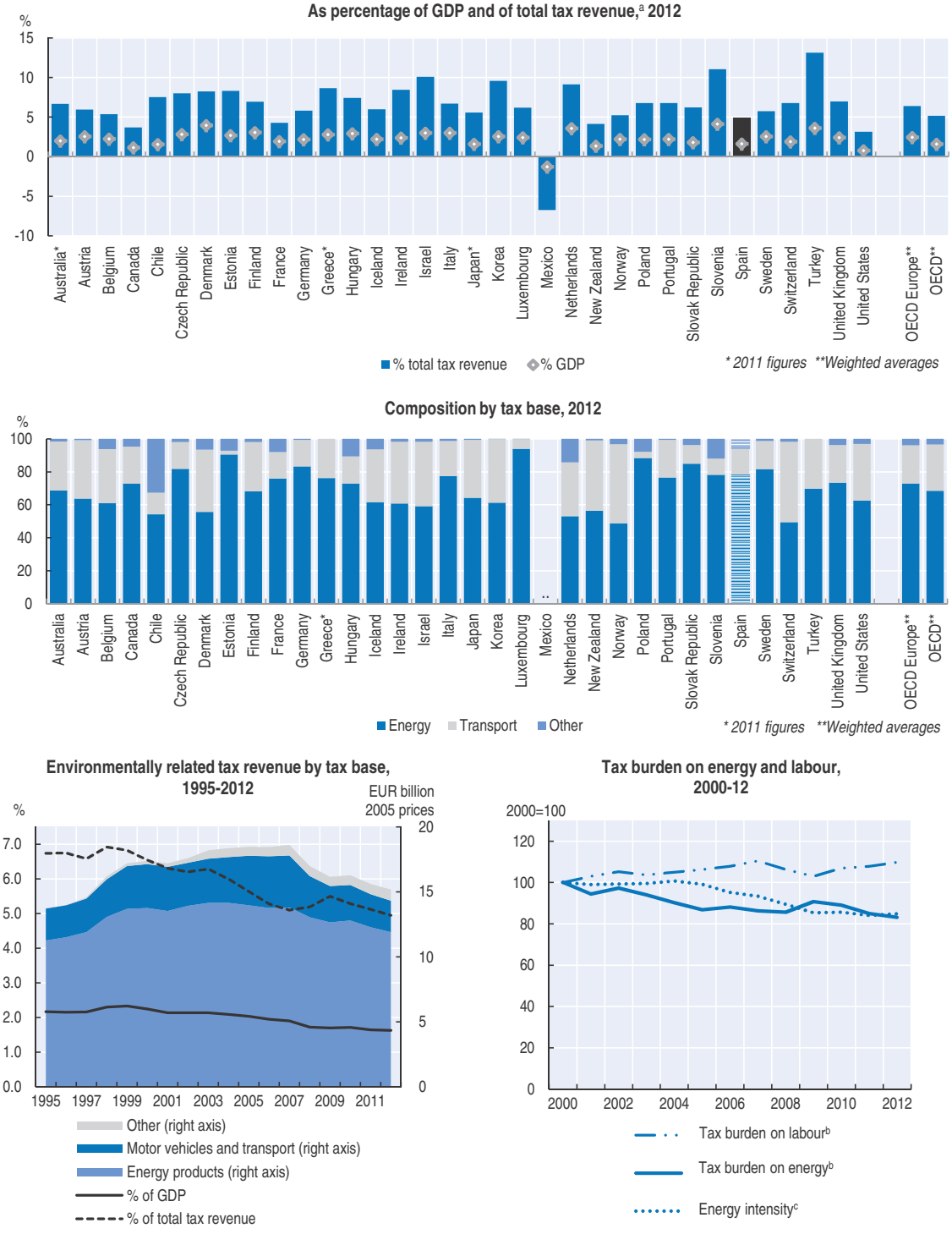
Like other OECD member countries, energy products – particularly transport fuels – constitute the main base for environmental taxation in Spain. As a share of GDP, Spain's energy taxes were the lowest among all EU member states in 2011, at 1.3% (EEA, 2013a). Taxes on energy products contributed over 78% of the revenue from environmentally related taxes in 2012, higher than both the OECD and OECD Europe averages of 69% and 73% respectively (Figure 3.1).

Taxes apply to all fossil fuels used for transport, as well as fuel oils used for heating and industrial purposes; a tax on coal used for heating was introduced in 2005, although with several exemptions (EC, 2014a). New measures passed at the end of 2012 significantly extended the energy tax base. This includes a tax on fossil fuels used for electricity production and on natural gas used for heating and in industry. As seen in Figure 3.2, which shows energy taxation prior to these changes, the fossil fuel tax has broadened coverage of fuels that were previously untaxed, notably natural gas for heating, and fuels for energy transformation (OECD, 2013b). Fiscal spending through tax exemptions on biofuels ended in 2012 with abolishment of the the excise tax exemption for these fuels. However, these new taxes, as well as the previous tax on coal, apply on an energy or volume basis, with no consideration of their carbon content. On a gigajoule (GJ) basis, coal and natural gas are taxed the same amount when used for electricity generation, while natural gas is taxed at a higher rate than coal when used for commercial heating (EC, 2014a). In 2014, fuel taxes amounted to approximately EUR 1 billion, while taxes on coal raised EUR 264 million in revenue (MINHAP, 2014).

Regarding transport fuels, nominal excise taxes for diesel increased in 2007 after remaining stable since 2002. These have increased in real terms since 2008, as have taxes on petrol, following a decline in real terms since 2002 (Figure 3.3). Given increases in global oil prices since 2000, the share of excise taxes in fuel prices has declined, accounting for approximately 27% of diesel prices and 32% of petrol prices in 2013 compared with 42% and 48% respectively a decade earlier (Figure 3.3). Taxes on petrol and diesel remain relatively low in Spain, compared with the neighbouring countries of France and Portugal (IEA, 2013a). Spain also taxes LPG used for transport at a significantly lower rate than either petrol or diesel, and the LPG tax rate is halved when the fuel is used in public transportation vehicles. In addition, 13 regional authorities applied a retail sales tax on these fuels (along with fuel oil and kerosene) on top of the excise duty from 2002-12. This tax was abolished in 2013 following a legal challenge, and has effectively been absorbed into the excise duty. Regional governments now have the option of applying varying excise duties per volume unit of fuel.[3]

Spain has long applied lower taxation rates on diesel fuel, leading to a consumer price for diesel that is lower than gasoline (Figure 3.3), despite diesel's pre-tax price being higher on average since the mid-2000s (IEA, 2013a). There are several reasons to re-examine this policy: diesel's higher carbon content; indications that diesel vehicle drivers may drive more; issues related to local air pollution due to particulate matter and nitrous oxide

Figure 3.1. **Environmentally related taxes**



a) Mexico: the system used to stabilise end-use prices of motor fuels causes tax revenue to turn negative (i.e. become a subsidy) in years when the international oil price is high. Australia and Japan: 2011 data for ratios to total tax revenue.

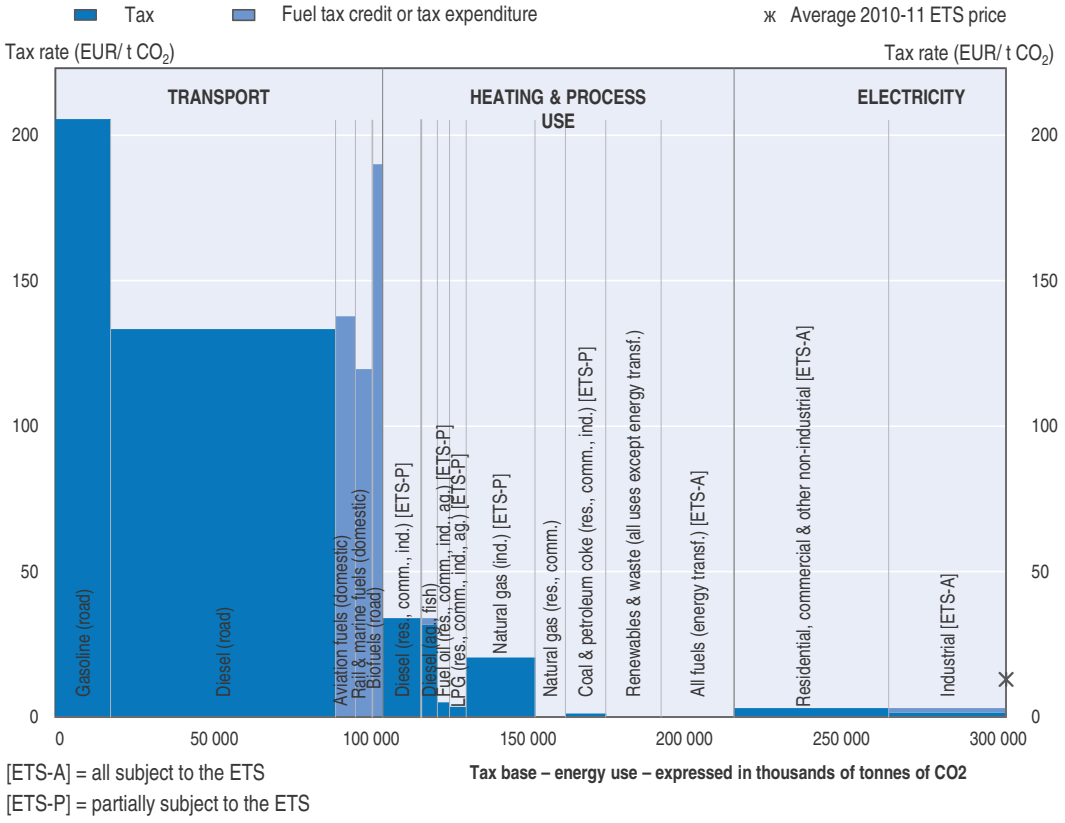
b) Tax burden on labour: ratio between the revenue from taxes on labour income and social contributions and overall compensation of employees; tax burden on energy: ratio between the revenue from energy taxes and final energy consumption.

c) Total primary energy supply per unit of GDP.

Source: Eurostat (2014), "Main Indicators", *Energy Statistics* (database); Eurostat (2014), *Government Finance Statistics* (database); OECD (2014), *OECD Database on Instruments Used for Environmental Policy and Natural Resources Management;* OECD (2014), *OECD Economic Outlook No. 95* (database).

StatLink http://dx.doi.org/10.1787/888933182929

Figure 3.2. **Taxation of energy in Spain on a carbon emission basis**

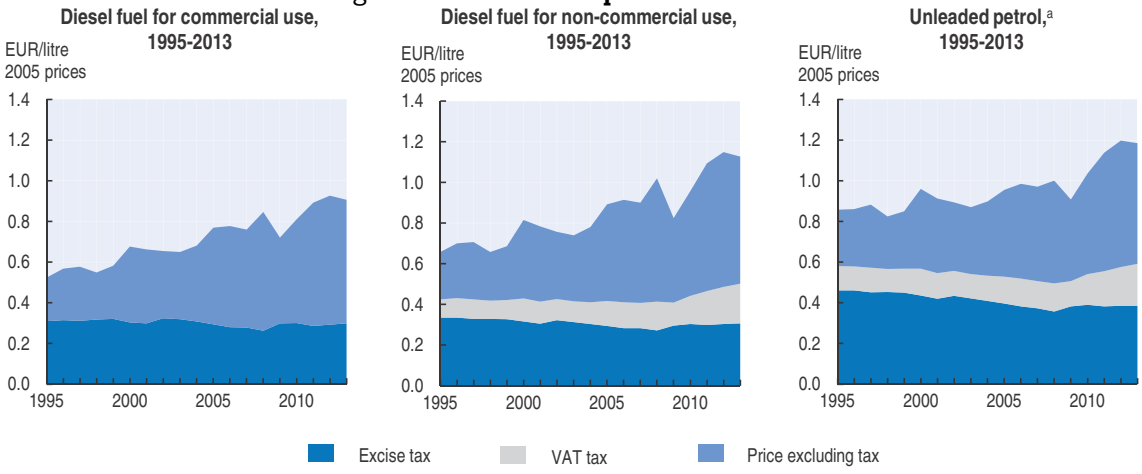


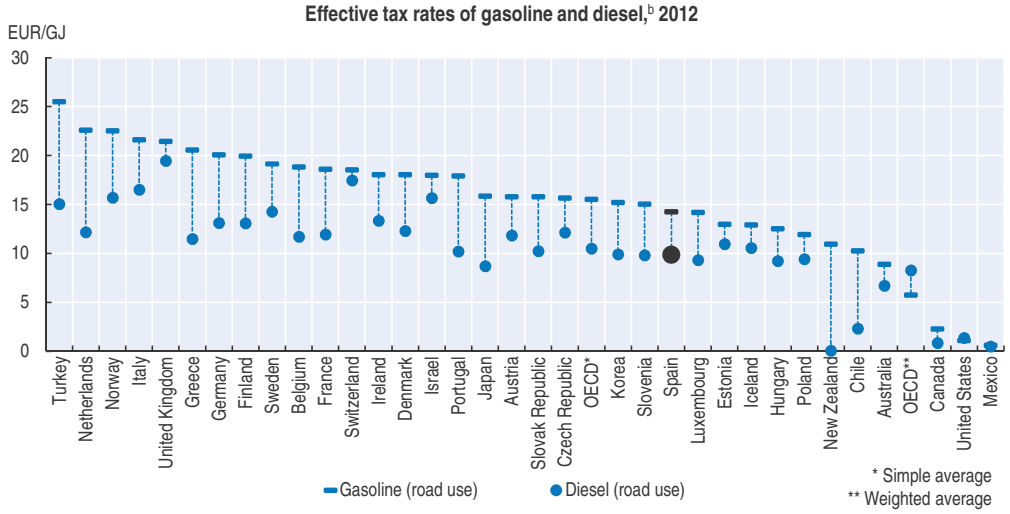
Tax rates are as of 1 April 2012; energy use is based on IEA data for 2009.
Abbreviations: Res. = residential; comm. = commercial; ind. = industrial; ag. = agricultural; fish. = fishery; energy transf. = energy transformation; heat = merchant heat.
Source: OECD (2013), *Taxing Energy Use: A Graphical Analysis.*

emissions, particularly from older vehicles (43% of passenger vehicles and 48% of trucks were over 10 years old in 2012); and evidence that diesel cars emit nitrous oxides (NO_x) at higher levels than those suggested by standard tests (Weiss et al., 2012; Anfac, 2013; Harding, 2014a).

As in most EU countries, electricity users pay a direct tax on the retail price (currently at 4.86%, which translates to approximately EUR 5.3/MWh). This tax is used in part for environmental purposes, to finance support to renewable electricity generation and to allow for regulated transmission and distribution costs. In 2014, revenue from this tax reached approximately EUR 1.7 billion (MINHAP, 2014). Since 2013, Spain has also applied an indirect value-added tax of 7% on electricity sales, which raised approximately EUR 1.3 billion in revenue in 2014 (MINHAP, 2014). Conventional power producers are expected to pass the tax cost to consumers where possible. The new tax is expected to affect lower-carbon electricity generation, which has higher capital investment needs, in a more negative way. Renewable facilities receiving fixed tariffs (combined with cuts to these tariffs) are expected to see lower income; the co-generation sector has been negatively affected, as have some nuclear facilities (GDF Suez, 2013; Pentland, 2013). The tax on

Figure 3.3. **Road fuel prices and taxes**





a) Unleaded premium (95 RON).
b) Tax rates are as of 1 April 2012. Only federal taxes for Canada and United States. New Zealand data exclude a road-user charge applied to diesel vehicles on a per-kilometre basis.
Source: IEA (2014), *IEA Energy Prices and Taxes Statistics* (database); OECD (2013), *Taxing Energy Use: A Graphical Analysis.*

StatLink http://dx.doi.org/10.1787/888933182936

electricity sales will also in part be used to finance renewable energy support programmes, but is largely designed to finance the electricity system tariff deficit.

Some environmental costs of nuclear and hydropower energy production have also been subject to new tax measures since 2013. Nuclear facilities are taxed on the production of spent fuel and other radioactive waste, while hydropower producers are subject to a new 22% levy on the value of electricity generated, to be collected by river basin authorities and used to protect and improve surface and ground water resources. However, smaller hydropower plants are exempt up to 90% from this levy, as are large pumping facilities (EURELECTRIC, 2013). In 2013, the hydropower levy raised nearly EUR 300 million; the new taxes on nuclear waste were expected to raise revenue of EUR 289 million (MINHAP, 2014). The Expert Commission on tax reform, in the 2014 Lagares report, suggested rationalising current taxes on electricity, while basing the electricity consumption tax on kilowatt hours (kWh) (Box 3.4).

The Spanish government has also discussed introducing a new charge on the self-production of electricity from renewable energy sources, authorised since 2011, under which users can sell unused electricity back to the grid. The tax is meant to recover the costs of electricity infrastructure, and would vary according to factors such as grid-connection capacity. Besides potentially discouraging the self-production and consumption of electricity from renewable sources, the impact on households and small businesses that made self-generation investments would need to be assessed; these investments could become a financial strain rather than a cost-saving measure at a time of contracting household income (Pérez and Brat, 2013).

The increase in taxation of electricity since 2013 described above has occurred in the context of broader electricity-sector reform, including changes to how generation from renewable sources is compensated, that will reduce subsidy levels. Reform of the electricity sector is intended to address the gap between revenues from tariffs and costs in Spain's electricity system, contributing to the system's sustainability in the future. This "tariff deficit" has grown since the early 2000s with increases in various costs, including fossil fuel prices and those related to the increasing share of renewable energy sources, coupled with declining demand and partly regulated electricity tariffs (Couture and Bechberger, 2013). Spain should continue to deregulate electricity prices in line with broader electricity market liberalisation under the EU energy market packages. Rather than reduced electricity tariffs, direct transfers would be a more efficient way to ensure energy affordability for vulnerable customers.

Regional governments also levy taxes on electricity generation, in different ways and for different purposes (EURELECTRIC, 2013, 2012, 2011, 2010). The majority of these taxes have been applied since 2004, mostly within the past five years, coinciding with fiscal tightening; most are used for revenue raising with little or unknown environmental impact.[4] The 2014 Lagares report suggested abolishing most of these regional taxes, for example on wind power, reservoir use and carbon dioxide emissions. Most regional governments are limited in the types of taxes they can impose, and in practice have focused on areas where taxation is possible, including the environment. While there can be some implicit alignment in rates, there is room for more formal co-ordination and harmonisation of environmental taxes between regional governments, a process that could be facilitated by the Fiscal and Financial Policy Council.[5]

2.3. Environmentally related taxation of vehicles

Spain reformed its vehicle registration tax in 2008, linking it to carbon dioxide (CO_2) emissions rather than vehicle engine power. Current rates range from 4.75% (for vehicles emitting between 121 and 159g CO_2/km) to 14.75% (for vehicles emitting 200g CO_2/km and more). Regional governments have been able to modify these rates upwards since 2009, and six regions currently charge higher rates (MINHAP, 2013a). This change in taxation is considered to have successfully shifted the vehicle market in Spain; currently 62% of vehicles sold emit below 120g CO_2/km, therefore paying no registration taxes. In 2012, average CO_2 emissions from the new passenger vehicle fleet reached 128.6g CO_2/km, below the mandatory EU target level for 2015 of 130g CO_2/km (EEA, 2013b).

The annual vehicle circulation tax is applied based on engine ratings, and increases with greater horsepower levels (for private vehicles and tractors), weight (for caravans), cylinder capacity (for motorcycles), number of seats (for public buses) and carrying capacity (for trucks). To date, this tax is not based on any environmental criteria, and does

not distinguish between diesel and gasoline vehicles – a policy option used in countries such as Finland and the Netherlands to correct the distortion stemming from lower taxes on diesel. The Spanish government plans reforms to base the vehicle circulation tax on emissions rather than engine size.

Other tools that could address both the diesel-gasoline differential and congestion in urban areas, which contribute to high air pollution levels, include: expanding the use of tolled motorways,[6] introducing distance-based tolls for heavy goods vehicles as announced in 2011 (T&E, 2011) and introducing measures to restrict private vehicle use in urban areas (e.g. limiting parking spaces, charging circulation fees), while improving public transportation.

2.4. Other environmental taxes and pricing measures

In Spain, pollution and resource taxes not based on energy or transport made up approximately 5.6% of environmental tax revenue in 2012. The Spanish government is discussing expansion of the scope of environmental taxation. New taxes on nuclear waste and fluorinated gases were very recently implemented, and taxes on air pollution, water and waste storage are being considered. Given there is room for using these instruments to address environmental challenges related to water use, waste and air pollution, these plans should be expedited.

A tax applies to wastewater discharges into water bodies, and water service fees and charges are used to finance river basin authorities, which manage water resources and wastewater releases, public storage and long-distance transport infrastructure. In 2014, water-use charges were expected to raise EUR 34 million in revenue (MINHAP, 2014). Urban water supply, and the collection and treatment of wastewater, are largely carried out at the municipal level, or in some cases by sub-regional or regional governments. Prices for water services to households rose by about 12% in real terms between 2001-09, although price rises were higher in regions most strongly affected by water scarcity. Still, water supply charges for households are lower than in most OECD member countries. Opportunities for improving industrial and urban water pricing could be explored through greater transparency and amendment of legal limitations that prevent pricing from reflecting scarcity and environmental considerations (Fuentes, 2011). Use of progressive tariff structures, which increase with greater levels of water consumption, is prevalent in both industrial and urban water use (Box 3.1). Estimates of cost recovery levels for provision of urban water supply vary greatly, highlighting gaps in data and lack of transparency in cost accounting (OECD, 2010). Criteria and definitions of water services and cost recovery are currently being discussed and clarified as part of elaborating the River Basin Management Plans, in co-ordination with the European Union.

As in most countries, investment and operational cost recovery in the provision of urban water supply is higher than for agriculture in Spain (see discussion of agricultural subsidies below). Farmers who use state infrastructure pay a "water use tariff" (*tarifa de utilización del agua*), which cover maintenance and administrative costs, as well as a small portion of investment costs. Irrigators that rely on public infrastructure to abstract water also pay a "water regulation levy" (*canon de regulación*). In addition, to reduce illegal water use, Spain continues to strengthen the Water Registry to control and monitor water abstraction.

Box 3.1. **Use of progressive water tariffs in Spain**

The use of progressive tariffs for water, or increasing block tariffs, is widespread in Spain (Conradin et al., 2010). Users pay different amounts for different consumption levels. As water use increases, so does the level of the tariff. Setting progressive tariffs based on volumes of water consumed requires that consumers have a metered connection to water services.

In most Spanish municipalities, tariffs comprise a fixed charge (or service charge), paid independently of water consumption, and a variable component paid progressively according to blocks of consumption. Progressive tariffs themselves are set at the local government level, leading to a great variety of systems and tariffs in accordance with different circumstances. Consumption units in each block can be different; the number of blocks vary; tariffs can be more or less progressive; additional levies can be included (for example, an investment levy or a drought levy); and certain types of households may enjoy bonuses or exemptions (Martínez-Espiñeira, García-Valiñas and González-Gómez, 2012; González-Gómez, García-Rubio and Guardiola, 2012). In some cases, tariffs are differentiated according to types of users; in other cases, they are not. For example, in the city of Saragossa, tariffs are the same for residential, industrial and service users across four consumption block categories (Barberán and Arbués, 2009).

The generally low level of water prices, which are subject to local government approval, has meant that progressive block tariff structures have been insufficient to discourage excessive water use (González-Gómez, García-Rubio and Guardiola, 2012). However, the increase in water tariffs since 2000 set off by transposition of the EU Water Framework Directive did coincide with a general reduction in household water consumption beginning in 2004, although the impact on agricultural water use is mixed (EEA, 2013c).

Most ACs also apply a sanitation charge on wastewater discharges into the environment, generally combining fixed and variable charges (based on volume) for industrial wastewater. In some cases, they consider pollution load factors in the calculation. How these are applied, along with individual rates, varies across regions. In several ACs, pollution levels are included in the variable charges. In Aragón, evidence suggests the sanitation charge itself, rather than a general increase in water supply prices, has influenced a reduction in industrial water use (Vallés-Giménez and Zárate-Marco, 2013).

Waste collection charges are applied at the regional level, and several regions apply taxes on the landfilling of industrial and/or construction waste. Catalonia also applies both landfill and incineration taxes on municipal solid waste, which have successfully increased separate collection of waste (Puig Ventosa, 2011); certain municipalities in Catalonia have also implemented "pay-as-you-throw" systems (Bio IS, 2012). During Spain's decade of intense construction activity up to 2007, construction and demolition waste was not always properly discarded, and often ended up in illegal dumps. A government decree in February 2008 required building developers to properly dispose of construction waste through a deposit fee, an approach successfully tested and piloted in Los Alcores in Sevilla (Solís-Guzmán et al., 2009). Castile-La Mancha and Andalusia have also implemented special taxes for the storage of nuclear waste, although these have technically been superseded since January 2013 by national taxes on nuclear waste and storage.[7]

Six regions also implement specific taxes on different combinations of emissions, mostly sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) above a certain threshold, which varies by region (EURELECTRIC, 2013, 2012). The tax rate is generally applied per tonne, and varies in all regions except for Aragón according to tranches set based on emissions levels.[8]

The central government has examined these regional taxes as part of taxation reform, and found that some local air pollution taxes have performed well. These positive experiences could inform a future national air pollution tax, although the localised nature of SO_x and NO_x pollution may justify differentiated tax rates at a regional level. Andalusia, Aragón and Murcia also include CO_2 alongside air pollution taxes.[9] However, imposing CO_2 taxes at a regional level is difficult to justify on an environmental basis, given the presence of the ETS, the diffuse nature of emissions and the global nature of their impacts.

A new tax on fluorinated gases, which are potent greenhouse gases, was implemented in January 2014. The tax is meant to promote investment and maintenance to prevent leakage of these gases into the atmosphere. Owners of installations using the fluorinated gases pay at the moment of recharge, but not when the gas recharge replaces gas that is being removed for recycling or disposal. Set at a rate of EUR 20/t of CO_2-equivalent (CO_2eq), the tax increases with the global warming potential of the gas. The new tax is expected to raise EUR 400 million in revenue for 2014 (MINHAP, 2014).

2.5. Pricing measures: The EU ETS

The industry and power sectors in Spain have been covered under the EU emissions trading system (EU ETS) since 2005, and therefore pay for CO_2 emitted above a previously allocated level at a market-determined price (Box 3.2).

2.6. Reforming environmentally harmful subsidies

Spain maintains various types of subsidies that can be considered environmentally harmful, the most important affecting energy and water use. As regards energy consumption, fuel tax exemptions and reductions represent the largest share of subsidies. These remained relatively stable over the past decade, although they have declined since 2009 in line with the overall contraction in public spending. Lower tax rates on diesel also effectively subsidise its consumption relative to petrol.

The largest share of budgetary support for fossil fuels in Spain comprises various exemptions from and reductions to payment of fuel taxes (OECD, 2013c). End-users in the aviation, navigation and railway transport sectors are exempt from paying fuel excise taxes. In 2011, this amounted to approximately EUR 394 million, a decrease from the 2000-02 average of EUR 733 million.[10] Fuel tax reductions are also offered in the farming and mining sectors; these amounted to EUR 666 million in 2011, after reaching a peak of EUR 1.4 billion in 2010. While the amount varies annually, the current level is similar to the average over the past decade. Since 2007, a partial refund of the diesel fuel excise tax has applied to its commercial use in agricultural production, designed to offset rising oil prices; in 2011, the refund amounted to approximately EUR 170 million. Biofuels were also exempt from fuel excise taxes from 2005-12, estimated in 2011 at EUR 562 million and EUR 178 million for biodiesel and ethanol respectively (Charles, Zamudio and Moerenhout, 2013).

Due to concerns regarding competitiveness of energy-intensive industries, certain manufacturing sectors are exempt from paying the electricity retail tax as of 2014. The tax exemption applies to 85% of electricity consumption for electricity-intensive industries in chemical reduction and electrolysis, metallurgical processes and mineralogical processes. This exemption is intended to protect these industries from expected increases in electricity prices and fewer free allowances under the 2013-20 period of the EU ETS. Additional support is provided to industries classified as exposed to a significant threat of carbon leakage through an annual fund of EUR 1 million (Chapter 5).

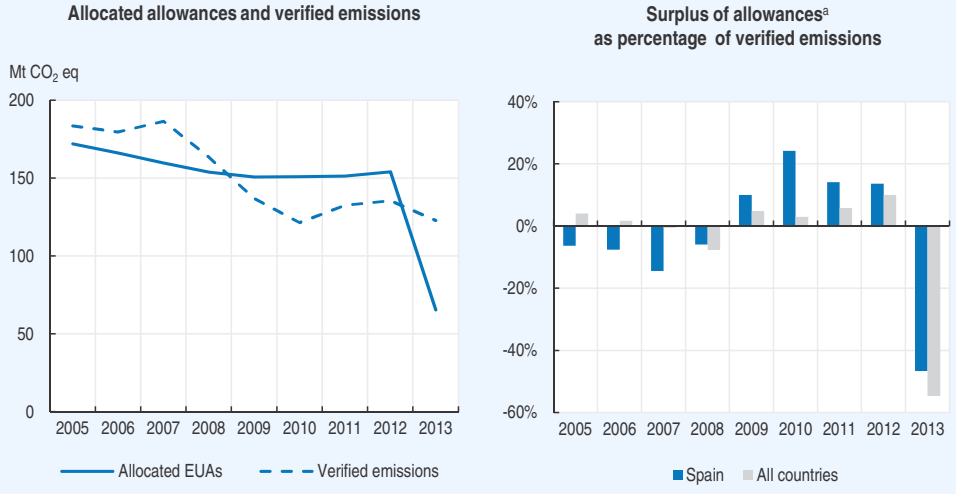
Box 3.2. **The EU emissions trading system in Spain**

Like other EU countries, Spain has implemented the EU emissions trading system (EU ETS) since 2005. It covered approximately 39% of total GHG emissions in 2012.

Under the EU ETS, Spain more than met its target of reducing average emissions over the 2008-12 period by 20% from the 2005 level (the most stringent reduction requirement within the EU); it overachieved the target by 9%, or 14.2 million metric tonnes of carbon dioxide equivalent (Mt CO_2eq) per year. Emissions from these sectors in 2012 were 29% lower than the 2005 level, following a sharp drop from 2008-10 (Figure 3.4.). This is mainly due to a decline in industry sector activities stemming from the economic crisis, as well as the increase in renewable energy sources in electricity generation (EEA, 2013d). Allowances were freely allocated to all installations, but actual emissions were higher up until 2009, after which they dropped below the amount of certificates allocated. As a result, Spanish industry covered under the EU ETS benefited from surplus allowances equivalent to approximately 18.5 million tonnes of CO_2 in 2012 (Sandbag, 2014).

In the third phase of the EU ETS from 2013-20, the share of free allowances has been drastically reduced; none are given to the power sector, while those awarded to the manufacturing sector will decline from 80% to 30% over the period in cases which are not considered to be at significant risk of carbon leakage (EC, 2013a, 2013b). As a result, the level of freely allocated allowances only covered approximately half of actual emissions, with the remainder being acquired through the purchase of allowances (Figure 3.4).

Figure 3.4. **Allocated allowances and emissions under the EU ETS**



a) Difference between allocated and verified emissions.
Source: EEA (2014), *EU ETS data viewer* (database).

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Unlike certain other EU countries, Spain did not make use of optional auctioning in the two previous EU ETS phases; the allocation regime under the third phase will therefore generate revenue from the auctioning of allowances, set to increase towards 2020 (CDC Climat, 2013). Member states are encouraged by the EU ETS Directive to use 50% of auction revenue for climate policies, with some countries already announcing and budgeting for the use of income from auctions.* The use of revenues generated from the auctioning of allowances was determined by law for the 2013 and 2014 state budgets. Currently, it provides for 90% of revenues (up to EUR 450 million) to be used for supporting the cost of electricity generation from renewable sources, with the remaining 10% (up to EUR 50 million) for other measures to address climate change.

* Germany announced all revenue would be allocated to a climate and energy fund, while France planned to allocate a certain amount to thermal renovation in buildings; the UK has specified all revenue will be allocated to the national budget.

Spain also provides various types of support to its domestic hard coal industry. The industry has struggled to remain competitive in the face of lower-cost imported coal and other fuel sources, and subsidies received are subject to EU rules on state aid and approval by the European Commission (Box 3.3). Coal is Spain's only domestic source of fossil fuels, and continued support is provided in part on energy security concerns. Besides the activity not being economically viable, coal's high carbon content makes it a significant source of GHG emissions, which emitters must pay for under the EU ETS. Coal is also a source of other local air pollutants such as SO_x, NO_x and particulate matter, which in large plants are regulated by the EU Industrial Emissions Directive; the need to meet emissions limits since 2008 has contributed to a decline in coal use (MIET, 2014).

Box 3.3. **Support to domestic coal production**

Support to hard coal producers is provided principally through government transfer payments to coal companies to compensate them for the difference between their operating costs and the prices at which they sell their output to local power plants; use of Spanish coal at power plants, the principal market, is based on volume quotas set by the government. Power producers contract directly with mining companies for the volume and price of coal under their quota (OECD, 2013c).

Operating cost support for hard coal production has declined approximately 90% since 2005, with a steep drop in subsidy amounts since 2012. Total amounts for private producers dropped from EUR 296 million to EUR 32 million between 2005-13, and from EUR 89 million to EUR 6.3 million over the same time period for the state-owned coal producer HUNOSA. Subsidies to coal mining companies will be terminated by 2018 in line with EU state aid rules. In 2012, both coal production volumes and employment figures fell below the reductions projected under the National Plan for Strategic Coal Reserves 2006-12 (OECD, 2013c; MIET, 2014). To mitigate the social cost of the closure of uncompetitive mines, the Spanish government grants aid to facilitate mine closure and provides financial compensation for early retirement or job losses; such aid totalled EUR 451.8 million in 2013 (MIET, 2014).

Royal Decree 1221/2010, which took effect in 2011 after approval by the European Commission under state aid rules, requires that fixed quantities of electricity generated from domestic coal be given priority dispatch into the electricity grid, at a regulated price. The 10 power plants affected by the regulation are required to purchase fixed quantities of domestic coal at a fixed price. As a result, they are awarded a fixed price per MWh of electricity produced, based on the generation cost, which considers fixed and variable costs, including the cost of domestic coal, the financial cost incurred for storing the coal, operating costs and the cost of covering CO_2 allowances required for the output produced. As approved by the European Commission, this subsidy is set to expire at the end of 2014, and is limited to the production of 23.4 terawatt hours (TWh) per year from domestic coal, representing approximately 8% of 2011 electricity generation (CNE, 2011; Songer, 2013, 2011). Overall, this support for domestic coal-fired electricity generation is estimated at EUR 400-450 million per year (Espinosa, 2013; Reuters Point Carbon, 2013).

A recent study estimates that only 52% of the benefit awarded to employees for the personal use of company cars is captured under the Spanish personal income tax rules, with an annual subsidy per company car of EUR 1 382 (Harding, 2014b). The under-taxation of company cars in Spain has important revenue and environmental implications: the study estimated the amount of tax expenditure for Spain at up to EUR 1.26 billion in 2012.

Moreover, the lack of a tax component based on the cost per distance travelled means that employees have no incentives to drive less and lower their fuel consumption. Reducing emissions from vehicle use is an important environmental objective in Spain given congestion challenges, as well as air pollution (notably particulate matter and NO_x) and GHG emissions from this sector.

Subsidies provided to agriculture have been overhauled since 2004 in line with changes to the EU's Common Agricultural Policy (CAP). Principal modifications include greater decoupling of direct payments to farmers from the volume of agricultural production, and linking them to maintaining various environmental, food safety, animal and plant health and welfare standards (known as "cross compliance"). The changes also devote more money to rural development policy through regional Rural Development Plans, which include compulsory agri-environmental programmes. These changes also require holders of water concessions to install and maintain irrigation-water measuring systems. Irrigation is responsible for approximately 63% of water consumption. While significant changes since the 2004 Agua programme and the 2005 Water Act have improved pricing structures and demand management measures, water for irrigation remains partly subsidised in Spain. Total subsidies for irrigated agriculture, including capital, operational and management costs, have been estimated at EUR 906 million to EUR 1.1 billion per year for 1998-2008 (Calatrava and Garrido, 2010). Subsidy levels after 2008 are assumed to be lower for three reasons: most irrigation modernisation projects have been completed; economic considerations have modified the ability to subsidise use of water for irrigation; and preferential electricity tariffs for agricultural economic activities were abolished in July 2008.

2.7. Towards a green tax reform?

Overall, Spain has not fully used the potential of environmental taxation to achieve environmental objectives and to help reduce public debt. Such taxes could help reduce energy consumption and related air pollutant and GHG emissions, particularly from the transport, residential and commercial sectors. Some reforms have helped address this issue, such as a restricted tax on coal introduced in 2005, increases in excise taxes applied to transport fuels in 2007, vehicle taxation based on CO_2 emissions since 2008 and broadening of energy products subject to tax since 2013. Preliminary forecasts place revenue from new hydrocarbon taxes on natural gas and coal at EUR 1.6 billion in 2013 and EUR 1.8 billion in 2014, up from an estimated EUR 65 million in 2012 (MINHAP, 2013b). The new environmental taxes on fluorinated gases and nuclear waste were forecast to add EUR 670 million in revenue in 2014, and the new tax on the value of electricity sales nearly EUR 1.3 billion; the tax on the use of reservoirs for hydropower raised nearly EUR 300 million in revenue in 2013 (MINHAP, 2014).

Addressing fuel use in non-ETS sectors is important for the success of Spain's climate policy, as well as for tackling air pollution: in 2010, air pollution caused 15 000 premature deaths in Spain, at a social cost of EUR 45 billion (OECD, 2014a). Increasing diesel taxation is thus a welcome proposal for addressing both GHG and air pollutant emissions from the transport sector. Taxes on other fuel use, such as for heating, should also be examined. In addition, taxation of energy products should be revised to ensure, for example, that tax levels on natural gas and coal reflect their respective contributions to CO_2 and air pollutant emissions. Various assessments examining fiscal outcomes from energy taxation reform, which would broaden coverage and account for both the energy and CO_2 content of fuels, generally find that Spain could increase revenues by between EUR 7.2 to EUR 9 billion in

2018, with less negative impact on GDP growth rates than other revenue-raising measures (Speck and Skou-Andersen, 2012). Restructuring the annual vehicle circulation tax to better reflect the environmental cost of vehicle use, covering emissions of air pollutants as well as CO_2, would also be an option for reform; the government is currently working on this option, which would also merge the vehicle registration and circulation taxes, resulting in a single annual country-wide tax rate. Spain should also consider reforming the calculation of taxable income for personal use of a company car by introducing a distance-based component. Non-carbon related externalities should also be better priced, which may include reforms to taxes and charges on water abstraction as part of River Basin Management Plans, wastewater discharges, pesticides and fertilisers.

The environmental effectiveness of tax measures to date has been weakened by exemptions and deductions, particularly regarding transport fuel taxes. There is also concern that the recent tax on the value of electricity sales, passed through to end-use prices by generators, may also effectively lead to a double taxation at the consumer level, while more negatively affecting revenues of lower-carbon generation facilities. The range of taxes applied in different Autonomous Communities could be made more coherent, both to better serve environmental purposes, and to reduce transaction and compliance costs. Environmental externalities with a primarily regional impact, such as certain air pollutants, could be better addressed by regional taxes, potentially with some guidance from the central government and co-ordination between regional governments. Ensuring the coherence of different measures remains important for any drive to reduce the public deficit and reform environmental taxation and spending. Any discussion of comprehensive tax reform should therefore involve a wide range of stakeholders and experts across and within government ministries, as well as independent experts.

In July 2013, Spain began considering a comprehensive tax reform with several major elements, including reducing taxes on labour, removing the bias towards indebtedness and reducing the public deficit. This process provides an important opportunity to advance reform of environmental taxation to more broadly cover energy use and address negative environmental externalities. The Commission of Experts produced a final report in March 2014 on reforming Spain's tax system, including environmental taxes – the Lagares report. Its recommendations provide a good basis for further greening the country's tax system (Box 3.4). As mentioned above, the government is considering a reform of the vehicle registration and circulation taxes, in line with recommendation 92; it is also considering a national-level waste tax, in line with recommendation 99.

Box 3.4. **Environmental tax reform: Recommendations from the Commission of National Experts**

Corporate income tax

- Recommendation 45: Remove deduction for environmental investments (as part of abolishing all corporate tax deductions, including for RD&D).

Taxes on hydrocarbons

- Recommendation 86: In line with the proposal for revising the EU Energy Tax Directive, establish excise tax based on separate values for energy content and carbon dioxide components. Within a time frame "deemed appropriate by the government", equalise excise rates for diesel and gasoline fuels. The additional revenue could be used to reduce social charges on labour.

Box 3.4. **Environmental tax reform: Recommendations from the Commission of National Experts** *(cont.)*

- Recommendation 87: Remove exemptions that prevent more widespread application of the tax on coal; adjust the coal tax in line with previous recommendation, i.e. apply on both an energy and carbon content basis.

Taxes on electricity

- Recommendation 88: Reform the taxable base to the number of kWh consumed, rather than price paid, for the price signal associated with energy use to be clearer. Reduce the number of exemptions and reductions applicable to payment of the electricity tax.
- Recommendations 89 and 90: Remove the tax on value of electricity production (the 7% tax on the value of electricity produced), and abolish the 22% levy on hydropower electricity producers for the use of inland water; compensate loss of revenue by increasing the electricity tax and base this on the volume, rather than the value, of electricity consumption.

Nuclear waste

- Recommendation 91: Combine the currently separate tax on the production of spent nuclear fuel and waste, and on the storage of such waste in centralised facilities. Once the electricity tariff deficit is paid off, transform this into a single rate covering the cost of managing and storing waste.

Taxes on transport and infrastructure

- Recommendation 92: The Motor Vehicle Tax and Tax on Certain Means of Transport should be replaced by a new Tax on the Use of Motor Vehicles. This would be a tax paid annually, based on the carbon dioxide emissions of each vehicle; it would therefore incorporate the current registration tax but continue to be levied annually at the municipal level, like the current circulation tax. The tax would be common across the country, levied at the municipal level with revenue transferred to regional governments.
- Recommendations 93 and 94: Fees should be set for the use of transport infrastructure, which can be related to the tax on vehicles, and certain cities could use congestion charges.

Reforming water taxes

- Recommendation 95: Reform the administrative fee, public water use fee and wastewater fee to ensure a distribution of infrastructure maintenance cost across all users.

Removing and replacing dispersed and ineffective environmental taxes

- Recommendations 96, 97 and 98: Abolish current taxes applied in some regions on wind power (by turbine), reservoir waters used for hydroelectricity, CO_2 emissions and on large building surfaces (e.g. shopping malls). These taxes are questionable from an environmental perspective, as well as being economically inefficient. These could potentially be replaced by common taxation that actually meets environmental goals.
- Recommendation 99: Regional landfill taxes should be replaced by a national tax, with revenue ceded to regional governments. The tax could vary in different regions within limits determined in the national law, taking into account various costs (waste treatment infrastructure; environmental costs; resource costs).
- Recommendation 100: Create a national-level tax on waste disposal (including on construction and hazardous waste) and incineration, applied and managed by regional governments. A minimum and maximum amount would be set in the law within which regions could set different tax rates.
- Recommendation 101: Create a national-level tax on air emissions, to be applied and managed by the regional governments. A minimum and maximum amount would be set in the law within which regions could set different tax rates.

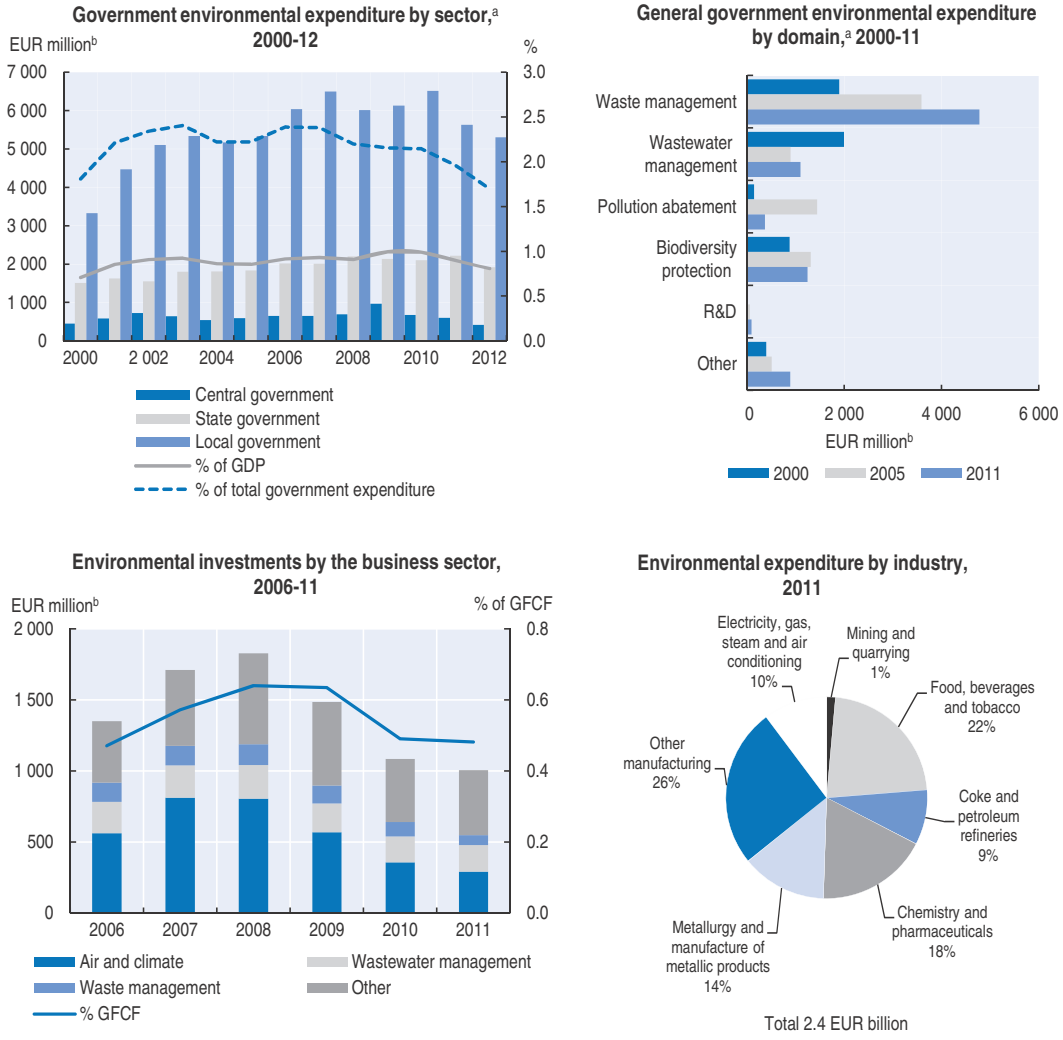
Source: MINHAP (2014), *Informe : Comisión de Expertos para la Reforma del Sistema Tributario Español* [Report: Commission of Experts on Reform of the Spanish Tax System], Ministerio de Hacienda y Administraciones Públicas, Madrid.

3. Environmental expenditure and investment

3.1. *Public expenditure on environmental protection*

Total government expenditure on environmental protection increased approximately 76% in real terms from 2000-10 despite the economic crisis, although it has declined since then and dropped nearly 18% between 2010-12. As a share of GDP, it has remained relatively steady over the past decade, at approximately 1%. The share of total government expenditure on the environment has fluctuated between 2.2% and 2.4% for most of the past decade, although it began declining in 2010 and reached a low of 1.7% in 2012 (Figure 3.5).

Figure 3.5. **Environmental protection expenditure by sector and environmental domain**



a) According to the COFOG classification.
b) At constant 2005 prices.
Source: INE (2014), "Encuesta del gasto de la industria en protección ambiental", *INEBase* (database); OECD (2014), *OECD Economic Outlook No. 95* (database); OECD (2014), *Environment Statistics* (database); OECD (2014), *National Accounts* (database).

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Expenditure on waste management has dominated government spending on the environment for the past decade, accounting for 56% of the total in 2010. Spending on waste reflects national priorities; Spain has struggled to reduce the share of landfilled municipal waste over the past decade, although total volumes of waste began to decrease in 2008. More recently, wastewater and water became priority areas; spending on water infrastructure and water quality dominates the Ministry of Agriculture, Food and Environment's budget, generally managed by river basin authorities. This accounted for over 80% of annual spending from 2004-09, and more than 75% since then.

As in many OECD member countries, sub-national governments (regional and municipal) represent the vast majority of government spending on the environment. Their share is particularly high in Spain, at above 90% since 2000. The only area in which the central government's share has increased relative to regional and municipal governments since 2004 is in pollution abatement.[11] At the sub-national level, most expenditure (except for spending on biodiversity) occurs at the municipal level, particularly as regards waste and wastewater management.

The business sector also invests in environmental protection activities, notably related to air pollution and climate change. In 2011, environmental investments by the business sector dropped to 0.48% of gross fixed capital formation (GFCF), down from a peak of 0.64% in 2008. Spending on the environment by the industrial sector reached EUR 2.4 billion in 2011, dominated by a few sectors, notably food, chemicals and metals (Figure 3.5). In line with most other EU countries, both public and private specialised producers of environmental services are most active in the areas of waste management and wastewater treatment. Various actors provide waste and water services in Spain, under the responsibility of municipal governments. These services can be provided directly by municipalities, indirectly via public companies or other public entities (54% of market share), through mixed public-private companies (13%) or outsourced to fully private companies (33%). Different municipalities opt for different models. Evidence is inconclusive regarding the efficiency of different ownership structures when it comes to waste. However, some evidence suggests that water supply services are characterised by lower prices when provided directly by municipalities (García-Valiñas, González-Gómez and Picazo-Tadeo, 2012; Martínez-Espiñeira, García-Valiñas and González-Gómez, 2012; Simoes, Cruz and Marques, 2012). To date, pricing of waste and water services has resulted in insufficient funding for maintenance, operations and extensions of water and wastewater networks, which have in effect been subsidised through other funding sources, notably EU funds (González-Gómez, García-Rubio and Guardiola, 2012).

While progress has been made in expanding water supply and sanitation infrastructure, new investments will be required over the next several years, in part to compensate for a decline in funding from EU sources. Current government budgets are therefore prioritising these investments. Options for more sustainable funding sources will need to be explored, particularly increased water service charges. In general, charging-systems for water lack transparency and charge relatively low fees (OECD, 2010). Water pricing has been based on a system of financial cost recovery since the 2004 National Hydrological Plan. The plan was designed primarily to cover upfront investment costs and a portion of operational and maintenance costs. There are currently no provisions for the recovery of environmental costs or the scarcity value of water; to date, this has limited the ability of prices to act as demand management instruments (Gómez et al., 2013).

About EUR 5 billion was invested under Spain's National Irrigation Modernisation Plan between 2002-08, of which 60% were public funds and 20% were from EU structural funds. These were supplemented by EUR 2.3 billion under the special "Shock" Plan of 2006-08 to address urgent drought conditions. The investment has improved efficiency of irrigation techniques, leading to positive economic impacts on agriculture, and lowered the level of water use per hectare on average. Total agricultural freshwater withdrawals declined by 2.6% per year on average between 1998-2000 and 2006-08 (OECD, 2013d).

3.2. EU structural funds for environmental protection and economic development

Spain has made use of the European Regional Development Fund (ERDF), Cohesion Fund (ECF) and Social Fund (ESF) over two programming periods, 2000-06 and 2007-13. In the first period, over EUR 28 billion from the ERDF was largely used for basic infrastructure projects. Over the same period, ECF support totalling over EUR 12 billion was used for both environmental and transport infrastructure projects (SWECO, 2008).[12]

From 2007-13, Spain was allocated over EUR 35 billion in structural funds, the majority (EUR 26.2 billion) for regions with low levels of GDP and employment were from the ERDF, along with EUR 8 billion from the ESF. For this funding period, the greatest number of projects targeted RD&I, followed by environmental projects and those fostering a knowledge-based economy and society. From 2000-12, approximately 9.7% of all ERDF funding supported R&D in the environment sector and eco-innovation. Transport was allocated a smaller share of projects than under the previous period, and included the reconstruction and maintenance of roads and rail.

However, Spain has struggled to disburse funding for projects under its operational programmes. Approximately 38% of total structural funds, including 45% of social funds, were disbursed by the end of 2011, which increased to nearly 70% by the end of 2013. Disbursement is expected to be complete by 2015. The slow disbursement is largely attributed to the economic crisis and the contraction of public budgets, as national governments are required to match EU funds (MINHAP, 2013c). The focus of operational programmes is aligned with Spain's current economic objectives (R&D and innovation, entrepreneurial development, human capital and a knowledge economy). However, some adjustment and reprogramming have sped up disbursement and reoriented funding to more pressing needs, such as tackling youth unemployment (MEH and MTI, 2009). Funding allocated to energy projects declined, for example, while increasing for social infrastructure (health, education, etc.), with a similar shift from spending on environmental projects to investment in transport infrastructure.

Spain has consistently been one of the EU member states responsible for a large share of errors, or irregular expenditures, in the use of structural funds. Errors can occur when regulations are not properly applied, when ineligible expenditures are declared, or when expenditure is not actually incurred or documented. For the 2000-06 programming period, Spain accounted for 41% of total financial corrections in ERDF and ESF amounts received, although it also received the most combined funding among the EU25 countries (EC, 2013c). Among the audited programmes in 2006-09, Spain accounted for 31% of quantifiable errors in the use of regional development and cohesion funds, and 23% of errors for social funds (EC, 2011). In the case of the ERDF and ECF, approximately half of the errors were due to weaknesses in public procurement procedures, and stemmed from a limited number of operational programmes. Delivery of funds through operational programmes in Spain is complex, involving a large number of intermediate bodies, thereby increasing the chances

for error.[13] In 2011, the EU suspended parts of payments to 19 programmes, some of which may impact components of environmental programmes. Work began in 2011 to identify problem areas and implement remedial actions, and will need to accelerate for more rapid disbursement of the funds and achievement of environmental and other objectives (EC, 2013c).

3.3. Investment in less polluting, more efficient energy and transport

Increasing energy efficiency and lowering CO_2 emissions from appliances, buildings and transport

The Energy Efficiency Action Plans (2004-12) promoted investment in energy efficiency, primarily in the transport and buildings sectors, where reducing energy consumption and associated emissions is challenging. From 2005-07, EUR 8 billion was spent implementing the plans, largely funded by a levy on consumer electricity bills for appliance replacement and corporate transport schemes. The 2008-11 Energy Saving and Efficiency Plan had a budget of EUR 245 million, while supplementary measures from 2008-12 resulted in additional public investment of EUR 497 million (IEA, 2012). The 2008 Action Plan placed particular emphasis on transport, which accounts for 38% of the total estimated energy savings resulting from the plan (33.4 million tonnes of oil equivalent [Mtoe]). Under the 2011-20 Energy Efficiency Action Plan, over half of the EUR 4.9 billion budget will target buildings and appliances; these will still account for a smaller share of total energy savings to 2020 compared with the transport sector. The most recent plan hopes to stimulate investment worth nearly EUR 46 billion (IDAE, 2011).

In June 2014, the Spanish government established a National Energy Efficiency Fund (*Fondo Nacional de Eficiencia Energética*, FNEE) with a budget of EUR 350 million, with the aim of transposing EU directives related to energy efficiency. Managed by the Institute for Diversification and Saving of Energy (IDAE), the FNEE is 35% financed by the central government from EU structural funds. It will focus on building renovation, heating systems and boiler efficiency. The FNEE is expected to support energy efficiency investments worth approximately EUR 892 million per year in the building sector, and investments totalling EUR 828 million per year in the industrial sector (Enerdata, 2014).

Spain has had some success in providing financial support to replace inefficient appliances, and shifting the market towards high-efficiency appliances rated "A" and higher. Funding is also provided for commercial equipment and lighting replacement, various types of building renovation (envelope, thermal installations), use of biomass or solar power for heating and construction of new energy efficient buildings. Financial incentives for renovation are likely to be more effective once they can be tied to specific energy performance requirements as articulated in the most recent Technical Building Code and energy performance certificates for existing buildings, implemented as of 2013 (IDAE, 2012, 2011). Support for energy efficiency improvements can also help with recent concerns about fuel poverty, which stems from a combination of lower income, rising energy prices and generally low energy performance of large parts of the existing building stock;[14] one study estimated that fuel poverty affected up to 4 million people in 2010 (ACA, 2012).

In the transport sector, spending has focused on encouraging renewal of the vehicle fleet with more efficient and less-polluting models, as well as through the use of biofuels. Spain has had a vehicle replacement scheme in place since 1994; it ended in 2007 only to

be replaced by the VIVE Plan (Innovative Vehicle – Ecological Vehicle) launched in 2008 with a budget of EUR 1.2 million until 2010. It offered interest-free and low-interest loans to subsidise the purchase of new vehicles meeting environmental criteria (limits to CO_2 emissions) if accompanied by the scrapping of an old vehicle. This was supplemented in 2009-10 by the *2000E* programme, which was offered as part of stimulus measures. It provided an incentive of EUR 2 000 for the scrapping of old and purchase of new vehicles, although with less stringent CO_2 emissions criteria than under the VIVE Plan (ACEA, 2010). In 2012, Spain launched an Efficient Vehicle Incentives Programme (PIVE) to support replacement of passenger vehicles over 10 years old and light trucks older than 12 years. It is set to run until the end of 2014 or until full allocation of the EUR 295 million budget (IEA, 2012).

These long-running schemes have both an economic and environmental aim: stimulate the automotive industry and replace old vehicles in the car fleet with newer, less-polluting ones, though the emphasis has in effect been on lower CO_2 emissions. It is unclear to what extent the first vehicle replacement scheme impacted the average age of the private vehicle fleet, given the small number of units replaced (less than 4 million over 12 years) (IHS, 2010). In addition, recent evidence has found that NO_x emissions from new diesel vehicles are higher than their ratings indicate (Weiss et al., 2012). The VIVE and PIVE schemes are more targeted from an environmental perspective, imposing CO_2 limits on new vehicles purchased, including for light-duty vehicles (the only European country to have done so among car scrapping schemes introduced between 2008-09), and targeting older models for scrapping. However, neither considered levels of other air emissions, which are important from an air pollution perspective. One assessment for 2009 found car scrapping schemes in Europe had only small environmental benefits; in Spain, these benefits were slightly higher than average, improving the sales-weighted average fuel economy of new cars by up to 2.3% rather than 1.3% (Leheyda and Verboven, 2013).

More targeted support programmes for commercial and electric vehicles were launched in 2013. With a budget of EUR 38 million, the PIMA Aire Plan provides direct financial support for the purchase of new or one-year-old commercial vehicles as a replacement for older models (the average age of the commercial vehicle fleet is seven years) (MAGRAMA, 2013). Importantly, beyond improving CO_2 emissions, the plan targets NO_x and particulate matter emissions, which contribute to local air pollution. In addition, nearly EUR 10 million has been allocated to create incentives for the purchase of new all-electric vehicles; the incentives increase with the vehicle's range, and also apply to commercial vehicles and buses (IEA, 2013b). Electrification of transport may be one means of tackling GHG and other air pollutant emissions that have been difficult to reduce in this sector.

The primary policy instrument for increasing the use of renewable energy in the transport sector has been a blending target for biofuels as a share of fuel energy content; in place since 2008, it became mandatory in 2009. Starting at 1.9% in 2008, it increased to 6.5% in 2012 before dropping to 4.1% in 2013. Previous analysis (OECD, 2013d) has found biofuel mandates to be cost ineffective from a CO_2 mitigation perspective. Spanish farmers are also eligible for agricultural subsidies under the EU CAP, known as the Single Payment Scheme (SPS). This system was introduced in 2005 to decouple subsidies from production-related aid. Although these subsidies do not directly support biofuel crop production, farmers growing crops destined for biofuels are also eligible for SPS payments, along with farmers whose crops are destined for other uses. Total SPS payment amounts for biofuels

in 2011 have been estimated at EUR 190 million, of which EUR 2 million were for biodiesel and the rest for ethanol (Charles, Zamudio and Moerenhout, 2013).

Significant investments have been made in high-speed rail over the past several decades, with considerable co-funding from EU sources (Guirao, 2012). The positive environmental impact of high-speed rail can be considerable, notably through avoided GHG and air pollutant emissions. However, high levels of ridership and displacement from road and air travel are required to counter the embedded carbon within a reasonable time period; evidence on whether this has occurred to a significant degree in Spain is inconclusive (Guirao, 2012; Westin and Kågeson, 2012). Continued investment in high-speed rail through the economic crisis was highly controversial in Spain, but was accompanied by increased investment in regular and freight rail services under the Extraordinary Infrastructure Plan of 2010 (Renner and Gardner, 2010; Guirao, 2012). Comprehensive economic and environmental cost-benefit assessments for high-speed rail investment have been weak, as have planning and demand forecasts on certain lines. Spain's network has been criticised for its lack of integration into the entire transport system, given the importance of door-to-door transit time; one consequence has been low ridership levels (Guirao, 2012). A positive economic development has been the emergence of Spanish companies in the high-speed rail market that are now exporting their products and systems (Renner and Gardner, 2010; Guirao, 2012).

Most public funding awarded under the Energy Efficiency Action Plans is disbursed by regional governments, which also have authority to provide direct incentives for certain activities. Since 2004, municipalities can also provide incentives for certain environmental investments via local ordinances. This includes incentives for businesses to develop sustainable transportation plans for employees (resulting in a 50% tax credit), a tax credit of up to 75% of the vehicle circulation tax for environmentally friendly vehicles and a tax credit of up to 95% for installation of solar energy systems in buildings.

In 2011, a new Carbon Fund for a Sustainable Economy (FES-CO_2) was created to directly support GHG emission reductions by purchasing carbon credits generated for each avoided or reduced tonne of GHG. The Carbon Fund is currently paying EUR 7/tonne of CO_2eq to support two programmes: Clima Projects, established through calls for tender starting in 2012; and the PIMA Sol, which launched in 2013. PIMA Sol combines preferential financing for energy efficiency investments in the hotel industry, supported by the European Investment Bank, and the purchase of carbon credits resulting from reductions achieved through the investments. It is expected to mobilise investments totalling EUR 400 million. Clima Projects target non-ETS sectors (excluding forestry activities), and receive payment for reductions achieved over four years. Projects funded in 2012 are expected to produce verified emissions reductions of 800 kilotonnes (kt) of CO_2eq between 2013-17 (MAGRAMA, 2013). The fund is seen as cost effective, as it pays only for third-party verified emissions reductions, although it is unclear how it deals with additionality, i.e. ensuring funding doesn't go to investments that would have occurred even without the funding. It forms part of a broader set of policy tools to achieve GHG reductions in non-ETS sectors. These include a carbon footprinting programme that will allow companies and organisations to voluntarily offset their emissions, and projects in the land use and forestry sector, which will be accounted for separately. Currently, the FES-CO_2 is funded directly by the Ministry of Agriculture, Food and Environment with an anticipated budget of EUR 10 million for 2013 Clima Projects. The government is also exploring the use of ETS auctioning revenue to partially finance the Carbon Fund.

Promoting renewable energy

Overall, subsidies awarded to renewable electricity generation have been the second highest in Europe, estimated at EUR 8.4 billion in 2012 (DG ECFIN, 2013) and EUR 9.1 billion in 2013 (Espinosa, 2013). The level of support provided per unit of electricity generated was the highest in Europe in 2011, largely due to the high share of renewables in Spain's electricity generation. However, weighted average support costs by technology were much lower than in several European countries, including France, Belgium, Germany and Italy (CEER, 2013).

Since the early 2000s, renewable electricity production has been supported through a fixed tariff awarded per unit of electricity generated (a feed-in tariff) or an additional payment on top of the market price of electricity to compensate the higher cost of generation (a feed-in premium). The cost of the support system was meant to be borne by all electricity consumers through regulated prices. This occurs in part through electricity tariff increases related to the increased cost of electricity supply, but also through specific levies included in the final tariff (known as the "access tariff") to support renewable energy, combined heat and power, and electricity systems on island territories. The access tariff also includes costs related to electricity transmission and distribution, which increased in part due to renewable energy sources entering the electricity system. The costs included in the access tariff increased significantly in 2005-13; renewable electricity increased 816%, surpassing costs for transport and distribution as of 2009 (MINETUR, 2013). However, the fixed charge for the access tariff, in effect limiting electricity price increases, shifted the cost burden of investments in renewable energy and transmission and distribution networks onto electricity utilities. The cost of supporting renewable energy, along with other costs such as fuel prices in combination with declining electricity demand, contributed to the "tariff deficit" in Spain's electricity system (the gap between revenues from tariffs and the investments and costs incurred by utilities).

Until the financial and economic crisis, Spain's major electricity companies financed the resulting tariff deficit on the understanding that the Spanish government would reimburse them with interest. After the economic crisis, the Spanish government became liable for the deficit, and established various mechanisms to manage this liability.[15] All consumers will eventually pay the full costs of the tariff deficit over the next 15 years or so. The increasing costs of the renewable energy support system, combined with tight financial conditions and stagnant electricity demand, led the government to significantly reform the electricity system, including support to renewable electricity generation. The new regime is being designed to better balance revenues and costs, eliminate the tariff deficit and ensure a reasonable return for investors. Details of how the regime will function are the subject of debate and judicial review. The potential for further growth in renewable energy in the medium term is considered limited, given changes to incentive systems, constrained economic growth and limited growth in electricity and energy demand (IEA, 2013c). The Spanish government is also prioritising improved electricity interconnections outside the Iberian Peninsula, which will help create a broader and more stable market for renewable energy.

The high costs of the subsidy system partly stem from the generous tariffs awarded to solar PV (nearly EUR 400/MWh in 2010 and EUR 357/MWh in 2011) (CEER, 2013), which led to a larger than expected level of installations and investment: the planned capacity limit for solar PV was already exceeded by 2007, and Spain's actual solar PV capacity in 2010 was

10 times the 40 MW planned for in its 2005 Renewable Energy Action Plan (Brown, 2013). A range of measures and tariff cuts were introduced starting in 2009, but the majority of PV installations had already been made, as developers rushed to install over 2 500 MW in 2008 alone before the limitations took effect. Tariff cuts therefore continued in 2010-11 for all renewable sources, and generation limits were set for wind power as well. Given that feed-in tariff payments span 15-28 years depending on the technology, payments for systems installed prior to 2007 continue, despite the suspension of all new projects since 2012. The difficulty of adjusting feed-in tariff levels to keep pace with reductions in technology costs, the unplanned level of installations and financial constraints related to the electricity tariff deficit have all led to an uncertain regulatory and investment environment for renewable energy since 2008 (Couture, 2012).

Spain's renewable energy subsidies are generally considered to have greatly increased the share of renewable energy in electricity generation, notably since 2008 (Chapter 1). In addition, Spain has developed a competitive wind power industry and is also a world leader in both deployment and total capacity of concentrating solar power (CSP) installations (REN21, 2013). In parts of Spain, the levelised cost of electricity of decentralised solar PV systems is cheaper than what owners of these generation units would normally pay; this parity does not include costs associated with maintaining the electricity transmission and distribution system, however (IEA, 2013c). Advanced systems and operating procedures, and a wide geographic distribution of generation, have allowed for variable renewable energy sources to integrate into the electricity grid (IEA, 2013c).[16]

A full assessment of the costs and benefits of public support for renewable energy are lacking; where some academic assessments have occurred these tend to be incomplete and narrow in scope. For example, only support costs paid per MWh of renewable electricity generation are generally included, with other potential social costs not addressed. Some analyses have found net benefits, in terms of avoided energy imports, the avoided cost of CO_2 emissions, a downward pressure on wholesale electricity prices, and lower SO_2 and NO_x emissions and associated health cost savings. However, costs appear to outweigh benefits for solar PV, and to a lesser extent for CSP, when considering the benefits of avoided energy imports and CO_2 emissions (Burgos-Payán et al., 2013; Ortega, del Río and Montero, 2013). There is some evidence that the level of the wholesale electricity price reduction may be decreasing while costs increase (Gelabert, Labandeira and Linares, 2011; Burgos-Payán et al., 2013). End-user electricity prices have increased in Spain, in part due to increases in the access tariff, while demand has been decreasing. In addition, the reduction in wholesale power prices may reduce the profitability of non-subsidised electricity generation.

Fiscal consolidation programmes launched in the post-2008 period made it urgent to reduce the burden of the electricity tariff deficit. In its 2013 country-specific recommendations, the European Council called on Spain to tackle the electricity tariff deficit by implementing structural reforms. In July 2013, the government proposed an overhaul of the electricity sector, which was approved in June 2014. It includes a new remuneration system for renewable energy projects based on a rate of return of approximately 7.5% that would apply to all existing installations. This return will be provided based on an assessment of "standardised" costs of investment, operation and maintenance, and income from the sale of power at market prices, determined by technology.

This overhaul in the remuneration system will have a strong impact on the renewable electricity sector in Spain. Policy changes, particularly for existing installations, introduce both policy and investment risk, as they tend to increase capital costs for future renewable energy projects (Brown, 2013). Currently, there is much uncertainty over remuneration rules and to which facilities they will apply. This will likely deter future investment. The most recent proposals suggest that subsidies will be cut by EUR 1.75 billion per year, with wind farms built before 2005 particularly affected, as well as CHP facilities using animal waste; CSP plants with storage capacity will be treated more favourably (ENDS Europe, 2014a, 2014b). The draft rules have been criticised for lack of transparency and consultation, and there are concerns certain projects may become insolvent depending on their initial borrowing conditions. In addition, legal challenges to changes in the remuneration for existing plants are underway (Couture and Bechberger, 2013; Daley, 2014).

Urgent reforms to the current system are clearly required, both to correct previous design flaws and to tackle the electricity sector deficit. However, these should aim to minimise negative impacts on future investments, given that de-carbonising the electricity system remains important from a longer-term perspective. Spain has already moved towards exposing renewable energy generators to market prices for electricity and making them responsible for grid integration and balancing issues, which are both welcome developments. Moves to de-link overall remuneration from electricity generation should be carefully considered for their impact on overall production, and built-in flexibility is essential; setting pre-determined levels of remuneration is highly challenging, and inevitably subject to revision. Transparency and public consultation have proved important factors in successfully instituting changes to renewable energy remuneration regimes; these principles should also be applied during revision processes (EC, 2013d).

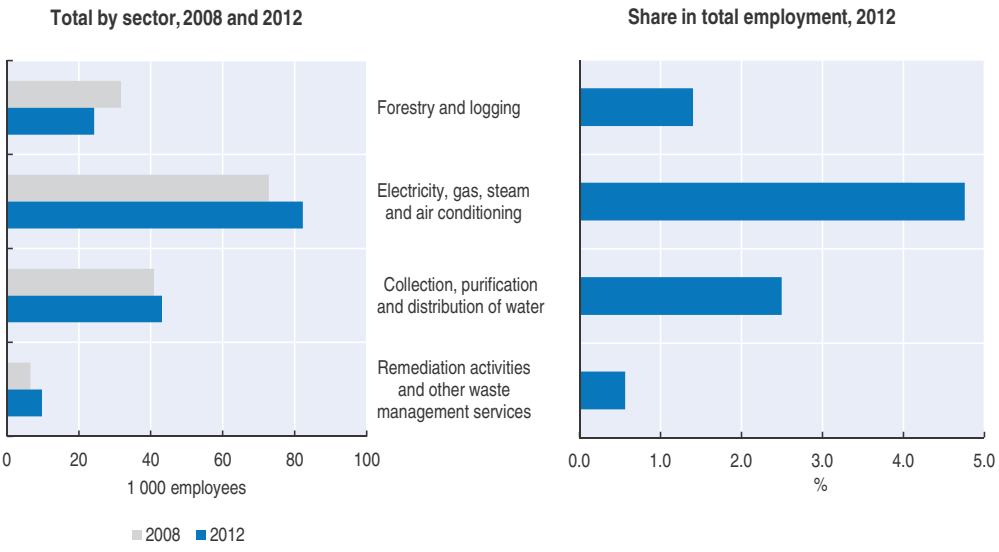
4. Green employment

Since the start of the economic crisis, unemployment has become one of Spain's most pressing socio-economic challenges. The unemployment rate increased from 8.3% in 2007 before the start of the crisis to 25.82% in the fourth quarter of 2013. Unemployment has begun to fall, decreasing to 24.6% in 2014. The unemployment rate is projected to continue a gradual decline, but will remain high (OECD, 2014b). Expanding employment in the environmental goods and services sector is a small part of the deeper structural challenges required to boost employment broadly across the economy (OECD, 2014b); however, employment did increase in these sectors over the past decade and potential for further growth remains.

The Spanish government has attempted to quantify what it considers to be "green" jobs in the environmental goods and services (EGS) sector. Despite significant variation in estimates of green jobs depending on scope, methodology and data sources, all studies find an increase in green employment since the earliest study in 1998. In that year, the Ministry of Environment put the number of green jobs at 158 500, or 1.12% of the total labour force (OSE and FB, 2009). Eurostat (2013) estimated the numbers reached 275 000 in 2008. Using a selection of sectors, the Spanish government estimates the number of environment-related jobs at 159 200 in 2012 (Figure 3.6). However, green employment was not spared from the economic crisis. The number of green jobs decreased to 222 000 in 2011, despite considerable output growth in the EGS sector.

These figures have to be treated with caution; another report estimated the number of green jobs at 531 000 in 2009, equivalent to 2.1% of total employment (OSE and FB, 2009).

Figure 3.6. **Employment in environment-related activities**



a) The sectors covered include: NACE 02,35,36 and 39.
Source: Country submission.

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Similarly, a report by the EOI Business School qualifies 407 200 jobs as green in 2010 (EOI, 2011). These estimates are also incomplete as they do not cover sectors such as sustainable housing, transport or tourism.

The increase in employment stemmed from economic growth and the simultaneous development of green sectors, especially renewables, water and waste management, and environmental education (OSE and FB, 2009). After 2008, the most important driver of green jobs has been the renewable energy sector: employment increased by over 3 000% between 1998-2009, from 3 500 to 109 400 jobs (OSE and FB, 2009). Other estimates of employment in the renewables industry reach similar estimates, in the range of 94 700 to 188 000 jobs in 2009-10 (Table 1). Since employment in the renewables sector was strongly policy driven, in particular by feed-in tariffs, the reduction of support for renewable energy is likely to have a substantially negative effect on employment in the sector.

Table 3.1. **Estimates of renewable energy employment**

Year	1998	2007	2009	2009	2009	2010	2010
Total	3 522	89 000	188 000	109 368	118 000	94 737	113 495
Source	Ministry of Environment (1998)	ISTAS (2007)	SEPE (2010)	OSE and FB (2009)	APPA (2012)	EOI (2011)	ISTAS (2010)

Environmental policies have neither been systematically reviewed in terms of their impact on the job market, nor been targeted to enhance employment. Support measures have focused on specific projects and programmes. As part of the fiscal stimulus package under Plan E, the State Fund for Employment and Local Sustainability invested EUR 1.13 billion in 5 184 projects that were directly related to environmental sustainability (EEO, 2013). Since 2007, Spain has been specifically promoting green jobs and businesses through

Empleaverde, a programme funded 50-80% by the European Social Fund and operated by the Biodiversity Foundation. As of 2013, the programme had supported the creation of 2 300 business lines or businesses and nearly 550 new direct jobs. In addition, 55 000 workers in existing jobs had been trained to reduce the environmental impacts of activities in their respective sectors. The programme also prioritises projects that target certain types of workers[17] and those that are under-qualified (ESF, 2011). Regional governments in Spain have also developed skills training programmes, including for the "greening" of existing occupations (Strietska-Ilina et al., 2011). The region of Navarra, for example, strategically developed a renewable energy training programme in 2002; employment in the sector increased 183% by 2006. The region of Extremadura also introduced a skills training programme for solar energy installations, targeted at workers in the construction sector. In addition, the Biodiversity Foundation's Green Business Network project (*Red emprendeverde*) programme for entrepreneurs helps entrepreneurs and investors start and consolidate green businesses. The network had 4 400 registered entrepreneurs and 85 investors as of 2013.

5. Eco-innovation

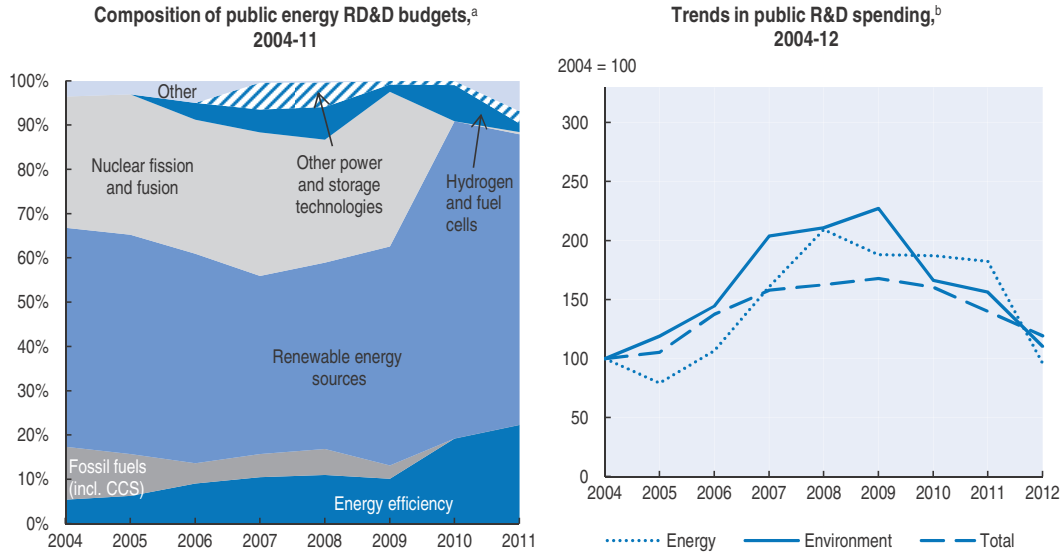
5.1. *Eco-innovation performance*

Gross domestic expenditure in research and development (R&D) was 1.3% of GDP in 2012, significantly below the OECD average of 2.4% (OECD, 2013e). Investment in R&D has increased substantially over the last decade, including by 9% in the midst of the economic crisis between 2007-10 (OECD, 2012). The increase, however, was not enough for Spain to meet its objective of investing 2% of GDP in R&D by 2010, as specified in the National Plan of Scientific Research, Development and Technological Innovation 2008-11 (Comisión Interministerial de Ciencia y Tecnología, 2007). The main driver of renewed economic growth is a surge in exports, which includes green economic sectors such as renewable energy. Moves to further develop these sectors will benefit from broader efforts outlined in Spain's National Reform Programme on stimulating innovation, education and a knowledge-based economy.

In 2010, Spain invested over 10% of the government R&D budget in environment and energy, placing it among the top 10 OECD member countries for this category (OECD, 2012). It remained within the top 10 in 2011-12, although share of spending in the category decreased to 6.2% in 2012. Gross domestic R&D expenditure for energy and the environment increased by 66% and 87% respectively between 2004-10, which surpassed growth in overall spending on R&D over the same period (Figure 3.7). R&D expenditure on energy peaked in 2008 and has since declined 54%, while spending on environment peaked a year later and has since dropped 51%; steep drops took place between 2011-12, especially for energy. A quarter of the support came from the European Regional Development Fund, which allocated almost 10% of resources to eco-innovation between 2000-12. In 2014, however, the government budget for environmentally related R&D increased by 5% from the 2013 level, the first increase since 2009.

Between 2000-12, the government devoted 4.6% of its R&D support to environmental research and eco-innovation projects; 75% of these funds supported earlier stages of R&D with the rest invested in activities closer to the market. Funding for early R&D is allocated through competitive calls from the state in accordance with the National Plan for Science, Technology and Innovation. R&D activities closer to the markets require companies to

Figure 3.7. **Public R&D spending on energy and environment**



a) Government energy technology budgets for Research, Development and Demonstration (RD&D). Based on data expressed in constant prices.
b) Government budget appropriations or outlays for R&D; breakdown according to the NABS 2007 classification. Based on data expressed in constant prices.
Source: IEA (2014), *IEA Energy Technology RD&D Statistics* (database); OECD (2014), *OECD Research and Development Statistics* (database).

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apply for funding through the Centre for Industrial Technological Development (CDTI), a public business entity dependent on the Ministry of Economy and Competitiveness. Between 2000-12, the CDTI gave more than 80% of its support in low-interest loans. In addition to funding environmental projects, the CDTI includes environmental sustainability in all funding decisions.

Private R&D expenditure is particularly low, and innovation depends to a large degree on government support. Corporate R&D expenditure amounted to 0.69% of GDP in 2012, while the OECD average was 1.63%. Corporate R&D has not increased as rapidly as public support to R&D over the last decade. This dependence on government support exposes corporate R&D activities to spending cuts in the public budget, as observed during the economic crisis (Conchado, Anadón and Linares, 2012). Contrary to most other OECD member countries, small and medium-sized enterprises (SMEs) are responsible for more than half of corporate R&D investment in Spain. This pattern tends to be found in countries with relatively low corporate R&D investments and innovation performance. Spending on innovation by large firms is lower than the OECD average, while that of small firms is around the OECD average. In addition, the percentage of small firms that innovate is below average, suggesting a high concentration in spending among a limited number of small firms (OECD, 2014b). Private companies perform well with respect to ISO 14001 certification, a voluntary standard of environmental management systems. There is some evidence that such certification increases eco-innovation (Ziegler and Rennings, 2004, for Germany; Demirel and Kesidou, 2011, for the UK), and the EU Eco-Innovation Observatory uses it as an indicator for measuring eco-innovation activities. Spain ranks fourth globally in the number of companies that have acquired ISO 14001 certification, but enjoys the best performance in terms of certified companies per million inhabitants. In 2012, Spain was also one of three countries with the highest number of

companies that had a certified energy management system under the ISO 50001:2011 standard (ISO, 2012).

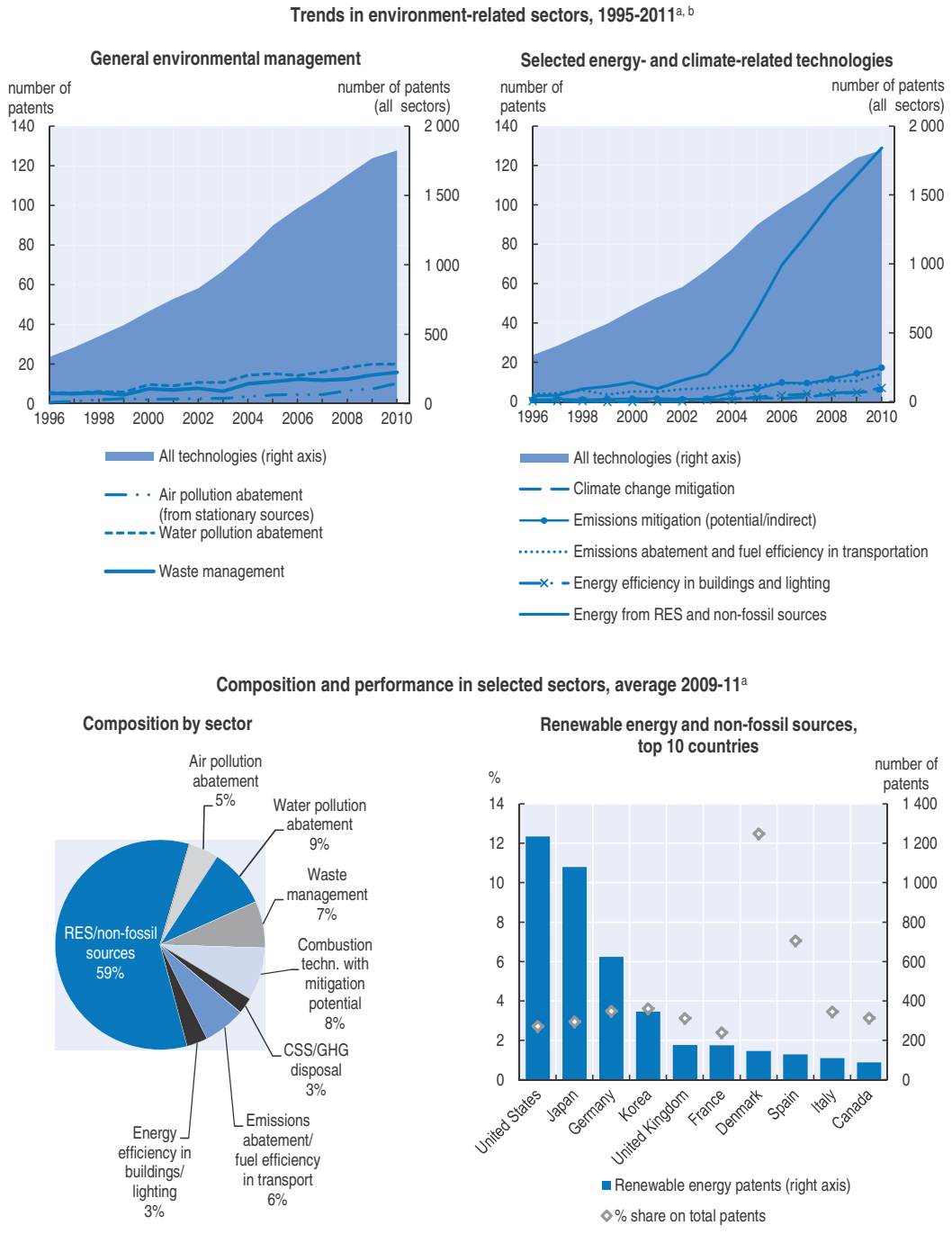
With an annual average of 38 patent applications filed under the Patent Co-operation Treaty per million people, Spain ranks low compared to the OECD average (OECD, 2012). Within Spain's relatively weak overall performance in patent applications, the environment and clean energy sectors are relatively strong. Spain has a revealed technology advantage in environmental technology: it has more patents in this field than in others (OECD, 2012). In particular, patent applications for energy from renewable and non-fossil fuel sources have increased dramatically since 2000, peaking at 6.7% of total applications in 2009 (Figure 3.8). The main contributing factors were public R&D support for these technologies, incentives through feed-in tariffs for renewables and the general increase of demand for such technologies due to the EU's ambitious clean energy and climate goals (Haščič et al., 2010). Patents for general environmental management (air, water, waste) went up markedly, but more slowly, in 2000-11. This trend is common to many OECD member countries, as these fields have reached a certain degree of maturity (OECD, 2011b). Innovation in climate change mitigation, emissions abatement, fuel-efficient transport and energy efficiency in buildings and lighting are still very low, but slowly growing. Public research institutions filed 12.6% of patents in environment-related technologies between 2005-09, the third highest share after Israel and France (the OECD median is 5.6%).

The prolonged economic crisis cast a shadow on this recent progress. From 2010-12, public and business R&D spending decreased by 8.2% and 5.5% respectively, and the number of enterprises that invested in R&D dropped by 36% (COTEC, 2013). Government support for environment and energy R&D was disproportionately affected; between 2009-12, it decreased by 51.4% for environment and 49% for energy.[18] The number of researchers decreased by 4.4% in the public sector and by 1.1% in the private sector between 2010-11 (COTEC, 2013). Spain has also postponed raising gross domestic expenditure in R&D to 2% of GDP by 2020 (Ministry of Economy and Competitiveness, 2012a). Even if it meets the target, Spain will remain far from the European target of investing 3% of GDP in R&D by 2020. The economic crisis has also led to cuts in support instruments, particularly to renewable energy. Accordingly, patent applications in renewable energy have decreased markedly since 2009. This trend is observed neither in total patent applications, nor in applications for general environmental management.

5.2. Policy framework for eco-innovation

Eco-innovation has become increasingly prominent in Spain's innovation policy framework. The 2004-07 National Plan for Scientific Research, Development and Technological Innovation aimed to reduce the environmental impact of the production of goods and services, mainly to help comply with international commitments (Comisión Interministerial de Ciencia y Tecnología, 2003). However, only 2 out of 30 national programmes had an environmental focus. In contrast, the subsequent 2008-11 National Plan (later extended until 2012) called for eco-innovation as a "strategic action on energy and climate change" that was relevant to all sectors. From merely meeting international commitments, the objective shifted to promoting technological solutions for sustainable development, including a sustainable energy model, energy efficient buildings and non-energy areas of climate change mitigation (Comisión Interministerial de Ciencia y Tecnología, 2007).

Figure 3.8. **Environmentally related patents**



a) Patent applications are based on the priority date and the inventor's country of residence, and use fractional counts on filings under the Patent Co-operation Treaty at international phase (European Patent Office designations).
b) Three-year moving average data.
Source: OECD (2014), *OECD Patent Statistics* (database).

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A new Science, Technology and Innovation Act, which entered into force in December 2011 (Law 14/2011), recognised that Spain's previous economic model based on construction and tourism is obsolete (BOE, 2011b). Instead, the act promotes a knowledge-based economy aiming at more balanced, diversified and sustainable growth. The act foresees the creation of a state research agency to fund public and private R&D, as well as a comprehensive reform of public research institutions. Supported by the Council of Science, Technology and Innovation, the act also aims for better co-ordination both between and within regional and central R&D policies and initiatives. Formed by government representatives from the national and regional level, the Council supports the drafting of national strategies. The private sector is represented in an Advisory Council of Science, Technology and Innovation.[19]

The most recent National Plan for Scientific Research, Development and Technological Innovation (2013-16) establishes a state R&D programme to respond to societal challenges with a major focus on environmental challenges, clean energy and transport, and climate change (Ministry of Economy and Competitiveness, 2012b). Other identified priorities, such as health or food security and agriculture, bear a close relationship with green growth. The national plan implements the Spanish Strategy for Science, Technology and Innovation 2013-20.

Spain needs to increase corporate R&D investment both in general R&D and in environment and clean energy technologies. Between 2013 and 2020, the government aims to double the share of private sector R&D in GDP from 0.6% to 1.2% by offering high fiscal incentives for corporate R&D activities compared to other OECD member countries (Ministry of Economy and Competitiveness, 2012b). In recent years, these incentives have been increased even further. Under the Sustainable Economy Act, the upper limit of tax credits for corporate R&D and innovation activities was raised from 50% to up to 60% of gross taxes. In 2012, the government increased the corporate tax deduction rate for innovative activities from 8% to 12%. However, fiscal incentives have not brought about significant private investment (Chapter 4); as part of broader corporate tax simplification measures, the 2014 Lagares report recommended removing these deductions (Box 3.4).

Many private companies state that eco-innovation is hampered by a lack of demand for environmental products in the domestic market (EC, 2013e). While Spain could choose from a wide range of policy instruments, demand-side innovation policies require increased co-ordination with sectoral and supply-oriented instruments. There is little co-ordination between policy instruments, however, including in the area of renewables (Conchado, Anadón and Linares, 2012). While public R&D support is monitored, results are not used to inform innovation policies. *Ex-ante* and *ex-post* evaluations, as well as annual questionnaires, assess the impact of public support for innovation, including employment benefits and the amount of corporate funding it has leveraged. However, results are only used internally and not made public. Monitoring of the innovation chain, therefore, stops before products have become competitive in domestic or international markets. In addition, better co-ordination is needed between environmental, energy and innovation policies. For example, public support for R&D could target those technologies likely to be promoted through energy policies (Conchado, Anadón and Linares, 2012).

Spanish universities and public research institutions have a strong record of scientific publications and patents in environment-related technologies (EIO, 2011; OECD, 2012). However, there is a disconnection between institutions that conduct academic research,

and the commercialisation of innovative products through public companies. There is also a disconnect between public and private researchers, and fundamental research and market needs in the field of eco-innovation (Conchado, Anadón and Linares, 2012; Scarpellini et al., 2012). Three instruments could help overcome the gap between fundamental research and commercialisation: technological centres that link researchers with academic and commercial backgrounds; networks and partnerships between research institutes and private companies; and better targeting of public support to make innovations more commercially applicable.

6. Environment, trade and development

6.1. Official development assistance (ODA)

Spain's net official development assistance (ODA) decreased 25% from 2003-12, reaching USD 2.197 billion (in 2011 USD). Due to general budget cuts following the economic crisis, ODA was significantly below the 2008-10 average of USD 6.56 billion in 2012, and dropped 67% from its peak of USD 6.7 billion in 2008. As a percentage of gross national income (GNI), Spain's ODA peaked at 0.46% in 2009, but dropped to 0.16% in 2012. Spain therefore missed the EU target of spending 0.51% of GNI as ODA by 2010, and is far from meeting the OECD target of spending 0.7% of GNI as ODA by 2015. To reach the OECD target, Spain would have needed to allocate more than USD 10 billion to ODA in 2012.

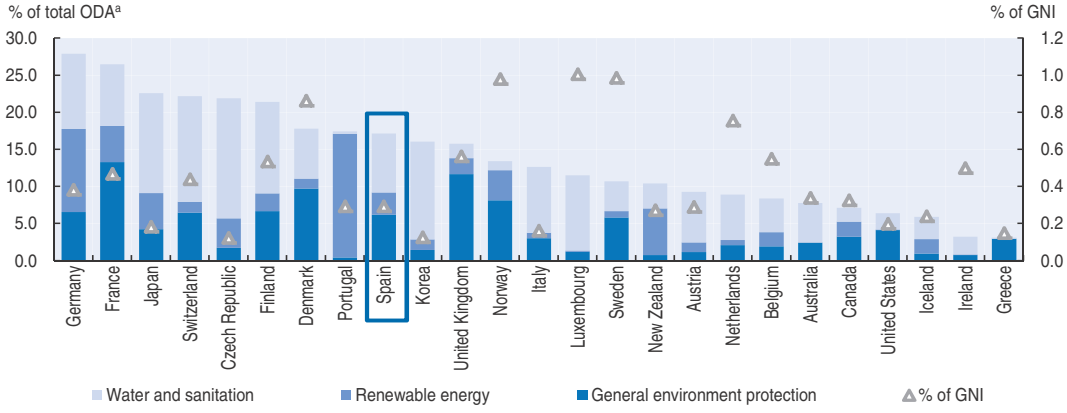
Spain's development co-operation, co-ordinated by the Ministry of Foreign Affairs and Co-operation and implemented by the Spanish Agency for International Development Co-operation (AECID), is guided by Master Plans of Spanish Co-operation.[20] With 12 partner countries and 34% of ODA in 2009/10, Latin America remains the main strategic region for Spanish development co-operation. The most recent master plan (2013-16) intends to reduce the geographic and thematic scope of its operations. Spain aims to focus its work in only 23 partner countries in Latin America, North Africa and the Middle East, sub-Saharan Africa and the Philippines. The master plan also considers the environment as a cross-cutting priority that contributes to the achievement of other development goals (Ministry of Foreign Affairs and Co-operation, 2012).[21]

Over 2010-12, Spain devoted about 17% of its sector-allocable ODA to the environment (including water and sanitation and renewable energy) (Figure 3.9). The Sectoral Action Plan on Environment and Climate Change prioritised five strategic areas: climate change, ecosystem conservation, basic living conditions, strengthening of institutions and mainstreaming of environmental concerns into other policy areas (Ministry of Foreign Affairs and Co-operation and AECID, 2008). Compared to other OECD member countries, Spain allocates significant resources to the water and sanitation sector. By 2009/10, Spain devoted more than 10% of its ODA budget and was the fourth largest donor to this sector in 2009. A Co-operation Fund for Water and Sanitation was set up in 2007 to facilitate access to freshwater and sanitation in Latin America and the Caribbean. In 2013, USD 800 million of an estimated USD 1.5 billion had been spent. Another major fund, the Millennium Development Goals Achievement Fund (MDG-F), has devoted USD 60 million to good governance in the water sector, and USD 90 million to environmental and climate change projects since 2007.

Mainstreaming environment and climate change into development co-operation has improved since 2004, mainly through a first environmental strategy for development co-operation valid from 2002-08, and a second strategy valid since 2008. The second

strategy focused on better mainstreaming environmental issues into development co-operation and better coding and reporting projects that have the environment as a significant objective. Between 2006-12, this led to an increase of ODA for activities that target the environment as a primary or significant objective in real terms (USD 2012) from USD 170-200 million (30% of total sector allocable aid or 18% of total ODA), with a particularly sharp increase from 2006-10 (Figure 3.9).[22] Spain's commitments to the different Rio Convention objectives have varied substantially in recent years. Overall, the contribution to biodiversity and desertification objectives has decreased, while the allocation for climate change mitigation and adaptation has increased (Figure 3.9). In 2012, 17% of ODA was made available for climate change adaptation objectives.

Figure 3.9. **ODA for environment, water and renewable energy in 2010-12**



a) Commitments of bilateral ODA expressed as percentage of total sector allocable ODA.
Source: OECD (2014), *OECD International Development Statistics* (database).

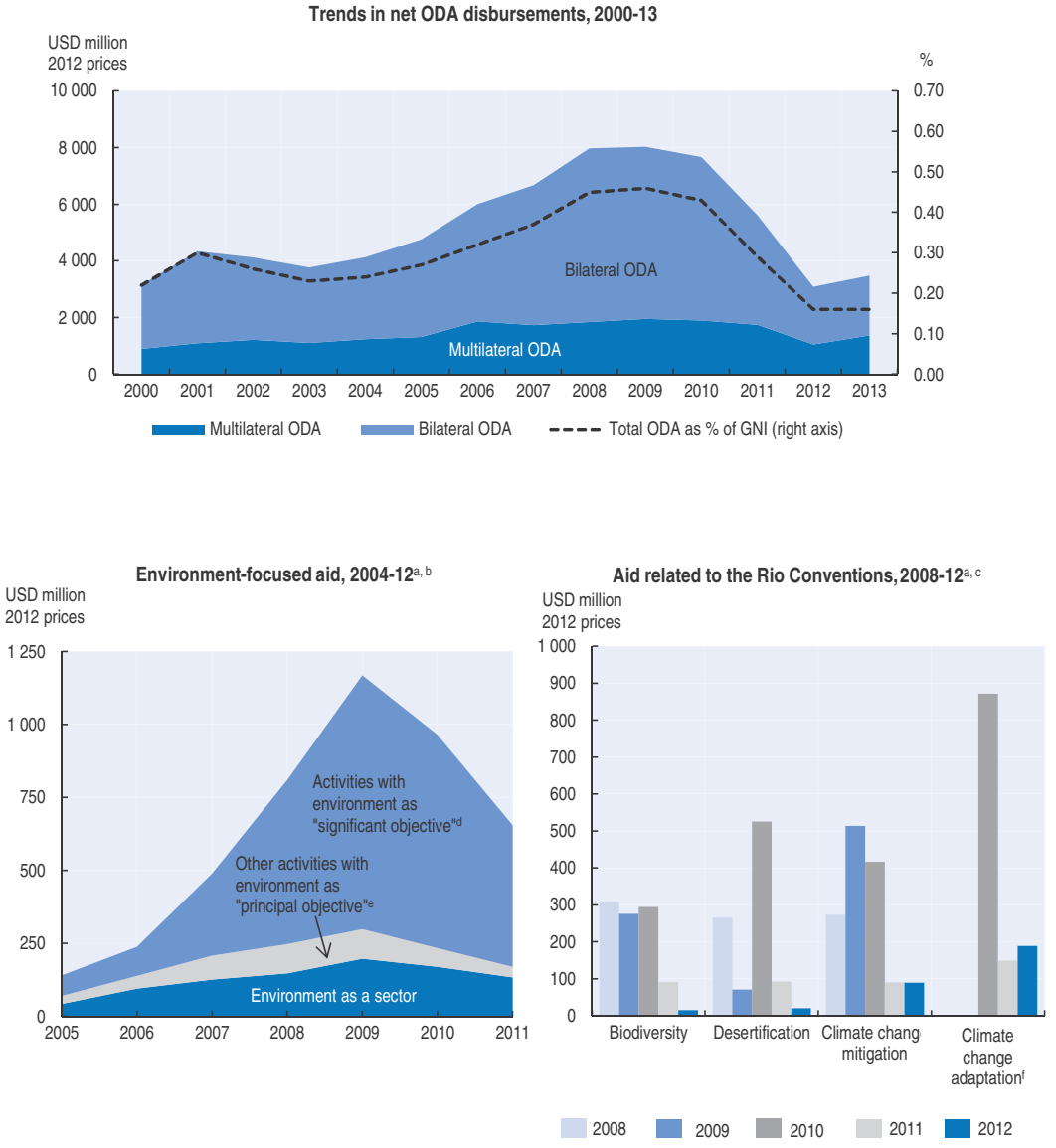
StatLink http://dx.doi.org/10.1787/888933182992

To improve the mainstreaming of environmental issues, Spain has integrated environmental issues into its guidelines for developing country framework partnership strategies. These provide the overarching strategic framework for engagement with the partner country for at least three-five years. In addition, Spain will also integrate the environment into the design of each project and guarantee that environmental impact and evaluation studies are undertaken. While good instruments exist, Spain has limited capacity to ensure mainstreaming and accurately report on all projects (OECD, 2013f). The Spanish Master Plan 2013-16 intends to address this challenge by reducing the number of priority countries and thematic areas (Ministry of Foreign Affairs and Co-operation, 2012).

6.2. Export credits

The Spanish Export Credit Agency (CESCE), a company of mixed capital with more than half of its shares held by the government, offers Spanish companies risk coverage for exports and foreign direct investment, on behalf of the state. Operations covered have a value of approximately EUR 1.5 billion. The CESCE has applied environmental impact assessments for operations of companies it supports since 2002 in accordance with the OECD Recommendation on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence, including its revisions in 2003, 2005, 2007 and 2012.

Figure 3.10. **Official development assistance**



a) Commitments of bilateral ODA. The coverage ratio for activities screened against the environment policy marker is 98% of total sector allocable aid. The marker data do not allow exact quantification of amounts allocated or spent in support of the environment. They give an indication of such aid flows and describe the extent to which donors address these objectives in their aid programmes.
b) Three-year moving average data.
c) Most activities targeting the objectives of the Rio Conventions fall under the definition of "environment-focused aid", but there is no exact match of the respective coverages. An activity can target the objectives of more than one of the conventions, thus respective ODA flows should not be added.
d) Activities where environment is an explicit objective of the activity and fundamental in its design.
e) Activities where environment is an important, but secondary, objective of the activity.
f) Climate change adaptation markers exist only since 2010.
Source: OECD (2014), *OECD International Development Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933183006

The CESCE covers a broader range of operations than required under the Common Approaches. For example, it applies a threshold of EUR 2 million in officially supported credits for assessing the potential environmental impacts of projects, rather than the EUR 10 million required under the Common Approaches. Since February 2002, the CESCE has assessed the environmental impacts of over 600 operations. While a provision on an

export credit may be denied for environmental reasons, this has not yet occurred. Since 2005, the CESCE has published annual reports on the application of environmental assessments and procedures.

In the past, the CESCE has been criticised for underwriting projects with serious environmental impacts in the destination countries and for the absence of independent on-site assessments to ensure that projects comply with environmental criteria (ECA Watch, n.d.). The most notable case was the CESCE's support in 2003 for the construction of a pulp mill in Fray Bentos, on the bank of the Uruguay River that forms the natural border between Uruguay and Argentina. The project generated protests and demonstrations from the local population over potential water pollution, leading to Argentina suing Uruguay in 2006 before the International Court of Justice. After a ruling in favour of Uruguay, the conflict ended only in 2010 with joint co-ordination of the mill's activities between Argentina and Uruguay.[23]

Since then, environmental procedures have been strengthened, and the CESCE's environment and social unit has been put in charge of reviewing potential impacts of proposed projects. This analysis is facilitated by special software, "Ecocheck", which helps to screen and classify transactions. After automatically processing information, the software determines the level of impact the project would generate based on a set of predetermined rules.[24] Among aspects analysed are impacts on the local environment, use of natural resources such as land and water, and compliance with toxic emissions limits or waste management standards. Particular attention is paid to projects in sectors with an inherently greater impact on the environment (following norms established in EU EIA Directive 97/11/EC) and to those located in sensitive areas. The CESCE's environmental policy requires detailed technical information from each project on the potential environmental impact of the operation, a factor which had not previously been considered in processing the funding request. The content and amount of information required vary depending on different criteria, including the type of operation to be insured, sector of activity, size and location.

The Spanish Development Finance Institution, COFIDES, a public-private company that supports viable private direct investment of Spanish companies abroad, has analysed environmental and social risk since 2001. In 2003, COFIDES included additional compliance requirements based on the OECD Guidelines for Multinational Enterprises in its financing contracts. Environmental assessments are carried out before contract decisions are made, and compliance with contractual requirements is verified through follow-up assessments. COFIDES publishes an annual Sustainability Report that includes information on its activities relevant to the environment and the environmental performance of projects supported.

Spain also supports exporting companies and foreign direct investment of Spanish companies through an Internationalisation Fund (FIEM). Following reforms in 2010, all credits previously granted as ODA under the Development Aid Fund have been allocated to the newly created FIEM. Since 2011, these funds are no longer counted as ODA. FIEM finances operations and projects that are aligned with the government's strategy for the internationalisation of Spanish companies through direct lending. It is administered by the Ministry of Economy and Competitiveness. Non-compliance with OECD standards, notably the Arrangement on Officially Supported Export Credits and the Guidelines for

Multinational Enterprises, can result in the cancelling of a loan, but so far no loans have been cancelled for environmental reasons.

6.3. Corporate social responsibility

Spain has signed the OECD Guidelines for Multinational Enterprises, which recommend responsible business conduct for multinational enterprises operating in or from adhering countries. Among others, recommendations refer to human rights, environment, labour standards and the fight against bribery. By the end of 2013, Spain's national contact point had not received any special incidences regarding the environment (OECD, 2013g).

The Spanish contact point is housed in the State Secretariat for International Trade in the Ministry of Economy and Competitiveness. A reform of the national contact point to give it an interagency structure is well underway. The reform is intended both to include the Ministries of Finance, Foreign Affairs, Industry, and Employment and Social Affairs, and to improve stakeholder participation. Businesses, trade unions and civil society will ultimately be represented in an advisory body.

In addition to the national contact point, Spain set up a State Board for Corporate Social Responsibility in 2008, currently under the Ministry of Labour and Immigration. The State Board advises the government by promoting good practices and proposing policy. Spain has also established links between development co-operation and corporate social responsibility (CSR). In 2010, the Development Co-operation Council established a working group to monitor CSR policies of Spanish companies and to improve complementarity among private and public policies. The working group also promotes experience exchanges between Spanish companies in developing countries and staff involved in Spanish development co-operation (OECD, 2013g).

Notes

1. Parallel with the development of the Sustainable Economy Law, which began in 2009, the Sustainable Economy Fund was established with up to EUR 20 billion available in preferential loans through various financing instruments between 2010-11, of which half is channelled through the Official Credit Institute (Instituto de Crédito Oficial, ICO) (Kessler and Cuerpo, 2011). The fund had three target sectors: environment; knowledge and innovation; and social. Environment programmes included waste treatment, efficiency, rehabilitation, sustainable transport, water management and eco-innovation. The knowledge and innovation programmes included energy and climate change, as well as sustainable construction. The ICO allocated EUR 1 billion for funding investment in energy and infrastructure projects, and EUR 300 million for venture capital funding. The remaining EUR 8.7 billion went towards various funding lines for SMEs and microcredit, and a co-financing facility (EUR 100 million) with the ICO and other financial institutions. Environmental projects received approximately EUR 5.4 million of the EUR 8.3 billion that was spent. Approximately 78% of the energy and infrastructure funding was used for knowledge and innovation, and nearly 18% for environmental purposes. Overall, EUR 8.4 billion was awarded by the ICO over 2010-11, of which 64% was used for environmental investments.
2. This shift forms part of a broader change in 2002 that saw competency for health services fully transferred to regional governments, with corresponding reforms to regional financial systems to provide resources for new regional health programmes. The special retail tax on hydrocarbons implemented at the regional level starting in 2002 was in part designed to finance provision of these new services.
3. On top of the excise rate applied per volume across the national territory, 13 regions chose to apply a supplementary retail tax of up to EUR 10 per 1 000L for diesel, petrol and kerosene (IEA, 2013a). Nearly EUR 13 billion in revenue was generated between 2002-12. However, this tax was legally challenged as not complying with EU excise law, given it applied on top of the excise duty on fuels,

and that tax receipts accruing to the regional governments were earmarked primarily for healthcare. While the tax has been abolished, the legal challenge to the previous tax is still pending, and if successful some of the revenue collected may have to be reimbursed (Curia, 2013; Dotinga, 2013).

4. Two regions tax the use of water reservoirs used for electricity generation as a means to address environmental damage to water resources stemming from these activities; some regions impose levies on wind turbines. Introduced from 2009 onwards, these wind farm levies apparently aim to discourage the negative visual impact of wind farms, although this contradicts the overall policy of supporting the generation of electricity from renewable sources, of which wind power is the most significant contributor.

5. The Fiscal and Financial Policy Council makes decisions, through qualified majority voting, related to regional financing. It is formed by ministers from the central government (notably the Ministry of Treasury and Public Administration Services), with the economy or finance counsellors of regional governments.

6. In Spain, high-capacity roads are both tolled and un-tolled, and users generally can use an un-tolled road. As a result, several motorway concessions were struggling and close to bankruptcy in 2013, with the Spanish government considering nationalisation (European Parliament, 2013).

7. These include a tax on spent fuel and nuclear waste produced in power plants, applied to nuclear electricity generators, and a tax on the centralised storage of spent fuel and low-level waste, as well as medium and high-level radioactive waste. However, a centralised interim storage facility for medium and high-level waste being built in Villar de Cañas (a municipality in Castile-La Mancha) will not be operational until 2019 (Moratilla Soria and Villar Lejarreta, 2013).

8. These range from seven tranches in Galicia, the last being any emissions above 80 000t (taxed at EUR 200/t), to five tranches in Castile-La Mancha, where the last is for emissions above 15 000t (taxed at EUR 120/t). In Murcia and Andalusia, taxes apply to "units" of SO_2, NO_2 and CO_2 (of 150, 100 and 100 000 tonnes respectively).

9. Note that for CO_2, only emissions falling within allowance levels under the EU ETS are taxed above the threshold amount (e.g. above 100kt in Aragón, up to the level of the emissions allowance level); for emissions above the cap level, allowances would need to be purchased on the carbon market. Tax levels for CO_2 tend to be low, at EUR 0.2/t in Aragón, and from EUR 0.05-0.14/t in Murcia and Andalusia.

10. It continued to increase from 2005-09, when it reached EUR 642 million, and has since declined.

11. Pollution abatement covers activities related to air, climate, soil and groundwater protection, as well as noise and vibration abatement and protection against radiation. It also includes construction, maintenance and operation of monitoring systems and stations, and measures to clean pollution in water bodies and decontaminate polluted soils.

12. During this period, European structural funds contributed to building 1 200 km of roads, extending the high-speed rail network 850 km; constructing 600 km of new water pipelines and renovating 2 000 km of existing water pipelines; and investing EUR 4 billion in RD&I (EC, 2009). In addition, 84 projects in the solid waste sector, 114 in wastewater and 74 in drinking water benefited from Cohesion Funds, contributing to improving drinking water supply networks, closing 90% of non-compliant landfills and improving waste collection capacity (RGL Forensics, AECOM and Imperial College, 2011).

13. Audit evidence points to delayed or incorrect transposition of EU directives into national legislation, difficulty with interpreting the applicable rules and weak administrative capacity (especially at the local level) as the most important reasons leading to errors in this area.

14. Households in fuel poverty have excessive energy costs compared to overall household income. In one common definition, any household spending more than 10% of its annual income on energy is in fuel poverty. Within the EU, a household spending twice the median fuel expenditure as a proportion of income is considered in fuel poverty. See Heffner and Campbell (2011) for more definitions.

15. This included securitisation of credits held by electricity companies (which allowed them to receive tariff deficit payments with interest) until 2006, the introduction of an *ex ante* deficit auction in 2007 and the creation of a securitisation fund (FADE) in 2009 for electricity tariff deficits accrued until 2012.

16. This is facilitated by a special operating unit of the Power Control Centre, the CECRE (Centro de Control de Régimen Especial) established in 2006. It controls all renewable, cogeneration and waste-based facilities over 10 MW, and also monitors installations above 1 MW (BNEF, 2013).

17. This includes those in sectors undergoing restructuring; immigrants; women; disabled people; those over the age of 45; and workers living in less populated, rural and protected areas, as well as Biosphere Reserves.

18. Government support means "government appropriations or outlays for RD" (GBAORD). Government support had increased prior to the 2008/09 start of the crisis and then dropped. Thus, 2011 levels are below or similar to 2007 levels of support.

19. In 2011, the newly elected government abolished the Ministry of Science and Innovation and gave the new Ministry for the Economy and Competitiveness responsibility over innovation policies.

20. The Ministry of Foreign Affairs and Co-operation leads Spain's international development co-operation policy and co-ordinates related activities that other government bodies might undertake within their mandates. The main implementing body is the Spanish Agency for International Development Co-operation (AECID). Policy planning and implementation between institutions are linked. The State Secretary for International Co-operation and Ibero-America also serves as a president of AECID. The Under-Secretary for Foreign Affairs and International Development Co-operation also acts as the Director of AECID. In matters related to the environment, the ministry works with the Ministry for Environment, Food and Agriculture. In recent years, there has been increasing co-operation with the Spanish Office for Climate Change.

21. Spain devoted quite a high share of ODA to renewables until 2010, but these were mostly in the form of credits. Following a recommendation of the OECD Development Assistance Committee (DAC), Spain reformed its system so these credits would no longer be counted as ODA. Instead, from 2011 onwards, credits for renewables are given through the FIEM (Fondo de Internacionalización de la Empresa Española) – FIEM is mentioned under export credits below.

22. Support for the environment as a primary or significant objective peaked at USD 1.3 billion in 2010.

23. Argentina demanded the project be terminated, arguing it was not consulted properly about transboundary environmental impacts. The ICJ ruled that, although Uruguay failed to inform Argentina of the operations, the project was not causing water pollution, so closing the pulp mill would be unjustified.

24. Following this step, the environmental department reviews the questionnaires, requests additional clarification if required and, once it has received all the necessary information, validates the results provided by Ecocheck.

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PART II

Progress towards selected environmental objectives

PART II

Chapter 4

The conservation and sustainable use of the marine and terrestrial environment

This chapter reviews Spain's efforts to significantly strengthen its policy framework for the protection and sustainable use of biodiversity. Following a description of the status, trends and pressures on Spain's biodiversity, this chapter reviews the country's progress in establishing key legislation to promote biodiversity conservation and sustainable use. It also discusses the expansion of Spain's terrestrial and marine protected areas, the management tools in place, as well as the main trends in financing biodiversity. Finally, the chapter examines the integration of biodiversity considerations into other sectors, such as agriculture and tourism.

Assessment and recommendations

Spain is one of the world's 25 biodiversity hotspots and hosts 30% of all endemic European species. However, this rich biodiversity has come under increasing threat: nearly 40% of the species assessed by the European Red List of Species are found in Spain, and 45% of ecosystem services are considered to be degraded or used unsustainably. A key factor underlying these trends has been land conversion due to construction and transport infrastructure. A significant increase in the population in coastal areas between 2000-10 accelerated urbanisation and the development of related infrastructure, and resulted in an annual land take that was significantly higher than in other European countries.

Responding to these pressures, Spain has significantly strengthened its legal framework for the protection and sustainable use of biodiversity. It adopted a comprehensive Law on Natural Heritage and Biodiversity in 2007 that is among the most ambitious in the OECD. A particularly important feature was the establishment of the principle that natural resource management plans should prevail over territorial and urban plans when the two were in conflict. Implementation of the law was supported by the 2011-17 Strategic Plan on Natural Heritage and Biodiversity, which specified more than 250 actions to be taken. A first report evaluating progress in 2011-13 indicated that one-third of the plan's actions had been implemented, though it did not assess what impact this had on biodiversity and ecosystems.

A new Law on the Protection of Marine Environment was adopted in 2010 that put the management of these ecosystems on a stronger footing, in line with the related EU directive. State-of-the-art technical guidelines were developed, and given legal backing, to assess environmental status and address habitat fragmentation from infrastructure projects. In 2013, a Law for the Protection and Sustainable Use of the Coast was enacted. It strengthened measures to protect the coast, and was supported by some restoration projects. It would be important to clearly specify the measures required to prevent further habitat fragmentation and loss of coastal biodiversity. Spain has also been active in supporting international and regional initiatives on both terrestrial and marine biodiversity. It was one of the first recipients of the Natura 2000 awards in 2012 for its efforts in promoting bilateral co-operation on biodiversity with France and Portugal.

In Spain's highly decentralised environmental governance system, most responsibilities for implementing biodiversity policies lie with the Autonomous Communities. The State Commission on Natural Heritage and Biodiversity serves as the main co-ordination mechanism between the national and regional authorities. Important progress has been made, for example, in developing guidelines to monitor and protect threatened species, but more co-ordination is needed to make the framework for the conservation and sustainable use of biodiversity more coherent and efficient. The current arrangements do not make the best use of declining existing resources, and are not sufficiently flexible to access alternative sources of funding, including from the private sector. There continues to be a gap between the national authorities, focus on transposing

EU directives, the broader policy picture, and the implementation focus on the Autonomous Communities around staffing and financing issues. Dialogue and co-operation between the national and regional levels should focus more on key, common challenges and best practices, and on benchmarking regional performance.

The Natural Heritage and Biodiversity National Council, established as a result of the 2007 law, has enabled greater involvement by civil society in the development and implementation of biodiversity policy. Successes have included the contribution of NGOs to the designation of Natura 2000 sites and development of sustainable fisheries practices. Spain has also been a pioneer in fostering international scientific collaboration on biodiversity. The Spanish Business and Biodiversity Initiative, launched in 2013, is an example of an innovative partnership with the business sector. Nevertheless, opportunities exist to draw more on the expertise and networks of civil society organisations in developing, and particularly, implementing biodiversity policy.

The establishment of the Natural Heritage and Biodiversity Inventory (NHBSI), and the supporting Nature Data Bank in 2011 were among the key biodiversity achievements in the last 10 years: they aim to address one of the major challenges of the past, namely dispersed, inconsistent and incomplete data on biodiversity resources across the autonomous regions. The annual "Environmental Profile of Spain" provides a comprehensive overview of main trends and a core set of biodiversity-related indicators. However, there are still gaps in issues covered, such as genetic resources, and inconsistencies among the data collected by regions. The development of common methodologies, envisaged in the current revision of the 2007 Law on Natural Heritage and Biodiversity, should facilitate the preparation of a more comprehensive and reliable assessment of Spain's biodiversity.

One university project, Valuation of Natural Assets of Spain (VANE), supported by the Ministry of Agriculture, Food and the Environment, examined the economic benefits of ecosystem services. The first phase of the Spanish national Millennium Ecosystem Assessment provided insights into how changes in ecosystems are affecting human welfare. A second phase, 2013-15, aims to provide a more comprehensive assessment of the economic value of Spain's biodiversity assets and ecosystem services. This analysis should provide a better basis for strengthening the role of economic analysis in setting policy targets, evaluating projects and policies, and more generally making the economic case for biodiversity policies. Recent experience with this type of analysis in Finland, France and the UK has helped to demonstrate that the benefits of expanding Natura 2000 sites far outweigh the costs. In Spain, only the costs have been examined.

Until now, protected areas and activities under the rural development programmes have constituted the main policy instrument for biodiversity protection. The territory under some form of protection increased by 9% between 2000 and 2012, and currently covers 29% of the territory, one of the highest shares among OECD countries. Marine protected areas also significantly expanded and in 2014 cover 8.4% of the territorial waters. As a result, Spain comfortably exceeds the Aichi targets for terrestrial protected areas. It is taking steps that will bring it close to reaching the marine target. However, the country faces several challenges in managing the terrestrial protected areas: the way they are classified and designated varies among the regions, although steps have been recently taken to address this issue; despite efforts to enhance the management of protected areas, about one-third do not have a management plan; and there are difficulties in managing

some national parks wheren they span two or more regions since responsibility for nature protection lies with the regional governments.

Species protection programmes are another instrument for biodiversity protection. There is evidence that these measures are effective: many have resulted in the significant recovery of populations of some endangered species. In 2014, Spain put in place 17 national conservation strategies for "endangered" species, and 166 regional recovery plans for "endangered" and "vulnerable" species. However, further efforts are needed to meet the 2007 biodiversity law target that requires conservation strategies for all "endangered" species which currently number 176.

Biodiversity financing remains heavily reliant on the national budget and EU funds, with more than half of the expenditure provided at the regional level. The reductions in public budgets are clearly impacting the ability of public authorities to maintain existing programmes (natural parks and species protection programmes), their ability to address new and emerging problems (such as habitat fragmentation and marine ecosystems), and to conduct the monitoring and research needed to support policy development and implementation. Part of this could be addressed by more effective use of existing resources, but there is also a need to develop alternative, economic instruments that can provide both incentives for conservation and sustainable use of biodiversity and revenues that can be used for this purpose.

More broadly, greater efforts are needed to move beyond a regulatory approach as well as to mainstream biodiversity in sectoral policies. A notable achievement in this regard has been the rapid expansion of organic agriculture which, by 2011, covered 5% of the total agricultural surface. This is the highest surface of land under organic agricultural production among EU members.[1] A sector plan for biodiversity and nature tourism 2014-20 has been developed. Against this, as in other EU member countries, direct agricultural payments are closely linked with intensive agricultural production, and infrastructure development is a continued threat to biodiversity, particularly in coastal areas. Better information on the economic benefits of biodiversity, as well as new instruments, such as taxes, charges, payments for ecosystem services and biodiversity offsets are needed to more effectively integrate biodiversity into sectoral policies.

Recommendations

- Continue to fill gaps and improve the consistency of information collected by regions with a view to developing a comprehensive and robust assessment of national biodiversity and ecosystems.
- Complete the economic analysis component of the National Ecosystem Assessment; strengthen the role of economic analysis in setting biodiversity policy targets, and in evaluating policies and projects that may affect biodiversity positively or negatively.
- Consider how current institutional arrangements could be reformed so as to make better use of existing resources for terrestrial and marine biodiversity, and facilitate access to alternative sources of finance, including from the private sector; focus dialogue and co-operation between national and regional authorities on common challenges, benchmarking performance and identifying good policy practices; further develop medium- to long-term work programmes to support enhanced co-operation between national and regional authorities.

Recommendations *(cont.)*

- Assess the impact that declining public budgets may have on managing existing and emerging biodiversity challenges; consider and promote alternative sources of financing, including how greater use could be made of economic mechanisms such as payments for ecosystem services and biodiversity offsets.
- Reinforce efforts to reduce pressures on biodiversity from key sectors such as agriculture, transport, construction and tourism, and to promote approaches that create markets for biodiversity-friendly products and services.
- Continue close co-operation with environmental NGOs, business and the academic community in developing and implementing biodiversity-related policies, for example in collecting and disseminating information.

1. Status, trends and pressures in conservation and sustainable use of biodiversity, species and ecosystems

1.1. *Status and trends*

Spain is one of the 25 biodiversity hotspots in the world and is considered one of the most biodiverse countries in the European Union. While the country includes four of the nine European biogeographic regions, Spanish seas, which occupy more than 1 million square kilometres (km^2), belong to 3 of the world's 49 large marine ecosystems. Spain hosts over 8 000 vascular flora species, which constitute 80% of all such species found in Europe, as well as 142 000 fauna species, which represent 50% of all European species. Spain also hosts 120 of 235 EU Habitats of Community Interest, the largest number in the EU. About 30% of all endemic European species are found in Spain, including 25-30% of vascular plants and 64% of its amphibians. Regions with the highest endemic rates are mountainous zones, coastal water regions of the Spanish peninsula and insular areas, especially those of the Canary Islands.

A plethora of data to help assess the status and trends of Spain's biodiversity resources is available from various sources and at various scales, including national, regional and local. Due to Spain's decentralised governance, compiling a harmonised set of baseline data to develop reliable national assessments is a challenge. For some ecosystem and species types such as forests or birds, the challenge is less pronounced; for others such as genetic resources, the knowledge gap is significant, as documented in Spain's latest 2012 Natural Heritage and Biodiversity Report. Over the past decade, important reforms have aimed to develop information systems that can generate and disseminate coherent, co-ordinated and comprehensive biodiversity data. This includes the "institutionalising" of the cataloguing and monitoring of biodiversity data through the Natural Heritage and Biodiversity Spanish Inventory (NHBSI). One of the key biodiversity policy achievements of the past 10 years, the NHBSI addresses the challenge of dispersed, inconsistent and incomplete datasets. Hence, to the extent that these relatively new inventories and data collection efforts will continue, and not be compromised due to lack of funding, the quality of Spain's biodiversity data should be on par with that found in best-practice OECD member countries.

Fauna and flora

Available data from Spain's central national inventories of species suggest that approximately 54% of freshwater species are threatened; this is of particular concern given the high percentage of its endemism in fish fauna (MAGRAMA 2014, 2013a, 2013b and 2012c). The share of threatened terrestrial species is lower, roughly 31% of the total. This includes vertebrates, mammals, birds, amphibians and reptiles. Data on terrestrial invertebrates, as well as on vascular plants, are highly incomplete; consequently, the scale of species under threat is difficult to evaluate (Table 4.1).

Table 4.1. **Threatened terrestrial species of fauna and flora**

Group	Total	Studied %	Threatened
Terrestrial vertebrates	635	100	197 (31%)
Land mammals	107	100	21(20%)
Birds[a]	337	100	99 (25%)
Amphibians	35	100	12 (34%)
Reptiles	87	100	28 (32%)
Freshwater fish	69	100	37 (54%)
Terrestrial invertebrates	57 000	0.5	> 258 (> 0.5%)
Vascular plants[b]	6 500-8 000	7-19	1 192 (15-18%)
Non-vascular plants	> 2 000	0	> 170 (> 9%)
Bryophytes	1 100	0	> 170 (15%)
Fungi and lichens	23 000	0	..
Total terrestrial species	91 000	1.6	..

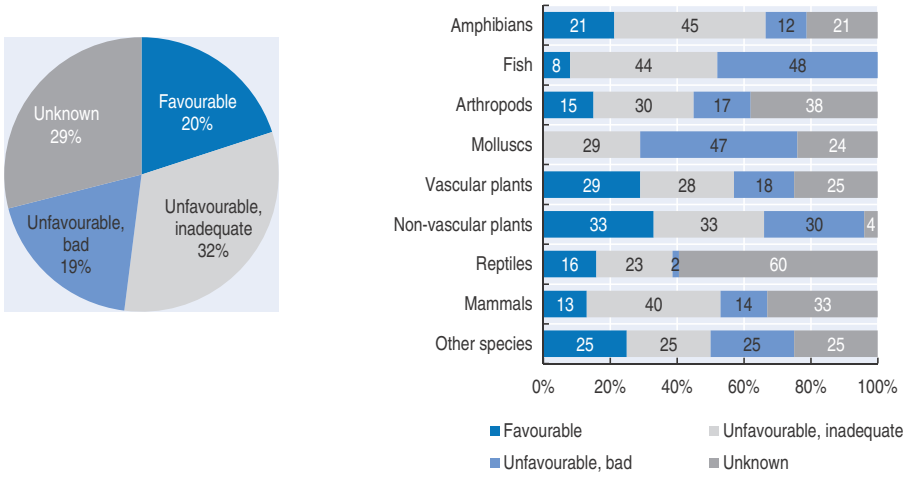
a) Threatened species: breeding species only, the % share is calculated on total species (including non-breeding species).
b) Algae, excluding cyanobacterias and marine species.
Source: MAGRAMA (2013).

Another indicator of wildlife status and trends comes from Spain's periodic reports. They are submitted as part of its obligations to the EU Habitat Directive, which assesses the conservation status of key species. According to Spain's 2007-12 report, out of 681 assessments (corresponding to 430 different taxonomic groups), 20% have "favourable" conservation status, 32% "unfavourable" and 19% "highly unfavourable". However, a large share (nearly 30%) has an "unknown" status (Figure 4.1). Comparing these figures with the previous assessment (2000-06) shows a reassuring trend: the percentage of species assessed with unknown conservation status is declining. Overall, however, the percentage of species with unfavourable conservation status has increased (MAGRAMA, 2014).

In the absence of comprehensive data from national inventories, alternative sources of information provide a reliable proxy indicator for broader ecosystem health. The availability of data on bird species is much more complete and reliable than for terrestrial species, partly due to contributions of nongovernmental organisations (NGOs) such as BirdLife International. Analyses show that bird populations in the forest environments have displayed an upward trend in the last decade, while numbers have declined in agricultural landscapes, urban environments and wetlands (Figure 4.2).

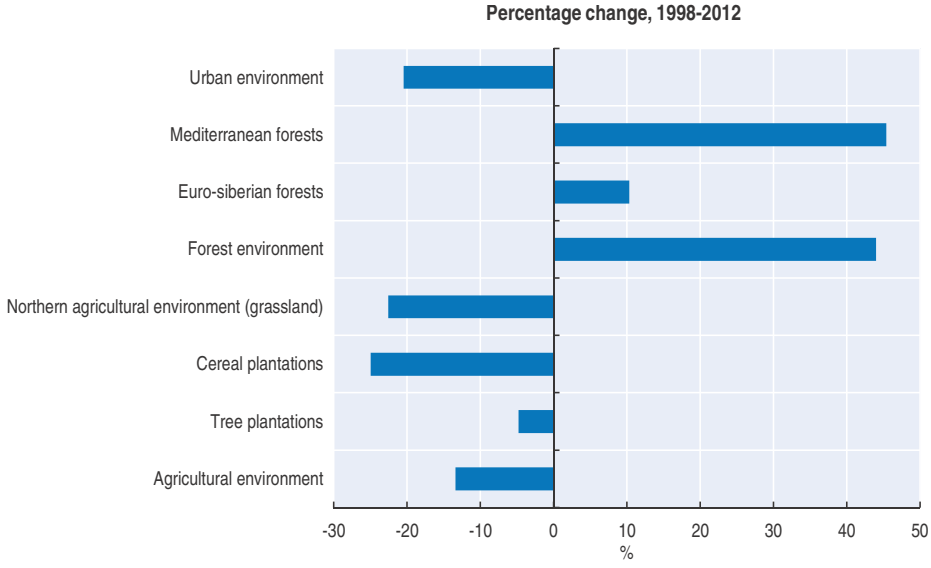
Finally, of the 2 233 species on the European Red List of Species that occur in Spain, more than one-fifth are considered "threatened" and at least 10% are "near threatened" at the European level; one species is "extinct in the wild"; and one species is "already extinct" (Box 4.1).

Figure 4.1. **Conservation status of species of the EU special interest**



Source: Based on national reports on Article 17 of the Habitats Directive (92/43/EEC), 2007-12.

Figure 4.2. **Trends in bird population in various types of habitats**



Source: MAGRAMA (2013), *Environmental profile of Spain 2012.*

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Agricultural and forest biodiversity

Evidence suggests that Spain is losing agricultural genetic diversity preserved over generations at an increasing rate. This is due primarily to homogenisation of agriculture and also rural land abandonment. Furthermore, intensive livestock farming has eroded livestock genetic diversity with over half of native livestock breeds threatened. This implies that current seed and livestock systems are more vulnerable to future climatic changes (EME, 2012; MAGRAMA, 2014).

Box 4.1. **Spain's biodiversity at risk**

Approximately 38% of the species assessed by the European Red List of Species are present in Spain. For some of the taxonomic groups, the percentages of European species that occur in Spain are particularly high, such as dragonflies, saproxylic beetles and butterflies. Species that are considered threatened at the European level and occur in Spain are found mostly in shrublands, rocky areas, wetlands and forests. These ecosystems require particular attention to sustain the habitats of these sensitive species.

Mammals: Spain hosts 48% of all the mammals that occur in Europe. Of these 111 species, 19% are threatened at the European level and at least an additional 11% are considered near threatened. The major threats at the European level that can possibly (or potentially) affect mammals in Spain are invasive and other problematic species, both native and non-native. Mammal populations are also highly threatened mainly by agricultural and forestry effluents and noise pollution. Hunting, trapping, logging and wood harvesting also pose serious threats to mammals in the country.

Reptiles: Spain has 44% of all reptile species in Europe, 24% of which are considered threatened at the European level. Reptiles show the highest percentage of critically endangered species from all groups assessed in the country. Habitat loss, fragmentation and degradation especially due to agricultural intensification and urbanisation are the main threats to this group at the European level. At least 18% of reptile species in Spain may be threatened by human persecution and control, especially snakes and vipers.

Amphibians: They represent 35% of all amphibians occurring in Europe. This group shows richness of high endemic species in the Iberian Peninsula, which also has one of the greatest concentrations of threatened species of amphibians. All told, 17% of amphibian species that occur in Spain are threatened at the European level and more than a quarter of the species are near threatened. The main threat to this group is the loss and degradation of suitable breeding habitat due to agricultural activities through excessive water withdrawal and water pollution by agrochemicals.

Freshwater fishes: They are one of the most threatened groups at the European level, and Spain hosts the largest number of threatened species; 37% of species occurring in Spain are threatened at the European level. Up to 80% of freshwater fish are endemic in the European region. Although areas with the highest richness in species clearly coincide with the lower parts of large rivers flowing to the Black and Caspian Sea, some of the highest concentrations of threatened freshwater fish species are found in Spain. The most important threat to this group is the abstraction of water from underground or from the streams and rivers themselves.

Butterflies: Spain hosts 54% of all butterfly species in Europe and 5% of them are considered threatened at the European level. The mountainous areas of Spain have a rich variety of butterfly species, as well as a high number of endemic species. The conservation status of butterflies in Spain based on the European Red List data is relatively good since approximately 86% of the species are classified as least concern. However, butterflies have very specific food and habitat requirements at different stages of their life cycle. Therefore, they are sensitive to changes in their environment, especially to habitat management such as overgrazing, undergrazing or changes in forestry practices.

Dragonflies: Spain has 58% of all dragonfly species in Europe, and hosts the highest number of dragonflies in Europe after France and Italy. In Spain, 8% of species are considered threatened at the European level. A large concentration of threatened species is found in the Iberian Peninsula, especially in the Mediterranean region. This group is adversely affected by desiccation caused by dry weather, fires and increased water extraction for irrigation and human consumption. River species are also affected by ecosystem modifications such as the construction of dams and reservoirs and water quality deterioration.

Box 4.1. **Spain's biodiversity at risk** *(cont.)*

Freshwater molluscs: 35% of freshwater molluscs that occur in Spain are threatened at the European level. One of the species within this group, which was endemic to Spain, has already gone extinct: *Islamia ateni*. Water abstraction is the main threat to this group, especially in the Iberian Peninsula where the springs are being converted to off-take water and vegetation for habitat is being removed to improve the "cleanliness" of the off-take area. Declining water quality in freshwater rivers and lakes caused by agricultural activities is also a major threat at the European level.

Vascular plants: At the European level, priority crop wild relatives, aquatic plants and all species included in the annexes of the Habitats Directive, Bern Convention and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) have been assessed. A total of 839 species are found in Spain, which represent 46% of the total species assessed in Europe. Spain is also one of the countries with the highest number of single country endemics. Of the 839 vascular plant species assessed in Spain, 26% are considered threatened at the European level. For terrestrial plants, intensified livestock farming, especially intensive grazing activities, have the worst impacts. For aquatic species, direct habitat loss caused by draining for development, agriculture and pasture is the main threat.

Source: IUCN (2013), *Spain's biodiversity at risk: A call for action.*

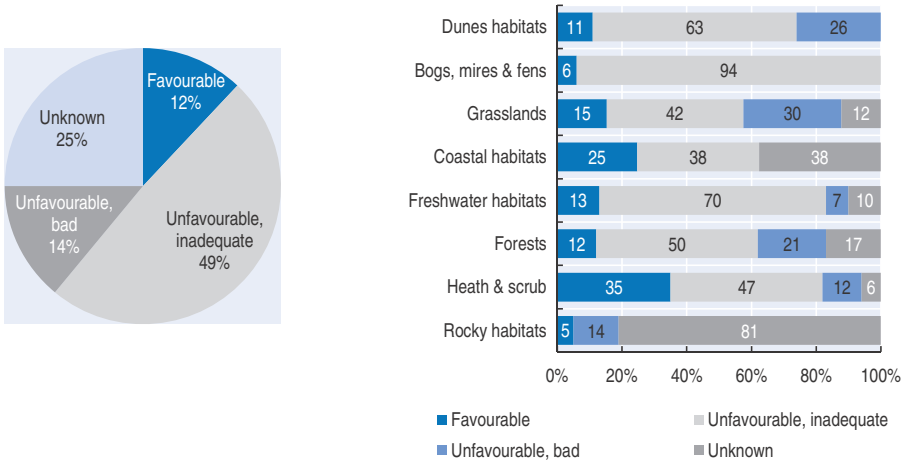
Forest genetic diversity clearly appears to be improving. Using the number of tree species per hundred square kilometres as an indicator of species richness, the data show that Spain outperforms most European countries and further hosts a very high degree of endemic tree plants (MAGRAMA, 2014; MAGRAMA, 2013b). Knowledge about forest genetic resources has also been improving, supported by tools such as the National Registry and Catalogue of Raw Materials. Other actions and measures to promote the increase of forest genetic diversity and conservation include the efforts of the National Committee for the Improvement and Conservation of Forest Genetic Resources, which has developed the Spanish Strategy for the Conservation and Sustainable Use of Forest Genetic Resources.

Ecosystems

A systematic assessment for some ecosystem types is still pending completion of the harmonisation process. Spain's Millennium Ecosystem Assessment (MEA), launched in 2009 and conducted under the auspices of the Biodiversity Foundation, aims to improve understanding of relationships between ecosystems and biodiversity, and human well-being. The first phase of the study focused on the biophysical dimension of ecosystems. It assessed 14 types of ecosystems and 22 different ecosystem services over 1960-2010 using state-of-the-art methods from biological and environmental sciences. The study found that 45% of the ecosystem services assessed are being degraded or used unsustainably; regulating services are the most affected (87% of services in a critical or vulnerable state). While some provisioning and cultural services that meet urban demand have improved in the last decades, 67% of services related to the rural population are in critical condition. Taken together, these data suggest that terrestrial areas characterised by mixed agricultural landscapes, as well as urban and peri-urban environments, remain under serious threat. The next phase of the study (2013-15) is focusing on the economic dimension of ecosystem services. Wilson et al., (2014) summarises lessons learned from Spain's experience with national ecosystem assessment, along with that of other countries.

Another indicator of ecosystem health comes from Spain's report for 2007-12 on the Habitat Directive. Around 25% of habitat types have "unknown" conservation status and the assessment of the remaining share is not positive: only 12% of 224 assessments (covering 117 different habitat types) show "favourable" conservation status, while 49% are "unfavourable" and 14% "highly unfavourable". The latest report included for the first time an assessment of marine habitat types to which over 50% was assigned an "unknown" conservation status; this further reinforces the need for improving understanding of Spain's marine environment (Figure 4.3).

Figure 4.3. **Conservation status of habitat types of the EU special interest**



Source: Based on national reports on Article 17 of the Habitats Directive (92/43/EEC), 2007-12.

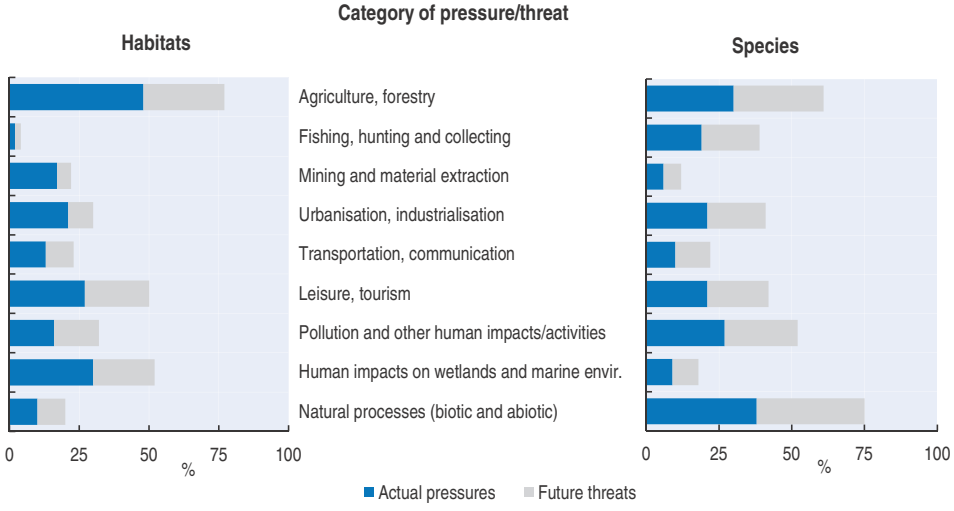
1.2. *Key drivers*

Spain's biodiversity and ecosystem services face a number of direct and indirect pressures that lead to habitat loss, fragmentation and degradation. The main historical threats include land-use changes, exploitation of natural resources and pollution from productive activities such as agriculture, tourism, manufacturing or mining. These pressures are reinforced by a growing list of external factors, such as invasive alien species and climate change. The indirect drivers of change are mostly related to underlying evolving demographic and socio-economic conditions.

Although not all losses of natural habitat pose a threat to the continued provision of ecosystem services, the degradation of habitats in critical biodiversity areas (ecological and river corridors, wetlands, estuaries and special habitats) is of particular concern. Spain's Millennium Ecosystem Assessment shows increasing direct and indirect pressures on biodiversity for 1960-2010.[2] A slight improvement post-2008 coincides with the implementation and enforcement of environment policies, as well as the downturn of economic activity. The overall long-term trend suggests that threats to biodiversity are considerable.

Land-use change related to agriculture, tourism development and urbanisation remains the most significant internal threat to terrestrial biodiversity (Figure 4.4). The mean annual

Figure 4.4. **Frequency of pressures and threats**



Source: Based on national reports on Article 17 of the Habitats Directive (92/43/EEC), 2007-12.

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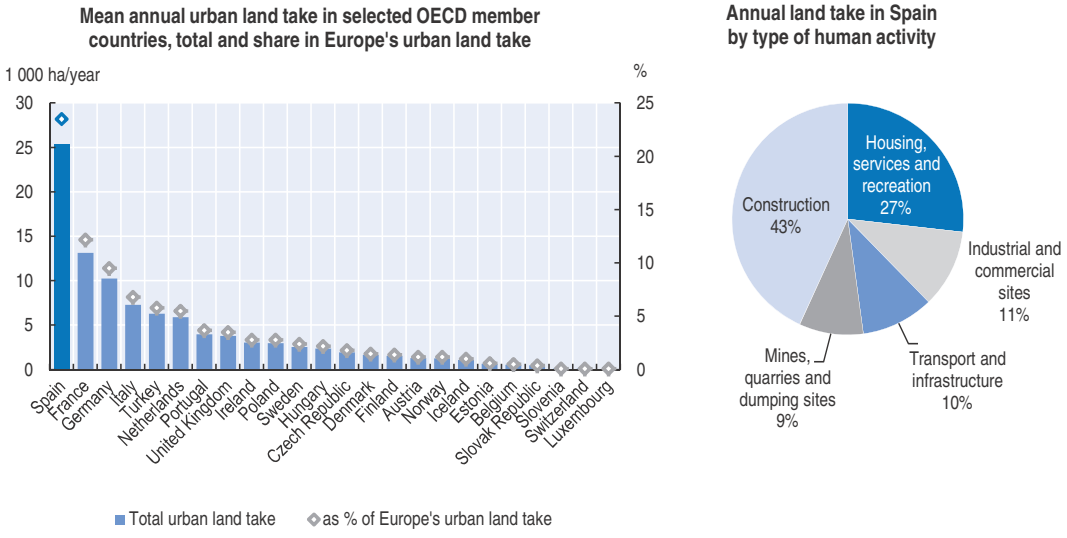
land take as a result of the expansion of residential and construction sites in Spain between 2000-06 was much higher than in other European countries (Figure 4.5) (EEA, 2013). Main causes of land-use change in the last decade include construction, which occurs mostly in coastal areas; and the development of transport infrastructure, which contributes to habitat fragmentation. Between 2006-12, the area occupied by urban surface plots grew by 19%, but in some regions such as Asturias, Murcia, Extremadura and Galicia, conversion to urban lands ranged between 40-75% (MAGRAMA, 2014, 2013b, 2013c).[3] However, only 2% of total land in Spain is covered by artificial surfaces, well below the EU average.

Figure 4.5. **Urban land take in 2000-06**



Note: Annual land take by the expansion of residential and construction sites.
Source: EEA (2013), *Land take Assessment.*

StatLink http://dx.doi.org/10.1787/888933183051

A key underlying indirect cause behind these drivers, which have accumulated for the last 50 years, is the increase in the country's population. Between 2000-10, the population increased by 15.5% with a significant increase along coastal areas (EEA,2013). These changes translated into faster urbanisation and new transport infrastructure, as well as increased waste generation, and pollution of water and air. The financial crisis and the resulting demands for fiscal consolidation translate into a growing new indirect threat to biodiversity conservation. The required budgetary cutbacks across environmental authorities affect monitoring, as well as the ability of national and regional authorities to maintain conservation projects and launch new initiatives. Re-prioritisation of public policy objectives has demoted the importance of biodiversity concerns in favour of other goals, especially concerning employment and health care.

1.3. Projections under a business as usual scenario

Spain has undertaken various long-term ecosystem projection analyses to inform policy making and help set priorities. According to the Spanish National Climate Change Adaptation Plan, species distribution models predict a general and progressive loss in both fauna and flora under a business as usual scenario. In the current climate change context, 51% of vertebrates will need concrete measures for their conservation. According to estimated models, climatic variations may explain up to 30% of the variability in data distribution for amphibians and reptiles, up to 22% for mammals and up to 15% for birds, depending on their thermal physiology. Another study for a group of 96 species of Iberian terrestrial endangered vertebrates has estimated a loss of favourable climate conditions in 13% of the current distribution area. In addition, predictions on the distribution area of 20 species of Iberian trees over the next century under moderately adverse climate change indicate significant reductions. Long-term modelling suggests that, under business as usual scenarios, species diversity and ecosystem resilience will be adversely impacted in the long run. One possible exception is the northern mountainous areas where species richness may improve under plausible climate change scenarios.

2. Policy and institutional framework

2.1. Objectives, goals, targets and key legislation

Policy and legislative framework for terrestrial biodiversity

Since the last review, Spain has made significant advances in developing its legislative framework for nature protection and biodiversity conservation. A number of legal acts were consolidated in 2007 in a new comprehensive Law on Natural Heritage and Biodiversity (42/2007). The law became the basis for managing the conservation, sustainable use, restoration and enhancement of biodiversity and ecosystem services. The law transposed the Habitat Directive (92/43/ECC) and incorporated a number of key biodiversity targets, in some cases with a plan to implement measures more quickly than required by the directive. The law also incorporated Spain's commitments under the UN Convention on Biological Diversity and other international agreements.

In several ways, the biodiversity law is one of the most ambitious among OECD member countries. Its fundamental aims are to integrate biodiversity considerations into other environmental policy areas, and into specific economic or productive sectors. One of the main principles permeating the law is the predominance of environmental protection over territorial and urban planning. The law established that natural resources management plans prevail over territorial and urban planning instruments whenever the two contradict (OSE, 2012). It also introduced novelties such as the new category of marine protected areas,

enhanced the importance of sectoral guidelines, created new institutions to co-ordinate policy implementation between administrative levels and expanded civil society participation. It also made provisions to create information tools for biodiversity management, most notably the inventories and cataloguing activities, as well as indicated the need for management plans on every site in the Natura 2000 Network.

The 2007 law also provided the overarching legislative framework for governing protected areas – the main policy instrument for biodiversity conservation in Spain.[4] Although the law relied on the same categories for classifying protected natural areas as the previous law (4/1989), it harmonised the definition of protected landscapes with that used by the European Landscape Convention. In addition, the law established the Spanish Inventory of Protected Natural Areas and the Natura 2000 Network, and incorporated the protected areas established by international agreements under the same legal framework.

The implementation of the 2007 law was further detailed in the 2011-17 Strategic Plan on Natural Heritage and Biodiversity. The plan contained 281 policy actions and mechanisms, as well as criteria for evaluating progress in their implementation. Sectoral integration of objectives and targets for biodiversity, as well as shared responsibility with the private sector, were two key guiding principles. In a sense, the strategic plan aims to disassociate biodiversity conservation from a strictly public policy matter to one also relevant to the private sector.

The first assessment of the implementation of the strategic plan (2011-13) was submitted as part of Spain's fifth periodic UN Convention on Biological Diversity (CBD) report (MAGRAMA, 2014). The report describes progress in implementation and its contribution to the Aichi targets. The report claims that 33% of the plan's actions have been executed, 45% are ongoing, 14% have not been initiated and 8% remained undetermined (MAGRAMA, 2014), although it did not assess its impact on biodiversity and ecosystems.

Spain has also adopted a range of legal instruments to address other biodiversity-related issues, including eradication of invasive species, combating desertification and soil erosion, and improving links between water and climate management (Box 4.2).

Box 4.2. **Main biodiversity-related legislative and management initiatives**

Regulation for invasive alien species

A series of legal instruments has been introduced in the fields of trade, transport, agriculture and livestock production to address threats from invasive species. Law 42/2007 created the Spanish Catalogue of Invasive Alien Species, which was recently put into place (Royal Decree 630/2013). The inventory will allow for assessing the threat of invasive alien species, as well as for prioritising species that need immediate attention. The MAGRAMA has also set up an official Working Group on Invasive Alien Species to promote co-ordination between administrations and encourage the exchange of information, as well as assessment and diagnostic control strategies for the most problematic species. A warning system is operating under the Committee of Wild Flora and Fauna of the State Commission for Natural Heritage and Biodiversity. A number of management plans for dealing with major invasive alien species have been developed, including the national strategy for controlling the Zebra mussel, the American Mink and invasive plant species in dune ecosystems (e.g. the *Carpobrotus* species), while others are under preparation. Autonomous Communities (e.g. Andalusia and Valencia) have developed complementary management plans and various national parks are putting into place eradication programmes.

Box 4.2. **Main biodiversity-related legislative and management initiatives** *(cont.)*

Combating desertification and soil erosion in Spain

More than two-thirds of Spanish territory is categorised as arid, semi-arid and dry sub-humid. This territory is affected by the impacts of desertification and soil erosion, which result from multiple factors including climate change, urbanisation (mostly coastal) and changes in agriculture and land-use management. To address these challenges, Spain has ratified the United Nations Convention to Combat Desertification (UNCCD). Further, the Forest Law of 10/2006 included specific articles to address desertification, soil erosion and forest hydrological restoration. Also, a National Action Programme was completed in 2008 to combat desertification and soil erosion. Its activities were supplemented by including a new ambitious afforestation programme to plant 45 million trees, which began in 2009. Beyond covering desertification objectives, the initiative also addresses climate change mitigation (an estimated 3.6 million tonnes of CO_2 will be absorbed), as well as rural development (e.g. job creation). Another initiative, approved in 2010, performs emergency restoration of burned hydrological-forest areas; it includes a series of emergency activities to prevent and repair the damage caused by forest fires and other natural disasters such as floods. Since 2010, more than EUR 5 million has been spent on this programme.

Climate change adaptation and biodiversity

In 2006, Spain approved its National Climate Change Adaptation Plan (PNACC). As a main objective, the PNACC sought to integrate climate change adaptation into rural planning instruments and in biodiversity management. Further, the Strategic Plan on Natural Heritage and Biodiversity (RD1274/2011) integrated the aims of the PNACC to achieve synergies between the two plans. A focal area of the First Action Programme of the PNACC is precisely the relationship between climate change adaptation and biodiversity. As a result, Spain launched the project "Assessment of impacts, vulnerability and adaptation of biodiversity to climate change in Spain" (2009-11). The project assessed scenarios over three periods (2020, 2050 and 2080) using data from the National Inventory of Biodiversity and climate change models developed from the Spanish Meteorological Agency. From this analysis, the project published an atlas of climate change impacts on wildlife, as well as an Iberian Spanish atlas that highlighted impacts of, and vulnerability to, climate change on flora and vegetation. In its next phase, the project will identify adaptation measures for the conservation of Spanish biodiversity, and undertake an economic valuation of existing networks of protected areas under alternative future climate scenarios. The Third Action Work Programme of the PNACC (2014-20) will consider assessing the impact of, and potential for, adaptation to climate change in specific sectors, including tourism, agriculture, forests and soils.

Legislative framework for marine biodiversity

While the 42/2007 law provided the legal foundation for all facets of biodiversity policy, the enactment of the Law on the Protection of Marine Environment (41/2010) established a modern and comprehensive framework for the preservation of marine ecosystems in Spain in line with the EU's Marine Strategy Framework Directive (2008/56/CE). The law clarified and classified marine-demarcated areas, the creation of the Spanish Protected Marine Areas Network (including Natura 2000 marine sites) and the establishment of marine reserves for sustainable fishing.

The 2010 law set targets with a 2020 horizon. The first phase (from mid-2012) assessed the status of Spain's marine environment, defining what is considered "Good Environmental Status" (GES). It also established environmental targets, such as including 8% of Spain's marine area under protection status by 2014 and 20% by 2020. Further steps envisaged in the second phase (from 2014 onwards) include i) development of subsequent phases of the marine strategies for the five marine demarcations (North Atlantic, South Atlantic, Canary Islands, East-Balearic Sea and the Gibraltar Strait/Alboran Sea);[5] ii) development and extension of the Spanish Network of Marine Protected Areas; and iii) approval of the Recovery and Conservation Plans for Threatened Marine Species of the National Strategies for the Conservation of Threatened Marine Species (such as sea turtles, the Balearic shearwater, ferruginean limpet, the killer whales of the Gulf of Cádiz and by-catch of vertebrates). The 2010 law also provided for monitoring programmes to measure the progress and effectiveness of these strategies, including assessments every six years; the first one was completed in 2012.

Other legislation affecting biodiversity

Biodiversity considerations have been included in several other laws enacted in the last decade, including coastal management, land-use planning, environmental liability and infrastructure development. Following the recommendation of the 2004 *OECD Environmental Performance Review* for additional policy measures for addressing threats to coastal areas, Spain has introduced various laws and strategies that have, in part, tried to address these concerns. In particular, the Law for the Protection and Sustainable Use of the Coast (2/2013) modified the concept of maritime-terrestrial public domain that was formerly set in the Law of Coasts (22/1988), thereby reinforcing legal safeguards in favour of coastal protection (Box 4.3). The Strategy for Coastal Protection identified coastal areas with a potentially high risk of flooding and erosion caused by climate change. Also, Spain issued a comprehensive manual on the restoration of coastal dunes based on several years of detailed scientific research.

Spain has also incorporated biodiversity considerations into planning legislation. The most important legal development was the 45/2007 Law on Sustainable Development of the Rural Environment and the National Strategic Rural Development Plan. These included components that favourably impact biodiversity both directly (such as requirements for protecting the Natura 2000 network, and specifications and standards for the agricultural, forestry, mining and fishing sectors) and indirectly (such as guidelines for the conservation of water and soil). These requirements are reflected in the rural development programmes of each Autonomous Community.

Spain introduced important developments into property and land law that are associated with land use and planning policy and have impacts on biodiversity. Laws 8/2007 and 2/2008 set out the principles for regulating land use in accordance with public interest and sustainable development. Similarly, Law 10/2006 on Forest Conservation, which modifies Law 43/2003, prohibits land-use change in forest areas for 30 years after a fire.

In addition, Law 26/2007 and Royal Decree 2090/2008 on Environmental Liability enhanced the "polluter pays" principle in dealing with environmental risks, which has ramifications for terrestrial biodiversity and even more so for marine biodiversity. The new liability regime provides improved incentives for the optimal management of environmental risks by the relative industries (e.g. energy, transport and mining). It also strengthens the legal framework for appropriate compensation and restoration in the case

Box 4.3. **Strengthening the protection and sustainable use of coasts**

The Law for the Protection and Sustainable Use of the Coast (2/2013) modified the concept of maritime-terrestrial public domain that was formerly set in Law 22/1988 of the Coast with the aim of reinforcing legal safeguards in favour of coastal protection. The new law harmonised public domain in all of Spain's Autonomous Communities; distinguished between coastal areas that can be subject to sustainable use and other areas that need greater conservation status; and provided guidelines for concessions for the sustainable use of coastal areas. The law also clarified types of construction and building maintenance allowed in coastal areas. In addition, it mandated the development of a strategy to adapt to climate change to enhance resilience in coastal areas. The implementation of the law has been supported by a number of coastal ecosystem restoration projects affecting coastal wetlands and dune ecosystems (MAGRAMA, 2013b).

Conservation NGOs have criticised the law, raising concerns that it legitimised previous transgressions and reduced the size and stringency of the protection easements strip. Yet the law has aimed to retain the same size of coastal protection zone (100 m) for the majority of coastal areas and only allow special provisions for reducing it (to 20 m) in certain cases (areas with an urban character before 1988). Although demand for development in coastal areas could increase due to tourism pressures, the law explicitly prohibits the construction of new buildings in the maritime-terrestrial public domain and includes additional specific measures (such as those provided in Article 119) that aim to avoid urban sprawl in coastal areas.

Currently, 96% of the public maritime-land domain has been demarcated. The process was interrupted due to consultations preceding the enactment of the new Law of the Coast, but the aim remains to reach 100% demarcation of the Spanish coast.

of an environmental hazard. In fact, Spain's environmental liability law are much more stringent and far-reaching than the corresponding EU directive: it includes ecosystems not covered by EU legislation and grants enhanced powers to the public prosecutor to intervene.

Spain has also made significant legislative and institutional advances in addressing habitat fragmentation from infrastructure projects, primarily related to transport and energy. The Commission on Natural Heritage and Biodiversity has produced state-of-the-art technical guidelines to address habitat fragmentation from transportation projects. Electronic journals and workshops disseminate mitigation measures implemented by enterprises and administrations. In addition, the Biodiversity Foundation, together with the Spanish Road Association, has produced maps and other material to enhance awareness of drivers with respect to wildlife protection. Particular danger areas for wildlife have been identified.

International obligations and agreements

Spain has been an active member of international conventions, agreements and organisations related to marine, terrestrial biodiversity and climate change. Spain's Strategic Plan on Natural Heritage and Biodiversity explicitly seeks to promote synergies between key international environmental agreements, most notably between the UN Conventions on Biological Diversity, Combating Desertification and Climate Change. The PNACC is the main vehicle to pursue synergies. With respect to the UN Convention on

Biological Diversity (CBD), Spain played a prominent role in the establishment of the Nagoya Protocol and remains one of the CBD's major donors. Its contribution to the third replenishment of the Global Environment Facility (GEF) amounted to EUR 22 million, with approximately EUR 9 million towards biodiversity. Further, Spain has hosted numerous meetings of the CBD's subsidiary bodies.

Another notable example of Spain's international co-operation is at the EU level, in particular efforts to establish and strengthen regional networks of cross-border protected areas. Spain has initiated co-operation agreements with Portugal and France to develop and adopt common management objectives and plans for neighbouring Natura 2000 network sites (e.g. joint conservation plans for the Iberian lynx in co-ordination with Portugal and for the Pyrenean brown bear and the Spanish Ibex with France). Another example of co-ordination with Portugal is the declaration of the Parque Internacional Tajo-Tejo in 2013. This declaration aims to help manage and preserve this cross-border territory, which has a high biodiversity value. Similarly, Spain initiated two Transboundary Biosphere Reserves: the Gerès-Xurés between Portugal and Spain and the Intercontinental del Mediterráneo between Morocco and Spain. Furthermore, in the framework of the Bonn Convention, Spain has developed an action plan with Portugal, Morocco and Mauritania to conserve the Mediterranean Monk Seal. In recognition of these achievements, Spain was a recipient of the first Natura 2000 awards offered by the EU in 2012.

Spain has played a prominent role in developing and fostering multilateral agreements and co-operation action plans for marine biodiversity. The Spanish Committee of the International Union for Conservation of Nature (IUCN) has been particularly influential on matters related to marine biodiversity conservation in the Mediterranean and in Latin America. Initiatives include, for example, COMET-LA (Community-Based Management of Environmental Challenges in Latin America for 2012-15). Further, the Technical Office of the IUCN Spanish Committee, created in 2007 under an agreement with the Biodiversity Foundation and the MAGRAMA, helps implement multilateral marine conservation action plans. Spain also supports the IUCN's Centre for Mediterranean Co-operation, with offices in Malaga. In 2006, Spain completed the ratification process for the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol); it incorporated new amendments to the emergency protocol incorporated into the Barcelona Convention and into national legislation. As of 2006, Spain had developed and funded the Spanish Marine Rescue Service, and a National Rescue Plan to respond quickly to marine pollution incidents in the Mediterranean and Atlantic. These efforts are co-ordinated with counterparts in France, Portugal and Morocco.

2.2. Institutional roles and arrangements

The Ministry of Agriculture, Food and Environment (MAGRAMA) takes primary responsibility for developing biodiversity policy and the legal framework, and also co-ordinates biodiversity policies within the European Union and at other international fora. The MAGRAMA also ensures timely and comprehensive harmonisation of the biodiversity-related legal framework with that of the EU and ensures Spain's ACs also achieve harmonisation.

As in many other substantive areas, ACs have been given responsibility for implementing biodiversity policies, except for a few spatial planning issues such as national parks, coastal areas, transport infrastructure and water resources that extend

beyond one autonomous region. Local administration and municipalities play an important role in biodiversity conservation through transferring the objectives of biodiversity policy into specific fields of action, as well as in raising awareness. They are supported by the Spanish Federation of Municipalities and Provinces, which recently adopted a strategy for the conservation and sustainable use of biodiversity at the local level.

Although the ministry takes the lead in formulating strategic policy and overarching biodiversity legislation, it consults with regional authorities through specific structures. The main co-ordination between the central administration and regional authorities (at the level of General Directors) is the State Commission on Natural Heritage and Biodiversity and its series of specialised committees and working groups. This Commission was established by the 42/2007 law and acts as a consultative and co-operation body on matters related to nature conservation and biodiversity.[6] Among many other issues, the Commission sets guidelines for monitoring and evaluation of the conservation status of threatened species and species under a special protection regime; these guidelines also established common methodologies. This aims to address a key problem with information on the status of biodiversity: lack of consistency across administrative authorities. The reports and proposals developed under the Commission require formal approval by the Sectoral Conference on the Environment; this is the collegiate, advisory and executive co-ordination body that brings together public representatives from central government (headed by the Minister of Agriculture, Food and Environment) and representatives from the autonomous regions with environmental responsibilities (Chapter 2).

Spain recently established the Inter-ministerial Commission on Marine Strategies (Royal Decree 715/2012) as the main government consultative and co-operation body on matters related to marine biodiversity. The Sectoral Conference and specific committees for each of the five marine districts co-ordinate and co-operate among central and regional administrations on marine biodiversity. In addition, bilateral agreements exist between the MAGRAMA and autonomous regions on the designation and management of coastal Natura 2000 Special Protected Areas (SPAs) and Sites of Community Importance (SCIs).

Many steps have been taken in response to calls from the ACs and other stakeholders to strengthen multilevel co-operation. This is intended to reduce the divergence between central authority target setting and the capacity of regional authorities to implement these targets. For example, some special working groups have been established to address specific drivers affecting biodiversity. One such group, which includes policy representatives from all related levels of administration and scientific experts, has produced detailed and state-of-the-art guidelines on habitat fragmentation and defragmentation initiatives related to transportation infrastructure (MAGRAMA, 2013a). This addresses the need to improve ecosystem connectivity, one of the main concerns in the 2004 *OECD Environmental Performance Review*. Other working groups have been established to co-ordinate habitat and species conservation and strengthen implementation of EU policies. Co-ordination has also been strengthened between various agencies at different levels in times of crisis (such as large wildfires) and among the national parks through the National Parks Autonomous Organisation (Organismo Autónomo Parques Nacionales, OAPN). This includes two new bodies, the Collaboration and Co-ordination Committee, comprising representatives of all national parks and OAPN, and a Steering Committee for each of the national parks located in more than one Autonomous Community. Co-operation has also been strengthened through the National Park Network where OAPN maintains the role of monitoring and assessment of compliance with the Master Plan for National Park Development.

Despite progress, concerns are still expressed concerning co-ordination of policy and regulatory development between the central and regional governments. A case in point has been the expansion of protected areas and the feasibility of reaching nationally established objectives and targets. Regional authorities are challenged to keep up with the pace of expansion and to find the matching funds to implement the various protected area management plans. This disparity is partly because central government sets policy targets based more on political and ecological criteria and less on cost-benefit analysis and the feasibility of providing adequate funding. Structured forms of dialogue and co-operation should be strengthened between the national and regional levels of administration on key challenges and best practices, and on helping to benchmark regional performance. The further development of transparent medium and long-term work programmes could strengthen the capacities and impacts of such co-ordination mechanisms.

2.3. Partnerships with NGOs, business, universities and other stakeholders

The Environment Advisory Council (Chapter 2), and its specialised working groups, remains the main institutional channel for involving the public in the development and monitoring of environmental policy, including NGOs, academia and the private sector.[7] A similar co-ordinating body, exclusively devoted to biodiversity issues, is the Natural Heritage and Biodiversity National Council.[8] The Council, established by the 42/2007 law, provides an effective forum for civil society (predominantly biodiversity NGOs and scientific bodies) to influence the design of environmental policy, as well as to undertake *ex ante* valuations of newly proposed policies and *ex post* assessments of existing policies. It also provides a forum for advice on technical and scientific matters in advance of international meetings on biodiversity. Examples of the successful operation of the Council include the contribution of BirdLife International in the designation of Natura 2000 sites or the collaboration fostered between WWF and the fishing industry to introduce sustainable fishing practices. Still, biodiversity NGOs and private sector representatives have raised concerns the Council's work does not provide adequate opportunity to consider their views. Moreover, the timeframes in which these working groups operate do not allow for a high degree of scrutiny of new regulations.

The Biodiversity Foundation, a non-profit public organisation set up by the Ministry of Environment in 1998, provides important support to the development and evaluation of biodiversity policy. The Foundation is an alternative forum for collaboration of different public and private entities and institutions. It has developed significantly over the last decade, in particular, following the 2006 merger with the National Park Foundation. Its purpose and functions include projects, publications, independent expert advisory services and public awareness-enhancing activities on all facets of biodiversity conservation. It hosts a multidisciplinary team of over 40 biodiversity expert professionals and has been developing over 400 projects per year.

Irrespective of the collaborative work through institutions such as the Biodiversity Foundation, the MAGRAMA also engages in direct collaboration with academic and research institutions to produce biodiversity information such as inventories and GIS datasets, which feed into its biodiversity policy. Some important initiatives that contribute to biodiversity knowledge in Spain take place at the Superior Council for Scientific Research and the Spanish Institute of Oceanography. Spain has also been a pioneer in fostering international scientific collaboration on biodiversity. It was one of the initial signatories of the Intergovernmental Science-Policy Platform on Biodiversity and Services

(IPBES). It has also fostered and hosts international biodiversity research centres, such as the Center for Mediterranean Forest Research (CEMFOR), the Centre for Ecological Research and Forestry Applications (CREAF) and the Biodiversity and Landscape Ecology Lab.

The Spanish Business and Biodiversity Initiative is an example of an innovative specific partnership with the business sector. Launched in 2013 by the MAGRAMA and the Biodiversity Foundation, it encourages economic practices that are compatible with biodiversity conservation. It provides a co-operation framework for large businesses, NGOs, associations and government agencies to join efforts to improving and maintaining Spain's natural capital (Box 4.4). Spain, together with Germany, the Netherlands, Belgium and the Global Nature Fund (GNF), established the European Business and Biodiversity Campaign (EBBC) in 2010 to provide practical advice and guidance on how to reconcile business and biodiversity conservation.[9] The web-based platform Environmental Markets[10] provides information for both the public and private sector on developing alternative sources of financing (primarily market-based instruments).

Box 4.4. **The Spanish Business and Biodiversity Initiative**

The Spanish Business and Biodiversity Initiative, launched in 2013 by the MAGRAMA and the Biodiversity Foundation, included as initial signatories of its "Biodiversity Pacts" 15 Spanish companies of which 7 come from the IBEX35, the benchmark stock market index of the Bolsa de Madrid, Spain's principal stock exchange. Since then, a total of 18 companies have become signatories. The Initiative provides a co-operation framework for large businesses, NGOs, associations and government agencies to improve and maintain Spain's natural capital. It promotes the inclusion of biodiversity conservation and management in the business strategies of different sectors of the Spanish economy, and identification of innovative opportunities and projects as solutions to the current financial crisis. It also aims to mobilise private funds to preserve biodiversity.

By signing a "Biodiversity Pact", companies acknowledge and support the objectives of the Convention on Biological Diversity. Companies accept the responsibility to carry out their economic activity in a manner consistent with the protection and conservation of biodiversity. They pledge to meet the following commitments:

- Evaluate the impact of their business activities on biodiversity and natural capital
- Integrate biodiversity protection into their management policies and manuals
- Set realistic and measurable goals for biodiversity conservation that will be reviewed, at least, every three years
- Publish activities and achievements attained in the sphere of biodiversity conservation in their annual reports
- Inform suppliers of the company's targets in the field of biodiversity conservation and support those that gradually incorporate those objectives in their operations
- Explore the possibilities of co-operating in this field with scientific institutions, nongovernmental organisations or government agencies to deepen the dialogue and establish joint projects and an ongoing climate of improvement of business and environmental management practices
- Designate a person in the company responsible for meeting the objectives of the Pact.

Box 4.4. **The Spanish Business and Biodiversity Initiative** *(cont.)*

By signing the voluntary agreement or "pact", firms benefit from best practice sustainable production and marketing approaches; opening of new market opportunities; better access to financial capital; and improvements in the firm's value (including stock value) from its projection of its biodiversity-friendly practices.

Partners in this initiative include the "Sustainability Excellence Club", a non-profit business association comprising large companies that encourage sustainability from the corporate environment by sharing and disseminating business practices that contribute to excellence and further the progress of society; Forética, a leading Spanish business and professional association of corporate social responsibility practitioners that promote ethical management and social responsibility, endowing organisations with knowledge and useful tools to successfully develop a competitive sustainable business model; "Biodiversity in Good Company", a non-profit business association established in 2008 to make tools available that link the business sector with biodiversity conservation; and "Fundación Global Nature", a foundation created in 1993 that aims to preserve and protect the environment.

Source: www.fundacion-biodiversidad.es/.

3. Information systems

Inventories and data portals

Spain has made considerable progress over the last decade in developing and using information tools, including inventories, portals with biodiversity data and monitoring protocols. The Natural Heritage and Biodiversity Spanish Inventory (NHBSI), called for by Law 42/2007 and made operational in 2011, is the main information knowledge tool for supporting the objectives and targets of Spain's biodiversity policy. It contains three main components: i) biodiversity data with over 30 inventories, catalogues and lists of species; ii) an indicator system to evaluate the state of biodiversity and trends; and iii) an annual report to disseminate this information. Independent professional or scientific organisations may generate additional information for the inventory. All of this information is gathered in the Nature Data Bank. Established by Royal Decree 556/2011, the data bank is an integrated system that harmonises, analyses and disseminates information in the NHBSI. It includes all national-level inventories, as well as extensive spatial and GIS-based data through the Geographic Information System Data Bank of Nature (or GeoPortal) and the Web Map Service facility.

The NHBSI and the Nature Data Bank provide an institutionalised process for harmonising the plethora of diverse and scattered data sets. Priority inventories have been harmonised nationally, to some degree, which includes changes to the component lists carried out with the State Commission of Natural Heritage and Biodiversity. This "institutionalising" of the cataloguing and monitoring of biodiversity data is one of the key biodiversity policy achievements in the last 10 years. It addresses one of the significant policy challenges of the past, namely dispersed, inconsistent and incomplete datasets over biodiversity resources across the autonomous regions. Once completed, these inventories and indices will help assess the status, past and future trends of biodiversity resources and, hence, will constitute the cornerstone of policy making and target setting.

Royal Decree 556/2011 also established the Spanish Biodiversity Monitoring System, which strives to obtain a complete annual account of biodiversity trends in Spain. To date, monitoring systems have been put in place for birds (1998), continental fishes (2008) and amphibians and reptiles (2009), while ones for mammals, vascular plants and invertebrates are still under development. The Observatory of Protected Areas (EUROPARC-Spain) is one of the main tools to facilitate the exchange and dissemination of information on the planning and management of protected areas. The Observatory maintains a geoportal that incorporates the protected area databases back to 1994.

Lastly, the NHBSI's Interactive Platform-Biodiversia was created under Laws 27/2006 and 42/2007 to foster civic participation in gathering and disseminating knowledge about species biodiversity. It aims to promote environmental education and awareness, as well as access to information about environmental protection.

Marine biodiversity policy information tools

Information systems on marine biodiversity remain more dispersed, and are significantly less complete compared to terrestrial resources. Significant recent initiatives include the Spanish Inventory of Marine Habitats and Species (to be completed in 2015). It feeds into the Marine Strategy Information System currently under development, which is expected to provide analogous information to the Nature Data Bank, including web-based mapping tools. Monitoring programmes under the Marine Strategy Framework Directive, as well as for the Marine Natura 2000 Network, will feed these information systems, and increase knowledge of marine biodiversity. Steps have also been taken to improve governance among different administrations, especially among central and regional (coastal) bodies. This will improve synergies, avoid duplication of data collection, storing activities and monitoring, and ensure comparability of the information gathered.

Other geographical data and metadata information resources relevant for marine biodiversity policy are the portal by the Spanish Institute of Oceanography (on research in marine science) and the portal under the Centre for Studies and Experimentation of Public Works (CEDEX) that demarcates marine ecosystems.

Indicators and reports

In response to Act 27/2006, which called for enhanced access rights to information, public involvement and access to justice on environmental matters, the MAGRAMA produces monthly and annual reports on the state of the environment and issues a complete report every four years. Together with these status reports, the ministry publishes "Environment in Spain" annually, which offers an overall assessment of the state of the Spanish environment, including biodiversity. In addition, the Spanish government has established the Environmental Indicators Public Bank that provides a list of 68 general environment indicators selected to accord with the European Environment Information and Observation Network (Eionet). Another environmental information instrument, published annually (since 2004), is "Environmental Profile of Spain", which seeks to provide a benchmark assessment of intertemporal trends (using EEA indicators) with respect to environmental resources (including biodiversity). In response to Act 42/2007, the MAGRAMA also produces an annual report on the status and trends of biodiversity in Spain, as well as actions implemented for its conservation.[11]

Other notable third-party, independent repositories of biodiversity information developed in the last decade include the Global Biodiversity Facility (GBIF) of Spain

(*www.gbif.es/index_in.php*), ANTHOS, or Spanish Plant Information System, (*www.anthos.es/*) and the InvasIBER website about the introduction of alien species in Spain (*http://invasiber.org/*), as well as an information system on Iberian and Macaronesian vegetation (Sistema de Información de la Vegetación Ibérica y Macaronésica, *www.sivim.info/*) and wild fauna (*www.fauna-iberica.mncn.csic.es/*).

Data gaps and harmonisation needs

Despite important progress, some inventories under the NHBSI still need to be completed and require greater harmonisation across regions. This makes a complete national assessment of the state of Spain's biodiversity particularly cumbersome. The most comprehensive data relate to woodland cover and forest extension, and forest fires. This is consistent with the longer history of institutionalised forest policy and forest monitoring activities. Efforts to generate reliable, comprehensive and coherent baseline data on marine species and marine ecosystems are lagging further behind those related to terrestrial biodiversity.

The latest report assessing Spain's Natural Heritage and Biodiversity Inventory contains the first assessment of the state of these inventories. In 2012, nearly all of the inventories called for by the 42/2007 law were established and implementation guidelines were developed. Yet the MAGRAMA concedes that when considering actual evaluation and monitoring, degree of coverage and quality of data collected (in particular, completeness and accuracy), as well as accessibility of information, the inventories have only generated half of the intended body of knowledge (MAGRAMA, 2013c). There is thus considerable work needed to make these inventories more effective.

There is also room for harmonising monitoring and reporting protocols for biodiversity resources across regions. The Nature Data Bank aims to include various scientific inventories, but they still have not been fully integrated and regional datasets have not been incorporated. A useful template could be the national forest inventories that have a longer history of co-ordinated and homogeneous data collection. Given the governance structure in Spain, a bottom-up approach is being used to harmonise data collection, monitoring and evaluation protocols. Co-ordinating institutions should enhance the voice of regional authorities to enable biodiversity target setting and monitoring protocols that adequately reflect capabilities. Greater collaboration among the Autonomous Communities could stimulate exchange of good practice and capacity building. The challenge in completing and updating existing inventories, catalogues, datasets and web-based databanks becomes particularly grave given increasing budgetary cutbacks.

Role of economic analysis

Spain has advanced its analysis of the economic benefits from ecosystem services. The Valuation of Natural Assets of Spain (VANE), a project by the University of Alcalá in 2004-08 with support from the Ministry of Agriculture, Food and the Environment, was the first attempt to identify the value of goods and services from natural resources throughout the Spanish territory. The project aimed to identify natural services and create physical models of value assignment. The second objective was the development of a Land Information System of natural capital to obtain value maps for each of the considered ecosystem services. Preliminary results showed that while water provision brings the highest annual benefit, recreational services bring the highest values per hectare

(Table 4.2).[12] More recently, Spain has completed the first phase of its Millennium Ecosystem Assessment (*www.ecomilenio.es/*), which was sponsored by the Biodiversity Foundation. This project generated additional information on changes in the ecosystems that directly affect human welfare. However, it provided little assessment of the economic and social costs of the loss of biodiversity and associated ecosystem services. The second phase of the assessment is developing these economic and social dimensions.

Table 4.2. **Preliminary values of Spanish ecosystem services from the VANE project**

Ecosystem services	Valuation method	Value (EUR/year in 2005 prices)	Average value (EUR/ha year)
Food and raw materials production	Market prices; land prices; real options method	5 553 129 950	444
Water provision	Residual value method; consumer surplus; avoided cost method	17 392 648 905	361
Recreational services	Travel cost method; willingness to pay measures	2 738 165 280	1 699
Sport hunting and fishing	Work at prices	106 652 386	30
Erosion control	Avoided costs method	443 022 879	11
Waste treatment	Avoided costs method	241 517 788	8
Carbon capture	Avoided costs method	7 021 831 219	193
Biological diversity conservation	Conservation costs	731 819 052	15

Source: MARM (2010). *Valoración de los Activos Naturales de España,* [Valuation of Spain's Natural Assets], Ministry of Environment, Rural and Marine Environment.

The VANE project has been a promising tool. It helped develop methods for determining the economic value of ecosystems goods and services, provided references for the appraisal of alternative uses of natural resources and made available information about the benefits that environmental services provide to society. It has been used in the context of the environmental liability regime to identify the values of damaged ecosystem services. However, it has played a less prominent role in establishing objectives of the main laws regulating biodiversity (mainly 42/2007 and 41/2010 on terrestrial and marine biodiversity respectively), as well as targets in the Natural Heritage and Biodiversity Strategic Plan; no alternative tools were developed. The planning and approval process for large investment projects considers economic impacts on biodiversity to some extent since they are included in environmental impact assessments. Yet biodiversity policy target setting has not been subjected to rigorous cost-benefit analysis. The strategic plan calls for the inclusion of biodiversity economic values in target setting, but this objective needs further development.

If economic input is used in decision making, it concerns the cost of target setting and managing conservation policies with little regard to benefits generated from biodiversity conservation. For example, the MAGRAMA focuses on the cost of expanding the Natura 2000 network and less on the benefits that can be generated from its expansion. MAGRAMA analysis showed that EUR 1 billion is required to ensure proper management of the Natura 2000 areas, or approximately EUR 80 per ha (Moreno, 2013), but the formal analysis of the benefits of the Natura 2000 sites in Spain has just started. Studies of the Natura 2000 network in the UK and France estimated benefits of around EUR 150/ha, exceeding costs seven-fold; in Finland, a similar study found that benefits exceed costs 20 times.

A more comprehensive assessment of the economic value of the country's biodiversity assets and ecosystem services is expected with the second phase of Spain's Millennium

Ecosystem Assessment (2013-15). The economic valuation of Spain's biodiversity and ecosystem services should also be an integral part of making the "business case" to integrate biodiversity considerations into all sectors of the economy.

4. Protected areas and wildlife conservation

4.1. Protected areas

Expansion of protected areas

The terrestrial area of Spain under some form of nature protection expanded by 9% between 2000-12 and covers 29% of the country. The current share of the protected land is one of the highest among OECD member countries and by far exceeds the 2020 Aichi biodiversity target of a minimum 10%.

Spain recognises three main categories of protected areas by law: i) Natura 2000 Network; ii) Protected Natural Areas (PNAs); and iii) Internationally Agreed Protected Areas (IAPAs) (Box 4.5 and Table 4.3).[13] In several cases, a specific territory falls under more than one protected area category. The PNAs and Natura 2000 network overlap significantly; this can vary from 100% in Autonomous Communities that assimilated the Natura 2000 network into their PNAs to 10-15% in those that kept the networks distinct (EUROPARC, 2012). Each category includes numerous subcategories with different legal ramifications. Some analysis identified up to 46 different types of protected areas in Spain, which make it difficult to compare areas declared at the regional level (Voth, 2007). To address this challenge, the Natural Heritage and Biodiversity Law (42/2007) requires ACs to link their different types of protected areas to one of the IUCN categories.

There is considerable regional variability with respect to protected areas. The Autonomous Communities with the highest percentages of protected territory are the Canary Islands (77%), La Rioja (51%), Madrid (41%) and Valencia (39%). In terms of actual size, protected areas in Andalusia, Castile and León and Castile-La Mancha account for half of the total (Table 4.3).

Marine protected areas (MPAs) have also considerably expanded. Spain estimates that MPAs covered 8.4% of territorial waters[14] by the end of 2014. An important policy shift brought about by the Law on the Protection of Marine Environment (41/2010) moved MPA expansion from a paradigm of designating fishery reserves (that focus mostly on maintaining the natural repopulation of fish stocks) to one designating marine protected areas (that focus on preserving entire marine ecosystems and fostering ecological corridors). The declaration of MPAs in 2010 and the subsequent development of the Network of Marine Protected Areas of Spain (NMPAs) spurred actions to make the network representative by including areas from all of Spain's marine sub-regions (i.e. East Atlantic, Bay of Biscay and Iberian Coast, the Macaronesian Islands Atlantic and the Mediterranean region). As of July 2014, 39 new marine protected areas classified as "Special Protection Areas for Birds" (SPAs) under the European Birds Directive have been established. In addition, four new areas are proposed as Sites of Community Importance (SCIs) under the European Habitats Directive. The ongoing expansion of the marine protected area network is co-ordinated through the Life+ INDEMARES project.

Key challenges in managing protected areas

The wide typology of protection reflects the decentralised and often ad hoc manner with which protected areas designation has evolved in Spain. For long periods, Spanish

Box 4.5. **Main categories of protected areas recognised by law in Spain**

Protected Natural Areas (PNAs)

The Natural Heritage and Biodiversity Law (42/2007) defines protected natural areas as those "within Spain's national territory, including the inland and marine waters (…) that contain natural elements or systems that are representative, unique, fragile, endangered or of special ecological scientific, scenic, geological or educational interest, and are specifically intended to protect and preserve biological diversity, geodiversity and associated natural and cultural resources".

The PNAs cover 12% of the Spanish territory and include 1 553 areas designated under 46 different protection categories. There are 15 national parks, 162 natural parks, 277 natural reserves, 319 natural monuments, 56 protected landscapes and more than 800 sites with different protection categories that add up to 6.2 million ha. The PNAs in Andalusia account for 25% of the total and those in Catalonia for another 15% (Table 4.3). Marine protected areas (MPAs) are a relatively new category. Nearly half of the area designated as MPAs belong to the El Cachucho, Spain's first maritime protected area under the OSPAR Convention. It is located in the waters of the Exclusive Economic Zone of the Cantabrian Sea.

The Natura 2000 Network

The Natura 2000 Network, an ecological network of protected areas in the territory of the European Union, aims to assure the long-term survival of Europe's most endangered species and habitats. It consists of Sites of Community Importance (SCI) declared under the Habitats Directive (92/43/CEE), and Special Protected Areas for Birds (SPA), designated under the Birds Directive (79/409/CEE).

About 27% of Spain is covered by the Natura 2000 areas. In 2014, this included 1 448 SCIs (of which 449 already had a status of Special Areas of Conservation) and 598 SPAs (MAGRAMA, 2014). In total, 23% of the Spanish land territory is protected by SCI status and 19% is under SPA status.* Spain has the highest proportion of Natura 2000 protected areas in Europe, and protects 65% of the 179 existing habitat types included in four Biogeographic Regions of the Habitat Directive.

Internationally Agreed Protected Areas (IAPAs)

The 42/2007 law defined internationally agreed protected areas (IAPAs) as those formally designated in accordance with the provisions of international conventions and agreements to which Spain is a party. This includes the Convention on Wetlands of International Importance (Ramsar); the World Heritage List of the Convention on the Protection of the World Cultural and Natural Heritage, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), the Specially Protected Areas of Mediterranean Importance (ZEPIM) and the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. The IAPAs also include the geoparks and the biosphere reserves declared by UNESCO and the biogenetic reservations designated by the Council of Europe.

The IAPAs cover 10% of Spain's territory. The surface area of biosphere reserves is the largest in Europe (MAGRAMA, 2014, 2013c). The UNESCO's World Heritage Convention recognised four Spanish national parks: Doñana, Garajonay (on the island of La Gomera), Teide (Tenerife) and Monte Perdido (in the Pyrenees). Some of the IAPAs, however, do not have any legal status and their protection is weak. Coverage of national waters by OSPAR MPAs remains at 0.9% in Spain.

* The percentages do not add up due to overlaps.

Table 4.3. **Protected areas by autonomous community and type of protection, 2012 or latest available year**

	Total area	Total terrestrial protected areas	Natural Protected Areas (NPA)[a]			Red Natura 2000			Protected areas under international conventions			
			Terrestrial	Marine	NPA terrestrial	Terrestrial	Marine	RN 2000 terrestrial	MAB	RAMSAR	ZEPIM	Subtotal
	(ha)	(ha)	(ha)	(ha)	% of total area	(ha)	(ha)	% of total area	(ha)	(ha)	(ha)	(ha)
Andalusia	8 760 432	2 815 018	1 626 214	53 282	19	2 587 547	110 066	30	1 524 594	139 116	37 830	1 701 541
Aragón	4 773 063	1 370 251	157 907	-	3	1 354 645	-	28	50 903	16 701	-	67 604
Cantabria	531 367	152 663	152 022	1 055	29	144 773	2 909	27	15 136	4 549	-	19 684
Castile-La Mancha	7 941 031	2 523 421	580 215	-	7	1 838 181	-	23	650 337	10 545	-	660 882
Castile andLeón	9 422 715	2 688 536	717 626	-	8	2 460 878	-	26	488 467	3 042	-	491 509
Catalonia	3 220 195	1 019 682	989 968	79 125	31	979 019	86 054	30	17 207	52 888	10 719	80 815
Ceuta	1 981	630	-	..	-	630	836	32	-	-	-	-
Melilla	1 395	46	-	..	-	46	45	3	-	-	-	-
Madrid	802 558	327 637	110 150	-	14	319 605	-	40	61 992	486	-	62 478
Navarra	1 038 554	273 206	84 942	-	8	265 321	-	26	39 388	316	-	39 704
Valencian Community	2 326 186	914 267	241 647	14 373	10	872 281	64 246	38	-	31 555	17	31 572
Extremadura	4 167 919	1 277 361	314 028	-	8	1 264 075	-	30	116 172	6 990	-	123 162
Galicia	2 967 888	858 993	357 657	40 139	12	352 016	38 158	12	610 900	3 384	-	614 284
Balearic Islands	501 604	176 533	72 810	25 717	15	113 605	108 234	23	69 773	2 188	1 301	73 262
Canary Islands	744 568	572 794	302 254	37 151	41	348 004	12 510	47	450 350	95	-	450 445
La Rioja	504 133	258 254	166 418	-	33	167 558	-	33	119 820	86	-	119 907
Basque Country	722 232	164 793	99 064	3 939	14	145 500	1 455	20	21 775	1 629	-	23 404
Asturias	1 061 094	349 765	232 444	-	22	284 549	19 813	27	243 618	2 171	-	245 788
Murcia	1 131 315	274 348	59 911	114	5	264 779	28 311	23	-	222	-	222
Managed by MAGRAMA		53	-	234 950	-	53	562 410	-	-	-	-	
TOTAL	50 620 665	16 018 253	6 265 278	489 845	12	13 763 065	1 035 048		4 480 383	275 962	49 868	4 806 213

a) Protected areas according to the Natural Heritage and Biodiversity Law 42/2007 of 13 December 2007.

Source: Ministerio de Agricultura, Alimentación y Medio Ambiente (2012), *Informe 2012 sobre el estado del Patrimonio Natural y de la Biodiversidad en España.*

legislation left much room for interpretation to the Autonomous Communities and favoured a heterogeneous evolution of protected areas. Many ACs established their own protected area categories based on their own legal framework. This unco-ordinated procedure has led to a great diversity in denomination of protected areas, as well as planning and management instruments. The 42/2007 law and corresponding strategic plan aimed to clarify this perplexing situation and provide guidelines to harmonise protected area classification and designation. Harmonisation with the IUCN criteria for protected areas is one of Spain's most important objectives, but this has only been accomplished for 30% of its protected areas.

Around one-third of Spanish protected territory areas do not have a management plan. Forty-two percent of national parks have Natural Resources Plans (NRPs), which serve as long-term strategic documents, and 68% have Use and Management Plans (UMPs) to govern day-to-day operations. Of the 15 national parks, 4 do not have management plans, although draft versions are nearly complete for 2 of them and the required public consultations are about to start. Also, IAPAs, which are protected by international agreements, do not have separate management plans as this is not required (EUROPARC-Spain, 2012). Yet IAPAs often overlap with other protected area categories and thus benefit from their management plans such as those for Natura 2000 sites. Delays in development and approval of management plans (which are not compulsory in the Habitat Directive, but are compulsory under the Act 42/2007) also extend to the Natura 2000 sites. Most sites are preparing management plans, around one-quarter have approved plans and only a small portion have no management tools in place (MAGRAMA, 2014). When available, management plans have proven instrumental in the development and sustainable utilisation of protected areas (Box 4.6).

Management plans have been produced at a considerably faster pace over the last few years. For example, the number of NRPs in protected parks doubled in 2010-11 compared to the previous year. In 2014, Spain was awarded the Networking and Cross-Border Co-operation Award for its technical co-operation network, which develops quality standards for management and a reference website on the state of the Natura 2000 Network in Spain. Rebollar de Navalpotro in Guadalajara is one area where these actions have been successfully applied, showing how Natura 2000 is both a network of species and habitats and a network of people. This partly reflects the increased availability of baseline ecological data that is needed to develop such plans, but is also likely an attempt to enhance the efficient management of resources in the face of constrained finances. The Priority Action Framework for the Natura 2000 Network in Spain (2014-20), the overarching strategic tool, aims to have management plans in all Natura 2000 Network sites by 2015. However, given previous experience and limited finances, such a target does not seem realistic.

Spain's third challenge has been governance of its 15 national parks, which cover around 382 000 ha, or 0.78% of its territory. Initially, the parks were conceived as elements of cohesion in the fragmented national network of protected areas. In the late 1990s, a legal framework established shared management of national parks by the national and regional administrations on the basis of a Master Plan. However, some Autonomous Communities continued to consider national parks legislation as un-constitutional and called for an absolute decentralisation of the management of protected areas. In 2004, the Constitutional Court declared that Autonomous Communities have responsibility for management and financing of national parks, but recognised the co-ordination role of the

Box 4.6. **The Albufera Natural Park**

The Albufera Natural Park in the Gulf of Valencia hosts the Albufera freshwater lagoon and estuary. The park, which occupies a surface area of 21 120 ha, is home to a significant variety of fauna and flora.

Once a saltwater lagoon, Albufera was converted into freshwater by the 17th century. The lake itself occupies around 3 000 ha with the remaining 18 000 ha occupied by land (mostly for rice cultivation). Sand dunes separate the lagoon from the Mediterranean Sea, while three gated canals regulate the flow of sea water both into the lake and into the rice fields. This type of paddy landscape surrounding the lake offers a unique ecosystem that serves as an important breeding and migratory route for many bird species, as well as habitat for other flora, fauna, reptile, fish, snail, molluscs and crustacean species. The lagoon represents perhaps the best example (in terms of rare and rich species) of a freshwater coastal lagoon in the Mediterranean. Beyond its national and international ecological significance, it has evolved into a productive landscape and serves as an exemplary case of how protected areas can both conserve the natural environment and generate growth and employment. The reserve hosts various sustainable agricultural activities (such as farming of traditional rice varieties), traditional fishing (which remains the main economic engine) and nature-based recreation (such as bird watching and sailing). Its proximity to the city of Valencia (about 11 km) facilitates the further development of recreation in the region, offering higher value nature-based tourism, agro-tourism and culinary tourism.

Unsurprisingly, the reserve was under constant threat of becoming a victim of its own success from the pressures of intensive agriculture, overfishing, urbanisation, illegal hunting and tourism. The reserve was granted Natural Park status in 1986, has been a Ramsar Site since 1990 and has been a Special Protected Area for Birds (SPA) since 1991 within the Natura 2000 Network. The neighbouring Autonomous Communities have passed several regulations to address specific management and enforcement issues. These regulations, together with the Management Plan (approved in 1990) and the Master Plan for the Use and Management of the Albufera Natural Park (approved in 2004), have been instrumental in balancing the need for both growth and conservation objectives. Despite ongoing pressures, Albufera Natural Park is an instrumental example for the need to develop management plans in all protected areas in Spain.

Source: www.albufera.com/parque/, Ghai et al. (2012).

state. The 2007 law confirmed this principle, but entrusted the Ministry of Agriculture, Food and the Environment with the monitoring and assessment of compliance with the objectives of the Master Plan through the National Parks Autonomous Organisation (OAPN). In 2014, the government adopted a bill on national parks that strengthens the role of the national administration and incorporates co-ordination between the state and ACs to ensure proper conservation of protected areas. It also puts forward an agenda for improvement compatible with green growth, emphasising job creation and sustainable development.

4.2. *Wildlife conservation*

Law 42/2007 and Royal Decree 139/2011 created the List of Wildlife Species of Special Protection Regime, which includes species and taxa that require particular attention owing to their scientific, ecological and cultural value, as well as to the uniqueness, rarity and

degree of threat, as specified by EU directives and international conventions ratified by Spain. This list encompasses the Spanish Catalogue of Endangered Species (also established by the 42/2007 law and 139/2011 decree), which includes species for which scientific information is available so as to formally classify them as technically "endangered" and/or "vulnerable". The 42/2007 law establishes the requirement for development of conservation strategies to be approved by the central government and recovery and conservation plans to be approved by the Autonomous Communities for species considered "endangered" and "vulnerable". Such conservation strategies are to be introduced for threatened species present in more than one AC.

In 2012, there were 904 species in the List of Wildlife Species of Special Protection Regime, 608 species of special protection and 296 species integrated into the Spanish Catalogue of Endangered Species, of which 120 are classified as "vulnerable" and 176 as "endangered".[15] As of 2014, Spain had adopted 17 national conservation strategies for "endangered" species. Such strategies were prepared under the Committee of Wild Flora and Fauna, which co-ordinates actions between different administrations. Also in 2014, the Spanish Strategy of Plant Conservation was developed to co-ordinate policies and actions related to plants with Global Strategy for Plant Conservation (GSPC) commitments. Further, Autonomous Communities are developing 166 regional recovery plans for "endangered" and "vulnerable" species and 44 plans for species under special protection regimes. Lastly, there are notable breeding and reintroduction programmes at national or regional levels for 40 species in the Spanish Catalogue of Endangered Species.

Evidence suggests these conservation strategies, recovery and reintroduction programmes are effective. The cases of the imperial eagle (*Aquila adalberti*), the brown bear (*Ursus arcto*), the Iberian lynx (*Lynx pardinus*) and the bearded vulture (*Gypaetus barbatus*) are exemplary conservation and reintroduction plans. Other high-profile species conservation programmes concern marine wildlife, including turtles and sharks (MAGRAMA, 2014). However, further efforts are needed to develop conservation strategies for all "endangered" species, which currently number 176, in compliance with Law 42/2007.

5. Financing biodiversity

5.1. *Key trends in financing biodiversity*

Although the identification of expenditure related to biodiversity provides only a partial picture, the available data show that biodiversity financing remains heavily reliant on the national budget and EU funds. Between 2000-09, overall expenditure increased from around EUR 870 million to EUR 2.3 billion, but rapidly decreased following the economic crises to EUR 1.5 million in 2011. More than half of expenditures were provided at the regional level. The private sector's contribution has increased since 2006, but only accounts for about 15% of the total (Table 4.4).

In 2011, approximately EUR 86 million was invested in direct management of protected areas, with EUR 248 per ha invested in national parks and EUR 26 per ha in natural parks. Direct investment decreased by nearly 50% between 2005-11. The downward trend was also linked with decreasing visitation as a result of the economic downturn, with 9.5 million recorded visitors in 2010 compared to 10.8 million in 2005. This decrease has escalated since 2007, with some exceptions in high profile parks (MAGRAMA, 2011).

Generally, the steady decline in labour and investment in the last decade has led to more parks with an annual budget of less than EUR 0.5 million; this is now close to 63%

Table 4.4. **Expenditure on biodiversity conservation in Spain in 2006-10**

EUR million, 2005 prices

	2006	2007	2008	2009	2010	2011
Central government	251	478	432	662	441	323
State government	1 054	933	931	949	811	747
Local government	187	247	248	401	221	181
Business sector	156	262	351	307	243	237
Total	1 649	1 920	1 962	2 319	1 716	1 488

Source: EUROSTAT (2014), "Environmental Accounts", *Environment and Energy Statistics* (database); OECD (2014), "General Government Accounts: Government expenditure by function", *OECD National Accounts Statistics* (database).

compared to 42% in 2005 (EUROPARC-Spain, 2012). Although the national parks provide detailed management information, only 30% provide budgetary information and considerably fewer report on key monitoring and evaluation variables. This could reflect budget cutbacks that do not allow for the production of such reports.

Following provisions of the 42/2007 law, a new financing instrument, the Fund for Natural Heritage and Biodiversity, was established. It aims to channel funds to the Autonomous Communities for implementation of the biodiversity law through a wide range of projects and activities. This includes projects on the sustainable use of forests and fire prevention, as well as the protection of Natura 2000 sites and biosphere reserves (including the promotion of sustainable agriculture, forestry and tourism). To date, the central government provides the bulk of financing. However, core government financing of the fund has been decreasing in recent years due to the economic situation.

The European Union also remains a potentially important source of funding for management of Natura 2000 sites. The Priority Action Framework for Financing Natura 2000 sites provides a tool for integrating financing of the network into appropriate EU financial instruments. One of the most important sources of EU funding is the European Regional Development Fund (ERDF). Other sources of EU funding for Natura 2000 sites are the European Agricultural Fund for Rural Development (EAFRD), the European Fisheries Fund (EFF), the European Social Fund, the European structural funds, EU Research Framework Programmes and LIFE+. However, the EU and state funds are not of sufficient magnitude to address Spain's biodiversity conservation needs or commitments. For example, LIFE+, which finances important conservation and recovery projects of Species of Community Interest and projects on the eradication of invasive species, provides funds for less than 10% of requirements. The revised Priority Action Framework for Financing Natura 2000 (2014-20) emphasises alternative sources of financing, with market solutions such as payment for ecosystem services (PES) at the forefront of attention. Such aspirations resurface in revised policy documents, but actual uptake remains limited.

There is no corresponding priority action plan for financing of marine Natura 2000 sites. The Strategic Plan of the Spanish Marine Protected Area Network (RAMPE) is expected to address these concerns, although it will be completed only in 2015. As in the case of the terrestrial Natura 2000 sites, most monitoring, evaluation and conservation activities are expected to be financed by increasingly reduced state and EU funds.

5.2. Reform of fiscal instruments for biodiversity conservation

A number of financial incentives have supported biodiversity objectives in Spain. These include tax credits to landowners who transfer a property right (usufruct) to non-profit entities that then conserves the land; property tax exemptions for purchase of land intended for conservation; a 25% tax deduction on individual income tax or 35% on corporate income tax for grants to organisations engaged in conservation; and other tax exemptions for donating land to conservation organisations. Various co-operation tax incentives have also been awarded to enterprises engaged in biodiversity activities, which increased their allowable deductible expenses. Also, some regions have established tax incentives for biodiversity-friendly investments. Castile and León, for example, provides income tax deductions to landowners within Natura 2000 sites for specific types of activities (authorised and audited by the local regional authorities) (MAGRAMA, 2014). During 2007-13, the European Fisheries Fund provided incentives to modernise the fishing fleet with more sustainable, biodiversity-friendly technology. In the agricultural sector, most notable reforms with respect to financial incentives concern the "greening" of subsidy payments provided under the Common Agricultural Policy (CAP) (Section 6).

The Strategic Plan on Natural Heritage and Biodiversity also called for analysis of the possible adverse impact of certain financial support mechanisms, such as subsidies and tax incentives, on biodiversity and the exploration of avenues for their adjustment. However, this work has advanced slowly and a comprehensive national evaluation of fiscal instruments for biodiversity conservation is under development as part of the general tax reform programme (Chapter 2).

5.3. Alternative sources of financing

Alternative financial instruments have been considered in Spain's Strategic Plan on Natural Heritage and Biodiversity, but their potential has not yet been realised. In some industries, such as agriculture and tourism, sustainable/biodiversity-friendly practices do contribute towards biodiversity preservation. Given the increasing paucity of traditional sources of funding (national and EU), there is an urgent need to develop alternative sources of financing biodiversity conservation and sustainable use that are likely to play a prominent role in the future.

Corporate social responsibility and biodiversity conservation

The National Business and Biodiversity Initiative (Box 4.4) and other business information-exchange initiatives, such as the Spanish Environmental Markets Platform, actively promote activities that link biodiversity conservation with firms' corporate social responsibility (CSR) objectives. A recent report by the Sustainability Excellence Club presents 40 case studies where Spanish businesses and private enterprises have voluntarily promoted biodiversity conservation through a variety of activities, all of which aim at attaining CSR benefits (SEC, 2014). These activities mostly include voluntary private financing of direct conservation activities such as reforestation programmes; ecological restoration initiatives; species and wildlife habitat recovery programmes; sponsoring of research projects for enhancing understanding of biodiversity; and private sponsorship of public awareness events that promote biodiversity conservation. These are typical voluntary environmental initiatives or agreements that yield benefits to firms from displaying such social responsibility.

For example, the food companies Frusansa Andalusian Nuts and Alcampo have financed the reforestation of forest lands with native tree species. The Esteve pharmaceutical company undertook conservation in corridor areas between protected areas, while Cemex and Holcim – both construction and mining companies – completed ecological restoration activities that went well beyond those required by their licensing agreements. Similarly, the Calvo Group fishing fleet initiated an independent audit and monitoring of its fishing practices to ensure sustainable fishing of tuna. The energy company Iberdrola supported and sponsored a major research project by the Spanish Ornithology Society/BirdLife to study the migratory movements of birds that will form the basis for an atlas of bird migration in Spain.

Various auditing initiatives have also emerged to certify biodiversity-friendly business practices. For example, the Global Nature Foundation has carried out numerous audits, similar to those for EMAS and ISO 14001, on participating companies (such as Cepsa, Ence, Herdade do Freixo do Meio, Cooperativa Agraria de Viver, Iberdrola and Red Eléctrica de España) to explore their biodiversity impacts. The Foundation advises audited companies on how to integrate biodiversity into environmental management plans, as well as how to take actions that directly aim at the sustainable use of resources and protection of nature (SEC, 2014). Audit results are confidential, but the firm's participation in the scheme is made public, which does enhance its corporate social responsibility profile.

Territorial custodianship

Spain also has experience with an alternative policy mechanism known as territorial custodianship schemes. They are akin to land stewardship programmes found in many other OECD member countries. These schemes have a relatively long history in Spain, but were given a more formal legal framework with the 42/2007 law. They have proven highly effective in restoring and conserving natural areas without necessarily requiring public finances. At a national level, the Territory Custody Platform has registered 85 custody entities (67% private and 33% public) in 11 autonomous regions, 80% of which are located in Catalonia and on the Balearic Islands. Through these entities, 706 custody agreements have been signed involving a heterogeneous mix of entities that include public agencies, protected area managers, private businesses and stakeholders, non-profit organisations, foundations, associations and NGOs. The main preservation values identified in these agreements are related to forests (18% of agreements), agricultural lands (14%) or habitat protection (8%). Nevertheless, 37% of projects do not specify their type of preservation benefits. Also, marine territorial custody is under consideration and a suitable legal framework is being prepared. In the meantime, some initiatives have emerged that involve stakeholders from the fishing community and the tourism and recreation sector, as well as consumer and public awareness groups that use beaches and shores.

Habitat banking

The concept of habitat banking first appeared in Spain as a result of the transposition of the EU Environmental Liability Directive. It was included in the Strategic Plan and formally established by the 21/2013 Law on Environmental Assessments. Habitat banks can be used voluntarily to compensate for unavoidable loss of biodiversity in situations regulated by the laws on environmental impact assessment and environmental liability. The general principles for their development have been legally approved and the MAGRAMA is developing detailed technical guidelines that would specify how banking can

ensure "no net loss" and the equivalency of ecosystem services in the "offsetted" site. A small number of consulting firms actively promote the development of habitat banking, carry out cost-benefit analysis of investment in conservation banks, explore alternatives for the purchase of environmental credits and provide training for governments and businesses. However, this sector remains at an embryonic stage.

There are a few cases of voluntarily offset projects by private firms – mostly from the energy and mining sectors (SEC, 2014). For example, the energy company Cepsa has established a new wetland that provides like-for-like ecosystem services (in terms of bird migration routes and other wildlife habitat). The offset wetland is located approximately 1 km from the wetland that was irreversibly transformed by the company in the 1950s. There is considerable scope for further promoting such actions and to expand into other sectors, such as the construction industry (EUROPARC-Spain, 2010).

PES schemes and territorial contracts

Payments for ecosystem services (PES) are payments to farmers or landowners who have agreed to manage their land or watersheds to provide an ecological service. As is the case with other market mechanisms for biodiversity conservation, the use of PES schemes (or beneficiary pays markets) has been prioritised in the 42/2007 law and its strategic plan. While the 42/2007 law provided the legal foundation for PES contracts, the recently established Fund for Natural Heritage and Biodiversity aims to be the vehicle for payments between public "demanders" and private "suppliers" of environmental ecosystem services. Although actual examples of pure PES programmes are practically non-existent, some programmes have affinities to PES schemes. These include agri-environment schemes, mostly funded under CAP and rural development programmes (Section 6) and territorial contracts established by Royal Decree 1336/2011, which serve as a tool for sustainable rural development. These schemes are primarily targeted towards agricultural activities, and under certain conditions compensate farmers for providing biodiversity benefits.

There is also no experience of PES schemes between private entities (e.g. water utility companies and agricultural or forest land users) as observed in other OECD member countries. As PES is an increasingly popular conservation and resource management tool, Spain should explore how PES could help satisfy economic and environmental objectives.

6. Integrating biodiversity into economic sectors

The Spanish 2011 Millennium Ecosystem Assessment showed that management of ecosystems and biodiversity based primarily on the designation of protected areas and species conservation has not been sufficient to stop biodiversity degradation. The need for biodiversity policies that go beyond the realm of protected areas has been accepted in Spain and is now enshrined in all recent key biodiversity legislative documents. This has been most prominent in the 42/2007 Biodiversity Law and the Strategic Plan on Natural Heritage and Biodiversity 2011-17. Ensuring the integrity of ecosystems and productive landscapes, especially those related to agriculture and tourism, and conserving corridor areas between reserves, is imperative for maintaining Spain's biodiversity.

6.1. Integrating biodiversity in agriculture

While agriculture generates more than 2.5% of Spanish GDP and creates jobs for more than 3.5% of the workforce, agricultural landscapes represent around half of the total surface of Spanish territory. Almost 75% of Natura 2000 areas in Spain are used to some

degree for agricultural purposes. The sector exerts significant pressures on biodiversity. Large areas of Spain are at risk of pollution by nitrates, which in turn affect aquatic biodiversity. This is mainly due to chemical fertiliser use for crops and discharges from intensive livestock farming into fresh waters. Nearly 12% of total national surface is classified as Nitrate Vulnerable Zones (NVZ), an area that has increased in recent years. Irrigation accounts for the largest share of water demand (63%), including three-quarters of groundwater used for agriculture. Although agricultural water withdrawals decreased in the last decade, the level of water stress did not, and remains among the highest in the OECD (OECD, 2013). Some regions, such as the Upper Guadiana basin, experienced intensive (and often uncontrolled) groundwater extraction for agriculture, which contributes to the degradation of ecosystems, including important wetlands.

Spain does not have a consolidated nation-wide sectoral plan for integrating biodiversity considerations into agriculture. However, the Strategic Plan on Natural Heritage and Biodiversity set the parameters for its development and included a series of policy measures for integration of biodiversity objectives into the agriculture policy. The main pillars of the integration include subsidy instruments associated with the CAP, rural development programmes and promotion of organic farming.

Despite various initiatives, the overarching trend in the Spanish agricultural sector has been the intensification of agriculture, bigger plots, the prevalence of monocultures, and the erosion and eventual abandonment of traditional agricultural practices. Traditional production landscapes, which included a mosaic of agricultural, forestry and ecosystems, are being gradually replaced by separation of productive areas from protected areas. These are relegated to isolated "islands" of protected areas that are not part of an integral component of broader production landscapes. Yet long-term biodiversity conservation requires the integration of sustainable agriculture and a network of protected areas within broader production landscapes. This is the main challenge in the development and implementation of the impending national sectoral plan for integrating biodiversity into agriculture.

Agri-environment payments

Agri-environment payments under the Common Agriculture Policy have become perhaps the most important policy mechanism for integrating biodiversity into agricultural practices. Spain introduced compulsory environmental conditionality and cross-compliance by Royal Decree 2352/2004. According to the decree, beneficiaries of direct CAP aid, as well as certain rural development subsidies, must comply with environmental requirements. These include appropriate tillage to avoid soil erosion; appropriate management of stubble; investment in and maintenance of terraces; maintenance of ecological features of habitats; contribution towards habitat connectivity; appropriate use of water for irrigation; appropriate storage of livestock manure; and maintenance of permanent pasture. More recently, Royal Decree 486/2009 simplified criteria for cross-compliance with the aim to enhance compliance and facilitate enforcement. Another initiative to establish minimum controls for cross-compliance enforcement has been the development of a National Plan for Cross-compliance Control (implemented annually since 2005). This plan was developed by the Spanish Agrarian Guarantee Fund (FEGA) of the MAGRAMA[16] (the national authority that co-ordinates agri-environment payments) and the Autonomous Communities. More recently, the Royal Decree 202/2012 modified the

provisions of direct payments to agricultural activities and livestock with the inclusion of a compulsory norm on the protection strips along river banks.

Despite such regulations, the actual monitoring and enforcement of cross-compliance remains challenging. There is very little robust evidence on the ecological impact of these payments. Indicative, albeit inconclusive, evidence from declining bird indicators suggests that payments are not delivering intended benefits to ecosystem services; however, compulsory fulfilling of cross-compliance reduces the risk of negative environmental impacts linked to less environmentally respectful agricultural practices.

Spain has further promoted the "greening" of its agricultural policies via the new scheme for "payments for agricultural practices that are beneficial for the climate change and the environment". This mechanism, introduced by CAP reforms and operational from 2015, aims to improve CAP's environmental performance through farming practices that address climate change and environmental objectives. These include requirements to diversify crops and to maintain permanent grassland and ecologically important areas. As such, they emphasise the multifunctional role of farmers as guarantees of environmental protection in rural areas. The new scheme goes beyond cross-compliance, which remains mandatory in 2015-20.

Rural development

The 2007-13 National Strategic Plan for Rural Development (NSPRD) set priorities for national policies and for using and allocating funds from the European Agricultural Fund for Rural Development (EAFRD). Promoting sustainable agricultural activities and projects in Natura 2000 and other areas of high natural value have been granted the highest priority.

The NSPRD provided guidelines to the Autonomous Communities to develop their own rural development programmes (RDP), including measures to promote the integration of environmental and biodiversity conservation activities into rural areas. Approximately 40% of all RDP budgets from EAFRD sources (some EUR 3 billion) have been assigned to such measures; the majority are allocated to agri-environmental measures; afforestation of agricultural land and compensation for loss of profits after adopting biodiversity-friendly agricultural practices or investments; desertification mitigation; and forest fire prevention. In Navarra, for example, farmers in Natura 2000 sites were compensated for loss of profits after adopting biodiversity-friendly practices. Such measures have been complemented under the EAFRD by investments in modern irrigation and soil erosion prevention practices to make the agricultural landscape more biodiversity-friendly.

The surface area covered by agri-environmental measures has been steadily increasing from 2.8 million ha in 2004, to 3.7 million ha in 2006, and 5.17 million ha in 2012. Afforestation programmes on agricultural lands were implemented on 167 273 ha between 2000-04, and increased by another 476 858 ha in 2007-13. The most important of these rural development measures, discussed below, promoted the organic agriculture industry.

Organic farming (agriculture and livestock)

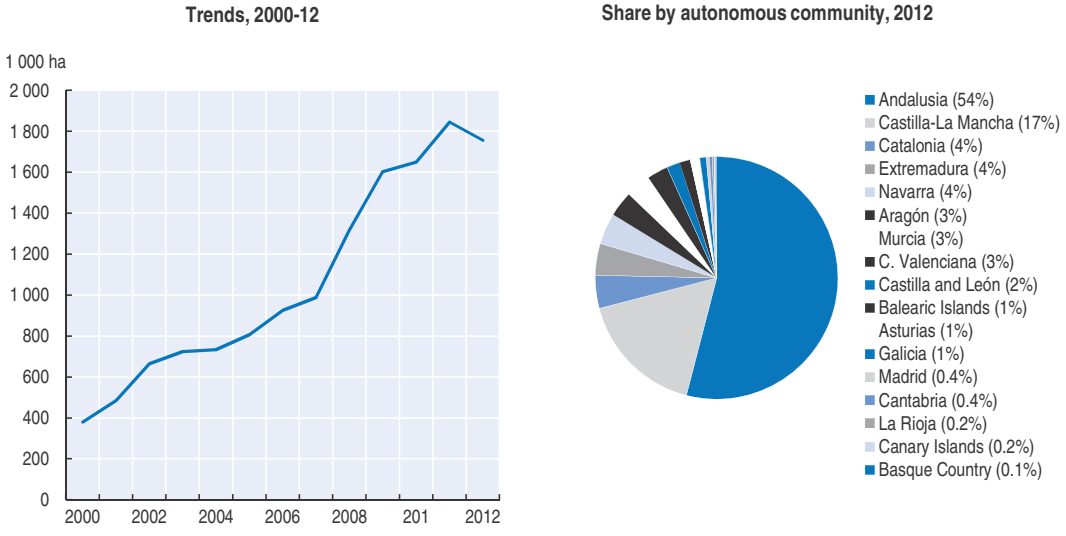
Due to its favourable climate conditions and a larger proportion of agricultural land under extensive production systems compared to other OECD member countries, Spain has considerable potential for developing organic agriculture and livestock. Organic farming has considerable potential for export markets, and could lead to significant employment opportunities and wealth creation for rural communities. At the same time, it helps maintain and improve rural landscapes and conserve biodiversity.

EU Regulations 834/2007 on organic production and labelling of organic products regulate organic farming in Spain. Autonomous Communities designate competent authorities to certify organic agricultural products that may perform the control themselves, confer their competences to a control authority or delegate tasks to private control bodies. Steps have been taken to simplify the labelling process, as well as labelling signals observed by consumers. As a result, certification of organic products is at a much more advanced stage compared to other certified final consumer products, such as from marine or forest resources.

Between 2004-08, the area under organic farming rapidly increased from 733 000 ha to 1.3 million ha, and then to 1.8 million ha in 2011, occupying around 5% of total agricultural surface. Only around 800 000 ha of this area are under agri-environmental payments, which suggests that solely private initiatives are a key driver to this increase (Figure 4.6).

Spain continues to be, for the fourth consecutive year, the EU member with the highest land area under organic agricultural production. In terms of organic crops produced, 25% are cereals, 24% olive trees, 14.3% fallow and green fertiliser, 13.6% nuts and 11% vineyards, while the remaining consists of vegetables, aromatic and medicinal plants, fruit trees (mostly citric) and tubers (MAGRAMA, 2013b, 2012b). The increase in the number of employment opportunities has also been notable. In 2011, there were 32 206 producers and 2 729 processors registered.

Figure 4.6. **Trends in organic farming area**

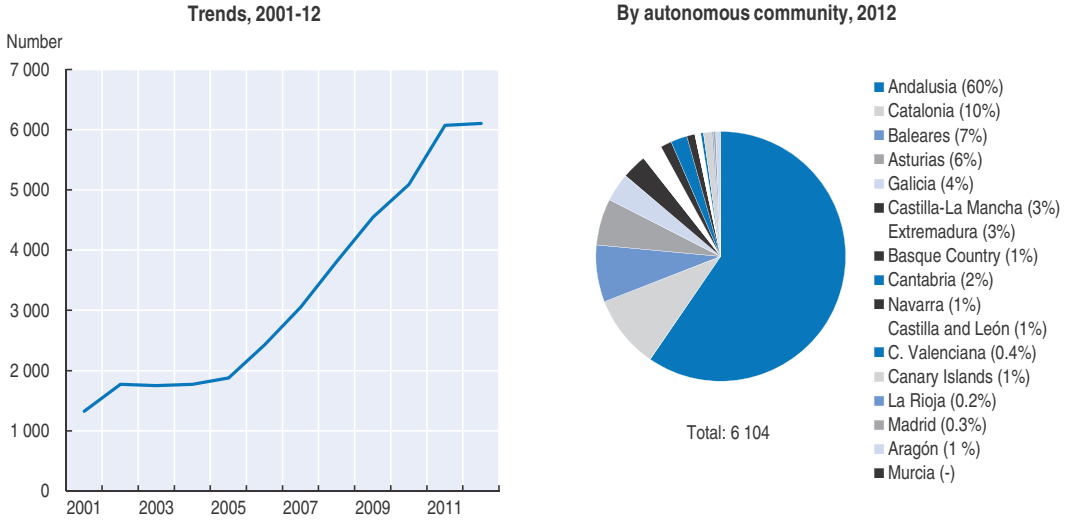


Source: MAGRAMA (2014), *Banco Público de Indicadores Ambientales.*

StatLink http://dx.doi.org/10.1787/888933183062

Spain witnessed the tripling of livestock farms between 2005-12, reaching 6 104 registered ecological livestock producers (Figure 4.7). The highest proportion is in Andalusia (60%), Catalonia (10%), Balearic Islands (7%) and Asturias (6%). There is thus considerable regional disparity in the development of the organic livestock sector. The most popular breeding types are bovine cattle (49%), ovine (28%) and goats (10%) (MAGRAMA, 2013b, 2012b). Although aquaculture accounts for a small share of organic production (0.2%), there are good examples of biodiversity objectives in this type of production (Box 4.7).

Figure 4.7. **Number of organic livestock farms**



Source: MAGRAMA (2014), *Banco Público de Indicadores Ambientales.*

StatLink http://dx.doi.org/10.1787/888933183070

The development of the organic agricultural sector has been stimulated by the Spanish Comprehensive Plan of Action to Promote Organic Farming (2007-10), which established priority areas of development that have improved product knowledge, consumption and marketing. The MAGRAMA is making organic certification more reliable by developing the General Registry of Organic Agriculture Producers (REGOE). Numerous professional associations have developed over the last decade promoting organic farming and providing third-party certification.

6.2. Integrating biodiversity into tourism

Key trends

Tourism is one of the mainstays of the Spanish economy and an outstanding driver of social development. It accounts for almost 10% of GDP and 11% of employment. For decades, Spain's tourism destinations grew rapidly based on a model of high volumes, price competition and a standardised holiday experience focusing on "sun, sea and sand" features. The impacts of this growth adversely affected the attractiveness of a number of destinations. In some regions, human pressure increased one hundredfold and led to overloading the capacity of the coastline, degradation of the environment and deterioration of social systems and facilities.

The threat of tourism decline prompted Spanish authorities to look towards a more sustainable approach. The 2007 Tourism Plan "Horizon 2020", a comprehensive strategy to improve the quality of the country's tourism products, called for ensuring that Spain stays competitive in the tourism marketplace by developing business models that are environmentally, socially and culturally sustainable. The plan envisaged mitigating environmental impacts of tourism by extending the tourist season and promoting lesser known areas of the country. To help achieve its goals, the Working Group on Sustainable Tourism was established in 2007 as part of the institutional framework for co-ordination of tourism policies in Spain.[17]

Box 4.7. **Biodiversity-friendly holistic agriculture in the Veta La Palma Estate, Spain**

The Pesquerías Isla Mayor, S.A. (PIMSA) operation is located in the Veta La Palma Estate at Isla Mayor, municipality of Puebla del Rio near Sevilla, Spain. PIMSA is part of Grupo Hisparroz, a leading rice production company. The estate, which stretches across 11 331 ha in the Doñana Natural Park, is faced with increasing agricultural productivity without jeopardising the ecosystem resilience of the surrounding landscape. Veta La Palma illustrates how holistic business practices can lead to productivity gains while taking into account ecosystem services beyond "provisioning", such as enhanced landscape and biodiversity values.

PIMSA established a polyculture fish farming operation in the early 1990s, fully complying with the park's management plan. The firm re-flooded wetlands lost to natural siltation, and used a pump system to engineer drainage to restore the original drainage channels to bring in water from the estuary. The fish farm covers some 3 200 ha and uses extensive and semi-extensive methods to breed a large variety of fish in 45 interconnected ponds of 70 ha each, which are joined to the local river system through a web of irrigation and drainage channels. To maintain high levels of environmental sustainability, the firm keeps fish at a relatively low density and harvests them less frequently compared to intensive aquaculture. The fish feed on microalgae and shrimp that reach the ponds from the estuary through the channel system and hence do not rely on external food sources. The harvest amounts to some 1 360 tonnes of fish per year (2010).

Birds are allowed to feed in the ponds (through nets and other technology), which reduces total production by approximately 20% per year. Before the aquaculture operation was established, only about 50 bird species were recorded in the area. With ecological investment undertaking by the PIMSA, over 250 different bird species (and 600 000 birds) visit or breed on the estates wetlands. Furthermore, the almost 3 200 ha of permanently flooded aquaculture marshland play an important role as a refuge for the natural fish fauna of the Guadalquivir River estuary, including several endangered species. The business provides income to about 100 farm workers from the nearby town of Isla Mayor (5 800 inhabitants) and to surrounding villages.

Apart from aquaculture, Veta La Palma also has an extensive horse and cattle operation for organic beef and grows some dry-farmed crops. About 2 400 ha of the estate produce livestock feed using a rotation system without fertilisers or pesticides; this also benefits steppe birds such as stone curlew (*Burhinus oedicnemus*) or pin-tailed sandgrouse (*Pterocles alchata*). Another 400 ha are used to cultivate rice. The remaining 4 800 ha are set aside as a conservation area. The reclaimed wetland habitat and sustainable production methods on the estate have boosted the area's biodiversity, while generating economic value.

As a result of its pioneering efforts at integrating aquaculture and marsh area restoration, Veta la Palma has been recognised as an exemplary case for sustainable and holistic agricultural development that is biodiversity-friendly.

Source: *www.vetalapalma.es/* and *www.ecoagriculture.org/*.

The creation of the working group expanded existing initiatives that incorporate environmental features in Spain's tourism development, and spurred new ones. These included the "Nature Walks Programme" and "Natural Roads Programme" based on traditional drovers' routes, paths and abandoned railway lines, "Sustainable Diving Strategy in Marine Reserves and Protected Areas", and numerous training courses on sustainable tourism offered to Autonomous Communities. Steps have also been taken to

align recreational hunting practices with the EU Habitats Directive and address the impact of tourism operators on marine mammals (primarily the whale-watching industry).[18] In 2009, the MAGRAMA and the Ministry of Industry, Tourism and Trade developed a joint initiative on the Tourist Product for Spanish Biosphere Reserves Club, promoted by the national tourism agency (Turespaña) and the National Parks Autonomous Organisation (OAPN).

Under the Horizon 2020 Plan, EUR 1.9 billion was made available to the tourism sector under two programmes: "Plan FuturE" and "Plan RenovE". The first, established in 2009 with a budget of EUR 1 billion, was designed to improve the tourist offer with regard to sustainability, accessibility, quality and infrastructure through low-interest loans for small tourism-related businesses with repayment terms of 5-12 years. The Plan RenovE, a partnership between the State Secretary for Tourism and the Official Credit Institute, focused on improvements in energy efficiency and environmental conservation of tourism establishments. In the first two years of operation, EUR 3.6 billion was invested in 3 380 projects, with EUR 1.9 mobilised for every EUR 1 of the budget credit. The plans together created 77 000 jobs. The programmes' success led to an additional EUR 300 million being made available for 2011.

Several other programmes focused on improving coastal tourism. These included the State Secretariat for Tourism's Programme for the Integrated Revalidation of Mature Tourism Destinations in four pilot destinations: the beaches of Palma in the Balearic Islands, the Costa del Sol in Andalusia, San Bartolomé de Tirajana and Puerto de la Cruz in the Canary Islands and the Spanish Tourism Board (CONESTUR) support under the 21st Century Plan for Coastal Tourism. Finally, the Tourism Infrastructures Modernisation Fund (FOMIT), worth EUR 200 million, is available to help municipalities modernise infrastructure and tourism accommodation, particularly in coastal areas.

Horizon 2020 also provided a basis for public-private partnerships. It helped create new tourist products in protected areas through a "Joining Spanish System" programme, which provides assistance to tourist operators and companies to join the European Charter on Sustainable Tourism (EUROPAC-Spain, 2012). Two such initiatives are the Spanish Tourist Quality System (or "Q" system) and the European Charter on Sustainable Tourism (CETS) certification that received considerable uptake from the industry. For example, 28 protected areas were accredited with the Q system (from only 4 in 2005) in 2012 and 36 were certified by the CETS from only 7 in 2005. Further, in 2012, 270 companies were certified under the CETS, while only 95 firms were certified in 2009. Clearly, the trend of additional protected areas and companies being granted such certification is increasing rapidly. These developments suggest that high value, quality sustainable tourism will play an important role in future protected-area management plans. Other notable private sector-led initiatives include the development of Spanish sustainable tourism criteria that meet the requirements of the Global Sustainable Tourism Council (GSTC); the establishment of Ecotourism Club in Spain, which includes 32 protected areas and over 600 private tourist companies; and action plans by the hotel industry to promote corporate social responsibility and green/sustainable tourism.

Currently, the Spanish strategy for tourism is set out in the National and Integral Tourism Plan 2012-15 (Plan Nacional e Integral de Turismo, PNIT). The strategy reinforces efforts to make Spanish tourism destinations more attractive by shifting from standard/basic products in traditional tourism markets to specialised products that address new markets and are tuned to preferences of different consumers. Innovation, technological

change, environmental responsibility and investment in human resources are key axes of the strategy, accompanied by supportive marketing campaigns. One area of growth is adventure tourism based on the country's natural features (Box 4.8).

Box 4.8. **Growth of adventure tourism in Spain**

Adventure tourism is one sector experiencing greater growth in recent years, with approximately 1 300 companies engaged in Spain. This type of tourism attracts over 7 million people annually thanks to a heterogeneous offer that has developed around the great variety of the country's landscape, including mountains, coastal areas, islands, caves and natural parks. Adventure tourism has resisted the economic crisis well, as Spain is able to offer low-cost active holiday opportunities to European markets, which make it a high potential sector of investment.

Land adventure attracts tourists during both summer and winter holidays. For example, the Pyrenean Trail is famous for hiking and includes cross-country routes to France, while Andalusia offers a rich set of natural caves open to the public, as well as the third largest chasm in the world in the Sierra de Tolox in the province of Málaga. Sierra Nevada is one of the most popular winter sports destinations in Europe, equipped with 105 km of runs for all levels. Spain is also one of the most attractive destinations for surfing, windsurfing and kitesurfing, with areas like the Basque Country and the Canary Islands promoted as well-equipped, low-cost destinations.

Adventure tourism was explicitly recognised as a priority area of investment in the Horizon 2020 Plan, as part of a specialisation strategy aimed to de-seasonalise tourism and better tune the sector's offer on different market segments. The current National and Integral Tourism Plan 2012-15 aims to further promote this product in the wider support framework to strengthen destination management, such as support to young and creative tourism entrepreneurs, and to help provide access to financing.

Changes in tourism preferences are generating greater movement away from traditional "sun and beach" destinations towards other locations, especially ones that present environmental values. As a result, Spain's national parks have witnessed an increase in the number of visits during recent years. Therefore, integrating biodiversity concerns into the tourism sector entails both promoting biodiversity-friendly tourism practices in the mainstream tourism sector, and also developing and expanding the nature-based tourism segment of the industry. The PNIT included the development of ecotourism in selected protected areas as a priority area. This approach stimulated the development of the Sectoral Plan for Biodiversity and Nature Tourism 2014-20, which signals the importance of this sector as a vehicle for green growth. The plan, implemented by the Ministry of Industry, Energy and Tourism and the Ministry of Agriculture, Food and Environment, provides a framework for collaboration among all stakeholders (both public and private) to promote nature-based tourism that integrates biodiversity considerations. As its main priority, the plan is to develop ecotourism within the Natura 2000 Network, while ensuring conservation of the sites. A new system for the accreditation of tourism sustainability in the Natura 2000 Network will consolidate and co-ordinate existing structures and mechanisms mentioned above, such as the European Charter on Sustainable Tourism in Protected Areas, the Spanish Biosphere Reserve System and the Ecotourism Club of Spain.

Notes

1. In terms of the total organic area (fully converted and under conversion) of individual EU member states as a share out of the total organic area in EU27, Spain accounted for the highest share as of 2008.
2. The trends of indirect drivers of change based on six indicators are related to demographic, economic and technological dimensions at a national level. The pressure of direct drivers of change based on eight indicators is related to the ecological footprint, emissions of sulphur and carbon dioxide, introduction of invasive alien species, overexploitation of fishery resources and groundwater, and land-use changes associated with urbanisation of the territory.
3. There are important regional variations in these figures with Asturias Murcia, Extremadura and Galicia having converted land to urban lands at a rate ranging between 40-75% (MAGRAMA 2014, 2013a).
4. Other more specialised laws cover specific types of protected areas (e.g. 5/2007 law specifically focuses on national parks, while 41/2010 focuses on marine protected areas).
5. These demarcations correspond to the marine environment over which Spain has sovereignty or jurisdiction.
6. Its exact legal status, its mandates and responsibilities are detailed in Royal Decree 1424/2008.
7. Its status has been upgraded by formally detailing its functions in Act 27/2006. The Council includes working groups on all facets of the environment, including terrestrial, coastal and marine biodiversity.
8. Its composition and function are formally detailed in Royal Decrees 948/2009 and 649/2011.
9. *www.business-biodiversity.eu*.
10. *www.mercadosdemedioambiente.com/plataforma/*.
11. Four of these reports have already been published and are available at: *www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/inventario-espanol-patrimonio-natural-biodiv/informe_anual_IEPNB.aspx*.
12. The values were obtained under the assumption that their future provision is secured indefinitely. Also, non-use values were not considered. As such, these figures can be considered as a minimum lower bound and are likely to be higher when the more comprehensive analysis is completed.
13. The legislative developments since 2004 also brought about Protected Peripheral Areas as an attempt to address habitat fragmentation.
14. In the calculation of territorial waters by the MAGRAMA, the provisions of the exclusive economic zone (EEZ) are applied, according to which the EEZ shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured. Protected marine areas include proposed areas for 2014.
15. Of the 176 species, there are 112 flora, 21 birds, 17 invertebrates, 10 fish, 7 reptiles, 7 mammals and 2 amphibians.
16. *www.fega.es/PwfGcp/es/*.
17. Under the Spanish Constitution, the autonomous regions are responsible for the promotion and regulation of tourism within their own territories. However, the national authorities, and in particular the Ministry of Industry, Energy and Tourism, design tourism policy and overall regulation of tourist activity and promote tourism abroad, in addition to their role in national economic planning in which tourism is a key component. The main institutions that bring coherence to the actions of public authorities in tourism matters are: the Inter-Ministry Committee for Tourism (Comisión Interministerial de Turismo), a co-ordination body whose members represent those national ministries that have responsibility for tourism-related matters; the Sectoral Tourism Conference (Conferencia Sectorial de Turismo), a co-ordination body that brings together public representatives from central government and the autonomous regions with tourism responsibilities; and the Spanish Tourism Board (Consejo Español de Turismo – CONESTUR), an advisory body that brings together all the territorial tourism administrations (state, regions and provinces-cities) and the private tourism sector (e.g. chambers of trade, the National Employers' Association [CEOE], professional associations, trade unions and a wide spectrum of tourism professionals).
18. This law provided guidelines for access to sensitive marine areas and for granting of special licences to diving operators, as well as to whale-watching vessels.

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PART II

Chapter 5

Environmental performance of the industrial sector

Spain's industrial sector has a smaller environmental footprint than most other European countries and is a leader in environmental management systems. However, as the economy recovers, environmental pressures are likely to increase. This chapter examines government and private sector initiatives to manage the industrial sector's impact on the environment. A selection of policies that aim to strengthen the environmental performance of businesses and to enforce compliance are reviewed. These include the use of economic instruments and environmental management systems.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Assessment and recommendations

The environmental performance of Spain's industrial sector has steadily improved since the turn of the century. Its environmental footprint is not as large as that in many other European countries; the industrial sector represents a lower share of output and is comprised of relatively more small and medium-sized enterprises (SMEs). Impressive progress was made in reducing water use, emissions of most air pollutants and waste generation. Energy consumption and material intensity decreased and were decoupled from economic growth. Environmental pressures were reduced due to the implementation of mandatory environmental requirements, investments in new technologies as well as the impact of the global economic downturn that hit Spain, and the industrial sector, particularly hard.

Despite this progress, industry contributes to pollution of air, water and land. In a few hotspots industrial pollution imposes significant costs on human health and the environment. As the economy begins to recover, some air emissions and waste generation have increased. Such trends are likely to continue, and may be reinforced by the policy objective of increasing the share of the industrial sector in the economy. To avoid this, it will be important for the Spanish government to ensure further integration of industrial and environmental policies, and to implement a robust system of environmental protection. Moreover, the government should take advantage of the economic opportunities that eco-innovation and an expanding environmental goods and services sector can provide.

Although economic and environmental policy frameworks are broadly aligned, and some mechanisms to manage trade-offs are in place, environmental objectives should be better integrated into industrial policies. Frequent use is made of financial incentives or tax breaks to promote more environmentally friendly practices in the industrial sector although these are generally less effective than environmentally related taxes and other policy instruments. More systematic *ex ante* and *ex post* policy evaluation would help address this challenge, and also help to foster better policy integration.

An OECD survey of firms suggested that regulatory compliance and cost savings were the most important drivers of environmental improvement in the industrial sector. Related to this, the implementation of the EU environmental *acquis* also provided the main impetus for improved environmental performance in the sector. The implementation of integrated permitting, and the reform of environmental impact assessment (EIA) and environmental liability regulations, were particularly important in this regard. The OECD survey suggested that the two main obstacles to environmental improvement from the perspective of firms were the cost of environmental improvements and accessing finance, which had become more difficult in recent years.

The relatively unco-ordinated implementation of environmental requirements together with the increased volume of environmental regulations has resulted in a regulatory environment that is complicated, burdensome and costly to both the

administration and industry. Although recent reforms have helped to streamline EIA and integrated permitting procedures, a recent OECD study suggests that environmental administrative requirements in Spain may be among the most burdensome in OECD countries in terms of influencing market entry and competition. Thus further efforts to streamline and simplify these requirements are needed, without compromising environmental ambitions. Reform of EIA and permitting are steps in the right direction. Given the decentralised nature of Spain's environmental governance, further efforts should focus on sharing information and good practices, capacity development and benchmarking of performance.

Spanish industry has become a leader in the adoption of environmental management systems (EMS). It is among the top three countries in terms of the number of certifications under the Eco-Management and Audit Scheme (EMAS) or ISO 14000. These high rates may be linked to requirements in supply chains and the benefits of regulatory relief associated with certification. While such systems can help to strengthen environmental management procedures, it is less clear that they result in improved environmental outcomes, particularly the ISO 14000 system. Spain is also very active in eco-labelling and corporate social responsibility (CSR) reporting; some sub-sectors, such as paper, aluminium production and the chemical sector, have engaged in voluntary agreements.

While information is neither complete nor consistent, evidence suggests that Spain's environmental goods and services (EGS) sector expanded since the early 2000s. There has been a significant increase in the number of patents for environmentally related technologies, particularly renewable energy. The EGS sector output reached 2% of GDP in 2011, about one-fifth less than agriculture's share (2.4% of GDP). Although there was a sharp decrease in employment in the manufacturing sector in the period 2004-12 (790 000), there was a small increase (60 000) in the energy supply and environmental industries. Increased environmentally related R&D in the manufacturing sector and support policies for renewable energy helped to drive these developments. Multiple agencies and programmes are available to support R&D. This creates opportunities and obstacles, and the transparency of, and access to, these programmes could be improved. More attention should be given to the needs of, and opportunities for, SMEs, which represent an important share of the industrial sector.

A more stringent environmental regulatory framework has been an important driver for the expansion of the EGS sector. The Green Public Procurement Plan, launched in 2008, also helped to stimulate demand for EGS. However, there appears to be relatively weak demand for EGS from the public and in the media, and a perception that such goods and services are more expensive. Further efforts should be made to improve public awareness and to strengthen demand for EGS.

Recommendations

- Continue to strengthen dialogue and co-operation between ministries responsible for industrial development and the environment, at both national and regional levels, with a view to better integrating these policies, including by: introducing explicit environmental objectives and evaluation criteria in industrial development programmes; and evaluating, *ex ante* and *ex post*, policy measures intended to improve the environmental performance of the industrial sector.

Recommendations *(cont.)*

- Further simplify and streamline environmental requirements, particularly for small and medium-sized enterprises, with a view to minimising administrative costs for business and public authorities without compromising environmental objectives.
- Develop a coherent national environmental inspection and compliance assurance strategy involving national and regional authorities, including a risk-based approach for targeting enforcement actions; apply sanctions that are proportional to the financial benefits arising from non-compliance.
- Establish more coherent and consistent environmental requirements and enforcement nationwide; in particular, reinforce the role of the Network of Environmental Enforcement Agencies (REDIA) in providing guidance, supporting capacity development, identifying and sharing good practices, and benchmarking performance of Autonomous Communities.
- Strengthen the capacity of Autonomous Communities to apply the environmental liability law and of the judiciary to adjudicate litigation.
- Further develop a strategy to reduce the potential risks to health and the environment in industrial pollution hotspots and industrial accidents.
- Improve co-ordination of industrial, innovation and eco-innovation policies across the government, between the central government and the regions, and between academic institutions and business sectors; regularly assess the results of measures to promote eco-innovation.

1. Economic and environmental trends

1.1. *Key trends in the structure and economic performance of the industrial sector*[1]

Once heavily reliant on agriculture, Spain has made significant progress in expanding and modernising its industries (Box 5.1). The sector developed particularly fast in the first half of the 2000s when Spanish economic and industrial growth was the strongest among OECD member countries. Although affected by the economic crises of 2009, industry accounted for 17.4% of gross domestic product (GDP) in 2013 and its value added has increased in absolute terms every year since 2000 with the exception of 2009. Manufacturing accounts for the lion's share of the total industrial sector composition. In 2012, it represented 89% of gross value added (GVA) and 77% of employment (INE, 2014).

The largest manufacturing sub-sectors are transport material, particularly manufacturing of cars and trucks; chemicals (including pharmaceuticals); metallic products; and food, beverages and tobacco (Figure 5.1). Among non-manufacturing sectors, the supply and distribution of electricity and gas, as well as environmental sectors (water supply, sanitation, solid waste management and soil decontamination), have been gaining a larger share. Between 2004-12, the combined industrial GVA rose from 13.2% to 22%.

After growing in the early 2000s, employment in the industrial sector has decreased every year of the last decade, dropping from 15.6% to 12.3% of total employment between 2004-12. The figure is more striking for manufacturing, which lost 790 000 jobs in the same period. However, not all industrial sub-sectors lost employment. For example, 60 000 jobs were created in the energy supply and environmental industries, which include water, sanitation and solid waste management.

Box 5.1. **Evolution of the industrial sector in Spain**

Spain's traditionally agrarian economy was not fundamentally transformed by the industrial revolution. However, after the 1936-39 Civil War, in its pursuit of economic self-sufficiency, Spain adopted an unsuccessful policy of industrial development based on state-owned enterprises, import substitution, tariff-based protection and barriers to foreign direct investment. The 1959 Stabilisation Plan, which marked the end of Spain's economic isolation, led to further development of the industrial sector, with a greater role for private and foreign investors. However, the industrial policy still guided industrial development, supporting "national champions" through subsidies and trade tariffs.

In the 1980s, further economic liberalisation led to the closing of non-competitive industries, including steelmaking and shipbuilding. Spain's entry into the European Economic Community in 1986 forced a refocusing of industrial policy from protection and subsidies to the promotion of competitiveness in the European and global context. The 1990s and early 2000s witnessed a more decisive globalisation of Spanish industry, while key elements of industrial policy included the privatisation of state-owned enterprises and investment in much-needed basic infrastructure. Since then, industrial policy has focused on horizontal policies that promote competitiveness, including promotion of research, development and innovation (R&D&I), opening access to foreign markets and improving product quality. Several measures focused on supporting small and medium-sized enterprises. Reforms led to an important increase in the sector's productivity and a growing contribution to economic growth and well-being of Spanish society. In the late 1990s and early 2000s, Spanish economic and industrial growth was the strongest among OECD member countries, and the share of the industrial sector in the economy increased to 18.5% of total GVA in 2004.

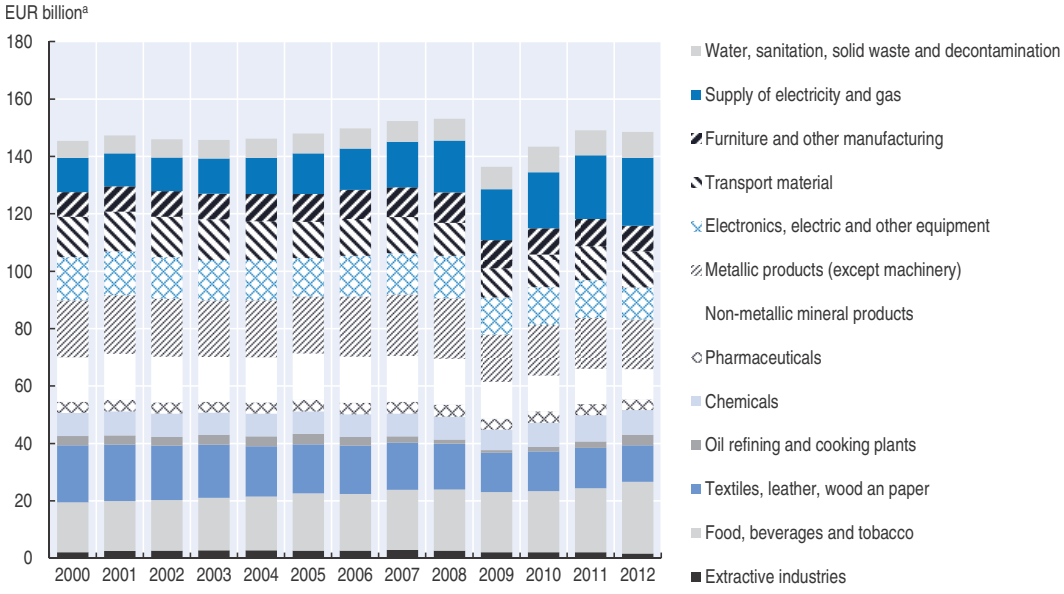
The economic crisis of 2008-09 heavily impacted the whole economy, including the industrial sector (Figure 5.2). The decline was led by manufacturing, which fell from 15.7% to 12.3% of GDP between 2004-09. Although the declining importance of industry was due in part to the relative strength of the construction and service sectors, this trend can also be attributed to deteriorating international competitiveness that deepened as the crisis continued. After Greece, Spain was the OECD member country that experienced the largest reduction in industrial production between 2010-12; a 7.9% decline in Spain, whereas the OECD average increased by 3.9%.

After a double dip recession, industrial production recovered with manufacturing contributing 13.3% of total GVA in 2013; the sector as a whole contributed 17.4%. In 2014, the Spanish government set ambitious plans to bolster the country's economic recovery through a stimulus package. The plans aim to encourage stronger investment in R&D&I and to "re-industrialise" the country. In the context of the EU target set in 2012, Spain wants to increase the industrial sector's share of the European economy from 16% to 20% by 2020.

Source: Espinosa de los Monteros and Boceta Álvarez (2005), EC (2012), INE (2014).

Spanish industrial enterprises, which are principally concentrated in Catalonia, Valencia, Madrid and the Basque Country, are relatively small. While large and medium companies represent 0.85% and 3.87% of enterprises in the European Union (EU), the corresponding figures for Spain are 0.47% and 2.82%.

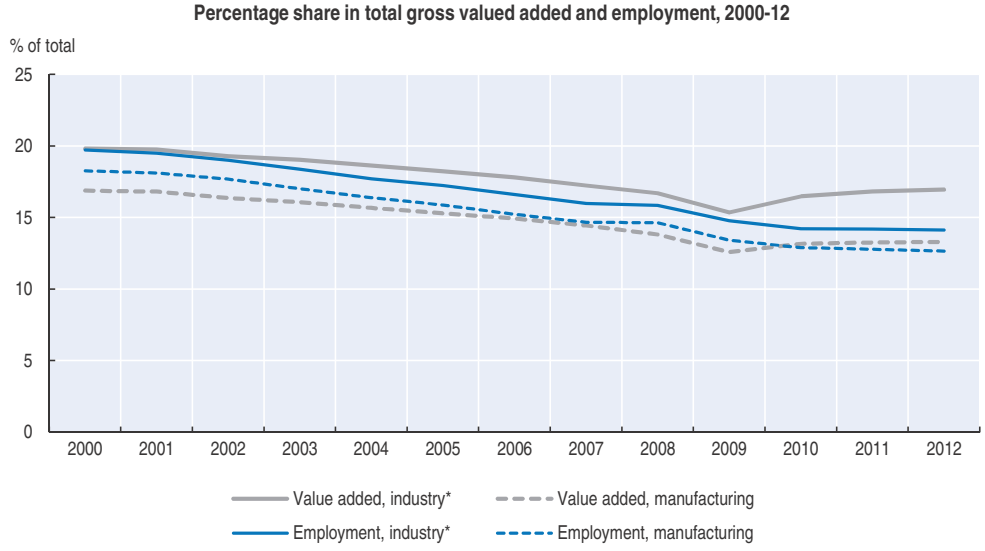
Figure 5.1. **Structure and recent evolution of the industrial sector**



a) Gross value added at constant 2005 prices.
Source: INE (2014), "Aggregates by industry", *INEbase* (database); OECD (2014), *OECD Economic Outlook No. 95* (database).

StatLink http://dx.doi.org/10.1787/888933183084

Figure 5.2. **Weight of the industrial sector in the Spanish economy**



* Excluding construction.
Source: OECD (2014), *OECD Employment and Labour Market Statistics* (database); OECD (2014), *OECD National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933183090

Despite progress in innovation, the sector is still characterised by its low technological intensity. Many firms are specialised in low-tech manufacturing (e.g. food products and beverages, textiles and apparel). High value-added sectors such as high-tech manufacturing are still under-represented in terms of the number of firms, employment and value added.

1.2. Key trends in the environmental performance of the industrial sector

Compared to many other OECD member countries, industrial pollution in Spain is not a major environmental issue (Chapter 1). The environmental performance of the industrial sector has steadily improved during the last decade. Principal factors accounting for this success include the internationalisation of the Spanish economy, and stronger environmental regulatory and institutional frameworks, especially those stemming from the EU *acquis communautaire,* along with investment and innovation. More recently, implementation of the regulatory framework, investments in clean technologies and the prolonged economic downturn have led to a further reduction of emissions, effluents and waste. Overall, some key industrial sectors, such as chemicals production, have made important progress in reducing environmental impacts of their operations (Box 5.2).

Despite progress, industrial operations contribute to air, water and land pollution. Environmental problems related to historical pollution hotspots remain unresolved in a few cases. The expected economic rebound and planned re-industrialisation of the Spanish economy are likely to increase pressures on the environment.

Box 5.2. **Environmental performance trends in the chemicals sector**

The Spanish chemicals sector is one of the key pillars of the Spanish economy. Made up of nearly 3 400 companies with annual sales of around EUR 53 billion, the sector generates 10% of the country's gross domestic product (GDP) and provides more than 500 000 direct, indirect and induced jobs. The chemicals sector has become the second largest exporter: in 2010, exports exceeded EUR 25 billion and sales to foreign markets accounted for more than 40% of revenues. This industry is also a leader in R&D&I investments and environmental protection, accounting for 20% of national investments in this field.

During the last decade, the Spanish chemicals industry has progressively shifted towards products with greater added value. In the 1970s, basic chemicals made up 61% of the sector, compared with 36% today. Chemicals for health, meanwhile, account for 33% (up from 19% in 1977), while chemicals for final consumption account for 31% (compared with 20% in 1977). By sub-sector, pharmaceutical products account for 25% of the total, followed by plastic and rubber raw materials (15%).

The industry has also significantly increased its environmental performance. Between 1999-2012, for most pollutants, emissions or discharges per tonne of chemicals have been reduced by at least 50%. Greenhouse gas (GHG) emissions have been reduced by 37%, while some other emissions (nitrogen oxides, phosphorus) have been reduced by nearly 100%. The sector also achieved significant, albeit slower, progress in water consumption (-40%), energy consumption (-18%) and solid waste generation (-13%). Since 2006, progress has continued, particularly regarding air pollutants (with the exception of heavy metals), although at a slower pace as cost-effective solutions were progressively exhausted. Between 2006-12, reductions in waste consumption and solid waste generation have been above 12%. While the sector reduced energy consumption by 6.5%, reductions in GHG emissions per tonne of chemicals produced were close to 20%.

Source: ICEX (2011), FEIQUE (2013).

Emissions to air

The manufacturing sector remains an important contributor to air pollution. In 2012, it represented 67% of non-methane volatile organic compounds (NMVOC)[2], 50% of all sulphur dioxide (SO_2) emitted in Spain, 28% of carbon monoxide (CO), 19% of nitrogen oxides (NO_x) and 17% of $PM_{2.5}$.[3] The aggregated cost of industrial air pollution in Spain is estimated at EUR 6.5-10 billion per year or EUR 2.3-6 billion excluding CO_2 (EEA, 2011).[4] Sectors involving production processes and combustion used in manufacturing are responsible for around 25% of these costs. While these costs are significant, the aggregated damage cost of air pollution emissions per unit of GDP from Spanish industrial facilities (including power stations) are estimated to be among the lowest in the EU.

Emissions of all key air pollutants from industrial processes and industrial combustion decreased in the period 2000-12. The largest decrease was recorded in reducing SO_x (-45%), NMVOC (-31%), $PM_{2.5}$ (-29%) and NO_x (-23%). Emissions of CO were also reduced, but at a slower pace (-5%) (Figure 5.3). The emissions were decoupled from the industrial value added. Emissions per capita and per unit of GDP are below the OECD average for SO_x and in line with the OECD average for NO_x (Annex I.C).

Emissions of heavy metals have also decreased since 2000 (OECD, 2014a). Lead emissions have declined significantly; between 2000-11, Spain's share of those emissions within the EU dropped from 12% to 7%. Cadmium emissions declined 70%. While nickel emissions dropped over 60%, Spain still produced 19% of all EU nickel emissions, which in Spain mostly come from nickel mining and refining activities.

Emissions of the persistent organic pollutant (POP) hexachlorobenzene (HCB) declined, dropping over 97% between 2000-12, while emissions of the POP polycyclic aromatic hydrocarbons (PAHs) increased by 2%. Spain accounted for 19% of PAH emissions and over 18% of HCB emissions in the EU in 2011, the highest share of all EU member states (EEA, 2013).

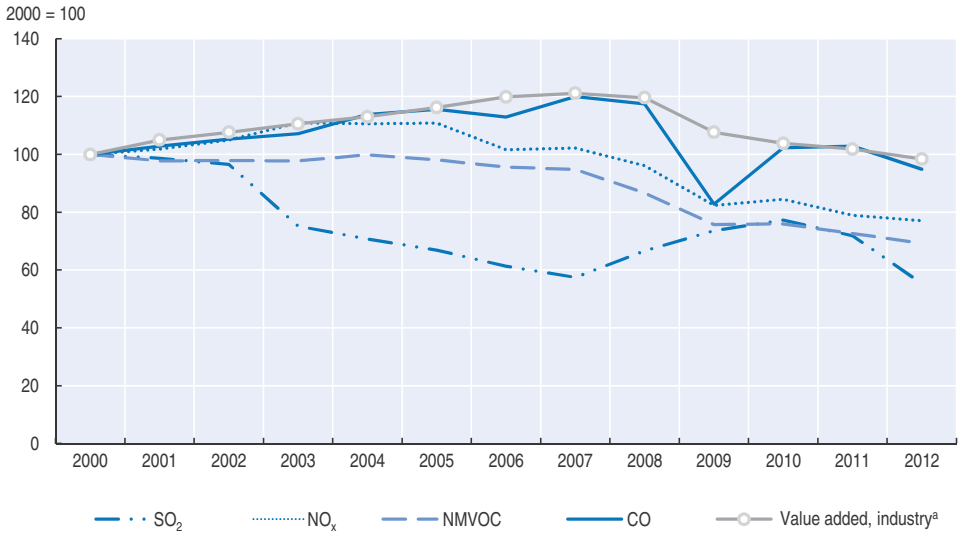
The industrial sector is the third largest source of greenhouse gas (GHG) emissions, accounting for 21% of the total. GHG emissions began declining in 2005 following major energy efficiency improvements of industrial operations and increased use of natural gas and renewable energy; in 2012, they were 16% below the 2000 level. Emission reductions, reinforced by the economic slowdown, started to increase in 2010 (Figure 5.3).

Water use and pollution

Spanish manufacturing has made impressive progress in reducing its use of water. Withdrawals decreased by 60% between 2000-10, with the fastest reduction occurring between 2003-08 (OECD, 2014a). Widespread concerns about the availability of water resources combined with the application of a levy on wastewater treatment (the so-called Sanitation Charge) applied by the Autonomous Communities (ACs) have led to significant investment in water efficiency in manufacturing.

Information on water pollution discharges in the industrial sector is scarce, however. One study in 2007 by the National Statistical Institute (INE, 2013) indicates that effluent discharges in the manufacturing sector corresponded to 56% of water used. Manufacturing industries treated 44% of effluents discharged and 25% of total effluents were internally reused or recycled. In terms of recipient bodies, about 35% of effluents were discharged into sewerage networks, 35% to the sea, 26% to surface waters and 4% to other sources.

Figure 5.3. **Air emissions from the industrial sector in 2000-2012**



Note: Air pollutant emissions from industrial combustion, industrial processes, and solvent and other products use.
a) Data include construction.
Source: OECD (2014), *Environment Statistics* (database); OECD (2014), *OECD Economic Outlook No. 95* (database).

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Solid waste

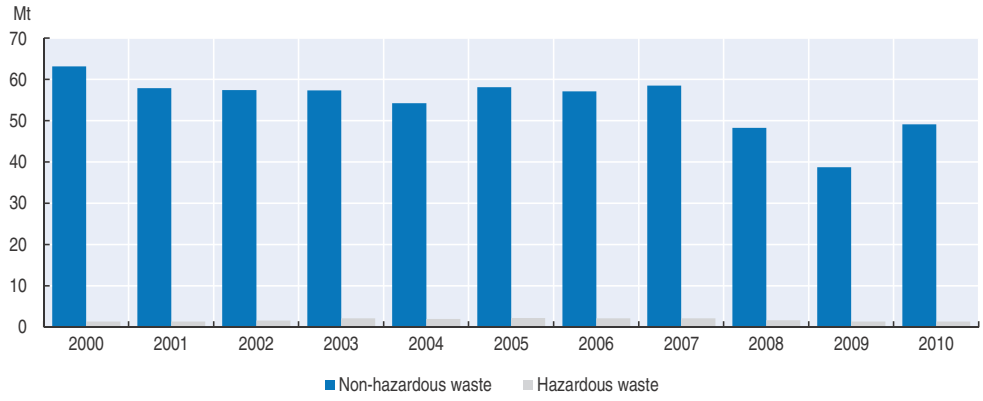
The industrial sector made some progress in reducing waste. Between 2000-07, the annual amount of non-hazardous waste generated by industry decreased by 7.4%, while in 2009 the decrease reached 39%. In 2010, the amount of industrial waste was 49.2 million tonnes, 22% less than in 2000 but 27% more than in 2009 (Figure 5.4). The overall decrease was driven by a decline in mostly non-hazardous waste generated by the extractive industries; this accounted for the biggest share of waste (24%), while the manufacturing sector generated 12% of the total.

The quantity of hazardous waste generated by industries nearly doubled between 2000-06, but decreased by 1% between 2000-10. Most hazardous waste is generated from manufacturing: 0.8 million tonnes comes from steelmaking and other metallic and non-metallic products, and 0.4 million from chemicals and rubber production (MAGRAMA, 2013b).

Energy consumption

Spain's industrial sector is the second largest consumer of energy after transport, accounting for around 23% of final energy demand. Between 2000-05, the sector's consumption increased along with the growth of gross value added, but then dropped sharply while the GVA continued to rise until 2008. Following the two years of economic crisis, the GVA recovered in 2010, while the sector's energy demand remained stable (Figure 5.5). Overall, the sector successfully decoupled energy consumption from the value of economic output. Industrial energy consumption was 17% below the 2000 level, while the sector's GVA increased by 4% in the same period.

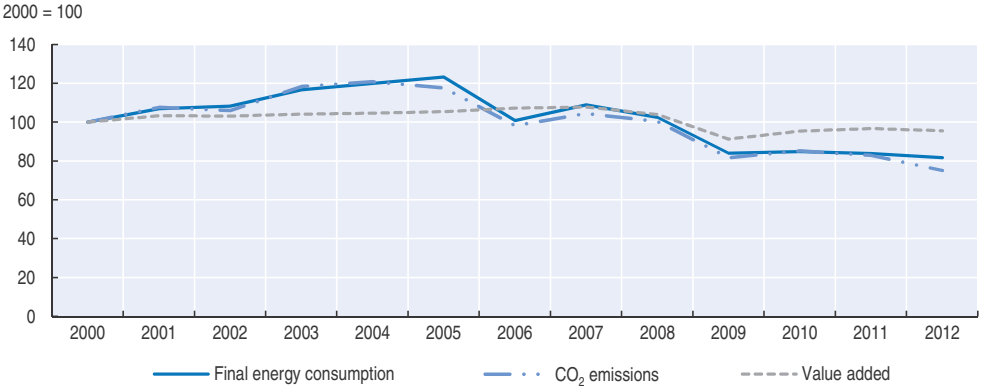
Figure 5.4. **Waste generation by industry in 2000-10**



Source: MAGRAMA (2013), *Environmental Profile of Spain 2012*.

StatLink http://dx.doi.org/10.1787/888933183112

Figure 5.5. **Energy and CO_2 intensities in the manufacturing industry in 2000-12**



Source: IEA (2014), *IEA CO_2 Emissions from Fuel Combustion Statistics* (database); IEA (2014), *IEA World Energy Statistics and Balances* (database); OECD (2014), *National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933183124

Material intensity

Overall, domestic material consumption (DMC) decreased by 14% between 2000-10 compared to a 7% decrease in DMC for the OECD average. The decrease was mostly due to decline in the construction sector, which accounts for more than half of DMC. However, the biggest reduction occurred with the use of industrial minerals (-45%) and metals (-32%), although they account for the lowest share of materials used by the Spanish economy (6% and 4% respectively) (Figure 1.7).

The reduction of DMC combined with economic growth resulted in a 49% increase in material productivity[5] in Spain between 2000-10, significantly higher than the OECD average of 27% (Chapter 1, Annex I.C). However, this relative decoupling occurred only recently: for most of the review period, DMC increased at a higher rate than GDP (Figure 1.7).

Industrial hot spots

Accelerated industrialisation of the country in the 1960s and 1970s resulted in a number of pollution "hotspots" where accumulated emissions exposed local populations to elevated health risks. In 2009, Spain hosted 12 of the 191 industrial facilities in Europe that generated the most air pollution (EEA, 2011).

Important pollution "hotspots" include the Algeciras Bay at the southern end of the Iberian Peninsula and the chemical poles of Huelva in Andalusia and Tarragona in Catalonia. Pollution is particularly heavy in Huelva, which is considered one of the most contaminated zones in the EU. The Algeciras Bay, which hosts large numbers of industrial operations, is considered to have the highest levels of hydrocarbon pollution in Spain. The Algeciras Bay, together with Huelva, experience the highest rates of death from cancer in Spain (Box 5.3).

Box 5.3. **Industrial pollution hotspots**

Bay of Algeciras, Andalusia

The area around the Bay of Algeciras is heavily industrialised with extensive petrochemical installations near San Roque (such as the CEPSA oil refinery and Acerinox stainless steel manufacturing plant), and ports in Algeciras and Gibraltar. Every year, more than 100 000 ships use the bay to cross the Strait of Gibraltar, including large-sized oil tankers. Oil bunkering activities also occur.

The area suffers from pollution by hydrocarbons. In 2007, a particularly serious sulphur release took place, as well as intermittent flaring episodes. In recent years, a small number of sinking, grounding and collision incidents resulted in oil spills. Responding to public protests against impacts on surrounding neighbourhoods, the environmental authorities of the Autonomous Community of Andalusia ordered an independent audit to investigate the incidents. In 2009, environmental organisations formed the Tripartite Forum to identify and implement measures to protect the bay.

Huelva industrial-chemical complex, Andalusia

A chemical complex, established in the 1960s close to the city of Huelva, comprises 14 different companies. Over 40 years of fertiliser production by one of the firms has generated 120 million tonnes of phosphogypsum – a waste product from phosphoric acid production that contains uranium and heavy metals. This waste has been stored in 30-metre high tailings and large ponds, covering 1 200 ha close to the town. The authorities also investigated the possible spreading of phosphogypsum on agricultural land as a means for pH correction of the soil. A number of studies to assess the level of pollution in Huelva showed elevated cases of cancer and other risks to inhabitants' health.

Over many years, several groups have demanded closure of the chemical complex, and several lawsuits have been launched against the fertiliser producer for breaching environment, public health and zoning regulations. In 2010, the European Commission demanded an end to the dumping of phosphogypsum at Huelva; the Supreme Court confirmed the National Court's decision to halt dumping. Since 2012, the plant has imported phosphoric acid, which eliminated the need to dump phosphogypsum. However, in 2014, Spanish authorities fined the fertiliser producer EUR 240 000 for failing to submit a restoration plan for phosphogypsum ponds.

Box 5.3. **Industrial pollution hotspots** *(cont.)*

Chemical industry in Flix, Tarragona, Catalonia

The electrochemical factory Ercros S.A., which began operations in 1897 in the Catalonian town of Flix, is the only industrial installation in Spain that has produced polychlorinated biphenyls (PCBs). Over time, about 700 000 tonnes of effluents containing mercury, cadmium and other toxic organochlorine components (such as hexachlorobenzene, PCBs and DDT) have been dumped in a reservoir in the Ebro river.

An evaluation of pollution impacts by the Environmental Department of the Catalan regional government found that mercury concentrations were up to 500 times higher and total concentration of PCBs was almost 80 times higher than in non-polluted areas. Additional studies show a high rate of premature births and deficient child development in the area.

In 1993, a court case began against Ercros, but the company was convicted only in 2003 for continuously polluting the environment. The court decision did not hold the company fully responsible for damages and the Spanish government committed over EUR 200 million for clean-up activities.

Source: Environmental Justice Atlas, *http://ejatlas.org/*.

2. Policy and institutional framework

2.1. Policy framework applying to the industrial sector

Economic and industrial policies

For most of the review period, there was no separate entrepreneurship policy document in Spain; industrial development has been part of horizontal economic development programmes, which promoted economic growth and employment. The National Reform Programme (NRP), adopted in 2005 to implement the EU Lisbon Strategy, included a number of measures to stimulate entrepreneurship. These included improving competition and regulation in product markets; strengthening efficiency of the regulatory framework and performance in research; development; and innovation.[6] The NRP did not explicitly set out to assess the environmental performance of industry. However, it had a number of specific programmes with environmental objectives. These included the Ingenio Plan[7], which was designed to step up environment-related research and development in the private sector.

Spain's response to the economic crisis of 2008-09 included the Integral Plan on Industrial Policy 2020 (PIN2020). This plan aimed to support the industrial sector more explicitly and bring coherence to the multitude of previously launched initiatives. To that end, it emphasised strengthening relations between industrial development and environmental policies (Box 5.4). In July 2014, the Agenda for Strengthening the Industrial Sector in Spain was approved. It includes several measures related to the protection of the environment, such as those linked to the National Energy Efficiency Fund (FNEE) (Chapter 3).

In 2013, the government announced an "Economic stimulus plan and support for the entrepreneur", which contained a number of measures to support the enterprise sector. These included lowering taxes for new firms and self-employed persons, and facilitating access to finance (Chapter 3). The "Spanish Strategy for Science, Technology and Innovation" and the "Spanish State Plan for Scientific and Technical Research and

Box 5.4. **Environmental issues in the Integral Plan on Industrial Policy 2020**

The Integral Plan on Industrial Policy 2020 (PIN2020), elaborated as part of Spain's Sustainable Economy Strategy, was launched in 2010 by the Ministry of Industry (Chapter 3). The plan provides a framework for government initiatives until 2020, aiming at increasing the share of industry in gross domestic product (GDP); adapting industrial policy to the new challenges and opportunities of the evolving global economy; improving the competitiveness of Spanish industry; and ensuring industry's contribution to a sustainable recovery of growth and employment. The plan, consistent with Spain's EU deficit-cutting objectives, aimed to refocus industry as the driver of economic growth, creating jobs and increasing competitiveness to implement the objectives of the EU's "Europe 2020 Strategy for jobs and smart, sustainable and inclusive growth".

The PIN2020 comprised an Action Plan 2011-15 that laid down 124 measures in 26 areas grouped into 5 priority policy areas. Four of the axes focus on horizontal measures: i) improving industry's competitiveness; ii) improving innovation and R&D; iii) improving SME growth and dynamism; iv) facilitating companies' orientation towards international markets; and v) strengthening strategic sectors. A fifth axis focuses on strategic industrial sectors. The cost of implementation was estimated at EUR 82.8 billion.

Although the plan emphasises the importance of policy coherence, links to environmental issues are only addressed indirectly in the horizontal axes. For example, one objective regarding competitiveness, which aimed to reduce energy costs, included measures for promoting energy efficiency. However, there were no measures targeting efficiency in raw materials or water. The objective of reducing logistical costs includes the promotion of rail transport, which is expected to generate positive environmental impacts.

The PIN2020 mentions the EU objective of reducing raw materials consumption through efficiency and recycling, but without specific measures to achieve it. Regulatory impact assessment is expected to address the impact of environmental regulations on industry. Some innovation measures explicitly target eco-innovation such as a line of credit for innovation (INNOCREDIT) and a venture capital programme (INNVIERTE).

Among the strategic sectors, environmental links are more explicit. For the vehicle manufacturing sector, measures focus on the development and production of cleaner cars (electric, hybrid, low emissions), as well as more energy efficient production. The industries focused on environmental protection (such as recycling); the production of equipment for renewable energy and energy efficiency are considered strategic. Measures related to the agro-food industry include the creation of a sustainability forum (Foro de Sostenibilidad del MARM) to discuss issues of sustainable consumption and production in the agro-food chain.

Innovation", adopted in 2013, sought to increase business R&D expenditure, ease transfer of knowledge between actors and foster smart specialisation at the regional level. In 2014, the Spanish government adopted ambitious new plans to bolster the country's economic recovery through tax cuts and a EUR 6.3 billion stimulus package to help the "re-industrialisation" of the country (Box 5.1).

In parallel, the Spanish government launched several initiatives to reduce administrative burdens on business, reinforce impact assessment for new regulations and strengthen regulatory management at the regional level. To revitalise Spanish business and boost its international competitiveness, Spain set ambitious targets that in some cases transcended those set by the EU. In one of the most notable examples, Spain aimed to

reduce administrative burdens by 30% at all levels of government by 2012. To achieve the target, the Council of Ministers created the Commission to Reform Public Administration (Comisión para la Reforma de las Administraciones Públicas, CORA) in 2012. Its mandate was to produce proposals to make public administration more austere, useful and effective. The final CORA report, completed in June 2013, recommended 78 actions by the central administration and 139 by the central administration and the Autonomous Communities.[8] With regard to environmental matters, the CORA report envisaged simplifying environmental processes for environmental assessment and environmental permitting (OECD, 2014b).

Environmental policies regulating industrial operations

Several reforms during the last decade have strengthened national environmental requirements. The most important changes occurred with regard to horizontal regulations, in particular environmental impact assessments, integrated environmental permitting and environmental liability. Key legal acts included: i) the 2007 implementing regulations to the Law on Integrated Pollution Prevention and Control (IPPC) (16/2002); ii) the 2013 Law on Environmental Impact Assessment; and iii) the 2013 Law on Environmental Liability. Those requirements have been translated into regional regulations with varying degree of stringency across Autonomous Communities.

In 2013, the OECD commissioned an industrial survey to analyse the relationship between environmental policy design and firm-level management and environmental performance in Spain. The survey attempted to compare the situation between 2006, just before the economic crisis started, and 2013. According to the survey, 67% of medium and large industrial firms considered the environmental policy regime to be more stringent in 2013 than in 2006; 41% considered that enforcement and compliance assurance by public authorities had become less flexible (Loureiro and Alló, 2014). Only 18% of surveyed firms indicated they had not carried out any environmental investment since 2006 (Box 5.5).

Box 5.5. **Environmental management at firm-level in medium and large Spanish firms**

Adoption of environmental management systems and practices. Most surveyed firms (76%) introduced an environmental management system and a further 10% are in the application process. More than 90% of firms have at least one person responsible for environmental issues. In most cases, these professionals belong to a department specialised in environmental issues (71%), while in less than 5% of cases they belong to senior management. A large majority of firms monitor the consumption of natural resources and energy (95%), solid waste generation (93%) and wastewater effluent (85%). However, only 56% gauge local or regional air pollution, and 55% measure soil contamination. The most widespread practices to help implement environmental management are internal and external environmental audits (85% and 83% of firms, respectively), environmental training programmes (82%) and written environmental policies or protocols (78%). Other practices include environmental accounting (55%), benchmarking environmental performance (47%), public environmental reporting (50%) and corporate social responsibility and sustainability reporting (46%). Only 19% of firms have a specific budget for environmental R&D. Around half of the firms altered production processes to improve environmental performance in the areas of natural resources (62%), solid waste generation (48%) and wastewater effluent (44%).

Box 5.5. **Environmental management at firm-level in medium and large Spanish firms** *(cont.)*

Technical measures. Actions across environmental themes vary widely – close to 85% of surveyed firms have acted in some way regarding natural resource use, while less than 38% of firms have done so for biodiversity and nature conservation. The proportion of surveyed firms that enhanced production processes to reduce pollution emissions and/or resource use vary from 62% for the use of natural resources to 15% for biodiversity and nature conservation. The proportion of firms that introduced end-of-pipe technologies to reduce pollution emissions or allow for resource recovery vary from 29% for wastewater effluents to 11% for global pollutants. Lastly, the proportion of firms that introduced changes in product characteristics vary from 14% for solid waste generation to less than 3% for wastewater effluents.

Environmental impacts. Around 60% of firms claim to have reduced consumption of natural resources and solid waste generation (per unit of output) since 2006. Among the surveyed firms, around half claim to have reduced wastewater effluents; around 40% said they reduced emissions of global pollutants, aesthetic effects (noise, smell, landscape), and local or regional air pollution; and around one-third said they reduced the risk of severe accidents.

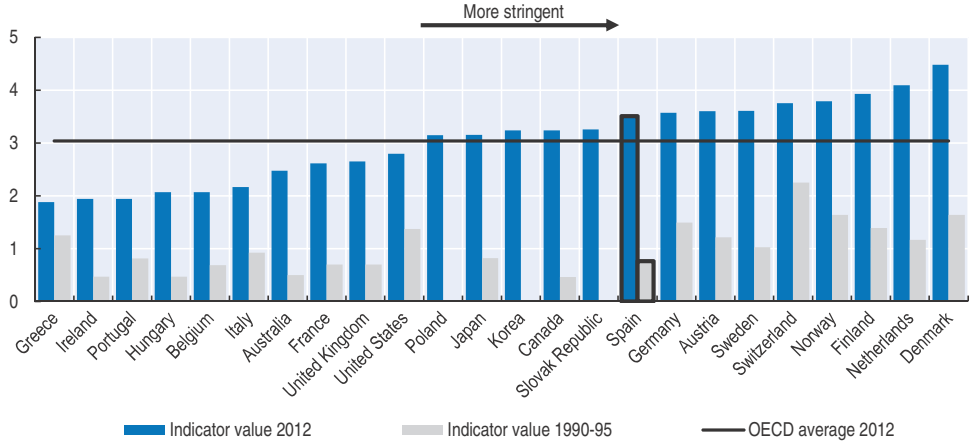
Motivations. Regulatory compliance is the most important driver of environmental management – 95% of the surveyed firms classify it as very important. Two-thirds of firms indicate that the environmental policy regime is more stringent (54%) or much more stringent (12%) than it was in 2006. About 42% of surveyed firms indicate that the level of environmental enforcement and compliance assurance has increased since 2006 (while 52% indicated that it has remained the same). Two-thirds of surveyed firms declare going beyond requirements – these firms are more likely to have multiple production facilities, headquarters located in a foreign country, annual sales above EUR 10 million and an environmental management system. Motivations, other than regulatory compliance, identified as very important include the prevention or control of environmental incidents (identified by 87% of firms), corporate image (69%), new product development (56%), demand from client companies (45%), cost savings (38%), new technology development (37%) and demand from final consumers (28%). In comparison with 2006, 62% of firms consider that cost savings are now a more important motivation, 42% indicate that corporate profile is now a more important motivation and about 30% indicate that new technology development and new product development are more important motivations. Cost reductions seem to be the most relevant driver for environmental improvements in the areas of natural resource consumption, waste generation and wastewater effluents.

Barriers. In 2013, 80% of surveyed firms identify the cost of environmental measures as a barrier for taking environmental actions, roughly the same as five years before. The proportion of firms identifying lack of access to finance as a barrier has increased (from 49-55% of firms). All other barriers seem to have improved, but 62% of firms still identify complexity of administrative procedures and 41% identify obsolete technical requirements of the legislation. The difficulty in choosing the right environmental measures is identified as a barrier by 37% of firms (down from 51%), and the lack of specific environmental skills by 25% (down from 42%).

Source: Loureiro and Alló (2014).

The stringency of policies increased in Spain more rapidly than in many other OECD member countries, largely as a result of a delayed and then accelerated harmonisation of environmental requirements with the EU legal framework. According to a recent OECD study, Spain's environmental policy can be classified as moderately stringent, just above the OECD average, and that this should not have detrimental effects on productivity (Figure 5.6) (OECD, 2014c). The same study suggests that Spain is the OECD country where environmental policies cause the highest burden to the economy in influencing market entry and competition. The major factors are direct impediments to competition (such as vintage-differentiated regulations and tax relief, and various subsidies awarded on the basis of historical performance), lack of coherent and consistent information, and lengthy, uncertain procedures, especially related to evaluation of both existing and new policies. While there are also administrative burdens in environmental permit and licensing (Figure 5.7 and Section 3), they are among the lowest in the OECD (OECD, 2014c).

Figure 5.6. **OECD environmental policy stringency indicator**



Source: Botta, E. and T. Koźluk (2014), "Measuring Environmental Policy Stringency in OECD Countries: A Composite Index Approach", *OECD Economics Department Working Papers*, No. 1177.

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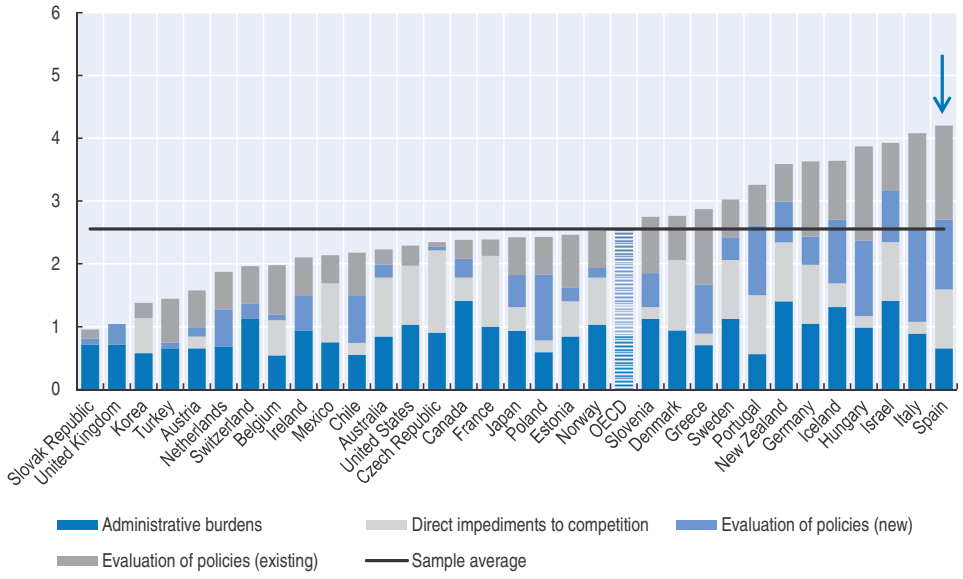
2.2. *Institutional framework*

Different ministries implement economic policies that affect the industrial sector. The Ministry of Industry, Energy and Tourism co-ordinates programmes of support for industrial competitiveness and re-industrialisation, including the PIN2020. The Ministry of Economy and Competitiveness is responsible for economic regulations and manages the national programme for research, development and innovation. The Ministry of Finance and Public Administration is responsible for fiscal policy; it includes incentives for R&D and innovation targeting SMEs, as well as a number of measures to promote their growth, job creation and liquidity. It also includes incentives for environmental investments. The Ministry of Agriculture, Food and Environment (MAGRAMA) plays an important role in regulating environmental performance of the industrial sector, mostly through regulations on environmental impact assessment procedures, environmental permitting, and compliance monitoring and promotion.

Several mechanisms exist to facilitate policy co-ordination between the economy, industry and the environment. Policy and regulatory proposals are systematically

Figure 5.7. **OECD indicator on burdens to the economy due to environmental policies**



Source: Kożluk, T. (2014), "The Indicators of the Economic Burdens of Environmental Policy Design: Results from the OECD Questionnaire", *OECD Economics Department Working Papers*, No. 1178.

StatLink http://dx.doi.org/10.1787/888933183145

discussed at the General Commission of State Secretaries and sub-Secretaries before being presented to the cabinet for approval. Since 2009, newly proposed regulations must undergo a regulatory impact assessment that considers policy impacts on prices, productivity, employment, innovation, consumers and SMEs. This process already helped ensure that new environmental regulations related to industrial activities reduced the compliance costs of the regulated community (Chapter 2). Since 2011, the Inter-ministerial Commission for Climate Change is in charge of developing and monitoring the implementation of climate change policies that are particularly important for the industrial sector.

Within the multilevel governance system of Spain, the regional governments at the Autonomous Community level play an important role regarding industrial and environmental policies, including legislation (through the regional parliaments), economic and environmental licensing and permitting, provision of industrial infrastructure and subsidies, and enforcement. In a recent survey, 76% of sampled industrial firms indicated that regional authorities are the most influential actors in the environmental management of firms, compared to 67% for national authorities (Loureiro and Alló, 2014).

The same survey also identified other stakeholders without a regulatory role that nevertheless influence environmental practices of industrial firms: commercial clients, neighbourhood and community groups, consumer groups, shareholders and investment funds. Banks and other lenders, industry associations and the media ranked among the less influential stakeholders (Table 5.1).

Table 5.1. **Influence of stakeholders on the environmental practices of environmental firms**

(% of respondents)

	Not important	Moderately important	Very important	Not applicable
National public authorities	5.13	25.64	66.67	2.56
Regional authorities	3.02	17.24	77.59	2.16
Commercial clients	13.96	43.24	37.39	5.41
Shareholders and investment funds	18.32	32.67	30.20	18.81
Banks and other lenders	43.75	25.52	10.94	19.79
Labour unions, employees	20.10	43.54	29.19	7.18
Industry associations	22.06	45.59	24.51	7.84
Environmental groups or organisations	21.46	45.37	26.34	6.83
Consumer groups	22.66	37.93	31.53	7.88
Neighbourhood/community groups	15.20	40.69	33.33	10.78
Media	25.49	39.71	23.04	11.76
Other groups or organisations	16.95	15.25	8.47	59.32

Source: Loureiro and Alló (2014).

3. Selected policies for strengthening environmental performance of enterprises

3.1. *Effectiveness and efficiency of the regulatory framework*

Environmental impact assessment

Environmental impact assessment (EIA) has been one of the key instruments to mitigate negative impacts of planned industrial projects. In Spain, EIA has been regulated since 1986, but the system was significantly reformed in 2001 and 2006 to bring EIA procedures in line with EU requirements. In particular, the reforms substantially extended the scope of projects subject to the compulsory EIA (Annex I) and those subject to discretionary EIA at the regional level (Annex II). The reforms also included stronger provisions for public participation in EIA procedures and incorporated EIA requirements into the transboundary context. In 2008, a consolidated text of the Law on Environmental Impact Assessment contributed to increasing the legal certainty for project promoters.

Unlike in other OECD member countries, the Spanish EIA law envisages penalties for implementing projects without a required EIA, before obtaining an Environmental Impact Declaration (Declaración de Impacto Ambiental, DIA) from the competent authority and for altering the project conditions established in the DIA. The levels of fines, which can range from EUR 24 000 to EUR 2.4 million, depend on the damage caused to the environment and/or human health, as well as the particular situation of the offender, such as its financial condition.

Since the reforms also made EIA compulsory at the regional level, most ACs issued their own laws and implementing regulations.[9] They were allowed to establish more restrictive thresholds or include additional types of projects for which EIA was required. Several regional EIA laws included provisions for compensatory and offset measures in EIA procedures. For example, Aragón required compensation for environmental damage in potential wind farm areas that are ecologically sensitive. In Navarra, a reduction in forested land required reforestation of an equivalent area.

A study commissioned by the Spanish Association for Environmental Impact Assessment indicated the number of EIA procedures every year increased from a few

hundred in the early 2000s to nearly 8 000 in 2007. The region-by-region data show significant differences in the number of EIAs – from 2 000 in Extremadura to 23 in Cantabria. This wide range was due not only to differences in the structure of economies, but also to the varying levels of regulation within the ACs (González Ubierna et al., 2011).

In many cases, EIA helped identify and reduce environmental impacts, especially for projects developed near nature protection areas. Over time, however, the business community raised concerns about shortcomings in the process, including unpredictability of results, complexity and delays. On average, an EIA required an estimated 3.4 years to be processed; almost 10 000 EIA case files accumulated in 2013 at various public administration services. Lack of uniformity in EIA across Spain led to different regulatory requirements, documentation and decisions in every region. This significantly increased application costs for promoters that planned investments in more than one community. Delays were also due to inadequate numbers of dedicated staff: the average number of EIAs per specialist in the regional environmental authority is about 30 per year, reaching 50 in some regions. These factors contributed to considerable delays in collecting and processing data, leaving a poor impression among applicants. Moreover, on numerous occasions, evidence suggests political interference in EIA decisions (González Ubierna et al., 2011).

To respond to these challenges and to the need for a clear legal framework, the Law on Environmental Assessment (21/2013) was approved in December 2013. The new law combines legislation on strategic environmental assessment and environmental impact assessment, as well as simplifies administrative procedures. By detailing EIA procedures and making it unnecessary for ACs to issue implementing regulations, the new law is expected to ensure common application of EIA across Spain.[10] The new legislation limits standard EIA to four months. It also requires higher quality, standardised documents from the project proponents and provides clearer *ex ante* notification regarding technical requirements.

The MAGRAMA estimated the new law will stimulate employment by creating close to 80 000 jobs and generate an additional EUR 1 billion from new economic activities. However, its implementation requires additional efforts at the national and regional level. This includes wider use of information and communication technologies, increased resources for processing and monitoring of the EIAs, and the creation of a "one stop shop" for all environmental procedures (AEIA, 2013).

Integrated environmental permitting

The 2002 Integrated Pollution Prevention and Control (IPPC) Law harmonised the Spanish legal framework with the EU IPPC Directive (96/61/EC). It required operators of large industrial installations, around 4 500 covered by Annex I of the IPPC Directive, to obtain an integrated permit (*autorización ambiental integrada* – AAI). Emission limits in the permits were based on best available techniques (BAT) and had to take into account local environmental conditions. To help licensing authorities and companies determine BAT, the European IPPC Bureau of the Institute for Prospective Technology Studies at EU Joint Research Centre in Seville organised an exchange of information between experts from EU member states, industry and environmental organisations.

The introduction of the AAI started late in Spain as some executive regulations were issued only in 2007 and harmonisation was completed in 2012. Only 596 permits were

issued in 2005, a number that increased to around 1 200 in 2007; AAI advanced rapidly so that nearly 4 000 permits were issued by mid-2008. Significant progress has been made since then. Around 10% of 6 100 large installations were awaiting completion of the procedure in 2011, four years after the deadline. The regional authorities, which are competent to provide the permits, publish their inventory of industrial installations with AAI, available for public information on the Spanish PRTR platform (*www.prtr-es.es*).

The integrated approach has had a positive impact since it brought together a range of permits that enterprises had previously to request separately. These include permits for the production and management of solid waste, for effluent discharges to inland waters or for effluent discharge in coastal waters. It has also enhanced understanding of regulatory demands from industries and helped regulate other industries for the first time. Some ACs introduced advanced approaches to simplify and accelerate authorisation procedures, such as integrating EIA and the AAI for large installations.

However, as with EIA, the industrial sector increasingly considered the AAI as a long and complex burden with both direct and opportunity costs (CEOE, 2012). Analysis by the Ministry of Public Administration in 2012 confirmed the proliferation of specific legislation by regional governments fragmented markets and increased the administrative burden for businesses. The study suggested that regulatory co-ordination and streamlining of the integrated permitting system could generate benefits for businesses in the range of EUR 1 billion in 2013-15 (CEOE-CEPYME, 2012).

Responding to these challenges, as well as to the changes at the EU level,[11] AAI procedures were reformed in June 2013. The new law and a number of implementing regulations tightened some requirements. For example, the changes reinforced implementation of the BAT to determine levels for industrial facility emissions and introduced new requirements to protect soil and groundwater.[12] However, it also introduced measures to reduce administrative burden and processing times.[13] The law also allowed applicants to request an amendment to the existing permit under a summary procedure when substantial changes have been made to the installations rather than having to apply for a new permit. It also established a limit of nine months for granting the permit. Finally, the law allowed for a single AAI for various parts of an industrial facility located on the same premises, even if such parts are operated by different title-holders/owners; previously, the facility required a sole owner.

Environmental liability

Spain has established an extensive system for covering potential environmental liabilities related to industrial operations. Since 2002, activities subject to IPPC, as well as waste management operators, have had to buy compulsory civil liability insurance for environmental pollution before obtaining environmental permits. Each AC determines the limit and scope of insurance cover.

The 2007 Environmental Liability Law (ELL) reinforced mechanisms to prevent and address the impacts of potential accidents with harmful consequences for the environment. The new law introduced provisions that ensure environmental damage remediation even in cases where an economic activity is in full compliance with the law (Box 5.6). To support application of the law, the Technical Commission on the Prevention and Remediation of Environmental Damage provides a framework for co-operation between the regions. It also develops support instruments such as an environmental

Box 5.6. **The Environmental Liability Law**

The Environmental Liability Law (ELL), adopted in April 2007, harmonised Spanish legislation with the requirements of the EU Directive on Environmental Liability in relation to the Prevention and Remediation of Environmental Damage (2004/35/EC). Before the ELL entered into force, the existing environmental legislation allowed the administration to order restoration or payment of damages when the operator was at fault. The law introduced strict liability for operators of activities listed in an annex of the ELL (also covered by Annex III of the EU Liability Directive). Subsidiary liability was also imposed on the managers and administrators of the legal person whose conduct has resulted in the liability of the latter. Furthermore, the law extends liability to the parent company.

The ELL goes further than the EU directive with respect to the coverage of scope and activities. It covers not only those species of fauna and flora that are protected by EC directives, but also those protected under national and regional Spanish legislation, in particular those listed as endangered species. As in the EU directive, the ELL extends environmental damage to species and habitats, water and soil, but also deals with damage caused by activities other than those listed in Annex III of the directive. Under the law, environmental organisations and owners of the land where the restoration is to take place have the right to trigger administrative action concerning restoration of the damaged environment.

By adopting the law, Spain became the eighth EU member state to introduce compulsory financial guarantees that cover the risk of environmental liability for operators included in Annex III. This risk is determined on a case-by-case basis by the public authorities with the maximum amount set at EUR 20 million. However, the maximum coverage does not affect total liability, which is unlimited. This means the operator remains liable and must bear the costs of reparation even in cases where the amount necessary to restore the environment is higher than the amount of the mandatory financial security. To cover outstanding liabilities, a Compensation Fund for Environmental Damage was established as part of the Consortium of Compensation of Insurances. The fund, administered and managed independently, will be financed via a surcharge on the premium for the insurance of environmental liability. Insurance companies will have to make monthly payments to the fund when the mandatory financial security system is in force.

Operators can comply with their obligation to have financial guarantees by: i) purchasing an insurance policy; ii) securing a financial guarantee from a financial entity authorised to operate in Spain (e.g. in a form of bond); or iii) setting aside a technical reserve through a self-owned fund. The guarantee must be maintained for the entire period of operation. Non-compliance with the guarantee is a serious infraction that can result in loss or suspension of the operator's authorisation up to two years and a fine of between EUR 50 000 and 2 million.

Some operators in Annex III are exempted from the guarantee obligation, including:

- Operators of activities likely to cause damage for which primary remediation is estimated to be less than EUR 300 000
- Operators of activities likely to cause damage for which primary remediation is estimated at between EUR 300 000 and 2 million but who show they are continuously certified with EMAS or ISO 14001 certification regimes
- Active users of phytosanitary products and biocides if these products serve agriculture and forestry purposes.

In 2009, additional regulations approved methods to assess damage in order to constitute the mandatory guarantee. The risk assessment must respect the national non-binding standard on risk assessment (UNE 150008:2008) or similar method, and be verified by an independent agent.

Source: Pedraza et al., (2013).

liability support software model (MORA). This helps put a monetary value on primary and complementary compensation costs; it also enables estimates of the extent of financial guarantees, as well as guidelines with criteria for repairing environmental damage.

The law has been infrequently applied in practice to date. In general, the law is only applicable for very serious cases. However, in the last two years, the number of ELL cases in Spain has increased. The ELL is a horizontal piece of legislation intended to complement sectorial legislation. The usefulness of the law has been demonstrated in certain cases, for example, when more than one natural resource is involved. To help competent authorities and to foster a more effective application of the law, a series of administrative and technical instruments have been developed. For example, guideline documents are being drafted for the determination of the magnitude of environmental damages in the context of ELL.

In 2014, the provisions of the liability law were simplified. Some low-risk activities were exempted from liability regimes, which reduced the burden on many SMEs. In addition, a new environmental damage index allowed the ranking of damage scenarios to simplify the determination of the mandatory financial guarantees. These revisions aimed to enable operators to carry out voluntary risk assessment and to cut red tape by shifting responsibility for determining the level of financial security to the operators. Around 10 000 of 320 000 operators covered by the law have already taken out voluntary insurance. An advisory body of the Council of State, estimated the changes would save the regulated community around EUR 160 million. However, the new law has been criticised for significantly reducing the number of operators required to arrange financial security and limiting the role of the state in risk assessment.

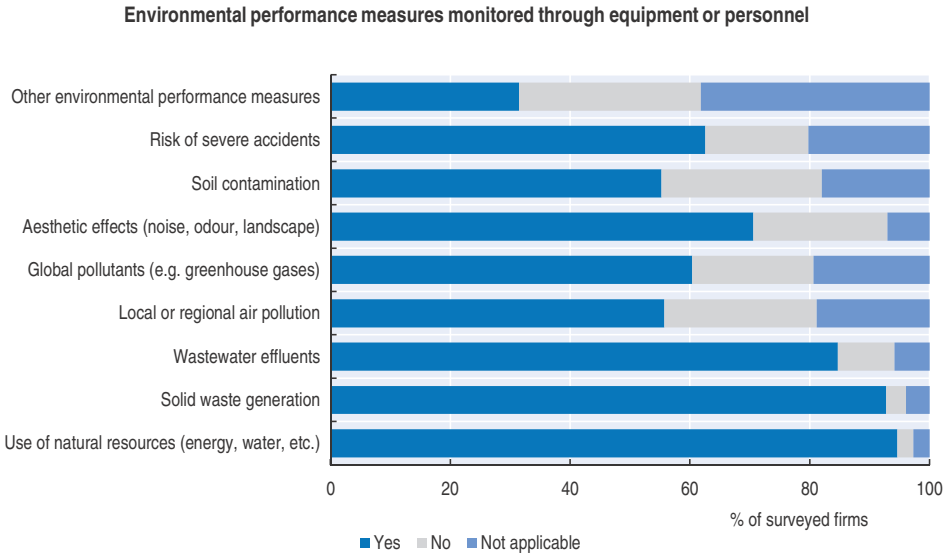
3.2. Environmental compliance and enforcement

Environmental compliance monitoring

The OECD survey of enterprises shows that over 90% of medium and large-sized firms (those with more than 100 employees) internally monitor use of natural resources (water and energy), releases of wastewater and solid waste generation; between 60-70% monitor aesthetic impacts (such as odour and impacts on landscape), noise levels, risk of accidents, local or regional air pollution, and soil contamination (Figure 5.8). The self-monitoring information has helped manage and reduce environmental impacts and related costs. It has also been used to inform authorities and the public about compliance with environmental requirements and pollution incidents.

Industry regularly presents results of self-monitoring related to emissions of air, water and soil pollutants, accidental emissions and external transfers of solid waste to the environmental authorities through a state register operational since 2001. Originally known as the European Pollutant Emission Register (EPER-Spain), the Spanish Register of Emissions and Pollutant (PRTR-Spain) collects environment-related information from over 6 000 industrial complexes in Spain.[14] All data above the PRTR thresholds are publicly available on the web (*www.prtr-es.es*).[15] At the regional level, some Autonomous Communities have their own PRTR websites (*www.prtr-es.es/conozca/Enlaces-interes-html#comunidadautonoma*). Competent authorities use the PRTR data to monitor compliance with environmental permits and to verify the information collected under national reporting schemes. The data are also used for designing specific policy instruments such

Figure 5.8. **Environmental self-monitoring by industrial firms**



Source: Loureiro, M.L. and M. Alló (2014), *Environmental Policy Tools and Firm-level Management Practices in Spain (2006-2014)*, OECD and University of Santiago de Compostela.

StatLink http://dx.doi.org/10.1787/888933183155

as environmental taxes or obligatory financial guarantees under the environmental liability legislation, as well as by different departments at national or regional level as a complementary tool to comply with the respective international reporting requirements.

The Working Group on PRTR, co-ordinated by the MAGRAMA, provides a platform for discussion and decisions concerning the scope, information requirements and models for transfer of information. For example, the group explores methodology and dissemination issues with representatives of industry and environmental organisations.

While the PRTR has been continuously expanded and improved, the administrative structure of the country and a growing number of reporting requirements have made monitoring complex and costly, both for government and industry. Recent discussions highlighted the need to further improve the system by, for example, increasing the number of common criteria for data gathering, and issuing sector-specific methodological guidance. There is also a need to digitalise information as some industrial activities (e.g. intensive farming) still send reports on paper to corresponding autonomous authorities (MAGRAMA, 2013c).

Environmental enforcement

Since industrial-related compliance assurance and enforcement are carried out at the sub-national level, the discretion of authorities varies substantially among Autonomous Communities. In principle, the regional administration inspects all permit holders periodically, but in some cases these responsibilities are delegated to the lower levels. For example, some municipalities (e.g. Zaragoza) have had historically strong environmental enforcement programmes. Meanwhile, Aragón has delegated authority to inspect compliance to *comarcas*, which are traditional communities of several municipalities. Other agencies can also carry out inspections. For example, eight river basin authorities (Water

Confederations) issue water abstraction and wastewater discharge permits and have the right to inspect permit compliance. In case of non-compliance, they can impose sanctions in accordance with the Water Law.

Several Autonomous Communities have strengthened their compliance assurance policies as part of the process of cutting red tape. For example, Navarra uses software to prioritise inspection on the basis of complexity, amount of pollution releases, location and the operator's environmental management system (Mazur, 2011). Responding to new inspection requirements of the EU Directive on industrial emissions, many regions (e.g. Andalusia, Basque Country, Castile-La Mancha, Madrid, Murcia, Navarra, La Rioja) have recently developed prioritised environmental inspection plans, subject to minimum national limits established in 2011 (MAGRAMA, 2013c). Even though regional authorities have complete discretion in monitoring compliance with their own regulations, fines for non-compliance must conform to national standards that define lower and upper limits for specific types of infringements (Mazur, 2011).

To support regional enforcement agencies and co-ordinate compliance assurance, Spain's Autonomous Communities established a State Environmental Inspection Network (REDIA) in 2008. The network, which brings together regional enforcement units and the national environment ministry, provides a platform to exchange best practices through projects of common interest (Box 5.7). Such a co-operation mechanism has been effective and its strengthening would be an excellent way to ensure national consistency in environmental enforcement. The network would benefit from additional financing and a permanent secretariat to facilitate operations; this could help better co-ordinate activities with the national-level enforcement agency responsible for nature conservation (SEPRONA), which usually has more inspection staff in the region than the ACs.

Box 5.7. **Networks promoting environmental compliance**

The REDIA network

Inspired by the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL), the environmental enforcement agencies of the Autonomous Communities created the Environmental Inspection Network (REDIA) in 2008. The REDIA allows regional environmental enforcement officials to identify and exchange experience on best practices through projects of common interest – from developing guidance documents to organising technical workshops. MAGRAMA representatives regularly take part in network activities.

The network is managed by an Executive Committee, which comprises representatives of five ACs on a rotating basis who elect a president. The committee prepares plenary meetings, technical sessions and workshops; elaborates annual work plans and annual activity reports; and selects projects for approval at plenary meetings. The committee also co-ordinates the REDIA's participation in other scientific/technical forums and in IMPEL activities.

Until now, the REDIA has focused its work on inspection. It has developed a protocol for developing environmental inspection programmes and common inspection criteria, as well as a tool for supporting systemic evaluation of environmental risks in industrial installations. It has also worked on damage assessment to inform implementation of the environmental liability law.

Box 5.7. **Networks promoting environmental compliance** *(cont.)*

Developing a coherent and consistent approach across different sub-national and local jurisdictions is a major challenge in terms of compliance assurance policy and the choice of specific tools. The REDIA Network provides a solid basis on which to strengthen the environmental enforcement system in Spain and its activities should be expanded. Some key priorities of the network could be:

- Joint environmental priority setting, priority-setting tools, guidance and training to promote risk-based inspection targeting
- Comparable enforcement policies (based on jointly developed guidance) and interagency co-ordination to identify proportionate and equitable responses to environmental violations
- Consistent methodologies to determine monetary penalties with the aim of removing the economic benefits of non-compliance – a crucial factor in restoring a level economic playing field across the regulated community and among regions.

An important prerequisite to evaluate the consistency of enforcement nationwide is accurate and complete information on the performance of sub-national and local enforcement authorities. The REDIA Network should develop a set of performance indicators and elaborate mechanisms for performance assessment and mutual support among the regions.

Green Entrepreneurs Network

Launched in 2011, the Green Entrepreneur Network (Red Emprendeverde) helps entrepreneurs create and expand companies or new lines of business in activities linked to the environment. The network is operated by the Fundacion Bioversidad, a public entity under the MAGRAMA, and co-funded through the European Social Fund.

The network is open to any entity concerned with green business, including entrepreneurs and investors, but it focuses on stimulating start-up and consolidating SMEs. The network, which currently has 4 300 members, provides counselling and training to help entrepreneurs develop business plans, incorporate new business lines related to green skills and sustainability, and foster environmental compliance. It provides specific information on eco-innovation, investment and also potential sources of funding. The "Green Business Network Web Platform 2.0", a tailor-made social network, helps in networking and best-practice sharing, as well as in the development of potential synergies among participating SMEs.

Emprendeverde regularly runs awareness-raising campaigns and has created its own annual award for green entrepreneurs who support sustainable economic activity, create jobs or eco-innovate to address environmental problems. The award is given in three categories: new entrepreneurial initiatives; new green product lines through existing enterprises; and new green product lines through existing enterprises (older than five years). Apart from special recognition, award winners receive additional dissemination and marketing. Previous winners, for example, have been singled out for improving the quality of surface waters in Bilbao and manufacturing portable water purification equipment. The 2014 editions of the award attracted 260 applications.

Source: Mazur (2011), *www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/medio-ambiente-industrial/inspeccion-ambiental/redia/*, *www.redemprendeverde.es/*.

3.3. Use of economic instruments

Environmentally related taxation

Although used less than in most OECD member countries, environmentally related taxes have played an important role in strengthening environmental management of Spanish industry. As in other countries, environmentally related taxes in Spain are dominated by those related to energy and transport (95%) (INE, 2011, Chapter 3). Payments from the manufacturing industry represent a small share of environmentally related taxes, accounting in 2011 for 7.9% (EUR 1.3 billion) of the total (INE, 2013). This share has been relatively stable, moving between 7.8-8.8% between 2008-11. In 2010, manufacturing industry paid about 6% of energy taxes and 33% of pollution taxes (INE, 2011).

Industrial operators have increasingly been charged environmentally related taxes at the regional level, which can be introduced by the ACs in the absence of national taxation (Table 5.2). Regional environmental taxes that apply to industrial producers include taxes on air pollution emissions, water use and pollution discharges, effluent discharges on coastal waters, and waste generation and storage. The most significant in terms of revenue, however, relate to water use and pollution.

The impacts of regional environmental taxation have been limited, mostly due to low tax rates, as well as weak connections between the tax base and actual environmental impacts, inequality in treatment and co-ordination problems between different governance levels, especially related to water use and pollution (González Laxe et al., 2006; Gago and Labandeira, 2013).

Table 5.2. **Regional environmental taxes that apply to industrial producers**

Environmental topic	Region (date)	Revenue in 2010 (million EUR)
Air pollution	Andalusia (2003)	3.8
	Aragón (2007)	2.5
	Galicia (1995)	2.1
	Murcia (2005)	0.6
Water use and pollution	Andalusia (2010)	Not applicable
	Aragón (2001)	34.7
	Asturias (1994)	26.7
	Balearic Islands (1992)	89.9
	Canary Islands (1994)	0.2
	Cantabria (2002)	25.9
	Catalonia (2003)	340
	Extremadura (2012)	Not applicable
	Galicia (1993 and 2008)	31.9 + 10.6
	Madrid (1993)	1.8
	Murcia (2002)	37.0
	La Rioja (2000)	7.4
	Valencian Community (1992)	199.6
Coastal waters	Andalusia (2003)	3.1
	Murcia (2005)	0.4
Waste	Andalusia (2003)	0.4
	Cantabria (2009)	1.3
	Extremadura (2012)	Not applicable
	Madrid (2003)	2.6
	Murcia (2005)	2.9

Note: There are other environmental taxes that do not apply to industrial manufacturing sectors. Dates refer to the year of approval of the relevant law. The revenue figures correspond to the total for all sectors (including households) subject to the tax, not just industrial sectors.
Source: INE (2011) and Economistas (2013).

3.4. Subsidies

The Spanish government has used public funds to support and stimulate environment-related investment via tax concessions or subsidised loans through a multitude of government programmes and legal instruments (Box 5.8). In some cases, these funding mechanisms have enabled private operators to make environment-friendly investments, mainly by lowering upfront costs and making the investment economically viable. However, in addition to being a cost to the budget, subsidies are generally not the most cost-effective instrument to achieve environmental objectives. Taxes that directly incorporate the cost of environmental damage into market prices are generally more efficient to tip the balance in favour of environmental investment; credit support (e.g. loan guarantee) is more appropriate to address capital market failures.

A key problem with government financial assistance is that some beneficiaries may invest without the support. As determining the exact subsidy needed to stimulate changes in investment decisions is difficult, subsidy programmes may result in extensive windfall benefits (Box 5.9). In addition, by targeting a limited range of "cleaner" technologies or activities, subsidy-based measures encourage firms and consumers to adopt the subsidised solutions even when other options are more effective. Thus, the overall environmental support policy towards the industrial sector would benefit from a thorough evaluation of its cost effectiveness. This review should include funds disbursed at both the national and regional levels, and consider the extent to which actual outcomes of subsidised investment projects meet expectations (or desired outcomes) and at what cost.

3.5. Business sector actions

Environmental expenditure by the industrial sector

Since 2004, the annual environmental expenditure of Spanish manufacturing industries has been above EUR 2 billion per year. Despite an increase in absolute level until 2008, expenditure as a share of the sector's gross value added has been relatively stable, oscillating between 1.6% and 2% (Figure 5.9). In the same period, there has been an evolution in the composition of environmental expenditure. Investments in pollution control equipment and installations have been decreasing since 2007, which may be attributed to efforts by the manufacturing industry in 2004-08 to comply with IPPC regulations. Current expenditures have been increasing every year of the period (except 2009): this may be partly attributed to the need to operate and maintain a growing stock of environmental protection equipment and installations. The share of current expenditure has grown from 60% to 76% of total environmental protection expenditure.

Environmental management systems

Spanish industry has become a leader in the adoption of environmental management systems (EMS), which help it manage environmental programmes in a comprehensive, systematic and documented manner. Between 2000-03, the number of companies registered under ISO 14001 rose from around 600 to 4 860, representing 15.7% of organisations registered in Europe and 7.5% of organisations registered in the world. By 2012, registrations reached an impressive 19 470, giving Spain the third highest number of certified companies in the world after China and Italy (Figure 5.10).[16]

Spanish companies are also certified under the EU's Eco-Management and Audit Scheme (EMAS). This includes the ISO 14001 requirements, but adds several elements such

Box 5.8. **Budgetary support to environmental investment**

Corporation tax concessions for environmental investment

The 2004 reform of the Law on Corporation Tax introduced a tax incentive for environmental investments – a 10% deduction in the tax payment of the company's expenses for environmental investments. Environmental investments were understood as those aimed at reducing air pollution emissions, reducing effluent discharges or promoting the reduction, reuse or adequate treatment of industrial waste. The environmental investments were required to help industry comply with environmental regulations, and had to be integrated into the framework of plans, programmes or agreements; environmental authorities had to issue certificates validating those requirements. The definition of environmental investments also included the acquisition of industrial or commercial vehicles that resulted in fewer emissions, as well as investments in renewable energies. Between 2007-10, the rate of the tax deduction was progressively reduced from 10% to 2%. In 2011, the Law on Sustainable Economy established the tax deduction rate at 8%. That same year, only 359 entities applied for the tax deduction for a combined amount of EUR 12 million; 744 entities were eligible for a combined amount of EUR 119 million (MAGRAMA, 2013b).

Subsidies to accelerate the uptake of environmental goods and services

Spain has several instruments to accelerate the uptake of environmental goods and services. At the national level, they include tax breaks for environmental investments as discussed above; subsidised loans for targeted environmental investments such as energy efficiency; and subsidised loans for general investments that include some premiums for environmental investments. At the regional level, most regional environmental taxes introduced by the ACs also include tax deductions for environmental investments ranging from 15-60% depending on the tax and the region (Lubián Silva, 2013). The effectiveness and efficiency of those instruments to improve environmental quality does not seem to have been evaluated.

Subsidised loans for energy efficiency investments

The 2011 Action Plan on Energy Savings and Energy Efficiency estimated the industry sector would need to invest EUR 806 million per year to achieve its objectives. The plan also envisaged the provision of public support of EUR 75 million per year in the form of grants, loans, guarantees and other instruments. Since 2013, industrial companies benefit from subsidised loans to finance investments in energy efficiency. The JESSICA-FIDAE Fund, which manages EUR 123 million for two years, will provide the subsidy component until April 2015. This fund is managed by the European Investment Bank and co-financed by the Spanish Institute for Energy Savings and Diversification (IDAE)* and the European Regional Development Fund.

* IDAE is an agency attached to the Secretary of Energy of the Ministry of Industry.

as stricter requirements on the measurement and evaluation of environmental performance, and compliance with environmental legislation. After Italy, Spain has the most EMAS-certified organisations (1 080) and sites (1 282). Industrial enterprises account for around half of this number; a large percentage are located in Catalonia (Figure 5.10). In 2012, Spain issued the fifth highest number of EU Ecolabel products, after Italy, France, the UK and the Netherlands (EC, 2012). The Spanish government supports Ecolabel certification by reducing the application fee for all companies that already have an eco-management and audit scheme in place.

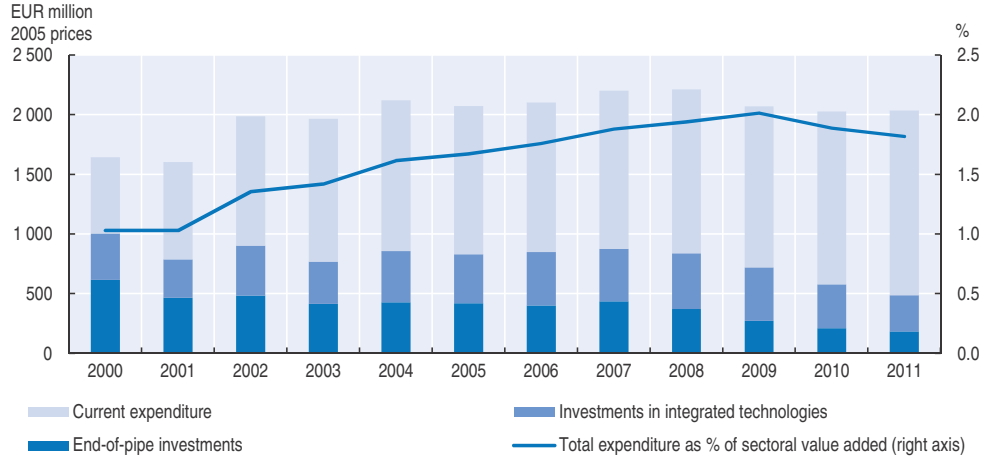
Box 5.9. **Windfall profits through sale of permits under the EU ETS**

The EU emissions trading system (EU ETS) covers the following sectors in Spain: oil refineries, metal, glass, ceramics, and pulp and paper. The average annual GHG emissions of those sectors in 2000-05 was 67.20 million tonnes of carbon dioxide ($MtCO_2$), representing 38.4% of total Spanish emissions covered by the EU ETS.

Similar to other sectors covered by the EU ETS, Spanish industry has been granted a number of emission allowances free of charge each year. Spanish authorities have allocated these free allowances based on the overall emissions ceiling of the country, historical emissions from each sector, and expected growth of emissions. For 2005-07, the industrial sector covered by the EU ETS was allocated allowances for 70.34 $MtCO_2$ per year on average; this increased to 73.92 $MtCO_2$ for 2008-12. The economic crisis reduced industrial activity and electricity demand, resulting in a decrease in GHG emissions across the EU. As a result, at the start of Phase 3, the EU ETS had a surplus of almost 2 billion allowances. Some industrial facilities have benefited from the sale of their free allowances instead of investing in emission reduction technologies. Some analysts put the revenue generated from free allowances at EUR 300 million in 2009 (Escribano, 2009). In addition, given the electricity generation sector will not have free permits during the 2013-20 phase of the EU ETS, Spanish authorities have allocated EUR 1 million to compensate some electricity-intensive industries exposed to carbon leakage for the expected increase in electricity prices.

During the third phase, the impacts of the EU ETS on the environmental performance of Spanish industry are expected to be stronger. As fewer allowances will be free, industry will have to pay directly for allowances. Indirectly, they will also be affected by the expected rise of electricity prices.

Figure 5.9. **Environmental protection expenditures of the manufacturing industry**



Note: Data refer to investments and total current expenditure (including payments to specialised producers of environmental protection services). Includes expenditure on i) pollution abatement and control covering air protection, waste and wastewater management, protection and remediation of soil and groundwater, and other environmental protection activities; and ii) biodiversity and landscape protection. Excludes expenditure on water supply.
Source: INE (2013), *Survey on Industry Expenditure on Environmental Protection. Year 2011;* OECD (2014), *OECD Economic Outlook No. 95* (database); OECD (2014), *Environment Statistics* (database).

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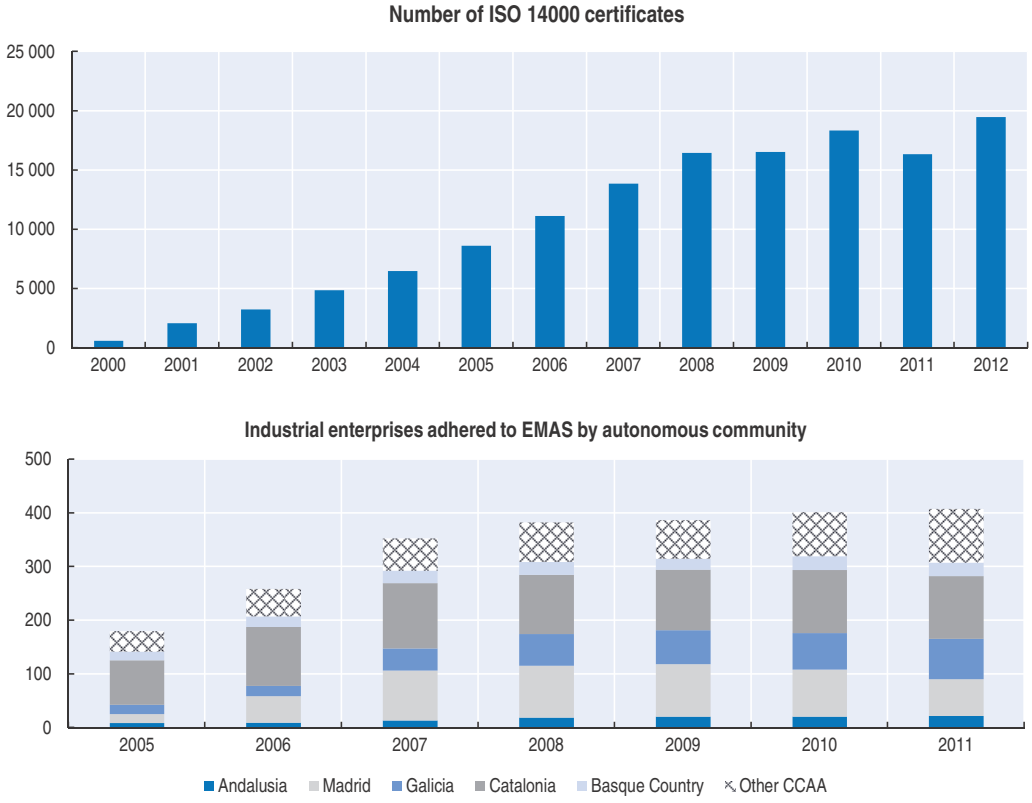
Figure 5.10. **Industrial enterprises adhered to ISO and EMAS certification schemes**



Source: MAGRAMA (2014), *Environmental Indicators Bank* (database).

StatLink http://dx.doi.org/10.1787/888933183176

The Ministry of Agriculture, Food and the Environment has actively promoted the implementation of EMAS through a number of measures, including providing funds from the European Regional Development Fund (2007-13) for such initiatives. In addition, no fees are charged for processing the EMAS registration and a discount is applied to fees associated with eco-labelling in the EU (30% discount for companies with EMAS and 15% discount for ISO 14001). Through the "BRAVE" project, industries with an EMAS system are subject to a simplified inspection and monitoring of the Integrated Environmental Authorisation. Finally, in the context of the Environmental Liability Law (see Box 5.6), certain operators may be exempted from the obligation to provide the mandatory financial guarantee if they show they are continuously certified with EMAS or ISO 14001.

EMS have become attractive to Spanish firms as they enable them to integrate procedures and processes for training of personnel, monitoring and reporting of specialised environmental performance information to internal and external stakeholders. Certified companies became recognised through the supply chain; they benefited from some relief from regulatory oversight systems, such as the exemption of EMAS and ISO-certified firms from compulsory financial guarantees (Box 5.6).

However, concerns have also been raised about the consistency and quality of accreditation and certification, especially concerning the ISO 14000 series. The certificate has been criticised for not specifying mechanisms or targets to encourage companies to reduce the amount of their pollution. In fact, researchers examined atmospheric pollution

emissions from 126 Spanish companies, from a range of sectors regulated under Spain's IPPC law and listed on the Pollutant Release and Transfer Register (Gomez and Rodriguez, 2011). The findings revealed no significant difference in atmospheric pollution emissions between those companies with ISO 14001 certification and those without. In effect, ISO 14001 allows companies to appear to take their environmental responsibilities seriously without requiring significant changes to operations. This suggests companies use the standard because of external pressures, either from customers and other stakeholders, or because of legislative requirements. Although the researchers caution their work includes only a sample of industries, these findings suggest more analysis is needed to demonstrate the actual effects of ISO 14001 certification on companies' environmental performance.

Corporate social responsibility

Spanish companies have become leaders in corporate social responsibility (CSR) reporting. In 2009, CSR reporting in Spain accounted for 22.6% of European country reports to the Global Reporting Initiative (van Wensen et al., 2011). In 2011, a survey of 144 large enterprises (including 47 industrial enterprises) found that 83% publish a CSR or sustainability report; 23% integrate the CSR into their annual report; and 42% have information verified by independent experts (CES, 2011).

Since 2008, emphasis has shifted from the environment towards employment creation, in line with the broader impact of the economic crisis on CSR activities. However, environmental protection, energy and resource efficiency still rank high among CSR programmes in Spain. Spanish companies have created the Club for Excellence in Sustainability that publishes reports on state-of-the-art CSR in Spain; and, in 2008, the government created a pioneering State Council on Corporate Social Responsibility (Olcese, 2013). Most recent CSR reports follow the Global Reporting Initiative (GRI) guidelines to the fullest extent (GRI, 2014). Since 2009, approximately 35 of Spain's largest companies by market capitalisation have participated in the Carbon Disclosure Project, disclosing their climate change management strategies (CDP, 2012).

With Spanish firms representing 874 of 6 117 active companies in the UN Global Compact, Spain represents one of the largest networks within the initiative. The Global Compact is a policy initiative for businesses that promotes responsible behaviour in the areas of human rights, labour, environment and anti-corruption. With their membership, companies commit to 10 principles, including a precautionary approach to environmental challenges; promoting greater environmental responsibility; and developing and diffusing environmentally friendly technologies. Spain's Global Compact network has developed separate reporting on progress with implementing the Compact's principles for small and large companies, developing a special reporting tool for SMEs. In 2013, it launched an online platform, Compactlink, to allow greater interaction among network participants, which includes online training, a self-assessment tool and discussion groups (UNGC, 2013).

In addition, the number of Spanish companies included in the FTSE4Good Index Series criteria, which assesses CSR performances of publicly listed companies, has increased markedly since 2007. Since 2008, a specific sustainability index has been developed for companies in the Spanish IBEX35 stock market index, the FTSE4Good IBEX Index (FTSE, 2008). However, the impact on corporate performance is unclear: stock market performances of companies with a greater commitment to CSR do not appear to differ greatly than those without such a commitment (FTSE, 2011).

Voluntary approaches

Although Spain does not have a strong tradition of voluntary approaches, industry has taken a number of initiatives to achieve environmental objectives beyond legal requirements. Over 60% of the Spanish chemical sector is part of the Responsible Care programme, an initiative launched globally in 1985 and implemented in Spain since 1993. In 2005, the environment ministry and ASPAPEL – the association of pulp and paper industries – undertook one of the most significant voluntary initiatives of the past decade. Their agreement established a reference framework to determine emission limit values. By expressing values in per unit of production terms rather than in concentration terms, the framework sought to create incentives for adoption of best available technologies. ASPAPEL members committed to reduce emissions, phase out the use of Cl_2 in whitening processes and produce annual certified reports. In return, the environment ministry committed to certify investments used to implement the agreement so they could benefit from fiscal incentives for environmental protection. The authorities also agreed to develop a reference framework for the environmental licensing process by liaising with ACs and basin authorities.

Other voluntary approaches included the agreement signed in 2008 by the MAGRAMA and regional governments of Asturias and Galicia with aluminium producers ALCOA Inespal and Aluminio Español. It focused on reducing emissions of fluorinated gases in aluminium electrolytic production. Another agreement with manufacturers of electrical equipment companies that transport and distribute electricity aimed to limit sulphur hexafluoride emissions.

Environmentally related R&D and eco-innovation

During the review period, the manufacturing sector increased environmental R&D and eco-innovation. Between 2004-06, total business expenditures in R&D of the sector increased from EUR 2.7 billion to EUR 3.4 billion, though they levelled off in 2006-10. Efforts to maintain R&D expenditure during the crisis led to an increase in the share of manufacturing within total business R&D, rising from 39.3% to 44.6% between 2008-10. Disaggregated data of expenditures in environmentally related R&D and eco-innovation are not available. However, other data show significant growth in the number of patents in environment-related technologies, particularly with respect to the renewable energies of wind and solar (Figure 3.8). Eco-innovation efforts by Spanish industry are partly driven by more stringent regulations and positive incentives to environmental investments introduced in the last decade discussed in previous sections.

Private sector funds account for around 80% of business R&D in manufacturing. Industrial enterprises can also access support for R&D and innovation from several programmes scattered through different ministries and public agencies. Public programmes that provide specific support for environmental R&D and eco-innovation include the INNPRONTA programme (which identifies energy, environment and climate change as one of its two priorities) and the EEA Grants programme.[17] The Spanish system for public support for R&D and innovation is characterised by a multitude of public agencies and programmes, and this also applies to public support for environmental R&D and eco-innovation. This makes it difficult to track total support for environmental R&D&I (FECYT, 2011). For example, the Strategic Action on Energy and Climate Change of the National Plan on R&D&I 2008-11 has been financed by various programmes of the Centre for Industrial Technological Development (CDTI) that include the Action Plan's objectives

among their priorities. In principle, the availability of different support mechanisms widens the possibility of accessing support. However, greater choice also makes it more difficult for industrial companies, particularly SMEs, to know their options for support and to apply for them. It may also increase administrative costs of managing the support programmes, as a share of the support allocated.

Many private companies state that eco-innovation is hampered by a lack of demand for environmental products in the domestic market (EC, 2013). While Spain could choose from a wide range of policy instruments to stimulate demand, demand-side innovation policies require increased policy co-ordination with sectoral and supply-oriented instruments. Currently, there is little co-ordination between policy instruments (Conchado et al., 2012). While public R&D support is monitored, results do not inform innovation policies. *Ex-ante* and *ex-post* evaluations, as well as annual questionnaires, assess the impact of public support for innovation, including employment benefits and the amount of corporate funding leveraged thanks to public R&D support. However, results are only used internally and not made available to the public. The monitoring of the innovation chain, therefore, stops before products have become competitive in domestic or international markets.

There is also a disconnect between institutions that conduct academic research, and the commercialisation of innovative products through companies, as well as between public and private researchers, and fundamental research and market needs in the field of eco-innovation (Conchado et al., 2012; Scarpellini et al., 2012). Technological centres that facilitate links between researchers with academic and commercial backgrounds; networks and partnerships between research institutes and private companies; and a better targeting of public support measures to facilitate commercial application of innovations could all help overcome the gap between fundamental research and commercialisation.

Since domestic firms are generally small, mechanisms to disseminate information about markets and stimulate awareness of business opportunities, particularly in Europe, should be promoted. Government R&D should be focused in areas where Spain appears to have the best comparative advantage. Large, long-term public procurement projects would help create demand for innovative, environmentally friendly products, as would implementation of an ambitious environmental agenda. Further efforts to stimulate dialogue and co-operation among the main players in the innovation system, including the financial sector and actors outside Spain, should be encouraged. All these efforts should also be supported by putting a price on pollution and removing environmentally harmful subsidies (through environmentally related taxes or emission trading systems), which should stimulate demand for eco-innovation.

Environmental goods and services sector

While information is neither complete nor consistent between different sources, evidence suggests that Spain's environmental goods and services (EGS) sector has expanded since the early 2000s. According to Eurostat (2013), EGS sector output reached EUR 46.7 billion in 2011. This is equivalent to 2% of Spain's GDP, comparable to that of agriculture (2.4% of GDP). Spain placed slightly below the average of 17 EU countries included in the Eurostat analysis.[18] Between 2007-11, EGS sector output increased by 6%, while GDP declined by 1.8%.

Between 2000-07, exports and imports of EGS increased by 56% and 45% respectively, but fell by several percentage points at the beginning of the crisis in 2008. In 2012, exports exceeded the pre-crisis values of 2007 for the first time, yet imports had not yet recovered. Spain's EGS trade balance reveals the dominance of renewable energy: in 2012, renewables made up 50% of the total value of EGS sector exports and 37% of its imports. Between 2006-12, imports remained at similar levels due to a 70% decrease compared to 2008. The trade balance between exports and imports of goods related to renewable energy was negative between 2000-11, and reached a peak deficit of EUR 6.5 billion in 2008. However, Spain reached a surplus of EUR 83 million in trade related to renewable energy in 2012. This is remarkable, given that both the EGS sector and the Spanish economy as a whole continued to experience trade deficits in that year.

A stronger environmental regulatory framework has been an important driver for the expansion of the EGS sector. This included stricter requirements for waste management, emissions of air and water pollution; and policies to combat GHG emissions and promote renewable energy. Policy uncertainty surrounding renewable energy support has had a negative impact on clean energy investments in Spain, which fell out of the top 10 countries in terms of investment volume in 2012 and 2013 (Pew, 2014, 2013, 2012, 2011). Previous research has underlined the importance of policy certainty in instruments such as feed-in tariffs for encouraging venture capital investments (Criscuolo and Menon, 2014).

According to a survey by the European Commission, 30% of SMEs decided not to offer green products and services due to insufficient demand from customers, which was higher than the EU average of 25% (EC, 2013). Their decision was mostly due to financial constraints enterprises face, combined with the view that environmentally friendly goods and services are more expensive. In the prolonged economic crisis, public support plays an important role in sustaining demand for EGS until private spending increases again. Spain's Green Public Procurement Plan, launched in 2008, is an example of policies that can stimulate demand.[19] Spain also launched an Action Plan for Energy Savings and Efficiency in the Buildings of the State Administration to promote energy savings and efficiency, as well as the associated goods and services. The plan aims for energy savings in 2012 in buildings owned by the national government, with the 2012 target of 9% mostly met; the 2016 target is 20%. Under the plan, 3 793 audits identified energy savings, although implementation of projects is hampered by lack of finance and broader difficulties with developing an energy services industry (Bobbino, Galván and González-Eguino, 2013). Current policies also emphasise cost savings over rewarding innovative products and are thus likely to have a limited effect on innovation.

Notes

1. The industrial sector includes extractive industries; the manufacturing sub-sectors; electricity, and gas supply and distribution; and water supply, sanitation and solid waste management. To a large extent, this chapter will focus on the environmental performance of manufacturing.
2. Including solvents.
3. The sector is also responsible for emitting other noxious air pollutants such as nitrous oxide (11% of the total), ammonia (less than 4% of the total) and methane (less than 2% of the total) (MAGRAMA, 2013a).
4. The methods used estimate the damage costs resulting from the air pollutant releases reported by nearly 10 000 individual facilities to the European Pollutant Release and Transfer Register (E-PRTR). The pollutants examined were regional air pollutants (ammonia, nitrogen oxides, particulate

matter (PM_{10}), sulphur dioxide and volatile organic compounds), heavy metals (arsenic, cadmium, chromium, lead, mercury and nickel), organic micro-pollutants (benzene, PAHs and dioxins and furans) and carbon dioxide (EEA, 2011).

5. Defined as the amount of economic wealth generated per unit of material used.

6. Other pillars of the programme included: enhancing macroeconomic and budgetary stability; developing transport networks and infrastructure; improving human capital; and pursuing social dialogue with the object of ensuring the labour market functions more efficiently.

7. The Ingenio 2010 plan aimed at aligning Spain with the strategy of the EU to reach 3% of the GDP invested in R&D by the year 2010 and to improve the "government-R&D centres-enterprises" axis.

8. The commission organised its proposals in four areas: i) reducing administrative duplication; ii) promoting regulatory simplification; iii) improving service delivery and shared services; and iv) strengthening institutional capacity of administration. These proposals were generated by senior civil servants from key areas of the central government, who also received suggestions from citizens through an electronic box and from an advisory council with representation of unions, the private sector and academia.

9. See *www.eia.es/nueva/legislacion_autonomica.html*.

10. The law set a deadline of one year for all Autonomous Communities to adapt their regulations to the new Law on Environmental Assessment.

11. The IPPC Directive was replaced by the Directive on Industrial Emissions (2010/75/EU).

12. For example, where the activity involves the use, production or release of relevant hazardous substances with the possibility of soil and groundwater contamination, the operator must submit a baseline report to the competent authority before starting an operation. In cases where the installation has caused significant pollution of soil or groundwater compared to the baseline, the operator must take all necessary measures to return the site to the original state.

13. Until 2013, a permit had to be renewed every eight years at the request of the facility's owner. However, a possibility for an *ex officio* revision by the competent authority will continue to be applied when any of the circumstances established under law arise.

14. EPER-Spain was implemented as part of the European Pollutant Emission Register, the Europe-wide register that provides easily accessible key environmental data from industrial facilities in EU member states. In 2006, it was replaced by an improved European Pollutant Release and Transfer Register (E-PRTR). The register contributes to transparency and public participation in environmental decision-making. It implements for the European Community the 2003 PRTR Protocol to the UNECE Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

15. The PRTR contains information on 115 pollutants, more than 86 required by the PRTR Protocol, and also on off-site transfer of waste. The data are presented separately for each facility and at aggregated levels such as by industrial activity or pollutant/waste. The register also makes available the complete inventory of facilities that report to the register, as well as reference documents such as relevant legislative acts and methodological guides.

16. After China and Italy, Spain is also the third country in the world with the highest number of companies certified by the ISO 9001 quality management certificate.

17. EEA Grants is a co-operation programme financed by Norway, Iceland and Liechtenstein. In addition to financing Spanish industry, it provides funds to 14 other EU countries. It supports environment and climate change exclusively.

18. EU15, Poland and Czech Republic comprised the 17 countries in the study. The Spanish government conducted a pilot analysis of the EGS sector in 2008 through its National Institute of Statistics (INE, 2011). This study followed an earlier Eurostat (2009) methodology and questionnaire, focusing on selected sectors for which data were available, or that had political priority in Spain. Therefore, total output in 2008 was estimated at only EUR 31.1 billion. This corresponded to a gross value added of 1% of GDP in that year (INE, 2011). The main sectors covered by the study were waste and wastewater management, renewable energy and organic agriculture. A number of areas, such as sustainable construction, desalination, R&D for environmental protection and the production of biofuels, were not included (INE, 2011).

19. The Plan aimed to green 50% of public procurement by 2010. The First General Report on the State of Green Procurement, released in 2011, found overall satisfactory implementation, but did not provide a specific assessment of the 2010 objective.

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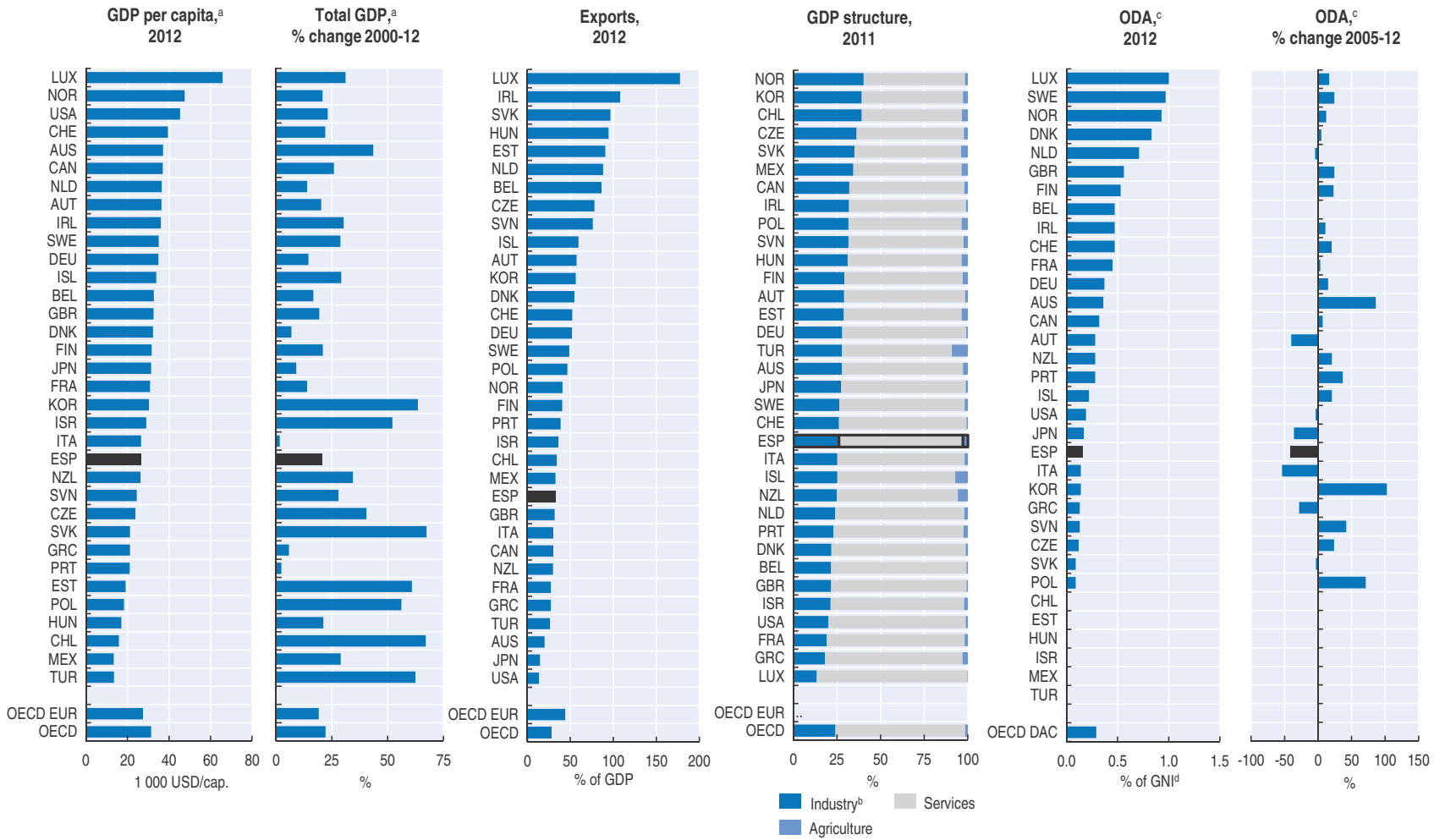
ANNEX I

*Selected data**

I.A. Selected economic data 212
I.B. Selected social data 215
I.C. Selected environmental data 216

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Annex I.A. **Selected economic data* – Economic context**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by shaded fill.

a) GDP at 2005 prices and purchasing power parities.

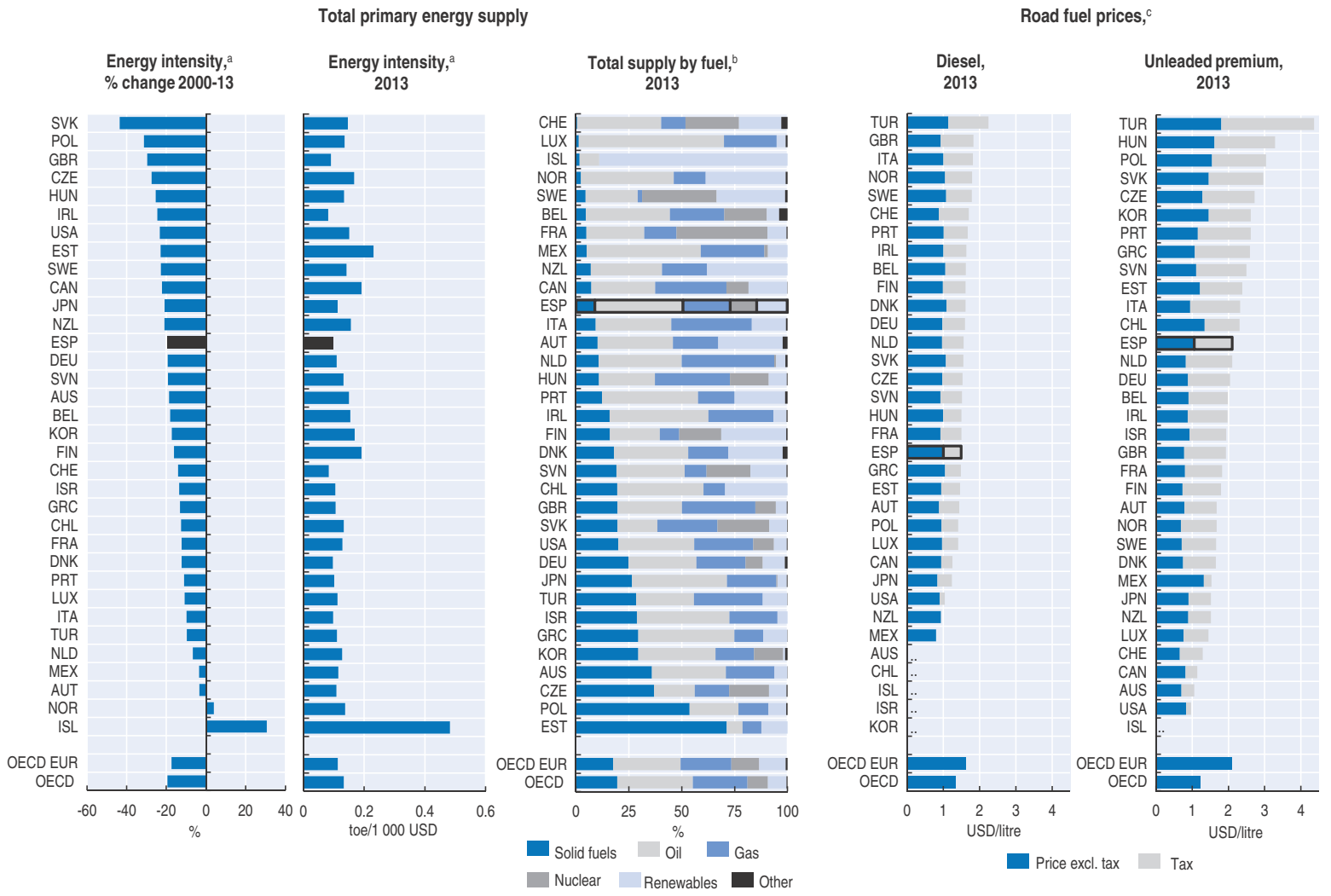
b) Includes mining and quarrying, manufacturing, gas, electricity and water, and construction.

c) Official development assistance by member countries of the OECD Development Assistance Committee. Total net disbursements at constant 2012 USD. CZE, ISL, KOR, POL, SVK and SVN became DAC members after 2005.

d) Gross national income.

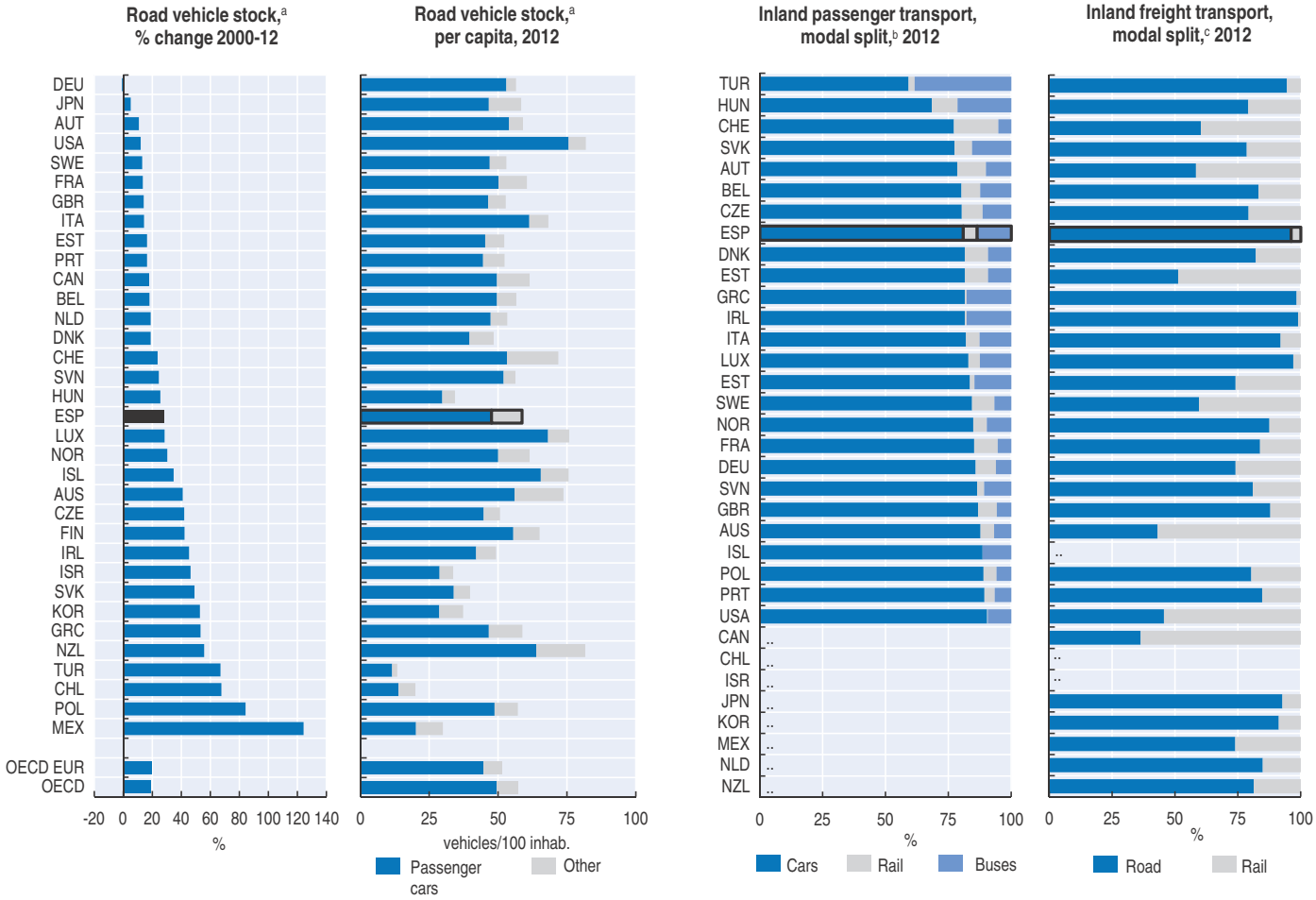
Source: OECD (2014), *OECD Economic Outlook No. 95* (database); OECD (2014), *OECD Environment Statistics* (database); OECD (2014), *OECD International Development Statistics* (database).

Annex I.A. **Selected economic data* – Energy**



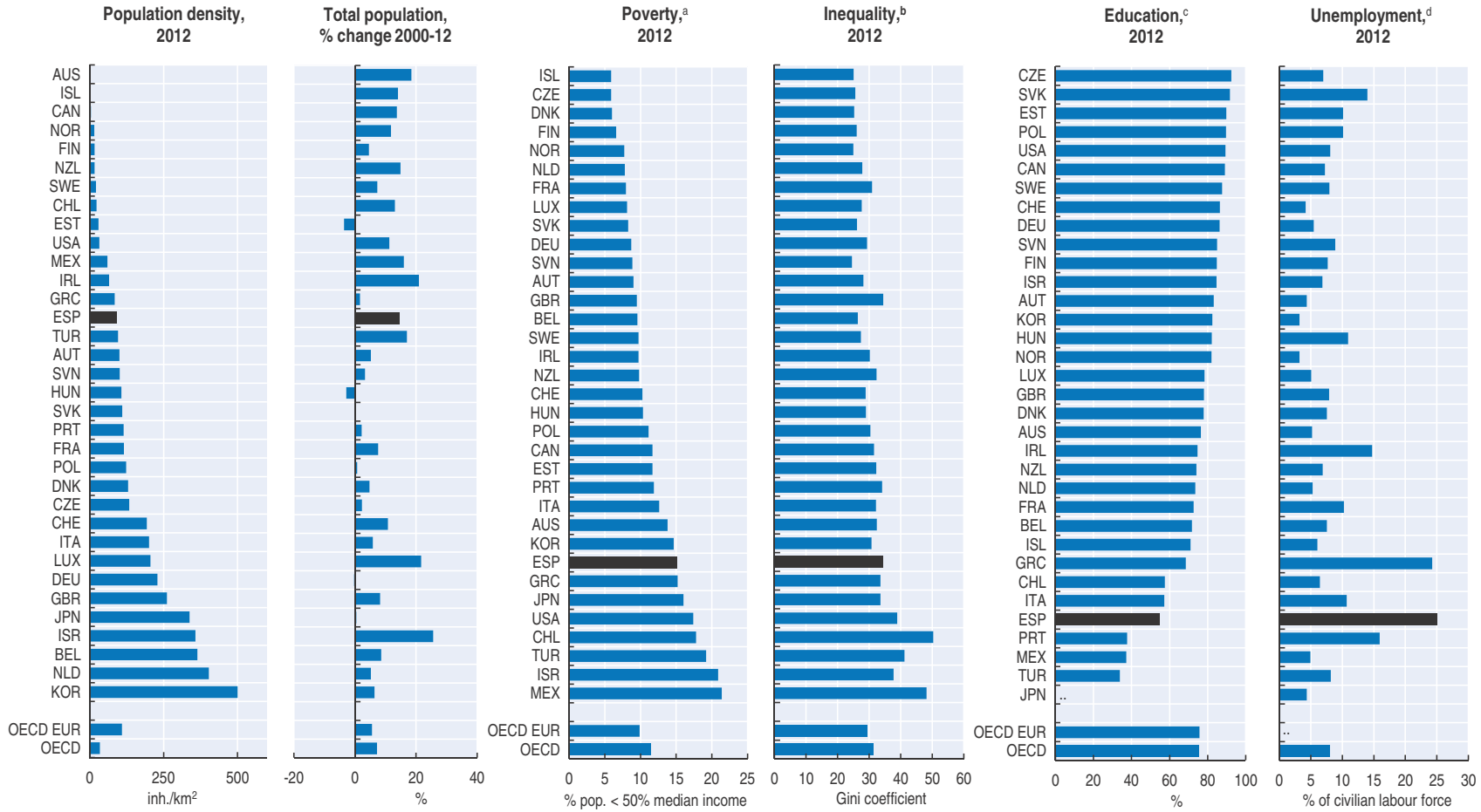
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Total primary energy supply per unit of GDP expressed at 2005 prices and purchasing power parities.
b) The breakdown excludes trade of electricity and heat.
c) Diesel fuel: automotive diesel for commercial use, current USD; unleaded petrol: unleaded premium (RON 95), except JPN (unleaded regular), USD at current prices and purchasing power parities.
Source: IEA (2014), *IEA Energy Prices and Taxes Statistics* (database); IEA (2014), *IEA World Energy Statistics and Balances* (database).

Annex I.A. **Selected economic data* – Transport**



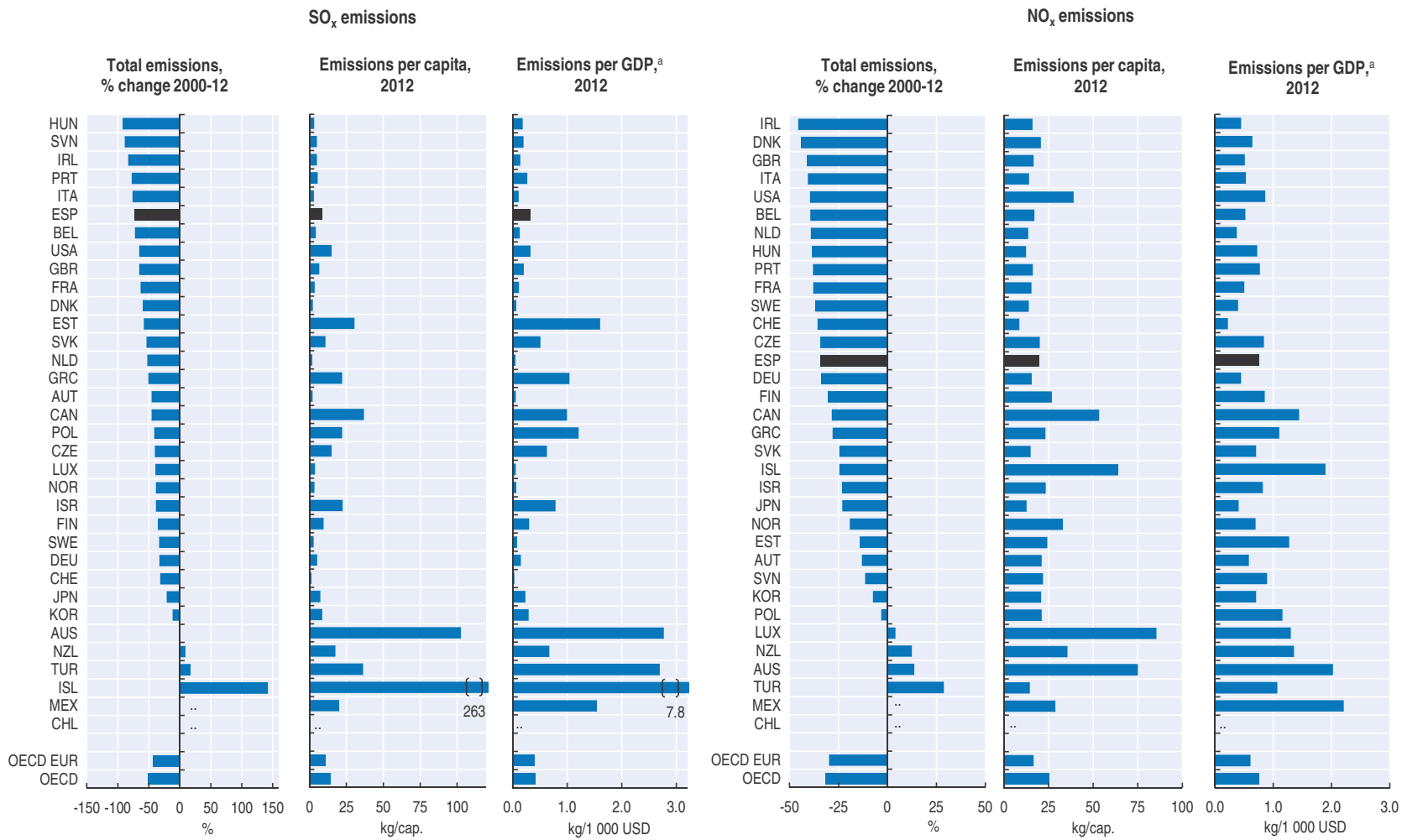
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Motor vehicles with four or more wheels.
b) Based on data expressed in passenger/km.
c) Based on value expressed in tonne/km.
Source: Eurostat (2014), *Transport Statistics* (database); OECD (2013), *Environment at a Glance 2013: OECD Indicators*; OECD/ITF (2013), *ITF Transport Outlook 2013: Funding Transport.*

Annex I.B. **Selected social data* – Social context**



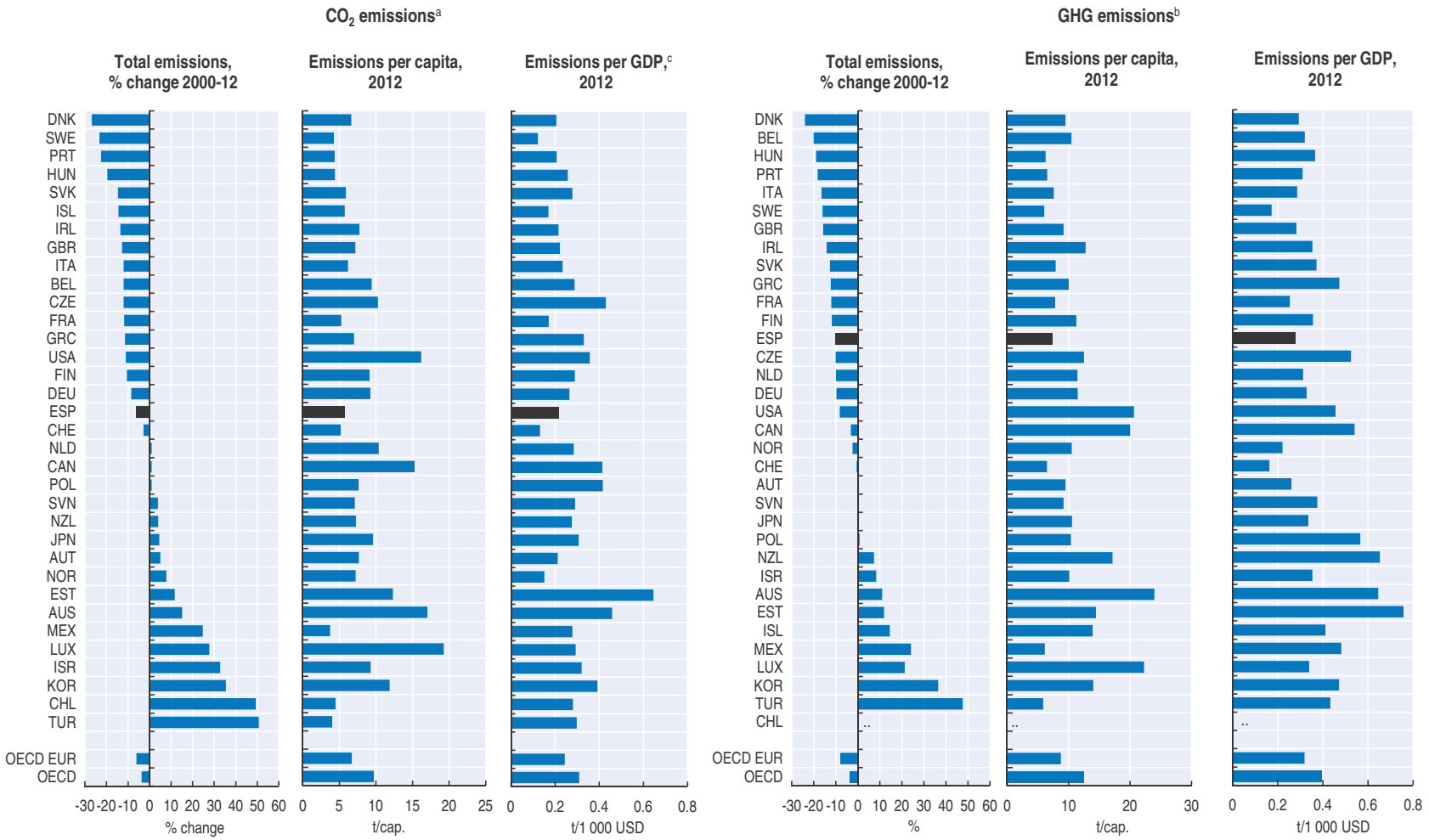
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Share of population with an income under 50% of the median income after taxes and transfers. OECD and OECD EUR: average of rates.
b) Ranging from 0 (equal) to 100 (inequal) income distribution, based on total disposable income (incl. all incomes, taxes and benefits) for the entire population. OECD and OECD EUR: average of rates.
c) Share of population aged 25-64 years with at least upper secondary education. OECD and OECD EUR: average of rates.
d) Harmonised unemployment rates.
Source: OECD (2014), *OECD Education Statistics* (database); *OECD Environment Statistics* (database), *OECD Main Economic Indicators* (database), *OECD Social and Welfare Statistics* (database).

Annex I.C. **Selected environmental data* – Air**



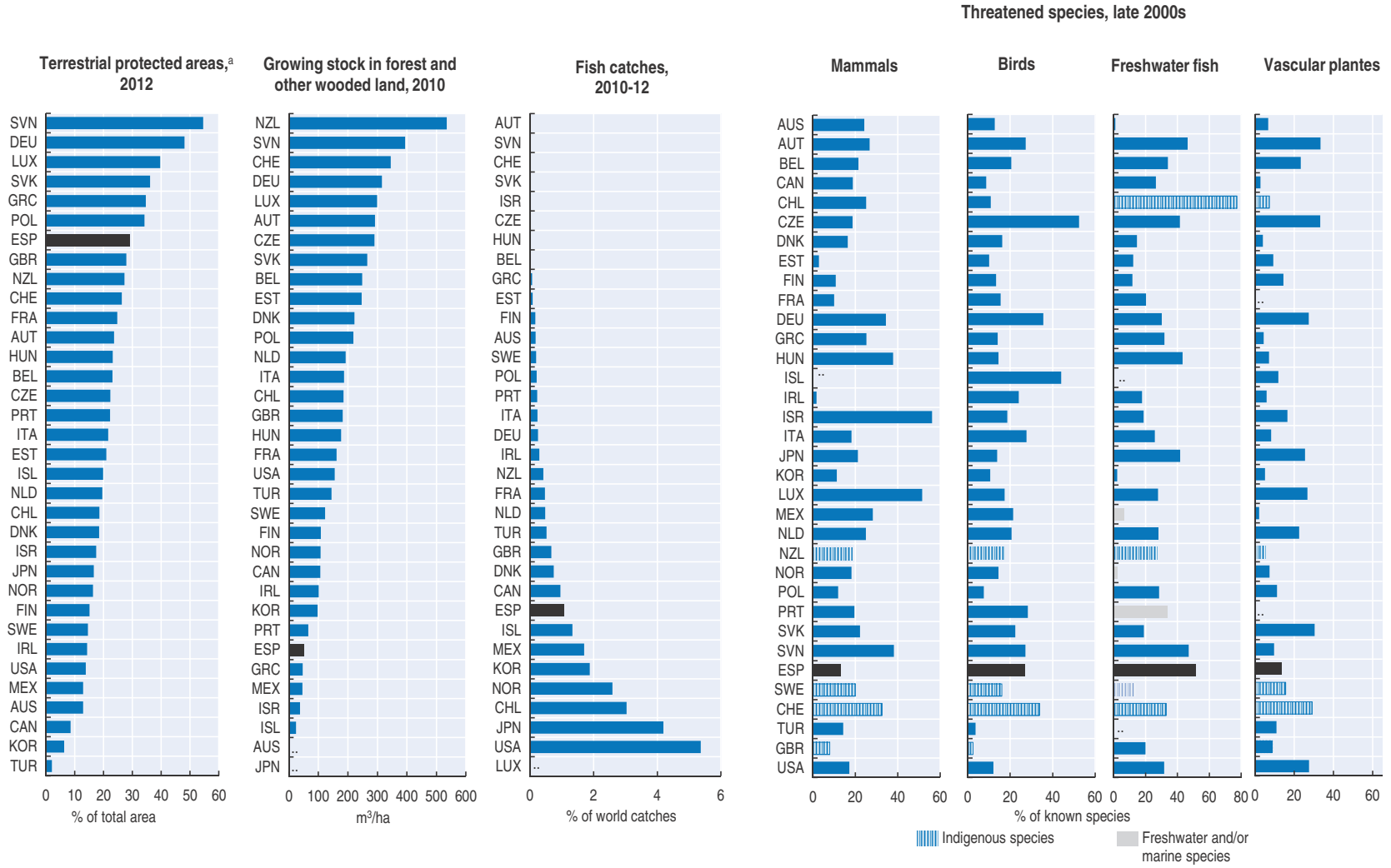
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) GDP at 2005 prices and purchasing power parities.
ISL: SO_x emissions include emissions from geothermal energy. LUX: NO_x emissions exclude emissions from "fuel tourism".
Source: OECD (2014); *OECD Environment Statistics* (database).

Annex I.C. **Selected environmental data* – Climate**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Emissions from energy use only; excluding international marine and aviation bunkers; sectoral approach.
b) Excluding emissions/removals from land use, land-use change and forestry. ISR: 2000 data exclude F-gases.
c) GDP at 2005 prices and purchasing power parities.
Source: IEA (2014), *IEA CO_2 Emissions from Fuel Combustion Statistics* (database); OECD (2014), *OECD Environment Statistics* (database).

Annex I.C. **Selected environmental data* – Biodiversity conservation and sustainable use**

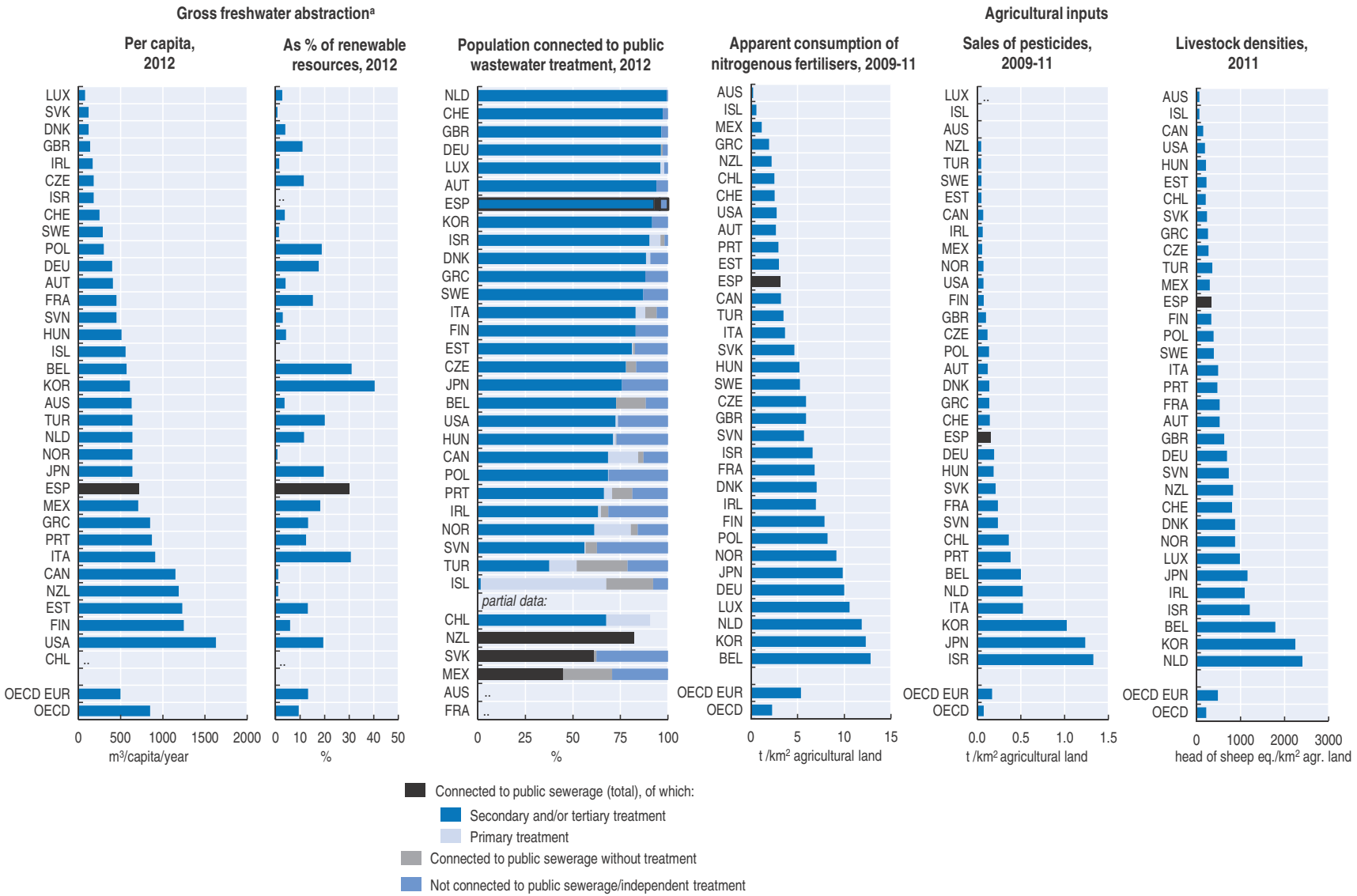


*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.

a) Nationally designated terrestrial protected areas recorded in the World Database on Protected Areas (WDPA). National classifications may differ.

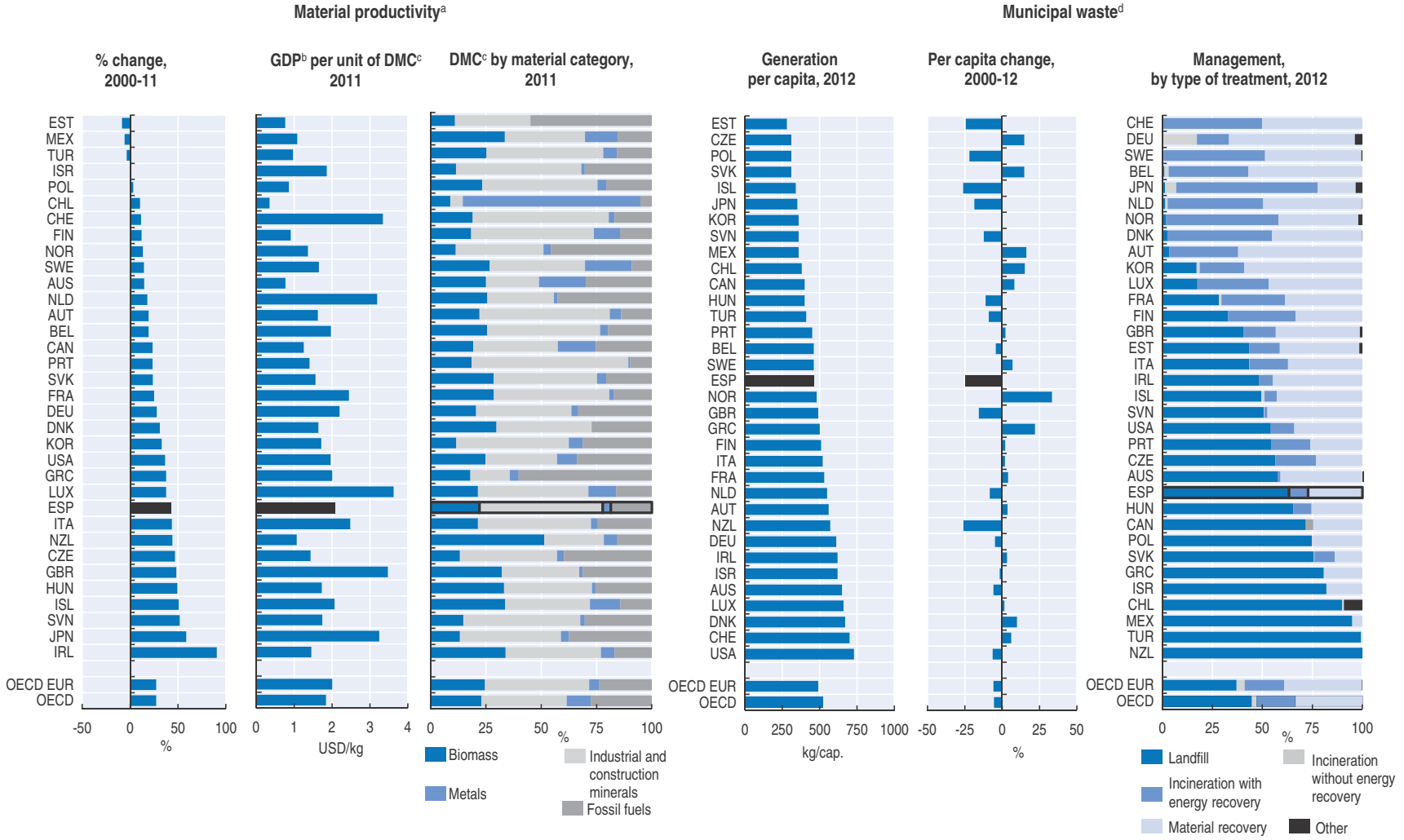
Source: FAO (2014), *Global Capture Production* (database); FAO (2010), *Global Forest Resources Assessment 2010*; OECD (2014), *OECD Environment Statistics (database);* UNSTATS (2014), *Millennium Development Goals Indicators* (database).

Annex I.C. **Selected environmental data* – Water and land**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) For some countries, data refer to water permits and not to actual abstractions.
GBR: Water abstraction and public wastewater treatment: England and Wales only; pesticides use: Great Britain only.
Source: OECD (2014), *OECD Environment Statistics* (database).

Annex I.C. **Selected environmental data* – Material productivity and waste**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Amount of GDP generated per unit of materials used, ratio of GDP to domestic material consumption (DMC).
b) GDP at 2005 prices and purchasing power parities.
c) DMC equals the sum of domestic extraction of raw materials used by an economy and their physical trade balance (imports minus exports of raw materials and manufactured products).
d) Waste collected by or for municipalities and includes household, bulky and commercial waste, and similar waste handled at the same facilities. CAN: household waste only and total incineration; NZL: landfilled waste only.
Source: OECD (2014), *OECD Environment Statistics* (database).

ANNEX II

Actions taken on selected recommendations from the 2004 OECD Review

Recommendations	Actions taken
Implementing more efficient environmental policies	
Strive for implementation of the polluter-pays and user-pays principles to improve the efficiency of environmental policies and secure financing of environmental services, including in the context of fiscal powers devolution.	Spain adopted in 2012 a range of new taxes on energy. They broadened coverage of fuels that were previously untaxed, notably natural gas for heating, and fuels for energy transformation. Fiscal spending through tax exemptions on biofuels ended in 2012, when the excise tax exemption for these fuels was abolished. New taxes on nuclear waste and fluorinated gases were also recently implemented, and taxes on air pollution, water and waste storage are being considered. Water service fees and charges (including a wastewater discharge tax) are used to finance river basin authorities, which manage water resources and wastewater releases, public storage and long-distance transport infrastructure. In 2014, water use charges were expected to raise EUR 34 million in revenue. Prices for water services to households rose by about 12% in real terms between 2001 and 2009. Price rises were higher in the regions most strongly affected by water scarcity. However, water supply charges for households are lower than in most OECD member countries.
Review the policy mix supporting environmental management; increase the use of economic instruments; strengthen enforcement mechanisms for both pollution and land use regulations (e.g. administrative and penal sanctions); monitor the effectiveness and efficiency of voluntary approaches.	A 2014 report on fiscal reform – the "Lagares" report – proposed to simplify, consolidate and reform existing environmental taxes to better capture environmental externalities and reduce the tax burden on labour. It provides a good basis for developing a green tax reform agenda. Several Autonomous Communities have strengthened compliance assurance policies as part of the process of cutting red tape. Responding to new inspection requirements of the EU Directive on Industrial Emissions, many regions have developed prioritised environmental inspection plans, subject to minimum national limits established in 2011. Even though regional authorities have complete discretion in monitoring compliance with their own regulations, fines for non-compliance must conform to national standards that define lower and upper limits for specific types of infringements.
Speed up the development of a national environmental strategy with appropriate multistakeholder consultation, measurable and timebound environ-mental objectives and targets, and related indicators;	Spain does not have a consolidated national environmental strategy or policy. Instead, there are a number of sector- and media-specific documents that established objectives, goals and specific targets on key environmental issues. The major strategic documents adopted during the last decade included: the Integrated Waste Management Programme, the National Air Pollution Reduction Plan, the Hydrological Water Plan, the 2006 Climate Change and Clean Energy Strategy (EECCEL), the Climate Change Roadmap and the National Climate Change Adaptation Plan. All have been subject to regular reviews and revisions that took account of progress, budgetary cycles and new requirements stemming from international initiatives.

Recommendations	Actions taken
Increase the use of economic analysis to improve the efficiency of environmental policies; eliminate environmentally harmful subsidies in the water sector.	Impact assessment of legislative and secondary regulatory proposals has been enshrined in the legal system since 1997. The development of legislative proposals included "memorias", which since 2003 comprised estimated costs of the proposals. Spain has advanced the application of analyses of the economic benefits in the analyses of ecosystem services. A project Valuation of Natural Assets of Spain (VANE), conducted by the University of Alcalá in 2004-08 with the support of the Ministry of Agriculture, Food and the Environment, was the first attempt to identify value of goods and services provided by natural resources throughout the Spanish territory. More recently, Spain completed the first phase of the Millennium Ecosystem Assessment Spain, which generated additional information on changes in the ecosystems that have a direct effect on human welfare. In the second phase of the assessment, efforts are underway to develop the economic and social dimensions of the assessment. While significant changes since the 2004 Agua programme and the 2005 Water Act have improved pricing structures and demand management measures, water for irrigation remains partly subsidised in Spain. Farmers who use state infrastructure pay a "water use tariff" (*tarifa de utilización del agua*) and those who reply on public infrastructure to abstract water also pay a "water regulation levy" (*canon de regulación*). Total subsidies for irrigated agriculture, have been estimated at EUR 906 million to EUR 1.1 billion per year for 1998-2008. Subsidy levels after 2008 have been lower since most irrigation modernisation projects were completed; economic considerations modified the ability to subsidise use of water for irrigation; and preferential electricity tariffs for agricultural activities were abolished in 2008.
Air management	
Strengthen efforts to improve ambient air quality (e.g. ozone and particulate matter concentrations) and to reduce air pollutant emissions (e.g. SO_x and NO_x from power generation, NO_x and VOCs from transport, VOCs from solvent use, ammonia from agriculture); strengthen efforts to meet national emission ceiling targets for SO_x, NO_x, VOCs and NH3;	Two of the principal measures to reduce local air pollution were the Law (34/2007) on Air Quality and Protection of the Atmosphere and the National Plan for Air Quality and Atmosphere Protection 2013-16, referred to as "Plan Aire". The law made it mandatory for ACs and cities with over 100 000 inhabitants to develop and adopt programmes to improve air quality and to comply with the air quality targets set for their territory. Plan Aire provides a reference framework for the improvement of the air quality in Spain through a series of specific measures as well as through co-ordination with other sectorial plans. Spain also launched several programmes to support cleaner vehicles: the five–phase Efficient Vehicle Incentives Programme (PIVE) that aimed to modernise the nation's motor vehicle stock; the 2010-14 Action Plan to Promote Electric Vehicles (Plan MOVELE), which established a target of having 250 000 electric vehicles on Spanish roads by the end of 2014; as well as the Plan to Promote the Environment (PIMA Aire), which aims to improve air quality in Spain through a renewal of commercial vehicle fleet with more efficient and less polluting vehicles. Significant investments have been made in high-speed rail over the past several decades, with considerable co-funding from EU sources. Spain also reformed its vehicle registration tax in 2008, linking it to carbon dioxide emissions rather than vehicle engine power. The government is currently working on a proposal to restructure the annual vehicle circulation tax to better reflect the environmental cost of vehicle use, covering emissions of air pollutants as well as CO_2. The proposal would also merge the vehicle registration and circulation taxes, resulting in a single annual country-wide tax rate. Regarding transport fuels, nominal excise taxes for diesel increased in 2007 after remaining stable since 2002. These have increased in real terms since 2008, as have taxes on petrol, following a decline in real terms since 2002.

Recommendations	Actions taken
Reduce greenhouse gas emissions in conjunction with other goals, such as meeting the air emission reduction objectives for 2010, energy security, energy efficiency and greater use of renewable energy;	The 2004 Spanish strategy for meeting objectives under the Kyoto Protocol together with the 2007 Spanish Strategy for Climate Change and Clean Energy defined the basic framework for medium-long term actions and included measures for a direct or indirect reduction of greenhouse gases and adjustment to their effects. The policies were reinforced by specific plans and initiatives on energy (e.g. the 2006 plan to phase out support to coal, the 2007 decree on the promotion of renewable electricity and the 2008-12 Strategy for Energy Saving and Efficiency in Spain) and transport. Since 2000, GHG emissions have exceeded, on average by 26% every year, the emissions level set under Spain's Kyoto Protocol target for 2008-12 (15% above the 1990 level). However, the excess amount of emissions dropped significantly in 2008-12.
Improve the integration of air quality concerns in energy decisions (including promotion of greater energy efficiency and investments to reduce emissions from power plants, refineries and industrial facilities), with a focus on large combustion plants and integrated pollution prevention and control; continue developing and using renewable energy sources.	The 2002 Integrated Pollution Prevention and Control (IPPC) Law harmonised the Spanish legal framework with the EU IPPC Directive (96/61/EC). It required operators of large industrial installations, around 4 500 covered by Annex I of the IPPC Directive, to obtain an integrated permit (*autorización ambiental integrada* – AAI). Around 10% of 6 100 large installations were awaiting completion of the procedure in 2011, four years after the deadline. Emission limits in the permits were based on best available techniques (BAT) and had to take into account local environmental conditions. The regional authorities, which are competent to provide the permits, publish their inventory of industrial installations with AAI, available for public information on the Spanish PRTR platform (www.prtr-es.es). Since 2004, renewable electricity production was supported through provision of a fixed tariff awarded per unit of electricity generated (a feed-in tariff) or an additional payment awarded on top of the market price of electricity to compensate the higher cost of generation (a feed-in premium). Renewable energy supply has increased by a remarkable 147% since 2000 and accounted for approximately 14% of primary energy supply in 2013. The increase accelerated particularly after 2005, as a result of the fast development of wind and solar capacity for electricity generation. Supply has also increased from biomass and biofuels, while it has remained relatively steady for hydropower.
Water management	
Implement the Water Act's minimum reserve flow requirements in such a way that river habitats are restored and effectively protected.	As required by the Water Framework Directive, Spain has introduced environmental flows (e-flows) in the first river basin planning cycle. The new water management plans incorporate the definition and mechanism of implementation of the e-flows regimes in each river basin. The water plans define minimum flow regimes both under normal hydrological situations and under droughts.
Review and revise the National Hydrological Plan.	The 2004 Plan AGUA (Actuaciones para la Gestión y la Utilización del Agua) significantly adjusted the approach to water management adopted by the 2001 Spanish National Hydrological Plan (NHP). The new plan shifted emphasis from developing artificial water reservoirs and transfer schemes, especially the highly disputed 914 km-long water transfer scheme from the lower Ebro river in the northeast of Spain to the regions along the Mediterranean coast. It also emphasised demand management approaches, wastewater recycling and reuse, and strengthened water governance. The plan emphasised the need to build desalination plants as a means of augmenting water supply.
Expand the mix of measures to halt over-exploitation of groundwater resources.	The groundwater monitoring networks were expanded and include now over 2 500 measurement points, an increase by 180% between 2002 and 2011. Local and regional groundwater abstraction controls and restrictions have been applied in overexploited and risk groundwater bodies and incorporated in River Basin Management Plans. No new groundwater concessions are issued until a hydrogeological study is carried out to analyse the groundwater situation.

Recommendations	Actions taken
Improve recognition and understanding of the relationships between water and economic variables with: i) better data on expenditures, prices and financing; ii) systematic analysis of the microeconomic conditions facing key water users; and iii) a systematic review of subsidies for water supply and treatment infrastructure, aiming at cost-effectiveness and long-term financing of the maintenance and upgrading of facilities.	Spain has actively worked to establish the relationship between the use of water and economic development in the context of the preparation of the RBMP. Hydrological plans for each of the Spanish river basin districts provide analyses of value-added, production, employment, dependent population, social structure and productivity in the use of water. The values of green water and blue water, as well as the movements of virtual water are systematically analysed.
Biodiversity	
Extend the total size of protected areas and ensure that they are representative of the main habitat types, in the context of implementing the Natura 2000 network and as part of development of regional spatial planning strategies; prepare management plans for all parks and reserves and guidelines for the development of the Natura 2000 network.	The territory under some form of protection increased by 9% between 2000 and 2012, and currently covers 29% of the territory. There is considerable regional variability with respect to protected areas. Marine protected areas also significantly expanded and in 2014 cover 8.4% of the territorial waters. Around one-third of Spanish protected territory areas do not have a management plan. Fourty-two percent of national parks have Natural Resources Plans, which serve as long-term strategic documents and 68% have Use and Management Plans to govern day-to-day operations. Of the 15 national parks, 4 do not have management plans, although for 2 of these, draft versions are nearly complete. Also, Internationally Agreed Protected Areas (IAPAs) do not have separate management plans as this is not required. Yet, IAPAs often overlap with other protected area categories and hence, benefit from the management plans that have been put into place for these areas.
Foster co-ordination of nature management among the autonomous regions, possibly through reinforcing the role of the National Nature Protection Commission; provide a legal basis for ecological corridors.	The State Commission on Natural Heritage and Biodiversity has played an important role as the consultative and co-operation body with the regional authorities on matters related to nature conservation and biodiversity, with a view to a more efficient management and fulfilment of the principle of solidarity in the decision making process on these issues. Its composition, functions and rules of procedures were adjusted in 2008 and a number of specialised committees were established, i.e. on Nature Protected Areas, Wild Fauna and Flora, Wetlands, and Inventory on the Natural Heritage and Biodiversity.
Enhance nature conservation along rivers, particularly in the context of the creation of a public hydrological domain.	The National Strategy for River Restoration supported several projects to enhance nature conservation along rivers, while the National System for Flood Prone Areas helps to manage the hydraulic public domain and the flood prone areas of the main rivers in Spain.
Improve integration of nature conservation concerns in the agriculture sector, through a sectoral action plan under the national biodiversity strategy and greater reliance on (and more targeted use of) agri-environmental payments.	Spain does not have a consolidated nation-wide sectoral plan for integrating biodiversity considerations into agriculture. However, the Strategic Plan on Natural Heritage and Biodiversity set the parameters for its development and included a series of policy measures for integration of biodiversity objectives into agricultural policy. The main pillars of the integration include subsidy instruments associated with the Common Agriculture Policy, rural development programmes and the promotion of organic farming. Spain introduced compulsory environmental conditionality and cross-compliance in 2004. In 2009 the criteria for cross-compliance were simplified with the aim to enhance compliance and facilitate enforcement. Another initiative to establish the minimum controls for cross-compliance enforcement has been the development of a National Plan for Cross-compliance Control (implemented annually since 2005). This plan was developed by the Spanish Agrarian Guarantee Fund (FEGA) of the MAGRAMA, the national authority that co-ordinates agri-environment payments, and the Autonomous Communities.

Recommendations	Actions taken
Set a target for protection of remaining natural coastal areas from urban development; accelerate implementation of the 100-metre dune and beach protection zone.	The Law for the Protection and Sustainable Use of the Coast (2/2013) modified the concept of maritime-terrestrial public domain that had been previously established in order to reinforce the legal safeguards in favour of coastal protection. The law also harmonised public domain in all of Spain's ACs and provides guidelines for concessions related to the sustainable use of coastal areas. The aim of the law is to retain the same size of coastal protection zone (100 metres) for the majority of coastal areas and only allow special provisions for reducing it (to 20 metres) in areas that had urban character before 1988. The law also clarified types of construction and building maintenance that can be undertaken in coastal areas. The implementation of the law has been supported by a number of coastal ecosystem restoration projects affecting coastal wetlands and dune ecosystems.
Integration of environmental concerns into economic decisions	
Further decouple environmental pressures from economic growth to reduce pollution intensity and improve the resource efficiency of the economy.	The carbon intensity of the Spanish economy has declined by more than 20% since 2000; in 2012, it was lower than the OECD average. The energy intensity of the economy decreased by more than 15% between 2000 and 2012. Spain has made progress in improving the material productivity of its economy, i.e. the economic output generated per unit of material used. This is due to the tripling of material recycling since 2000. Material productivity remains higher than the OECD average. Municipal waste generated per capita decreased by 23% in 2000-12, remaining well below levels in other OECD member countries. Spain has one of the highest intensities of water use in the OECD and is considered as medium-high water-stressed, i.e. abstracting around 30% of its total available renewable resources. Nitrogen and phosphorous surpluses have declined more than in other OECD member countries, mostly due to the growth of organic farming; however, the amount of nitrogen fertiliser used per square kilometre of agricultural land is higher than the OECD average.
Finalise the Spanish Sustainable Development Strategy with the involvement of civil society.	The Sustainable Development Strategy was adopted by the Spanish Council of Ministers in November 2007. It included seven high-priority areas: climate change and clean energies; sustainable transport; sustainable production and consumption; public health challenges; management of natural resources; social inclusion, demography and migration; and the fight against world-wide poverty. A periodic review and evaluation process based on a set of specific indicators was established under the Inter-Ministerial Group. The priorities reflected those of the 2006 EU Sustainable Development Strategy and were linked to the National Reform Programme.

Recommendations	Actions taken
Further strengthen policy co-ordination and integration among all levels of government as an important component of achieving environmental objectives.	The Sectoral Conference on the Environment (CSMA) plays an important role in bringing together heads of environmental departments of all Autonomous Communities and the MAGRAMA. The main functions of the CSMA are to agree on national legislation that affects regional powers; to approve and monitor plans and programmes whereby the central administration and regional governments decide to cooperate for a specific period; to exchange information between central-state and regional governments; and to formulate joint positions at the international level, including the EU. The CSMA is supported by a system of more specialised multilevel co-ordination bodies on specific issues and by the lower level working groups of various forms and mandates. These included the National Council on Water (2001); the Climate Change Policy Co-ordination Commission and its working groups (2005); the State Commission on Natural Heritage and Biodiversity (2007); Waste Co-ordination Commission (2011). In the case of water, for the management of river basin districts that cross a regional border, there is intensive co-ordination among the state and the ACs. The creation of the Environmental Policy Advisory Council for European Community Affairs in 2012 was an important step towards strengthening the implementation of EU environmental policies. The other form of co-operation includes "bilateral co-operation commissions" (Comisiones Bilaterales de Co-operación); these are similar to the sectoral conferences but are established between the state and a single AC in order to solve co-ordination problems in a more focused and timely manner. A successful model developed in the environmental field has been extended to other sectors.
Develop strategic environmental assessment (SEA) of sectoral programmes and plans with appropriate public participation; in particular, integrate further environmental considerations in agricultural policies and physical planning.	The SEA procedures became obligatory following the adoption of the Law on the Assessment of the Effects of Certain Plans and Programmes on the Environment (9/2006). The law transposed the EU SEA Directive (2001/42/EC) into Spanish law, two years after the EC deadline. In addition to the basic requirements application for the whole territory, the law also allows the ACs, in the framework of their competencies, to develop their own SEA legislation with additional requirements.
At project level, continue and further strengthen the use of environmental impact assessment (EIA).	The EIA has been regulated since 1986, but the system was significantly reformed in 2001 and 2006 to bring EIA procedures in line with EU requirements. In particular, the reforms substantially extended the scope of projects subject to the compulsory EIA (Annex I) and those subject to discretionary EIA at the regional level (Annex II). The reforms also included stronger provisions for public participation in EIA procedures and incorporated EIA requirements into the transboundary context. In 2008, a consolidated text of the Law on Environmental Impact Assessment contributed to increasing the legal certainty for project promoters. The MAGRAMA has established the SABIA data base to collect information regarding EIA of projects carried out by the central administration and to strengthen public participation in the approval process.
Continue to phase out environmentally harmful subsidies (direct and indirect) in the coal, agriculture and fishery sectors.	Support to hard coal producers continues to be provided through government transfer payments to coal companies to compensate them for the difference between their operating costs and the prices at which they sell their output to local power plants; use of Spanish coal at power plants, the principal market, is based on volume quotas set by the government. Power producers contract directly with mining companies for the volume and price of coal under their quota. Subsidies provided to agriculture have been overhauled since 2004 in line with changes to the EU's Common Agricultural Policy. Principal modifications included greater decoupling of direct payments to farmers from the volume of agricultural production, and linking them to maintaining various environmental, food safety, animal and plant health and welfare standards (known as "cross compliance"). The changes also devoted more money to rural development policy through regional Rural Development Plans, which include compulsory agri-environmental programmes.

Recommendations	Actions taken
Review existing environmentally related taxes (e.g. on energy and transport) with a view to restructuring them in a more environmentally friendly manner, possibly in the context of a fiscal reform better balancing energy and labour taxation.	In July 2013, Spain launched a process to consider a comprehensive tax reform with several major elements, including reducing taxes on labour, removing the bias towards indebtedness and reducing the public deficit. This process provides an important opportunity to advance reform of environmental taxation to more broadly cover energy use and address negative environmental externalities. The Commission of Experts produced a final report in March 2014 on reforming Spain's tax system, including environmental taxes – the Lagares report. Its recommendations provide a good basis for further greening the country's tax system.
Integration of environmental and social concerns	
Continue to consider employment implications in environmental decisions and policies.	The Spanish government has attempted to quantify what it considers to be "green" jobs related to the environmental goods and service sector. Despite significant variation in estimates of green jobs depending on the scope, methodology and data sources used, all studies find an increase in green employment since 1998, when the earliest study was undertaken. Using a selected set of sectors, the Spanish government estimates the number of environment-related jobs at 159 200 in 2012. The increase in employment stemmed from economic growth and the simultaneous development of green sectors, especially renewables, water and waste management, and environmental education. After 2008, the most important driver of green jobs has been the renewable energy sector: employment increased by over 3 000% between 1998 and 2009, from 3 500 to 109 400 jobs. However, environmental policies have neither been systematically reviewed in terms of their impact on the job market, nor measures taken to enhance employment through targeted environmental policies.
Renew and broaden communication between national and regional environmental authorities and civil society (e.g. NGOs, trade unions) and increase public participation (e.g. in the preparation of sustainability strategies, plans and programmes, EIA and SEA procedures).	The 27/2006 Law promoted transparency of public decision making and civic participation in policy development and evaluation. The law modified the existing framework to comply with the provisions of the Aarhus Convention, particularly by redefining "public" and "public concerned" and strengthening provisions for early participation in the policy-making process. In particular, the regulatory framework for SEA, EIA and environmental permitting introduced mechanisms to enhance the way the public can influence final decisions, including extending the duration of consultations and using electronic means to access documents and provide comments. Similar provisions have been applied at the regional level. Several consultative bodies to the MAGRAMA engage representatives of the public, including NGOs, in defining environmental policies. The Environmental Advisory Council (CAMA) consists of 15 members appointed for a two-year term, including NGOs, trade unions, businesses, farming and municipality associations. The Council makes publicly available all draft legislation before its approval. Prior to international meetings, such as the Conference of the Parties to multilateral environmental agreements in which Spain is represented, the MAGRAMA maintains permanent contacts with NGOs and other representatives of civil society.
Ratify and effectively implement the Aarhus Convention.	Spain ratified the Aarhus Convention in December 2004, and passed the law regulating rights to access to information, public participation and access to justice (27/2006). Its provisions also transposed two EU directives, the Directive on Public Access to Environmental Information (2003/4/EC) and the Directive on Public Participation in respect of the drawing up of Certain Plans and Programmes relating to the Environment (2003/35/EC).

Recommendations	Actions taken
Further develop and use environmental indicators at national and regional levels, including to monitor progress towards meeting environmental objectives.	Since 2004, the "Environmental Profile of Spain" has been published each year. It provides an annual snapshot of the environmental situation in the country using selected indicators, analyses major pressures on the environment and monitors effectiveness of policies. Since 2008, the MAGRAMA has produced a separate detailed annual statistical yearbook that offers detailed regional and national statistics on various aspects of the environment. The Public Data Base on Environmental Indicators, which lists 68 key environment indicators selected in co-operation with the European Environment Information and Observation Network (Eionet), is available from the MAGRAMA's website.
Sectoral integration: Towards sustainable tourism	
Strengthen efforts to improve the environment in coastal areas, protect it from pressures related to development of infrastructure, construction and tourism, and promote integrated coastal management in tourism.	The Law for the Protection and Sustainable Use of the Coast (2/2013) modified the concept of maritime-terrestrial public domain that had been previously established in order to reinforce the legal safeguards in favour of coastal protection. The law also harmonised public domain in all of Spain's ACs and provides guidelines for concessions related to the sustainable use of coastal areas. The aim of the law is to retain the same size of coastal protection zone (100 metres) for the majority of coastal areas and only allow special provisions for reducing it (to 20 metres) in areas that had urban character before 1988. Several programmes focused on improving coastal tourism. These included the State Secretariat for Tourism's Programme for the Integrated Revalidation of Mature Tourism Destinations (in four pilot destinations: the beaches of Palma in the Balearic Islands, the Costa del Sol in Andalusia, San Bartolomé de Tirajana and Puerto de la Cruz in the Canary Islands) and the Spanish Tourism Board's (CONESTUR) support under the 21st Century Plan for Coastal Tourism. Finally, the Tourism Infrastructure Modernisation Fund (FOMIT), worth EUR 200 million, has been at the disposal of municipalities for the modernisation of infrastructure and tourism accommodation, particularly in coastal areas.
Pursue efforts to integrate environmental concerns in the tourism sector by establishing a national strategy for sustainable tourism development; introduce quantitative and qualitative targets.	The 2007 Tourism Plan "Horizon 2020", a comprehensive strategy to improve the quality of the country's tourism products, called for ensuring that Spain stays competitive in the tourism marketplace by developing business models that are environmentally, socially and culturally sustainable. The plan envisaged mitigating environmental impacts of tourism by extending the tourist season and promoting lesser known areas of the country. Currently, the Spanish strategy for tourism is set out in the National and Integral Tourism Plan 2012-15 (Plan Nacional e Integral de Turismo, PNIT). The strategy reinforces efforts to increase attractiveness of Spanish tourism destinations by shifting from standard/basic products in traditional tourism markets to specialised products, which address new markets and are tuned to preferences of different consumers. Innovation, technological change, environmental responsibility and investment in human resources are key axes of the strategy, accompanied by supportive marketing campaigns. The PNIT included the development of ecotourism in selected protected areas as a priority area. This approach stimulated the development of the Sector Plan for Biodiversity and Nature Tourism 2014-2020, which signals the importance placed on this sector as a vehicle for green growth. The Sectoral Plan, implemented by the Ministry of Industry, Energy and Tourism and the Ministry of Agriculture, Food and Environment, provides a framework for collaboration among all stakeholders (both public and private) to promote nature-based tourism that integrates biodiversity considerations. The main priority of the sectoral plan is to develop ecotourism within the Natura 2000 Network while ensuring the conservation of the sites.
Strengthen the leadership of the national tourism administration in regard to environmental management, promote further inter-ministerial co-operation (transport, nature, construction) and increase allocated resources.	To facilitate achieving its sustainable tourism goals, the Working Group on Sustainable Tourism was established in 2007 as part of the institutional framework for co-ordination of tourism policies in Spain.

Recommendations	Actions taken
Further promote voluntary sustainable management initiatives by the tourism industry.	Horizon 2020 provided a basis for public-private partnerships. It helped create new tourist products in protected areas through a "Joining Spanish System" programme, which provides assistance to tourist operators and companies to join the European Charter on Sustainable Tourism (EUROPAC 2012). Two such initiatives are the Spanish Tourist Quality System (or "Q" system) and the European Charter on Sustainable Tourism certification that received considerable uptake from the industry. Other notable private sector-led initiatives include the development of Spanish sustainable tourism criteria that meet the requirements of the Global Sustainable Tourism Council (GSTC), the establishment of Ecotourism Club in Spain (which includes 32 protected areas and over 600 private tourist companies) and the development of action plans by the hotel industry to promote corporate social responsibility and green/ sustainable tourism.
International commitments	
Adopt the national Climate Change Strategy and monitor its implementation; identify further possible needs for reinforcing it to meet the Kyoto target and the terms of the EU burden-sharing agreement; analyse the cost-effectiveness of its measures and amend it as necessary.	The 2004 Spanish strategy for meeting objectives under the Kyoto Protocol together with the 2007 Spanish Strategy for Climate Change and Clean Energy defined the basic framework for medium-long term actions and included measures for a direct or indirect reduction of greenhouse gases and adjustment to its effects. The policies were reinforced by specific plans and initiatives on energy (e.g. the 2006 plan to phase out support to coal, the 2007 decree on the promotion of renewable electricity and the 2008-12 Strategy for Energy Saving and Efficiency in Spain) and transport (e.g. 2009 regulations setting CO_2 emission performance standards for new passenger cars or the promotion of biofuels in road traffic based on the National Action Plan for Renewable Energies 2011- 20). The EU Emissions Trading System (EU ETS) has been implemented since 2005. For non-ETS sectors, Spain has developed several programmes and projects since 2012. Examples include the Climate Project Programme, in which the government acquires verified CO_2 equivalent emissions reductions from projects in Spain, as well as PIMA SOL which promotes the reduction of GHG emissions in hotel and other tourism facilities through energy efficiency improvements.
Increase total ODA, up to the UN objective of 0.7% of GNI, and ODA devoted to environmental projects.	Spain's net ODA decreased 25% from 2003-12, reaching USD 2.197 billion (in 2011 USD). Due to general budget cuts following the economic crisis, ODA was significantly below the 2008-10 average of USD 6.56 billion in 2012, and dropped 67% from its peak of USD 6.7 billion in 2008. As a percentage of gross national income (GNI), Spain's ODA peaked at 0.46% in 2009, but dropped to 0.16% in 2012. Spain is far from meeting the OECD target of spending 0.7% of GNI as ODA by 2015. To reach the OECD target, Spain would have needed to allocate more than USD 10 billion to ODA in 2012.
Ratify and implement the Aarhus and Gothenburg Protocols to the LRTAP Convention.	Spain ratified the Gothenburg Protocol in 2005 and the Aarhus Protocols in 2011. Spain met its targets under the Gothenburg Protocol in 2010 for both SO_x and non-methane volatile organic compounds (NMVOCs). Although NO_x emissions decreased, emissions still exceeded the 2010 target set by the Protocol, by 16% in 2010 and 10% in 2012. Emissions of heavy metals have also decreased since 2000. Lead emissions declined significantly in 2002, principally due to the reduction of emissions from transport. Between 2000 and 2011, Spain's share of those emissions within the EU also dropped from 12% to 7%. 21 cadmium emissions declined 51%, while nickel emissions dropped over 54%. Emissions of the persistent organic pollutant (POP) hexachlorobenzene (HCB) declined, dropping over 97% between 2000-12, while emissions of the POP polycyclic aromatic hydrocarbons (PAHs) increased by 2%. Spain accounted for 19% of PAH emissions and over 18% of HCB emissions in the EU in 2011, the highest share of all EU member states.

ANNEX III

Abbreviations

AC	Autonomous Community
ACEA	European Automobile Manufacturers' Association
AECID	Agency for International Development Co-operation
AEVAL	Agency to Evaluate Public Policies and the Quality of Services
AGUA	Actions for the Management and Use of Water
ANTHOS	Spanish Plant Information System
BAT	Best available technologies, Best available techniques
CAMA	Environmental Advisory Council
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CDTI	Centre for Industrial Technological Development
CECRE	Power Control Centre
CEDEX	Centre for Studies and Experimentation of Public Works
CEER	Council of European Energy Regulators
CEMFOR	Center for Mediterranean Forest Research
CENEAM	National Center for Environmental Education
CESCE	Spanish Export Credit Agency
CETS	European Charter of Sustainable Tourism
CIEM	Inter-ministerial Commission on Marine Strategies
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO_2	Carbon dioxide
CREAF	Centre for Ecological Research and Forestry Applications
CSMA	Sectoral Conference on the Environment
CSP	Concentrated solar power
CSR	Corporate social responsibility
DAC	OECD Development Assistance Committee
DIA	Environmental Impact Declaration
DMC	Domestic material consumption
EAFRD	European Agricultural Fund for Rural Development
EBBF	European Business and Biodiversity Campaign
EC	European Commission
ECF	European Cohesion Fund
EEA	European Environment Agency
EECCEL	Climate Change and Clean Energy Strategy
EEZ	Exclusive economic zone

EGS	Environmental goods and services
EIA	Environmental impact assessment
Eionet	European environment information and observation network
ELL	Environmental Liability Law
EMAS	EU Eco-Management and Audit Scheme
EMEP	European monitoring and evaluation programme
EMS	Environmental management system
ENSEA	European Network for Strategic Environmental Assessment
EQS	Environmental quality standards
ERDF	European Regional Development Fund
ESF	European Social Fund
ESS	European Statistical System
ETS	Emissions trading system
EU	European Union
EUR	Euro
FEGA	Spanish Agrarian Guarantee Fund
FEMP	Federation of Municipalities and Provinces
FES-CO_2	Carbon Fund for a Sustainable Economy
FIEM	Spanish Business Internationalisation Fund
FNEE	National Energy Efficiency Fund
FOMIT	Tourism Infrastructures Modernisation Fund
FSC	Forest Stewardship Council
GBIF	Global Biodiversity Facility
GDP	Gross domestic product
GEF	Global Environment Facility
GES	Good environmental status
GFCF	Gross fixed capital formation
GHG	Greenhouse gas
GJ	Gigajoule
GNF	Global Nature Fund
GoS	Government of Spain
GNI	Gross national income
GRI	Global Reporting Initiative
GSPC	Global Strategy for Plant Conservation
GSTC	Global Sustainable Tourism Council
GVA	Gross Value Added
GWh	Gigawatt hours
HCB	Hexachlorobenzene
IAPA	Internationally Agreed Protected Areas
ICCT	International Council of Clean Transportation
ICO	Official Credit Institute
IDAE	Institute for Diversification and Saving of Energy
IEA	International Energy Agency
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
INE	National Statistics Institute
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Services

IPPC	Integrated Pollution Prevention and Control
IUCN	International Union for Conservation of Nature
MAGRAMA	Ministry of Agriculture, Food and Environment
MARM	Ministry of Environment, Rural and Marine Affairs
MDG-F	Millennium Development Goals Achievement Fund
MEA	Millennium Ecosystem Assessment
MIET	Ministry of Industry, Energy and Tourism
MINHAP	Ministry for Finances and Public Administration
MMA	Ministry of the Environment
MOVELE	Action Plan to Promote Electric Vehicles
MPA	Marine protected areas
MSSSI	Ministry of Health, Social Services and Equality
Mt CO_2eq	Million metric tonnes of carbon dioxide equivalent
MW	Megawatt
NEC	EU National Emissions Ceilings Directive
NGO	Nongovernmental organisation
NHBSI	Natural Heritage and Biodiversity Spanish Inventory
NMPA	Network of Marine Protected Areas of Spain
NMVOCs	Non-methane volatile organic compounds
NO_x	Nitrogen oxides
NRP	National Reform Programme; Natural Resources Plans
NSPRD	National Strategic Plan for Rural Development
NVZ	Nitrate Vulnerable Zones
OAPN	National Parks Autonomous Organisation
ODA	Official development assistance
OPRC-HNS	Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PAHs	Polycyclic aromatic hydrocarbons
PEFC	Programme for the Endorsement of Forest Certification
PES	Payment for ecosystem services
PIN2020	Integral Plan on Industrial Policy 2020
PIVE	Efficient-Vehicle Incentive Programme
PNA	Protected Natural Areas
PNIR	Integrated National Plan on Waste
PNIT	National and Integral Tourism Plan
POPs	Persistent organic pollutants
PPP	Purchasing Power Parity
PRTR	Register of Emissions and Pollutant Sources
R&D	Research and development
RAA	Environmental Authorities Network
RAMPE	Spanish Marine Protected Area Network
RBMPs	River basin management plans
RDP	Rural development programme
REDIA	Environmental Inspection Network
REGOE	General Registry of Organic Agriculture Producers

RENADE	National Registry of Greenhouse Gas Emissions Allowances
RIA	Regulatory impact assessment
SCI	Sites of Community Importance
SDS	Sustainable Development Strategies
SEA	Strategic environmental assessment
SEPRONA	Environmental unit of the Guardia Civil
SINAC	National Information System on Drinking Water
SME	Small- and medium-sized enterprises
SO_x	Sulphur oxides
SPA	Special Protection Areas
SPS	Single Payment Scheme
TCE	Spanish Court of Audit
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UMPs	Use and Management Plans
USD	United States Dollar
VANE	Valuation of Natural Assets of Spain
VAT	Value added taxes
VIVE	Innovative Vehicle – Ecological Vehicle plan
VSL	Value of a statistical life
WHO	World Health Organization
WWF	World Wide Fund for Nature
ZEPIM	Specially Protected Areas of Mediterranean Importance

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