

# Environmental Profile of Spain 2009




## Indicator-based Report



2010

## CONTENTS




---




<b>CONTENTS</b> .....	4
<b>INTRODUCTION</b> .....	8
<b>FOREWORD</b> .....	12
<b>SUMMARY</b> .....	16
<b>1. BACKGROUND</b> .....	30
Territory and climate	
Administrative structure	
Current and projected population	
Economic development	
Productive sectors	
Towards the knowledge and innovation society	
<b>2. INDICATORS: THEMES AND SECTORS</b> .....	42
 <b>2.1 Air</b> .....	44
Emissions of greenhouse gases	
Emissions of acidifying and eutrophying gases and tropospheric ozone precursors	
Emissions of particulate matter	
Regional background air quality for the protection of health and vegetation	
 <b>2.2 Water</b> .....	58
Water consumption	
Reservoir water levels	
Natural water resources	
Brackish and sea water desalination	
Treatment of urban wastewater	
Quality of bathing water	
 <b>2.3 Land</b> .....	76
Changes in land cover: artificial surfaces	
Artificial surfaces along the coast	
Contaminated land	
Area affected by erosion	

	<b>2.4 Nature and biodiversity</b> .....	88
	Protected areas	
	Forest defoliation	
	Wooded area and other forest formations	
	Trends in common bird populations	
	Environmental monitoring	
	<b>2.5 Coasts and marine environment</b> .....	102
	Marine biodiversity: protected marine areas	
	Artificial reefs	
	Jellyfish swarms	
	<b>2.6 Green economy</b> .....	112
	Energy intensity of the economy	
	Total material requirement	
	Green jobs	
	Research and development	
	<b>2.7 Waste</b> .....	124
	Urban waste generation	
	Urban waste management: landfill and incineration	
	Paper and cardboard recycling	
	Glass recycling	
	Packaging waste recycling and recovery	
	Sewage sludge production and use	
	<b>2.8 Agriculture</b> .....	140
	Fertiliser consumption	
	Phyosanitary product consumption	
	Organic farming	
	Organic livestock farming	
	Irrigated area	
	Eco-efficiency of agriculture	
	<b>2.9 Energy</b> .....	160
	Primary energy intensity	
	Energy-related GHG emissions intensity	
	Renewable energy	
	Eco-efficiency of energy	

## CONTENTS

---

 <b>2.10 Industry</b> .....	172
Atmospheric emissions by industry	
Energy consumption by industry	
Waste generation by industry	
Number of industrial enterprises with Environmental Management Systems	
Eco-efficiency of industry	
 <b>2.11 Fishing</b> .....	184
Number of vessels and fishing fleet capacity	
Fishing fleet catches	
Aquaculture production	
Eco-efficiency of fishing and aquaculture	
 <b>2.12 Tourism</b> .....	196
Number of foreign tourists per inhabitant	
Number of foreign tourists per kilometre of coast	
Tourist Population Equivalent (TPE) in the areas with the highest number of overnight stays	
Number of visitors to National Parks	
Rural tourism: accommodation, capacity, tourists and overnight stays	
Trends in the main variables affecting tourism in Spain	
 <b>2.13 Transport</b> .....	212
Total inter-city transport volume: modal split	
Emissions of air pollutants by transport	
Air transport	
Waste generated by transport: End-of-Life tyres (ELTs)	
Eco-efficiency of transport	

 <b>2.14 Households</b> .....	226
Number of passenger cars per household	
Urban waste production per household	
Energy consumption per household	
Emissions of CO <sub>2</sub> by households	
Water consumption per household	
Gross disposable household income	
Eco-efficiency of households	
 <b>2.15 Urban environment</b> .....	246
Urban pressure on land	
Air quality in the urban environment	
Environmental noise	
Architectural heritage of Spain's cities	
Metropolitan areas: modes of public transport	
Public participation in environmental policy	
 <b>2.16 Natural and technological disasters</b> .....	266
Fatalities due to natural disasters	
Drought	
Forest fires	
Road and rail accidents causing possible environmental damage	
Oil spills due to maritime accidents	
Industrial accidents involving dangerous substances	
<b>3. INFORMATION BY AUTONOMOUS COMMUNITY: BASIC DATA</b> .....	286
Introduction and data sheets in alphabetical order	
<b>4. APPENDICES</b> .....	330
I Index of acronyms and abbreviations	
II Thematic index of indicators	
III Alphabetical index of indicators	
IV Contributors to production and review of this report	

The *Environmental Profile of Spain 2009* is the 6th edition of the Ministry of the Environment and Rural and Marine Affairs' report on the state of the environment in Spain. As in years past, this publication provides an overview of the situation, increases our knowledge about the environment, provides specific data, monitors policies intended to mainstream environmental criteria into the country's production sectors, and serves as an important tool in the ongoing dissemination and awareness-raising campaigns run by the Ministry of the Environment and Rural and Marine Affairs.

Several relevant facts regarding Spanish environmental policy are made evident in this year's Environmental Profile. For instance, greenhouse gas emissions fell in 2008, and air quality improved overall. Waste generation per inhabitant in Spain continued the generally downward trend started in 2003 and moved nearer to the EU average. The agricultural area under organic management grew and water use efficiency on irrigated land increased further as a result of more widespread application of drip and sprinkler irrigation. These practices, along with other objectives, will be reinforced by implementation of the National Strategy for Sustainable Irrigation, Horizon 2015. With respect to fishing and fisheries, Spanish aquaculture has clearly consolidated its position within the sector, although its overall output fell in 2008 due to the downturn in mussel production. Meanwhile, Spain's sea-fishing industry has fully committed to the fight against illegal, unreported, and unregulated fishing, a move that will undoubtedly be reinforced by enactment of the Sustainable Fishing Bill currently under debate in Parliament. In short, even with its flaws, the quality of Spain's environment is satisfactory overall.

This past year has been clearly marked by Spain's six-month Presidency of the European Union, a period that coincided with the entry into force of the Treaty of Lisbon, an event that added a further challenge to the demands inherent in holding the post of European President. The difficulty of steering a process in which the sensibilities and visions of 27 nations converge posed a formidable test for this Government's administrative structures and, in particular, for the Ministry I have the honour of directing. I believe that on the whole, the environmental goals and objectives set by the Spanish Presidency at the beginning of its term were achieved

satisfactorily, and that Spain demonstrated its leadership in many areas. In my opinion, two main events have defined the period since publication of the last Environmental Profile. The first of these was the Copenhagen Conference on Climate Change, held in December 2009, and the consequences and opportunities deriving from it, while the second was the start of the International Year of Biodiversity in 2010.

With respect to the former, despite the bittersweet taste its conclusion left for many, we should interpret its results as an opportunity to reach a binding agreement in the immediate future, an accord in which not only industrialised nations, responsible for the majority of worldwide emissions, are represented, but also one in which developing nations can feel part of the global decision-making process as the new green, low-carbon economy develops. In this way, emerging nations will be able to view participation as a real opportunity to procure social and economic development comparable to that of their more developed counterparts.

The International Year of Biodiversity, declared by the General Assembly of the United Nations in 2009, seeks to enhance awareness of the need to reduce and halt the degradation of ecosystems as, according to recent reports, biodiversity loss is accelerating globally and, in many cases, is already irreversible.

The European Union continues to implement a broad ecosystem protection policy, begun with the UN Conference on Environment and Development (Earth Summit, Rio 92) and clearly defined in 2001 with establishment of the goal of 'halting the loss of biodiversity in the EU by 2010'. The policy's main milestones were later compiled and explained in the Commission Communication titled "*Halting the loss of Biodiversity by 2010 — and Beyond*". This document described the scale of the problem and specified a series of objectives and measures under the EU Action Plan to 2010 and Beyond. The main areas of action to halt biodiversity loss focused on protecting the most important habitats and species; controlling invasive alien species; mainstreaming protection principles into agricultural and rural development policies; and, finally, integrating protective measures into the fishing industry. The target date set in the Communication established a deadline that was perhaps overly optimistic, given the magnitude of the task at hand.

This date was necessarily readjusted in the new Communication, "*Options for an EU vision and target for biodiversity beyond 2010*", which analyses the accomplishments and deficiencies of current policy. Outlined among the shortcomings were implementation gaps in relation to the Natura 2000 network, policy and strategy gaps (particularly regarding soils and invasive species), and knowledge and data gaps. This Communication

presented a long-term vision (up to 2050) of the policies to be developed and implemented.

The year 2020 has been set as the intermediate deadline to achieve several new objectives and evaluate the measures adopted, as a decade is the minimum time needed to develop, apply, and assess actions affecting biodiversity.

Instead of listing all of the biodiversity protection activities and events in which the Ministry has participated, I would like to highlight what I believe was one of the significant successes of our Presidency — the conclusions adopted in the EU Council of Environment Ministers on 15 March relative to post-2010 biodiversity. The best proof of this success lies in the unanimity achieved across the EU's 27 Member States.

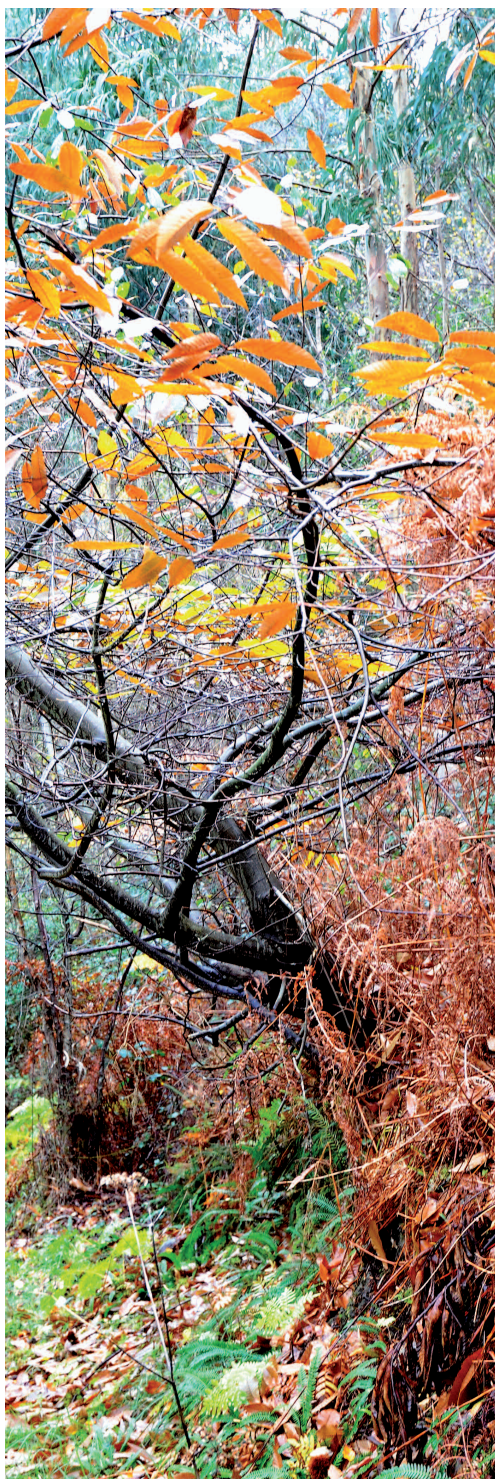
These conclusions emphasise that protecting biodiversity and maintaining ecosystem services are tasks that go far beyond protected areas or ecological networks, and insist on the need to apply in full the Birds and Habitats Directives, as well as to accelerate completion of the Natura 2000 network. The conclusions also underscore the need to intensify efforts to mainstream biodiversity into sectoral policy, and make a decided commitment to conservation, sustainable use, and biodiversity restoration.

I would like to emphasise, relative to this edition of the *Environmental Profile of Spain*, one of the conclusions of the aforementioned European Council, in which the Council specified that two of the main reasons for the failure to halt the loss of biodiversity in the European Union to date were 'insufficient scientific knowledge and data gaps', and 'shortcomings in communication and education to enhance awareness'. With the publication of this report, we aim to make a considerable contribution to filling those gaps, not only in the areas related to biodiversity, but also in each and every one of the areas examined in the report. I sincerely hope that publication of the Profile contributes to a substantial improvement in decision-making processes and further mainstreams environmental concerns into sectoral policy in Spain.

**Elena Espinosa Mangana**

Minister of the Environment and Rural and Marine Affairs





# FOREWORD

The *Environmental Profile of Spain 2009, an Indicator-based Report* reaches its sixth edition as the Spanish presidency of the EU comes to a close. A fascinating year, full of debates, expectations, plans and decisions, has passed since publication of the last edition. I believe that, for the most part, we can feel satisfied with our collective achievements, in which the efforts and contributions of all of the public offices and administrations and of innumerable people have converged, people whose work, oftentimes unrecognised, is what allows us to advance, improve and achieve the results we seek.

The Copenhagen Conference on Climate Change, held in December 2009, ended, admittedly, without reaching a legally binding agreement that would replace the Kyoto Protocol after 2012. However, a political accord was achieved that was not only unusually far-reaching in terms of the direct personal participation in the negotiation process of the Heads of State and of the governments of the nations that account for over 80% of global emissions, but also with respect to its content. For the first time, the United Nations has acknowledged that the planet's temperature should not be allowed to rise by more than 2 degrees centigrade and has identified the permissible risk, linking its plan of action to scientific data. With the agreement, we will have common emission-reduction goals for industrialised countries and commitments to plans of action for emerging nations, financing for short and medium-term projects, provisions to design new structures of governance, and monitoring, review and verification systems, among others.

The Conference opened significant new avenues and indicated the paths Europe needs to explore. We have already taken some fundamental steps — the informal EU Council of Environment Ministers recently analysed the results of the Copenhagen Conference and highlighted that significant potential exists to reach a final agreement encompassing over 80% of greenhouse gas emissions worldwide. As has since occurred on other occasions, emphasis was placed on the need to move toward an agreement and to adopt concrete measures to provide the immediate financing approved in Copenhagen (Fast Start) as soon as possible to demonstrate developed nations' commitment to the fight against climate change. Following the Copenhagen Conference, the European Council of March (2010) ratified the EU's commitment to reduce greenhouse gas

emissions by 20% with respect to 1990 levels, to raise renewable energy's share of final energy consumption to as much as 20%, and to advance toward a 20% increase in energy efficiency.

In the above-mentioned Council, the EU reaffirmed its commitment to reducing greenhouse gas emissions by 30% with respect to 1990 levels by no later than 2020, provided that other developed nations agree to apply comparable emissions reductions and that developing countries contribute to the process according to their respective responsibilities and capabilities. Our objective continues to be to achieve a worldwide legal accord that enables us to limit the global temperature rise to 2 degrees centigrade above pre-industrial levels.

In Spain, greenhouse gas emissions in 2008 fell by 7.5% year-on-year. We have achieved a markedly downward trend in these emissions, due principally to the combination of high prices of both energy-producing raw materials and that of CO<sub>2</sub> per tonne in the European market, as well as to continuing improvements in energy intensity and the growing contribution of renewable energy to the generation mix, a trend we should maintain and encourage in coming years.

The Sustainable Economy Bill has begun its passage through Parliament and includes chapters specifically devoted to the promotion of renewable energy and energy efficiency, to the reduction of greenhouse gas emissions, and to sustainable mobility. We are becoming increasingly aware of the importance that the green economy can have in our world today, and above all, of the number of environment-related jobs it creates. The first study carried out in this regard (on the initiative of the Ministry of the Environment and Rural and Marine Affairs) reveals that over half a million jobs, equivalent to 2.64% of the working population, are related to the environment in Spain. While there remains much to be done before we can consider green jobs to make up 100% of employment, it is our duty to make our economic activity and well-being compatible with the environment and to move unequivocally toward a low-carbon economy. The new model necessary to overcome the current crisis can be sustainable, and we have to work toward making it just that.

Relative to Spain's efforts in the fight against climate change, in April 2010 the Council of Ministers passed a bill on carbon capture and geological storage that transposes Directive 2009/31/EC into Spanish legislation and should contribute, under safe conditions and without risks to health or the environment, to reducing greenhouse gas emissions by 20% by 2020.

Among the actions initiated by the Ministry to reinforce environmental protection, I would like to highlight the passage through Parliament of the Marine Environment Protection Bill, the goal of which is to establish the general planning framework for the marine environment. Its aim is to guarantee the marine environment's well-being by regulating human activity in our waters and ensuring that this does not compromise the conservation of our marine ecosystems' natural features and characteristics.

All of the above serves to emphasise that this edition of the Report contains several new elements, among them two new chapters — one devoted to the Green Economy, and another to the Marine Environment. Their respective indicators will be enhanced in future editions, but their inclusion states our intention to explore fields that until now had received secondary consideration.

The Report maintains its basic structure and comprises sixteen chapters and a total of 81 indicators. Just as if it were a living thing, this edition has given birth to several new indicators, while others, which it has not been possible to update annually, have gone into hibernation and hopefully will re-emerge in the future. In addition, for the third time, the block of environmental information on Spain's autonomous communities has been included and presents basic environmental, territorial, and socio-economic data about each of them.

The *Environmental Profile of Spain 2009* is the result of collaboration between many people. EIONET Spain, which comprises various Spanish administrations and several agencies and institutions, has contributed much of the data and proposals and has reviewed the material and, alongside the team of writers, has once again done everything needed to ensure successful completion of another edition.

**Teresa Ribera Rodríguez**  
Secretary of State for Climate Change







# Summary

By analysing the indicators selected, this report reveals trends in the state of the environment and the progress made in mainstreaming environmental concerns into sectoral policy. Although it is no easy task to summarise the Report's entire contents, it is worthwhile attempting to highlight, or at least indicate, the most significant aspects of each of the themes addressed. This overview is intended to emphasise the main findings of the analyses undertaken and, above all, to encourage readers to explore in greater depth the themes and indicators that comprise this environmental profile.

## AIR

The state of Spain's air quality is one of the country's main environmental concerns. Moreover, as the impact of atmospheric emissions of pollutant gases is conditioned and compounded by various natural phenomena, a significant proportion of environmental policy and planning is devoted to ensuring they are controlled.

In 2008, Spain's greenhouse gas emissions were 7.5% lower than in 2007, thereby placing the country in a better position to comply with the Kyoto Protocol targets. Implementation of the 2<sup>nd</sup> Emission Rights Allocation Plan (PAE) for 2008–2012 envisages achieving compliance with the Protocol's goals (as indicated in Spain's GHG emissions projections) by making use of the flexibility mechanisms.

In addition, 2008 was characterised by a significant drop in aggregate emissions of acidifying and eutrophying substances and tropospheric ozone precursors (29.1% and 34.0%, respectively). Likewise, emissions of particulate matter were also lower than in 2000.

As regards background pollution in Spain (as measured at monitoring stations located away from sources of pollutant emissions), in 2008 only ozone levels exceeded the target values set by national legislation. The annual mean concentration values of all of the remaining pollutants were below the established limit values.



## WATER

Water policy's priorities include saving the resource and ensuring rational management of it whilst maintaining the well-being of aquatic and related ecosystems and involving stakeholders in their management. These priorities are reflected in the regulations adopted in 2009 relating to the new composition of the National Water Council (CNA), the protection of groundwater, and to modernisation of irrigation (this latter regulation is still in the drafting stage).

In 2007, household water consumption continued its downward trend. This is encouraging news, as economic growth becomes more sustainable if it is able to increase whilst water consumption falls.

As regards reservoir water levels, in 2009 these rose by 23% after heavy rain at the end of the year. This improvement in water reserves led to a slight drop in desalinated water production in Spain.

For their part, natural water resources, which had recovered slightly in the 2006–2007 hydrological year, generally decreased in all of the country's river basins in 2007–2008 as drought conditions intensified, although they did improve somewhat in 2008–2009.

With regard to treatment of urban wastewater in 2008, compliance with Directive 91/271/EEC, expressed as pollutant load treated per population equivalent (% p.e), stood at 78%.

In terms of the quality of Spain's bathing waters, in 2009 the percentage rated as being of very good quality continued to rise, reaching 89% in the case of coastal bathing waters and 41% in the case of inland bathing waters.

## LAND

According to the data compiled by the Corine Land Cover 2006 survey, artificial surfaces in Spain increased over the period 2000–2006, although they still only accounted for just over 2% of the country's total area. Urban fabric, both continuous and discontinuous, accounted for 632,000 ha, 1.25% of Spain's territory. The areas that grew most in this period were road and rail networks and associated land.

The figures for these types of land cover increased considerably on the 1-km-wide coastal strip, where artificial surfaces accounted for 22% of the total area. However, this concentration decreased within a very short distance of the sea and artificial surfaces on the 10-km-wide coastal strip represented 9.3% of the total area.

Application of Royal Decree 9/2005, on contaminated land, has meant that work on producing Preliminary Situation Reports for Spain's autonomous communities has begun. These will enable regional governments to take an inventory of their contaminated land and establish priorities for action according to the hazard that this constitutes to human health and local ecosystems.

## NATURE AND BIODIVERSITY

Globalisation of environmental problems and the growing impact of the effects of climate change, together with gradual depletion of some natural resources, have brought about the disappearance, sometimes irreversibly, of a large number of species of wild flora and fauna and the degradation of areas of natural interest.

In Spain, adoption of Law 42/2007, of 13 December, on natural heritage and biodiversity, instigated creation of instruments such as the Spanish Natural Heritage and Biodiversity Inventory and the National Strategic Plan for Natural Heritage and Biodiversity (PEEPNB) to combat biodiversity loss.

In 2009, the area protected by the Natura 2000 network increased slightly, reaching 14,763,572 ha (including both marine and terrestrial areas), and accounted for 27.1% of Spain's total area. In addition, Spain had 1,519 Protected Areas covering a total of 6,174,788 ha (terrestrial and marine). In percentage terms, this represents 11.7% of the country's overall area. In short, and excluding overlaps between the various protection categories, in 2009, 27.7% of Spain's territory was protected.

Spain's forest area, comprising woodland and other forest formations, currently stands at almost 28 million ha, a figure that has remained fairly stable in recent years. However, the general state of the country's forests declined in comparison with the year before. This deterioration was less pronounced in coniferous trees than in broad-leafed trees.

The trend in bird populations in Spain was similar to that identified in 2008. Thus,

forest populations maintained their moderate growth, while those in agricultural environments continued to decline.

The number of criminal and administrative offences reported by SEPRONA fell by 11.4% between 2007 and 2008 and, by type, forest fires accounted for the largest proportion. Meanwhile, the number of arrests was 9.8% lower than in 2007. Despite this general drop, the number of people arrested for wildlife-related offences rose by 53.3%.

## COASTS AND MARINE ENVIRONMENT

Conservation, management and sustainable use of the seas are some of the top items on the international political agenda. The Water (2000/60/EC) and Marine Strategy (2008/56/EC) Framework Directives form the regulatory basis of sustainable water management in Europe. The result of these Community-level policies is reflected at a national level in various provisions, such as Royal Legislative Decree 1/2001, approving the consolidated text of the Water Law (including its modifications and subsequent development), and Law 42/2007, of 13 December, on natural heritage and biodiversity, which introduces a highly significant new piece of legislation by incorporating international guidelines on the conservation of marine biodiversity into Spanish law to create the Marine Protected Area category.

The unique geographic positions of the Iberian Peninsula and its two archipelagos confer an exceptional biological and geological heritage on Spain's marine environment, which comprises approximately 10,000 km of coastline and almost 1,000,000 km<sup>2</sup> of marine area under Spanish sovereignty and jurisdiction.

Spain currently has one of the largest expanses of marine area included in Protected Areas in Europe and it also has one of the highest numbers of such areas. Protected marine area Spain is estimated to cover approximately 1,335,000 ha.

Installation of artificial reefs contributes to achieving the goals laid down by the Directives. From the point of view of fisheries, an artificial reef is a management tool that protects fishery resources and ecosystems and develops these resources locally. Today, the number of artificial reefs installed to protect habitats of interest to fishing and, therefore, regenerate natural resources, stands at 133.

Although the presence of jellyfish in the sea is a natural phenomenon, in recent

years Spanish coastal waters have been affected by particularly large numbers. In order to understand the true scale of the problem of proliferating numbers of jellyfish in Spain's coastal waters, since 2007 the MARM has run an annual monitoring campaign.

## GREEN ECONOMY

International organisations working in the environmental field define the process of 'greening' the economy as the shift to an eco-efficient economy characterised by low carbon emissions and efficient use of resources. The aim is to ensure greater long-term human well-being by preventing potential environmental scarcities in the future.

For several years now, and in line with the general European trend, the Spanish economy's energy intensity (energy consumption per unit of GDP) has been decreasing. This drop in energy intensity is the result of enhanced energy efficiency, production of a greater proportion of energy from renewable sources and, recently, a downturn in economic activity. Materials consumption is now rising at a slower rate than before in Spain and the number of green jobs has grown considerably, especially in renewable energy and related fields. The percentage of GDP devoted to research and development has also increased and is now approaching the European average. Spain is ranked fifth internationally by number of patents related to renewable energy, behind only the United States, Japan, Germany and the United Kingdom.

## WASTE

According to Eurostat data, the trend in urban waste generation per inhabitant in Spain has been generally downward since 2003 and is approaching the EU average.

In recent years, there has been a decrease in the quantity of urban waste that ends up in landfill (although the proportion is still high in comparison with the EU average), a slight increase in incineration, and a rise in separate collection.

In fact, paper recovery has almost doubled in the past 10 years and in 2008 the recycling rate reached 74.9% (in 2000 it was 56.8%). For its part, in 2008 the glass recycling rate stood at over 60%, the target set in the legislation, while the

targets for packaging waste recycling and recovery were met in 2007, two years ahead of the 2009 deadline (the recycling rate was 62.1% and the recovery rate was 56.3%).

The increase in wastewater treatment was counterbalanced by the rise in sewage sludge production, which, despite the decrease in 2008, climbed by 38% over 2000–2008. Disposal of sewage sludge constitutes a major environmental problem and use in agriculture remains the most common way of dealing with it (68.8% in 2008).

## AGRICULTURE

The process of adapting farming in Spain, a consequence of the continual changes to the Common Agricultural Policy (CAP), has produced disparate territorial and sectoral impacts. For the Ministry of the Environment and Rural and Marine Affairs, achieving a robust and varied Common Agricultural Policy adapted to the specific needs of Spain's agriculture whilst accompanying its agri-food sector as it modernises and develops is a priority.

In 2008, the area under irrigation, which plays a key role in the agricultural economy, showed a slight increase, while there was an improvement in the efficiency of water resource use.

With respect to organic agricultural and livestock products, in the context of increased quality requirements and a greater number of environmental and toxicological restrictions on the products employed, the sector in Spain showed very positive development, as not only was there a significant increase in the area devoted to organic farming, but also in the number of people working in the field .

Finally, in 2008, consumption of fertiliser products fell significantly (-30.2%) while, despite dropping slightly, phytosanitary product consumption remained at a level similar to the previous three years.

## ENERGY

In Spain, primary energy intensity is tending to decrease, albeit at a slower rate than in the European Union as a whole. There was a significant 26.14% decrease in consumption of coal as an energy source in 2008, while use of natural gas (14.03%), nuclear energy (11%) and renewable energy (9.09%) all rose. Also, for

the first time, in 2008 use of renewable energy (hydro, wind, biomass, solar and other power forms) exceeded coal as a source of electricity.

By sector, transport continued to consume a huge proportion (40.2%) of final energy. Within this sector, road transport was by far the most dominant mode. In 2008, there was a very significant decline (-15.2%) in the intensity of energy-related CO<sub>2</sub> emissions. Meanwhile, in the same year, Spain had the largest installed capacity for thermal solar energy, the second-largest for wind and photovoltaic power and the third-largest for mini-hydroelectric energy.

## INDUSTRY

The Spanish economy started to feel the effects of the global economic crisis from 2008 onwards. In conjunction with this, the trends established in preceding years were maintained. Thus, emissions of CO<sub>2</sub>, NMVOC and NO<sub>x</sub> all decreased, while those of SO<sub>2</sub> rose. Final energy consumption by industrial processes remained stable and use of coal, gas and renewable energy fell, while that of petroleum products grew.

Although waste generation by industry increased slightly, corporate expenditure on environmental protection also rose. Also, Spain still has the second-highest number of companies registered with the EMAS environmental management system

Industry showed significant changes in eco-efficiency in comparison with previous years — while the sector's Gross Value Added grew by 7% between 2006 and 2008, final energy consumption remained stable and emissions fell by 7.3%.

## FISHING

In application of the Common Fisheries Policy, in 2008 the number of vessels in the Spanish fishing fleet fell significantly (at a rate four times higher than for the European fleet as a whole). There was also a decrease, albeit to a lesser extent, in terms of power and tonnage. According to Eurostat, catches in waters far from the Spanish coast increased.

In 2008, overall aquaculture production dropped by 8%, driven mainly by the downturn in mussel production. Fish production in marine aquaculture rose, while

inland aquaculture's output declined. The sector's gross value added fell slightly, while factors such as the rising price of fuel had an impact on its socio-economic sustainability.

## TOURISM

After several years of growth, in which Spain received a record number of foreign tourists (in 2007), the sector is now suffering the consequences of the international crisis. In 2008, the country received 57.3 million tourists, a figure that dropped to 52.2 million in 2009. However, domestic tourism remained relatively high.

In 2009, 45.4 million tourists visited the Spanish coast. This influx accounted for 86.8% of inbound tourism and produced an average of 5,759 tourists per kilometre of coast. The Catalan coast suffered the greatest pressure in this regard, while Galicia and Asturias suffered the least. Despite the decline in the number of tourists, the 10 areas recording the highest number of overnight hotel stays performed favourably in comparison with 2000, with Majorca, Tenerife and the Costa del Sol all posting particularly noteworthy results.

Unlike sun-and-sea tourism, the volume of rural tourism and the number of visitors to National Parks remained stable in 2009. In comparison with the previous year, rural tourism recorded increases in the number of establishments offering accommodation, in the number beds available, in the number of visitors, and, to a lesser extent, in the number of overnight stays.

Since 1996, Spain's National Parks have received an average of around 10 million visitors per year, with the highest volume to date being registered in 2004. In 2008, 10.2 million people visited the country's National Parks, a figure that dropped slightly to 9.9 million in 2009. The most popular sites were the Teide (3.4 million visitors) and Picos de Europa National Parks. In 2009, Spain's National Parks received 28.7 visitors per hectare.

## TRANSPORT

In Spain, road transport is the predominant inter-city mode used for both people and goods. In 2008, this mode of transport accounted for almost 90% of all passenger-km and 83.4% of tonne-km. Also, 2008 was the first year to show a slight year-on-year drop in interior freight and passenger traffic, thereby breaking the existing upward trend. It is also noteworthy that rail accounted for a larger share of passenger transport than air.

Over 1990–2008, emissions of ozone precursor gases by transport fell by 46.2%, while those of acidifying substances dropped by 18%. However, greenhouse gas emissions rocketed up by 80.4%. Nevertheless, 2008 produced a notable change in trend and emissions of all of the gas types decreased substantially. Likewise, 2008 produced the greatest reduction in energy consumption by transport (3.1%) since 1990.

The downward trend in air transport that started in 2008 was continued in 2009 — air passenger transport fell by 8.1% and that of freight dropped by 10.3%.

Except for freight transport, which showed a change in the trend in existence since 2001, the rise in the other variables was very closely linked to GDP at constant prices, although passenger transport did show lower annual increments. Over 1995–2008, energy consumption by transport grew faster than GDP.

On the other hand, the waste generated by transport, such as end-of-life tyres, is being managed increasingly well. Although the accident rate (number of accidents with victims per thousand vehicles) is falling steadily, traffic accidents still account for a high number of fatalities.

## HOUSEHOLDS

The residential sector has been exerting increasing pressure on the physical environment as a result of various factors, among them the consumption patterns that became widespread in the period of economic expansion, the increase in gross disposable household income, and the burgeoning size of the sector, which in 2008 comprised 16.7 million households, 24.3% more than in 2001.

Between 2000 and 2007, Spanish households progressively consumed more energy, emitted more CO<sub>2</sub> into the atmosphere and produced more waste. Nevertheless, there have been some positive trends in recent years — the volume of mixed urban waste decreased, there was a sharp rise in separate collection, and, in addition, water consumption per household fell.

As regards production of urban waste, in 2007, 28.2 million tonnes were collected, representing 1,735 kg per household per year, the lowest figure recorded between 1998 and 2007.

In terms of energy consumption per household, 2008 produced a 5% year-on-year



decrease, with use for heating falling more sharply than electrical usage. Notably, Spain has one of Europe's lowest levels of electricity consumption in the residential sector, though the average annual rate of increase is higher than in other EU countries.

In 2008, CO<sub>2</sub> emissions by the residential sector rose once again and were 1.6% higher than in 2007. Each household produced 1,116 t of CO<sub>2</sub>, a reduction of 1.4%. The fact that emissions per household decreased, despite the increase in the sector's emissions, is attributable to the rise in the number of households (2.4%). Finally, it is worth noting that water consumption by Spanish households stood at 2,544 hm<sup>3</sup> in 2007, a decrease of 2.7% on the year before. Average consumption per household per year was 156.2 m<sup>3</sup>, while average consumption per inhabitant per day was 157 litres, the lowest figure since 1998.

## URBAN ENVIRONMENT

In 2009, Spain's population stood at 46.7 million, of which number 78.9% resided in towns and cities with over 10,000 inhabitants. Urbanisation of the country's population is a long-established trend and, as such, requires policies that address the many challenges it presents. In response, the Spanish Government has drawn up the Spanish Strategy for Urban and Local Sustainability (EESUL) to draw town and city councils' attention to the requirements of sustainable development.

The number of Spanish towns and cities with over 10,000 inhabitants grew by 17.2% over the period 2001–2009. According to a report by the Metropolitan Mobility Monitoring Centre (OMM), Spain's 16 metropolitan areas with their own public transport authorities, all of which contributed to the document, operate 2,690 bus lines covering around 70,000 km. They also operate 3,000 km of railway lines (including Metro systems and regional rail networks, etc.). This infrastructure facilitates mobility for 22 million people.

Public participation in environmental policy is articulated through networks such as the Network of Sustainable Local Development Networks and the Spanish Network of Cities for Climate, both of which are promoted by the Ministry of the Environment and Rural and Marine Affairs. The Network of Networks comprises 2,706 municipalities and covers a population of 26 million inhabitants. For its part, the Spanish Network of Cities for Climate, which is co-ordinated by the Federation of Municipalities and Provinces (FEMP), focuses on leading local policy to combat climate change.

In towns and cities with over 50,000 inhabitants, average levels of NO<sub>2</sub>, suspended particulate matter (PM<sub>10</sub>) and ozone (O<sub>3</sub>) in 2009 were below the regulatory limit and target values. Suspended particulates, perhaps the main air quality problem in the majority of Spanish towns and cities, showed a slight average improvement in population centres of this size.

The first phase in the process of drawing up Strategic Noise Maps for 19 conurbations (with a total of 11.9 million inhabitants) was completed in 2009. The Maps reveal that 68% of this population is affected by noise (Lden > 55 dB) produced by road and rail traffic, airports, and industrial facilities. Outside these conurbations, a further 2.1 million people are affected by noise from major roads.

Spain's significant architectural heritage, which is protected by Law 16/1985, on historical heritage, is largely located in the urban environment. In 2008, this protection extended to 15,849 Sites of Cultural Interest (SCI) listed under the Property category, 251 more than the year before.



## NATURAL AND TECHNOLOGICAL DISASTERS

In recent years, there has been an increase in the violence, distribution and recurrence of extreme climatic phenomena, resulting in major natural and technological disasters across the globe. The United Nations' International Strategy for Disaster Reduction (ISDR) considers Disaster Risk Reduction (DRR) to be the focal point of action. The impact of these disasters was less catastrophic in 2009 than in 2008. Even so, at least 10,500 people died in the 850 disasters registered.

In Spain, the magnitude of the natural disasters that occur is not comparable with that of other global regions. In January 2009, extra-tropical cyclone Klaus, which particularly affected northern Spain and southern France, caused 26 fatalities, 12 of them in Spain, as well as doing extensive damage to infrastructure and facilities, felling trees and branches, and provoking landslides.

Forest fires are one of Spain's biggest environmental and social problems. With 11 fatalities, 2009 was the second-worst year in this regard in the last two decades.

Disasters can also be caused by accidents arising from industrial activity. The economic development of recent years has led to an increase in industry and transport of dangerous goods, especially in countries that, like Spain, have high levels of energy dependence. That said, it is notable that only one accident involving an oil tanker occurred off the Spanish coast in 2008 compared with five in 2007

Likewise, in 2009 only one accident occurred in an industrial facility covered by the Seveso Directive.