2.8 INDUSTRY

Spanish industry is currently undergoing a process of transition from its historical position of low wage costs and low technology deployment, towards a more complex situation characterised by greater added value and the quest for higher productivity achieved through a greater focus on knowledge and new technologies. As with other sectors, a large part of industrial policy is under the control of Regional Government, meaning that Spain requires policies which are agreed and co- ordinated between National Government and its regional counterparts.

In 2005 and 2006, recovery could be seen in industrial production and productivity. Industrial productivity rose by 3.3% in 2006, more than that of the overall economy. In some regards, Spanish industry is positioning itself to take over from construction as the driver of economic growth, with potentially positive environmental energy-related consequences.

Final energy consumption by industry has fallen significantly. For the first time since 1996, the previous upward trend in final energy consumption by ry has been reversed, with a notable fall of 5.21% in 2006 as compared with consumption in 2005.

Increased productivity has taken place alongside a general reduction in pollutants emitted by industry. The fall in N_2O emissions has been especially significant (8.83% decrease in one year). In 2006, there was a rise in SO_2 emissions following years of sustained reductions.

INDICATOR	GOAL	TREND
Atmospheric emissions by industry	Prevent and reduce pollution	Emissions of pollutant gasses are stabilising or decreasing
Energy consumption by industry	Reduce consumption and improve efficiency in resource use	Final energy consumption by industry is showing a clear decrease
Waste generation by industry	Prevent and reduce pollution	Production of non-hazardous waste by the energy and mining and quarrying industries is increasing, while that produced by manufacturing industry is falling
Total Material Requirement	Rational use of resources	Total Material Requirement is increasing, with greater demand on domestic sources than imports
Number of industrial enterprises with concerns into production operations Environmental Management Systems (EMAS)	Integrate environmental	The number of Spanish industrial companies with environmental management systems continues to rise
Eco-efficiency in industry	Decouple industrial production from consumption of resources and pollution	The sector's GVA is rising, while its final energy consumption and pollutant emissions are falling

Figures on production of waste and investment in environmental protection by industrial enterprises have been provided as a new indicator. These had, to a limited extent, begun to be available in previous editions. In 2006, production of non- hazardous waste by the energy and mining and quarrying industries increased, while that generated by manufacturing industry fell. In contrast, production of hazardous waste by the manufacturing and energy industries increased while that generated by quarrying and mining fell.

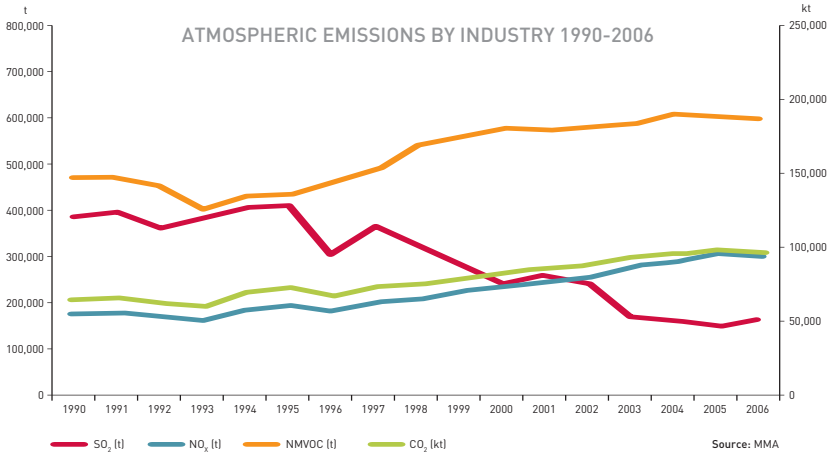
Investment in environmental protection by industry continues to rise.

Total Material Requirement (TMR) has risen. This indicator measures the physical input of material entering the national economic system in terms of physical units (tonnes) which include the extraction, transformation, consumption and final disposal of chemical substances, raw materials and products.

The number of industrial enterprises in Spain registered with the European EMAS Environmental Management System continues to grow. This increase has been produced once again in the Autonomous Communities of Catalonia, Madrid and the Basque Country. Spain has more companies with ISO 14001 environmental certification than any other European country.

Atmospheric emissions by industry

Emissions of pollutant gases by industry have stabilised or are falling

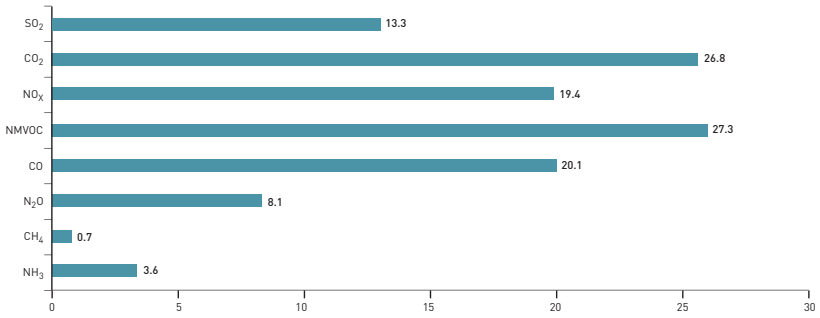


The indicator shows the changes in emissions of the main pollutants generated by industry. Changes in each of the pollutant gases considered since 1990 are shown on the graph. CO_2 emissions by industry fell by 0.73% between 2005 and 2006, dropping from 97,090 kt to 96,379 kt.

SO_2 emissions by industry increased by 5.7% in 2006 as compared with 2005. However, the notable decrease seen over the entire period considered (since 1990) must be taken into account. SO_2 emissions by industry for the period 1990-2006 represent 17,6% of total emissions of this pollutant. Industry's contribution of this pollutant fell to 13.3% of total SO_2 emissions in 2006 as part of a clear downward trend, although this year did produce an upward shift.

There was a fall in emissions by industry of all the other gases considered in 2006 as compared with the previous year. This reduction is sharp in the case of NO2 (8.83% year-on-year decrease). The reduction in CO emissions is around 1.20%, while that of other gases is less than 1%.

EMISSIONS BY INDUSTRY COMPARED WITH TOTAL EMISSIONS, 2006 (%)



Source: MMA

NOTES

- The indicator shows the changes in emissions of each of the pollutants generated by industry. As in the previous edition, the following groups and sectors (SNAP classification) are considered 2005 to form part of the industrial sector: Industrial combustion plants, Non-combustion industrial processes and Use of solvents and other products. The categories for combustion and energy transformation are not included, since these emissions are covered by the chapter on energy; nor are emissions generated by the extraction and distribution of fossil fuels and geothermal energy included.
- For reasons of scale, the indicator does not include emissions of fluorinated gases, although these are 100% industrial in origin. The change in such emissions between 1990 and 2006 was as follows:

EMISSIONS OF FLUORATED GASES (kg)

	1990	2004	2005	2006
SF_6	2,800	10,628	11,365	13,541
HFCs	205,400	2,076,945	2,266,280	2,416,454
PFCs	131,825	40,073	35,943	36,324

Source: MMA

SOURCES

- National Atmospheric Emissions Inventory *(Inventario Nacional de Emisiones a la Atmósfera)*. Sub-Directorate General for Air Quality and Risk Prevention *(Subdirección General de Calidad del Aire y Prevención de Riesgos)*. Spanish Ministry of the Environment (MMA – Ministerio de Medio Ambiente).

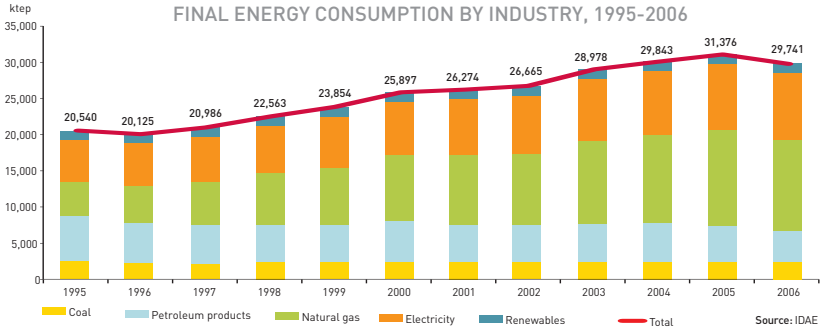
FURTHER INFORMATION

- http://www.mma.es

Energy consumption by industry

In 2006, there was a clear reduction in final energy consumption by industry

FINAL ENERGY CONSUMPTION BY INDUSTRY, 1995-2006



Source: IDAE

From 1996 onwards, final energy consumption by industry increased continually year on year. This trend was reversed in 2006, when a clear reduction (5.21%) in final energy consumption was produced. Mention should also be made of changes in each of the components: final energy from coal fell by 6.36%; from petroleum products by 14.84%; and from natural gas by 6.46%. Renewable energies have increased by 0.65% as compared with final energy consumed by industry, and although this represents a limited overall contribution, mention should be made of the 19.23% growth in thermal solar energy.

The proportion of final energy consumption by industry as compared to total energy consumption has fallen in Spain since 2004, and, according to Eurostat, represented 31.9% of the total in 2005. Comparing changes over 2004 and 2005, in Spain the decrease in this percentage was a few tenths of a point higher than that of the EU-27 and EU-15 countries. Therefore, although the percentage of energy consumed by industry is higher in Spain, there seems to be a clear trend towards European levels.

The structure of primary energy consumption seems to be basically stable in terms of source, although changes between 2005 and 2006 should be underlined. Coal's contribution fell from 2,395 kilotonnes of oil equivalent to 2,243 ktoe. The proportion of petroleum products also fell, from 11,327 ktoe to 10,071 ktoe. In 2006, the incessant rise in natural gas' contribution since 1995 slowed. This figure stood at 5,123 ktoe in 1995 and reached 13,752 ktoe in 2005 before falling slightly in 2006 to 12,863 ktoe.

NOTES

- As in the previous edition, when calculating final energy consumption by industry, only figures corresponding to energy consumption are considered, without incorporating petroleum products or natural gas that are part of industrial processes but do not directly produce energy.

SOURCES

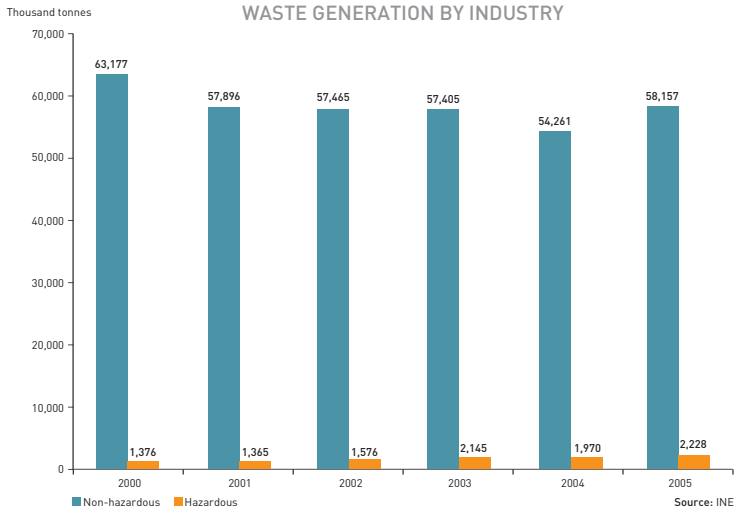
- Energy in Spain 2006 *(La Energía en España 2006)*. Spanish Ministry of Trade, Industry and Tourism (MITyC –*Ministerio de Industria, Turismo y Comercio*).
- Energy Efficiency and Renewable Energy *(Eficiencia energética y energías renovables)*. Spanish Institute for Energy Saving and Diversification (IDAE – *Instituto para la Diversificación y Ahorro de la Energía*). Spanish Ministry of Trade, Industry and Tourism (MITyC).

FURTHER INFORMATION

- http://www.mityc.es
- http://www.idae.es
- http://epp.eurostat.cec.eu.int

Waste generation by industry

Waste generated by industry is growing, especially in mining and quarrying

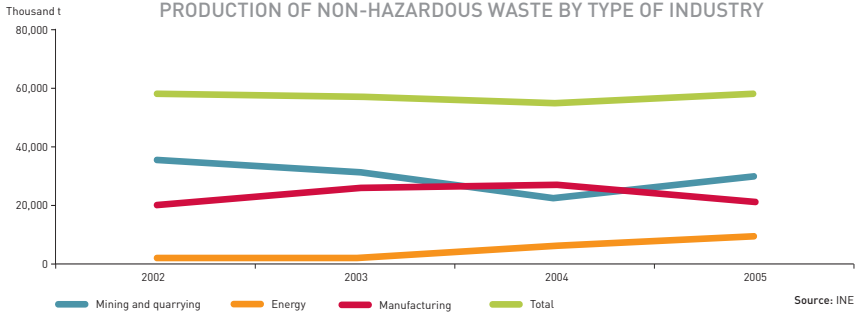


In 2005, Spain's various industrial sectors generated 60.4 million tonnes of waste, 7.4% more than the previous year. Of this quantity, 29.0 million tonnes were generated by mining and quarrying (responsible for the largest annual increase); 22.9 million tonnes by manufacturing industry; and 8.5 million tonnes by industries related to electricity generation. Of the total waste generated, 2.2 million tonnes were classified as hazardous.

The majority of the waste generated was mineral and construction waste (35 million tonnes), combustion waste (9,8 million tonnes) and animal and vegetable waste. By Autonomous Community, Castile-Leon generated 42.3% of the total of non-hazardous waste, followed by Aragon, which recorded 10.6% of the national total. As far as hazardous waste is concerned, Catalonia, the Basque Country and Andalusia generated 49.8% of the national total.

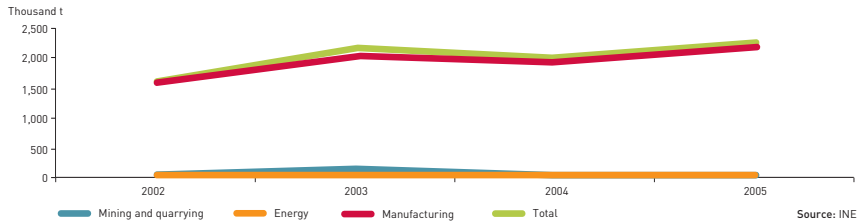
In 2005, the trend towards growth in company expenditure on environmental protection was ratified, both in terms of operating expenditure and in terms of investment, reversing the reduction seen in this area in 2003.

PRODUCTION OF NON-HAZARDOUS WASTE BY TYPE OF INDUSTRY



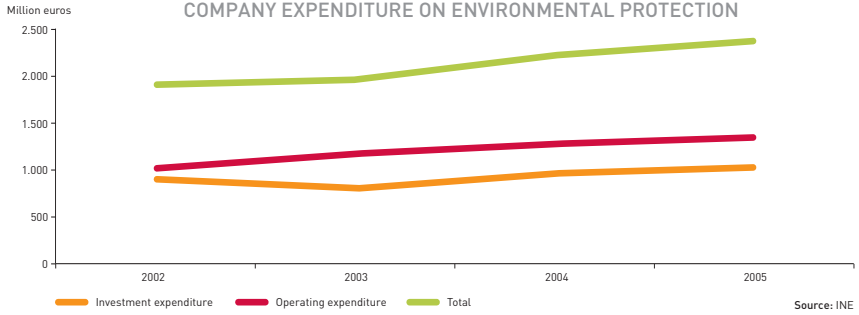
Source: INE

PRODUCTION OF HAZARDOUS WASTE BY TYPE OF INDUSTRY



Source: INE

COMPANY EXPENDITURE ON ENVIRONMENTAL PROTECTION



Source: INE

NOTES

- In this indicator, figures for the energy industry have been maintained. The first INE survey aimed to quantify waste generated in economic activities classified as industrial (CNAE C, D and E, branch 40). The second INE survey aimed to evaluate expenditure by industrial-sector companies on reducing or eliminating pollutant emissions into the atmosphere and noise pollution, on treatment of waste-water and solid waste generated, and on use of less polluting raw materials or on use the same in lesser quantities.

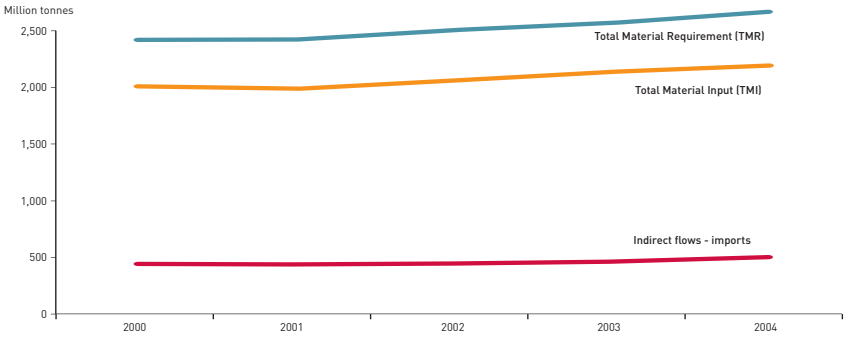
SOURCES

- Survey on Waste Generation *(Encuesta sobre la generación de residuos).* Spanish National Institute of Statistics *(INE–Instituto Nacional de Estadística).* Environmental Statistics *(Estadísticas sobre el medio ambiente),* December 2007.
- Survey on Company Expenditure on Environmental Protection *(Encuesta del gasto de las empresas en protección ambiental).* INE. In: Environmental Statistics, November 2007.

Total Material Requirement

Materials consumption in Spain continues its upward trend and is more notable in domestically obtained materials than imports

TOTAL MATERIAL REQUIREMENT



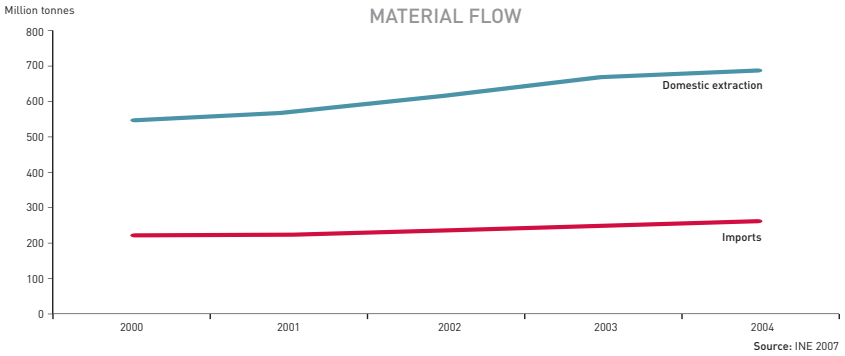
Source: INE 2007

The Total Material Requirement (TMR) indicator reflects extraction, consumption, transformation and final disposal of chemicals, raw materials and products (in tonnes) used in economic activity in Spain. Material flows can be classified in three categories: input of materials extracted from nature, end products and waste.

Nationally sourced components include fossil fuels, minerals (metallic, non-metallic and construction materials) and biomass. Also considered are those originating from national sources, but which become non-used resources (crop biomass and the by- products of mining and land excavation). It also includes indirectflows associated with imports. Besides those extracted from domestic sources, imported materials are also taken into account. These can be, according to degree of processing, raw materials, semi-manufactured products, finished products and other products.

Materials consumption in Spain, apart from a short down-turn in 2001, grew constantly and stood at 10.2% in the period 2000-2004. Materials extraction from domestic sources rose sharply and reached 9% in the period considered. Meanwhile, imports increased by 16.1%. Use of metallic minerals fell between 2000 and 2004, although use of industrial minerals grew, whilst use of construction minerals climbed.

The material flow account reveals a 12.7% fall in extraction of fossil fuels during 2000-2004, and an increase of 33% in total mineral extraction for both for industrial and construction purposes. During this period, use of biomass remained stable.



Source: INE 2007

NOTES

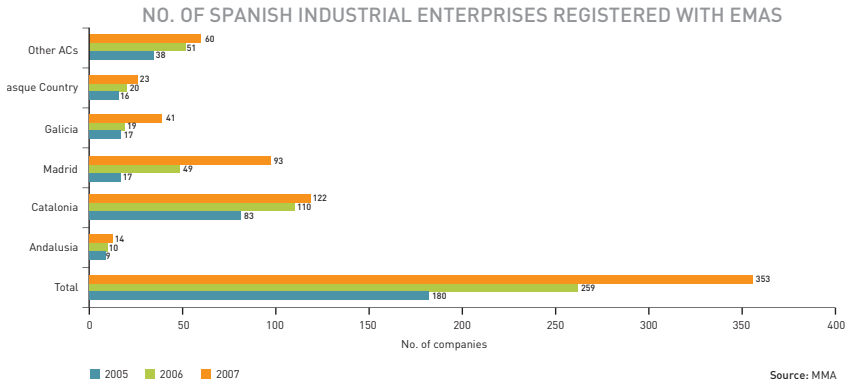
- Modification of some coefficients by the INE in the calculation of this indicator prevents comparison with years prior to 2000. The modifications were made to incorporate changes introduced in European methodology. These include a change in the presentation of the mineral break-down, with the non-metallic and mined minerals categories being replaced by industrial and construction minerals. They also include a new break-down in waste types adapted to modifications in the Waste Statistics *(Estadísticas de Residuos)*.

SOURCES

- Total Material Requirement: Spanish National Institute of Statistics (INE). Material Flow Accounts. Inebase. In Environment: Environmental Accounts.

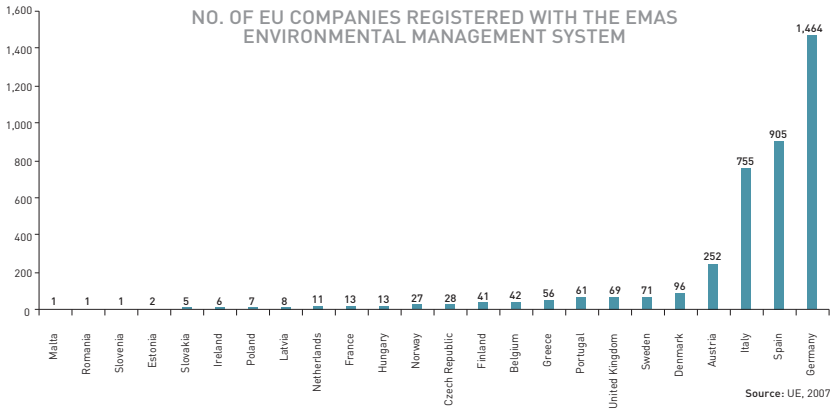
Number of industrial enterprises with Environmental Management Systems (EMAS)

Spain continues to be one of the top European countries in terms of number of companies registered with the EMAS Environmental Management System



Source: MMA

EMAS (Eco-Management and Audit Scheme) is the European Union's environmental management system. It is a voluntary scheme enabling enterprises and organisations to assess and improve their environmental performance. EMAS registrations grew notably in 2007. The countries where most progress was made were Italy (32% increase in registered companies), Spain (28% increase), Portugal (15%) and Greece (9.8%). Between them, Spain and Italy accounted for registration of 1,000 establishments in 2007.



Source: UE, 2007

Between December 2003 and December 2007, the number of industrial enterprises in Spain registered with the EMAS Environmental Management System increased by 31.6%.Of the total number of enterprises registered with EMAS in December 2007, 37% belonged to the industrial sector. Within Europe, and bearing in mind the total number of enterprises, Spain holds second place in the ranking (behind Germany) by number of EMAS-registered companies.

NO. OF INDUSTRIAL ENTERPRISES IN SPAIN REGISTERED WITH EMAS, 2003-2007

2003	2007	Incremento
136	353	259.6 %

Source: MMA

In addition, Spain has the world's third-highest number of enterprises (8,077) certified according to the ISO 14001 standard, another international environmental certification system. The top two places in the ranking are taken by Japan and China. Within Europe, it tops the table and is followed by Italy, the United Kingdom and Germany (data provided by IHOBE).

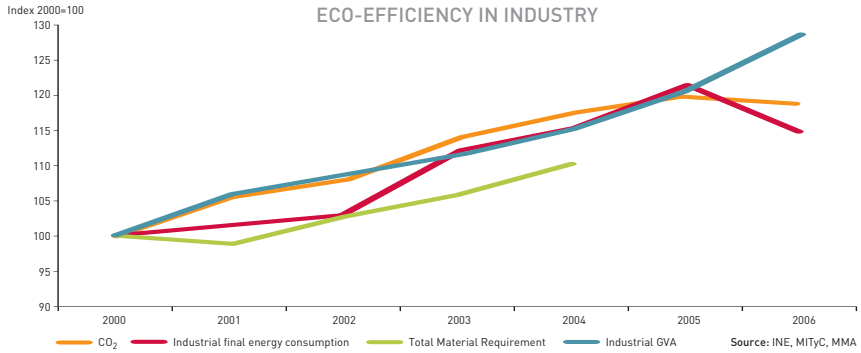
NOTES
- For the purpose of calculating this indicator, the enterprises included are those in categories 10 to 41 of the CNAE classification. This therefore excludes arable and livestock farming and forestry, as well as the construction and service industries.
- The EMAS system is regulated by Regulation 761/2001 of 19 March 2001, which includes the basic provisions of the previous Regulation (1836/93 of 29 June 1993), while further extending the scope to achieve greater participation. EMAS is currently being extended to cover all enterprises, irrespective of sector. Actions derived from its application include:
  - Set-up and application of environmental management systems in enterprises and systematic, objective and regular assessment of their operation.
  - Dissemination of information on environmental performance.
  - Active involvement of employees in the programme, achieved through continuous vocational training.
- The ISO 14000 series is a voluntary set of standards intended to achieve environmental commitment within organisations. ISO standards were designed to develop a shared and internationally recognised focus on environmental management systems. ISO 14001 was adopted in 1996 as the international standard governing the design of environmental management systems. The ISO 14001 EMS is defined as: "the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy" (ISO 14001, 1996).

SOURCES
- European EMAS data: EMAS website, European Commission.
- Data for Spain: Spanish Ministry of the Environment (MMA), Directorate General for Environmental Assessment and Quality *(Dirección General de Calidad y Evaluación Ambiental)*.

FURTHER INFORMATION
- http://www.europa.eu.int/comm/environment/emas
- http://www.mma.es/calid_amb/ma_ind/index.htm
- http://www.ihobe.es
- http://www2.ihobe.net/CertMed.nsf

Eco-efficiency in industry

Industry's GVA shows continuous growth, while final energy consumption and CO_2 emissions fall



Spain's industrial sector showed substantial improvements in environmental performance in 2006. Final energy consumption decreased 5.2% in just one year and CO_2 emissions dropped by a little under 1%. Thus, the 97,090 kilotonnes recorded in 2005 fell to 96,379 kt in 2006.

These reductions were accompanied by a 6.3% increase in Gross Value Added, which rose from 124,568 million at current prices to 132,419 million.

However, Total Material Requirement, figures for which are only available up to 2004, maintained its upward trend up to that year.

SOURCES
- Gross Value Added at current prices by sector. INE. Spanish National Accounts *(Contabilidad Nacional de España)*. Economic Accounts *(Cuentas económicas)*. Base 1995.
- Institute for Energy Saving and Diversification (IDAE), Ministry of Trade, Industry and Transport *(Ministerio de Industria, Transporte y Comercio)*.
- Energy in Spain 2006. Spanish Ministry of Trade, Industry and Transport.
- Data on emissions of atmospheric pollutants from the Spanish National Atmospheric Emissions Inventory. Sub-Directorate General for Air Quality and Risk Prevention. Spanish Ministry of the Environment (MMA).
- Survey on Waste Generation in the Industrial Sector *(Encuesta sobre generación de residuos en el sector industrial)*. Spanish National Institute of Statistics (INE).
- Survey on Environmental Protection Expenditure by Industrial Enterprises *(Encuesta sobre el gasto de las empresas industriales en protección medioambiental)*. Spanish National Institute of Statistics (INE).
- Technological Innovation in Enterprises *(Innovación tecnológica en las empresas)*. Spanish National Institute of Statistics (INE).
- European Environment Agency: Europe's environment: The Third Assessment. Madrid, MMA, 2004.

FURTHER INFORMATION
- http://www.ine.es
- http://www.mityc.es
- http://www.mma.es
- http://www.eea.eu.int