
2.5

WASTE



Waste generation and management is a serious environmental problem in modern society. Decreased waste generation and its appropriate management are necessary to avoid serious environmental impacts, which lead to pollution of ecosystems and affect human health. When waste is managed correctly, however, it becomes a resource which contributes to the preservation of raw materials and the conservation of natural resources, and therefore sustainable development.

Spain has approved several National Plans covering different waste categories and contaminated land over the past few years. The new National Integrated Waste Plan 2008-2015 (PNIR, Plan Nacional Integral de Residuos), approved by the Council of Ministers in December 2008, is intended to serve as a guide for the development of specific policies to improve waste management by reducing its generation and promoting its correct treatment.

This Plan establishes specific waste reduction, reuse, recycling, assessment and elimination targets and covers the treatment of household waste, specific waste, contaminated land and some non-hazardous agricultural and industrial waste. It also includes a Biodegradable Waste Discharge Reduction Strategy, which in compliance with legal requirements, will help to prolong the life of landfill sites, reduce their environmental



impact and, in particular, reduce the emission of greenhouse gases. As well as taking into account the contribution of waste to climate change, reducing the proportion of Spanish waste that ends up in landfill sites is also an important goal of the NIWP. To achieve this, it proposes measures to promote waste reuse as well as the implementation of selective collection.

In Spain, as in other European countries, waste generation has increased alongside economic growth. Information regarding the generation and management of waste is

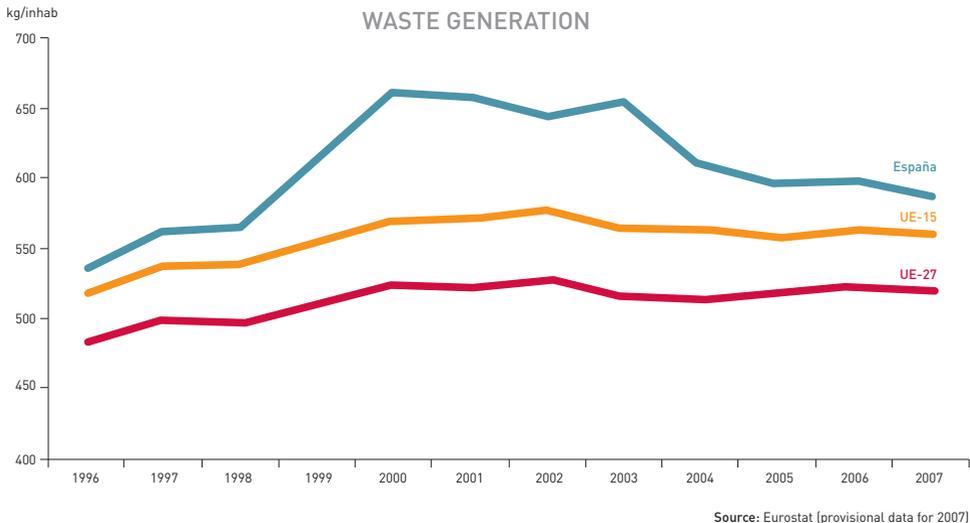
INDICATOR	GOAL	TREND
Urban waste generation	Minimise production	The amount of urban waste produced per person has decreased since 2003
Urban waste management: landfill and incineration	Increase recycling and reduce the quantity of waste ending up in landfill sites	The amount of waste per person reaching landfill sites decreased in 2007. Incineration is continuing to increase
Paper-cardboard recycling	Increase recycling rate	Collection and recycling of paper-cardboard waste continues to increase
Glass recycling	Increase recycling rate	Glass recycling continues to increase
Packaging waste recycling and recovery	Increase recycling rate	The recycling and recovery rate is approaching the targets set by Royal Decree 252/2006
Sewage sludge production and disposal	Increase sewage sludge reuse	67.7% of sludge is used by the agricultural sector

2.5 WASTE

particularly important for planning both treatment infrastructure needs and for setting realistic targets for improving waste management. This chapter presents a series of indicators that help progress towards such a quantification of waste in Spain and contribute to the greater knowledge and awareness required to enable effective responses to the issues raised.

Urban waste generation

According to Eurostat, urban waste generation in Spain began to trend downwards in 2003



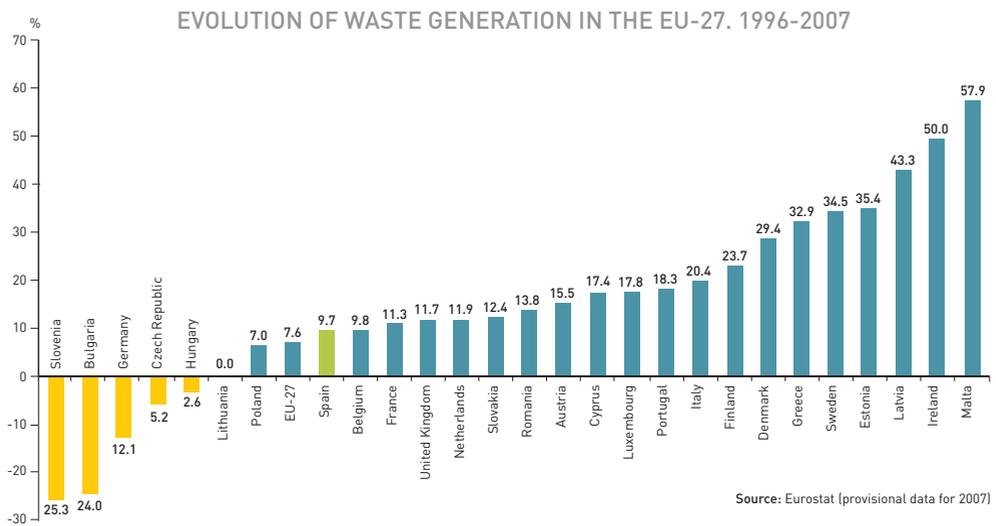
The provisional 2007 data from Eurostat indicate that Spain generated 588 kg of urban waste per person, a much lower amount than the average for 2000 (662 kg/person), which was the highest value for the period 1996-2007. The most significant aspect of the overall trend is that, after an initial increase, a continual decrease in the amount of urban waste generated per person was initiated in 2003.

In comparison with the EU, during the period under consideration both the EU-15 and the EU-27 produced less urban waste per person, although without significant decreases in the past few years. The absolute figures show that in the period 1996-2007, Spain appears in ninth place in the list of countries with the smallest increases in urban waste generation (only 9.7%), a figure that is slightly higher than the EU-27 average (7.6%). Only five countries (Slovenia, Bulgaria, Germany, Czech Republic and Hungary) reduced their urban waste production in this period, whereas it increased in the other 21 countries (waste production in Lithuania did not change between these two dates).

A comparison of the amount of urban waste generated per person in Spain with that generated in other EU countries shows that in 2007 Spain was in 8th position in the EU-27, behind Denmark (801 kg/person), Ireland (786 kg), Cyprus (754 kg),

Luxembourg (694 kg), Malta (652 kg), Holland (630 kg) and Austria (597 kg). The average for the EU-27 in 2007 was 522 kg/person.

According to figures from the National Institute of Statistics (INE), in 2006 urban waste management companies collected 28.4 million tonnes of waste, 1.3% more than in the previous year. The majority of this amount (21.8 million tones) corresponded to mixed waste, whereas the remaining 6.6 million tonnes were selective collection. According to the same source, the Balearic Islands and Ceuta and Melilla (together) had the highest values, with 630 and 609 kg/person, respectively. At the other extreme, Catalonia and Galicia generated only 441 kg/person.



As discussed in previous editions, the Ministry of the Environment and Rural and Marine Affairs (MARM) also collects information concerning urban waste generation, although its figures are notably different to those provided by the NIS compiled from “waste collection and treatment surveys”, which is the source used by Eurostat. It should be stressed, however, that the INE uses a completely different statistical methodology to that used by MARM, which obtains information on domestic urban waste and excludes flows of some specific waste. However, both institutions are working together to establish joint criteria to avoid such differences. The figures for urban waste generated per person from both sources are given below:

COMPARISON OF URBAN WASTE GENERATION DATA (kg/person)

	2005	2006	2007
MARM	507	529	521
Eurostat	597	599	588

Source: Eurostat and MARM

NOTES

- The indicator shows municipal waste generation, expressed in kilograms per person (kg/person) and refers to waste collected by municipal services, or by similar services contracted by local councils, destined for the waste management system. The majority of this waste flow comes from homes, although waste from related sources, such as shops, offices and public institutions, are also included.
- According to the Waste Act 10/1998, urban or municipal waste is "waste generated in private households, shops, offices and service businesses, as well as all waste similar to that produced in the above-mentioned places or activities and that is not classified as hazardous".
- Mixed waste is defined as waste and household fittings generated by private households, shops, offices and service businesses, or during cleaning of public highways.
- Selectively collected waste is the result of differential collection of fermentable organic matter and recyclable material, as well as any other differential collection system which allows the separation of recoverable material contained in waste.
- Annual waste generation per person per year is calculated by dividing annual waste collected by the estimated population for each year according to NIS data (1991 and 2001 population censuses and intercensal estimates for the remaining years). The seasonal tourist population is not included.

SOURCES

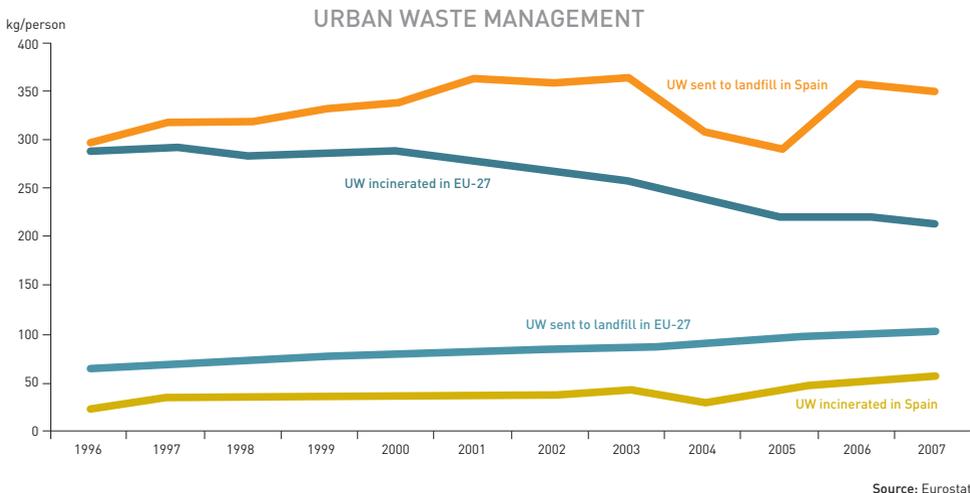
- National Institute of Statistics. Press release of 28 December 2008, regarding the "Survey on Waste Collection and Treatment. Year 2006".
- Eurostat. See web page: Eurostat/ Statistics/ Environment/ Main tables/Waste statistics.
<http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/introduction>

MORE INFORMATION

- <http://www.marm.es>
- <http://www.ine.es>
- <http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes>

Urban waste management: landfill and incineration

The amount of waste per person sent to landfill sites decreased once again in 2007 after the increase seen in 2006, and waste incineration continued to rise



The amount of urban waste per person sent to landfill sites grew from 1996 to 2001, stabilised between 2001 and 2003 (at around 360 kg/person) and decreased sharply between 2003 and 2005 from 364 kg/person to 292 kg. However, 2006 saw a significant increase to 358 kg/person, although the amount decreased again in 2007.

The use of landfill sites as a waste management system places Spain in sixth position in the EU-27 in the ranking of countries where landfill use is increasing the most. Between 1996 and 2007 the amount of urban waste per person sent to landfill grew 17.4%, whereas the EU-27 average decreased by 26%. In this context, the decrease observed in Germany (98.7%) and other countries such as Holland, Belgium and Sweden (more than 80%) during the same period is notable. In 2007 Spain was seventh in the ranking of EU-27 countries that send the most urban waste per person to landfill (350 kg/person). The EU-27 average was 214 kg/person, with Germany, Belgium, Sweden and Denmark sending less than 50 kg/person to landfill.

Waste incineration is another means of eliminating waste that also provides a benefit in terms of energy generation. A total of 58 kg/person were incinerated in Spain in 2007, which is rather low when compared with the EU-27 average (104 kg/person) and the figures for countries such as Denmark (427 kg/person) or Luxembourg,

Sweden and Holland (more than 200 kg/person). Nevertheless, use of this elimination method has increased faster in Spain than essentially any other EU country, with Spain's growth of 132.0% bettered only by Austria (233.3%) and Italy (148.1%).

The results of the waste collection and treatment survey undertaken by the NIS show that in 2006 6.8% of mixed was sent for recycling, 16.7% was sent for composting and 76.5% was eliminated.

URBAN WASTE TREATMENT 2006 (%)

Type of waste	Recycling	Composting	Elimination
Mixed	6.8	16.7	76.5
Selectively collected	49.5	20.2	30.3

Source: INE

According to the same source, the amount of selectively collected urban waste increased in Spain in 2006 to 22.1 kg/person of paper and cardboard, an increase of 18.9% with respect to the previous year, and 12.6 kg/person of glass, an increase of 11.7% with respect to 2005.

By Autonomous Region, the largest amounts of selectively collected paper and cardboard were obtained in the Balearic Islands (66.3 kg/person), the Basque Country (39.3 kg) and the Canary Islands (39.3 kg), whereas the highest amounts of glass were collected in the Balearic Islands (23.3 kg/person), Navarra (21.9 kg), the Basque Country (19.7 kg) and La Rioja (19.1 kg).

As is the case with information regarding urban waste generation, MARM also makes figures available concerning this waste's final destination. As discussed for the previous indicator, the differences between the estimates from INE (sent to Eurostat) and MARM are due above all to methodological considerations such as the fact that MARM takes into account household urban waste and excludes other specific waste flows. As can be seen in the table below, the amounts of urban waste sent for landfill and incinerated are rather different, although work is underway to homogenise the two systems (INE and MARM) in order to provide a single figure.

COMPARISON OF URBAN WASTE MANAGEMENT DATA (KG/PERSON)

		2005	2006	2007 (provisional)
Landfill	MARM	333.2	358	356.1
	Eurostat	292	358	350
Incineration	MARM	43.4	45.3	42.3
	Eurostat	44	54	58

Fuente: Eurostat y MARM

NOTES

- This indicator indicates the relationship between the amount of waste treated in the different destinations and the population of Spain each year, which must be taken into account to interpret this indicator correctly. A combination of moderate increases in the amount of waste treated and higher increases in population can lead to a decrease in this ratio, whereas a decrease in the amount of waste treated together with a large population decrease can lead to an increase in the ratio.
- See notes for the previous indicator.

SOURCES

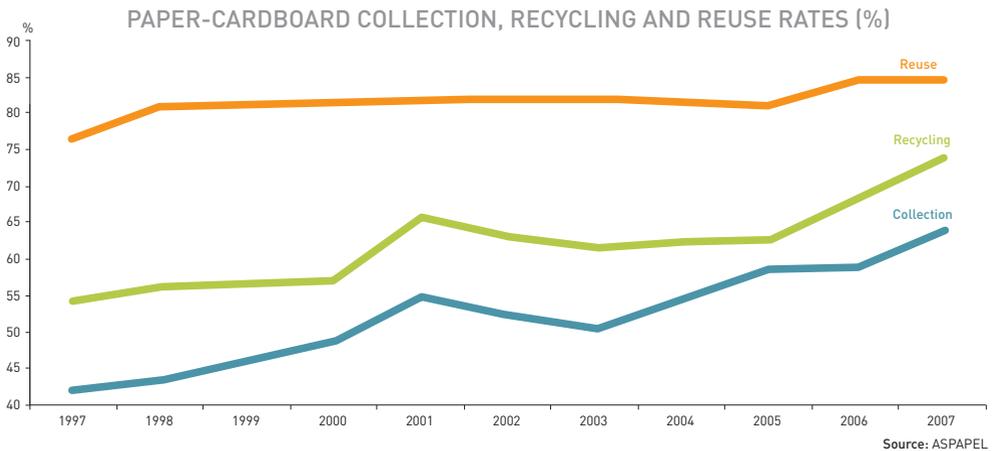
- National Institute of Statistics. Press release of 28 December 2008, regarding the "Survey on Waste Collection and Treatment. 2006".
- Eurostat. See web page: Eurostat/ Statistics/ Environment/ Main tables/Waste statistics.
<http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/introduction>

MORE INFORMATION

- <http://www.marm.es>
- <http://www.ine.es>
- <http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes>

Paper-cardboard recycling

Recovery of paper-cardboard increased to 4.9 million tonnes in 2007 with respect to the 4.6 million tonnes in the previous year



In 2007 Spain was the sixth largest paper manufacturer in the EU behind Germany, Finland, Sweden, Italy and France. Furthermore, paper consumption in Spain went down along with the overall economic situation. According to the Spanish Association of Pulp, Paper and Cardboard Manufacturers (ASPAPPEL), in 2006 Spain was in 24th position in the worldwide list of paper consumers (176 kg/year), far behind other countries such as Luxembourg (480 kg/year), Belgium (361 kg/year), Finland (330 kg/year) and the USA (301 kg/year).

The Spanish paper industry leads the EU in terms of recycling by recycling all the used paper recovered in Spain and importing almost one million tonnes more from other countries. Around 19% of the paper used cannot be recovered for recycling as it is either saved or its use means that it degrades or is destroyed.

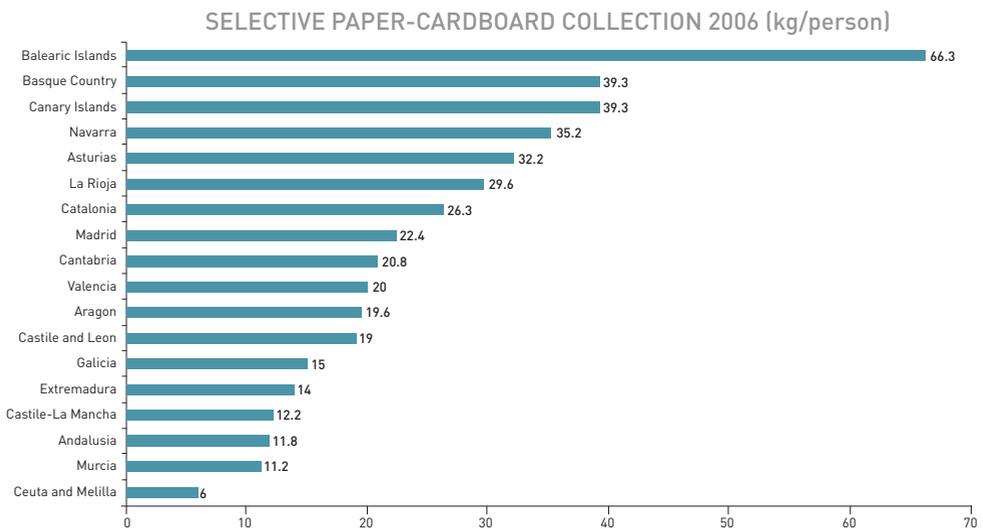
Recycling allows a better use of natural resources and means less waste, less landfill sites and a reduction in greenhouse gas emissions.

According to ASPAPEL, the recovery rate of 50.5% in 2003 has increased steadily to reach 63.9% in 2007, close to the EU average. In the period 2004-2007 the amount of paper recovered increased by 34.9% from 3.6 million tonnes to 4.9 million. These 4.9 million tonnes per year of used paper and cardboard collected for recycling in Spain signify a saving in landfill volume equivalent to 49 large football grounds and

avoid the emission of 4.1 million tonnes of CO₂ from landfill sites (more than 1% of Spain's total emissions).

The recycling rate of 61.6% in 2003 increased between 2004 and 2007 to 73.7%. These figures place Spain above the EU average and as one of the leading countries alongside Austria, Sweden and Germany. The volume of paper recycled in 2007 reached 5.7 million tonnes, 5.7% more than in 2006. The large amounts of money invested in new installations have allowed this increased recycling capacity over the past few years. The reuse rate (84.6% in 2007) has remained steady over the last decade.

According to the INE, the breakdown by Autonomous Region for 2006 shows the highest amounts of paper and cardboard for recycling were collected in the Balearic Islands (66.3 kg/person), followed by the Basque Country (39.3 kg), the Canary Islands (39.3 kg) and Navarra (35.2 kg), whereas the lowest amounts were collected in Ceuta and Melilla (6.0 kg/person), Murcia (11.2 kg) and Andalusia (11.8 kg). The increase observed in the national average for selective collection from 17.9 kg/person in 2005 to 22.1 kg/person in 2006 is a sign of increasing public interest and awareness in recycling and environmental conservation.



Source: INE

NOTES

- The reuse rate is calculated as the ratio between the amount of paper recovered and the paper produced and is expressed as a percentage.
- The collection rate is estimated from the ratio between the amount of paper recovered and the paper and cardboard consumed and is expressed as a percentage. Used paper and cardboard are recovered for recycling by various means: industrial collection (companies, publishing houses, printers and large retail outlets), selective collection (blue containers and door-to-door collection from small retailers) and special collection (offices, public buildings, recycling points, etc.). After being cleaned and sorted into different grades, the recovered paper is used as a raw material by the paper-making industry to produce new paper. Recovered paper is thus used paper which has been collected to be used as the raw material for the manufacture of new paper, in other words to be recycled.
- The recycling rate for paper-cardboard waste is calculated as the ratio between recovered paper and apparent consumption of paper and cardboard. Apparent consumption is calculated by adding the amount imported to the amount produced and then deducting exports.

SOURCES

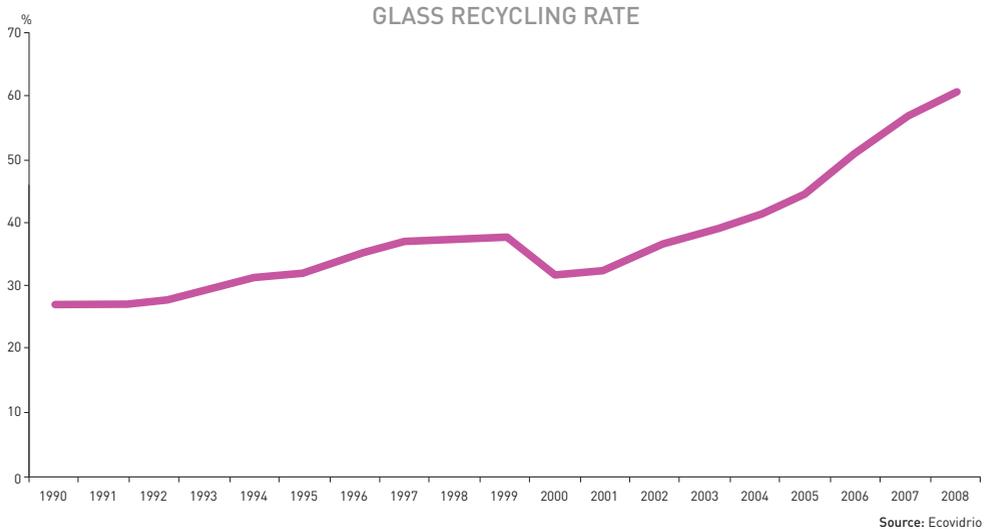
- Spanish Association of Pulp, Paper and Cardboard Manufacturers (ASPAPPEL). "Sustainability Report". Various years.
- ASPAPPEL, 2008: Summary of the latest statistics on the sector (see website).
- REPACAR. Spanish Paper and Cardboard Recycling Association. Activities Report 2007.

MORE INFORMATION

- <http://www.marm.es>
- <http://www.aspapel.es>
- <http://www.ine.es>
- <http://www.repacar.org>

Glass recycling

The glass recycling rate in 2008 (60.3%) exceeded the target established by Directive 94/62/EC



The advantages of glass recycling can be seen in both the benefits derived from conserving the environment and the fact that the properties of glass mean that it can be recycled completely (thereby reducing the need to extract raw materials), it maintains these properties after recycling, and therefore can be recycled continually, and saves the energy that would otherwise be used to manufacture new packaging.

In 2008, the total amount of glass recycled reached 972,658 tonnes, an increase of more than 9% on the previous year, with a recycling rate of 60.3%. This means that the minimum 60% recycling rate established by the Directive 94/62/EC of the European Parliament and the Council, on packaging and packaging waste, has been exceeded.

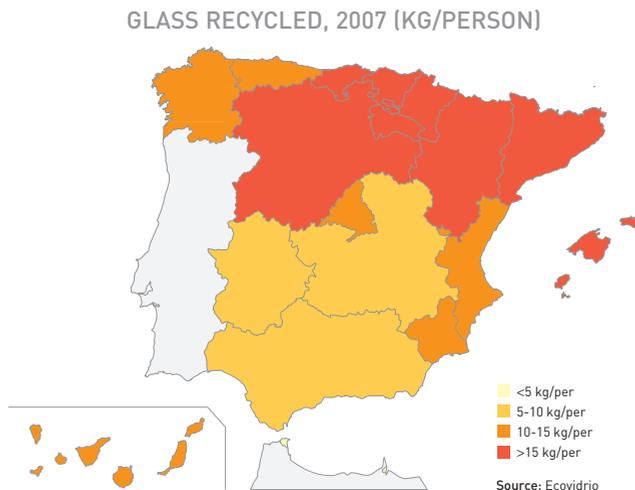
Spending on raising consciousness and the ever-increasing public awareness mean that, according to data from Ecovidrio's Integrated Management System, 14% more glass packaging was recycled in 2007. A further 80,362 tonnes were deposited in containers (576,968 tonnes in 2006 vs. 657,330 tonnes in 2007), in other words the amount recycled has increased to 14.5 kg/person from the 12.9 kg recorded in 2006.

An analysis of the evolution of glass recycling over the past five years shows that almost 50% more glass is now recycled (10.1 kg/person in 2003 vs. 14.5 kg in 2007).

This is a sign that the public has assumed glass recycling as an everyday occurrence.

In 2006, the number of containers in Spain stood at 136,689, or one container for every 327 people. In 2007, these figures rose slightly to 151,000 containers, or one container for every 299 people. This latter figure means that Spain is still the European country with most containers per person.

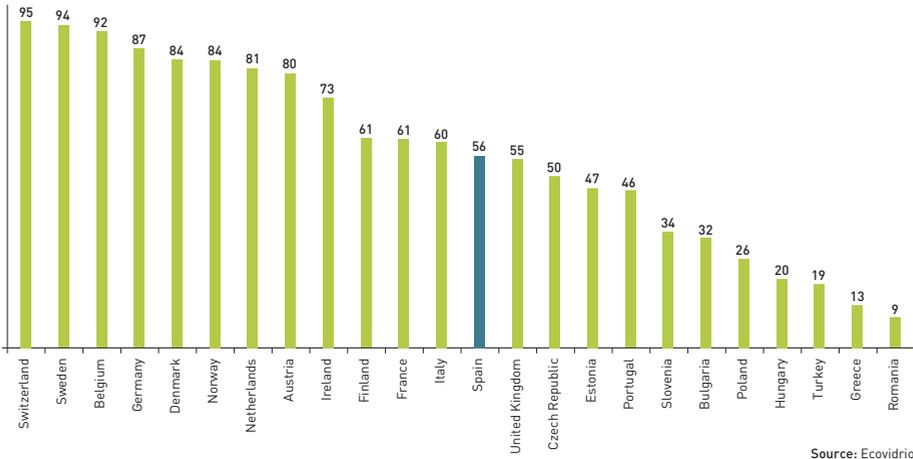
The Autonomous Regions which increased their collection rates most with respect to 2006 are Extremadura (35.8% increase), Murcia (25.8%) and Madrid (25.3%), with the latter two going from being two of the communities with the lowest increases to two of those with the largest increases. In overall terms, the Basque Country remains the Autonomous Region with the highest recycling rate (24.0 kg/person), followed by Navarra (22.7 kg) and the Balearic Islands (21.5 kg).



According to figures from the European Glass Packaging Federation (FEVE), Spain's recycling rate in 2006 stood at 56%, slightly lower than the European average (62%) and some distance from leading countries like Switzerland (95%), Sweden (94%) and Belgium (92%), which have a long-standing recycling tradition.

In 2007, twelve European countries had already surpassed the target 60% recycling rate for 2008 established by the EU Directive. The current challenge is for the remaining countries to increase their recycling rates to meet this target.

GLASS RECYCLING RATE 2007 (%)



Source: Ecovidrio

NOTES

- The glass recycling rate is the ratio between glass collected and its apparent consumption. The latter is calculated by subtracting exports from the sum of the glass produced and imports. ECOVIDRIO oversees the entire glass recycling process for the manufacture of new packaging (collection, treatment and final recycling, which is undertaken in the same year). It refers only to packaging glass (hollow glass) and does not include other types of glass such as window panes, car windows, laminated glass, etc. (sheet glass).
- The glass collected comes from two sources: glass collected by the public, in other words glass deposited in containers (green igloos) located in the street, and glass from other sources, such as packaging plants, waste selection and recovery plants in the HORECA (hotel and catering) sector and other public and private bodies.

SOURCES

- Ecovidrio. "Annual Report 2007".
- European Glass Packaging Federation (FEVE).

MORE INFORMATION

- <http://www.marm.es>
- <http://www.ecovidrio.es>
- <http://www.anfevi.com/>
- <http://www.feve.org>

Packaging waste recycling and recovery

The target for packaging waste recovery established by RD 252/2006 (60%) was exceeded in 2006

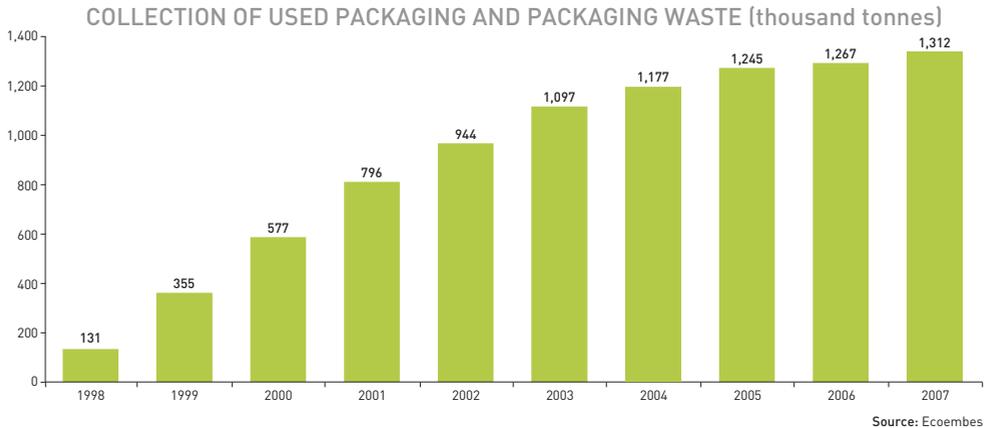


In 2006 Spain achieved a recovery rate of 60.7%, thereby exceeding the target established by RD 252/2006, of 3 March, which set a packaging recovery rate target of 60% for 2009.

This Royal Decree, which transposed Directive 2004/12/EC and modified the targets set by Act 11/1997 for packaging and packaging waste, also establishes a recycling rate target of 55%. Spain achieved a recycling rate of 54.0% in 2007. However, if the current growth rate of 3.5 percentage points per year for the past few years continues, the recycling targets established by this Royal Decree are likely to be met before 2009.

Public awareness of packaging recovery and recycling has increased. According to information provided by Ecoembes in its Annual Report 2007, more than 43.7 million people had access to selective packaging collection, 900,000 more than in 2006. Around 1.4 million more people had access to selective collection of small packaging than in 2006, with the total reaching 42.9 million. The average amount of incorrectly deposited waste continues to decrease as a result of the numerous advertising campaigns.

The igloo-type containers are the most widely used by towns participating in Ecoembes' Integrated Management System (SIG: Sistema Integrado de Gestión), accounting for 40.18% of the total population with selective collections, and are also chosen by the majority of semi-urban and rural towns.



According to Ecoembes' annual report, 1,312,886 tonnes of packaging were collected in 2007, 45,817 tonnes more than in 2006, and 1,160,616 tonnes were recycled, 94,273 tonnes more than the previous year. Furthermore, 152,270 tonnes were recovered for their energy value. This means that in 2007 the IMS overseen by Ecoembes managed to recycle 56.1% of the packaging put onto the Spanish market by companies belonging to the IMS. These results mean that the targets established by the European Directive 2004/12/EC for December 2008, as set out in RD 252/2006, have already been met.

In 2007 167 new companies joined the SIG, which represents an increase of 1.4% on the previous year and makes a total of 12,375 companies managing 90% of the packaging placed on the market.

Catalonia, with 2633 (21.28% of the total), is the Autonomous Region with the highest number of companies belonging to the SIG, followed by Valencia, with 1781 (14.39% of the total). These two are followed by Madrid, with 1490 companies (12.04%), and Andalusia, with 1408 (11.28%); Castile-La Mancha, Castile and León, Galicia, Murcia and Aragon come next.

A sector-based breakdown shows that the food sector, with 6,362 companies (51.41% of the total), is the largest representative, followed by the drinks sector (961 companies, 7.77%), health and beauty (910 companies, 7.35%), and cleaning and maintenance (577 companies, 4.66%). The remaining 3565 companies belong to various other sectors.

NOTES

- Ecoembalajes España, S.A. (Ecoembes) is a not-for-profit public limited company whose purpose is to design and manage systems to separate and recover used packaging and packaging waste in order to ensure compliance with the reduction, recycling and recovery targets defined in the Packaging and Packaging Waste Act 11/1997, of 24 April 1997.
- Recycling and recovery rates are calculated from the amount of material (in tonnes) recycled and recovered for energy value (measured at the point of entry into the recycling and recovery process) compared with total packaging waste generated. This figure is estimated as the total quantity of packaging placed on the market. It is assumed that the quantity of reusable containers from previous years which become waste will balance out the reusable containers placed on the market in that year and which continue to be reused.

SOURCES

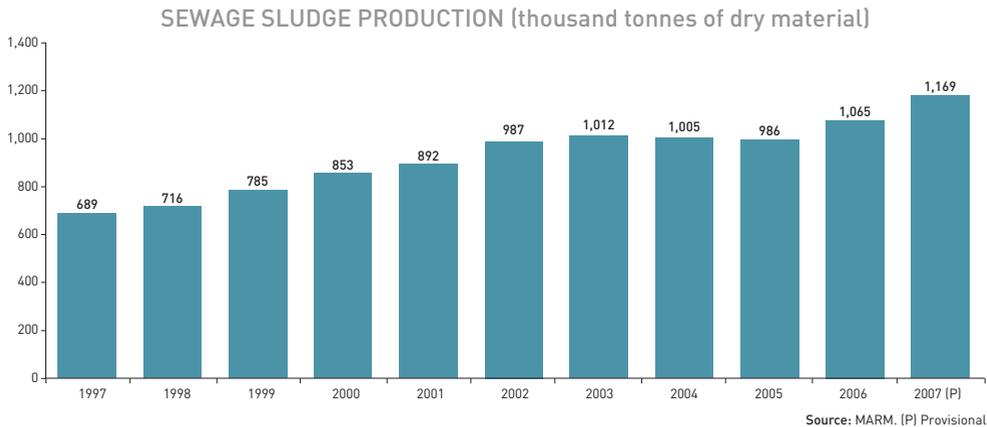
- MARM. *"The Environment in Spain"* (various years).
- Ecoembalajes España, S.A. (Ecoembes). Annual Report.

MORE INFORMATION

- <http://www.MARM.es>
- <http://www.ecoembes.com>

Sewage sludge production and disposal

Sludge production increased by 9.7% over the past year; 67.7% of sludge is used by the agricultural sector



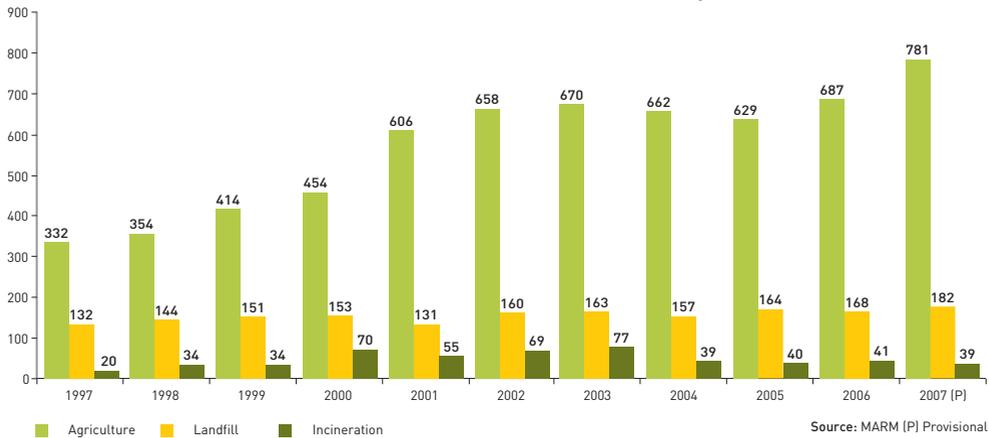
Sludge production in Spain has grown constantly over the last few years, with provisional figures for 2007 suggesting that production has reached 1,169,000 tonnes of dry material. The increasing production of sludge from household and/or urban waste-water treatment is leading to problems arising from its correct management, treatment and, above all, elimination. With the aim of solving these problems, the National Water Quality Plan 2007-2015 contemplates a raft of measures that aim to ensure full compliance with Directive 91/271/EEC. This Plan anticipates the construction of new waste-water treatment plants and the correct exploitation, maintenance and management of existing installations.

The National Sewage Sludge Plan established 2007 as the deadline for recovering 80% of WWTP (waste-water treatment plant) sludge and a 20% reduction in sludge sent to landfill. The increase in WWTP sludge production due to application of both Directive 91/271/EEC and the National Sewage Sludge Plan brings with it the need to manage this sludge correctly. One of the solutions selected to achieve environmentally friendly sludge management is to use this sludge as agricultural fertiliser.

Composition of the sludge, although somewhat variable, makes it a valuable source of organic material and fertilising elements for use in agricultural activities, which appears to be the most appropriate route for its elimination as it allows its incorporation into natural material and energy cycles. This brings a twofold

–environmental and agricultural– benefit due on the one hand to its elimination with no significant effects on the ecological balance and on the other to the effect of its application to soil, which increases in organic matter and nutrient content.

SEWAGE SLUDGE USE (thousand tonnes of dry material)



In 2007, sewage sludge production increased by 9.7% on the previous year. Agriculture continues to be the main destination for this kind of waste, accounting for 781,000 tonnes (66.7%) of all sludge produced.

The amount of sludge sent for landfill has increased by 13.7% in the last year to a total of 168,000 tonnes of dry material, and the amount sent for incineration appears to have stabilised at around 39,000 tonnes of dry material in 2007. The volume of waste incinerated in 2007 amounted to 3.3% of the total.

NOTES

- Directive 86/278/EEC, of 12 June, on "the protection of the environment and, in particular, of the soil, when sewage sludge is used in agriculture", makes use of the following terms:
 - "residual sludge from sewage plants treating domestic or urban waste-water and from other sewage plants treating waste-waters of a composition similar to domestic and urban waste-water"
 - "residual sludge from septic tanks and other similar installations for the treatment of sewage"
 - "residual sludge from sewage plants other than those referred to above"

SOURCES

- National Sewage Sludge Register. Sub-Directorate General for Agricultural Production Methods. MARM (specific query).

MORE INFORMATION

- <http://www.marm.es>