This article shows recent statistics on packaging waste in the 28 European Union (EU) Member States and some non-member countries. In particular, it summarises the developments during the 2007–2016 period for which official reporting on packaging waste for all EU Member States was implemented. Information and data are based on the Directive 2004/12/EC which lays down the recycling and recovery targets. The Directive aims at providing a high level of environmental protection and harmonising national measures concerning the management of packaging and packaging waste.

Waste generation by packaging material

In 2016, 169.7 kg of packaging waste was generated per inhabitant in the EU-28. This quantity varied between 54.9 kg per inhabitant in Croatia and 220.6 kg per inhabitant in Germany. Figure 1 shows that in 2016 ‘paper and cardboard (41 %)’, ‘plastic (19 %)’, ‘glass (19 %)’, ‘wood (16 %)’ and ‘metal (5 %)’ are the most common types of packaging waste in the EU-28. Other materials represent less than 0.3 % of the total volume of packaging waste generated in 2016.
Figure 1: Packaging waste generated by packaging material, EU, 2016(%) Source: Eurostat (env_waspac)

**Time series of packaging waste generation and treatment**

Figure 2 shows the development of packaging waste generated from 2007 to 2016 in the EU. The total quantity of generated packaging materials rose from 81.5 million tonnes in 2007 to 81.7 million tonnes in 2008. In 2009, the volume dropped to 76.8 million tonnes but rose in 2010 to 78.7 million tonnes and, in 2011 increased further to 80.1 million tonnes.
In 2012, the EU-28 presented a total of 78.9 million tonnes of packaging waste, which was a decrease of 1.5 % compared with 2011. In 2016, all packaging waste materials, except metal, experienced an increase compared to 2015 which resulted in a total volume of packaging waste of 86.7 million tonnes of generated waste – a rise of 2.2 % compared with 2015.

Over the 10-year period ‘paper and cardboard’ was the main packaging waste material generated, contributing with nearly 35.4 million tonnes to the total packaging waste generated in 2016. Plastic packaging material reached a total of 16.3 million tonnes in 2016 as the second most significant material. ‘Glass’ had a volume of nearly 16.3 million tonnes, wood packaging 13.9 million tonnes and metal packaging 4.5 million tonnes in 2016.

Figure 2: Packaging waste generated, EU, 2007–2016 (million tonnes)

Source: Eurostat (env_waspac)

While all packaging materials experienced a clear decrease of in total 4.9 million tonnes (– 6.0 %) from 2008 to 2009, the decline was especially sharp for ‘metal’ and ‘wood’. The volume of ‘metal’ shrunk by 0.4 million tonnes (– 7.8 %) and the volume of ‘wood’ decreased by 2 million tonnes (– 15.0 %). Both packaging materials held a high share of the transport packaging, especially the use of wood pallets. The decline can therefore be attributed to the dip in trade volume.

The decrease in the generation of the EU packaging waste from 2011 to 2012 was more moderate compared with the 2008–2009 decline and occurred in all packaging materials, except for ‘plastic’, which increased by 0.7 %. From 2011 to 2012, the largest decrease took place in wooden packaging (– 3.1 %), followed by glass packaging waste (– 3.0 %). The generation of metal packaging waste decreased by 1.4 % from 2011 to 2012, while ‘paper and cardboard’ decreased by 1.0 %. In 2013, the generation of total packaging waste appeared to have increased mainly due to the increase in generation of ‘paper and cardboard’ of 2.5 % compared to the previous year. Since 2013 total packaging waste increased by 6.6 % in 2015 and by 8.9 % in 2016 reaching the amount of 86.7 million tonnes. The increase was mainly due to increased generation of wood (+ 17.7 %), paper (+ 9.5 %) and plastic (+ 8.6 %) packaging waste from 2013 to 2016.

The development of total packaging waste generation in the EU-28 and each of the main materials during 2007-2016 shows, albeit with various fluctuations, an increase in the total packaging waste generation, paper and cardboard, plastic and wood (+ 6.3 %, + 11.8 %, + 8.5 %, + 5.4 % respectively), whereas glass and metal show decreases for the same period of − 1.7 % and − 5.2 % respectively.

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Figure 3 depicts the development of the quantity of waste generated per inhabitant, by main waste materials. The total waste generation of packaging materials per inhabitant in the EU-28 in 2007 was 163.3 kg. After the economic crisis in 2008 the total waste generation dropped to 152.8 kg per inhabitant in 2009. In 2010, the packaging generated had somewhat increased to 156.3 kg per inhabitant, and further increased to 159.1 kg per inhabitant in 2011. Hereafter, it fell back to 2010 levels in both 2012 (156.4 kg/inhabitant) and 2013 (157.3 kg/inhabitant). Compared with the total volume of generated packaging waste per inhabitant in 2007, the total volume per inhabitant in 2016 increased by 6.4 kg. It peaked at the highest level for the entire period at 169.7
kg per inhabitant in 2016.

Figure 3: Packaging generated per inhabitant, EU, 2007–2016 (kg per inhabitant) Source: Eurostat (env_waspac)

Figure 4 shows the evolution of the volume of all packaging waste per inhabitant generated, recovered and recycled. In comparison to the previous year, the amount of packaging waste generated in 2016 rose by 1.9%; packaging waste recycled and packaging waste recovered each increased by 4.0% and 3.7% respectively. While for the 2007–2016 period the amounts of packaging waste generated show fluctuations and only slight increases, both recycling and recovery volumes in 2016 were significantly higher than in 2007. However, both volumes experienced also a short reduction during the 2008–2009 economic slump.
Figure 4: All packaging waste generated, recovered and recycled, EU, 2007–2016 (kg per inhabitant)Source: Eurostat (env_waspac)

Figure 5 shows the corresponding evolution of the recycling and recovery rates during 2007–2016. In the EU-28 the recycling rate of packaging waste went up from 59.2 % in 2007 to 67.2 % in 2016. The recycling rate and the recovery rate evolved in parallel. The recovery rate including incineration at waste incineration plants with energy recovery rose from 72.5 % in 2007 to 80.3 % in 2016.

Figure 5: Recycling and recovery rates for all packaging, EU, 2007–2016(% by kg/inhabitant)Source: Eurostat (env_waspac)

Figure 6 shows the share of treatment options for all packaging waste in 2016. The major form of recovery in all countries is recycling. In some countries 'Energy recovery' and 'Incineration with energy recovery' contributed significantly to the overall recovery rate. Countries which utilise 'Incineration with energy recovery' as a standard method of waste disposal achieved a significantly higher recovery rate. In 2016, this was the case for Finland (43.2 %), Luxembourg (23.8 %), Austria (20.0 %), the Netherlands (18.2 %), Belgium (13.0 %), Italy (10.7 %) and Ireland (10.3 %), as well as the EFTA countries Norway (37.3 %) and Liechtenstein (26.3 %). 'Recovery other than energy recovery' contributed only a minor share.

Figure 6: Share of treatment options for all packaging waste in 2016Source: Eurostat (env_waspac)
Figure 6: Share of treatment for all packaging waste, 2016 (%)Source: Eurostat (env_waspac)

Generation and recycling per inhabitant

The total amounts of packaging waste generated and recycled are compiled from all packaging materials: ‘glass’, ‘paper and cardboard’, ‘metal’, ‘plastic’, ‘wood’ and ‘others’. Figure 7 gives an overview of the data reported by the EU Member States in 2016 on generation and recycling of packaging per inhabitant. There were 15 countries with amounts of packaging waste generated per inhabitant of more than 150 kg. In 2016, Bulgaria and Croatia reported the EU’s lowest amounts of generated and recycled packaging waste, showing generation per inhabitant of 59.1 kg and 55 kg and recycling per inhabitant of 37.7 kg and 30.1 kg respectively. Germany (220.6 kg/inhabitant), Luxembourg (219.4 kg/inhabitant), Italy (209.5 kg/inhabitant) and Ireland (208.5 kg/inhabitant) reported the highest amounts of packaging waste generated in 2016. Germany, Italy and Ireland also reported the highest amounts of packaging material recycled (155.9 kg/inhabitant; 140.2 kg/inhabitant; 139.6 kg/inhabitant respectively) in 2016.
Recycling and recovery targets

Article 6 of the Packaging Waste Directive sets out the recovery and recycling targets for the years 2001 and 2008. The targets for 2008 had to be met in 2015 for the first time for all countries.

The Packaging Waste Directive sets the following targets: a minimum of 60 % recovery rate (including waste incineration); between 55 % and 80 % of packaging waste to be recycled; with minimum rates of 60 % for glass, paper and cardboard; 50 % for metals; 22.5 % for plastics; and 15 % for wood.

These targets are calculated according to weight, by dividing the amount of packaging waste recycled by the total amount of packaging waste generated.

For the reference year 2016 all EU Member States and EEA/EFTA countries have to comply with the targets set for 2008 for recycling and recovery.

The recovery and recycling rates for all packaging waste in 2016 of the EU-28 Member States and the EEA/EFTA countries are shown in Table 1. According to these rates, Belgium held both the highest recovery rate of 99.8 % and the highest recycling rate of 81.9 %.
Table 1: Recovery and recycling rates for packaging waste, 2016 (%) 

<table>
<thead>
<tr>
<th>Country</th>
<th>Recovery rate</th>
<th>Recycling rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-28 (+)</td>
<td>56.3</td>
<td>67.3</td>
</tr>
<tr>
<td>Belgium</td>
<td>99.8</td>
<td>81.9</td>
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<tr>
<td>Bulgaria</td>
<td>63.6</td>
<td>63.6</td>
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<td>Czechia</td>
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<td>Denmark</td>
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<td>Estonia</td>
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<td>Ireland</td>
<td>97.6</td>
<td>67.0</td>
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<tr>
<td>Norway</td>
<td>96.4</td>
<td>57.2</td>
</tr>
</tbody>
</table>

(*) Estimate: Cyprus (2015 data)  
Source: Eurostat (online data code: env_waspac)

Recycling and recovery rates

Figure 8 shows the recycling rate for all packaging waste for the EU Member States and EEA/EFTA countries in 2016. The recycling covers material recycling and other forms of recycling (e.g. organic recycling). The target of 55 % recycled packaging waste was met by all Member States, except Hungary (49.7 %) and Malta (39.7 %).
Figure 8: Recycling rate for all packaging, 2016 (%) Source: Eurostat (env_waspac)

Figure 9 shows the recycling rate for plastic packaging waste for the EU Member States and EEA/EFTA countries in 2016. The recycling rate covers only material recycling and not other forms of recycling, i.e. exclusively material that is recycled back into plastics.

The target of 22.5% recycled plastic packaging waste was met by all Member States, only Lichtenstein, with 20.9%, did not reach the target.

Figure 9: Recycling rate for plastic packaging waste, 2016 (%) Source: Eurostat (env_waspac)

The recovery rate for all packaging waste of 60% which should be achieved by all EU Member States and...
EEA/EFTA countries in 2016 is shown in Figure 10, together with the performance of each country. The recovery covers energy recovery, other forms of recovery, incineration at waste incinerators with energy recovery and total recycling. The recovery rates in Cyprus (59.9 %), Hungary (59.9 %), Croatia (54.7 %) and Malta (39.7 %) were below the target of 60 %.

Figure 10: Recovery rate for all packaging, 2016(%) Source: Eurostat (env_waspac)

Conclusions

- Due to the 2008 global financial and economic crisis, the amount of packaging generated decreased but increased during the following years and in 2016 the volume of packaging waste reached the highest value since 2007.

- Over the 2007–2016 period, the generation of ‘paper and cardboard’ and ‘plastic’ packaging waste increased while ‘glass’, and ‘metal’ packaging waste decreased. Although largely fluctuating over the entire period, the amounts of wooden packaging waste also increased.

- The absolute amount of packaging waste recycling and recovery increased from 2007 to 2016.

- The recycling and recovery rates have increased steadily over the ten-year period.

Source data for tables and figures on this page (MS Excel)

- Packaging waste EXCEL file

Data sources

The packaging waste data are reported by the EU Member States as laid down in Commission Decision 2005/270/EC. The reported data are usually available in the Eurostat database on packaging waste approximately 20 months after the end of the reference year.

The analysis focuses on the EU-28 in 2016, as data on packaging waste are available for all EU Member States except for Cyprus (most recent data from 2015). For the calculation of the EU aggregate of 2016, estimated data were taken from the latest year available (2015). EU-28 aggregates prior to 2012 are estimated where no data are available for Croatia. Data from previous reporting years for the EU-28 (2002-2004) are not sufficiently
robust for many packaging materials as data for the entry year.

**Context**


- reusing packaging;
- recycling; and
- implementing other forms of recovering packaging waste hence reducing the final disposal of such waste.

It also limits the level of heavy metals in packaging.

Commission Decision 2005/270/EC of March 2005 established a common format on which reporting by EU Member States is based.

**Definitions**

Packaging is defined as any material which is used to contain, protect, handle, deliver or present goods. Packaging waste can arise from a wide range of sources including supermarkets, retail outlets, manufacturing industries, households, hotels, hospitals, restaurants and transport companies. Items like glass bottles, plastic containers, aluminium cans, food wrappers, timber pallets and drums are all classified as packaging.

Article 3 and Annex I of the Packaging Waste Directive specify ‘packaging’ in further detail. In contrast to other waste statistics, the term ‘packaging waste generated’ means not the amount of ‘packaging collected’, but all ‘packaging placed on the market’.

The main packaging materials are glass, paper and cardboard, plastics, metals (aluminium and steel) and wood. Composite materials are made of paper, plastic and metal which could not be separated by hand. Composites are reported under their predominant material by weight. Other packaging materials are counted as ‘others’.

Recycling is divided into ‘material recycling’ (the reprocessing to the original material) and other forms of recycling (including the reprocessing for other purposes such as organic recycling).

Recovery includes recycling, energy recovery (e.g. as fuel in cement kilns or blast furnaces), other forms of recovery and incineration at waste incinerators with energy recovery. Energy recovery means energy generation from waste at special incineration plants. Incineration with energy recovery and the other forms of recovery are defined by Annex II.b in the Waste Framework Directive 75/442/EEC (amended).

The weight of recovered or recycled packaging waste is determined as the input to an effective process or, for practical reasons, as the output of a sorting plant which is sent to an effective recovery or recycling process. The weight should exclude non-packaging materials as far as practical.

Reusable packaging is only counted once in its lifetime and not after every refilling and purchase trip. The recycling or recovery rates are the total quantity of recycled or recovered materials divided by the total quantity of generated packaging material.

The recycling or recovery rates are the total quantity of recycled or recovered materials divided by the total quantity of generated packaging material.
See also

- Environment statistics introduced
- Waste statistics
- Municipal waste statistics
- Waste shipment statistics
- End-of-life vehicle statistics
- Waste statistics - electrical and electronic equipment

Publications

All publications on waste issued by Eurostat.

Main tables

- Waste statistics, see:

  Waste streams (t_env_wasst)
  - Recovery rates for packaging waste (ten00062)
  - Recycling rates for packaging waste (ten00063)

Database

- Waste, see:

  Waste (env_was)
  - Waste generation and treatment (env_wasgt)
  - Waste streams (env_wasst)
  - Packaging waste (env_waspac)

Dedicated section

- Eurostat’s dedicated website on waste statistics

Methodology

- Packaging waste (ESMS metadata file — env_waspac_esms)

Legislation


External links

- European Commission — Environment — Packaging waste
- European Environment Agency — Resource efficiency and waste