This article gives an overview on waste generation and treatment in the European Union (EU) and several non-member countries. It draws exclusively on data collected in accordance with Regulation (EC) No 2150/2002 of the European Parliament and Council on waste statistics.

Waste, defined by Directive 2008/98/EC Article 3(1) as 'any substance or object which the holder discards or intends or is required to discard', potentially represents an enormous loss of resources in the form of both materials and energy. In addition, the management and disposal of waste can have serious environmental impacts. Landfill, for example, takes up land space and may cause air, water and soil pollution, while incineration may result in emissions of air pollutants.

EU waste management policies therefore aim to reduce the environmental and health impacts of waste and to improve the EU’s resource efficiency. The long-term aim of these policies is to reduce the amount of waste generated and when waste generation is unavoidable to promote it as a resource and achieve higher levels of recycling and the safe disposal of waste.

**Total waste generation**

In 2016, the total waste generated in the EU-28 by all economic activities and households amounted to 2 533 million tonnes; this was the highest amount recorded for the EU-28 during the period 2004-2016 (a time series only exists for even years).

As might be expected, the overall amount of waste generated is related to some extent to the population and economic size of a country. In Table 1, the smallest EU Member States generally reported the lowest levels of waste generation and the larger ones the highest. Nevertheless, relatively high quantities of waste were generated in Bulgaria and Romania and a relatively low quantity in Italy.
Table 1: Waste generation by economic activities and households, 2016

Source: Eurostat (env_wasgen)

The share of different economic activities and of households in total waste generation in 2016 is presented in Figure 1. In the EU-28, construction contributed 36.4% of the total in 2016 and was followed by mining and quarrying (25.0%), manufacturing (10.3%), waste and water services (10.0%) and households (8.5%); the remaining 9.8% was waste generated from other economic activities, mainly services (4.6%) and energy (3.4%).
Figure 1: Waste generation by economic activities and households, EU-28, 2016(%) Source: Eurostat (env_wasgen)

Figure 2 shows an analysis of the amount of waste generated in a standardised form, in relation to population size. The high levels of waste generated in some of the smaller EU Member States can be clearly seen, with a particularly high value recorded for Finland where on average 22.4 tonnes of waste were generated per inhabitant in 2016, more than four times the 5.0 tonnes per inhabitant average across the EU-28. Several of the Member States with particularly high levels of waste generated per inhabitant reported very high shares of waste from mining and quarrying, while elsewhere construction and demolition often contributed high shares.

A lot of the waste from mining and quarrying and from construction and demolition is classified as major mineral wastes: the analysis presented in Figure 2 distinguishes major mineral wastes from all other wastes. Almost two thirds (64 % or 3.2 tonnes per inhabitant) of the total waste generated in the EU-28 in 2016 was major mineral wastes. The relative share of major mineral wastes in the total waste generated varied considerably between EU Member States, which may reflect, at least to some degree, different economic structures. In general, those EU Member States that had higher shares of major mineral wastes were those that were characterised as having relatively sizeable mining and quarrying activities, such as Bulgaria, Sweden, Romania and Finland, and/or construction and demolition activities, such as Luxembourg; in these Member States, major mineral wastes accounted 85 % or more of all waste generated, as was also the case in Liechtenstein.
Waste generation excluding major mineral wastes

In the EU-28, 911 million tonnes of waste excluding major mineral wastes were generated in 2016, equivalent to 36 % of the total waste generated (Table 2). When expressed in relation to population size, the EU-28 generated, on average, 1.8 tonnes per inhabitant of waste excluding major mineral wastes in 2016 (Figure 3).

Across the EU Member States, waste generation excluding major mineral wastes ranged, in 2016, from an average of 9.0 tonnes per inhabitant in Estonia per to 0.8 tonnes per inhabitant in Croatia and Cyprus. The large quantity of waste generated in Estonia is related to energy production based on oil shale.
Table 2 shows the development of EU-28 waste generation excluding major mineral wastes analysed by economic activity. In 2016, the highest levels of waste generation were recorded for water and waste services, for households and for manufacturing activities (228 million tonnes, 208 million tonnes and 190 million tonnes). Their developments followed different patterns over time: waste generation (excluding major mineral waste) by water and waste services increased by 105.7 % between 2004 and 2016. The quantity of waste (excluding major mineral waste) generated from construction also grew but only by 4.0 %. At the same time, waste generated (excluding major mineral waste) by households remained quite stable. Waste (excluding major mineral waste) generated by agriculture, forestry and fishing fell by 67.9 % and that from mining and quarrying by 31.8 %. Likewise, the quantity of waste (excluding major mineral waste) generated by manufacturing activities and by other sectors also diminished quite considerably, down by 29.9 % and 11.0 % respectively.
Hazardous waste generation

Hazardous waste may pose an elevated risk to human health and to the environment if not managed and disposed of safely. Among the waste generated in the EU-28 in 2016, 100 million tonnes (4.0 % of the total) were classified as hazardous waste.

Compared with 2010, 4.6 % more hazardous waste was generated in 2016 in the EU-28 which is an increasing in quantity terms from 96.0 to 100.4 million tonnes. In 2016, the share of hazardous waste in total waste generation was below 10.0 % in all of the EU Member States except for Estonia and Bulgaria, where it made up a 39.9 % and 11.1 % share of the total (see Figure 4). The very high share for Estonia was principally due to energy production from oil shale. Among the non-member countries shown in Figure 4, Serbia recorded the highest share of hazardous waste in total waste generation (35.2 %) due to intensive activity in mining and quarrying, and was followed by Montenegro (19.4 %) and Norway (14.5 %).
Figure 4: Hazardous waste generated, 2010 and 2016 (% share of total waste)

Source: Eurostat (env_wasgen)

Waste treatment

In 2016, some 2 309 million tonnes of waste were treated in the EU-28. This doesn’t include exported waste but includes the treatment of waste imported into the EU. The reported amounts are therefore not directly comparable with those on waste generation.

Figure 5 shows the development of waste treatment in the EU-28 for the two main treatment categories – recovery and disposal – during the period from 2004 to 2016. The quantity of waste recovered, in other words recycled, used for backfilling (the use of waste in excavated areas for the purpose of slope reclamation or safety or for engineering purposes in landscaping) or incinerated with energy recovery grew by 28.6 % from 960 million tonnes in 2004 to 1 235 million tonnes in 2016; as a result, the share of such recovery in total waste treatment rose from 45.4 % in 2004 to 53.5 % by 2016. The quantity of waste subject to disposal decreased from 1 154 million tonnes in 2004 to 1 074 million tonnes in 2016, which was a decrease of 7.0 %. The share of disposal in total waste treatment decreased from 54.6 % in 2004 to 46.5 % by 2016.
As stated above, in the EU-28 in 2016, slightly more than a half (53.5 %) of the waste was treated in recovery operations: recycling (37.5 % of the total treated waste) backfilling (10.1 %) or energy recovery (5.6 %). The remaining 46.5 % was either incinerated without energy recovery (1.0 %) or disposed of otherwise, mainly by landfilling (45.5 %). Significant differences could be observed among the EU Member States concerning the use they made of these various treatment methods. For instance, some Member States had very high recycling rates (Italy and Belgium), while others favoured landfill (Bulgaria, Romania, Greece, Sweden and Finland).

Figure 5: Development of waste treatment, EU-28, 2004-2016(2004 = 100)Source: Eurostat (env_wastrt)
In total, 76.4 million tonnes of hazardous waste were treated in the EU-28 in 2016, with more than half of this treated in just three EU Member States, Germany (28.1 %), Bulgaria (17.2 %) and Estonia (12.5 %)(Figure 6).
Slightly more than a half (51.3 %) of the hazardous waste treated in the EU-28 was landfilled, in other words deposited into or onto land or through land treatment and release into water bodies, equivalent to 77 kg per inhabitant (Figure 7). Some 6.0 % of all hazardous waste was incinerated without energy recovery (9 kg per inhabitant). Energy recovery was the treatment for further 7.3 % (11 kg per inhabitant). More than one third (35.3 %) of hazardous waste in the EU-28 was recovered by recycling or backfilling in 2016, equivalent to 53 kg per inhabitant.
In order to monitor the implementation of waste policy, in particular compliance with the principles of recovery and safe disposal, reliable statistics on the production and management of waste from businesses and private households are required. In 2002, Regulation (EC) No 2150/2002 on waste statistics was adopted, creating a framework for harmonised Community statistics in this field.

Starting with reference year 2004, the Regulation requires EU Member States to provide data on the generation, recovery and disposal of waste every two years. Data on waste generation and treatment are currently available for even reference years from 2004 to 2016.

Context

EU waste management policies aim to reduce the environmental and health impacts of waste and improve Europe’s resource efficiency. The long-term goal is to turn Europe into a recycling society, avoiding waste and using unavoidable waste as a resource wherever possible. The aim is to achieve much higher levels of recycling and to minimise the extraction of additional natural resources. Proper waste management is a key element in ensuring resource efficiency and the sustainable growth of European economies. For more information see the Europe 2020 strategy.

Accordingly, the revised Waste Framework Directive of 2008 introduced a five-step waste hierarchy where prevention is the best option, followed by re-use, recycling and other forms of recovery, with disposal such as
landfill as the last resort. In line with this hierarchy, the 7th Environment Action Programme sets the following priority objectives for waste policy in the EU:

- reduce the amount of waste generated;
- maximise recycling and re-use;
- limit incineration to non-recyclable materials;
- phase out landfilling to non-recyclable and non-recoverable waste;
- ensure full implementation of the waste policy targets in all EU Member States.

Other articles

- End-of-life vehicle statistics
- Environmental economy – statistics on employment and growth
- Municipal waste statistics
- Packaging waste statistics
- Recycling — secondary material price indicator
- Waste shipment statistics
- Waste statistics — electrical and electronic equipment

Publications

- Energy, transport and environment indicators — 2017 edition
- Environmental statistics and accounts in Europe (2010)

Main tables

- Waste (env_was), see:

Waste generation and treatment (env_wasgt)

Database

- Waste (env_was), see:

Waste generation and treatment (env_wasgt)

Dedicated section

- Waste
- Environmental Data Centre on Waste

Methodology

- Manual on waste statistics
- Waste generation and treatment (ESMS metadata file — env_wasgt_esms)
Legislation


External links

- Being wise with waste: the EU’s approach to waste management
- European Commission — DG Environment — Waste in the EU
- European Environment Agency — Waste and material resources
- Thematic strategy on the prevention and recycling of waste