Management of used and waste textiles in Europe's circular economy

The Waste Framework Directive (WFD) mandates that from 2025, EU Member States must establish separate collection systems for used textiles. This briefing provides an overview of the current state of textile waste generation, collection systems, treatment capacity and the different classifications for used textiles in Europe. Additionally, it identifies factors which must be considered when implementing separate collection systems to foster the circularity of textiles without inadvertently increasing exports, incineration, or landfilling.

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Key messages

The EU generated an estimated 6.95 million tonnes of textile waste in 2020 — around 16kg per person. Of this, 4.4kg per person were collected separately for reuse and recycling, and 11.6kg per person ended up in mixed household waste.

Of the total textile waste, 82% was post-consumer waste. The rest was textile waste generated from manufacturing or unsold textiles.

In more than half of the EU-27 Member States, it is already mandatory to collect textiles separately, but this is mostly to capture reusable textiles.

If sorting and recycling capacities are not scaled up in Europe, there is a risk that significant amounts of collected textile waste will continue to end up in incinerators or landfills or be exported to regions outside the EU.

Harmonisation of definitions and mandatory reporting on the amounts and management of used and waste textiles are needed for setting future targets and monitoring the sector's progress towards circularity.

This briefing is underpinned by a report from the European Environment Agency's European Topic Centre on Circular Economy and Resource Use (ETC CE). The report is largely based upon information derived from a questionnaire completed by 27 of the European Environment Agency's member countries in 2023[1].

The generation, composition, and sources of textile waste

The EU-27 generated an estimated total of 6.95 million tonnes of textile waste in 2020 — around 16kg per person. Of this, 4.4kg per person were collected separately for reuse and recycling, and 11.6kg per person ended up in mixed household waste.

Figure 1 illustrates textile waste generation per country in 2020. It shows textile waste collected from economic activities and textile waste collected from households, alongside textile waste which ended up in mixed household waste (in kg per capita).

Box 1. Reuse versus recycling

Reuse refers to using items again as they are, while recycling involves breaking them down to make new products. Reuse is a more environmentally sustainable option than recycling. Moreover, it offers socio-economic benefits; for example, establish small businesses centred around upcycling, repurposing, or selling second-hand textiles, thereby creating employment opportunities. Additionally, it provides access to clothing for disadvantaged individuals.

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Figure 1. Generation of textile waste in 2020, in kg per capita
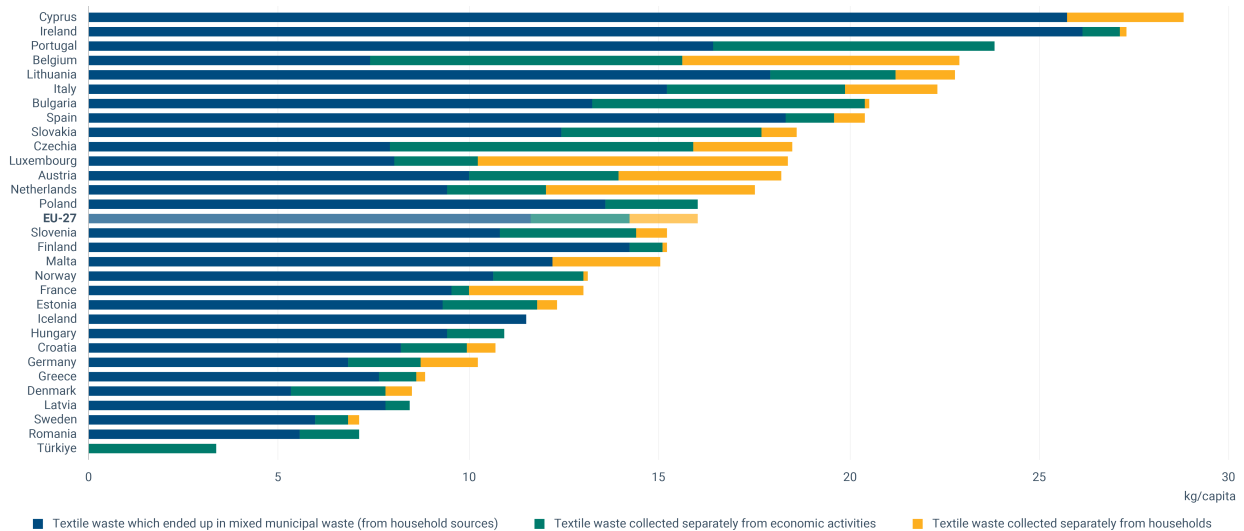
Notes: Amounts of textile waste collected separately from economic activities and households were obtained from Eurostat's ENV_WASGEN dataset. The amounts of textile waste in mixed municipal waste are estimations based on waste composition analyses (WCAs) and calculated based on the mixed municipal waste from households and similar sources. As there is no harmonised method for WCA across Europe, these numbers should be interpreted cautiously. There are no data available on textiles in mixed municipal waste for Türkiye. Note that due to a lack of capacity, Ireland and Norway were not able to verify these data; therefore, for these countries, data are calculated based on the residual waste composition provided in the EEA's early warning assessment (EEA, 2022). Italy indicated that its figure for waste from economic activities is an overestimation as it includes non-textile waste like scraps from leather manufacturing or secondary textile waste.

Source: Adapted from ETC CE, 2023 based on Eurostat, 2023b and information provided by each country to the EEA.

Discrepancies may be present in the data due to different collection systems in each Member State and varied interpretations of the waste categories; for instance, in some countries, textiles collected for reuse may not be classified as waste but as products. Reporting inconsistencies may also be present due to the voluntary nature of reporting on non-waste textiles, resulting in gaps in datasets on reusable textiles and a paucity of comprehensive data on textile waste.

Figure 2 gives a country-wide overview of the proportion of textiles and shoes in mixed municipal waste. This information is derived from waste compositions analyses (WCAs) conducted by individual

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countries. It is important to note that the methodology for WCAs varies in different countries; thus, these figures should be approached with caution and regarded as estimations.

Figure 2. Proportion of textiles and shoes in mixed municipal waste
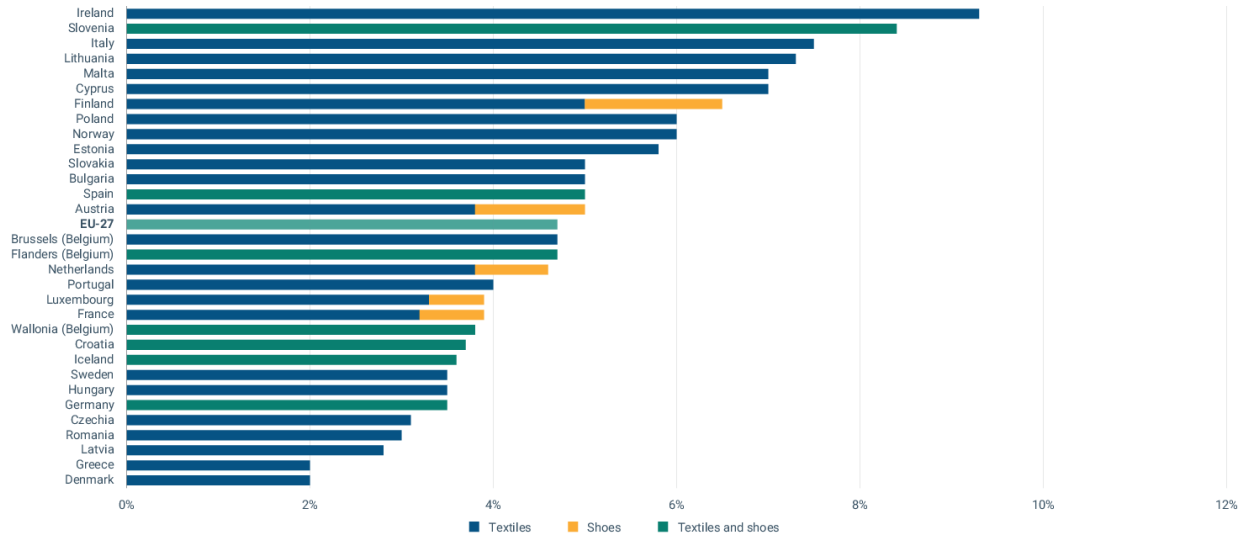
Notes: No data are available for Türkiye. WCAs are based on different reference years. ETC CE, 2024 Annex 1 indicates the reference year used per country.

Source: Adapted from ETC CE, 2023 based on Eurostat, 2023b and information provided by the countries to the EEA.

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Main sources of textile waste

Of the nearly 7 million tonnes of total textile waste in 2020, 82% had been used as clothing or household textiles (post-consumer waste). There are minimal data available from Member States on the proportions of pre-consumer textile waste, such as unsold textiles, generated at retail stages. An estimated 4-9% of all textile products put on the market in Europe are destroyed before use, amounting to between 264,000 and 594,000 tonnes of textiles each year (EEA, 2024).

The effectiveness of current collection systems

Collection systems currently in place

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Textile waste currently collected in Europe is predominantly deposited in street containers (bring points). Such facilities are often complemented by civic amenity sites where residents can dispose of household waste and recyclables that are not collected through regular curb-side collection services.

Each collection system has its advantages and challenges. Indoor collection is ideal for gathering high-quality, unsoiled textiles suitable for reuse (Wagner, 2022; van Duijn et al., 2022). However, factors like opening hours and a relatively low number of collection points can limit its potential for collecting high volumes of waste.

Bring points can collect large quantities of textiles but pose a higher contamination risk compared to indoor collection (van Duijn et al., 2022). Damp textile waste or rainwater can lead to contamination from mould, for instance; this makes textiles valueless for collectors because slim profit margins make cleaning, washing, or drying unviable.

Door-to-door collection costs more and involves theft risks (van Duijn et al., 2022). On balance, bring points are generally considered the most suitable ways of collecting large quantities of used textiles of an acceptable quality (Wagner, 2022). Other factors, such as the location of collection points, collection frequency, container type, condition of the container, labelling and effective communication, are all significant for improving both collection volumes and quality.

Effectiveness of collection systems

The average capture rate for textile waste in Europe is only 12 %, indicating that the rest ends up in mixed municipal waste and is consequently landfilled or incinerated. These data show significant room for improvement in separate collection systems for textiles. Luxembourg (50%) and Belgium (50%) have the highest figures for collecting textiles separately, followed by the Netherlands (37%) and Austria (30%) (Figure 3). These countries offer diverse collection systems across various levels of urbanisation.

Figure 3. Overview of the capture rates for textiles and shoes per country, 2020
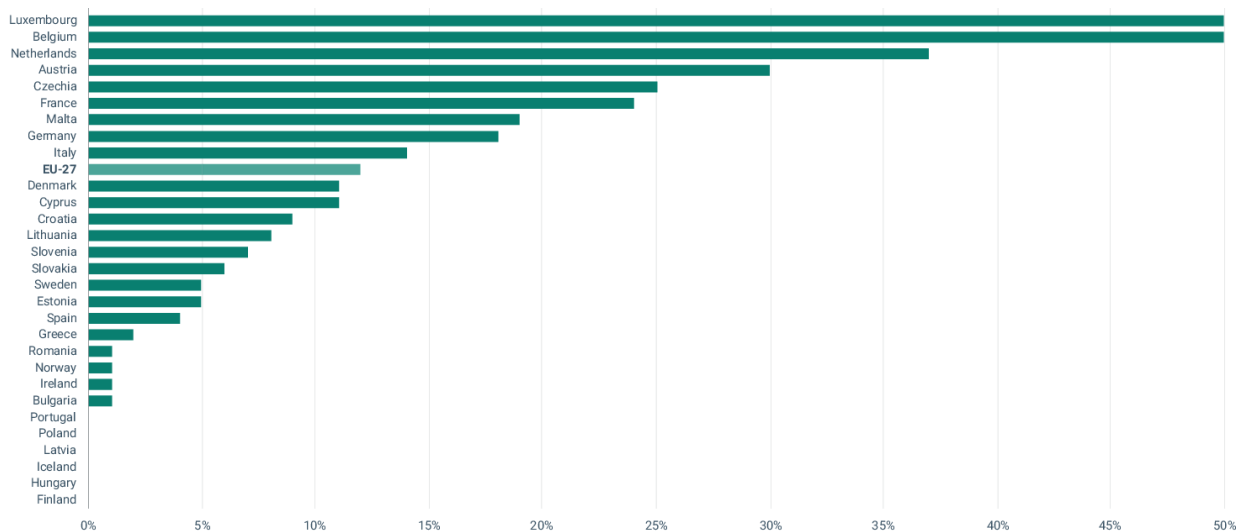
Note: In this figure, the capture rate for textiles and shoes is calculated by dividing the amount of separately collected textile waste from households by the sum of the amount of separately-collected textile waste from households and the amount of textile waste in mixed municipal waste from households. The latter is based upon WCAs performed by the countries listed. As there is no harmonised method for conducting a WCA across Europe, these numbers should be interpreted cautiously.

Source: Adapted from ETC Report, 2023).

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Pre-sorting at source

With the implementation of EU regulation on separate textile waste collection by 2025, the collection rates for textiles from households are expected to increase, though the overall quality of collected items may decrease. This is likely to reduce the incentive for reuse (Janmark et al., 2022; van Duijn et al., 2022; Long and Lee-Simion, 2022) and could lead to more recycling — a less environmentally-sustainable option than reuse (see Box 1, p. 1).

In this context, avoiding incentives that might divert textiles away from reuse becomes even more important (Long and Lee-Simion, 2022) as they could worsen the problem and potentially create competition between reuse and recycling. In addition, this context points to the need for effective

sorting of waste textiles at source.

The optimisation of collection systems is currently under discussion to enable both high capture rates and good conditions for reuse. For example, better pre-sorting by residents to distinguish between reusable and non-reusable textiles, alongside better information, and education, might facilitate higher reuse and recycling rates.

The pre-sorting process might be facilitated through e.g. citizen education under the condition that the quality of reusable textiles is safeguarded. However, it is uncertain whether the disposer should be responsible for distinguishing between reusable textiles and textile waste. This is due to a lack of clarity around the sorting criteria which should be applied and could result in misthrows.

Reuse, recycling and treatment capacities

In 2020, 1.41 million tonnes of textiles were treated within the EU-27 (Eurostat, 2023b). However, in the same year, a greater volume of textiles was collected — amounting to 1.95 million tonnes, according to Eurostat (2023a). Both these figures exclude textile waste mixed with other waste. The discrepancy is most likely due to exports of textile waste for treatment outside the EU.

Figure 4 below illustrates a notable reduction in the landfilling of textiles within the EU. In 2010, 21% of textile waste was landfilled, but by 2020, this figure had decreased to 11%. This translates into a reduction from 220,000 tonnes in 2010 to 150,000 tonnes in 2020. While landfilling of textiles decreased in most countries up to 2020, it increased in Bulgaria, Estonia, France, Poland, Latvia, Lithuania, the Netherlands and Hungary (Eurostat, 2023b). However, the data may have been influenced by the trade in used and waste textiles between EU countries. This is because textiles discarded during sorting operations and subsequently landfilled — including imported textiles waste — are reported in the receiving country.

Simultaneously, the quantity of textile waste redirected for energy recovery rose from 9% in 2010 to 16% in 2020. This corresponds to an increase from 90,000 tonnes in 2010 to 220,000 tonnes in 2020.

Figure 4. Treatment of textile waste in the EU, 2010-2020, in percentages
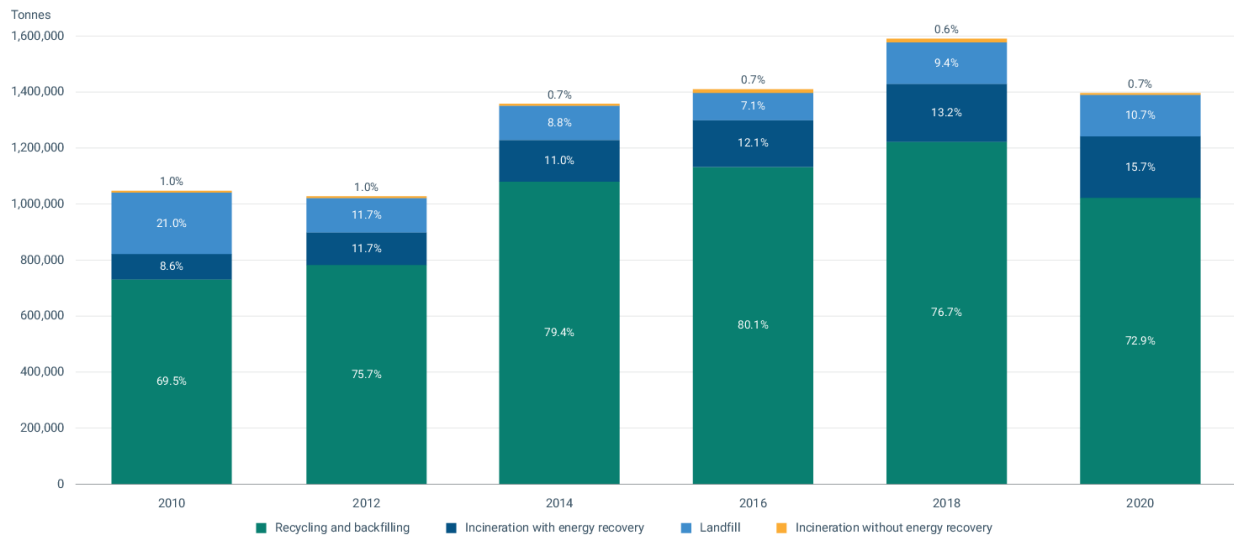
Note: Backfilling involves using textile waste, often in the form of shredded or compacted materials, to fill empty spaces or voids in the ground, such as abandoned mines or excavations. Czechia is the only country that reports this treatment method regarding textile waste.

Source: Adapted from Eurostat, 2023b.

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Sorting capacities

It is estimated that the EU has the capacity to store approximately 1.5 million tonnes of used and waste textiles annually. Given that sorting is labour-intensive and must usually be undertaken manually, the process is more cost-effective in countries with relatively lower labour costs (ETC CE, 2023; van Duijn et al., 2022). Sorting facilities in countries where the purchase of collected textiles is costlier often source textiles from neighbouring countries.

The Netherlands and Poland are two of the countries which receive the most exported used and waste textiles. They have estimated annual sorting capacities of 200,000 tonnes and 300,000 tonnes, respectively.

Poland and Czechia send a noteworthy share of textile waste to landfills. This is of concern since there is a risk that substantial amounts of separately-collected textile waste will end up being sent to landfills or incinerated unless there is timely upscaling of textile recycling capacity across the EU-27.
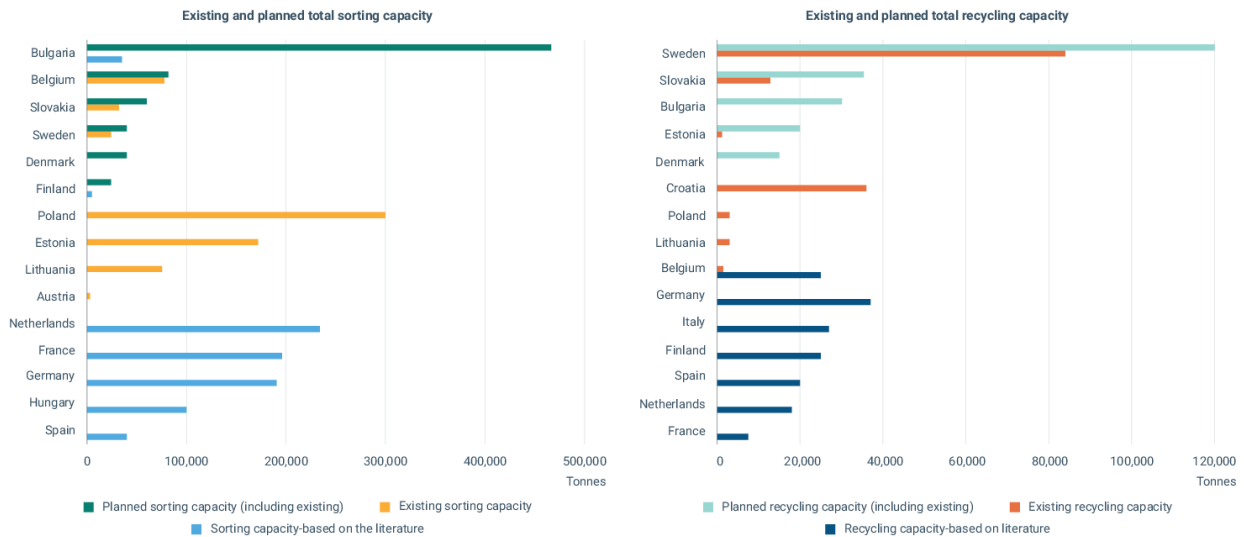
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At the same time, Germany, Poland and Lithuania are also major exporters of used and waste textiles to areas outside the EU. The fate of used textiles exported from the EU is highly uncertain, as described in this 2023 EEA briefing.

Recycling capacity

According to the literature, there are 17 textile recycling companies in Europe, which expect to recycle 1,25 to 1.3 million tonnes of fibres annually until 2025 — 1 million tonnes through mechanical recycling and 250,000 tonnes through chemical recycling (Köhler et al., 2021; Dahlbom et al., 2023). It should be noted that the mechanical recycling estimate might be too low, as only 30% of all companies were identified. Most of the recycled fibres are downcycled into e.g. rags or insulation materials. The open source 'Textiles Sorting and Recycling database', provided by WRAP[2], maps out textiles sorters, pre-processors, recyclers, and yarn spinners within the EU and UK. Currently, this database contains over 50 fibre-to-fibre recyclers, both chemical and mechanical, some of which are in the piloting phase.

Figure 5. Existing and planned total sorting capacity

Existing and planned total sorting capacity

Existing and planned total recycling capacity

■ Planned sorting capacity (including existing)   ■ Existing sorting capacity
■ Sorting capacity-based on the literature

■ Planned recycling capacity (including existing)   ■ Existing recycling capacity
■ Recycling capacity-based on literature

Source: Adapted from ETC CE (2023).

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Extended producer responsibility for textiles

As part of the revision of the Waste Framework Directive in 2023, the European Commission proposed harmonised Extended Producer Responsibility (EPR) regulations for textiles. This initiative aims to establish an economy focused on collecting, sorting, reusing and recycling textiles, while also ensuring that products are designed with circularity in mind. To achieve these objectives, the European Commission proposes to allocate a significant portion of the EPR contributions paid by textile producers to waste prevention measures and preparing items for reuse (EC, 2023).

Up until now, an EPR system for textiles has only been mandatory in France, Hungary and the Netherlands, and voluntary in the Flanders region (Belgium). Additionally, Croatia mandates textile producers to facilitate the collection of the type of textile products that they put on the market[3].

The fact that large amounts of used textiles are exported from the countries of collection generates specific barriers to effectively implementing EPR. Where textiles are being exported for reuse or waste treatment, EPR fees typically stay within the exporting countries. This deprives receiving countries, including third countries in Africa and Asia, of the financial support they need for end-of-life

treatment. Hence, as indicated by Thapa et al. (2023), there is an option for a transition to so-called 'Ultimate Producer Responsibility' (UPR). The UPR system relies on high product traceability from exporting to importing countries and should help improve accountability for product producers and distributors.

EPR schemes must promote the adoption of reuse and repair practices, which are recognised as more environmentally-sustainable than recycling and offer socio-economic benefits (Circle Economy, 2021). However, establishing large-scale repair operations in European countries is a challenge because of commercial non-viability. This is primarily due to the combination of high labour costs and notably lower pricing for new products manufactured in, for example, Asia. Consequently, for a significant number of consumers, the more rational choice is to acquire new garments rather than pursue expensive repairs for lower-cost clothing.

Subsidies for textile repairs funded through EPR fees, coupled with tax reductions on practices like repair and reuse, could potentially help bridge this gap.

The need for harmonisation and mandatory reporting

Classification of used textiles

The variations in data concerning generated and collected textile waste could stem from differing interpretations of what constitutes waste versus used textiles.

In general, countries classify textile products as textile waste when the holder intends to dispose of them. However, these textiles can regain their status as reusable after undergoing sorting processes.

In most countries, textiles transferred via sales or donations[4] to institutions, non-profit organisations, clothing stores, social department stores or second-hand shops are not categorised as waste. Nevertheless, some countries or regions, such as Germany and the Walloon region in Belgium, provide further specifications by classifying textile products disposed of in bags (regardless of the collection method) as waste. This is because the third party collecting the textiles cannot determine the contents of each bag before opening it. Following sorting, assessment of the condition and potential cleaning, some of these textiles may be deemed suitable for reuse.

Other countries, such as Denmark, Czechia, Slovenia and Sweden, take into account whether the intended purpose is communicated by the collector or on the bin — primarily assessing whether there is an intention to discard the textiles.

When collection takes place without direct interaction between the collector and the person depositing the textiles (e.g. via collection bins in a city), the message conveyed by the collector is important in determining the disposer's intent. Such information can, for example, be communicated

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on the collection bin by specifying which textiles should be placed inside and what their intended onward use is.

Additionally, the distinction between whether textiles are classified as waste or reusable can be based on whether the collection method is handled by humans or not. For example, textiles in Cyprus are considered waste when disposed of in collection bins; however, when exchanged between people or handed over, they are still considered products.

Further guidelines and harmonisation of collection and sorting approaches would be useful for improving the standardisation of reporting and in helping set up performance targets (e.g. targets for separate collection, preparation for reuse and recycling).

Reporting requirements

There are currently few specific reporting requirements for used textiles not considered waste, which leads to data discrepancies. While it is mandatory for Member States to report on quantities of municipal waste, this obligation extends to municipal textile waste only if it is legally classified as waste. If used textiles are not considered waste, there is no corresponding reporting requirement.

Furthermore, where waste textiles are classified as municipal waste, it is mandatory to report on how they have been generated and treated (i.e. recycling, energy recovery and other recovery). However, reporting on how textiles are collected and prepared for reuse is currently voluntary.

If reporting on these flows became standardised and mandatory, it would help identify where textile management could be improved across Europe and in individual countries. Additionally, it would enable targets for separate collection, preparation for reuse and recycling to be established, monitored, and evaluated.

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Other reading

This briefing represents a continuation of the work on textiles in Europe's circular economy by the EEA and its ETC CE. The work began with the 2019 EEA briefing underpinned by ETC CE reports on textiles and the environment in a circular economy. These were followed by other reports and briefings. These include the 2022 briefings and reports on design for circularity and microplastic from textiles consumption in Europe, the 2023 EEA briefings and ETC CE papers on exports of used textiles and bio-based textiles, and the 2024 briefing The destruction of returned and unsold textiles in Europe's circular economy.

Notes

[1] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, and Türkiye.

[2] WRAP's Textiles Sorting and Recycling Database: https://wrap.org.uk/resources/tool/textiles-sorting-and-recycling-database

[3] Ordinance on waste textile and waste footwear management-OG 99/15.

[4] Donation refers to the act of transferring clothing or other textile items to another individual, organisation or charity with reuse as the primary intention rather than disposal.

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