



Germany | How Germany's EPR system for packaging waste went from a single PRO to multiple PROs with a register

Germany was one of the first countries to set up an Extended Producer Responsibility (EPR) system for packaging, back in the 1990s, and it has developed significantly since. The legal framework provided by the *Verpackungsverordnung*, or Packaging Ordinance, was amended several times over the years and was recently replaced by a new *Verpackungsgesetz*, or Packaging Act, that entered into force in January 2019. One of the most significant changes to EPR in Germany has been its transformation from a system based on a single, non-profit PRO to one that incorporates several for-profit PROs, operating in competition with each other. This change was triggered by changes to antitrust regulations. The system for charging fees has also changed over time, moving progressively towards a model based on the types and weights of material in the system. In 2019, further changes were made to encourage the use of more recyclable packaging.



In Germany, all expenses associated with the collection, sorting and recycling of packaging waste is supposed to be covered by fees paid by obliged companies, who have to join a central register and pay fees to a PRO of their choice. The competing PROs manage these fees and conclude contracts and agreements with waste management companies and municipalities. The targets set for the EPR are enshrined in law and changed over time. Originally they focused on making separate collections mandatory and they then began to concentrate on recovery rates. From 2019 onwards, targets focussed on achieving higher recycling targets. Another significant change was the introduction of a deposit-refund system for beverage packaging (PET bottles, cans) in the early 2000s. This system has itself developed over the last two decades and has now been incorporated into the Packaging Act.



PREVENT

The origins of Germany's EPR system for packaging

Why an EPR was set up in the 1990s

Until the end of the 1980s, most of Germany's waste was sent to landfill – separate collections of recyclables were carried out by a mixture of formal and informal operators. In some areas, glass and paper were collected through formal channels on behalf of the municipality or municipality, but most collections were made informally by commercial organisations and community bodies. As far as packaging waste was concerned, only packaging and other waste with a market value was collected, as the revenues generated from these materials could be used to cover the expenses associated with collecting, sorting and marketing them. Along with glass and paper waste, scrap and textiles were often collected on an informal basis. Even now, these fractions are sometimes collected on an informal basis, but any collection activity must be formally reported to the municipality.

By 1990, waste was becoming a major political issue. Many landfills in Germany were full to capacity, and there were not enough incinerators to handle the country's household waste. About half the waste brought to landfill by volume (and a third by weight) consisted of packaging waste.

To tackle this problem, the national government set targets to stem the tide of packaging waste at landfills. These targets were aimed at retailers and packaging manufacturers, who were put under an obligation to submit proposals for systems that would allow packaging to be returned, rather than disposed of in landfill.

The first Packaging Ordinance, 1991

The German *Verpackungsverordnung*, or Packaging Ordinance, was initially approved by the German government on 12 July 1991. It would be amended no fewer than eight times before it was finally replaced by the *Verpackungsgesetz*, or Packaging Act, which became law on 1 January 2019.

The Packaging Ordinance of 1991 was the first legislation anywhere in the world to incorporate the concept of EPR, which had to be assumed in respect of all packaging waste produced by households, commerce and industry. The key provisions of the Packaging Ordinance included:

- A requirement for **transport packaging** to be taken back by producers and distributors and be reused or recycled.
- The distributor was required to remove **grouped packaging** as soon as the product was stocked in store. The retailer was obliged to recycle the packaging.
- The distributor was obliged to take back **sales packaging** returned to their shop unless an EPR system had been set up to do so. If such a system was in place, producers and distributors of the packaged goods were made to contribute to it financially and pay for the disposal of their packaging. Anyone who introduced sales packaging into the German market and did not allow it to be returned to their shop was made to pay a contribution towards the costs of disposal, payable when the product was sold. This provision laid the foundations for an initial EPR system for packaging.

As it was underpinned by the Packaging Ordinance, Germany's EPR system was mandatory from the outset. The EPR system for sales packaging operated on the basis of a number of specific regulations, including binding targets for collection and sorting rates; these targets had to be met for the first time in 1993. There was also a requirement for the collection material to be fed into material recycling processes.

The collection and sorting targets in force between 1 January 1993 and 1 July 1995 are set out in the table below:

Table 1: Collection and sorting quotas under the German Packaging Ordinance, 1 January 1993 to 1 July 1995¹

Packaging material	Collection rate ¹⁾	Sorted/sent for recycling ²⁾	Recycling rate ³⁾
Glass	60%	70%	42%
Tinplate	40%	65%	26%
Aluminium	30%	60%	18%
Paper, cartons and cardboard	30%	60%	18%
Plastics	30%	30%	9%
Composite materials	20%	30%	6%

1) The amount of sales packaging to be collected as a proportion of the total packaging consumed.

2) The amount of packaging to be sorted as a proportion of the amount collected. Sorted waste had to be sent on for recycling.

3) The total volume of packaging recycled as a proportion of total packaging consumption (i.e. the collection rate multiplied by the sorting/recycling rate).

The development of Dual System Germany as a single non-profit PRO

The first Packaging Ordinance was passed in 1991, tasking the private industry to set up an EPR system. When the Ordinance came into force in 1993, all requirements had to be fulfilled. This system was to be under private-sector management and charged with collecting, sorting and recycling packaging waste throughout Germany. In preparation for this task, industry representatives set up an association known as *Duales System Deutschland – Gesellschaft für Abfallvermeidung und Sekundärrohstoffgewinnung mbh* as early as 1990. The association eventually became known outside the country as Dual System Germany, or by its German acronym, DSD.

The inaugural meeting of DSD was held on 28 August 1990, and attended by 95 stakeholders. By 1993, that number had risen to 562, all of them private-sector companies involved in the manufacturing sector, the production and filling of consumer goods and commerce. Later, the symbol that became known as *Der Grüne Punkt*, or the ‘Green Dot’ was adopted and used for DSD’s licensing and financial activities. When DSD was first founded, its share capital amounted to three million Deutschmarks², and the company was launched as a **non-profit company**. In 1993, it handled transactions worth DM 2.8 billion. A number of waste disposal companies had also been keen to join DSD when it was founded, but this was vetoed by the *Bundeskartellamt* (Federal Cartel Office).³



Financing

Producers and importers were required to participate in this system and to ensure their packaging was included in it. At the same time, they were put under an obligation to **make a financial contribution to the system in line with the amount of the packaging they introduced to the German market**. To show they were participating in the system, they were allowed to print the licensed

¹ German Packaging Ordinance (*Verpackungsverordnung*) – 12 June 1991

² Deutschmark (DM) is the currency Germany used before it adopted the Euro in 2002 (exchange rate in 2002: 1EUR = 1.95DM)

³ Bünemann, Rachut (1993): *Der Grüne Punkt, eine Versuchung der Wirtschaft*. Karlsruhe: Verlag C.F. Müller

‘Green Dot’ symbol on their packaging. This symbol is still in use today and has been adopted by a number of other countries for their own EPR systems.

From 1991-92 onwards, participation in the system and the entitlement to use the Green Dot logo was based on a fee linked to the amount of packaging used. The maximum fee was DM 0.02 per item, irrespective of material and weight. Plastic packaging was subject to an additional levy for recycling. When the EPR system rolled out across Germany in 1993, **it ended up in severe financial difficulty, which led to the introduction of a new fee system based on the weight of each item and the materials used to make it.**

Table 2: DSD EPR fees from 1 October 1993 onwards

Packaging material	Licence fee ⁴
Glass	DM 0.16/kg
Tinplate	DM 0.56/kg
Aluminium	DM 1.00/kg
Paper, cartons and cardboard	DM 0.33/kg
Plastics	DM 3.00 DM/kg
Composite materials	DM 1.66/kg

Recycling and industry guarantors

When DSD was founded, it only covered collection and sorting of sales packaging, but it came with a requirement to ensure there was a market for the packaging once it had been collected and sorted and that it would eventually be recycled. This meant the companies and organisations handling the packaging had to find a market for the individual packaging material flows. This led to the designation of ‘guarantors’ under the scheme, which were organisations made up of raw material suppliers, packaging material manufacturers or converters. These **guarantors were responsible for ensuring the various packaging material streams were recycled.** They agreed to receive the sorted waste fractions and recycle them as appropriate. One guarantor was nominated for each material fraction, and the main ones were as follows:

- **For plastic packaging**, the Deutsche Gesellschaft für Kreislaufwirtschaft und Rohstoffe mbH (DKR GmbH) (or the German Society for the Circular Economy and Raw Materials) was set up in 1991, with an initial share capital of DM 100,000,000. Its shareholders were plastics manufacturers and processors, larger waste disposal companies and DSD itself. Once plastic packaging had been sorted, it was taken to DKR, who delivered it to recycling plants.
- The Recarton-Gesellschaft für Wertstoffgewinnung GmbH (ReCarton GmbH) was established in 1991 and was responsible for **beverage cartons**. Its shareholders were the four carton manufacturers that, between them, covered the entire German market (namely Tetrapak, Elopak, PKL and PWA). As of 2020, ReCarton is still marketing collected and sorted beverage cartons, although it no longer enjoys a monopoly.

⁴ At the time, one Deutschmark had roughly the same purchasing power as one Euro does today.



- Deutsche Aluminium Verpackung Recycling GmbH (DAVR, or German Aluminium Packaging Recycling) was founded in 1991 to handle **aluminium and aluminium-based packaging**. Its principle shareholders were aluminium manufacturers. DAVR is still marketing collected and sorted aluminium today, although it is no longer a monopoly.
- **For tinplate packaging**, Germany's major steel manufacturers acted as guarantors (specifically Thyssen, Rasselstein and Krupp Hoesch).
- The Association of the German Glass Industry acted as the guarantor for **glass packaging**, and set up the Gesellschaft für Glasrecycling und Abfallvermeidung mbH (CGA) (or the Society for Glass Recycling and Waste Prevention).

For the first ten years or so after they were set up, the guarantors enjoyed preferential treatment when marketing their material fractions. Some of them enjoyed fully-fledged monopolies for marketing and using the material, particularly GGA for glass and DKR for plastics, but these monopolies were eventually broken up following instructions from the German competition authorities.

Dealing with teething problems during the 1990s

Using contracts to set up separate collection systems for packaging waste

The initial contracts for collection and sorting ran for ten years, from 1993 to 2003. In most parts of Germany, sales packaging was collected in three different fractions from 1993 onwards:

- **Paper, cartons and cardboard** and **glass** was collected from central collection points.
- **Lightweight packaging**⁵ was usually collected from households in special yellow bags (*gelbe Säcke*) or yellow bins.

Collections were organised by DSD, which acted as the PRO. It invited tenders for collection services and concluded contracts with companies and municipalities.

This collection system gradually reduced the amount of residual waste in the system, eventually allowing municipalities to increase the intervals between collections from households (e.g. from weekly to fortnightly collections).

Initial financial difficulties

The initial service contracts for the EPR were drafted in accordance with the volumes required by the Packaging Ordinance. Initially, DSD expected to collect 4 – 8kg per person per year between 1993 and 1995, rising to 11.4kg – 13kg from July 1995 onwards. However, in some regions, quantities of up to 20kg per person were being collected as early as 1993, which created **huge logistical and financial problems for DSD**. The contracts had to be amended multiple times over their 10-year terms so as not to jeopardise the existence of DSD.

Problems determining whether separate collection and recovery quotas had been reached

It was difficult to determine whether the legally mandated **separate collection quotas** had been achieved, as the precise quantities of packaging introduced to the market always had to be calculated retrospectively, with the help of a private consultant. Moreover, the collected material contained other waste items besides packaging, which meant a detailed analysis was required to determine exactly what proportion of the collected material qualified as packaging. This system produced rather imprecise numbers.

⁵ Lightweight packaging is an umbrella term for packaging made of tinplate, aluminium, plastics or compound materials.

To solve this problem, an important amendment was made to the Packaging Ordinance in 1998. The law was changed so that the reference quantity of the denominator of the quota would be measured in relation to the quantity of packaging introduced to the German market by the companies *participating in the EPR system*, rather than on the basis of the amount of packaging being introduced to the German market *in total* (this change reduced the overall total for calculation purposes, because it excluded free riders who failed to participate in the system despite their legal obligation to do so). At the same time, the **collection quota was replaced by a recovery quota for each type of material**. The table below shows the recovery quotas that applied from 1998 onwards:

Table 3: Recycling quotas after the Packaging Ordinance was amended in 1998

Packaging material	Recovery quota following the 1998 amendment to the Packaging Ordinance of 1998*
Glass	75%
Tinplate	70%
Aluminium	60%
Paper, cartons and cardboard	70%
Plastics	60%

*The percentage is based on the amounts registered with DSD and for which EPR fees were paid.

The amended Packaging Ordinance included a **special regulation for plastics**. It stipulated that at least 60% of plastics had to be recovered, and at least 60% of the recovered material then had to be recycled using material recycling processes. These quotas remained in force until the end of 2018.

In addition, the first amendment to the Packaging Ordinance also stipulated that:

- Producers and distributors that did not want to participate in an EPR system would be obliged to **verify that they had fulfilled the recovery quota** in order to maintain a level playing field between all obliged companies.
- There would be **greater competition between waste management operators**. Specifically, (i) PROs were required to invite for tenders for collection, sorting and recycling services; (ii) collected packaging was to be provided under competitive conditions, and (iii) the costs associated with individual packaging materials were to be published.

Major revisions during the 2000s

A deposit-refund system for beverage packaging

A **mandatory deposit-refund system for single-use beverage packaging** was introduced in 2003, in response to a decline in the quantity of reusable beverage packaging. Initially, the regulations stipulated that empty beverage containers could only be returned to the original point of sale. However, in 2005 the central organisation Deutsches Pfandsystem GmbH (German Deposit System, known by the acronym DPG), set up a clearing system between retailers and fillers that allowed consumers to return containers to any participating retailer, and not just to the original point of sale.

Table 4: Major amendments to the Packaging Ordinance

Most significant amendments to the Packaging Ordinance	
1 st amendment, 1998	<p>Waste management services had to go out to tender.</p> <p>Recovery quotas had to be verifiably met by the relevant companies using their own take-back schemes (individual producer responsibility).</p> <p>Changes to the way collection and sorting rates were calculated: quota to be measured on the basis of the total amount of licensed packaging produced.</p>
2 nd amendment, 2002	Mandatory deposit-refund scheme (DRS) introduced for single-use beverage containers from 2003 onwards.
3 rd amendment, 2005	Clearing organisation set up to simplify the DRS.
4 th amendment, 2006	New terms and targets set.
5 th amendment, 2008	Producers and fillers in a PRO obliged to participate in the system. Provision was made to exempt companies with their own take-back schemes or participating in an industry-wide system solution. Verified declarations of completeness required for sales packaging produced by the obliged companies.
6 th amendment, 2013	Certain terms clarified.
7 th amendment, 2015	The option for companies to operate their own take-back systems was abolished. Criteria for exemption from the EPR scheme are tightened.
New <i>Verpackungsgesetz</i> (Packaging Act) (2019 onwards)	Certain terms clarified, requirement to increase recycling rates, central packaging register introduced to improve monitoring, incentives introduced to improve recyclability of packaging and municipalities given more powers.

Moving from a single, not-for-profit PRO to multiple, for-profit PROs in competition

In 2003, a number of additional PROs were cleared to operate alongside DSD. The approval came from Germany’s Federal States (*Bundesländer*) as a response to pressure from the national federal cartel office. This meant that **Germany’s EPR system for packaging moved from a single, non-profit PRO acting as the system operator (i.e. DSD) to a system in which various for-profit PROs required to fulfil their responsibilities in competition with each other.** This change gave rise to some significant challenges, particularly because there should be only one packaging collection system in each area. This led to the total volume of collected packaging amounts under the EPR system being divided among the various PROs, and this system is still in use today.

Each PRO enters into contracts with certain obliged companies within the system. Once the waste has been collected, each PRO takes responsibility for an amount of waste corresponding to the amount licensed and paid by the obliged countries for which it is the contracted PRO. The diagram below illustrates how the German system works:

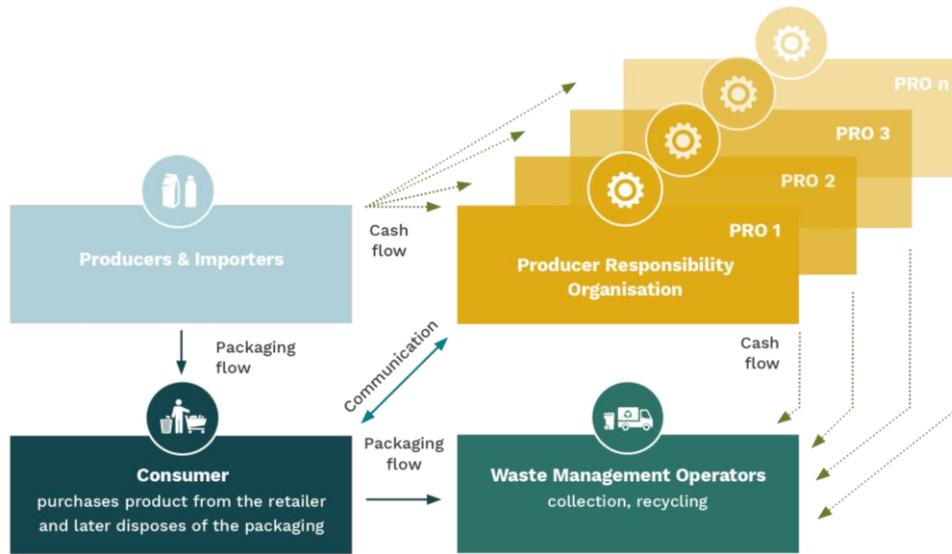


Figure 1: Competing PROs in the German EPR system for packaging

Since DSD’s monopoly was ended, a large number of PROs have been active in Germany’s EPR system, as shown in Table 5 below:

Table 5: PROs in Germany (as of April 2020)

PRO	Start of operations	Current status
Der Grüne Punkt – Duales System Deutschland GmbH	1992	Still active
Landbell AG	2003	Still active
Interseroh Dienstleistungs GmbH	2005	Still active
EKO-PUNKT GmbH	2006	Operated until 2016
Reclay Systems GmbH	2007	Still active
BellandVision GmbH	2008	Still active
Zentek GmbH & Co. KG	2008	Still active
Veolia Umweltservice Dual GmbH	2009	Still active
Vfw GmbH	2009	Taken over by Reclay in 2008
Recycling Kontor Dual GmbH & Co. KG	2013	Operated until 2018
ELS GmbH	2015	Filed for insolvency in 2018
Noventitz Dual GmbH	2017	Still active
PreZero Dual GmbH	2020	Still active

Competing different PROs led to in a reduction in collection and recycling costs. However, it also made the system more complex and opaque. It became impossible to verify whether any given obliged company had actually paid its EPR fees to any of the PROs. The overall quantity of packaging licensed under the system fell significantly, as **many obliged companies exploited the situation and failed to license all of their packaging with a PRO**. This development, combined with a political prioritisation of environmental issues, led to the adoption of the new Packaging Act (*Verpackungsgesetz*) by the German parliament in 2017.

Germany's new Packaging Act⁶

The Packaging Act (also known by the German abbreviation *VerpackG*) replaced the Packaging Ordinance on 1 January 2019. It brings together regulations covering all the major issues connected to the handling of packaging waste, and is consistent with the EU Directive on Packaging and Packaging Waste. The Packaging Act introduced a number of new requirements and set up new institutions. Although it did not fundamentally alter the nature of Germany's EPR system, it did add the following additional elements:

- A new Central Agency Packaging Register (*Zentrale Stelle Verpackungsregister* – referred to here as the Central Agency).
- Increased recycling targets.
- Provision to take recyclability of packaging into account when setting EPR fees.
- The new title for obliged companies was 'manufacturer'. However, in this context the term manufacturer is used as a synonym for producers and importers.

The new Central Agency⁷

Anyone who introduces packaged products to the market in Germany, (e.g. to protect a product, to make it easier to ship, or for marketing purposes) must ensure that their packaging will be recycled or recovered appropriately at the end of its life cycle. The person, or firm, who initially introduces these products to market is called an 'initial distributor'.

The **Central Agency Packaging Register (the Central Agency) was created to increase transparency and monitor compliance with the principles of EPR**. In most cases, the initial distributor of a product on the German market is either the manufacturer* or the importer, which means they are obliged to register under the EPR system. The Central Agency is responsible for registering manufacturers*, receiving and verifying data reported by manufacturer* and importers (obliged companies) and PROs and, by extension, for monitoring and enforcing how obliged companies are participating in the system.

Manufacturers* and importers (obliged companies) are subject to a number of basic conditions:

- Manufacturers* and importers (obliged companies) must **register** with Central Agency before they can market packaging materials commercially.
- Manufacturers* and importers (obliged companies) must **register their business-to-consumer packaging materials** with an EPR system before marketing them commercially.
- At least once a year, manufacturers* and importers (obliged companies) must **report the mass (total weight) of the packaging materials** marketed by them, along with details of the materials they contain. Reports must be filed simultaneously to their chosen system and to the Central Agency.

⁶ <https://www.gesetze-im-internet.de/verpackg/>

⁷ Source: Zentrale Stelle Verpackungsregister (2019)

*In this context, the term 'manufacturer' implies producers and importers.

- When they submit their ‘declaration of completeness’, manufacturers* and importers (obliged companies) must **report the total weight of the sales packaging they have marketed, broken down by material**, to the Central Agency. Exceptions apply when the amount of waste falls below 80 tonnes of glass, 50 tonnes of paper, cartons and cardboard or 30 tonnes of light-weight packaging.⁸

Should a manufacturer* fail to register, or if it distributes goods that it has not registered correctly, it becomes liable to a **potential fine of up to €100,000 per instance of non-compliance**. Failure to participate in any system is punishable by a fine of **up to €200,000**. **Moreover, under civil law, the company’s competitors are entitled to enforce a ban on the company concerned distributing any products.**

New recycling targets

The new recycling targets under the Packaging Act are shown in the table below:

Table 6: New recycling targets

Material	Target under the Packaging Ordinance (applied up to the end of 2018)	Target as of 1 January 2019	Target as of 1 January 2022
Glass	75%	80% ✓	90%
Paper, cartons and cardboard	70%	85% ✓	90%
Ferrous metals	70%	80% ✓	90%
Aluminium	60%	80% ✓	90%
Beverage cartons	60%	75% ✓	80%
Other composites		55%	70%
Plastics	60%	90%	90%
Mechanical recycling (plastics)	36% ✓	58.5%	63%

✓ target has already been met

Integrating recyclability

Section 21 of the new Packaging Act serves as basis for new operational guidelines for EPR systems. It states:

"(1) Systems are obliged to calculate their participations fees in such a way that incentives are included with a view to the production of packaging subject to system participation to promote the use of materials and material combinations that allow for the highest possible percentage to be recycled, considering the practice of sorting and recovery [...]"

⁸ Source: VerpackG §11 (4)

Working together with the German Environmental Agency, the Central Agency drew up a ‘minimum standard for determining the recyclability of packaging subject to system participation pursuant to section 21 (3) VerpackG (Verpackungsgesetz –Packaging Act)⁹’. The **minimum criteria for recyclability** are defined as follows:

“2. Minimum criteria

When determining recyclability, the available recyclable content of a packaging should be taken as the minimum starting point for further considerations. In determining the available recyclable content, at least the following three requirements must be taken into account:

- 1) The existence of a sorting and recycling infrastructure that allows for high-quality mechanical recycling for this packaging,*
- 2) the sortability of the packaging as well as, where applicable, the separability of its components,*
- 3) incompatibilities of packaging components or substances contained therein that might render a successful recycling impossible with currently used technology”.¹⁰*

This means that the starting point for the consideration is the part of the packaging that is potentially recyclable. For instance, only 99% of a PET-bottle is considered recyclable, since the sleeve is not. These 99% are thus considered the minimum starting point and the 3 mentioned criteria are then applied to determine recyclability.

The minimum standard includes a number of specific provisions, including:

- Definitions of specific types of packaging and their recyclability.
- A summary of different groups/types of packaging, along with a list of specific elements that make materials unsuitable for recycling.

The standard has the status of an official regulation in Germany and is increasingly applied in other countries, too.

Conclusion and outlook – outcomes from Germany’s EPR system

- The improvement of EPR schemes is a continuous effort. It took almost 29 years, that a packaging act and therewith a central registry avoiding freeriding effectively, was installed in Germany. The capacity of the waste and recycling sector improved significantly in that time. The recovery rate of packaging materials (material recycling and energetic recovery) increased from 37.3% to 94.3% from 1991 to 2017.¹¹
- However, due to mainly changes in consumption behaviour (take-away and e-commerce) and living conditions (e.g. single households), the amount of packaging raised from 15.6 million tonnes in 1991 to 18.7 million tonnes in 2017.
- Approximately 2.5 million tonnes of lightweight packaging and about 2 million tonnes of glass waste packaging are collected by the PROs every year.

⁹ An electronic copy of the Packaging Act is available at: https://www.verpackungsregister.org/fileadmin/files/Mindeststandard/2019-10-07_Mindeststandard___21_VerpackG_EN.pdf

¹⁰ https://www.verpackungsregister.org/fileadmin/files/Mindeststandard/2020-01-22_Mindeststandard_VerpackG_EN.pdf

¹¹ <https://www.umweltbundesamt.de/daten/ressourcen-abfall/verwertung-entsorgung-ausgewaehlte-abfallarten/verpackungsabfaelle#verpackungen-uberall>



- Paper, cartons and cardboard packaging are collected directly from households (as are newspapers, magazines, etc.). In 2014 this amounted to about 5.8 million t/year.
- The collection, sorting and recovery of packaging by the PROs generates total revenues of over €1 billion per year.
- Lightweight packaging is sorted in about 45 sorting facilities across Germany.¹²
- The amount of waste going through each recycling path must be officially reported on an annual basis. The figures for 2017 were:¹³
 - Glass: 1.87 million tonnes
 - Paper, carton, cardboard boxes (for packaging): 1.2 million tonnes
 - Aluminium: 0.07 million tonnes
 - Tinplate: 0.27 million tonnes
 - Beverage cartons: 0.14 million tonnes
 - At total of 1.2 million tonnes of plastics were recovered. Of those, 0.46 million tonnes were mechanically recycled.

Information correct as of June 2020

Further reading

EU Directive. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1585617716849&uri=CELEX:01994L0062-20180704>

Packaging Act (Verpackungsgesetz).
https://www.verpackungsregister.org/fileadmin/files/Mindeststandard/2019-10-07_Mindeststandard_21_VerpackG_EN.pdf

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¹² Source: Bundeskartellamt, 4. Beschlussabteilung B4 – 21/19, Fusionskontrollverfahren

¹³ Data (rounded) from: Kurt Schüler (GVM) „Aufkommen und Verwertung von Verpackungsabfällen in Deutschland im Jahr 2017“, Umweltbundesamt Texte 139/2019