

BEVERAGE CARTON RECYCLING FACTS & FIGURES



THE ALLIANCE FOR
BEVERAGE CARTONS
AND THE ENVIRONMENT

EXTR:ACT
DRIVING VALUE FROM MULTI-MATERIAL RECYCLING

October 2023

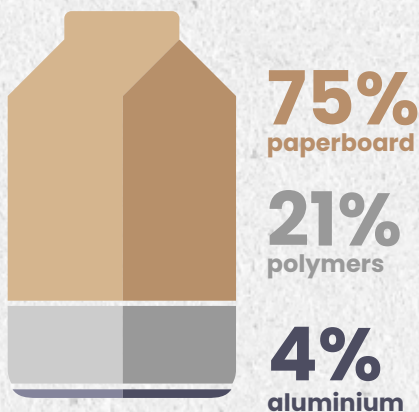


Beverage cartons have a lower carbon footprint compared to packaging alternatives



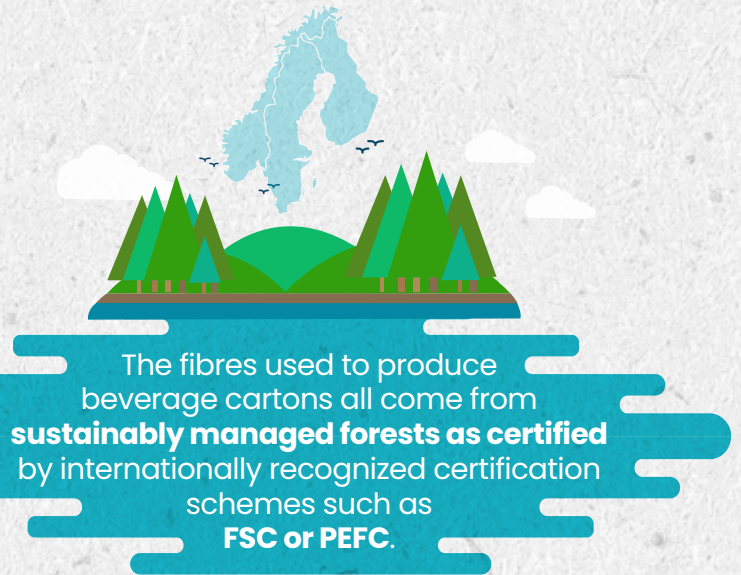
On average around 1 million tons of beverage cartons are put on the market annually in EU30. ~75% of the milk and 59% of the juice are packed in beverage cartons in Europe.¹

Beverage cartons (BC) are paper-based packaging and are on average, made of (by weight):



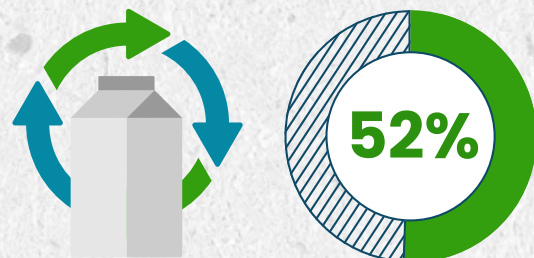
- a. 75% paperboard** – a renewable material coming from sustainably managed forests – to give stiffness and protection
- b. 21% polymers** – mostly polyethylene, to prevent leakage.
- c. 4% aluminium** – to protect sensitive contents from light and oxygen. Non aseptic packaging, for fresh dairy products for example, does not contain aluminium.

Beverage cartons are a recyclable low carbon packaging solution today. Beverage cartons are recyclable and recycled at scale as highlighted in the Eunomia report².



Beverage cartons have an essential role in providing access to safe and nutritional food, limiting contamination and preventing food waste.

The fibres used to produce beverage cartons all come from sustainably managed forests as certified by internationally recognized certification schemes such as FSC or PEFC. The renewable materials used in beverage cartons have lower greenhouse gas emissions than the alternative fossil-fuel solutions for milk and juice.³



In 2021, around **490,000 tons** of beverage cartons (52%)⁴ were collected for **recycling in EU30**. 330,000 were considered recycled.

¹ Milk: Roland Berger, "Impact assessment study of an EU-wide collection for recycling target of beverage cartons" (2022); Juice: 2018 Liquid Fruit Market Report

² Eunomia report for the European Commission "Effectiveness of the essential requirements for packaging and packaging waste and proposals for reinforcement" that "beverage cartons are recycled at scale across the EU, however, so based upon this consideration they should be categorized as recyclable packaging".

³ Using the existing calculation method according to which recycling is accounted to the predominant material, in ACE's case, paper. (EC Decision 2005/270).

⁴ "Supporting evidence - environmental performance of beverage cartons" – Circular Analytics, December 2020 <https://www.european-bioplastics.org/bioplastics/>

Collection as pre-condition to recycling

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An effective collection system is required for a well-functioning recycling system. And this will even be more critical as the upcoming PPWR (Packaging and Packaging Waste Regulation) will require all packaging to be recycled at scale across the EU. The role of Member States in implementing the mandatory separate collection of all packaging is therefore critical. ACE members call for an EU or national collection for recycling targets for beverage cartons to drive national collection and increase recycling. The increased volume of materials available for recycling, the predictability and the high-quality waste stream provide a strong incentive for investment and innovation in sorting and recycling technologies.

In most Member States, citizens either have their beverage cartons collected from their homes – for example, in differently coloured bags or bins – or they take them to nearby collection points. Beverage cartons are either collected with lightweight packaging (in most cases) or with other paper-based packaging. Increased harmonization of collection will help improve the collection rates.

There are two main ways in which beverage cartons are collected:



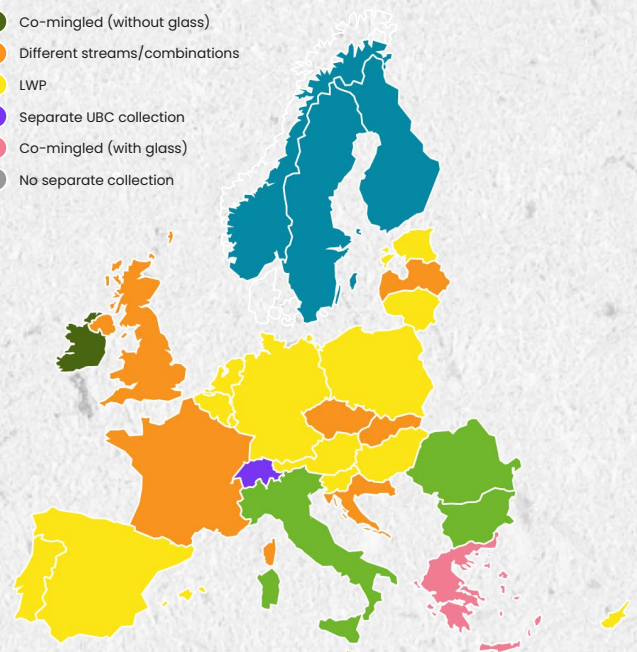
With lightweight packaging



With paper based packaging

Different collection systems for beverage cartons in Europe

- Paper/Cardboard
- LWP and/or paper
- Co-mingled (without glass)
- Different streams/combinations
- LWP
- Separate UBC collection
- Co-mingled (with glass)
- No separate collection



As of 2021, some countries are ahead of the curve, with specific collection/recycling targets by law in place in Belgium (90%), Germany (80%), Austria (80%), and Spain (70%). High recycling rates can be achieved through well-functioning collection schemes (EPR) as is demonstrated by countries such as Belgium or Germany.



Sorting of beverage cartons

Today's near-infrared (NIR) technology for sorting materials from a mixed packaging waste collection finds its roots in an initiative of the beverage carton industry allowing package identification based on the individual infrared spectrum of the materials. It is still the standard in sorting systems today.

Beverage cartons have been sorted fully automatically ever since. Recent developments in sorting technology use artificial intelligence to achieve the desired result even more precisely

by recognising shapes in addition to NIR identification of the material. In parallel, work is being done on digital and /or water marking systems through which the invisible or visible marking applied on each package can then be recognised on the conveyor belts and thus the individual articles can be sorted out quite easily. Digital marking offers different benefits including to allow separation of different packaging types having different shapes or refuse similar packaging that are not wanted.



Beverage carton recycling

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Today, beverage cartons are recyclable⁵ and recycled. Recycling of beverage cartons in Europe (EU30) has steadily increased over recent decades, with around 490,000 tonnes collected for recycling in 2021⁶ (52%), with some countries, like Belgium or Germany, officially recording rates over 70%.

We are confident that the recycling rate of beverage cartons will continue to increase thanks to both the new requirement under EU waste legislation to separately collect all packaging materials for recycling and the numerous initiatives of the industry.

Currently, about 20 paper mills across Europe recycle all currently collected beverage cartons. Recycling beverage cartons is not a complex process. The first step is to separate the fibres from the packaging through a mechanical separation process in a papermill.

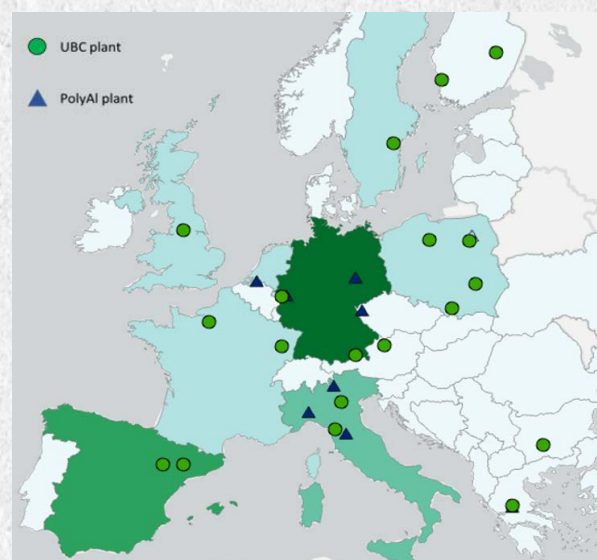
The long fibres used to produce beverage cartons are highly appreciated by recyclers. Once recycled the fibres are used to produce new paper products, while the remaining aluminium and polymers can be used for a variety of other new applications. See examples in the infographic on page 11.

After recovery of the fibres, the plastic film (LDPE), with or without the thin aluminium coating, and the caps and closures (HDPE/PP) remain as by-products (called PolyAl) which can subsequently enter the next recycling step.

In addition to some initiatives by private companies, e.g. in Italy, the Netherlands or the Czech Republic, the manufacturers of beverage cartons have invested themselves in the recycling of plastic/aluminium. This has led to the launch of Palurec GmbH, which is now operational in Cologne. Palurec treats approximately 20.000 tons of PolyAl and separates the valuable components like LDPE/Al, HDPE/PP, Aluminium which is used by other processors to develop new value-added products replacing virgin material.

The map below shows the current PolyAl-facilities, that will be up and running in the course of 2023. By the end of 2023, nearly one-third of the PolyAl collected from used beverage cartons can be recycled. And a significant increase in capacity is planned for the near future. In 2025, about 115,000 tons of PolyAl will be recycled (43%).

Overview of the operational UBC and polyAl recycling facilities in Europe



⁵ Eunomia report for the European Commission "Effectiveness of the essential requirements for packaging and packaging waste and proposals for reinforcement" that "beverage cartons are recycled at scale across the EU, however, so based upon this consideration they should be categorized as recyclable packaging".

⁶ Using the existing calculation method according to which recycling is accounted to the predominant material, in ACE's case, paper. (EC Decision 2005/270).



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Beverage cartons recycling in Europe today and tomorrow

Collection of beverage cartons differs across Europe and so is collection of related official statistics on recycling. Our reporting on the annual beverage carton recycling rate is based on statistics reported by waste management and packaging recovery organisations in each Member State. In cases where such official data do not show specific details about beverage carton recycling, ACE/EXTR:ACT use industry internal estimates. The beverage carton industry is keen to increase the robustness of the recycling rates for all EU countries and EXTR:ACT contracted an external consultancy to verify and consolidate beverage cartons recycling rates as from 2021 (for national recycling rates contact ACE).

Beverage cartons are recyclable and are recycled at scale. In 2021, collection rates of beverage cartons in Europe (EU30) reached 52%⁷.

The recycling rate of beverage cartons will continue to increase thanks to both the new legal requirements under EU waste legislation to separately collect all packaging materials for recycling, and the efforts of the industry.

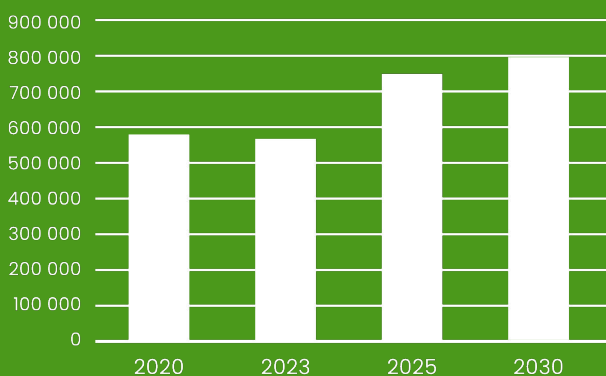
With the ACE 2030 Roadmap, our industry commits to reach:

90% & **70%**
collection rate recycling rate

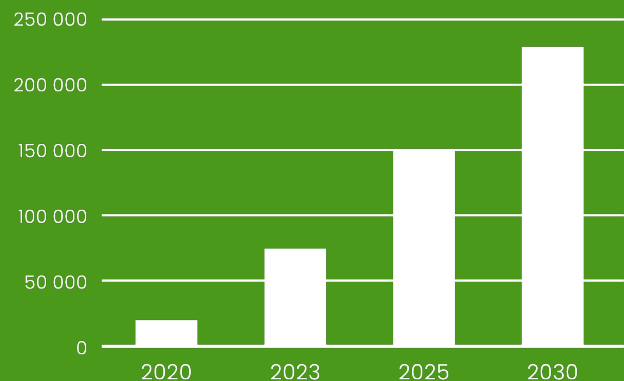
of beverage cartons verified by third parties by 2030.

We hope that as many cartons collected as possible will be recycled and that the rate reached will be higher than 70% but we wish our commitments to be realistic. There are losses through the recycling chains for different reasons including the collection and sorting efficiency. More UBC recycling capacities are planned, as well as corresponding new recycling options for PolyAl, including installing additional capacities at existing processors or building up new processors, new technologies. The installed UBC recycling capacities will cover the needs to reach the 2030 target of 70% recycling rate. The bottleneck is collection, which is why the industry calls for a mandatory collection target for beverage cartons.

UBC recycling capacities in EU30, [tons]



PolyAl recycling capacities in EU30, [tons]



⁷ Using the existing calculation method according to which recycling is accounted to the predominant material (in our case paper). (EC Decision 2005/270).



Innovation and technology – the role of EXTR:ACT

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EXTR:ACT
DRIVING VALUE FROM MULTI-MATERIAL RECYCLING

ACE published a first Design for Recycling Guideline in 2022. ACE members implement them and update the Guidelines every year to ensure that the design for recyclability best practices are always up-to-date.

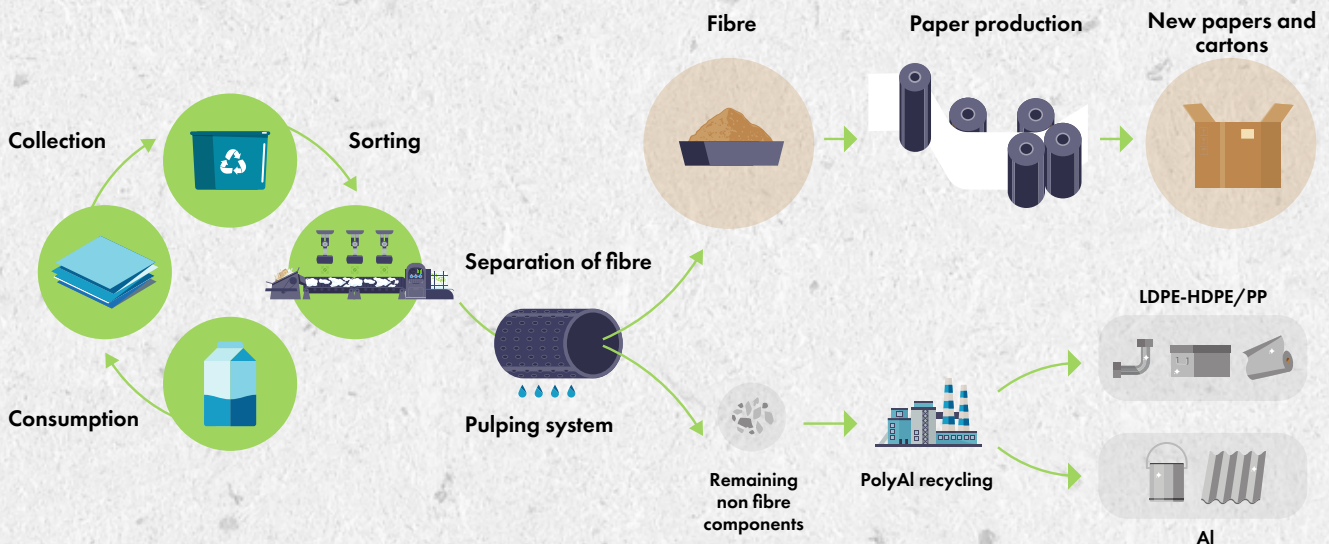
In 2018, the beverage carton industry and their European suppliers decided to set up a new platform – EXTR:ACT to take action towards ensuring that beverage cartons and similar fibre-based multi-material packaging are collected and recycled throughout Europe.

The industry’s pan-European recycling platform, EXTR:ACT aims at ensuring that higher volumes of beverage cartons and similar fibre-based multi-material packaging are collected and recycled throughout Europe.

Through its life cycle perspective EXTR:ACT looks into various issues including:

- **Collection options**
- **Implementation of a recyclability assessment center for Beverage Cartons and Fibre Based Composite Packaging.**
- **Sorting (artificial Intelligence, blockchain, new material streams, digital marking)**
- **Processing to enhance the valuable content**
- **Reuse of all valuable content: cooperation with relevant market players**
- **Processing/disposal of remaining materials**
- **Consulting brand owners, support R&D (design for recycling)**
- **Optimizing structure and simulating projections through a mapping tool.**

Brand owners and retailers partly substitute their plastic packaging by paper-based coated packaging. This increase in paper composite packaging opens new possibilities for recycling that are investigated and evaluated. Currently, the market volume of such fibre-based composite packaging is estimated at about 1.4 million tonnes – in addition, there are about 1 million tonnes of beverage cartons on the market.

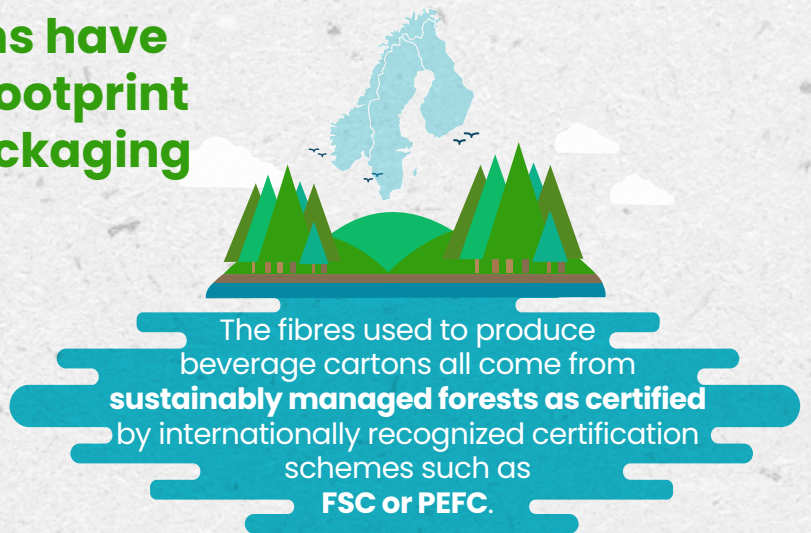
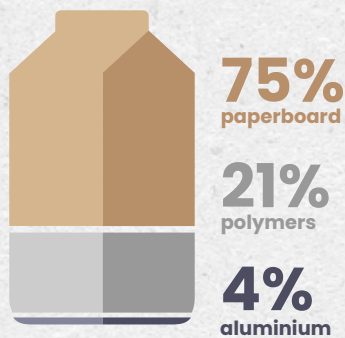


BEVERAGE CARTON

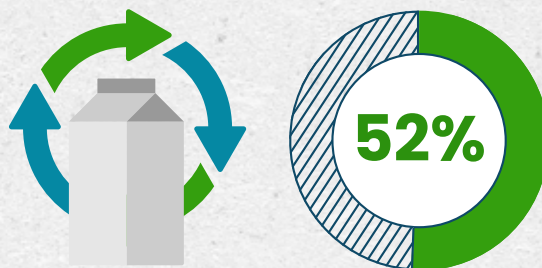
RECYCLING FACTS & FIGURES

1 Beverage cartons have a lower carbon footprint compared to packaging alternatives

Beverage cartons (BC) are paper-based packaging and are on average, made of (by weight):



In 2021, around **490,000 tons** of beverage cartons (52%)⁸ **were collected for recycling**.



2 Collection as pre-condition to recycling

There are **two main ways** in which beverage cartons are collected:

With lightweight packaging

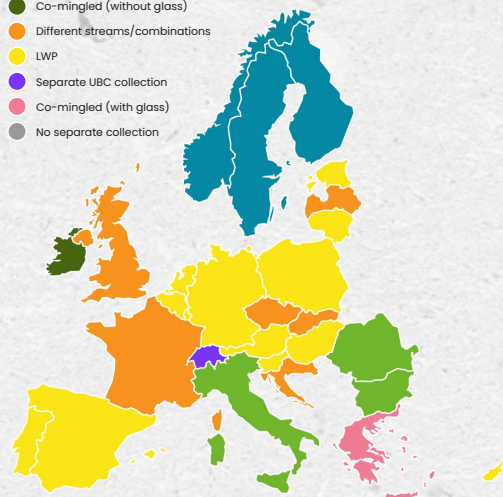


With paper based packaging



Different **collection systems** for beverage cartons in Europe

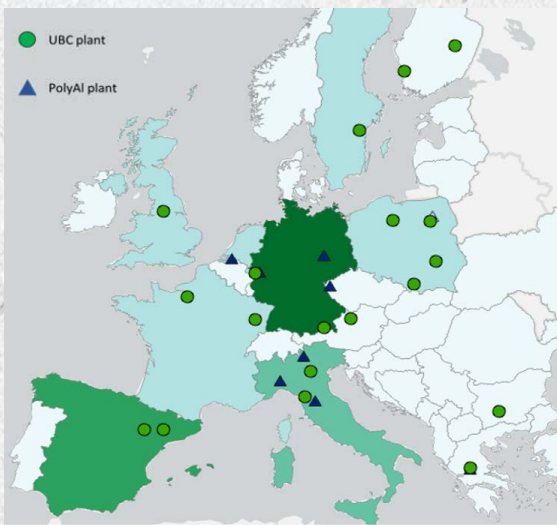
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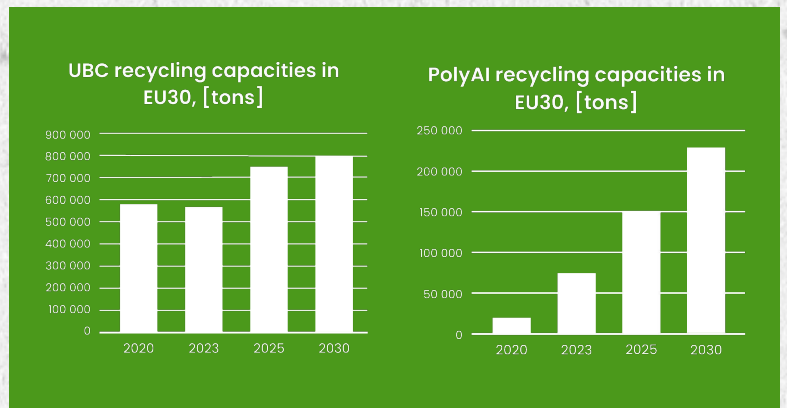
⁸ Using the existing calculation method according to which recycling is accounted to the predominant material, in ACE's case, paper. (EC Decision 2005/270).

3 Beverage carton recycling

Overview of the operational **UBC and polyAl recycling facilities** in Europe



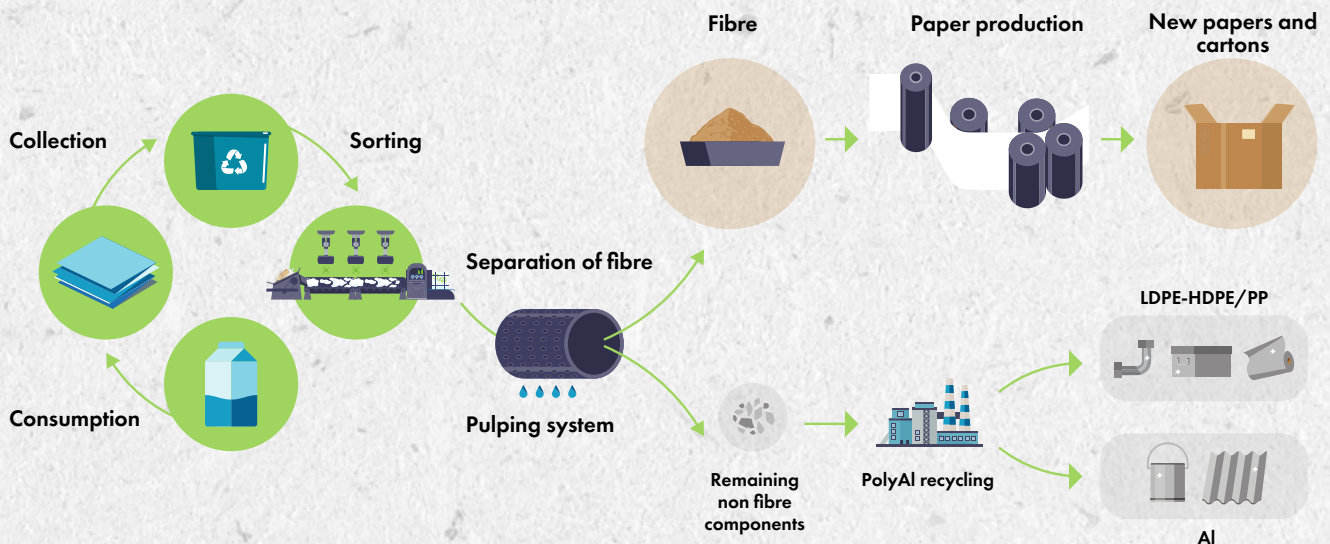
4 Beverage cartons recycling in Europe today and tomorrow



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5 Innovation and technology – the role of EXTR:ACT


The industry's pan-European recycling platform, **EXTR:ACT** aims at ensuring that higher volumes of beverage cartons and similar fibre-based multi-material packaging are collected and recycled throughout Europe.



The Beverage Carton Roadmap to 2030 and Beyond

VISION

We deliver the most sustainable packaging for resilient food supply systems which is renewable, climate positive and circular.

-  Made only from renewable material and/or from recycled material
-  Made entirely from sustainably sourced raw materials
-  Fully recyclable and recycled
-  The lowest carbon packaging solution

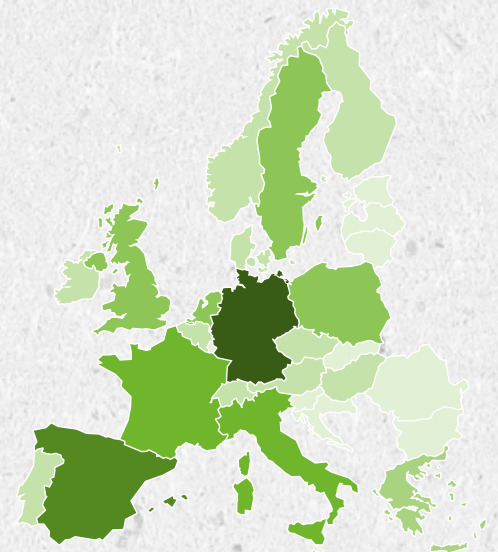
COMMITMENTS

Our journey to 2030: The beverage carton industry commits to

-  Produce beverage cartons only from renewable materials
-  Achieve a 90% collection rate of beverage cartons for recycling
-  And/or produce beverage cartons from recycled content
-  Achieve at least a 70% recycling rate for beverage cartons
-  Use more fibres and less plastic
-  Decarbonise the value chain in line with 1.5°C target
-  Design for circularity
-  All materials meet the highest sustainability sourcing standard
-  The beverage carton supply chain increases carbon sequestration, enhance biodiversity, increases the forest growth




Beverage carton volumes in Europe

(the darker the color, the higher the market volumes)



KPIs

We deliver the most sustainable packaging for resilient food supply systems which is renewable, climate positive and circular.

-  Report on existing globally recognised sustainability sourcing and traceability standards for all materials every two years
-  Identification of sound metrics on plastic content in 2021
-  Report on the use of renewable material and recycled content every two years
-  Report on GHG emissions in line with 1.5°C science-based target (SBT)
-  Update annually the industry's Design for Recycling Guidelines
-  Report on the beverage carton system climate balance
-  Annual recycling rates verified by a third party
-  Develop metrics to assess the impact on biodiversity, carbon sequestration & forest growth





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