

BEVERAGE CARTON RECYCLING FACTS & FIGURES



THE ALLIANCE FOR
BEVERAGE CARTONS
AND THE ENVIRONMENT

EXTR:ACT
DRIVING VALUE FROM MULTI-MATERIAL RECYCLING

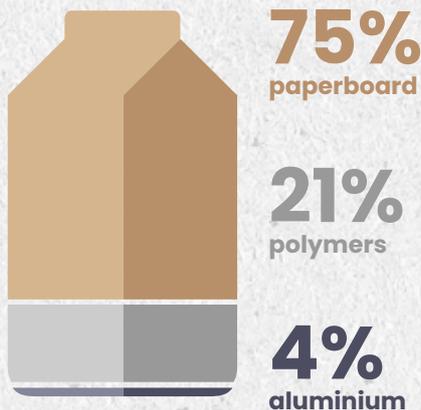


Beverage cartons have a lower carbon footprint compared to packaging alternatives

1

On average around 900.000 tons of beverage cartons are put on the market annually in Europe. Beverage cartons are mainly used to pack dairy products (55%), juices and other liquid food products (45%).

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

Beverage cartons are a recyclable low carbon packaging solution today. Beverage cartons are recyclable and recycled at scale as highlighted in the Eunomia report¹.



The fibres used to produce beverage cartons all come from **sustainably managed forests as certified** by internationally recognised certification schemes such as **FSC or PEFC**.

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 recognised 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 2019, around **450,000 tons** of beverage cartons (51%)² were recycled.

¹ 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”.

² 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 “Supporting evidence- environmental performance of beverage cartons” – Circular Analytics, December 2020 <https://www.european-bioplastics.org/bioplastics/>

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Collection as pre-condition to recycling

An effective collection system is required for a well-functioning recycling system. 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.

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



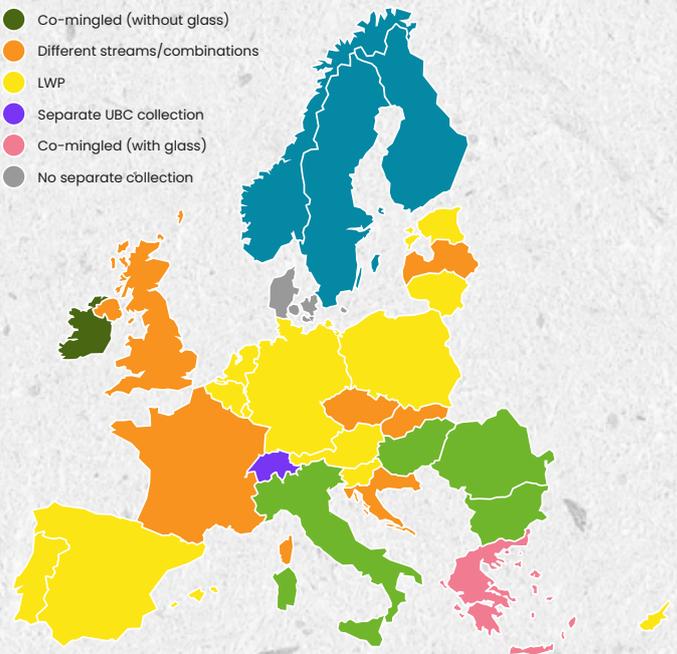
With lightweight packaging



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 2019, some countries are ahead of the curve, with specific collection/recycling targets by law in place in Belgium (90%), Germany (75%) and France (59%). High recycling rates can be achieved through well-functioning collection schemes (EPR) as is demonstrated by countries such as Belgium or Germany. The Netherlands started collecting BCs about five years ago and has already reached a recycling rate of close to 50%. Reaching high recycling rates does not automatically require the setting up of a deposit return scheme (DRS).



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.



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Beverage carton recycling

Today, beverage cartons are recyclable⁴ and are recycled at scale. Recycling of beverage cartons in Europe (EU-28) has steadily increased over recent decades, with around 450,000 tonnes recycled in 2019⁵ (51%), 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 dedicated industry's pan-European recycling platform, EXTR:ACT (www.extr-act.eu).

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 different special dissolving technology in a paper mill.

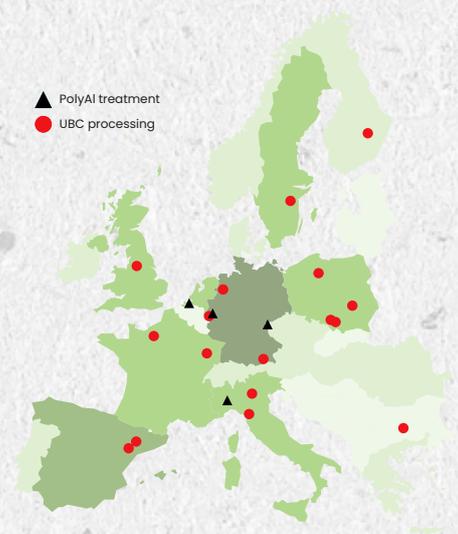
The long fibres used to produce beverage cartons are highly appreciated by recyclers. Once recycled the fibres are used to produce new paper products, while the remaining aluminium and polymers can be used for a variety of other new applications. See examples figure 10.

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 residues (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 will be now operational in Cologne. Palurec will treat approximately 20.000 tons of PolyAl and separate the valuable components like LDPE/Al, HDPE/PP, Aluminium which will be used by other processors to develop new value-added products replacing virgin material.

The map below shows the current PolyAl-facilities (in green), that will be up and running in the course of 2021. By the end of the 2021, 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.

Overview of the operational UBC and polyAl recycling facilities in Europe



⁴ 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".

⁵ Using the existing calculation method according to which recycling is accounted to the predominant material, in ACE's case, paper. (EC Decision 2005/270).



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 2020 (for national recycling rates contact ACE).

Beverage cartons are recyclable and are recycled at scale. In 2019, recycling rates of beverage cartons in Europe (EU-28) reached 51%⁶.

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's pan-European recycling platform, EXTR:ACT (www.extr-act.eu).

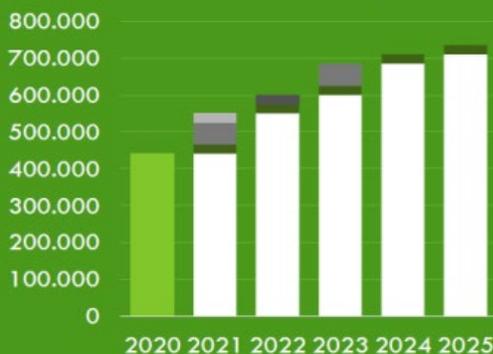
With the ACE 2030 Roadmap, our industry commits to reach:

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

of beverage cartons verified by third parties by 2030.

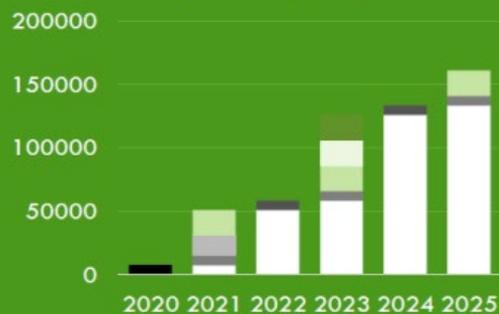
We hope that as many cartons collected as possible will be recycled and that the rate reached will be higher than 70% but we wish our commitments to be realistic. There are losses through the recycling chains for different reasons including the collection and sorting efficiency. More UBC recycling capacities 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.

UBC fibre recycling



Project A Activate existing capacity
Project B Used existing capacity
Project C Target

PolyAl recycling



Target existing capacity
Project 1 Project 2
Project 3 Project 4
Project 5 Project 6

⁶ 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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DRIVING VALUE FROM MULTI-MATERIAL RECYCLING

ACE is developing Design for Recycling Guidelines that will be issued in autumn 2021. ACE members will implement them and will update the Guidelines every year to ensure that the design for recyclability best practices are always up-to-date.

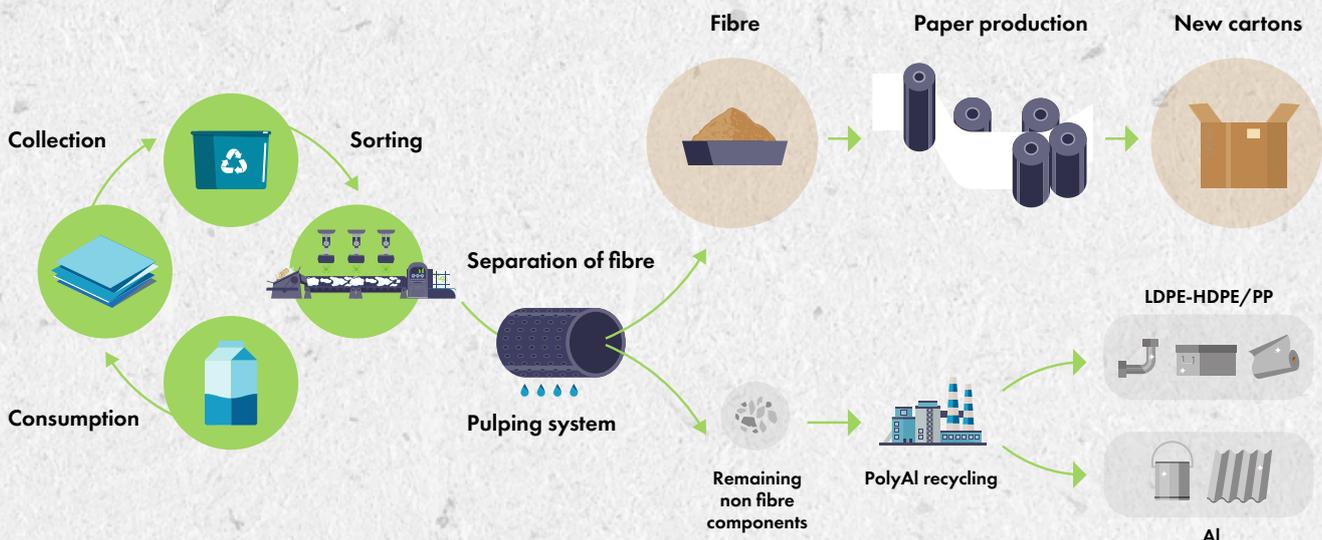
In 2018, the beverage carton industry and their European suppliers decided to set up a new platform – EXTR:ACT to take action towards ensuring that beverage cartons and similar fibre-based multi-material packaging are collected and recycled throughout Europe.

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**
- **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 900.000 tonnes of beverage cartons on the market.

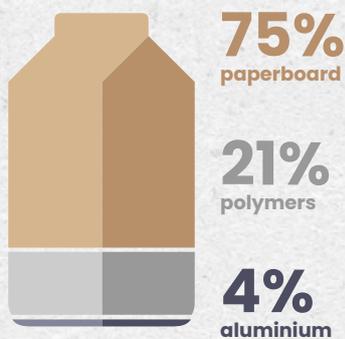


BEVERAGE CARTON

RECYCLING FACTS & FIGURES

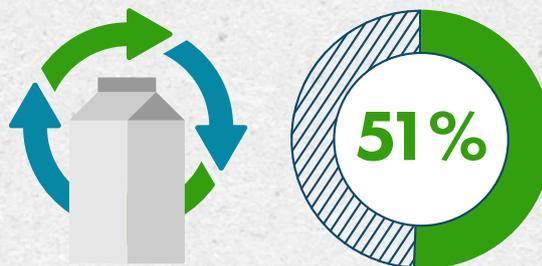
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2 Collection as pre-condition to recycling

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

With lightweight packaging

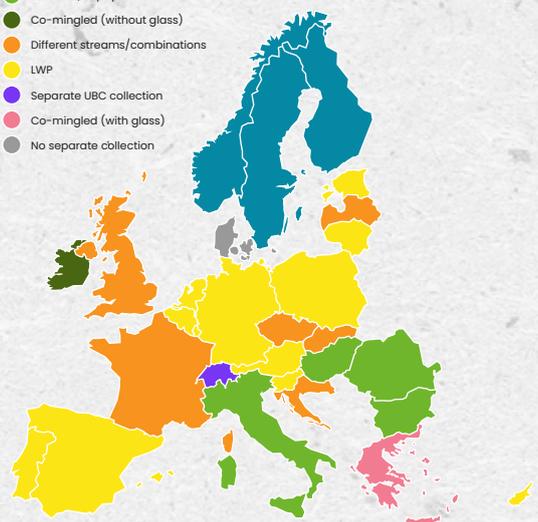


With paper based packaging



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

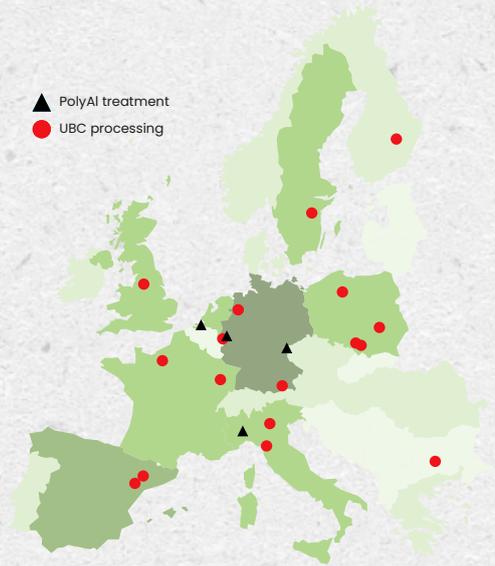
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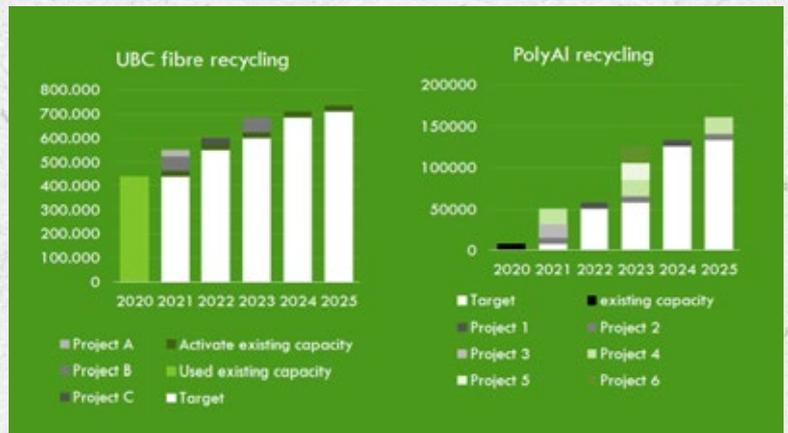
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3 Beverage carton recycling

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



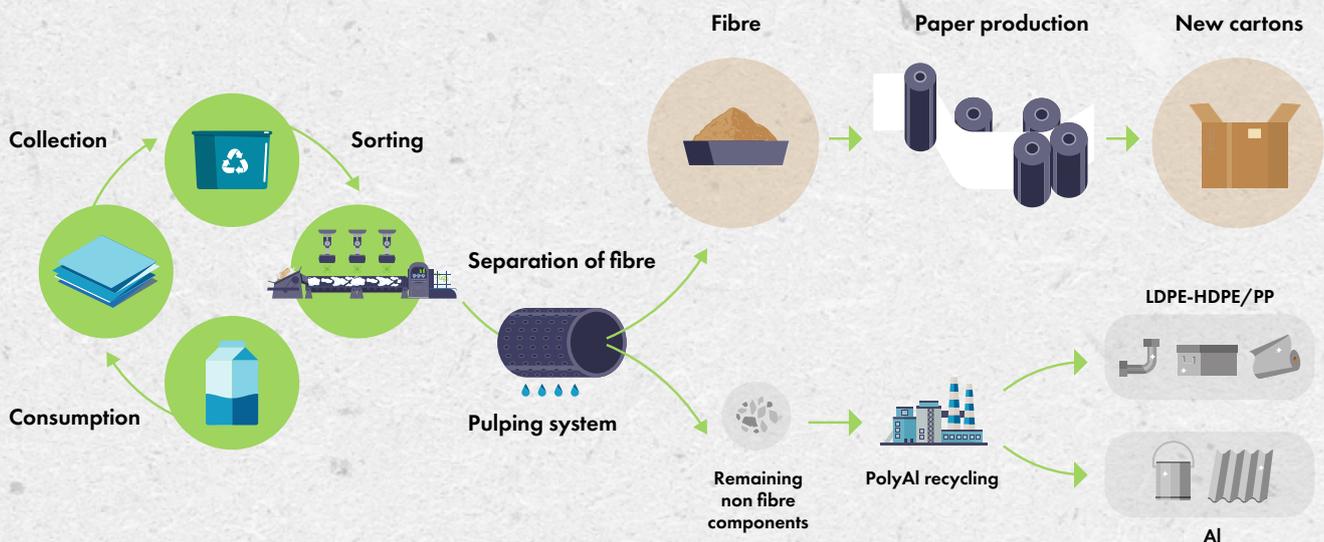
4 Beverage cartons recycling in Europe today and tomorrow



We hope that as many cartons collected are 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.

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

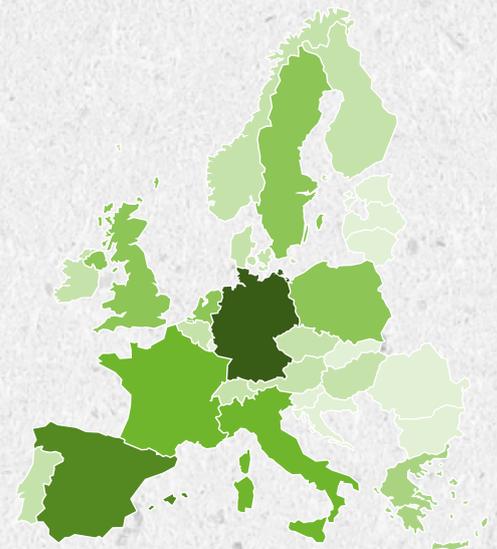
COMMITMENTS

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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