FEFCO
Corrugated Packaging

CORRUGATED CARDBOARD PACKAGING

# Europe's Proven Circular System Operating at Scale

FEFCO Circularity Study, 2026



CIRCULAR BY NATURE

OCT 2026

# INTRODUCTION



> *A circular economy is a system which maintains the value of products, materials and resources in the economy for as long as possible, and minimises the generation of waste.*
>
> EUROPEAN UNION

Europe's circular economy ambitions require packaging policies that deliver measurable results in practice. The relevant question is not whether packaging is labelled reusable or recyclable, but whether the system in which it operates protects products, uses resources efficiently and achieves effective collection and recycling at scale. In this context, corrugated cardboard packaging offers a valuable case study: it is not a theoretical future model, but an established system already functioning at industrial scale across Europe for decades.

FEFCO's 2026 study finds that European **corrugated cardboard operates within an established circular system** supported by mature collection, recycling and secondary-material infrastructure. Across the three use cases assessed, E-commerce packaging, Fast Moving Consumer Goods (FMCG) & Logistics packaging, and Food and Beverage packaging[1], **this system demonstrates strong performance across several indicators related to material circulation, recycling infrastructure and policy alignment.**

1. The three cases represent ~87% of the European corrugated market according to FEFCO 2024 statistics



# ABOUT THE STUDY

FEFCO commissioned the circular economy consultancy **Circul'R** to assess the circular performance of corrugated cardboard packaging, to provide a robust evidence base for outcome-focused packaging policy and continued improvement across the corrugated sector. The study considers selected stages and characteristics of the circular value chain, including material inputs, selected environmental indicators, logistics, packaging functionality, number of uses, collection, recycling and secondary-material markets.

The study contrasts corrugated cardboard packaging, as a baseline, with selected alternative packaging scenarios assessed for the three uses cases:

1. E-commerce packaging
2. FMCG, Logistics and Long-lasting Goods packaging
3. Food & Beverage packaging

These use cases were selected because they reflect distinct B2C and B2B applications, significant market relevance, data availability and sector interest.

**Within the KPI framework, selected scenarios, data and assumptions applied in this study, the corrugated baseline receives a higher overall score than the assessed alternatives.**

## STUDY METHODOLOGY & SCOPE

### DRIVERS

- **Circularity assessment think thank MEDECIR**, grounded in international standards and environmental assessment methodologies of which ISO 59020, 59004, 59010, 14021 & 26000, CSRD and SFDR directives, Ellen MacArthur Foundation, the French Environmental Agency (ADEME), and OECD framework
- Current and upcoming European regulatory framework: Packaging and Packaging Waste Regulation (PPWR) and Circular Economy Act (CEA)

### METHODOLOGY

Following a literature review and interviews with industry experts, the study defined three case studies and mapped their respective value chains and circular pathways. A study-specific framework of 11 KPIs (see Annex I) was then developed across three categories: environmental, operational and functional performance, and policy alignment.

Quantitative data, qualitative evidence and proxies were used to score the baseline and selected alternative scenarios.

The global score is an aggregated outcome generated within the context of this study-specific framework. It does not represent a physical measurement or a universally standardized indicator of circularity.

### LIMITATIONS

This study is an indicator-based circularity assessment, not an LCA or Product Environmental Footprint study. Its results depend on the selected use cases, study-specific KPIs, scoring rules, weighting, available evidence and proxies. Much of the sector-specific evidence was provided or commissioned by FEFCO, alongside regulatory sources, external statistics and selected third-party publications.

The findings apply to the scenarios assessed and should not be interpreted as universally applicable comparisons between all corrugated and reusable packaging systems.



## Key findings

Corrugated cardboard operates a mature circular model - established capacity, widespread collection and recycling infrastructure, substantial material recirculation, and an operating secondary-material market.

The study finds that the European corrugated cardboard system has been established over many years and operates at industrial scale. It is not a prospective future pathway waiting for infrastructure, collection systems or market demand to develop. Within the KPI framework, corrugated cardboard's qualities drive strong performance for 8 out of the 11 KPIs (see Annex I).

This strong performance is primarily driven by KPIs on environmental performance and policy alignment. European corrugated packaging contains an average of 88% recycled fibre and is approximately 95% bio-based[1], reducing dependence on primary resources and supporting repeated material circulation. In addition, the fibres used by the sector are mainly sourced through recognised FSC- or PEFC-certified systems.

This performance is not based only on material characteristics. It is also supported by a well-established EU recycling infrastructure, short and efficient distances between production and end-of-life treatment, and a mature secondary market with efficient collection systems for paper and cardboard across the EU.

### BASELINE TOTAL SCORES (/5) WITHIN THE STUDY-SPECIFIC KPI FRAMEWORK[2]

| E-commerce (B2C) | FMCG & Logistics (B2B) | F&B (B2B) |
|---|---|---|
| **3,9** | **4,3** | **4,1** |
| vs 3,2 (Alternative: reusable plastic and fibre-solutions in both flexible or rigid formats) | vs 2,1 (Alternative: reusable plastic crates) | vs 2,2 (Alternative: reusable plastic crates) |

1. Consist of 100% of fibres and starch
2. See Annex I for the KPIs assessed and where each system performed better

# WHAT MAKES THE CORRUGATED CIRCULAR MODEL MATURE?



1. **A high level of recycled content:** core feature of the corrugated circular model is its reliance on secondary fibre, with an 88% recycled content on average.
2. **A renewable and certified material origin:** corrugated cardboard is made of bio-based and renewable materials, with huge majority of wood-fibres sources from FSC- or PEFC-certified sources. Additives are described as minimal and primarily bio-based, including starch.
3. **Recycling that operates at scale:** established collection and reprocessing infrastructure supports high levels of recycling and regional material recirculation. Recycling of corrugated cardboard exceeds 90% in Europe.
4. **Regionally integrated circular loops:** Corrugated packaging benefits from distributed European production, converting and recycling infrastructure.
5. **A functioning secondary material market:** the established market for recovered fibre provides favourable economic conditions for its continued use as a secondary raw material, supporting a circular system that operates at scale.

# CONCLUSION

Within its defined scope, the study concludes that corrugated cardboard packaging operates within an established European circular system at industrial scale. This system is supported by a high average share of recycled fibre, predominantly bio-based material composition, established collection and recycling infrastructure, regional material recirculation and an operating secondary-fibre market.

European packaging policy should recognise and build on circular systems that already operate at scale, while continuing to support innovation, better data and complementary reuse solutions where these can demonstrate effective performance under the relevant application and logistics conditions.

## CONTACT & INFORMATION

For contact: **Juliette Guerin**, Technical & Sustainability Director at FEFCO

juliette.guerin@fefco.org

## QUALITY ASSURANCE & CREDIBILITY

Methodology Development:

Circul'R

The methodological framework has been developed by the circular economy consultancy Circul'R

Independent Peer Review:

JAY partners

The methodology and model credibility were critically reviewed by Jay Partners

# ANNEX I: KPIs DETAILS

## The circularity performance of corrugated cardboard was measured across 3 KPI categories

### ENVIRONMENTAL PERFORMANCE

- **Recycled content** (%)
- **Material origin** (bio-based)
- **End-of-life treatments** (% incineration & landfill)
- **Environmental impacts** (carbon emissions, water use, fossil resource consumption)

### OPERATIONAL & FUNCTIONALITY PERFORMANCE

- **Distances** from production to end-of-life treatments
- Packaging **performance** (empty space ratio, adaptability)
- **Number of uses**
- **Material efficiency** (weight-load ratio)

### POLICY ALIGNMENT

- **Recycling at scale** (PPWR)
- Contribution to secondary raw material – **price gap**
- **Collection to recirculation**

### PERFORMANCE LEGEND

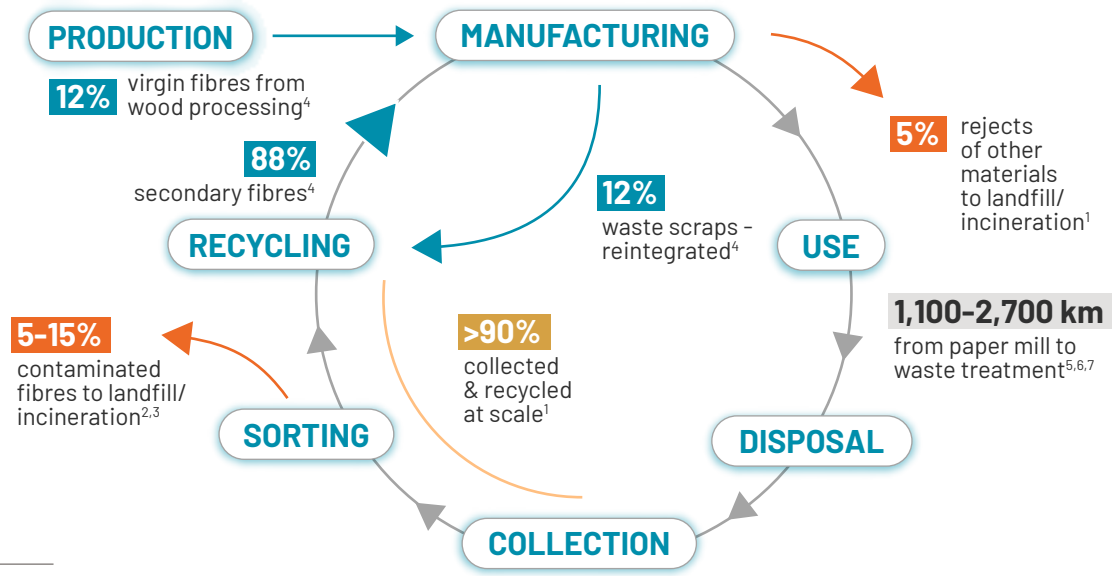
**Strong baseline performance**
The corrugated cardboard baseline outperforms the alternatives in all 3 case studies.

**Mixed or equivalent performance**
The baseline outperforms the alternatives in up to 2/3 cases studies, with the remaining case(s) showing similar performance, or

The KPI shows similar performance between the baseline and the alternatives across all case studies.

**Strong alternative performance**
The alternatives outperform the baseline in 2 out of 3 case studies, with the remaining case showing similar performance.

# ANNEX II: THE CORRUGATED CIRCULARITY LOOP




1. FEFCO x Cirpack Recycling Performance 2026
2. FEFCO x Recycle ME Sorting Performance 2025
3. DS Smith - Wasted Paper
4. FEFCO x Containerboard Europe LCA 2023 & FEFCO Annual Statistics 2024
5. FEFCO x Ramboll - Comparative LCA Packaging Solutions For Food (2022)
6. FEFCO x Ramboll - Hot-Spot Analysis Of E-Commerce Logistic Chain 2022
7. FEFCO x Deloitte - Case study analysis 2023

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# The Federation of Corrugated Board Manufacturers

Avenue Louise 250 B – 1050 Brussels
Tel + 32 2 646 40 70
www.fefco.org

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