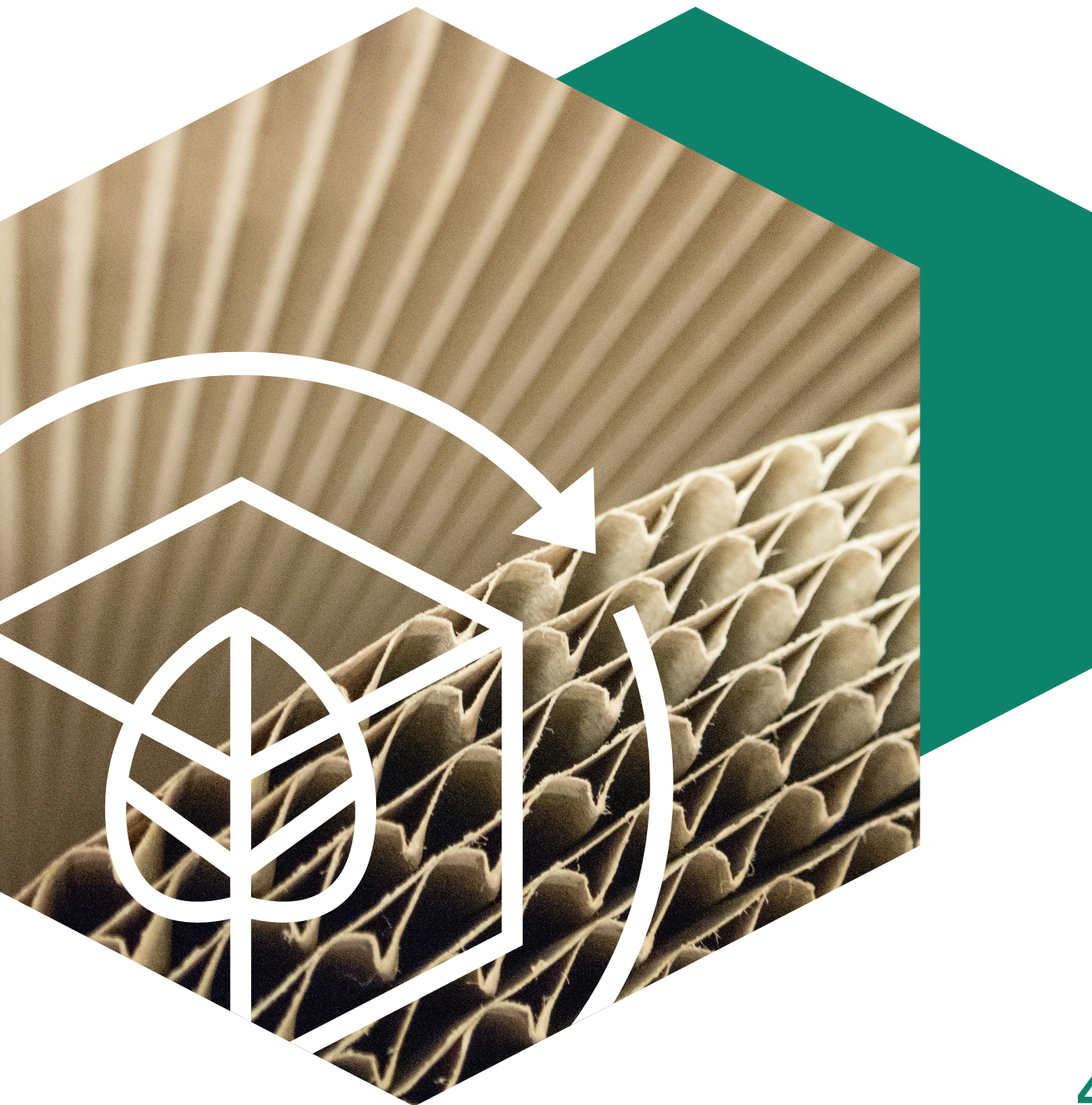


GUIDANCE ON THE IMPROVED COLLECTION AND SORTING OF FIBRE-BASED PACKAGING FOR RECYCLING

December 2023



1. List of abbreviations

EPR	extended producer responsibility
FBCP	fibre-based composite packaging
HORECA	hotel restaurant catering
LWP	lightweight packaging
MSW	municipal solid waste
OCC	old corrugated containers
UBC	used beverage carton

2. Introduction

Goals and overview

4evergreen is a cross-industry alliance promoting low-carbon and circular fibre-based packaging. By bringing together the entire value chain, the different workstreams of 4evergreen aim for a comprehensive outlook on the lifecycle of fibre-based packaging. To enable the recycling of fibre-based packaging waste, effective collection and sorting is crucial.

This ‘**Guidance on the Improved Collection and Sorting of Fibre-Based Packaging for Recycling – Version 2**’, hereafter referred to as the Guidance, is based on input received from 65 participating companies from all relevant industry segments along the value chain. The recommendations are based on a consensus reached through discussions between workstream participants and experts.

These recommendations are written based on best practices and are intended to aid the implementation of future collection, sorting and recycling infrastructure, to meet EU legal requirements and realise 4evergreen’s aspirational target of a 90% recycling rate for fibre-based packaging. This Guidance affects all key actors in the fibre-based packaging value chain (e.g. producers/importers, (local) authorities, waste handlers/collectors, recyclers, NGOs) and is aimed towards policymakers, local authorities and extended producer responsibility schemes.

Fibre-based packaging waste recycling rate targets

The EU has adopted material-by-material packaging waste recycling rate targets for both 2025 and 2030¹:

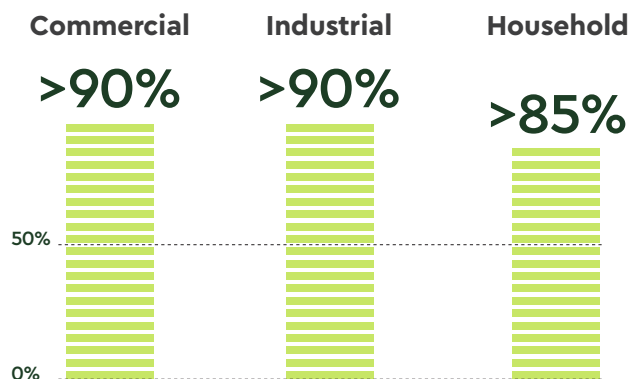
Year	All packaging waste	Plactic	Wood	Ferrous metals	Aluminium	Glass	Fibre-based
2025	60%	50%	25%	70%	50%	70%	75%
2030	70%	55%	30%	80%	60%	75%	85%

Source: EU Directive 2018/852

Note: Fibre-based packaging is called “paper and cardboard” packaging in the respective directive

These can be considered minimum targets, as EU member states are free to implement more ambitious packaging waste recycling targets in their respective national legislation (e.g. Germany, Spain and Sweden).

Therefore, 4evergreen strives for the following recycling rate sub-targets of recycling of fibre-based packaging:



¹ The UK has also set packaging waste recycling targets, broadly in line with the EU.

Collection systems today

In Europe (EU27 + NO, CH, UK) 47 million tonnes of fibre-based packaging is consumed each year, of which 42 million tonnes are collected. The material collected comes from three different sources:

- Households (21% – 9 million tonnes)
- Industrial (31% – 13 million tonnes)
- Commercial (48% – 20 million tonnes)²

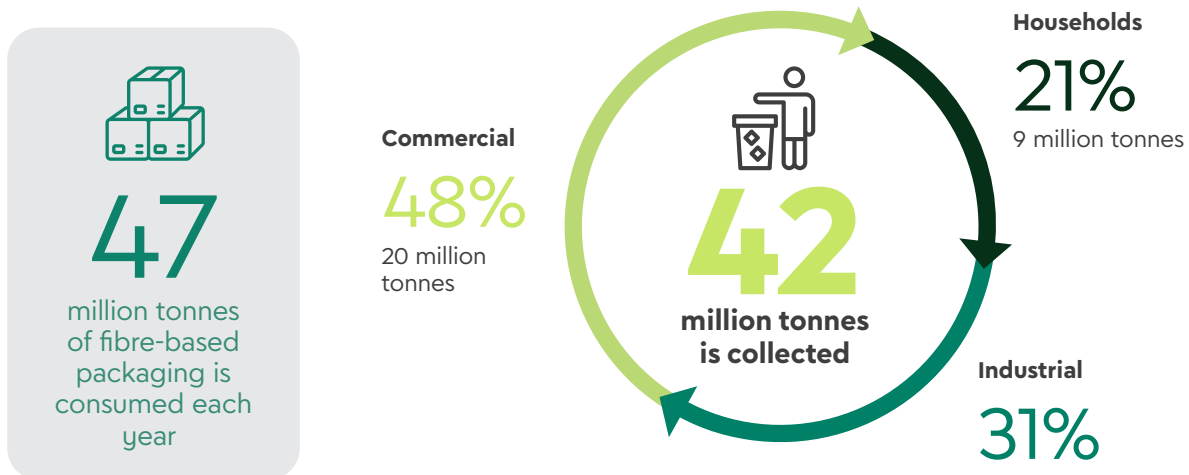
These three sources have significantly different recycling rates with industrial and commercial at 85% and 88% respectively, while household collection is at 55%³.

As the current recycling rates need to be improved to reach an overall recycling rate of 90%, 4evergreen concludes that more focus needs to be put on household collection while maintaining high recycling rates for industrial and commercial collection.

The 4evergreen guidance includes steps that should be taken by countries, municipalities, and other actors in the recycling value chain to make it easier for consumers to sort correctly, allowing the packaging to be collected in the correct stream and recycled into a new valuable resource. This should reduce the share of fibre-based packaging in mixed municipal solid waste (MSW) and increase the recycling rate of the sorted household stream.

4evergreen recommends two streams for the collection of fibre-based packaging as a guide to implementing future collection, sorting and recycling infrastructure. That means one bin for fibre-based packaging suitable for recycling in standard paper mills and a second bin for lightweight packaging (LWP), including fibre-based packaging suitable for recycling in specialised mills. In every respect, 4evergreen also supports alternative streams for collection and infrastructures **capable of meeting the recycling rate (sub)targets.**

IN EUROPE (EU27 + NO, CH, UK)



Household collection

The starting point and basis for the Guidance and recommendations is separate collection of paper and board within households. Here, fibre-based packaging should be collected in either the standard paper and board stream or the lightweight packaging stream, depending

on its composition and recyclability. The routes from collection to recycling at paper and board mills are also examined, followed by practical recommendations how to optimise collection.

Separate collection of fibre-based packaging is fundamental, as it enables better quality paper and

² RISI; Expert interviews; Press search; FAO; OECD; Cepi, team analysis

³ RISI; Expert interviews; Press search; FAO; OECD; Cepi, team analysis

board to enter recycling streams with less contamination. **4evergreen endorses collection systems where material is sorted into different streams at the source (e.g. households), laying a strong foundation for recycling at suitable paper and board mills.**

Household collection schemes determine suitable recycling streams for various grades of fibre-based packaging and other paper products, which in turn have a fundamental impact on the efficiency of paper recycling. In essence, this concerns practical matters, such as looking at the number of recycling streams households are dealing with and what sort of instructions or information they receive on how or where to discard what packaging product.

In this Guidance, a distinction is made between two dominant coexisting collection streams for fibre-based packaging waste originating in households (both will be addressed in more detail in later chapters). Meanwhile, further separation at source exists in some countries whereby additional fractions being collected deliver high quality and volume for recycling.

It is important that the collection and sorting set-up guides the different paper grades towards the right recycling process and end use in order to secure the highest quality and yield of recovered material across different types of recycling mills processing different types of fibre-based materials. Moreover, each paper mill will have its own special recipe and appropriate technical equipment related to the properties of the intended end products.

The highest efficiency and recycling rates will thus be obtained by ensuring that paper mills have access to fibre-based material collected and sorted into different feedstock fractions, with sufficient quality to create the required recipe for their own products.

Connecting packaging and the full recycling system

There are several key elements in achieving fibre-based packaging waste recycling rate targets. In principle, all fibre-based packaging is recyclable, the vast majority in standard mills. However, not every paper or board mill can recycle all types of fibre-based packaging, as their processes and equipment vary. As such, a certain packaging item for one type of mill could be considered recyclable, and for another mill it could be considered non-recyclable. Therefore, effective and efficient recycling depends on the correct fibre-based packaging reaching the correctly designated paper or board mills.

Consumers need to be empowered and encouraged to recycle fibre-based packaging and paper by separating them into the right collection stream. This positively affects the recycling process and avoids recyclable material being sent to incineration plants or landfill. Public awareness and education on this topic is key. Today, fibre-based products collected with, and sorted from, residual waste streams are not considered suitable for recycling in paper mills, as fibres may have been contaminated by organic or hazardous substances.

In order to achieve higher recycling rates packaging needs to be circular by design (learn more about this [here](#)⁴).

Recycling legislation

The EU Waste Framework Directive (2008/98/EC) named separate collection as a precondition for high-quality recycling. In accordance with the later Packaging and Packaging Waste Directive (2018/852), European member states are required to implement national extended producer responsibility schemes (EPR) by the end of 2024⁵. This obliges affected stakeholders (e.g. municipalities, producers) to develop, among other things, the required infrastructure to collect fibre-based packaging separately at source (households). Minimum requirements for such schemes have been set out in the latest amendment of the Waste Framework Directive (EU Directive 2018/851; article 8a).

Implementation of separate collection and adequate sorting of fibre-based packaging and other paper and board products is not only necessary to comply with European law, but also important to create qualities of paper for recycling that match suitable paper mills, thus increasing the recycling rate and delivering the best overall environmental solution for European consumers and the planet.

4evergreen is in support of legislative initiatives that incentivise more investment and the wider participation of all relevant stakeholders in separate collection and post-collection sorting actions aimed at increasing the recycling rate of fibre-based packaging.

Moreover, 4evergreen supports EPR-fee structures which, to the largest extent possible, reflect the real net recycling costs for each type of packaging material. An economic assessment should take into account (a) collection costs, (b) need for and cost of sorting/processing, (c) actual cost of recycling, and (d) the value of recyclates.

⁴ <https://4evergreenforum.eu/about/guidelinesandprotocol/>

⁵ The UK has indicated that it will implement similar EPR legislation.

3. Standard and deinking mill route

Recycling of fibre-based packaging into new paper and board is an established technique in widespread use. In fact, fibre-based packaging and paper can go through multiple cycles of production, use and recycling. The recycling processes are designed to maintain the quality of the fibres, thus allowing multiple cycles. In every cycle, the fibrous material is cleaned of non-paper constituents, such as staples, barrier and adhesive applications as well as loose non-paper components.

The basic processes to treat paper and board for recycling are similar. The raw material and the end product manufactured determine the recycling technology required and level of complexity of the processes. Common in all mills is a repulping stage which disintegrates the structure of paper and board into individual fibres, followed by cleaning and screening stages.

Mills with standard equipment typically treat old corrugated containers (OCC) and/or mixed paper. They mainly reject non-paper constituents and non-paper components. The output is a greyish and brownish pulp. This pulp is typically used to produce brown containerboard and inner layers of cardboard.

Deinking mills have similar cleaning and screening stages but apply additional processes to remove ink, and they typically have more sophisticated equipment to improve the cleanliness of the pulp. Inputs here are paper and board products on bleached substrates, and the output is a white or off-white pulp. This pulp is typically used for graphic and for hygiene papers as well as for white top layers of liner and cardboard.

More than three quarters of the paper and board for recycling utilised in Europe consist of corrugated, kraft and mixed grades. Most of this material is used in standard mills to produce packaging paper and board. Another 15-20% are graphic grades mainly treated using a process to remove the ink and enhance the optical properties. Both processes are well designed to handle recyclable paper and board products, which are typically non-wet-strength and are limited to no more than a one-sided barrier application.

Optimum paper and board recycling occurs in two co-existing and interlinked material cycles. The smaller cycle

is for graphic paper products, typically with deinking, and the larger one for fibre-based packaging. Since deinking processes are designed to remove ink but not to bleach naturally coloured fibres, the graphic cycle is sensitive to unbleached material. The packaging cycle also receives some graphic material – directly via mixed paper and indirectly via white top layers of corrugated and solid board. Also, packaging produced on bleached, mostly virgin substrates often goes directly into packaging grades of paper for recycling. The key quality parameters for recycled packaging paper or board are strength properties.

The main volume of paper and board for recycling is from post-consumer sources, being industrial and commercial outlets, households and offices. All but the households provide rather pure material, either graphic or packaging products. Collection from those sources is often well established with the help of service providers and leaves little room for augmentation.

There is definite scope for improvement in household paper and board recycling – the focus of this Guidance. Households provide used packaging as well as graphic products, but the collection rate is not as high as from the other three post-consumer sources.

Recommended system: separate collection

Separate collection of paper and board for recycling is generally accepted and supported by the paper and board industry. It is also the prevailing system in Europe. The collection system should be comprised of all used paper and products which can be utilised in standard and deinking mills. **The key to a high recycling rate is implementation of kerbside collection systems for households.**

Drop-off systems such as ‘bring banks’ and recycling centres have the advantage of lower collection costs for the municipality, but they require more effort by citizens, resulting in lower collection rates.

An important aspect is the quality of the collected paper and board for recycling with respect to non-paper components and other contamination. The collected material should be as clean and dry as possible, without

food residues and only with light stains, if any. In general, the quantity of non-paper components and unwanted paper/board increases when the collection process is more anonymous. Other influencing factors are size and the shape of container openings, housing structure, the environmental consciousness of users, frequency of residential waste collection etc.

Consumers play a vital role in sorting the material at source, therefore public education is key.

The quality of the collected paper and board for recycling determines whether a subsequent sorting should take place. If part of the material is destined for a deinking mill, sorting is inevitable.

Other collection systems in place

- Selective collection of paper and board**

These systems can be organised by placing separate containers, bins or baskets at the point of collection, in recycling centres, as part of a campaign, or in participating shops, etc. Collectively, they provide rather low quantities but higher purity with less contamination, e. g. graphic paper products as well as packaging based on bleached substrates. Wherever

these systems are already established, they should continue.

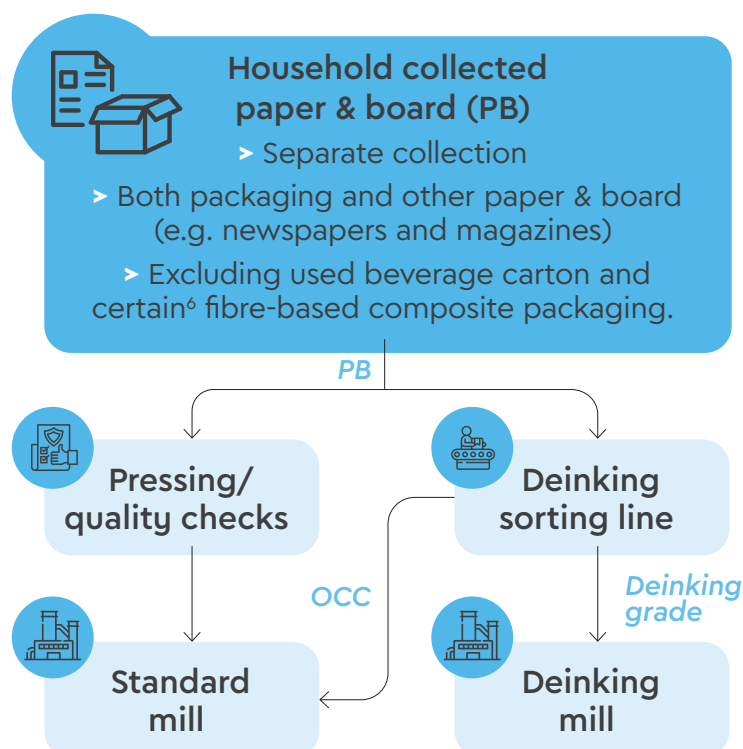
- Separate collection of paper and board (including used liquid packaging cartons; not supported by 4evergreen Alliance).**

Regionally, this variant of separate collection is in place. Here, subsequent sorting into standard paper and board for recycling in standard mills and used liquid packaging cartons for recycling in specialised mills is expected.

- Commingled collection (not supported by 4evergreen Alliance)**

In some regions, commingled collection systems where dry recyclables (e. g. plastic, paper, metal, glass) are all collected in the same recycling stream are common. Even after sorting, the resulting paper fraction rarely meets the quality requirements of European standard paper mills – in terms of unwanted materials and cross-contamination.

The following picture shows the two main sub-routes for collected paper and board in standard grades from households to paper mills. Typically, large and heavy non-paper components are removed from the paper stream during the sorting process.



European Standard (EN 643)

The European Standard EN 643, ‘Paper and board – European list of standard grades of paper and board for recycling’, defines general requirements for paper and board recycling and individual grades within five groups. The grades in groups 1 to 4 are suitable to be used in standard and/or deinking mills. Grades in group 5 typically need an adapted process and thus should go to specialised mills.

The definitions and the general requirements in EN 643 are:

- **Source of the material**
If the paper and board for recycling comes from commingled collection, it has to be specifically marked. If it originates from refuse collections, it is not suitable for the paper and board industry.
- **Prohibited materials**
Any materials considered hazardous for health, safety and the environment are forbidden, with zero tolerance.
- **Unwanted materials**
There are two tolerance levels in each grade for non-paper components and for the total unwanted material.
- **Moisture**
There is no limit but clearly stated that any moisture above 10% may be deducted from the final weight and claimed back from the supplier.
- **Form of delivery**
Shredding should be avoided and limited to requirements for confidentiality.
- **Deinking grades**
These grades have additional requirements in terms of their ‘deinkability’ and the age of the material in the case of newspapers.

The EN 643 standard lists around 100 grades by number, name, and a corresponding description of its content and two tolerance levels. One parameter is for non-paper components (loose non-paper material) that can be removed by dry sorting. The second parameter is the total unwanted material; the sum of non-paper components, paper and board detrimental to production, paper and board not matching the grade definition, and (in deinking grades) paper products not suitable for deinking.

For paper and board collected from households and used in standard or deinking mills, the following grades are the most relevant in terms of volume:

1.01.00, 1.02.00	mixed paper and board (after inspection and/or sorting)
1.04.00, 1.05.00 (incl. subgrades)	OCC (in different quality levels)
1.11.00	deinking grade graphic paper

For the American market, the corresponding document to EN 643 is ISRI SPECS, which is updated on an annual basis.

Fibre-based packaging innovations are being developed at a rapid rate, largely in response to legislation, taxation, and restrictions on plastic packaging. Such innovations are resulting in a complex mix of fibre-based composite packaging (FBCP) products – containing non-paper components – being placed on the market. It is not always clear which collection system is best suited to these new products. In this situation, 4evergreen recommends the ‘Recyclability Evaluation Protocol’ and ‘Design for Recycling Guidelines’ as a reference. As a rule of thumb, material with the following characteristics should be collected via LWP: wet-strength fibre, two-sided barrier application (such as liquid packaging cartons), and high percentage of non-fibre content. For such materials, the specialised mill route is recommended.

4. Specialised mill route

As highlighted previously, separate collection of fibre-based packaging from households sets a strong foundation to recycle different fibre-based packaging into suitable paper and board mills, creating the highest yield and quality in the recycling process.

In the previous chapter, it was explained that clean (packaging and non-packaging) paper and board, including certain⁶ fibre-based composite packaging – ideally collected separately in order to be recycled in a standard paper mills. Paper and board intended for recycling, but which cannot be recycled efficiently in a standard mill, needs a special process. This is why used beverage cartons (UBC) and certain⁷ other FBCP are to be recycled in a specialised paper mill.

Input qualities for specialised mills

Although specialised mills are designed to recycle specific paper grades, it does not mean they can all be recycled together. Input qualities need to be adapted to the specific technology used and should consider the end products for which the fibres will be used.

Here, UBCs are an already well-established recycling process in a specialised mill. Typically, this is a two-sided laminated paper, with or without a metallised layer, which requires a specialised pulping action and a reject system handling higher quantities. The technology used by these mills is designed to optimise paper-recovery, hence providing an almost fibre-free reject quality. If the variety of products is low, such as in the treatment of UBC, additional process steps are often in place to recover and recycle the non-paper constituents as well (e.g. ‘polyal’ from UBC).

Specialised mills can recycle certain types of non-standard grades of paper and board for recycling, including FBCP. They often have longer repulping times and increased screening and cleaning capacity.

Similar processes can be adapted and optimised for wet-strength products and certain⁸ other FBCP, i.e. packaging composed of two or more materials, where

the predominant material is paper. Depending on product design and the type and amount of non-paper constituents used, part of these products could be suitable for collection via the household paper and board stream, and then recycled in standard mills. Specific information on this topic will be provided in a forthcoming 4evergreen guidance in 2024.

Recommended system: collection of lightweight packaging

Collection systems for lightweight packaging are well-established in some countries and provide a solution to capture UBC and certain⁹ FBCP in an efficient way, as existing (and future) sorting technologies can separate qualities suitable for recycling in specialised paper and board mills. As such, it is 4evergreen’s recommended collection system for this packaging. In LWP collection, targeted material may include plastic packaging, metal packaging, UBC and certain¹⁰ FBCP. Glass should be kept separate.

UBCs are already being collected with LWP in many countries across Europe (mainly together with plastic and metal packaging), separated at source from other paper and board. In some countries, such as Germany, other FBCP is also accepted in the LWP collection. Typically, LWP is sent to a dedicated sorting plant capable of separating the LWP into different fractions ready for recycling. For fibre-based packaging, two qualities need to be separated for recycling in a specialised mill, i.e. UBC and other FBCP.

Industry commitments on input requirements

The EN 643 standard lists the grades of ‘Paper and Board for Recycling’, including barrier-coated, fibre-based packaging such as liquid packaging board or cups. As the variety of fibre-based packaging is increasing, adding non-paper constituents, recycling needs to be considered for the non-paper constituents as well.

Industry is committed to drive and increase recycling for the variety of fibre-based packaging. Specialised

⁶ Specific information on this topic can be found in the [4evergreen Fibre-based Packaging Evaluation Protocol](#).

⁷ ibidem

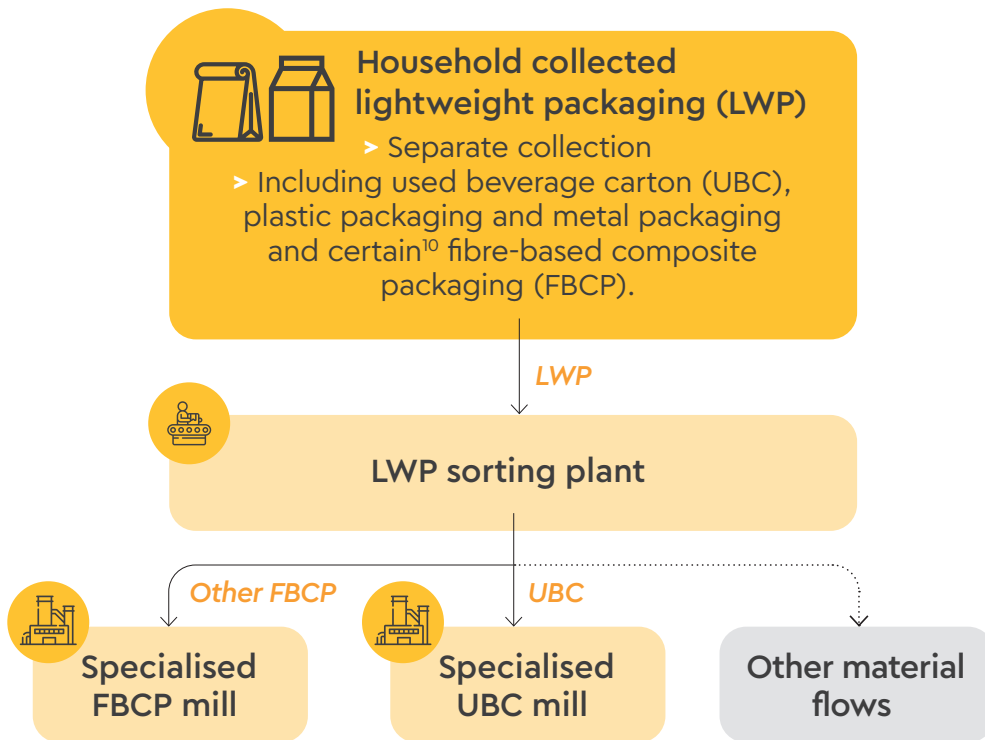
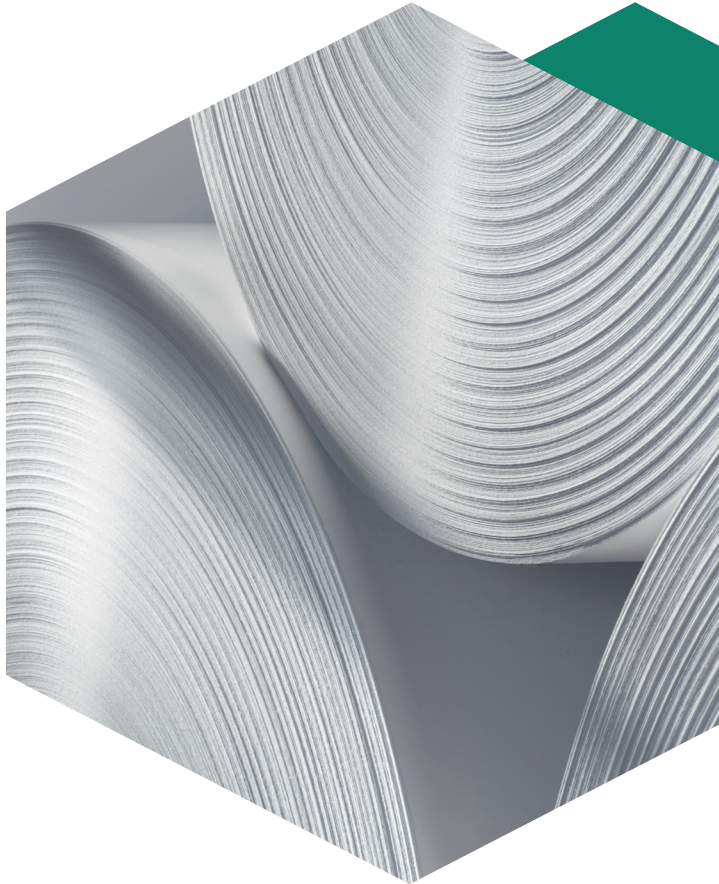
⁸ ibidem

⁹ ibidem

¹⁰ ibidem

recycling mills are applying bilateral commitments onto specific input requirements beyond EN 643, which are consequently a guideline for sorting plants to produce these qualities. An example from Germany can be highlighted; specification n° 512 concerns recycling in dedicated specialised mills for UBC, while specification n° 550 covers those mills also capable of processing other FBCP.

Sorting is a vital step in the process, as specialised recycling mills are not necessarily capable of recycling all fibre-based packaging types. A specialised mill developed to recycle UBC, or materials with a similar composition, will not automatically be able to recycle other FBCP. The technology being used in a specialised mill is linked to repulping time, fibre quality and properties, additives, agents, adhesives, fillers, and non-fibre components.



5. Practical recommendations for collecting and sorting fibre-based packaging for recycling

4evergreen's ambitious target to exceed EU legal requirements by recycling 90% of all fibre-based packaging by 2030 is dependent upon achieving a step change in household recycling across Europe. These Guidelines set out the preferred collection and sorting processes to achieve, but it requires the commitment of all stakeholders in the supply chain, as well as consumers and governments.

4evergreen advocates two recommended systems that can work harmoniously to deliver an effective system for collecting paper-based packaging:

Household curb-side collection; 'two-bin' system for fibre-based packaging

Collection of packaging waste generated at the home is essential, with the fibre-based packaging separated in to two streams. The first stream, identified as the 'blue bin' should contain paper and board, fibre-based packaging and certain FBCP which is suitable for recycling at standard paper mills (as described in Chapter 2). This makes up the majority of all fibre-based packaging emanating from households.

The second stream identified as the 'yellow bin' contains LWP, including certain fibre-based packaging which is recyclable only in specialised paper mills. Examples of which may include UBCs, and certain FBCP (as described in Chapter 3). Sorting of this packaging fraction is needed to produce the quality of feedstock required for specialised mills.

4evergreen will provide a more detailed description of such packaging upon the conclusion of Version 3 of the 'Recyclability Evaluation Protocol' in 2024.

Separation of fibre-based packaging into these two streams reduces the need for unnecessary sorting for the standard mill route, and produces higher quality paper for recycling in both standard and specialised paper mills.

While separation of materials for recycling is required to be undertaken by consumers at source, it is the most effective method of limiting cross-contamination of recyclable materials and maximises the opportunity to recycle all the packaging recovered. It should also be noted that any material collected in either the blue or yellow bins should be clean, dry, and free of residue.

In addition, where consumers have frequent and scheduled household curb-side collections, there is less need to take recyclables to community recycling points or 'bring banks', which typically results in higher volumes being collected for recycling.

Community and on-the-go collection points

Community and on-the-go collection points can play an important role in the required infrastructure to achieve 90% recycling rates for fibre-based packaging. They can be a great complementary solution for consumers that have too much packaging to recycle through their home system, and for packaging waste generated 'on-the-go'. However, the Guidelines discourage national and local governments from relying solely on systems that require an ever-increasing commitment from citizens. In places that rely on community waste-collection infrastructure, the relative rate of recycling is usually lower. Exceptions or special arrangements may therefore be needed for high-rise buildings and high-density areas where effective household collection can be challenging.

Effective on-the-go recycling systems should include bins that match the materials and colours of household bins, to ensure consistency and harmonisation. Equally, capacity and collections should be optimised, limiting the risk of fly tipping, or dumping of material outside the container. Attention should also be given to locating bins where packaging waste is likely to be generated – typically public places such as parks, railway stations and shopping centres.

Examples of best practice exist in public places where source separation is in place, and it is 4evergreen's view

that this should be expanded more widely. 4evergreen will be providing more detailed recommendations and examples of best practice for HORECA and on-the-go recycling in the 2024 update of these Guidelines.

One practical example to maximise capacity of community and on-the-go collection points is to provide underground storage for waste that is put into bins at street level. This results in higher payloads and greater efficiency for collectors, and is most effective in areas of high population density.

Further considerations

The 4Evergreen recommendation of two recycling bins for collection of household and on-the-go fibre-based packaging is key for optimising the already well-established recycling system across Europe.

The consistency and harmonisation of collection systems is essential not only at the local level, but also the national level, and long-term aspirations for European-wide harmonisation should be considered. Properly organised, homogeneous collection and sorting systems across EU member states will produce high-quality, fibre-based recycling streams at relatively low social cost, bringing high value to the economy and reducing the carbon impact on the environment.

Other less granular collection methodologies, such as comingled collection, have proven to cause unnecessary and sometimes unacceptable levels of contamination, rendering normally recyclable material unrecyclable and undermining the overall objective of 90% recyclability for fibre-based packaging.

A key responsibility in this optimised chain lies with the consumer and the need to separate paper packaging into two streams at the point of collection: either paper and board (blue bin) or LWP for sorting (yellow bin). Harmonising such systems across Europe will require public engagement from consumers and must be led by

public administrators. A dual-stream system is necessary to ensure that the quality of material is maintained and only material that requires sorting is economically separated through existing sorting technologies, and recycled in the correct type of paper mill.

To be successful at scale, consistent dual-stream collection systems need to be available and accessible to the majority of the population and supported by manufacturing infrastructure capable of reprocessing the material.

4evergreen defines packaging as recyclable at scale if:

- The material is collected by specific national or regional collection systems
- Sorting technologies for the packaging are in place and accessible
- Processing technology for the material exists, and enough capacity is available and accessible
- There is market potential for the resulting secondary raw materials¹¹

Where capacity within EU member states is insufficient, global commodity markets provide a ready outlet for high-quality materials. **4evergreen notes that future regulation may hinder export of paper-based packaging waste outside the EU and, as such, consideration for increasing mill capacity within the EU is needed.**

More and better data is needed for reporting on material collected for recycling. This should align with potential revisions under the Packaging and Packaging Waste Directive, and the introduction of EPR and eco-modulation across member states. Necessary quality inspections should start at the point of collection and continue throughout the value chain until the point of recycling in a paper mill. Data should be made available to monitor leakage of valuable resources from within the system and highlight areas of improved efficiency which could be made.

¹¹ See P12 of 4EG Circularity by Design Guideline for Fibre-based Packaging Version 2, published June 2023

Education and communication to consumers is key, with access to information on sorting instructions for local and national areas combined with education programmes and public awareness campaigns to drive long-lasting, generational improvements. Consumers must be encouraged to understand the importance of their role in the recycling process. Together with a harmonised collection system, this will deliver transparency and trust for consumers. Other such methods to improve engagement and enforcement include the use of penalties/incentives to drive change. As seen in some EU member states, this can be an effective method to boost recycling rates.

For any of these recommendations to take hold, there must be clear and complete national legal and operational frameworks implemented to support these activities, including:

- The citizen's responsibility to sort their waste for recycling
- The municipality's obligation to collect and recycle the material collected
- Targets to reduce municipal residual waste are issued
- Responsibility and ownership regimes for the material (e.g. EPR)
- Transparent reporting on recycling rates, and an improvement in data
- Translation of European legislation into (more ambitious) national recycling targets
- Enforcement of regulations

Throughout this process, the quality and consistency of output from the system is paramount.

4evergreen believes that to maximise our use of resources, optimise recycling systems, minimise energy and reduce carbon emissions, it is necessary to adopt a standardised and harmonised separate collection infrastructure across EU member states, starting at local and national level.



6. Glossary



Deinking

Process of ink removal from pulp during the recycling process.

Deinking Mill

Deinking mills have been designed for pulping, cleaning and deinking of graphic paper grades, typically newspapers and magazines like grade 1.11.00 and other grades defined in EN 643 as intended for deinking. The deinking process also has the capability of processing white/bleached fibre-based packaging papers if they fulfil the brightness and general quality requirements. The vast majority of deinking processes worldwide use flotation deinking processes. A washing step is commonly added in the deinking process, which also has to remove the minerals (e.g., for tissue papers).

EN643 - European List of Standard Grades of Paper and Board for Recycling

The European List of Standard Grades of Paper and Board for Recycling gives a general description of the standard grades by defining what they are allowed and not allowed to contain.

Fibre-based composite packaging (FBCP)

Packaging composed of paper and a considerable share of non-paper elements that by design are not separated after use.

Fibre-based packaging

Product, based on paper and/or cardboard, suitable to pack filling goods. Design and properties of the fibre-based packaging typically are specific for the respective filling goods.

Kraft paper

Paper of high mechanical strength made entirely from sulphate chemical pulp – can be either MF-paper, MG-paper or sack kraft paper

Liquid Packaging Boards

Board intended for the manufacture of packaging for liquids.

Liquid Packaging Carton

A closed composite packaging suitable for packaging liquids or foods, other than drinking cups, for which liquid packaging board is the main component.

Paper

Range of materials in the form of a coherent sheet or web, made by deposition of pulp from a fluid suspension onto a suitable forming device. Pulp fibres are generally of vegetable origin, typically cellulose. For specialties, other origins are possible. In the generic sense, the term “paper” may be used to describe both paper and board as well as moulded pulp products. The primary distinction between paper and board is normally based upon thickness or grammage, though in some instances the distinction will be based on the characteristics and/or end-use. Papers may be coated, impregnated or otherwise converted, during or after their manufacture, without necessarily losing their identity as paper. In conventional papermaking processes, the fluid medium is water; new developments, however, include the use of air and other fluids. Sheets or laps of pulp as commonly understood for paper making or dissolving purposes are excluded.

Paper and Board for Recycling

Natural fibre based paper and board suitable for recycling and consisting of - Paper and board in any shape - Products made predominately from paper and board, which may include other constituents that cannot be removed by dry sorting, such as coatings and laminates, spiral bindings, etc.

Pulp

Fibrous material, generally of vegetable origin, obtained with various processes from raw materials in different forms and made ready for use in further manufacturing processes. Examples for raw materials are wood, wood chips, plants, paper and board for recycling, textiles, etc.

Repulping

Process for treating dry pulp, paper, board, or paper for recycling with water in order to prepare a suspension of fibres.

Recycling

The mechanical reprocessing of Paper for Recycling in a paper and board mill as part of a production process into new products, materials, or substances.

Sorting

The dry segregation of discarded material into specified streams, either at the source or at a dedicated facility, in order to support effective and efficient recycling.

Specialised recycling mill

These mills treat a mix of special grades (group 5 of EN 643) and grades from other groups (1-4 from EN 643). Each recycling mill determines the optimal mix and adds one or more piece of dedicated equipment, such as a horizontal high consistency drum pulper, a separate batch pulper with longer pulping time, de-inking, fine cleaners, hot dispersion, special process and waste water systems. These specialised recycling mills can treat fibre-based packaging that has been coated with non-water soluble products such as wax, plastic film or other layers such as aluminium, polyester and polyethylene entering the recycling process in homogeneous lots. Some specialised recycling mills can also treat wet strength grades (labels).

In order to optimise the recycling process, fibre-based composite packaging, which cannot be handled in standard processes, should be delivered to specialised paper mills in EN 643 identified flows. As in standard mills, the result of the process is also very high quality fibrous material suspended in water ready for papermaking.

Standard recycling mill

Such mills typically produce high quality end-products based on EN 643 groups 1 to 4 . In large mills, repulping is done with drum pulpers or continuous vertical pulpers. Often such processes operate deflakers to separate fibre bundles into individual fibres, as well as coarse and fine screening and cleaners. The aim is to separate the fibre from the other material. The final result is fibrous material suspended in water ready for papermaking (=recycled pulp). This process is set out in Chapter 2 of 4evergreen's Circularity by Design Guideline.

Yield

In 4evergreen the yield in fibre-based packaging recycling is defined as the percentage of fibrous material recovered in the lab test procedure according to the formulas provided in the test and evaluation protocol (in parts I, II and III).

ABOUT 4EVERGREEN

[4evergreen](#) is a cross-industry alliance perfecting the circularity of fibre-based packaging to contribute to a climate-neutral and sustainable society. Our goal is to raise the overall recycling rate of fibre-based packaging to 90% by 2030. We bring a particular focus on packaging with a lower circularity performance today, namely the types used for household, out-of-home and on-the-go consumption.

The alliance brings together industry representatives from across the fibre-based packaging value-chain, from pulp, paper and board manufacturers and recyclers to packaging producers and converters, including brand owners, retailers and waste management companies. It also comprises non-fibre material suppliers (e.g., adhesives, inks, coatings), technology providers (e.g., machinery, collection, and recycling solutions), and leading research institutes.



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