

Pack it in paper | White Paper

Paper Closes the Loop



Koehler
PAPER

The world of packaging is facing a revolution.
The new EU Packaging and Packaging Waste Regulation is shining a spotlight on materials that actually get recycled.

This paper illustrates why barrier paper is superior to composite materials when it comes to recycling and describes the kinds of opportunities this entails for brands.

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01

Recycling: Illusion and Reality

In this day and age, you can hardly find any packaging without mentions of sustainability. “Recyclable”, “Circular”, “Environmentally friendly”. These labels are known to everyone, but they hide an ugly truth. In 2024, just under 30% of plastic waste was recycled in Europe, with an appalling 70% ending up in landfills, the environment, or incinerators – despite every single promise to the contrary. Arguably even worse: 60% of all plastic waste comes from packaging.



Paper Leads by Example

Paper shows that things can be different. For years now, more than 75% of used paper has been recycled in Europe, with the figure increasing to more than 80% in the case of packaging – the best result for any popular packaging material out there. No other material closes the loop as reliably as paper does, and a large part of that comes from the fact that it has the best existing and fully developed collection, sorting, and recycling infrastructure, bar none.

Simple. Effective.

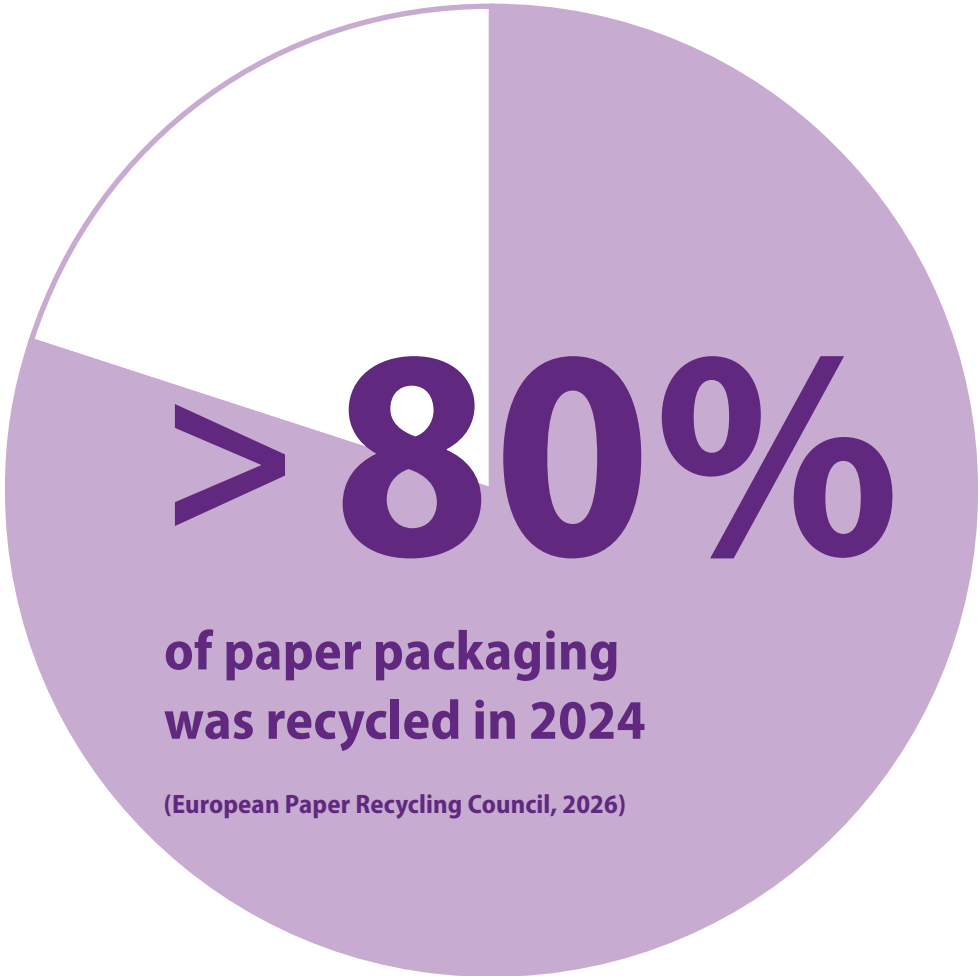
Barrier paper can replace plastic in many types of packaging. After being used, it can be thrown into exactly the same wastepaper bin as newspapers and shoe boxes, with the recycling process being exactly the same for all of them. This elegant simplicity – a single material, a single bin, a single process – is the crucial advantage behind paper packaging.

A Reality Check on Recycling Promises

< 30%

of plastic waste
was recycled in 2024

(Plastics Europe, 2026)



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A Storied Raw Material



Reuse has always been part and parcel of the way paper works. The ancient Egyptians, for example, would glue waste papyrus into layers in order to make funerary masks and sarcophagi with the resulting cartonnage. And much later, in 1774, jurist Justus Claproth would invent the first-ever process for removing printing ink from wastepaper in Göttingen, Germany.

From an Idea to a Recycling System

Around 200 years later, in the 70s and 80s, the concept of recycling started making serious headway as it found purchase with people in Europe and North America. Collection systems for wastepaper and glass waste soon followed, with Germany playing a pioneering role in Europe. Today, decades of investments in sorting systems,

material flow networks, and processing technology are paying off: In Europe, paper fibers are recycled an average of 4.8 times. Moreover, the latest research shows that they can be recycled up to 25 times without any loss in quality (TU Darmstadt, 2020).

Plastic Remains a Laggard

The industrial sector used enormous amounts of plastic after World War II, so it took longer for recycling methods to arise. The first approach was to incinerate plastic to recover part of the energy released during the process. Then, in 1990, Germany would start its Der Grüne Punkt scheme. However, even though mechanical recycling increased, the complexity involved remained high: Even today, polyethylene, polypropylene, polystyrene, and polyethylene terephthalate all have to be separated from each other during sorting in order to be able to produce high-quality recycled plastics. And pigments and plasticizers make the process even more difficult. Ultimately, every single thing that is found in the plastic melt will remain there and accumulate. Not to mention that with every single recycling loop, the molecular chains in plastic get shorter, leading to a drop in quality.

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Paper Recycling – Something New From Something Old

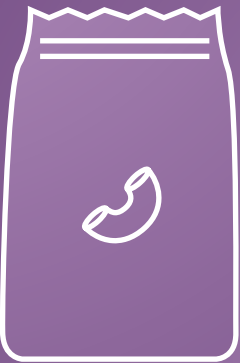
There are already well-established structures for collecting and sorting wastepaper, and the recycling process for the material has long been solid: Collected and sorted paper is mixed with hot water in a pulper until it breaks down and the fibers are separated from each other. The resulting pulp slurry then passes through a coarse screen that retains contaminants larger than 5 millimeters, with examples including staples, string, and the plastic portion of composite packaging. After this, various screens and filters are used to retain stickies and coating residue. Then, for bright or white recycled paper, a deinking stage is used

to remove printing ink from the pulp slurry with the use of surfactants. In this stage, a foam that forms floats to the top together with the color pigments, where they are skimmed off. Finally, a refiner is used to separate the cleaned fibers further and prepare them so that they can be made into new paper with a paper machine.

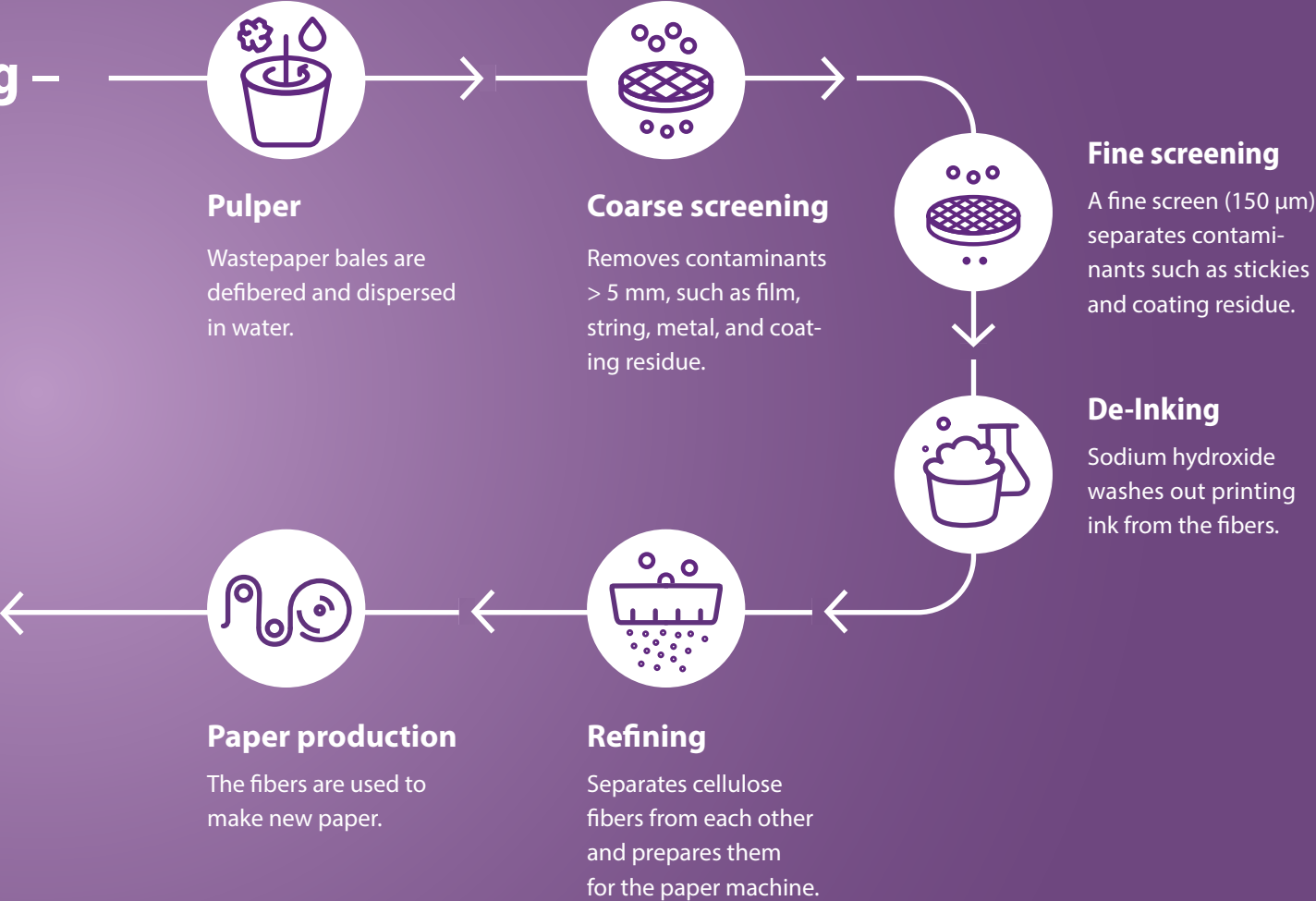


Conserving Fibers and Water

The entire recycling process is designed to prevent damage to valuable cellulose fibers and recover as many of them as possible. These fibers are then used to make tomorrow's newspaper, paper towel rolls, toilet paper, and much more. In addition, the water used for the process is extensively purified and fed back into the loop multiple times. As for screened coarse and fine rejects, only a small part of them can be reused, with the rest being incinerated for energy recovery purposes.



Paper Recycling – Step by Step



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How Barrier Paper Works

When making flexible packaging paper, high-grade cellulose fibers are mixed with fillers and plenty of water. At the paper machine, this slurry mixture flows through a screen that drains it of water and dries the resulting paper web. However, this raw paper would let moisture and grease through without further treatment, making it unsuitable for packaging. In order to address this, the paper is coated with a polymer dispersion in which tiny plastic particles are finely distributed in water. This water then evaporates, causing the polymers to settle on the paper fibers so that these polymers act as a barrier from within the paper itself. The specific type of barrier varies depending on the type of polymer, with possibilities including barriers against oxygen, water vapor, mineral oil, or grease.

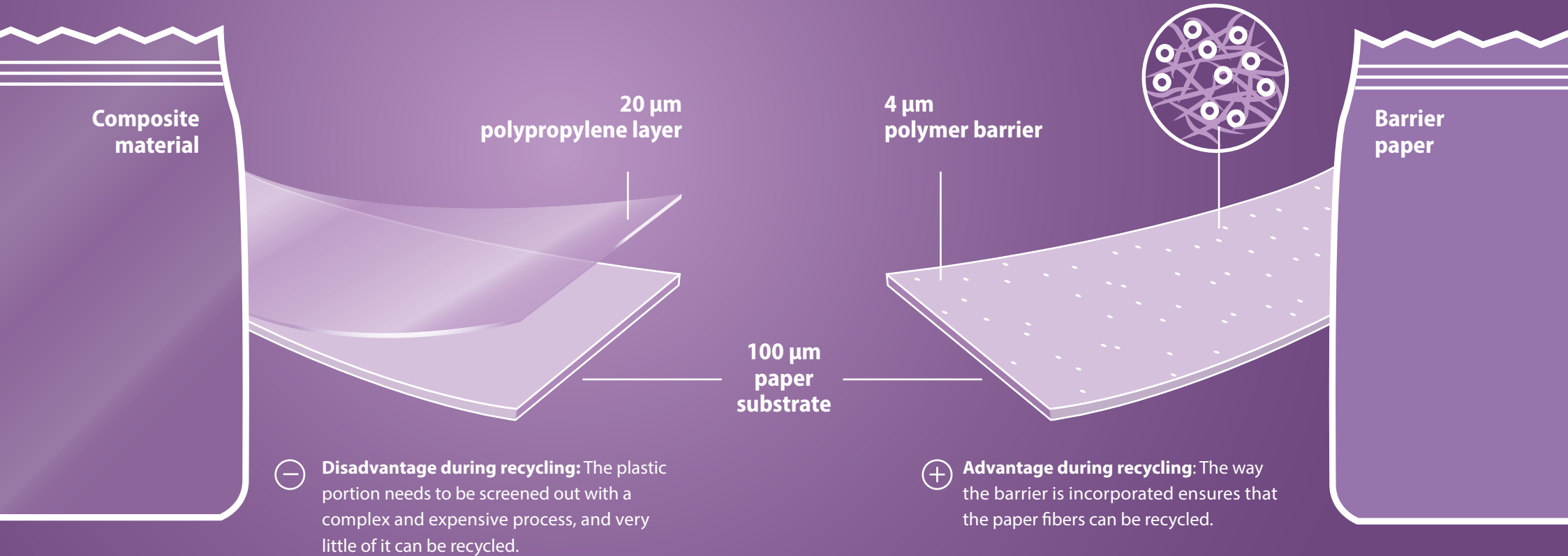


Paper Remains Paper

This technology provides invaluable advantages when it comes to recycling later on. Since the barrier materials are part of the paper itself, the latter can simply be broken down into its constituent fibers, with the polymers being fully compatible with the process.

In contrast, conventional coated paper is produced by applying a plastic film to paper, resulting in a composite material that is much harder to recycle efficiently. More specifically, the plastic portion needs to be removed with a complex and expensive process, not to mention that it is poorly suited to any sort of recycling.

A Comparison Between Composite Materials and Barrier Paper



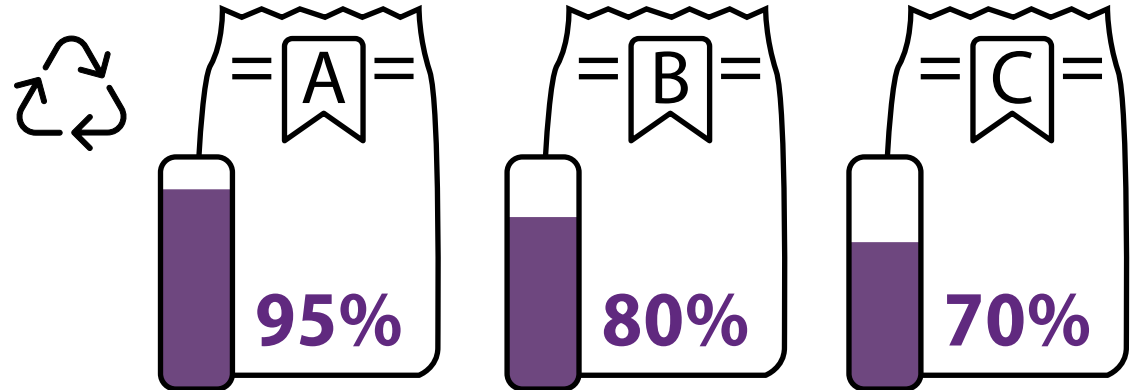
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Screening for Proof

Starting in 2030, all packaging placed on the market in the EU must be verifiably recyclable in line with the Packaging and Packaging Waste Regulation (PPWR).

The plan is for packaging to be subdivided into three grades (A, B, and C) based on whether it is recyclable by at least 70%, 80%, or 95% – the final values are expected to be published in 2028 at the earliest. Starting in 2035, only grades A and B will continue to be allowed.

The Confederation of European Paper Industries has developed a test method that reproduces the most important steps in paper recycling. We use this method to test how well Koehler products can be recycled using the standard wastepaper process – including in comparison to conventional coated paper.



We tested two packages for 500 g of noodles:

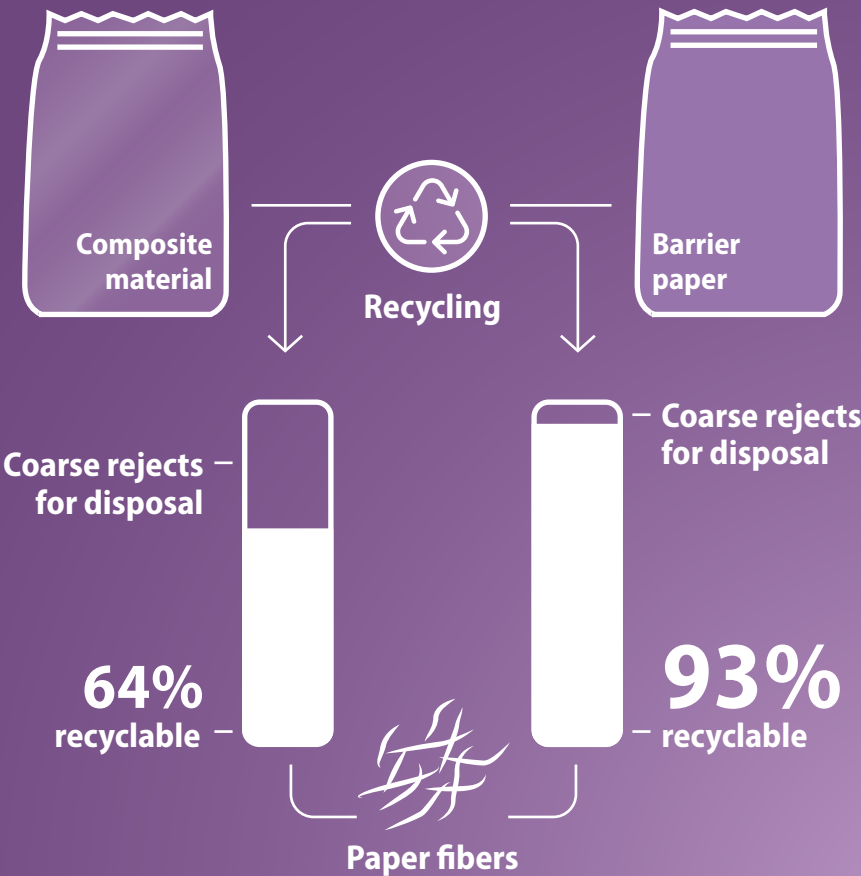
- Composite material consisting of 60 gsm kraft paper coated with 27 gsm polypropylene film
- Koehler NexPlus® Seal Pure, 80 gsm, of which 4 gsm are the polymer coating



Barrier Paper Is Recyclable

The test result: When going through the coarse screen, 36% of the materials used in the composite material were rejected and had to be disposed of. Compare that to Koehler NexPlus® Seal Pure, where the amount was just under 7% instead. This means that in a conventional recycling plant, our flexible packaging paper delivers a recycling yield of up to 93%. Accordingly, we expect it to have a PPWR recycling grade of B, so that it will continue to be possible to use it under the stringent requirements scheduled to take effect in 2035.

The Victor: Barrier Paper

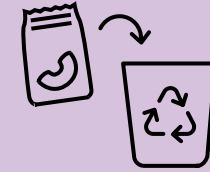


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Mono-Materials Beat Composites

Barrier paper and composite materials are both intended for the same purpose: Protecting products from moisture, oxygen, and/or the loss of aroma. However, the difference is thrown into stark relief when considering recycling:

	Barrier paper	Composite material
Sorting	Easy (wastepaper)	Difficult (mixed waste)
Actual recycling rate	High	Low
Barrier function	Yes	Yes
Mono-material	Yes	No



Flexible packaging paper is characterized by material efficiency and is optimal for recycling:

- Since consumers recognize it unambiguously and dispose of it as wastepaper.
- Since it is easy to sort in wastepaper streams.
- Since it can be used to make high-quality recycled paper.

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What the New Packaging Regulation Means for Brands

The PPWR sets new standards. It classifies packaging, bans certain chemicals, and requires manufacturers to use circular materials.

Starting in 2035: Only Actual Results Will Count

While the initial segment of this transition will accommodate packaging that is recyclable in theory, actual results will be the only thing that matters starting in 2035: At that point, the recycling infrastructure in place must actually recycle the material in question. If it does not, that material will no longer be allowed to be placed on the market.



Plastics in Crisis

This change is already disrupting markets: The recycling rate for plastic, which was already low to begin with, has stagnated. In fact, 2024 saw less plastic waste being recycled than the preceding year (and more being exported). In addition, a record number of plastic recycling plants have shuttered (Plastics Recyclers Europe). Rob Ingram, President of Plastics Europe, warns: "It is deeply concerning that, just when Europe should be accelerating the transition to a circular economy, we see a dramatic slowdown."

Choosing Paper Now Is the Safe Bet for Tomorrow

Barrier paper meets both PPWR requirements. It is recyclable, and the systems and plants required for recycling have been around for decades at this point. In addition, demand for waste-paper is high. For brands, this means that switching over to barrier paper today is a safe bet on tried-and-true processes. In contrast, plastics and composite packaging will undoubtedly become a regulatory risk by 2035 at the very latest.

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Checklist for Brand Managers



Does everyone involved understand the technical differences between barrier paper and composite materials?

Not every converter or packaging company is familiar with the details of the aforementioned recyclability test method or PPWR grades – a knowledge gap that can lead to the wrong decision when it comes to choosing materials.



Will I even be able to continue using my composite material starting in 2030?

A recycling code may suggest that paper recycling is a viable option for your composite material, but actual testing shows that composite materials often have a recyclability rate of less than 70% when the applicable test method is used. That is far below the rate needed for actual circularity, and will no longer be allowed starting in 2030.



Do I actually need a composite material?

Flexible packaging paper with polymer-based barriers provides protection against oxygen, grease, moisture, mineral oils, and aroma loss – with zero plastic composites, so that it is highly recyclable. Dry and greasy foods, candy, confections, tea, and drugstore products can usually be packed in barrier paper without issue.



How high are my EPR fees – now and in the future?

Extended producer responsibility fees for flexible packaging paper are significantly lower than those for composite packaging in many countries, since barrier paper is more recyclable.



Does the finance department know that EPR costs can be lowered with barrier paper?

EPR fees are often considered a fixed cost, rather than a variable that can be controlled. Fees can be lowered by choosing the right packaging material – a consideration that is frequently overlooked in budget discussions.



How much of my packaging is affected by the PPWR?

Not every piece of packaging in your portfolio will be affected with the same urgency. Prioritizing things by volume, material, and risk can help plan for the switch properly.



What kind of hit will my brand take if we stick to plastic?

Not making the switch now may end up with you looking like a Johnny-come-lately sooner than expected. If one of your competitors gets a recyclable, PPWR-compliant alternative established on the market, your composite packaging may quickly become a PR and regulatory liability.



Make the switch and talk about it!

Switching to barrier paper is not just a technical opportunity – it is also a way to enhance your brand image. Packaging that is verifiably recycled represents a clear signal for your customer base – and a powerful argument for listing negotiations.



360° Koehler Service

We clear the way for your sustainable packaging solution and advise from start to finish – from initial analysis through to market readiness. Get in touch with us and we'll be happy to advise you!

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Contact

**Do you want to find out how
paper packaging can strengthen
your brand?**

**Then get in touch with us.
Together we can develop
the solutions that will match
your product.**

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