

# Spotlight on packaging: The future is circular, linear belongs to the past



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# Recycled materials: the order of the day.

Regulators, NGOs, and consumers are unanimously calling for more sustainability, more circular economy, and more use of recycled materials. This requires a change of era. Burning and burying valuable secondary raw materials must become a thing of the past. "Out of sight, out of mind" is not a strategy and not a solution – neither ecologically nor economically.

#### **Regulatory requirements**

The EU Commission has made the circular economy a top priority, especially since the "Green Deal" was approved. This is clearly stated in the proposal for the new Packaging and Packaging Waste Regulation (PPWR) presented by the EU Commission at the end of 2022:

> "Packaging is necessary to protect and to transport goods. (...) Packaging is also a key environmental concern. It is one of the main users of virgin materials (40 % of plastics and 50 % of paper used in the EU is destined for packaging) and accounts for 36 % of municipal solid waste."<sup>1</sup>

1 Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on packaging and packaging waste 2022, S. 1 f.



There are various regulations that are key drivers for sustainability and the circular economy.

#### Brands' sense of urgency

In response to regulations and consumer demands, brands and retailers have set ambitious targets for the sustainable performance of their products, processes, and packaging. The level of voluntary commitment is remarkable.

- "100 percent of Henkel packaging is to be recyclable or reusable by 2025."<sup>2</sup>
- "95 percent of our packaging will be recyclable by 2025 - we are working at full speed on the rest until no more **Nestlé** packaging ends up in the environment."<sup>3</sup>
- "Globally, P&G aims for all our packaging to be recyclable or reusable by 2030. In Europe, we are setting even more ambitious targets: By 2025, all our main packaging platforms will be recyclable. This includes around 95 percent of all packaging materials."<sup>4</sup>

#### Consumers are putting their foot down

Sustainability has become a major topic for consumers. According to a study conducted by Simon-Kucher & Partner in 2021, product packaging is important in this area: 73 percent of consumers attach importance to sustainable packaging. 83 percent are even willing to pay more for it, 6.5 percent on average. From the consumer's point of view, however, only paper, cardboard, and glass are sustainable. Among all packaging materials, 70 percent of consumers consider paper, cardboard, and cartonboard to be the most sustainable materials by a wide margin.

<sup>&</sup>lt;sup>2</sup> https://www.henkel.de/presse-und-medien/presseinformationen-und-pressemappen/2021-03-04-starke-erfolgsbilanz-und-ambitionierte-nachhaltigkeitsziele-fu-

er-2025-1156090

<sup>&</sup>lt;sup>3</sup> https://www.nestle.de/storys/plastikverpackungen

<sup>&</sup>lt;sup>4</sup> https://pgnewsroom.de/pressemeldungen/pressemitteilung-details/2019/Verpackungsvermeidung-und-Steigerung-des-Rezyklateinsatzes-Procter--Gamble-halbiert-den-

Einsatz-von-Neu-Plastik-bis-2030-und-spart-damit-dann-ber-300.000-Tonnen-pro-Jahr-ein/default.aspx-pro-Jahr-ein/default.

### 01 — WEIG Intro

#### **Closing the loop**

Packaging made of paper, cardboard, and cartonboard is perfect when it comes to sustainability and the circular economy. They use raw materials from renewable sources and can also be easily recycled.

In 2021, an empirical recycling study conducted by the Technical University of Graz made a clear statement in this regard using the example of folding boxes:

"In general, the fibrous material itself allows recycling for more than 25 cycles without any problems. The present study does not show any limiting trend."<sup>5</sup>

\*Translated from German

This potential has to be taken advantage of. The goal must be to keep as many fibres as possible in the cycle via the recovered paper stream.

#### The crux

Currently, in Germany, only packaging with a fibre content of at least 95 percent may enter the recovered paper cycle. This regulation is also included in the EU Commission's proposal for the Packaging and Packaging Waste Directive. As a result, the fibres of packaging that is not disposed of via the recovered paper cycle are very likely to be lost for material reuse. Yet, using existing technologies and recycling streams, they could easily be preserved and

put back into circulation – even if the packaging is coated or laminated. And even if the fibre content is far below 95 percent.



5 Über die Rezyklierbarkeit von Faltschachtelkarton, Technische Universität Graz, 2021

# Recyclates the fuel of the circular economy

See you again and again. Sustainability focuses on the cycle of materials. The material recycling of used packaging and the return of the recyclate for the manufacture of new products are examples for climate and environmental protection. The use of valuable secondary raw materials conserves resources, reduces the ecological footprint, and makes a decisive contribution to security of supply. If, in addition, the primary material comes from renewable sources, you have done everything right from start to finish.

In addition to the material used, a key criterion in measuring the sustainability of packaging is whether and how quickly there is a reduction in material quality during recycling. The more often packaging can be recycled, the greater its contribution to the climate, the environment, and the conservation of primary resources.

#### 25 times and no end in sight

Fibre-based packaging materials can be excellently recycled. Despite popular belief, the number of possible recycling cycles is virtually unlimited. The above-mentioned recycling study by the Technical University of Graz states: "According to the results, folding boxes represent a highly sustainable packaging solution that can be recycled seemingly any number of times, with the number of recycling cycles limited mainly by the recovered paper collection rate and losses during cleaning of the fibre material."

#### The reality speaks volumes

Only practice can be truly green. Theory remains grey. Anything that is theoretically recyclable, but in the end – for whatever reason – is disposed of in landfills or burned, has failed to achieve its goal. According to the Statistical Office of the European Union (Eurostat)<sup>6</sup> 81.6 percent of paper, cardboard and cartonboard packaging in the EU was recycled in 2020. Thus, fibre-based packaging has by far the highest recycling rates of all packaging materials. It is followed by glass (76 percent), metal (75.5 percent) and plastic (37.7 percent).

 $<sup>^{6}\</sup> https://ec.europa.eu/eurostat/databrowser/view/TEN00063/default/table?lang=de&category=env.env\_was.env$ 

### 02 — WEIG Recyclates

#### **Good grades**

The quality of the recyclate obtained is an important aspect in balancing a sustainable, circular economy. In the case of fibrous materials, the calculation works. A study conducted by the Papiertechnische Stiftung (PTS) in 2020 confirms this: "For all folding box samples examined, it was shown that the fibre component can be completely recycled. (...) The quality of the recovered pulp (recyclate) showed no restriction with regard to mechanical recycling via the recovered paper household collection material stream."

#### An advantage from the beginning

The sustainability advantages of fibre-based materials do not only become apparent during recycling. According to the study "Carbon Footprint of Carton Packaging 2023"<sup>7</sup>, even before material recycling, cartonboard has the lowest fossil "cradle to grave" footprint with 249 kg CO2e per ton of processable material. The corresponding footprint of PET granules is 3,093 kg CO2e, and for PP and HDPE it is 2,110 kg CO2e.

Nevertheless, without an appropriate infrastructure for collection, sorting, and recycling, even the highest recyclability is an empty promise.



# Flow patterns: The current state of packaging recycling

Packaging is only a secondary raw material if it is returned to the cycle after use and then is recycled. Functioning recycling streams are a crucial prerequisite for this.

Looking at the situation in Europe, it shows a large gap between the streams of the different packaging materials. What is clear, however, is that no recycling stream is as established throughout Europe as that of paper, cardboard and cartonboard.

#### Where it flows - and where it only drips

The reality of recycling streams in Europe is reflected accordingly in the recycling rates for the different packaging materials. Here, too, fibre is the number one.

#### Where the best costs the least

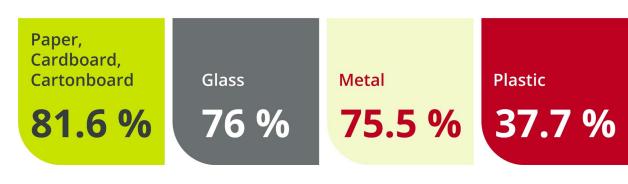
Used packaging is a secondary raw material. However, the process to recover it is not free. In addition to costs for collection, transport, sorting, and recycling, there are also social and environmental follow-up costs.

#### Brands are asked to pay

In Germany, for example, the distributors of packaging pay a license fee. The amount of the fee is not only based on the weight of

## Material recycling rates in Europe (2020)<sup>8</sup>

according to the Statistical Office of the European Union (Eurostat) for 2020



the packaging. Other relevant factors are the material used and the ecological quality of the packaging. Therefore, it is no coincidence that the disposal costs for packaging made of fibre-based material are significantly lower than those for plastic packaging, provided that the fibre packaging may be disposed of via the recovered paper stream.

#### **Consumers want offers, not tasks**

Packaging can only be recycled if the consumer is allowed to give it to the right stream. This means, complexity must be reduced and disposal made as simple as possible for consumers. Studies show that consumers want clear instructions. Certificates and seals

In Germany, for example, distributors must pay a license fee of 171 euros per ton of paper, cardboard or cartonboard for disposal via Duales System Deutschland GmbH (DSD). For plastic packaging, on the other hand, the costs are more than four times as high, at 799 euros per ton.<sup>9</sup> are also relevant. According to the above-mentioned study by Simon-Kucher (2021), for example, only eleven percent of German consumers currently feel well informed.

The domestic dis-

#### Extra charge for plastic

In order to speed up efforts to move away from plastic, the EU has also decided to introduce a so-called plastic tax as part of its Green Deal. The tax is to be 0.80 euros per kilogram of non-recycled plastic packaging waste generated in the respective member state. The plastic tax will be implemented differently by the member states within the framework of their respective national laws. In Germany, it will be imposed on to those who place the packaging on the market. posal of used packaging must not be allowed to become an investigative task. That is why (at least) uniform symbols are needed throughout Europe that clearly specify the correct recycling stream.



The variety of logos, e. g. for plastics, is not very helpful for the end consumers.<sup>10</sup>

<sup>9</sup> https://www.verpackgo.com/de/license-calculator/

<sup>10</sup> https://packhelp.de/recycling-zeichen/

Clear communication instead of disposal "Cluedo", then consumers are ready to play their part. Packaging industry, brands, retailers, and regulators should work together to make it possible for them.

#### New EU regulation on the way

This basic idea is now also followed by the European Commission. In the "Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on packaging and packaging waste" it is stated as follows:

Article 11 (of Chapter III Labelling, marking and information requirements) requires that packaging is marked with a label containing information on its material composition in order to facilitate consumer sorting. The same labels shall be placed on waste receptacles for the consumer to easily identify the appropriate disposal route (Article 12). (...) Commission shall be empowered to, by implementing acts, establish harmonised labelling requirements and formats for packaging and waste receptacles.



# Mono-material is king! Is it?

Packaging made entirely from a single packaging material – e.g. plastic packaging made from a single type of plastic – is the best solution in many cases. Therefore, mono-material packaging made of fibres is currently in fashion. However, the functionality and thus the range of applications of packaging made from mono-material is limited. This gap is filled by composite packaging that combines different materials. There is little to be said against it – if the composite can be recycled well in the end. This is the crux of the matter.

### **Trend I: Paper**

The turn to paper, in particular as a substitute for plastic, has remained a strong trend in 2022. An end to this "paperization" is not in sight. No wonder, when it comes to the many advantages of fibre-based packaging materials. They come from renewable sources. They have a well-developed and functioning recycling stream. They recycle well and provide a high-quality recyclate. Moreover, they are the preferred packaging material among consumers. The Simon-Kucher (2021) study mentioned earlier shows paper, cardboard, and cartonboard as consumers' packaging material favourites with 72 percent and by a large margin.

#### **Trend II: Mono-material**

Mono-material solutions are on a roll. They fit well into the circular economy because, as the name implies, they are made of 100 percent paper, glass, metal, or a single type of plastic (PE, PP, etc.), respectively. As a result, monomaterials reduce complexity and are easier to recycle. After all, what has not first been joined together does not have to be separated again. The disadvantage of Experts from paper manufacturer UPM-Kymmene Oyj estimate that up to 4.7 million primary food packaging items could be used annually by 2040. Compared to Euromonitor data, this is about twice the current volume. Industry experts surveyed in Euromonitor's Sustainable Food Packaging report believe that up to 40 percent of this packaging could be made of fibre.<sup>11</sup>

mono-material solutions: They usually do not offer the same range of functions as composite packaging. This is particularly true in terms of functional barriers.

#### **Trend III: Composites**

Composites were developed because the combination of thin layers of different materials provides increased functionality while at the same time reducing material consumption and weight.

#### **Crux of the matter: Barrier**

The barrier effect is of particular importance, especially in the food sector. For example, the barrier protects the food against undesirable external influences that can lead to a reduction in quality or spoilage.

Depending on the packaged good, barriers are required to protect against oxygen, light, moisture, or other undesirable substances that may occur during the packaged good's journey from production to the consumer's table.

Barrier functions are in many cases without alternative – facing loss and waste of food and related resources as well as health risks for consumers.

#### **Eliminating plastic and convenience**

In the food sector in particular, plastic packaging is increasingly being replaced by barrier composite packaging based on paper, cardboard, and cartonboard. In this way, it is making an important contribution to reducing the use of plastic – and is thus meeting the needs of the time.

There are also other reasons for the popularity of fibre-based composites among retailers, brands, and consumers. In addition to the advantages regarding the sustainability of materials, they also offer a great deal of convenience and can be used in an extremely wide range of applications.

#### Politics has its own opinion

In theory, fibre-based composites combine the best of many worlds: Functionality, sustainability, and convenience. However, national and European regulators are focusing on a different aspect: for the recycling of composites, the different layers must first be separated before they can be processed into unmixed recyclate. This applies to both multilayer plastic packaging and paper-based composites. In the eyes of the political decision-makers, this is a decisive disadvantage favouring mono-materials.

#### GVM–STUDY "MARKET VOLUME AND POTENTIAL OF PAPER COMPOSITES IN GERMANY"<sup>72</sup>:

- In 2020, 271 kt of packaging made of paper composites with a paper content of less than 95 % was consumed in private end use in Germany. Liquid packaging cartonboard not included.
- We predict that 60.9 kt of plastic packaging will be substituted by paper-based composites by 2025. This is 3.8 % of the relevant market volume.
- The market for paper composites will increase by 31.6 % by 2025 at the cost of plastic packaging. This corresponds to an annual growth rate of 5.7 % (CAGR).
- We assume that the technically and economically possible substitution potential of plastic packaging by paper composites is about 7 times larger (~400 kt) than the amount that will actually be replaced by 2025.

The Zentrale Stelle Verpackungsregister (Central Agency Packaging Register – ZSVR), for example, mentions in its report "Trendwende erreicht - Jahresbericht zur Transparenz beim Verpackungsrecycling" from November 2020: "Poorly recyclable composite packaging made of paper and plastic is increasing disproportionately. At best, these can only be partially recycled. In order to prevent a composite classification, the cardboard / paper content is increased in some cases, to the detriment of prevention. Recyclable packaging alternatives made of mono-materials are clearly preferable from an ecological point of view."

#### No more generalizing

The discussion about composites and monomaterials is too often characterized by blackand-white thinking. This includes the fact that different types of packaging with very different recyclability are subsumed under the term "composite". A beverage carton and a folding box board, for example, differ considerably as far as the possibilities and realities of recycling are concerned. It has been proven that folding boxes do not belong to the "poorly recyclable composite packaging" mentioned by the ZSVR.<sup>13</sup> For example, the study by the Papiertechnische Stiftung (PTS) mentioned above, proves that "folding box boards can be recycled as part of the recovered paper household collection. For all folding box samples examined, it was shown that the fibre component is completely recyclable. As expected, the fibre yield is only reduced by the proportion of non-paper product components. The quality of the recovered pulp (recyclate) showed no restriction with regard to mechanical recycling via the recovered paper stream."

And the German Gesellschaft für Verpackungsmarktforschung (Society for Packaging Market Research – GVM) states in its 2021 study "Substitution von Kunststoffverpackungen durch papierbasierte Verbunde" (Substitution of plastic packaging by paper-based composites): "The paper composites that will replace plastic packaging by 2025 are basically well recyclable."

<sup>&</sup>lt;sup>12</sup> GVM-Studie "Substitution von Kunststoffverpackungen durch papierbasierte Verbunde" im Auftrag des IK, März 2021 <sup>13</sup> https://www.getraenkekarton.de/recyclingquote-getraenkekartons-2020/

## Chance or obstacle?

The regulatory activities of national policymakers and the EU Commission in Brussels have shown clear preferences for a circular economy of packaging, and not just since the Green Deal of 2019.

#### Wrong limits for composite packaging

The draft of the new regulation "Rules on the calculation of the attainment of the recycling targets" states the following with regard to composite packaging:

cifically, this means: Packaging that consists of 94.9 percent paper can not be disposed of as waste paper. It must be regarded as a composite – with the negative consequence that in Germany, for example, it be disposed of in the "yellow bag" for plastic recycling and

thus tends to be withdrawn from the fibre cycle.

"Composite packaging and other packaging composed of more than one material shall be calculated and reported per material contained in the packaging. Member States may derogate from this requirement where a given material constitutes an insignificant part of the packaging unit, and in no case more than 5 % of the total mass of the packaging unit." However, this means the loss of valuable (fibre) raw materials that could be used to make new packaging at least 25 times. The stipulation of a maximum proportion of 5 % non-fibre materials leads more or less directly to thermal recycling. Yet there is a different and better way. From technology and know-how to infrastructure and recyclate quality

In this way, the EU Commission sets a fixed limit and adopts the threshold which has already been established in Germany by the Central Packaging Register Office. More speto demand and consumer wishes, everything is in place to recycle more fibre-based composites via the recovered paper cycle and to recover the valuable fibres.

# No second chance for a wrong design

The path of a packaging is decided at the very beginning of its development. Will it become a cycle? Or do values become waste? Design for recycling requires that packaging is designed for material recycling right from the start. This can only succeed through the cooperation of all partners in the value chain.

#### **Design for Recycling in the PPWR**

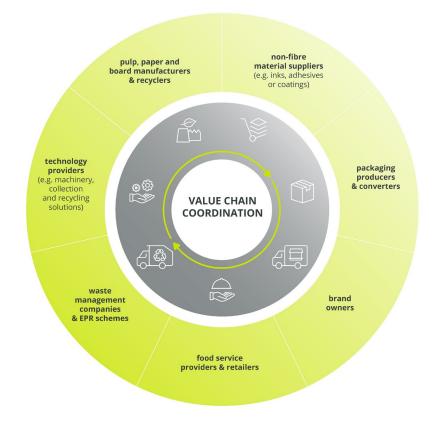
The new directive makes the right design of packaging a central issue since it plays a fundamental role in the circular economy. For example, it states:

> "In order to prevent barriers to the internal market and provide industry with a level playing field, and with the objective to promote the sustainability of packaging, it is important to set mandatory requirements regarding the recyclability of packaging, by harmonising the criteria and the methodology for assessing packaging recyclability based on a design for recycling methodology at the Union level."<sup>14</sup>

## 06 — WEIG Design for Recycling

#### VALUE CHAIN

Together, we can adopt a holistic approach and look at the full life cycle of fibre-based packaging.<sup>15</sup>



In order to meet all the demands placed on packaging, it requires the work and know-how of the entire value chain. One example of this teamwork is the 4evergreen initiative. The cross-value chain alliance promotes synergies between companies working on low-carbon and fibre-based recycled packaging.

Paper and cartonboard manufacturers, packaging producers, food brands, retailers, technology and material suppliers, recycling companies, research institutes, and technical universities are all involved in 4evergreen. Based on the realities of recycling streams, technical and technological possibilities, recyclate quality, and consumer demands and behaviours, the members of 4evergreen have developed a recommendation for a design guideline for recyclable fibre-based packaging. The guideline covers all packaging that consists of at least 50 percent fibre-based material.

## 06 — WEIG Design for Recycling

According to 4evergreen and thus representatives of the entire value chain, packaging with a fibre content of 50 percent or more should be placed in the recovered paper cycle after use. This is because fibres make up the majority of the material in this packaging. Accordingly, this is also where the greatest potential for secondary raw materials can be found.



Guideline for Fibre-Based Packaging 16

"A minimum of 50 % paper content is needed to be considered or classified as "fibre-based packaging"."<sup>17</sup>



# Clear consumer vote and a clear mission

Studies and surveys unanimously confirm the growing importance of sustainability in consumers' purchasing decisions. This is especially true for packaging. They are the first – and often the only – sustainability ambassador at the "moment of truth". Packaging that is not convincing often does not receive a second chance.

The conclusion of the Simon-Kucher & Partner study from 2021 on the importance of sustainable product packaging and consumer preferences states: "The importance of sustainability in the purchasing process will continue to increase. Already today, half of consumers name sustainability as one of the most important value drivers. Consumers' expectations of sustainability are rising. Sustainability will become the norm in the future, no longer the exception. Accordingly, companies need to rethink and make it a central part of their value proposition."

#### Both logic and gut feeling say "yes" to cartonboard

It is no surprise that many packaging materials therefore imitate the look and feel of paper, cardboard and cartonboard. After all, fibrous materials are by far the most favoured and the German Gesellschaft für Verpackungsmarktmost sustainable among consumers.

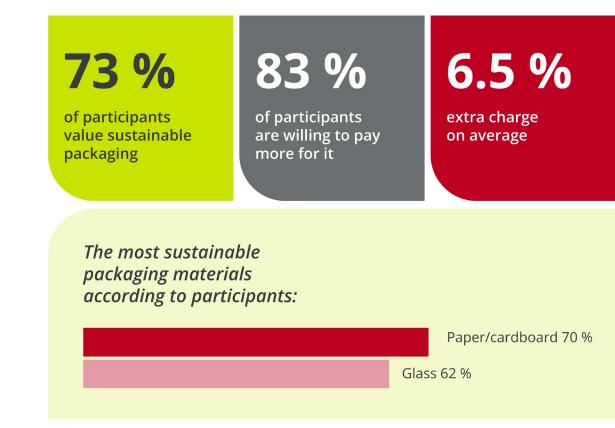
However, greenwashing by imitation is not a solution. And the pretence of false facts does not last long. So, it's better to go for the sustainable original. Especially since cartonboard not only provides the best in terms of sustainability, but also in terms of functionality and convenience.

#### **Right instinct for disposal**

There is no recycling cycle that has been established for longer and enjoys greater trust than that of paper, cardboard and cartonboard. Consumers instinctively act correctly when disposing of emptied packaging. Paper, cardboard and cartonboard end up in the collection bins for recovered paper as a matter of course.

According to a study conducted by the forschung (Society for Packaging Market

## Conclusion of the 2021 study by Simon-Kucher & Partner<sup>18</sup>



Research – GVM) as part of the 2021 study "Substitution von Kunststoffverpackungen durch papierbasierte Verbunde" (Substitution of plastic packaging by paper-based composites), "composite packaging with a high fibre content also ends up for the most part in the recovered paper recycling stream".

#### Upcycling: From 95/5 to 85/15

Consumers want more. And the industry can deliver. There is no good reason to demand a minimum ratio of 95 percent fibre content for recovered paper recycling. A ratio of 80/20 or 85/15 is already no problem today. On the contrary, it is an opportunity for sustainability. After all, where 100 percent would normally be burned, we save 80 or 85 percent for the recyclable materials cycle.

# From the beginning to a new start: Everything in one hand!

Recycle or dispose? Secondary raw material or waste? The success of sustainability and the circular economy is decided in practice. At WEIG, we know what we are talking about because we implement it successfully. From the beginning to a new beginning, for the environment, consumers, and especially for our customers.

#### Triple expertise: we close the loop

Our major advantage is that we cover all relevant areas of the value chain through our business units.

- We are a recycling company for recovered paper and other secondary raw materials (WEIG-Recycling).
- We produce recycled cartonboard (WEIG-Karton).
- We develop and produce folding boxes (WEIG-Packaging).

#### Integrated value added

Thanks to WEIG's technical and technological expertise as well as our knowledge and insights into all stages of the value chain, we can optimally support our customers - from disposers and processors to brands and retailers - in ensuring their sustainability in

#### **WEIG-Recycling**

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Paper recycling has been part of WEIG from the very beginning – as part of an integrated added value with a focus on sustainability and circular economy. As a recycling company, we secure the recovered paper quantities and qualities required for WEIG-Karton.

- Annual recovered paper turnover of approx. 900,000 t through own collection and trade
- Own collection systems, own fleet, own employees
- Disposal of households, trade, commerce, industry, and administrative bodies
- High market penetration through own locations and Europe-wide networking
  - Certified recycling company with over 50 years of expertise

#### **WEIG-Karton**

Recycled cartonboard is not only our business, but also our passion. We produce folding box board for the European market on the basis of recovered paper.

- Our products set standards and are preferred semi-finished products for further processing.
- As a major supplier, we serve multinational corporations and regionally based customers.
- Our product development is the result of close teamwork with our customers.
- Our sustainable production is characterized by high resource efficiency.

#### **WEIG-Packaging**

We offer top-quality folding boxes with knowhow from the entire value chain – for the food and non-food sectors. Our customers include well-known brand owners and manufacturers of private labels. In doing so, we incorporate the know-how and expertise of the Group. By this, we enable flexibility and process reliability for our customers.

- Highly refined packaging for optimum sales support
- Customized product development for the necessary difference at the point-of-sale
- Optionally non-glued blanks or complete folding boxes depending on the packing process
- Services beyond the mere packaging offer

#### AT THE CORE

Circular economy is our main topic. We:

- use raw materials from sustainable sources,
- · assume product responsibility as recycling company,
- use recyclates from regional recovered paper streams including coated or laminated packaging,
- use the rejects to generate energy for the recycling process and
- produce fibre-based packaging materials and folding boxes that can be recycled at least 25 times.

Our holistic approach and expertise make us experts in the entire value chain. We know the theory and we master the practice in all three stages. With us, the loop closes.



#### **EDITOR**

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