DEEP DIVE:

FUTURE-PROOF YOUR PACKAGING

Design for circularity and recyclable packaging solutions

HOLMEN IGGESUND

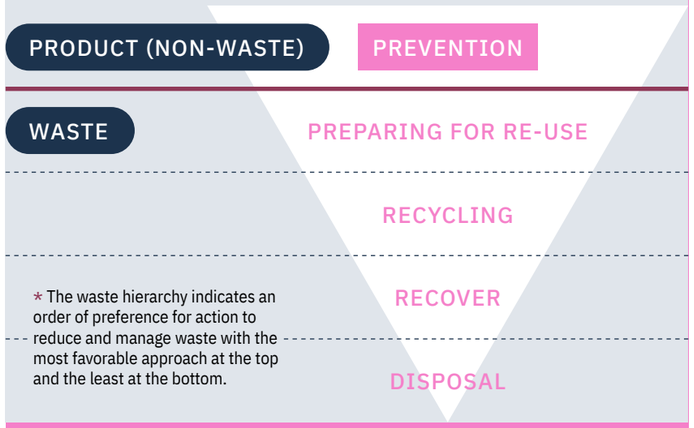
DESIGN FOR CIRCULARITY

The idea of materials in a circular loop is quite simple: valuable raw materials should be processed to create new materials when a product reaches the end of its life. The best scenario would be that products are designed to last longer or to be reused. With this deep dive we want to give you a brief understanding of how paperboard contributes to circularity and how you can design your packaging with recyclability in mind.

When it comes to packaging, however, circularity focuses largely on recyclability, reusability and compostability of the materials used. Whilst some materials may be difficult to recycle, unless we include downcycling, there is a lot happening right now to improve recyclability. In the next couple of years we will see many innovations in new technology and materials, as well as the introduction of new policies and regulations. We will probably also see more joint efforts, since we must apply system approaches and work together in the value chain to improve circularity and recycling. Countries lacking infrastructure will need to invest in collection, sorting and recycling capacity.

From the brand and retail side we have seen several initiatives recently that are mostly focused on improved recycling for plastic packaging. There is a general view that plastic is the area to focus on as only 14 per cent of all the plastics globally are collected and only 2 per cent are in closed-loop recycling (same or similar application). Unilever, for example, has committed to reducing its non-recyclable plastic packaging with 50 per cent by 2025 as part of the company's circular economy strategy. Unilever is also looking into introducing more reusable and refillable packaging, which we have seen in the collaboration with UK retailer Asda where consumers can now buy refills to some of Unilever's most popular household brands. Loop, an initiative originating from the recycling company TerraCycle, is partnering with several major FMCG brands and retailers globally to introduce reusable and refillable packaging. Consumers can buy their products online or in selected retail stores, and later return their empty containers to the purchase point and have it sent for sorting and cleaning. Afterwards, the container can be refilled and reused by the next consumer.

Waste hierarchy*



* The waste hierarchy indicates an order of preference for action to reduce and manage waste with the most favorable approach at the top and the least at the bottom.

Deep Dive

MYTHS ABOUT CIRCULARITY AND RECYCLING

Myth:

“Plastic coated paperboard cannot be recycled and is therefore incinerated”

TRUTH: Well, yes and no. Many paper recycling mills can separate plastic barriers from the paper or paperboard. The rules for sorting packaging with plastic barriers vary from region to region and depend on how developed the waste and recycling schemes are. If there are no established recycling schemes or receiving mills with the separation technology, then laminates will most likely be incinerated for energy. In 2020 the UK recommended that packaging with as much as 15 per cent plastic content can be sorted as paper. The UK recommendation is based on the condition that the allowed plastic content gradually will be reduced to 15 per cent.

Myth:

“Every package should be made of recycled material”

TRUTH: For some products it makes sense to use recycled material but for other products where strength, pureness or quality consistency are more important, it is better to use fresh fibres. Consider all requirements when selecting your packaging material and include the whole value chain since recycled material does not always make the most sustainable and economic sense.

Myth:

“The best packaging is no packaging at all”

TRUTH: That really depends on the product to be packaged. The key purposes of packaging are to protect its contents from damage or contamination, simplify handling, transport and store, promote the product, and carry information. Packaging that is unnecessary, in that it serves no essential purpose, should naturally be avoided and in the future we might see bans on packaging that is considered to be excessive.

Myth:

“Recycling is the most important foundation for circularity”

TRUTH: While it is great to recycle it is important to understand that recycling isn’t a foolproof solution. Recycling is a key part of the circular economy but it is not one of the circular economy’s three key principles: Keep products and materials in use, design out waste and pollution and regenerate natural systems.

Myth:

“Recycled paperboard mostly uses PCW (post consumer waste)”

TRUTH: In reality a lot of PIW (post industrial waste) is used since these fibres are stronger, less contaminated and contribute to a better yield.

Myth:

“European forests are shrinking”

TRUTH: Almost all forests in Europe are protected and fibres for paper and paperboard are sourced from well-managed forests where the cycle of planting, growing and logging is carefully monitored. Swedish forests are protected by the Forestry Act, a more than 100 year-old law stating that forests should be managed sustainably, and that trees must be replanted after felling.

FIBRE PART OF THE BIOECONOMY

Designing for circularity or eco-design is about providing the conditions for packaging materials to be recovered for additional use. This means that a package's end of life must be considered early in the design and development phase. Paper and paperboard are highly recyclable, which can be seen in current recycling statistics (84 per cent in Europe) and their raw material, wood, is renewable and part of the forest bioeconomy. Well-managed forests contribute to decarbonisation and are a source for renewable raw materials. Out of the tree we make products such as boards and planks for buildings, and the leftovers from that process are used to make paper and paperboard.

Most European board and paper mills can offer full traceability for their products, all the way back to the origin of where the trees have been harvested. At Holmen Iggesund we also incinerate the parts we cannot use, such as bark and lignin, a high energy density bi-product, to create our own energy and make our production process almost fossil-free. When paper or board packaging have been used, they can be recycled and made into new paper and paperboard products.

Cellulose fibres cannot be recycled endlessly as they lose some of their strength each time they are recycled. Studies show that they can be recycled up to seven times. This is why fresh fibres need to be fed into the system and compensate for the loss. When the fibres cannot be recycled any longer, they are incinerated and turned into energy. Both fresh fibres and recycled fibres are part of the bioeconomy and dependent on each other.

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Want to know more about traceability and transparancy in sourcing?
Go to for more deep dives.

AMANDA BERGLUND

1: Sustainable forest management
2: Saw mill
3: Board and paper manufacturing
4: Packaging production and use
5: Recovery and recycling
6: Energy recovery

ANSWERS TO YOUR RECYCLING QUESTIONS

When assessing if a material is recyclable, you need to look at it from three different levels: system, material and market. System concerns the infrastructure of collection and sorting. Material involves whether there is a financially viable material recycling process. Market is the one which is seldom mentioned but the actual market driver of demand for recyled materials. To add to the complexity level, these conditions may differ between different markets, so it is important to understand the specific markets for your products.

System level

Is there an existing collection stream in place?

It starts with having a bin to put the material in. Not all municipalities have separate collection of different materials, as in practice you cannot have unlimited collection streams. It is both a financial and practical issue. Materials can be mixed if they can be sorted later on into different fractions (sorting steams).

Is there a functioning sorting infrastructure in place?

As an example, black plastics normally use black carbon pigments for colouring. This unfortunately makes it impossible for the near-infrared readers (NIR) that are used in automatic plastic sorting to detach the plastic. The UK Plastic Pact is pushing for all black plastics to be produced using detectable black.

Material level

Does an economically viable recycling process exist?

As an example, multimaterials consist of two or more layers of different material. Some multimaterials have compositions that complicate separation and thus cannot be fully recyclable with today's processing technology.

Do customers understand how to handle and sort?

Recycling guidelines depends on waste infrastructure. It is quite difficult for a consumer to understand how to sort all materials since some material groups will have exceptions. Did you, for example, know that you should not sort post-its with paper? This is due to their glue. And not all bioplastics can be recycled together with conventional plastics.

Market level

Is there an after-market for the recycled material?

There are materials that have well-functioning collection and sorting schemes and can be recycled from a materials technology perspective. However, they still don't end up being recycled into new products. Motala Sorting facility, one of Europe's most modern plastic sorting facility, must pay their customers to collect the low-density polyethylene (LDPE) that they have sorted. When the price differentiation between virgin and recycled is too close, there is little incitement for producers to use recycled LDPE and the plastic is instead used to produce downcycled products such as flowerpots, pipes and carpets, or is incinerated for energy.

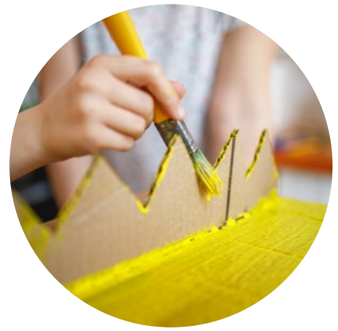
SEVEN GUIDELINES TOWARDS CIRCULAR PACKAGING DESIGN

NESTLÉ

1

When designing packaging, start with the need and functionality.
Is there a need for a packaging? Is the material choice fit-for-purpose? Does it protect the product? Can it be optimally emptied? If you can switch to a more sustainable material, then why haven't you done it?

As an example, Nestlé has an ambition to make all of its packaging recyclable or reusable by 2025 and their Smarties brand has already switched its plastic packaging to paper packaging. Making such changes is seldom easy. It requires a strong commitment from management and close collaboration across several departments in an organisation and with suppliers. Nestlé however is committed to its packaging strategy and this switch has resulted in the reduction of 250 million plastic packages globally.



2

Design the packaging so it can have a second life.
Create packages that consumers can repurpose, for example by turning an attractive box into a permanent holder or by using a package for a child's crafts project.

3

BARILLA

Keep the material combinations simple, only using non-paper elements to fulfil a necessary function of the packaging.
Barilla recently removed the plastic window from all of its packaging on its biggest pasta lines in the UK to produce the packaging from a single material and make it easier to fully recycle. The company has replaced the box's plastic window with an image of pasta and a text highlighting the change.

4

When using plastic coatings or barriers, make sure that the plastic layers won't readily degrade or break into very small pieces in the pulping stage.
Some paper recycling mills prefer not to handle any plastic laminated paperboards since plastic can affect the production efficiency, quality consistency or the economic viability of recycling paperboard. However, mills like Fiskeby have separation equipment that can handle plastic laminated paperboard and will even burn the plastic reject to generate steam and energy for its own process.

5

Understand and gather knowledge on the end-of-life processes for your packaging design.
It is not an easy task but if you are making design choices it is important to understand how they affect the whole recyclability result. Consumers today also rely on brands having made the best choices for positive social and environmental impact. Talk to the recycling organisations, mills and experts in your target markets and ask a lot of questions to broaden your understanding.

6

Provide consumers with information to encourage the sorting and recycling of packaging.
All design efforts go to waste unless your consumers can understand how to correctly dispose of the packaging.

7

A wasted product is a loss for the environment.
The most important role of packaging is to protect and sell the product. A wasted product can have a substantially larger effect on the environment compared to the impact from the actual package. Be sure to make conscious choices that compare all parameters and take the entire system into consideration.

PACKAGING OF THE WORLD

RECYCLABILITY AND CIRCULARITY

Recycling is a key topic within circularity, it will help us reduce the strain on virgin materials, reduce emissions and prevent packaging waste from ending up in landfill or in nature. However it is important to emphasize that it is not enough if we want to solve global warming.

As presented in the
we will need to implement much more drastic changes on a system scale and start several different initiatives such as phasing out fossil energy, investing in new infrastructure, changing the idea of consumption and even carbon capturing.

The focus is still mostly on recycling. A study from Mintel shows that "recyclability" dominated the sustainability claims on European food and drink packaging, representing almost one fifth of all products launched in 2020 whilst "biodegradable/compostable" represented just 0.1 per cent of the claims. To make sure that your packaging is recyclable, you need to take the material, system, and aftermarket into consideration during the design process.

A study from McKinsey found that most brand-owners and retailers in Europe are pledging to improve plastic usage and recycling, yet less than half are committing to quantitative targets. More brand owners need to walk the talk. Follow the guidelines to make easy design choices that improve your packaging recyclability and find partners to collaborate with on the more difficult challenges. Circularity and recyclability initiatives often need system approaches. It is when we work together in the value chain that we can develop solutions fit for the future.

Do you want more information or discuss possible solutions?

Visit iggesund.com or get in touch: iggesund.com/consulting

Holmen Iggesund is the premium paperboard company for purposeful solutions. We invite our customers and partners to be part of creating the next generation of sustainable packaging solutions and graphical applications together with us.

We are part of the Holmen Group, relying on our own sustainably managed forests to ensure a renewable material for centuries to come.

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