BRÜCKNER GROUP

CIRCULAR ECONOMY

IN THE PLASTICS INDUSTRY

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PRE**FACE**

Dear Readers,

Since we started our initiative YES, **WE CARE** in late 2017, there have been significant developments on the subject of plastics and the environment - in the markets, through legal requirements and in public discussion. Initially, the voices fundamentally condemning plastic were predominant; by now, the discussion in the media has become more differentiated.

In 2020, our thinking and actions have been primarily influenced by the COVID-19 crisis. The pandemic has resulted in drastic changes and has also had an impact on the discussion on the subject of plastic: security of supply, which used to be taken for granted, has suddenly become a topic of concern in addition to all the health issues, and this is changing the way in which packaging is viewed. **Hygiene and shelf life** of foods have become more important again.

At the same time, the oil price is influencing the plastics recycling market, making it more difficult to drive a functioning **circular economy**. The latter is, however, a decisive factor for the entire thematic complex of "plastic - environment - sustainability", which is why we are focusing on it in this booklet. Only when the plastics industry has become a permanent participant of a circular economy will it be able to find its place in a sustainable world.

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CIRCULAR ECONOMY –
FROM AN IDEA TO A CONCEPT OF ACTION

WHAT IS A CIRCULAR ECONOMY?

Ever since industrialisation, we have been living in a **linear economy**. Products are made, used and, in most cases, discarded after use. We have been using up limited raw materials and filling landfills with massive amounts of waste. This has resulted in an imbalance – one that we have to address urgently.

> "Nature has zero waste."
> **Andrew Dent, Material Innovator, Material ConneXion**

Nature itself is the best example. Everything is part of an **endless cycle**, everything always serves for something new – e.g. as food for plants or animals, as building material, as protection. Nothing is lost. And that is exactly what a circular economy is all about. Its aim is to use all raw materials and goods in such a way that they are not simply discarded at the end of their service life, but instead remain within a cycle.

> "A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems."
> **Ellen MacArthur Foundation**

Not only recycling, but above all multiple use and reuse (refill, reusable etc.) as well as reconditioning and repair, are key elements in the cycle. Problematic or potentially dangerous substances should be avoided. The Ellen MacArthur Foundation has become very influential on a global scale in this respect, bringing together a large number of stakeholders in order to advance the **circular economy**.

For too long now, we haven't thought beyond the use of products or packaging. This is a mistake we have to correct. The chain needs to become a closed circle – and that requires the **cooperation** of all parties involved, from the production of the raw material all the way to recycling of the waste. It's also about thinking and acting in a way that is fundamentally different – that is, from the end of a product's lifecycle. The United Nations and the EU, individual countries and an increasing number of companies are all agreeing on goals similar to those of the **New Plastics Economy Global Commitment**:

- Eliminate unnecessary and problematic plastic packaging through **redesign and innovation**
- Move from single-use to **reuse** where relevant
- Ensure all plastic packaging is reusable, **recyclable, or compostable**
- Increase the reuse, collection, and recycling or composting of plastic packaging
- **Increase recycled** content in plastic packaging

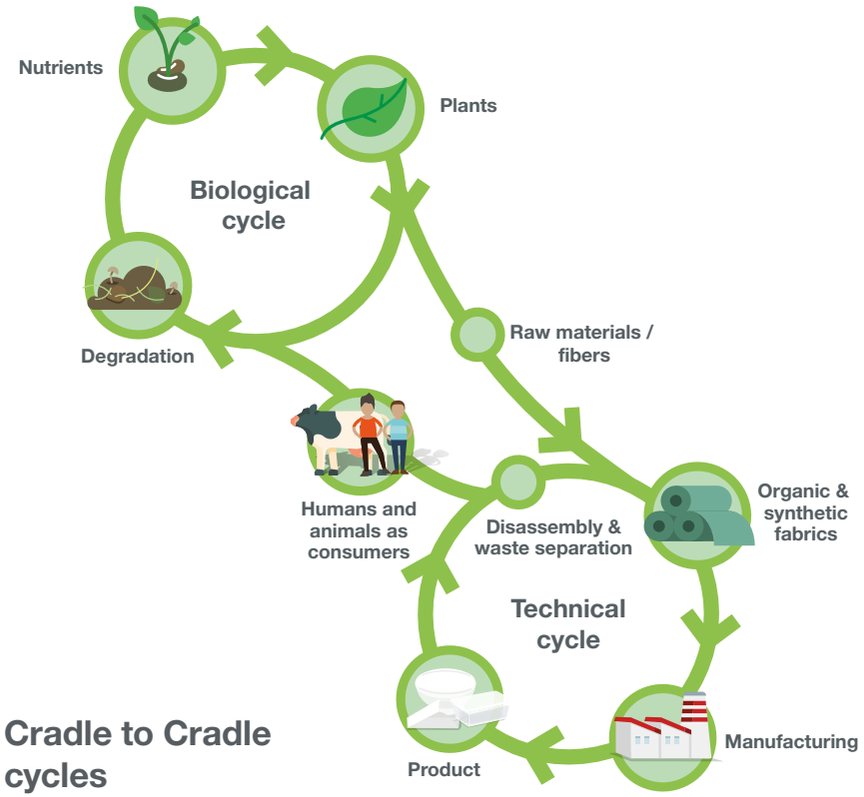
CIRCULAR ECONOMY –
FROM AN IDEA TO A CONCEPT OF ACTION

SCHOOLS **OF THOUGHT**

The circular economy can be promoted in different ways. Here are some examples of the different schools of thought.

CRADLE **TO CRADLE**

The "cradle to cradle" principle conceives of all materials used in a production process in such a way that they are either returned to a **biological cycle** (e.g. biodegradable cleaning agents, packaging made from naturally degradable plastic) or enter the cycle of permanent reuse as **technical materials** (e.g. electronic devices, non-biodegradable packaging). The goals here are to eliminate waste, to use only renewable energies and to respect natural as well as social systems.



Cradle to Cradle cycles

CLUB **OF ROME**

The Club of Rome was founded more than 50 years ago to provide global answers to various **crises of our planet and of humanity**. Even back then, it was clear to the founders that the exponential growth of economy and consumption would push us to our limits.

> "Agree in 2020 to halve consumption and production footprints in developed and emerging economies and close loops in inefficient value chains, by 2030."
> **Planetary Emergency Plan, Club of Rome**

BLUE **ECONOMY**

Blue Economy has the goal of protecting the **ecosystem** while creating **jobs** at the same time. It is to be regarded as the answer to the basic needs of everyone with the means available, and creates innovations based on the model of nature while trying to create as many advantages as possible. This applies to people, jobs, nature and resources. This open source movement is a further development of the Green Economy. "Blue" refers to the colour of the sky, the ocean and of our entire planet.

PERFORMANCE **ECONOMY**

Circular economy in the sense of Performance Economy has the aim of **optimising the service life** of products. Economic and ecological aspects are to be harmonised – by not buying a product but renting as a service, for example.

BIO**MIMICRY**

Biomimicry is defined as the discipline that studies nature's best ideas and mechanisms and adapts them. It's all about **innovation inspired by nature**. The three core principles are: nature is the model for development and design; nature is also a measure of the sustainability of ideas and products; and nature is also our mentor: we don't use nature, we learn from it.

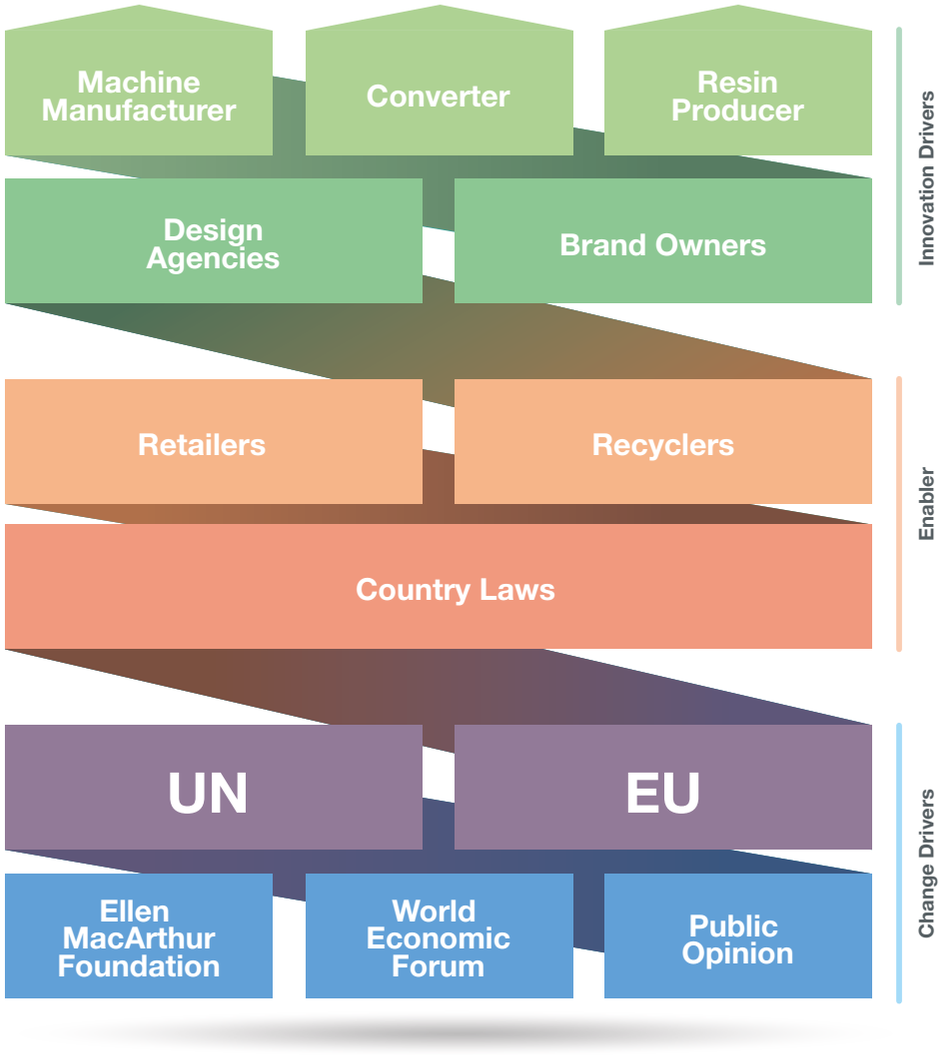
ITS MEANING FOR
THE PLASTICS INDUSTRY

The plastics industry processes an enormous range of products and applications made from very different materials. You can't lump everything together when it comes to closing the cycle. In addition, the products have very **different service lives** – from a few minutes up to decades.

Today, individual components of certain products such as cars, refrigerators, electrical appliances or computers are already separated in sorting plants and, for the most part, are passed on for recycling. This also works for plastics inside window frames or with agricultural foils. These cycles are almost self-contained. Unlike many packaging materials, the products are not disposed of or mixed with other products and materials. Recycling is easier when **sorting streams are properly monitored**.

> "We make the wrong things perfect and then they are perfectly wrong."
> **Michael Braungart, chemist and process engineer, EPEA**

There have recently been discussions about the correct disposal of electric vehicles and their batteries. In the case of solar power systems, too, the question of how to dispose of them also came up after many panels had already been installed and been in use for years. There are now corresponding regulations in force. These examples, however, show that it is important to consider the issue of disposal from the start. This is why the Brückner Group companies have long been working, together with their respective partners, to include the **entire lifecycle** of products in the development of new machines and services.



Who drives the circular economy

ITS MEANING FOR
PLASTIC PACKAGING

Packaging generally only has a very short period of usage. It protects the goods in transit, when they are stored in shops and then used at home. Then it is thrown away. We're so accustomed to this that for a long time we haven't spared a thought as to what happens to the products after they have been used.

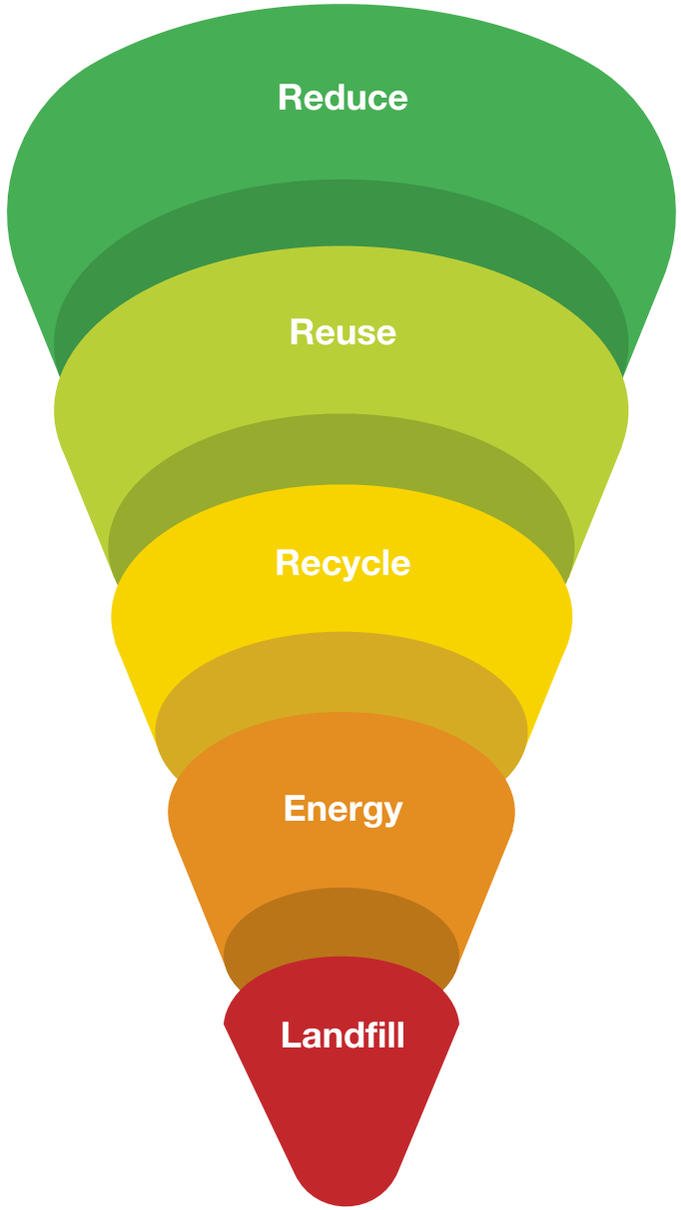
> "It's not about avoiding plastics - it's about avoiding plastic waste."
> **Axel Kühner, CEO Greiner**

But the collecting and sorting of garbage alone does not close a cycle. What is collected and how it is sorted already presents us with the first problem. Each country - and sometimes even individual region - has its own **disposal policies**. Packaging that is recycled in country A might end up at an incineration plant in country B. In many countries - including the US - the recycling rate is still very low.

There are different guidelines for waste separation, different sorting streams ►(pages 16ff) or varying directives for recyclates and packaging. To change this, an increasing number of stakeholders are coming together and working on **solutions for the entire value chain**.

The current goals are summarized in the **waste hierarchy**. The ultimate goal is waste avoidance. It is followed by multiple use - by way of reusable packaging, refill-solutions or repair. Only then comes recycling. If it is not possible, the waste should be used to generate energy. Landfilling should always be the very last option - it might even be completely abolished in the EU in the future.

For (plastic) packaging in particular, the preferred options (avoidance, reuse or recycling) can only be optimally implemented if they are integrated into the early production phase. Too little attention was paid to this until recently – and it is precisely this that the companies of the Brückner Group are working towards changing ►(pages 22ff).



Waste hierarchy

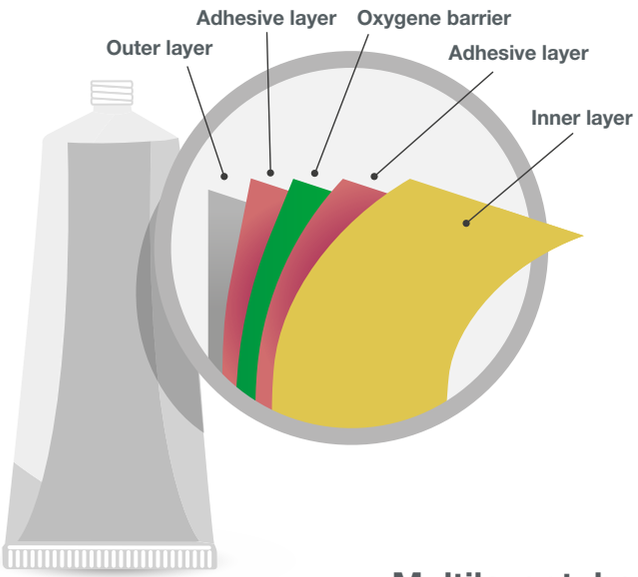
MATERIAL FOR A FUNCTIONING CIRCULAR ECONOMY

Waste avoidance is the top priority in the waste hierarchy ► (page 10f). It is followed by reusable solutions, and by recycling. So how should packaging be made, and what material and specifications should we use to best meet these goals?

MATERIAL **REDUCTION**

Packaging - and especially outer packaging - must be critically reviewed. How necessary is the packaging? Is it as safe as necessary, and as reduced as possible?

In many cases, packaging has already been optimised so as to achieve the greatest possible benefit using very little material. In the case of film packaging, for instance, different **material layers** are combined to form so-called multilayer films. Since each layer only has certain functions, such as forming a barrier against oxygen or water vapour, the multilayer film is very thin. It saves material (= less raw material consumption and less waste) and, if it is produced in a single working step, can also reduce energy consumption and CO_2 emissions.



Multilayer tube

MATERIAL **COMBINATIONS**

If plastics are mixed with other materials such as aluminium for a good barrier effect, the problem is that they cannot be separated, or can only be separated with great difficulty. This significantly reduces the **quality of the recyclates** and material mixtures are now increasingly being avoided. The same applies to labels that are made of a different kind of plastic than the packaging itself.

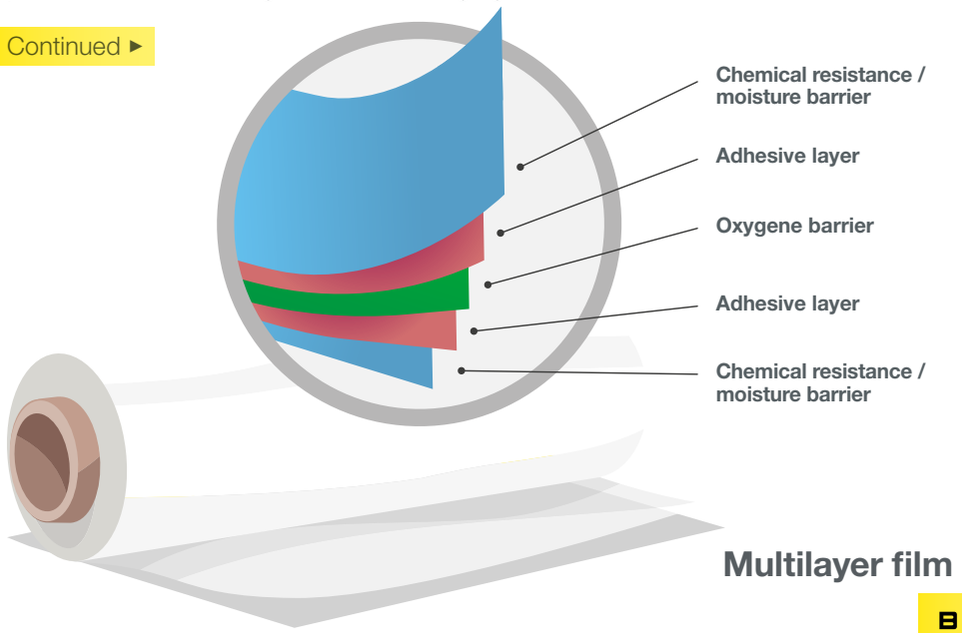
Composite solutions such as those used in yoghurt cups, which consist of a very thin plastic layer and a cardboard cover, can only be recycled easily if the materials are separated before they are disposed of.

> "To eliminate waste, we need to rediscover thrift."
> **Andrew Dent, Material Innovator, Material ConneXion**

REUSABLE **PACKAGING SOLUTIONS**

Reusable packaging is a good solution when there is a smoothly **functioning (deposit) system** in place, such as for reusable plastic bottles in Germany. This includes a sufficient number of collection points, transport routes that are as short as possible (CO_2 emissions), and good cleaning options for the reusable packaging (hygiene, water and energy consumption). Drugstores are increasingly offering **refilling stations** for products such as detergents and cleaning agents.

Continued ►



Multilayer film

MATERIAL FOR A FUNCTIONING CIRCULAR ECONOMY – *continued*

RECYCL**ABILITY**

Not every kind of plastic is easy to recycle, since the recyclates made from some materials show a significant loss of quality. It is therefore preferable to choose materials for packaging that have the **lowest possible loss of quality**. Mixed plastic waste also results in regranulates of inferior quality.

In conventional sorting facilities, packaging made from mixed plastic - such as **multilayer packaging** - cannot be separated to the extent necessary for mechanical recycling ►(pages 16ff). There have been pilot projects for layer separation, but these have been limited to a few material combinations and are not yet being applied on a large scale. Multi-material solutions therefore do significantly worse in terms of recyclability where waste avoidance is concerned. Solvent-based or chemical recycling can be a future solution regardless of the high energy input ►(pages 18ff).

Currently, **mono-material packaging** is increasingly favoured for this reason. Here, too, different functional layers are usually combined with each other. These consist of the same material, but they are processed differently. To meet the demands made on the packaging, the thickness of the layers must usually be higher than with multi-material solutions. Mono-material solutions therefore meet all the requirements of recyclability, but they require more resources and do not fulfil the demand for reduction.

> "There's a lot of pressure to move to alternatives [to plastics], which aren't necessarily better from an environmental and climate impact point of view."
> **Plastic Promises Report 2020**

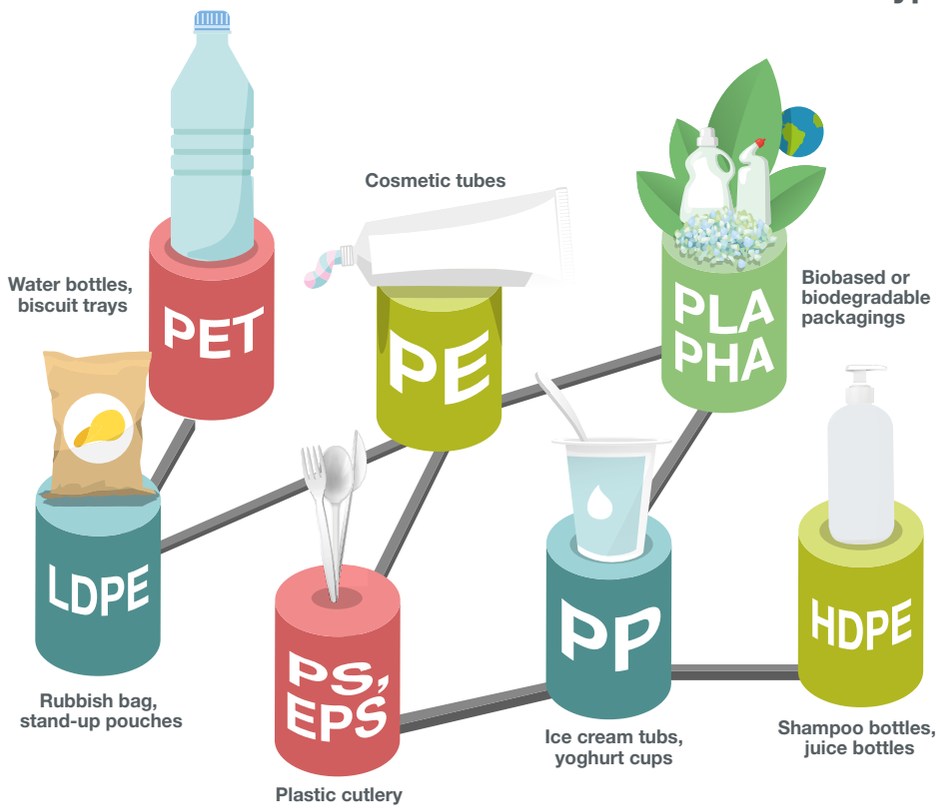
ADDITIVES **AND INKS**

What can be added, and how much of it? There are material restrictions and proportion limits for additives. Whether, and how much of, an additive is added needs to be carefully considered ► (page 20f), because things that may be advantageous in production can cause problems in recycling. One example is (printing) inks. Together with other partners in the **PRINTCYC** project, the companies of the Brückner Group are currently researching the influence of inks on the mechanical recycling process ►(page 22f).

MATERIAL **ALTERNATIVES**

Research in the field of bio-based and compostable plastics (e.g. PLA and PHA) is advancing further, even if many approaches are still niche solutions ►(page 22f). Kiefel has developed a completely different alternative: **Kiefel Fiber Thermoforming**, or KFT ►(page 26f). This process enables pulp to be processed into high-quality packaging that is easily reusable or compostable.

Plastic types



RECYCLING AS A **COMPONENT OF THE CYCLE**

For the "**Green Deal 2020**", the EU has drawn up an action plan for the circular economy stating the following with regard to plastic: "Single-use products will be phased out in stages as far as possible, and replaced by long-lasting reusable products." And: "Measures to prevent and reduce waste will be taken in order to increase the proportion of recyclates [...]. An EU model for the separate collection and labelling of products is being implemented."

> "The underlying problem these days is that plastic has no value."
> **Alexander Baumgartner, Flexible Packaging Europe**

The raw material plastic is valuable, and that is how we have to treat it. Recycling is not the only solution for a closed plastic cycle, but an important one. In order to be able to produce recyclates of best possible quality and with the best possible performance features, one first has to know the possibilities and limits of recycling.

SORTING AND **MECHANICAL RECYCLING**

In the **sorting streams**, household waste is separated according to material. Magnetic and eddy flow separators sort out tinplate and aluminium. **Wind sifters** separate materials with low density from those with high density. **Swim-sink separation** is also used to distinguish different materials from one another. In addition, modern technologies are applied: electric fields, **infrared or laser technology** and artificial intelligence help to separate the materials according to type as strictly as possible, sometimes even in just one single step.

Scanner technology can distinguish between a shampoo bottle made of polyethylene (PE) from a PET bottle, and from a yoghurt cup made of polystyrol (PS); it cannot, however, differentiate between black or sooty packaging, or material mixtures. Intelligent design helps to save packaging from incinerators. A further promising option is **digital coding**, which makes materials traceable even beyond a product's lifecycle. The **R-Cycle** initiative (in which Brückner Maschinenbau is also involved) is working on this, too. The common goal is to realize a seamless tracing option with the help of machine-readable markings, thereby facilitating precise sorting of plastic waste.

Mechanical recycling still constitutes the largest part of the recycling process. Here, clean and sorted plastics are shredded into so-called **flakes**, which are then melted down and processed into **regranulate**. The better the sorting technology's ► (pages 18ff) recognition and separation of different materials, the purer the sorted state of the material when it is sent off for mechanical recycling. If **contamination** is too great, the quality and thus the usability of the regranulate both decrease rapidly. Different connected materials, such as those used in multilayer packaging, are not ideally suited for mechanical recycling.

Continued ►

Design helps to close the cycle

RECYCLING AS A **COMPONENT OF THE CYCLE** – *continued*

For **mechanical** recycling, the material flakes must be **cleaned** of food or product residues, paper labels, soil, etc., so that the quality of the recyclate is not impaired. The flakes are washed in slightly alkaline, aqueous solution and freed from contaminants by way of centrifuges, sedimentation or filtering technologies. The flakes are then dried mechanically or thermally, since water is also a **contaminant**. Cleaning can alternatively be carried out completely dry, using only centrifuges.

CHEMICAL **RECYCLING**

Chemical recycling is a very promising approach, in which the plastics are '**converted back**', as it were – by means of solvolysis, thermolysis or pyrolysis. The polymer chains of the plastic are split up in order to produce **oils and/or synthesis gases**. These raw materials can be used to produce new plastics. The energy consumption involved in this process is still very high, but several companies are doing research on this and there has been some **progress** in this regard. In 2019, at the world's largest plastics trade fair "K", the first packaging prototypes made from chemically recycled raw materials were presented. This procedure could be a promising solution for **multilayer packaging**, as well as for non-sortable or dirty packaging, which might otherwise end up in an incinerator. More waste could be avoided and this would help close the cycle even more effectively.

SOLVENT-BASED **RECYCLING**

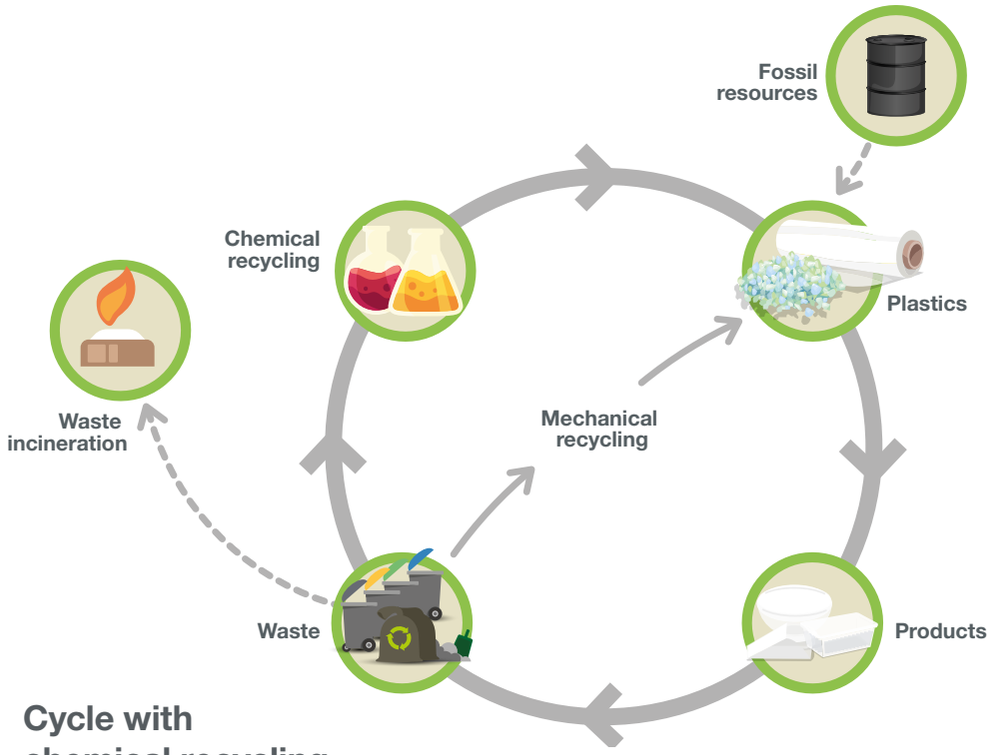
With solvent-based recycling, just as with mechanical recycling, plastic waste is shredded and cleaned but is then selectively separated in a **solvent bath**. In this way, the polymers can be processed into pure granulates. The procedure – which likewise is not facilitated on a large scale yet - is a good alternative to mechanical recycling and is particularly suitable for **mixed** plastic waste or **multilayer packaging**.

ALTERNATIVE **METHODS**

Researchers are also testing other methods, such as those involving plastic-decomposing enzymes. Scientists at the University of Portsmouth have discovered a mutated **bacterial enzyme** that breaks down PET into its chemical components within just a few hours. The components can then be used to produce new PET. Some other approaches: the larvae of the greater wax moth, for instance, can decompose polyethylene. Mealworm larvae can digest polystyrene and turn it into biomass for their own organism. It remains to be seen whether or when such experiments will be practicable on a larger scale.

> "Indian politics [is] a step ahead of ours [...]. If you process thousands of tons of plastic in Europe today, you don't have to prove that there will be recycling on the same scale - in India, however, you do [...]."
> **Alexander Baumgartner, Flexible Packaging Europe**

The main problem with recycling is the lack of uniform regulations. Even within the EU, there are only small-scale systems - and questions that need to be answered. What are the criteria according to which consumers must separate their waste, and what can sorting machines do? What kind of packaging must be redesigned, and according to what rules ▶(page 20f)? Which economic measures need to be taken to ensure that recyclates are not only morally but also economically advantageous?



Cycle with chemical recycling

DESIGN GUIDES FOR THE CIRCULAR ECONOMY

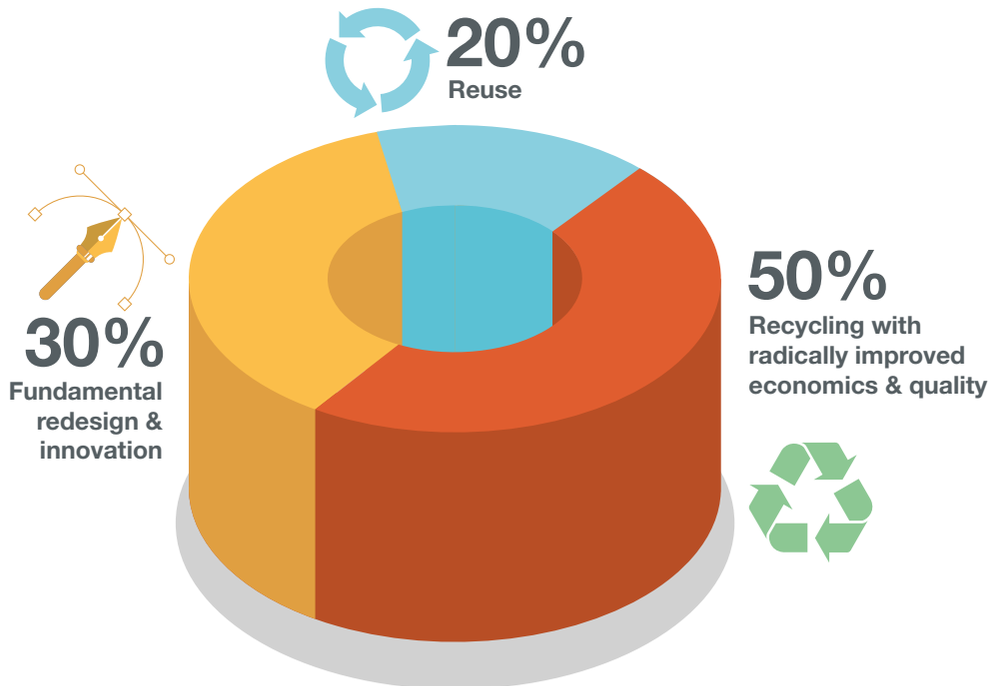
Recycling of plastic does not start with waste separation, but as early as the product design stage. In order to develop guidelines for recyclable design, recyclability first needs to be defined. The following definition was developed in 2018 by the Association of Plastics Recyclers (APR) and Plastics Recyclers Europe (PRE):

- The product must be made from a plastic that is collected for recycling, has market value and/or is supported by a legally prescribed programme.
- The product must be sorted and aggregated into defined streams for recycling processes.
- The product can be processed and recycled using commercial recycling procedures.
- The recycled plastic becomes a raw material from which new products are made.

> "Silo thinking, in which marketing, research & development and sustainability run parallel to each other without anything being interlinked is no longer an option in view of the challenges."
> **Christine Lischka, Serviceplan Design**

Associations such as APR, PRE, Petcore Europe, CEFLEX or Plastic Squeeze Tubes are working on corresponding guidelines. There must be individual rules with **different details** for each packaging division. There are higher-level **similarities**, however, that are estimated according to different stages. Packaging can thus be "easily recyclable", "partially recyclable" and "non-recyclable".

- **Material:** in mechanical recycling, mono-material solutions are still the easiest to recycle ►(page 14f). So, for raw materials and additives, the "less is more" principle currently applies.
- **Lids:** wherever packaging and lids (capsule lids, foil lids) are made from the same material, they can be recycled together and should therefore be firmly connected to one another. If they are made from different materials, they need be easy to separate for recycling.
- **Labels and lettering:** labels should be made of the same material as the packaging. The choice of adhesives has to be taken into account. And wherever packaging is printed directly, the inks need to be compatible with the recycling process ►(page 22f).



The strategies of New Plastics Economy for changing plastic packaging

CIRCULAR ECONOMY AND
THE BRÜCKNER GROUP

BRÜCKNER **MASCHINENBAU**

Despite all the necessary developments for the circular economy, Brückner Maschinenbau remains committed to its objectives of **reducing raw material input and lowered energy consumption** in the production of film. With all the legitimate demands for recycling and reusability, we must not forget the **challenge of climate** change and the reduction of our CO_2 footprint throughout the value chain of packaging.

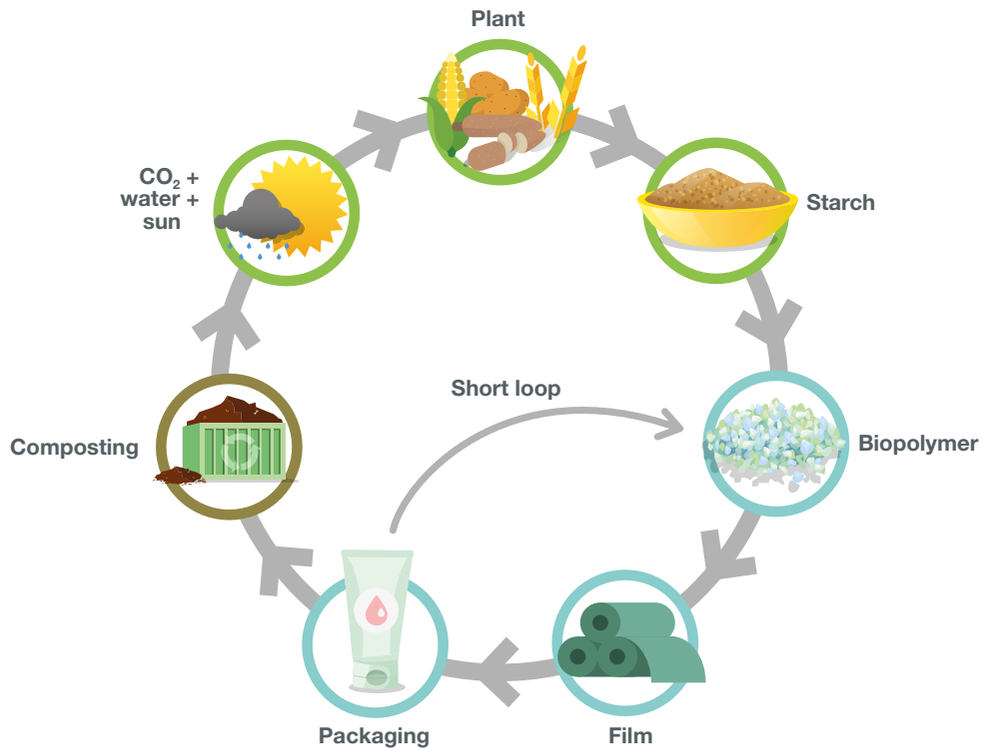
But of course we are also undertaking research and development regarding **film recyclability** and the **use of regranulates** in film production. Cooperation with other participants in the value chain - from raw material suppliers, packaging and product manufacturers all the way to recyclers - is essential. We drive materials research at our own technology centre.

Biopolymers - so-called bioplastics that are biodegradable and/or bio-based - have long been a part of our portfolio. However, packaging made from these raw materials is still largely a niche solution. A lack of recycling streams, difficult sorting, high raw material prices and reduced finishing properties all set limits here.

> "Through our research, we've developed the first elements of a 'biofilm-kit'. If we want to create a coherent film concept, however, collaboration with an end-user is essential."
> **Dr. Martin Wolf, Laboratory Manager Brückner Maschinenbau**

Since mono-material packaging is often printed directly instead of having labels attached, we – together with all the other companies of the Brückner Group– are part of the **PRINTCYC** project, which, together with other stakeholders, is examining the effects of printing inks on the recycling process. Special types of ink reduce odours and/or gas emissions and have the potential of significantly improving the quality of the recyclate.

Our research also focuses on the production of coated and uncoated mono-material films with excellent mechanical and optical properties, which can replace previous multilayer films. They are ideal for use in new packaging material that is as pure as possible and guarantee easy sorting during waste separation as well as excellent recyclability. Entirely new system concepts for producing **BOPE** films (biaxially oriented polyethylene) are good examples here.



Biopolymers

BRÜCKNER **SERVTEC**

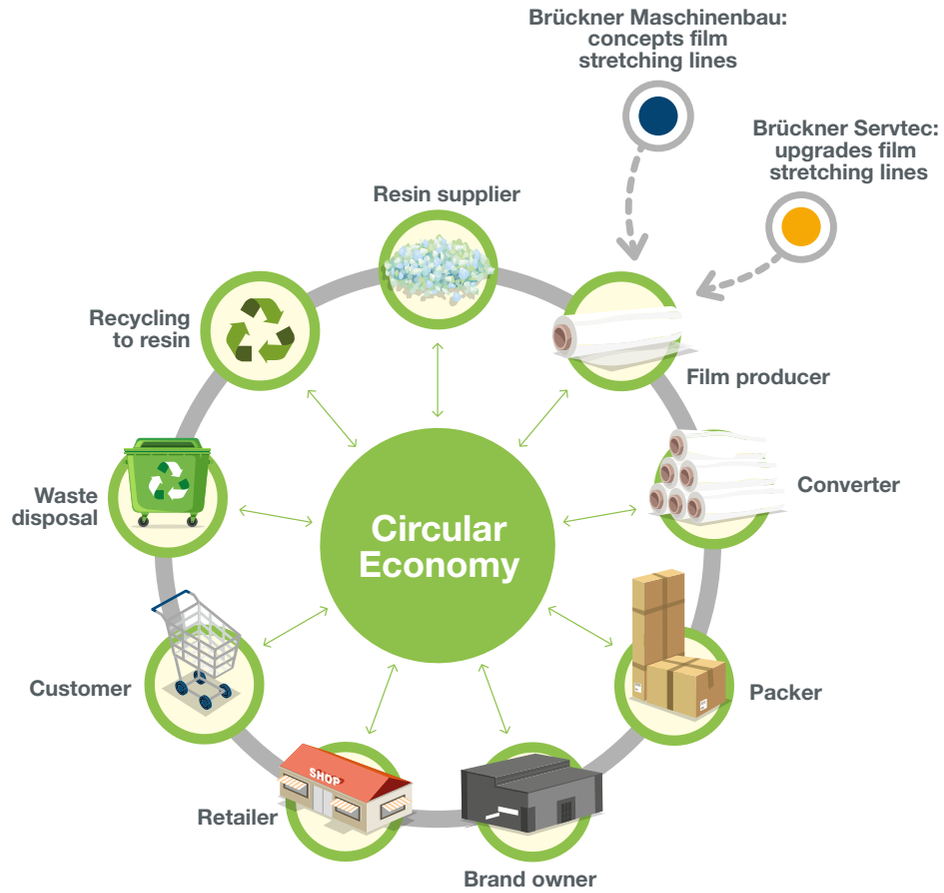
Through **modifications** and specific **updates**, Brückner Servtec ensures that even existing stretching lines can produce the latest products in terms of film types and materials. Development work together with Brückner Maschinenbau has also recently enabled to implement two major projects for an improved circular economy.

Since mono-material films are becoming increasingly important, customers need appropriate solutions. To ensure that the films have the same properties as multilayer films, the individual layers are, for instance, treated with coatings. A customer from Turkey successfully carried out tests with a PE film from Brückner's technology centre, which he subsequently **metallised** with an ultra-thin layer of aluminium oxide. We then upgraded the customer's system to ensure that this step could be carried out simultaneously with the stretching process. This saves energy and an additional process step.

> "This PE composite film with less than five percent foreign content is directly recyclable."
> **Markus Gschwandtner, CEO Brückner Servtec**

For an Indian packaging manufacturer, we converted an older BOPP line (for biaxially stretched polypropylene) so that it can now also produce modern BOPE films for recyclable mono-material packaging. This **hybrid technology** enables our customers to flexibly enter new markets that are only just emerging and are not yet profitable on their own.

Together with Brückner Maschinenbau, we are also part of **CEFLEX** and similar initiatives and organisations to strengthen the circular economy.



Cooperation within the cycle

KIEFEL

Kiefel works with partners from the entire value chain to ensure that the buzzwords "**reduce, reuse, recycle**" are actually put into action. In various projects, with the aim of closing the cycle – and together with material manufacturers, customers and others – we develop products and solutions that are optimised for the respective application needs and are above all sustainable. This also includes cooperation with the **Fraunhofer Institutes** in Munich and Leipzig in order to find the best materials for recyclable and biodegradable products.

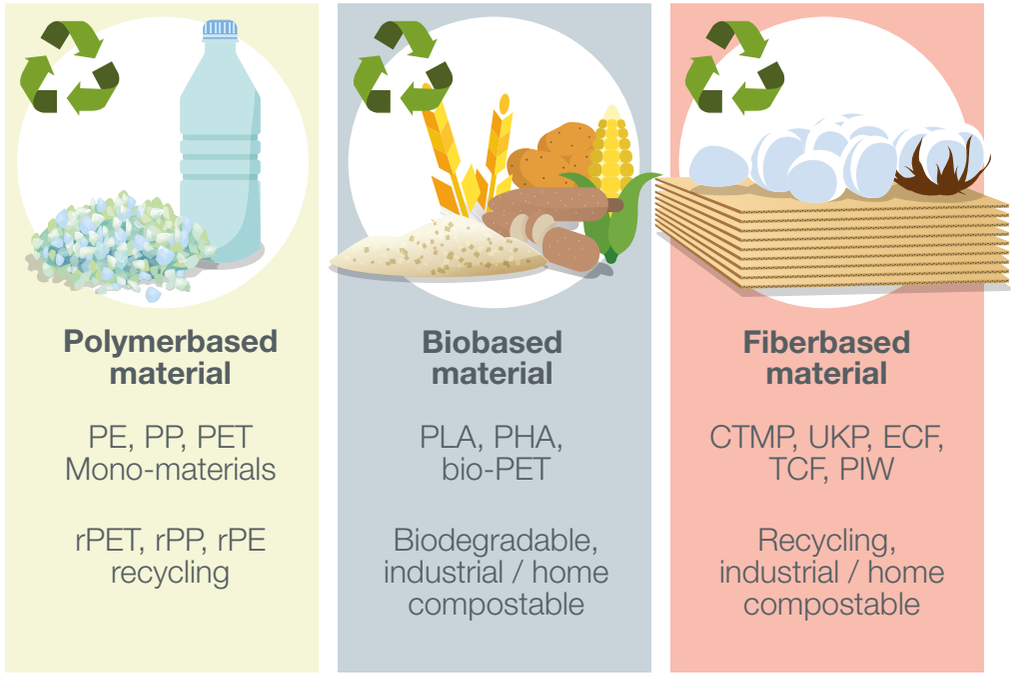
> "We rethink how every product can be created more sustainable in terms of design, functionality, material, composition and process optimisation."
> **Cornelia Frank, Head of Marketing & Sustainability Kiefel**

At a plant in China, together with several European recycling specialists on site, we enabled a **closed cycle** for food packaging made from PET. For customers in the US and Canada, we worked out a solution for changing the material used for **coffee capsules** from polystyrene (PS) to the more easily recyclable polypropylene (PP), which can fully meet the different technical requirements – including the correct density for swim-sink separation in the sorting streams.

At the "K" 2019, we were already able to present a **foamed PET cup** that we developed in collaboration with the extrusion specialist SML. This cup is not only very easy to recycle thanks to its mono-material structure, it also saves up to 50% material thanks to the foaming technology. In addition, it is particularly lightweight and also cold-resistant up to -20° Celsius as well as heat-resistant up to 100°C.

In Europe, our customer Faerch implemented with our machines the "**Colour of the Day**" project: production of PET bowls in the respective recycling colours of the day. For a long time, the unvarying colour of a product stood for unvarying quality in the eyes of customers and retailers. Recyclates, however, lead to colour variations, and until now these were counterbalanced with additives. Thanks to the current zeitgeist, however, consumers in Great Britain are now buying Faerch containers produced on our machines in the "colour of the day".

We have also developed a method of producing food containers and packaging from **natural fibres** on our machines. This high-quality packaging, produced with **Kiefel Fiber Thermoforming (KFT)**, can be used i.e. for food or hot beverage. KFT products are also suitable for more advanced packaging of electronic goods like smartphones. Via waste paper they can optimally be recycled.



Material processing competence at Kiefel

PACKSYS **GLOBAL**

PackSys Global is currently active in two initiatives to promote the circular economy. As an international consortium, the **Tube Circle** brings together stakeholders from the entire value chain to close the cycle for tube packaging as far as possible. Our initial goal is to drive material reduction. Secondly, we aim for optimised recyclability and thus mono-material tubes. Currently, many tubes are made of polyethylene and the caps are made of polypropylene. What would be the advantages of a purely PE and/or PP tube? And thirdly, we want to examine the use of bio-based materials with the goal of further increasing tube sustainability.

The initiative **Plastic Squeeze Tubes**, co-founded by us, arose from the CEFLEX project (for flexible plastic packaging). It focuses on developing **design guidelines** for the recyclability of tubes in Europe and their compatibility in the recycling stream. This is a major challenge: recycling streams in Europe are still very diverse and urgently need to be harmonized and consolidated. Since tubes, like many other types of packaging, do not have their own sorting streams, this is also about the role played by tube quotas in the recycling stream.

With our new technology for 360° printed laminate tubes, we have already taken a convincing step in the direction of sustainable tubes. Thanks to direct print, **NEOSeam™** tubes neither need additional material for labelling nor for creating the side weld seam, making them ideally suited for mono-material solutions.

> "We want to strengthen even further the importance of tubes compared to other packaging. It's not only about the question of recyclability - the increased use of recyclates is also important."
> **Dr. Peter Schkoda, Head of Global Sales Tubes PackSys Global**

The question of which material is best generally plays a major role for us. Among other things, we carry out **tests** with recyclates produced by EREMA. The barrier layers are also important. The body of a tube currently consists of several PE layers in which an aluminium barrier layer (aluminium barrier laminate, or ABL for short) is embedded. Tube manufacturers and brand owners are currently replacing ABL tubes with PBL tubes (plastic barrier laminate, i.e. tubes with a plastic barrier layer) for better recyclability. Our machines can already produce tubes with different barrier layers. If the EVOH barrier layer (ethylene vinyl alcohol copolymer) used makes up less than five percent of the total weight of the body, the tube is recyclable as a mono-material.

GOALS **& OUTLOOK**

What is certain is that the linear economy that has been practised across the board for a long time now is no longer sustainable. A general **rethink** has to take place in all areas. In the long term, this can only work if we consider all the effects of our actions, if we regard every **raw material as valuable**, and if we strive to **leave behind an ecological footprint that is positive**, rather than just as small as possible.

The first steps have been taken and developments are progressing quickly - a lot has happened since our first booklet. What was progress yesterday has become obsolete today. What is only an idea today could be a reality tomorrow. But we must **continue to act**. There is still a long way to go. And, most importantly, everyone involved must pursue this goal together. That includes not only producers, manufacturers and recyclers, it also includes consumers. The "Colour of the Day" packaging shows how important it is that we all rethink things. **Information** is therefore just as important as **product innovations**. A well-founded decision can only be made once people know the details of what lies behind individual products and their packaging. That is why we, the companies of the Brückner Group, will not stop researching and developing – and will continue to discuss every single aspect.

> "Sustainability is only possible within a community.
> In the tour de force of closing the cycle,
> there cannot be any competitors - only allies."
> **Dr. Axel von Wiedersperg, CEO Brückner Group**

NEWS ABOUT
THE PROJECTS WE SUPPORT

ASASE
RESILIENT AND SUSTAINABLE COMMUNITIES

ASASE **FOUNDATION**

Our donations are also helping to develop an app for a microfinancing model, and in the purchase of a cargo bike for collecting plastic waste or deliveries to recyclers in the region. ASAE recently also formed a partnership with the Alliance to End Plastic Waste, which will further advance the project.

ONE earth ocean
www.oneearth-oneocean.com

ONE EARTH **– ONE OCEAN**

Recipients of our donation include a school project in a favela in Rio de Janeiro, with about 80 children. Due to the Coronavirus crisis, however, this project, in which children aged between the ages of eight and ten are taught about plastic waste and environmental protection, had to be temporarily suspended.

BRÜCKNER GROUP

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