



TWELVE QUESTIONS AND ANSWERS REGARDING
PLASTIC AND THE ENVIRONMENT

WE WANT TO BE AMBASSADORS FOR THE CORRECT **HANDLING OF PLASTIC!**

FOREWORD

Dear Employees,
Dear Readers,

Many of us are concerned about the negative headlines regarding plastic and the environment – especially about the images of plastic waste in the oceans. In many cases, however, reporting is influenced by subjective opinions, and offers only a brief sketch of reality. The reason for this is that plastic is versatile.

In this little book we would like to show you that diversity, based on the twelve questions which are often asked. **Valuable impulses** in this respect resulted from our **employee survey!**

We would like to offer a differentiated view of this complex topic and provide you with the right arguments. We are aware that there are countless other questions and that this can at best be a first step. There will be more – on our way to a future with plastic, but without the pollution due to plastic!

Dr. Axel von Wiedersperg
CEO, Brückner Group GmbH

Helmut Huber
COO, Brückner Maschinenbau GmbH & Co. KG

Markus Gschwandtner
CEO, Brückner Servtec GmbH

Thomas Halletz
CEO, Kiefel GmbH

Manfred Zurkirch
CEO, PackSys Global AG

TABLE OF CONTENT

03
CRUDE OIL – **A FINITE RESOURCE**

▶ Page 10



02
OUR CONTRIBUTION TO
SOLVING THE PROBLEM

▶ Page 8

12
CIRCULAR **ECONOMY**

▶ Page 28



06
PACKAGING FOR **FRESH FOODS**

▶ Page 16



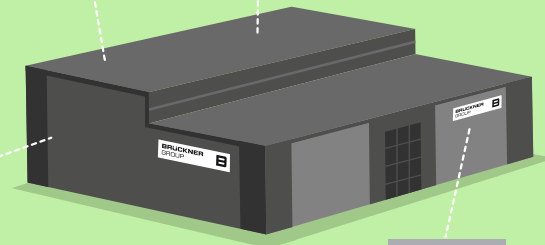
05
BAN ON
DISPOSABLE PACKAGING

▶ Page 14



08
PROMOTION OF PROJECTS BY
THE BRÜCKNER GROUP

▶ Page 20



07
PLASTIC WASTE IN **THE OCEANS**

▶ Page 18



09
THE FUTURE OF
OUR JOBS

▶ Page 22



10
OUR TECHNOLOGY
AND SUSTAINABILITY

▶ Page 24



01
PLASTIC AS AN **ENVIRONMENTAL PROBLEM**

▶ Page 6



04
BIOPLASTICS AS **A SOLUTION**

▶ Page 12



11
WASTE **MANAGEMENT**

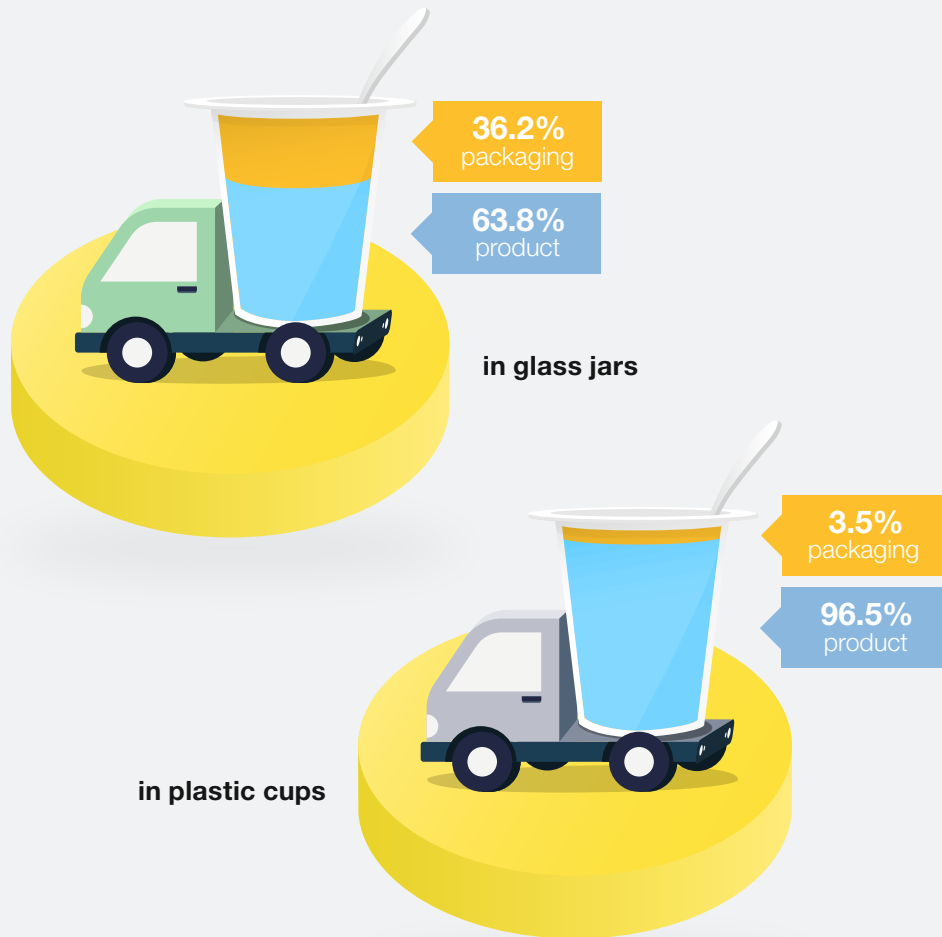
▶ Page 26



01

PLASTIC IS A PROBLEM FOR THE ENVIRONMENT. WOULDN'T IT BE BETTER TO AVOID PLASTIC ALTOGETHER?

PROPORTION OF PACKAGING WHEN TRANSPORTING YOGHURT (WEIGHT)



Plastic has recently become a target of criticism. The fact that it is not biodegradable and that there is still much room for improvement when it comes to recycling has given plastic a much worse public image than other materials such as glass or paper. But are these materials really better? Should they, for instance, be used to replace plastic as a packaging material?

No, that would be too short-sighted. Plastic is clearly the better choice in many cases – sometimes it is even indispensable. In medical technology, plastic helps us save lives (e.g. infusion or blood bags, syringes). Its application in the automotive industry, or in technical films in computers and smartphones, is crucial for much of our contemporary mobility. Plastic packaging is also important **for food protection and hygienic handling.**

► Questions 5 & 6

When it comes to **environmental protection**, plastic is often an important part of urgently required solutions!



Plastic is part of the solution:

- Saving of energy:
E.g. with light packaging (reduced transport emissions), thermal insulation in building construction (window frames etc.), weight reduction in automotive construction
- Renewable energies:
Plastic films are an important component of photovoltaic modules
- Electromobility:
Inconceivable without battery separators made from plastic

It is therefore neither reasonable nor realistic to avoid plastic altogether.

Plastic is a reusable material.

That is what we have to communicate, thereby changing the behaviour of people all over the world.

02

WHAT MIGHT THE CONTRIBUTION OF THE BRÜCKNER GROUP COMPANIES TOWARDS THE SOLUTION OF THE PROBLEMS LOOK LIKE?



Consumer behaviour has changed. Instead of going to the weekly market, we buy things at the supermarket or via the Internet.



We are all part of the value chain – the manufacturer of the plastic granulate, the film and packaging producer, the trader and the consumer. So we all share the responsibility for what happens to plastic waste. **Environmental protection** is also a matter of **attitude!**

This is why the Brückner Group companies examine all factors in company operations to determine whether things can be improved – starting with simple matters of waste separation at the offices, all the way to complex technical solutions in our machines.

Packaging design

Packaging design that has been thoroughly considered from the start saves raw materials and optimises recyclability.

► Question 12

Bioplastics

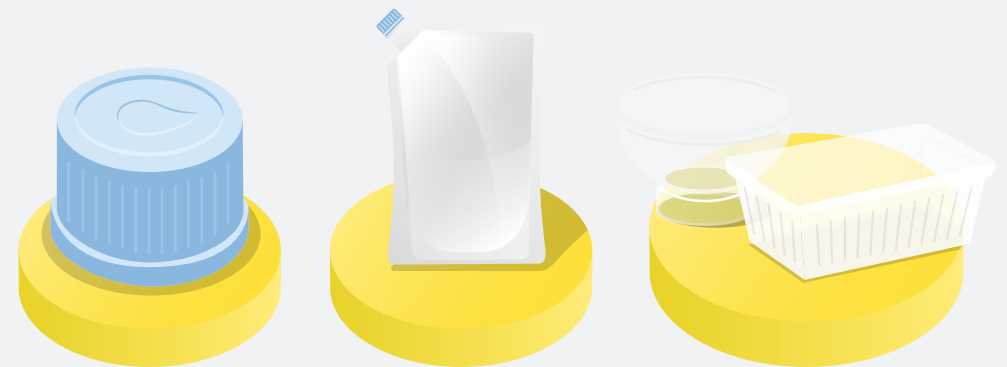
For years we have been carrying out research into the use of alternative plastics, and many of our machines can already process such materials.

► Question 4

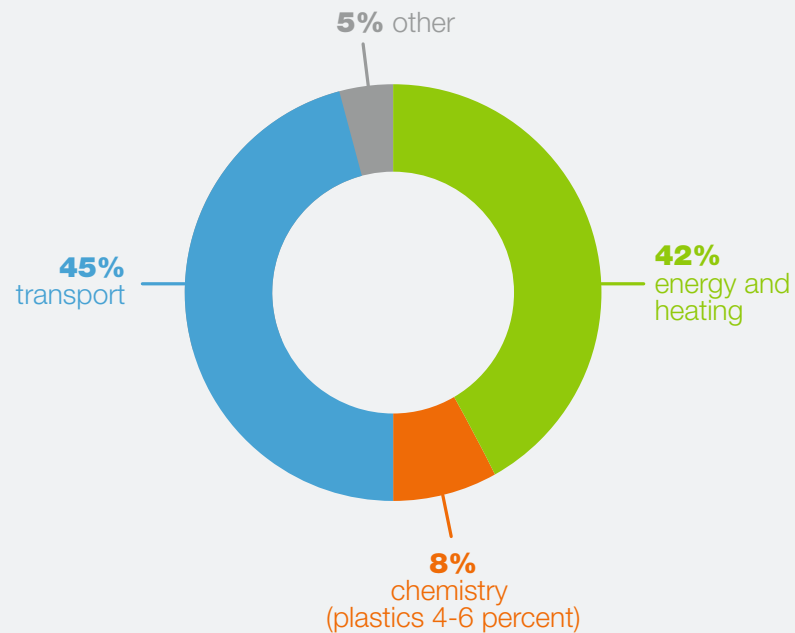
We invest in innovative **technologies** such as special films for photovoltaic systems or battery separator films for electromobility.

► Question 10

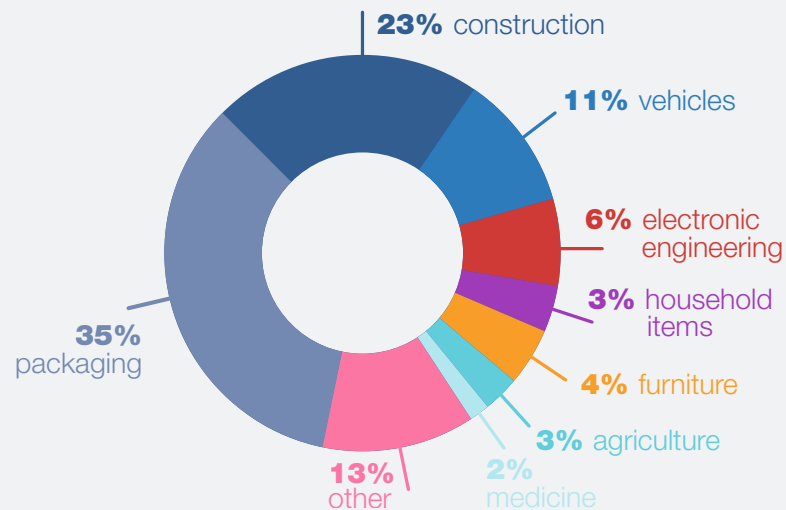
We are serious about our motto **YES, WE CARE.** This is why the issue will also continue to concern us **in the future.**



SHARE OF PLASTICS IN
TOTAL CRUDE OIL AND NATURAL GAS CONSUMPTION



WHERE PLASTICS ARE USED



Source: PlasticsEurope

03

PLASTIC IS MADE FROM CRUDE OIL,
 A FINITE RESOURCE.
**HOW MUCH CRUDE OIL IS USED
 FOR PLASTICS PRODUCTION?**

The answer may surprise many: Only a very small part of our crude oil and natural gas – actually 4-6 % – is used for producing plastics! It is used for manufacturing packagings, building materials, vehicle components, medical technology, furniture, household items and many other things. The main part of our oil and gas reserves, however, is used for transport and traffic, as well as for energy and heating.

In contrast, the raw materials are not lost when they are used to make plastic: Plastic can be recycled and reused.

Plastic waste is valuable!

Initiatives such as Plastic Bank or Waste-Free Ocean – to name but two of many – help to ensure that plastic is recognised as a reusable material. An increasing number of manufacturers are undertaking to produce packagings made from recycled plastic.

▶ Question 8

*Figures: PlasticsEurope

04

HOW DO WE ADDRESS THE STEADY INCREASE IN CONSUMPTION OF NON-RENEWABLE RESOURCES? **ARE BIOPLASTICS A SOLUTION?**

We first have to make distinctions here – because “bioplastics” is a collective term that is used for two very different concepts: **biobased plastics** and **biodegradable plastics**.

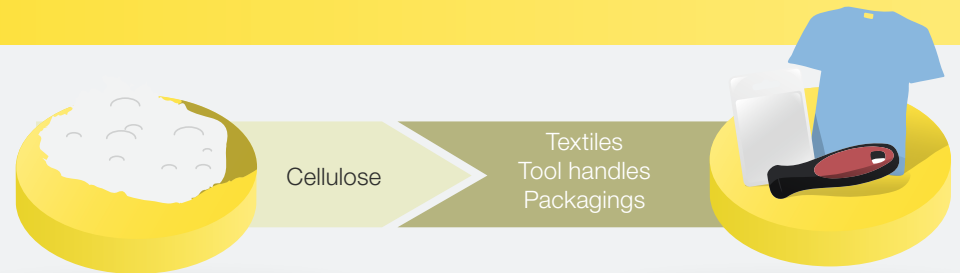
Biobased plastics

These are partly or completely made from renewable raw materials. Copolyester systems, starch-based materials, polylactic acid and cellulose materials are primarily used today. They can be, but do not have to be, biodegradable!

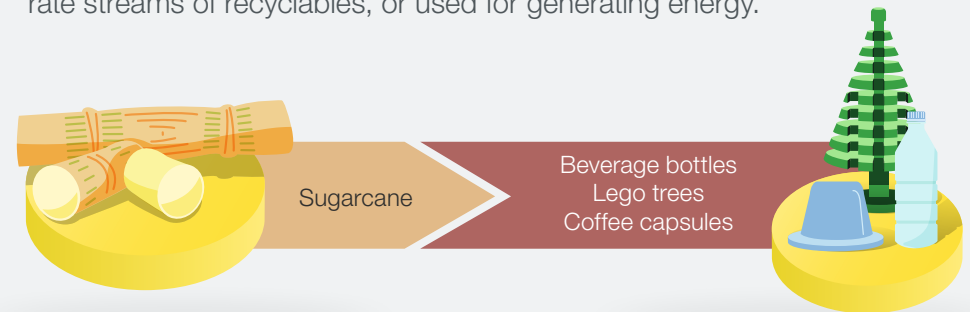


Biodegradable plastics

These can be based on renewable raw materials as well as on crude oil – and under specific conditions (temperature, humidity, oxygen), within a defined period of time, they can be converted into water, carbon dioxide and biomass.



However, how can consumers differentiate between biodegradable and non-biodegradable plastics? Without labelling it is not obvious, and this is why biodegradable plastics often end up in the bins for residual waste. Currently they cannot be recycled easily. They have to be sorted into separate streams of recyclables, or used for generating energy.



Moreover, biobased plastics are often made from starch (maize, wheat, potatoes etc.) or from sugarcane. They therefore compete with food for cultivation areas, and/or their production requires a large amount of water and fertilisers.

This is why bioplastics are a possible step in the right direction, but not a 100 percent sustainable solution. We need much more research in this area!

The **Brückner Group companies** offer progressive layouts for new facilities and/or modifications of existing facilities to allow the processing of materials on a biological basis, e.g. Bio-PE, Bio-PA, Bio-PET or PLA.

05

SHOULD DISPOSABLE PACKAGINGS BE BANNED?

Disposable packagings play an important role with regard to product protection, **hygiene** and **food safety**. ▶ Question 6 This is particularly obvious where medical products, care products or drinking water are concerned. What seems only natural in Europe can only be guaranteed by disposable packagings in many other countries: for example, access to clean drinking water!

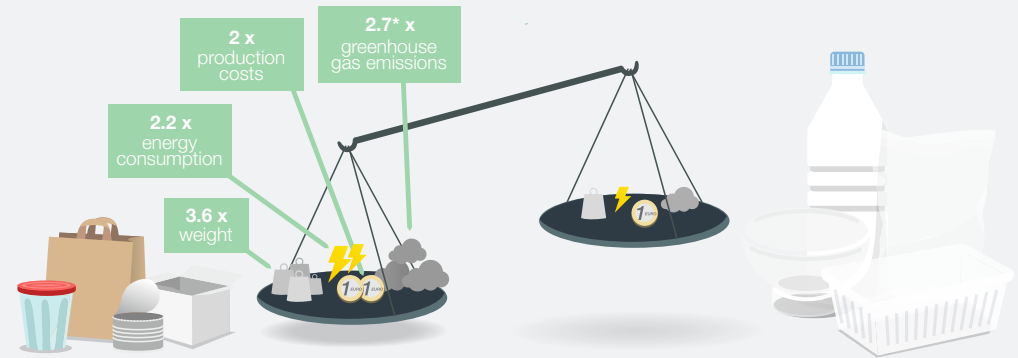
Moreover, **the ecological footprint** of plastic packagings is even better than the one of other packaging materials such as aluminium, sheet metal, paper or glass. A unilateral ban would therefore not be expedient.

Disposable packagings made from plastic are **light and easy to transport**. They therefore not only lead to reduced CO₂ transport emissions, but also to reduced consumption of fuel, i.e. crude oil. Research is constantly being carried out on how to further reduce material and weight.

Disposable packagings also provide crucial **protection for sensitive goods** such as screens, displays, computers, glasses etc. and ensure that the goods reach the consumer undamaged.

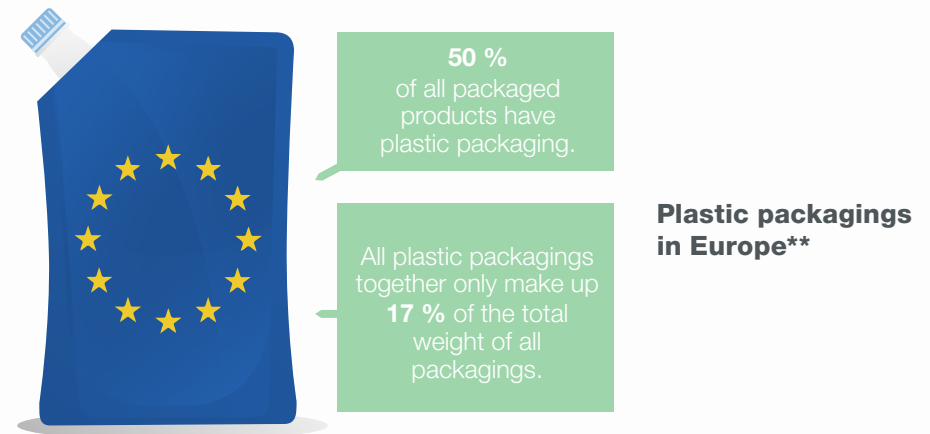
Ecodesign

Ultimately, consistent collection and utilisation, i.e. recycling, is the correct approach to the solution. The right design from the beginning is important for recyclability (materials, foil structure, packaging shape, size, weight etc.). We think ahead!



Replacement of plastic packagings with alternatives*

If all plastic packagings were replaced by alternatives, production costs, weight, energy consumption and greenhouse gas emissions would skyrocket.



Plastic packagings in Europe**

* Figures: BUERGO.FOL / denkstatt

** Figures: PlasticsEurope

06

AREN'T PLASTIC PACKAGINGS FOR FRESH FOOD COMPLETELY UNNECESSARY?

Fruit and vegetables have a skin for protection. Why do we have to add extra packaging?

In many countries, the hygienic and climatic conditions are very different from those in places such as Europe. There are far fewer refrigerated vehicles or refrigerators, and transport links are often very time-consuming. Packagings are very important here – even for fruit and vegetables – to prolong the food's shelf life and to secure food for the growing world population in this way.

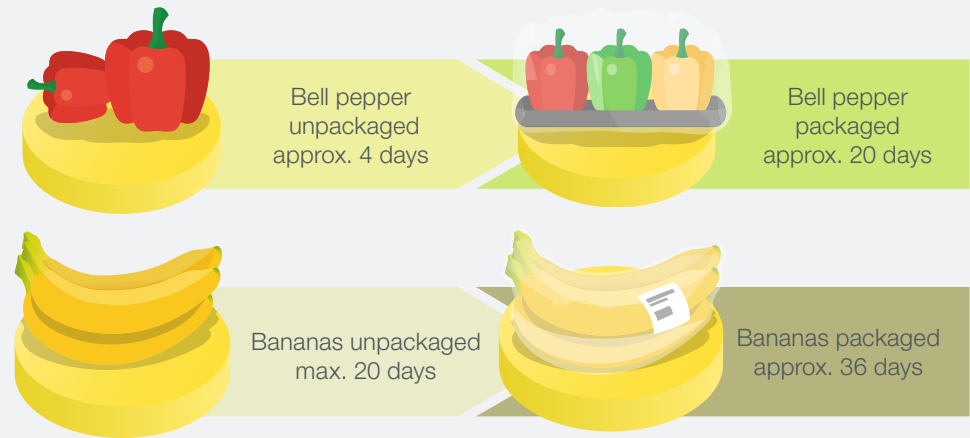
However, prolonged shelf life and (transport) protection are important everywhere – also in Europe – when one considers how much food is thrown away. Optimised packaging is always better than discarded food if we compare the costs and benefits from an environmental and financial point of view. Think of the CO₂ footprint of a steak, or of the amount of meat equivalent to 75 million cows* that is thrown away every year.

Water in small bottles and cups?

In many countries, clean drinking water can only be made available with the help of plastic packagings and sealed lids.

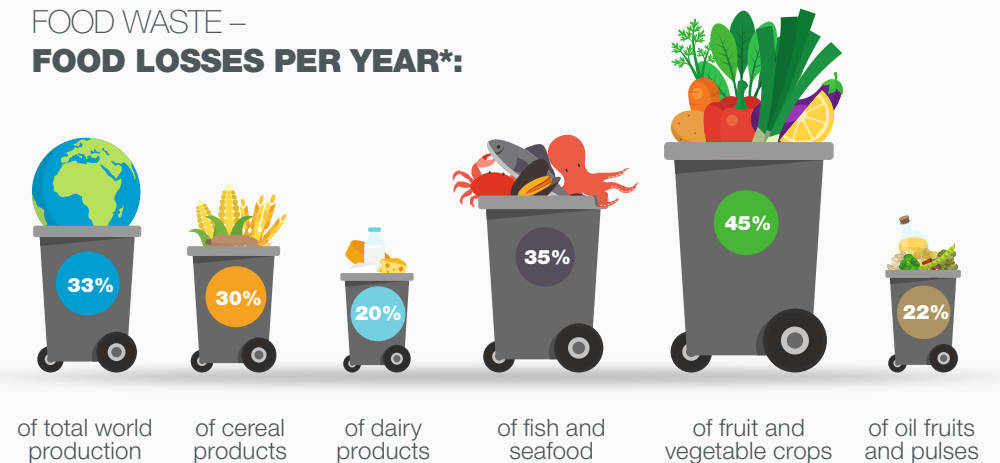
There are major **differences in the countries** that have to be taken into consideration: for example, in their disposal and recycling systems. However, the rule **everywhere** should be: **plastic is a reusable material!**

PROLONGED SHELF LIFE



Figures: FPA Value of Flexible Packaging in Extending Shelf Life and Reducing Food Waste Report / Brückner Maschinenbau

FOOD WASTE – FOOD LOSSES PER YEAR*:



* Figures: Food and Agriculture Organization of the United Nations (FAQ), 2015

* Figures: Food and Agriculture Organization of the United Nations (FAQ), 2015

07

HOW DO PLASTICS AND MICROPLASTICS END UP IN THE OCEANS? AND HOW CAN THIS BE PREVENTED?

Sources of microplastic in the ocean (mainly via wastewater):

- from cosmetic products
- from cleaning agents
- from washing plastic clothing
- pulverized plastic waste
(due to time, sun, wind and water)

PLASTIC WASTE THAT IS DISPOSED OF INCORRECTLY
IS THE MAIN PROBLEM!

Sources of plastic waste in the ocean (partly due to the wind):

- from landfills
- from overflowing bins
- thoughtlessly discarded rubbish
- industrial waste that was disposed of incorrectly
- waste that was incorrectly disposed of in the toilet
- fishing nets
- lost freight from ships



Marine Litter concerns all of us, even when different studies show that the main polluters are China, Indonesia, Thailand, Vietnam, the Philippines and India*. In these regions, where the problem is difficult to tackle, the Brückner Group companies want to address the prevention and elimination of “ocean waste” and “lend a hand” financially – and, where appropriate, provide assistance through local branches of the Group.

► Question 8 In the end we are all responsible!

* Source: ISWA – International Solid Waste Association

08

DOES THE BRÜCKNER GROUP SUPPORT RELATED INITIATIVES OR PROJECTS?

In line with YES, **WE CARE**, this is one of our main concerns. We are currently examining different projects so that we can take appropriate action and/or provide support. These include:



plasticbank.org

Plastic Bank

An organisation that combats both plastic waste and poverty by paying people who collect plastic, and also by offering them social security (health insurance etc.).

THE OCEAN CLEANUP

The Ocean Cleanup

Project of the Dutchman Boyan Slat, aiming at collecting more than 50% of waste in the Pacific Ocean within five years.



Seabin Project

The Seabin, a kind of floating bin, uses a funnel for collecting plastic waste in ports, etc. Moreover, the project team counts on knowledge transfer as the most important instrument for saving the oceans, and has developed an Open Source Education Program for this purpose.



Garbage Clinical Insurance

A health insurance system in Indonesia that uses (plastic) waste as currency. People who collect waste regularly get free access to healthcare services. The waste is separated and reused.

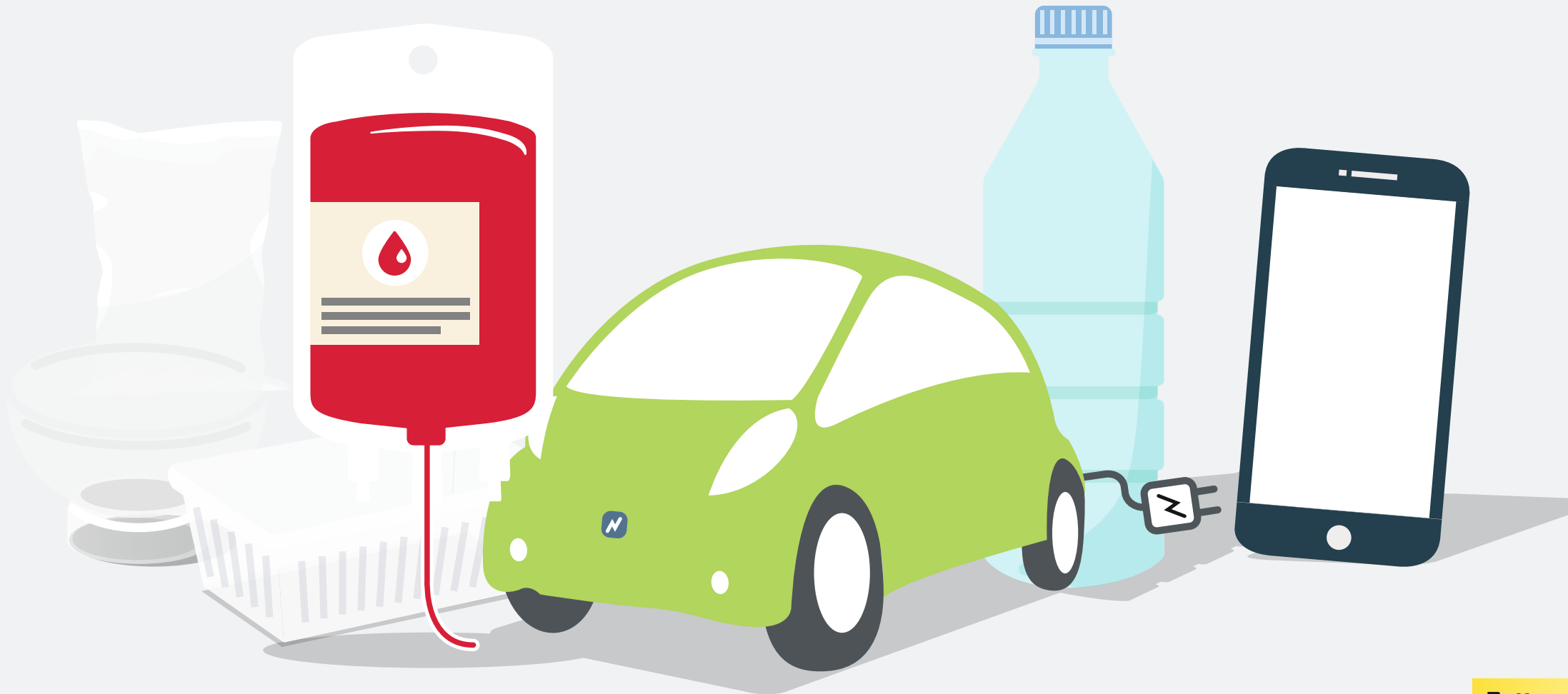
We're looking forward to further proposals!

09

DOESN'T YES, **WE CARE** CONTRADICT OUR BUSINESS IDEA, JEOPARDIZING THE REDUCTION OF PLASTIC CONSUMPTION AND **ULTIMATELY PUTTING OUR JOBS AT RISK?**

At first sight it might appear as if a reduction in plastic consumption contradicts the objectives of our companies and our daily work.

However, if you have read this carefully, you will see that this is not about condemning plastic or even about banning it. Plastic is far too important, and has too many positive qualities. **Rather the aim is to stop pollution caused by plastic.** We must change the public perception: **Plastic is a reusable material.** A cycle of reuse for this material has yet to be created and optimised – all over the world.



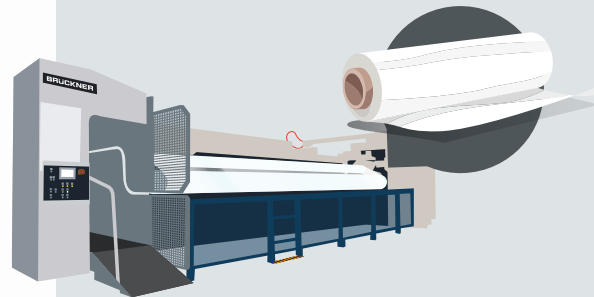
10

WHAT ARE THE BRÜCKNER GROUP COMPANIES ALREADY DOING TECHNOLOGICALLY REGARDING SUSTAINABILITY?

The issue of sustainability has been important to us since well before YES, **WE CARE.** The machines at all the companies of the Brückner Group meet the highest technological requirements, and we invest a considerable amount in remaining state-of-the-art by means of cutting-edge technology. Recyclability of manufactured products, low energy consumption at our production facilities and sustainability throughout the production process are central themes. Here are some of many examples – we are constantly **developing new ones:**

Brückner Maschinenbau

Our BOPET facilities produce single-origin films and thus stand for ultimate recyclability. All raw materials of these single or multilayered, biaxially oriented films originate from a common polymer group, and can therefore be recycled into high-quality regranulates.

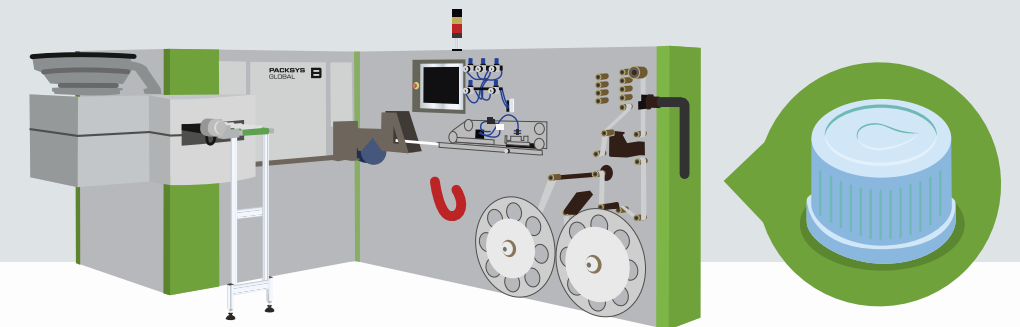
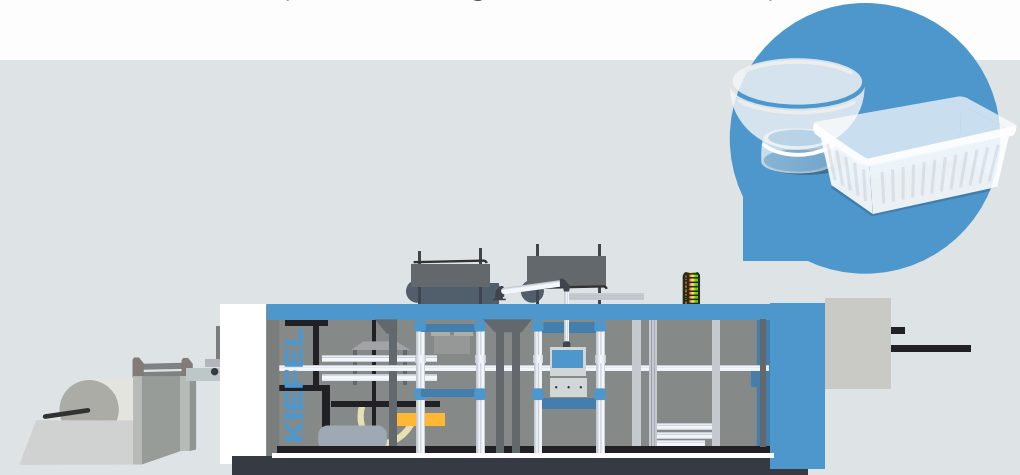


Brückner Servtec

We regularly modify older production facilities to ensure that they are up-to-date with current technologies. Depending on the upgrade, we optimise numerous processes: we reduce the energy consumption of the facilities, shift to production of thinner films or single-material multilayer films, or convert the facilities in such a way that they can process biobased materials.

Kiefel

We keep an eye on the development of biobased and biodegradable plastics, and test new materials for applicability in our own laboratory. We are also carrying out active research, and we have a great deal of experience with PLA. With the collaboration of manufacturers of raw materials and additives, we have succeeded in increasing temperature stability, and our machines can now produce biodegradable PLA coffee cups.



PackSys Global

We develop tubes that are made entirely – including the lid – of a single material (PP) for better recyclability. Furthermore, we are developing safety caps for PET bottles which stay attached to the bottle so that both can be recycled together.

11

HOW DOES WASTE MANAGEMENT ACTUALLY WORK?

Our waste can go different ways: to the landfill, to thermal utilisation (energy generation through waste incineration), to recycling, or it can be used again directly as a reusable product.

For plastic, recycling is the solution that generates the most value. This is why all products must be designed to be as recyclable as possible, e.g. by working with unmixed raw materials.

► Question 10

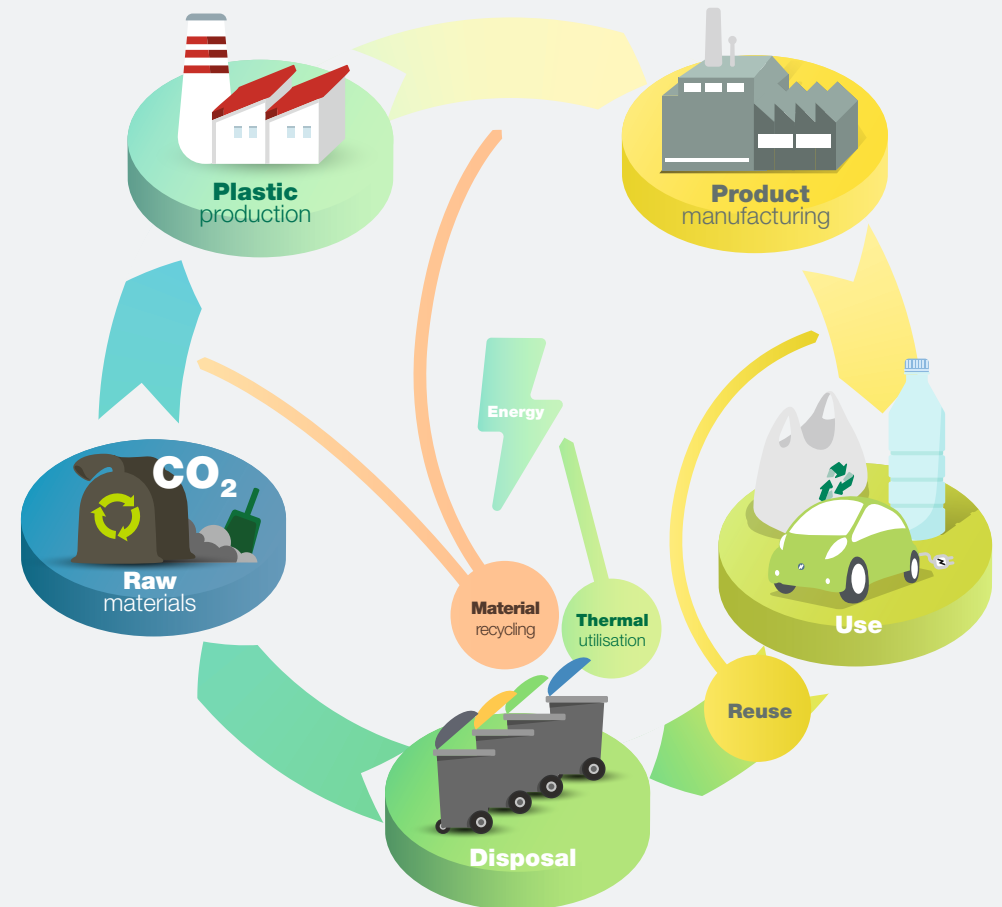
No plastic should end up on **landfills**. Anything that cannot be recycled should be incinerated. Valuable energy is generated through **thermal utilisation**, and this also protects other resources. It is always best if we can prevent or **reduce** waste altogether.

In summary: **reduce – reuse – recycle**.

What might work quite well in most parts of Europe is still very different in other regions of the world. When it comes to collecting waste, sorting, and recycling, there is **enormous scope** for development in these regions.

EU objectives for waste and recycling:

- No more plastic waste on landfills by 2030
- 30 % less food waste by 2025
- 80 % packaging recycling by 2030



12

A FUNCTIONING CIRCULAR ECONOMY
CAN HELP SOLVE MANY PROBLEMS.

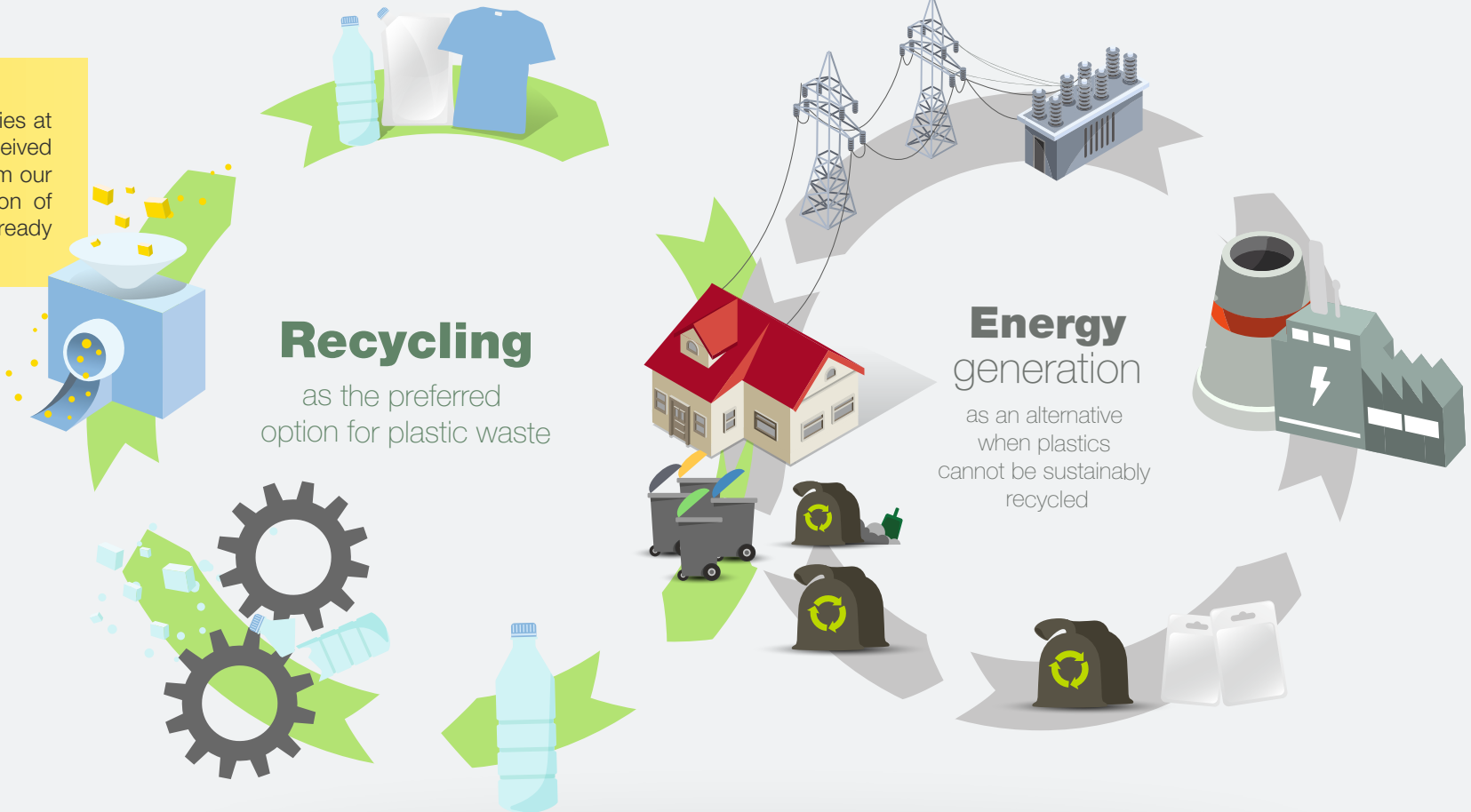
WHAT CAN OUR GROUP AND EACH INDIVIDUAL DO IN THIS RESPECT?

We can all contribute by collecting and sorting out our waste in a better and more consistent way. Environmental protection and sustainability must become the accepted norm in our thinking and acting.

Valuable impulses

The same goes for our companies at the different locations. We received plenty of input in this regard from our employee survey. Implementation of some of these suggestions is already underway.

The main objective of the Brückner Group is to align the requirements for sustainability regarding material, product and machine. The other members of the value chain – raw material manufacturers, film and packaging manufacturers, brand owners and traders – have recognised that much needs to be done for the circular economy. Corresponding initiatives have already been started.



CEFLEX, a pan-European association of companies that addresses the entire value chain of flexible packaging, is an example of such an initiative, and Brückner Maschinenbau is also a member.

The aim is to strengthen the circular economy through the right developments in material and packaging design, to further develop sorting and recycling technologies, and thereby to improve the recycling rate.

We want to be ambassadors for the correct handling of plastic!

DON'T STOP
PLASTIC –
**BUT PLASTIC
POLLUTION!**

AFTERWORD

The world today would be inconceivable without plastic, but we have no choice: it is essential that we change our way of handling it. It is especially important to close the reusable material cycle. All parties involved – the product and packaging designers, the consumers, the recyclers – must all work together. This is our ambition, and our promise – especially where our employees are concerned.

This is an immensely dynamic topic, so a booklet like this one can never be complete. We will, however, continually and intensively address the topic of plastic and the environment. We are also looking forward to continuing close consultations with you. We want to inform, discuss and act. Together with you!

Because we care.



YES, **WE CARE**
is an initiative of:

www.brueckner.com

Brückner Group ▪ Brückner Maschinenbau ▪ Brückner Servtec ▪ Kiefel ▪ PackSys Global