

ENVIRONMENTAL
SUSTAINABILITY
AT ALPLA

ALPLA

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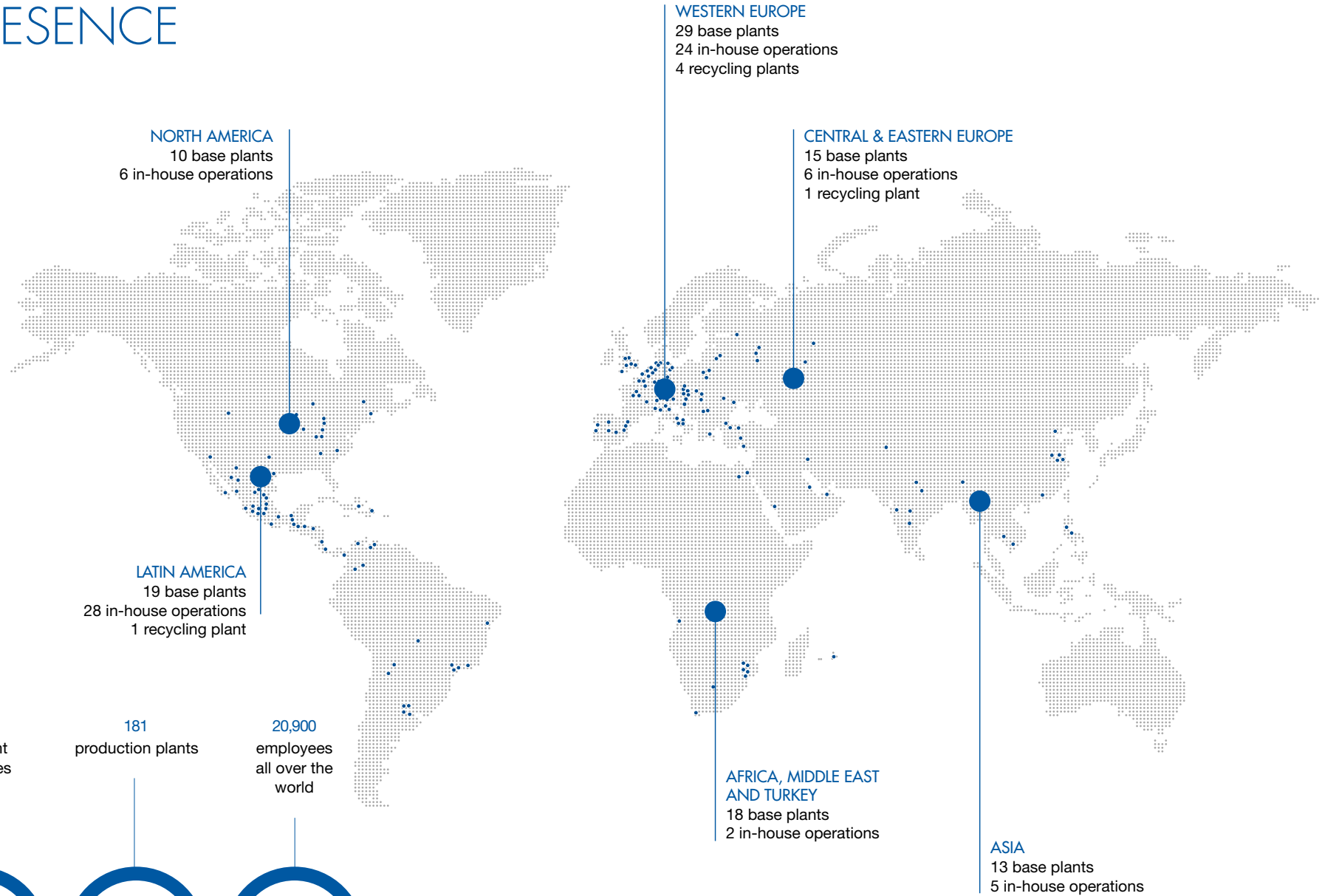
WE ARE THE FAMILY OF PIONEERS.

ALPLA produces plastic packaging worldwide to meet your daily needs. We are one of the market leaders and a family-owned company.

We supply high-quality plastic packaging to brands in the food, beverage, pharmaceutical, oil and lubricant, home care, beauty care and crop protection industries. Our highly qualified employees carry out research in a variety of fields. The latest technologies and close collaboration with our customers bring about innovative products of excellent quality.

As the world's largest family-run company producing packaging solutions, we are well aware that our employees are our foundation and our most valuable asset. Fairness, respect and social responsibility towards them, as well as our partners, customers and environment, characterise our thinking and way of working in all locations worldwide.

GLOBAL PRESENCE

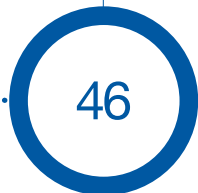


3.8
billion euros total
sales 2018

46
different
countries

181
production plants

20,900
employees
all over the
world



ENVIRONMENTAL AWARENESS AND EFFICIENCY - A STRONG COMBINATION AT ALPLA:

ALPLA Sustainability integrates social, environmental, ethical and human rights concerns into the business operation and core strategy. This booklet exclusively focuses on the company's environmental sustainability approach.

An important obligation of ALPLA is to create innovative ways of allowing future generations to live and grow up in an intact environment.

To live up to this responsibility, ALPLA pursues a resource-conserving policy in all its areas of impact:



MATERIAL



ENERGY



WATER



TRANSPORT

More information:
sustainability.alpla.com

ENVIRONMENTAL SUSTAINABILITY AT ALPLA



As one of the world's leading companies in the plastic packaging industry, ALPLA is aware of its great responsibility to the future of the world. To live up to this responsibility, ALPLA pursues a resource-conserving policy in all areas, and incorporates sustainability into its core strategy.



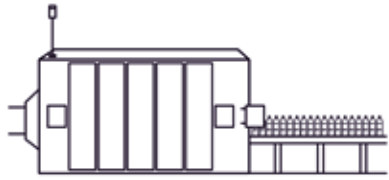
Renewable energy is used wherever possible (photovoltaic, wind and water). Our production plants in Mexico, for example, are running on 65 percent wind energy. ALPLA's global fresh water consumption has been

reduced by forty percent (base year 2011) through the implementation of closed loop water systems. In addition, we collect and report data regarding our global energy and water consumption. The performance of ALPLA plants around the world are assessed, and individual action plans are developed by a team of experts to optimize a plant's environmental performance.



ALPLA believes in recycling even though economic conditions, depending on the fluctuating prices of raw oil and the related price of new (virgin) PET, do not favour the recycling of plastics. ALPLA runs several recycling plants and participates in a

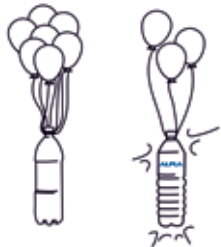
number of cooperations in the field of recycling. The recycled PET (rPET) produced in Austria and Poland has a carbon footprint of 0.21 resp. 0.27 kg CO₂-equivalent per kilogram. That results in approximately 90 percent less greenhouse gas emissions compared to virgin PET (2.19kg CO₂-eq./kg). To enhance and support our recycling activities at ALPLA now and in the future, we have dedicated a budget of more than 50 million euros for the development of recycling activities by 2025.



ALPLA's in-house operations are optimising our delivery systems, but also saves secondary packaging materials and CO₂ emissions caused by transportation. Currently, 71 ALPLA in-house production plants are implemented around the world.



The development of new packaging materials is a big opportunity to effectively reduce negative environmental impacts. ALPLA works with bio-based plastics made of plants, such as sugar cane (PlantBottle™). ALPLA also works with customers in the development of compostable materials, like home compostable coffee capsules [A]. Most recently, we are testing new materials beyond plastics. Go online to our press releases to learn more about our latest advancements [B].



Constant optimisation, design adjustments and improvements in the production process allow for significant reductions in the weight of packaging products. The following example represents a huge success of lightweighting at ALPLA.

Bottle size:	1 Liter
Bottle in 2005:	31g
Bottle in 2017:	22g
Reduction by:	29%

PROJECTS & INITIATIVES SUPPORTED BY ALPLA



THE GREAT BUBBLE BARRIER

Bubble barrier technology in rivers and canals to collect plastics while allowing for the passage of fish and river traffic.

WASTE FREE OCEANS

Collecting and transforming floating ocean plastic by recycling raw material into sustainable products.

HELIOZ

Water disinfection project in India; distribution of solar powered UV-measurement devices, which serve as an indicator for the process of solar water disinfection in transparent PET bottles.

As a family-owned company, financial support of social and environmental projects is part of ALPLA's philosophy. Some of the recently sponsored projects are:

ELLEN MACARTHUR FOUNDATION

In 2018, ALPLA joined the New Plastics Economy of the Ellen MacArthur Foundation. ALPLA's commitment, partnership and ambitious recycling targets until 2025 will contribute to a circular economy.

ALPLA'S BEST PRACTICE PRODUCTS

ALPLA produces a variety of sustainable products for different customers. An overview of our best practice products is provided below.

WERNER & MERTZ

- Detergents and households
- 100% rPET (recycled PET) in all bottles
- Connected to other recycling initiatives ("yellow bag" in Germany)
- 100% recyclable



VÖSLAUER

- Several types of mineral waters
- Up to 100% rPET in all bottles
- 100% recyclable



UHU STIC RENATURE

- Container from 58% plant-based raw material
- 46% decrease in CO₂ emissions
- 48% less consumption of fossil raw fossil materials
- 100% recyclable



ECOVER

- Up to 100% recycled plastic
- Reduction of CO₂ emissions and the use of fossil raw materials
- 100% recyclable



HENKEL

- All Perwoll Wolle & Feines bottles with 25% rHDPE
- Recycling HDPE is more difficult than recycling PET
- 100% recyclable



P&G

- Head & Shoulders bottles with up to 25% recycled beach plastic
- Usage of 50% rHDPE
- 100% recyclable



UNILEVER

- Foam bottles
- Material and weight reduction by 15% with equal functionalities and recyclability through foaming technology
- Project partner: MuCell®
- 100% recyclable



MILK MARKET UK

- Eco bottles
- Super lightweight HDPE bottles for Arla Foods & Müller Wiseman Dairies
- Bottles contain up to 30% recycling material
- 100% recyclable



L'ORÉAL

- L'Oréal Paris Botanicals
- 100% rPET
- 100% recyclable



PEPSI

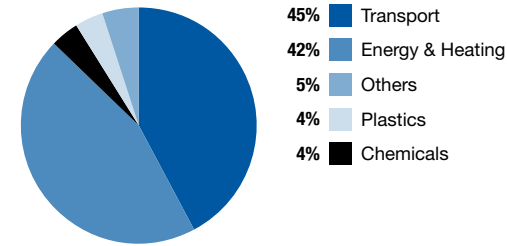
- Pepsi
- Usage of 50% rPET
- 100% recyclable



PLASTIC FACTS

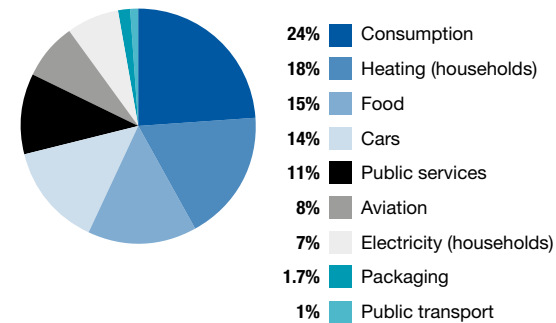


GLOBAL USAGE OF EXTRACTED CRUDE OIL



Plastic is generated out of crude oil, consuming 4% of the extracted oil worldwide. 36% of plastic products are manufactured into plastic packaging material, of which a portion is used for the production of plastic bottles [1].

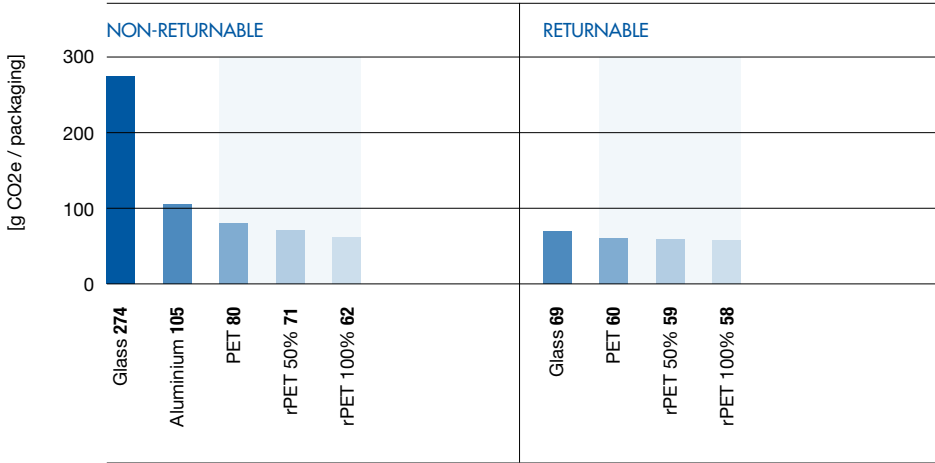
AVERAGE EUROPEAN CONSUMER CARBON FOOTPRINT BY SEGMENTS (2011)



All packaging materials (both domestic and commercial) account for 1.7 percent of the total average consumer carbon footprint in Europe, with plastic packaging being related to 0.6 percent of the average consumer carbon footprint [2].

CARBON FOOTPRINT OF DIFFERENT BEVERAGE PACKAGING MATERIALS

(0.5L CARBONATED SOFT DRINK IN AUSTRIA)



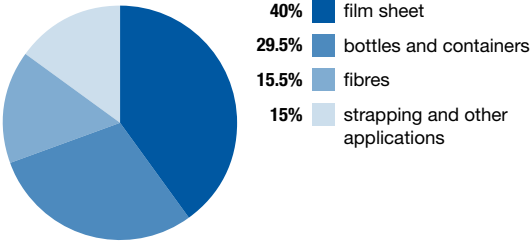
The carbon footprint of plastics is competitive to its glass and aluminium alternatives. In the case of carbonated soft drinks in Austria, returnable plastic bottles have the lowest carbon footprint when compared to other beverage packaging options. While, single-use glass bottles have a carbon footprint that is over three

times that of a PET bottle made from virgin material [3]. Returnable PET bottles can be reused about 30 times, then the bottles have to be recycled in order to keep the material in a circular economy.

Plastic is highly recyclable with the ability to be collected, reheated and reprocessed several times without remarkably losing material integrity. The biggest challenge today with plastic recycling is that materials coming out of one application field are not always recycled in a way that maintain the high quality characteristics that are needed for re-use in the same field (e.g. bottle-to-bottle). Very often plastic products find new application fields (e.g. textile fibers) after being recycled, without going through the additional processing steps required to re-enter the product's original stream (i.e. production of food grade plastic material).



APPLICATION FIELDS OF RECYCLED PET, 2017 [4]



At recycling plants, plastics are sorted according to their colour and material. The separated plastics are then sliced into flakes and washed. The clean plastic flakes get melted together, extruded through small holes, and then chopped into pellets. These recycled plastic pellets are then turned into products like fiber, strapping, and food/beverage containers.

CALORIFIC VALUE OF MATERIALS USED IN ENERGY RECOVERY

Fraction	Net calorific value (MJ/kg)
Plastics	35
Textiles	19
Paper	16
Other materials	11
Organic material	4
Glass	0
Metals	0

[5]

If plastic packaging is not recycled, the material can still be used for energy recovery as an alternative to landfilling. Plastic has a thermal value in countries where thermal treatment is used for energy generation. While plastic can be taken out of the stream, it would have to be substituted with alternative raw materials to ensure an adequate thermal value. As an example, 15 percent of the plastic waste in

the US was used for energy recovery through thermal recycling in 2014 [6], and Germany had a thermal recycling rate of 53 percent of its plastic waste in 2015 [7].

CLEARING UP SOME PLASTIC MYTHS



Myth 1 PLASTIC PACKAGING IS NOT NECESSARY

THE TRUTH:

Plastic packaging protects foods and enables the transportation and hygienic storage of foods and beverages. It also prolongs the durability of these products significantly [8].

WHY IS THIS IMPORTANT?

Food waste accounts for eight percent of the greenhouse gas emissions caused by humans [9]. Around a third of the foods produced worldwide ends up as waste. This is a remarkable amount of waste and not just from a financial perspective. If even only a quarter of the food waste was saved, then 870 million people could be saved from hunger [10]. Land, energy and a significant amount of water are required to produce this needlessly discarded food [11]. Only for it to end up in the rubbish bin?

Plastic packaging prevents the wastage of food products and thus has a positive impact on climate change.

TIPS FOR YOUR DAILY ROUTINES:

Think about what you need when you go shopping, only buying what you need. Make sure that you keep foods properly chilled and hygienically sealed. Freeze food products in good time if you are not able to consume them while fresh.

Do not waste, taste! Even if the best-before date may have passed, many food products are still fine and edible. So do not discard food products without thinking. First, check them carefully, smell them and taste them.



Myth 2 PLASTIC PACKAGING IS A WASTE OF NATURAL RESOURCES

Plastic is created from natural resources such as crude oil, natural gas, coal and cellulose. However, just four percent of the crude oil produced worldwide is used for the production of plastics and just 1.4 percent for plastic packaging. 87 percent is used for the generation of fuels for energy generation, heating and transportation [12].

**FROM CRUDE OIL TO PLASTIC:
HOW DOES IT WORK?** The first step takes place in an oil refinery. Through a process of distillation, the heavy crude oil is split into groups of lighter components (fractions). Each fraction is a specific chemical compound of carbon and hydrogen (hydrocarbon chains), which differ in the size and shape of their molecules. Petroleum (naphtha) is the most important fraction for the production of plastic [13].

THE FACTS:

It is true that most plastics are produced from fossil fuels at the present time. However, only a small amount of output and only certain chemical components are used.

ALPLA supports the development of bio-based plastics from renewable resources. Agricultural waste or wood, for example, are suitable for this. In addition to saving fossil resources, these plastics also offer very good properties (e.g. barrier function).

ALPLA believes in recycling: our recycling plants produce about 100,000 tonnes of food-grade rPET each year. The technology has now become so sophisticated that the production of rPET in Wöllersdorf (Austria) and Radomsko (Poland) generates only one tenth of the greenhouse gas emissions of virgin materials. Recycling therefore has enormous potential and can play a major role in achieving global climate targets.



Myth 3 PLASTIC BOTTLES ARE MORE DAMAGING TO THE ENVIRONMENT THAN GLASS BOTTLES

THE TRUTH:

The carbon footprint of PET bottles is generally lower overall than that of many other types of drinks packaging. In fact, the carbon footprint of disposable glass bottles is three times higher than that of disposable PET bottles [14]. One reason for this is the high amount of energy required for the production of glass. Glass only begins to melt at temperatures of over 1000°C.

Packaging should never be considered in isolation in this discussion. Not every packaging solution is equally suitable for each type of product. Durability and transportation, as well as handling for the consumer (e.g. residual emptying), are important factors with regard to the best and most sustainable solution.

THE FACTS:

Material usage – a PET bottle with a capacity of 330 ml weighs around 18 grams, while a comparable glass bottle weighs around 200 grams or more. PET bottles are very light in weight and thus save a considerable amount of materials.

Transportation – packaging weight is particularly important in relation to transportation. Around 40 percent more energy is required to transport heavier glass bottles than PET bottles [15]. This means higher transport costs as well as higher costs for consumers. The increased CO₂ emissions also have negative effects on the environment.

Recyclability – PET has excellent recyclability; particularly in comparison to foil materials, composite materials and aluminium. This, this is a major benefit.



Myth 4 PLASTIC PACKAGING PRODUCES LARGE QUANTITIES OF WASTE THAT IS NOT RECYCLED

Plastics can be recycled very effectively. PET is particularly recyclable, while materials such as HDPE or LDPE can also be reintroduced to the materials cycle. Most plastics can be reprocessed many times without any significant loss in quality. Most useful is the cradle-to-cradle principle where new packaging is created out of used packaging. However, plastic packaging is also often recycled for other applications, such as textiles. This type of recycling is known as downcycling. When plastics can no longer be recycled, 'thermal recycling' to produce energy is preferable to landfilling.

ALPLA has been actively involved in recycling for over 25 years. With our own recycling company (PET Recycling Team GmbH) and long-term collaborations, we have considerable expertise in this area. We are currently expanding our activities with the goal of building a centre of expertise for recycling technology. Our customers particularly value our extensive experience in processing recycled plastics into new packaging.

Many of our customers have set ambitious sustainability targets for themselves and are looking to increase the recycled content of their packaging. New laws and regulations, such as the EU plastics strategy, are also leading to an increase in recycling rates. This calls for well-functioning waste disposal systems to ensure that sufficient post-consumer materials are available to recycling companies. More than 40 years after the launch of the first universal recycling symbol, only 14 percent of plastic packaging is collected for recycling [16]. In countries with a well-functioning waste management system, a high percentage of plastic packaging is collected for recycling.

In 2017, the PET collection rate was 95.7% for Germany, 92.0% for Finland, and 86.4% for Croatia [17], and 29.2% for the US [18]. In South Asia and Sub-Saharan Africa, between 80 and 90 percent of plastic waste is inadequately managed [19]. This provides compelling evidence for the need for exploration and the development of a circular economy by increasing the system effectiveness of material flows globally.

TIPS FOR EVERY DAY:

Plastics should be seen as valuable materials that should not end up in landfills and certainly not in nature. Each of us can play our part in maintaining a functioning circular economy. Here are a few simple tips for how to handle used packaging properly:

Never discard packaging carelessly. This of course applies to all types of waste.

Separate waste correctly (plastics, glass, paper, organics, residual waste) and dispose of it in the correct bins provided. Ideally, waste should be as clean as possible.

Where possible, when you go shopping try to buy products in recycled plastic packaging.



Myth 5 PLASTIC PACKAGING ALWAYS ENDS UP IN THE OCEANS

THE TRUTH:

Without a doubt, pollution of the oceans is one of the biggest environmental problems of our time. 80 percent comes from land, with the remaining 20 percent originating from the fishing and shipping industries. Each year, it is estimated that 275 million tonnes of plastic is wasted. Of this, 99.5 million tonnes are generated by populations within 50 kilometres of a coastline, putting it at risk of entering the ocean. 31.9 million tonnes of this plastic waste from coastal populations is inadequately managed or is littered plastic. Each year between 8 and 12 million metric tons of plastic ends up in the ocean [20].

WHAT ARE MICROPLASTICS AND HOW ARE THEY PRODUCED?

Microplastics refer to small pieces of plastic with a diameter of less than five millimetres. One way microplastics can be produced is from the breakdown of plastic products, particularly when these end up in nature. Sunlight, sea salt, bacteria and abrasion accelerate the breakdown process. Depending on the type of plastic, this has different effects on the environment, which are not yet entirely understood.

THE FACTS:

Only consistent collection, sorting and recycling of used packaging prevents it from ending up in nature or the ocean. With this in mind, ALPLA welcomes new laws and measures that increase recycling rates and establish the use of recycled materials.

Microplastics may be produced when packaging ends up in nature. To prevent this, ALPLA is committed to the recycling of post-consumer materials. We also raise awareness of this among our employees through trainings and activities.

ALPLA itself has been active in recycling for more than 25 years and supports its customers in the processing of recycled plastics. We are continually expanding our activities in this area, for example through cooperation with partners such as Texplast (Germany).

ALPLA provides targeted support to non-profit organisations, such as 'The Great Bubble Barrier' or 'Waste Free Oceans' that use various measures to combat oceanic pollution.



Myth 6 PLASTIC PACKAGING IS HAZARDOUS TO HEALTH

THE TRUTH:

Neither PET drink bottles nor caps (PP/PE) or plastic packaging for personal hygiene and household products (PE) contain plasticisers, including the plasticiser Bisphenol A (BPA), to which harmful side effects are attributed.

PET bottles contain small amounts of acetaldehyde, of which higher doses are toxic to internal organs. Acetaldehyde is also found in fruit, fish and cheese, and in the human body as a metabolite [21].

Plastics can be hazardous to health when they leave the circular economy and become environmental pollution. Plastic pollution not only has ecological impacts, but may also contribute to issues of food security, food safety and consequently human health [22]. Recent studies show that large amounts of microplastics are travelling by air, polluting our air, land and waters [23]. It is imperative that everyone, from governments and international organisations to industry and individuals, takes responsibility and actions in stopping plastic pollution.

THE FACTS:

BPA and plasticisers are not used for or added in the manufacturing of our packaging solutions. In the packaging industry, polycarbonate, thermal paper and metal packaging (epoxide coating) are the primary sources of BPA. Plasticisers are used in PVC seals for glass containers.

Acetaldehyde is a naturally occurring substance found in food and in the human body as a metabolite. Acetaldehyde concentrations in PET bottles are low. These products are subject to strict controls and therefore are not a cause for concern [21].

Plastic can even support health: contaminated water can be disinfected via UV radiation in transparent PET bottles. This provides a simple solution that can help people in regions without clean drinking water.

SOURCES:

- [A] <https://blog.alpla.com/en/pressemitteilung/newsroom/first-coffee-capsule-compostable-home/10-18>
[B] <https://blog.alpla.com/en/pressemitteilung/newsroom/alpla-and-billerudkorsnas-join-forces-pioneer-paper-bottles-sustainable>

PLASTIC FACTS:

- [1] <https://www.weforum.org/agenda/2018/08/the-world-of-plastics-in-numbers>
[2] <http://www.agvu.de/wp-content/uploads/sites/7/2018/09/Verpackungen-nutzen-auch-in-%C3%B6kologischer-Hinsicht.pdf>
[3] <https://blog.alpla.com/en/pressemitteilung/newsroom/new-study-quantifies-environmental-impacts-packaging/04-19>
[4] <https://petcore-europe.org/news-events/202-2017-survey-on-european-pet-recycle-industry-58-2-of-pet-bottles-collected.html>
[5] <https://www.kunststoffverpackungen.de/show.php?ID=6126>
[6] https://www.epa.gov/sites/production/files/2016-11/documents/2014_smmfactsheet_508.pdf
[7] <https://www.umweltbundesamt.de/daten/abfall-kreislaufwirtschaft/entsorgung-verwertung-ausgewaehlter-abfallarten/kunststoffab-faelle#-textpart-4>

CLEARING UP SOME PLASTIC MYTHS:

- [8] https://www.worldenergy.org/wp-content/uploads/2017/03/WEResources_Waste_to_Energy_2016.pdf
[9] http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/FWF_and_climate_change.pdf
[10] <http://www.fao.org/save-food/resources/keyfindings/en/>
[11] https://www.researchgate.net/publication/226482170_Role_of_Packaging_in_LCA_of_Food_Products
[12] <https://www.weforum.org/agenda/2018/08/the-world-of-plastics-in-numbers>
[13] <https://www.plasticseurope.org/en/about-plastics/what-are-plastics/how-plastics-are-made>
[14] <https://blog.alpla.com/en/pressemitteilung/newsroom/new-study-quantifies-environmental-impacts-packaging/04-19> (source also used on slide 4)
[15] <https://www.kunststoffverpackungen.de/show.php?ID=5309>
[16] https://newplasticseconomy.org/assets/doc/EllenMacArthurFoundation_TheNewPlasticsEconomy_Pages.pdf
[17] ICIS and Petcore Europe Annual Survey on the European PET Recycling Industry, 2017
[18] https://napcor.com/wp-content/uploads/2018/11/NAPCOR_2017RateReport_FINAL.pdf, 2018
[19] <https://ourworldindata.org/plastic-pollution>, 2019
[20] <https://ourworldindata.org/uploads/2018/08/Plastic-production-to-ocean-input.png>
[21] <https://www.bfr.bund.de/cm/349/selected-questions-and-answers-on-pet-bottles.pdf>
[22] <https://www.sciencedirect.com/science/article/pii/S0025326X1830376X>
[23] <https://www.scientificamerican.com/article/earth-has-a-hidden-plastic-problem-mdash-scientists-are-hunting-it-down/>

Further information regarding ALPLA's sustainability performance can be found on our homepage and in our most recent sustainability report: www.alpla.com

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