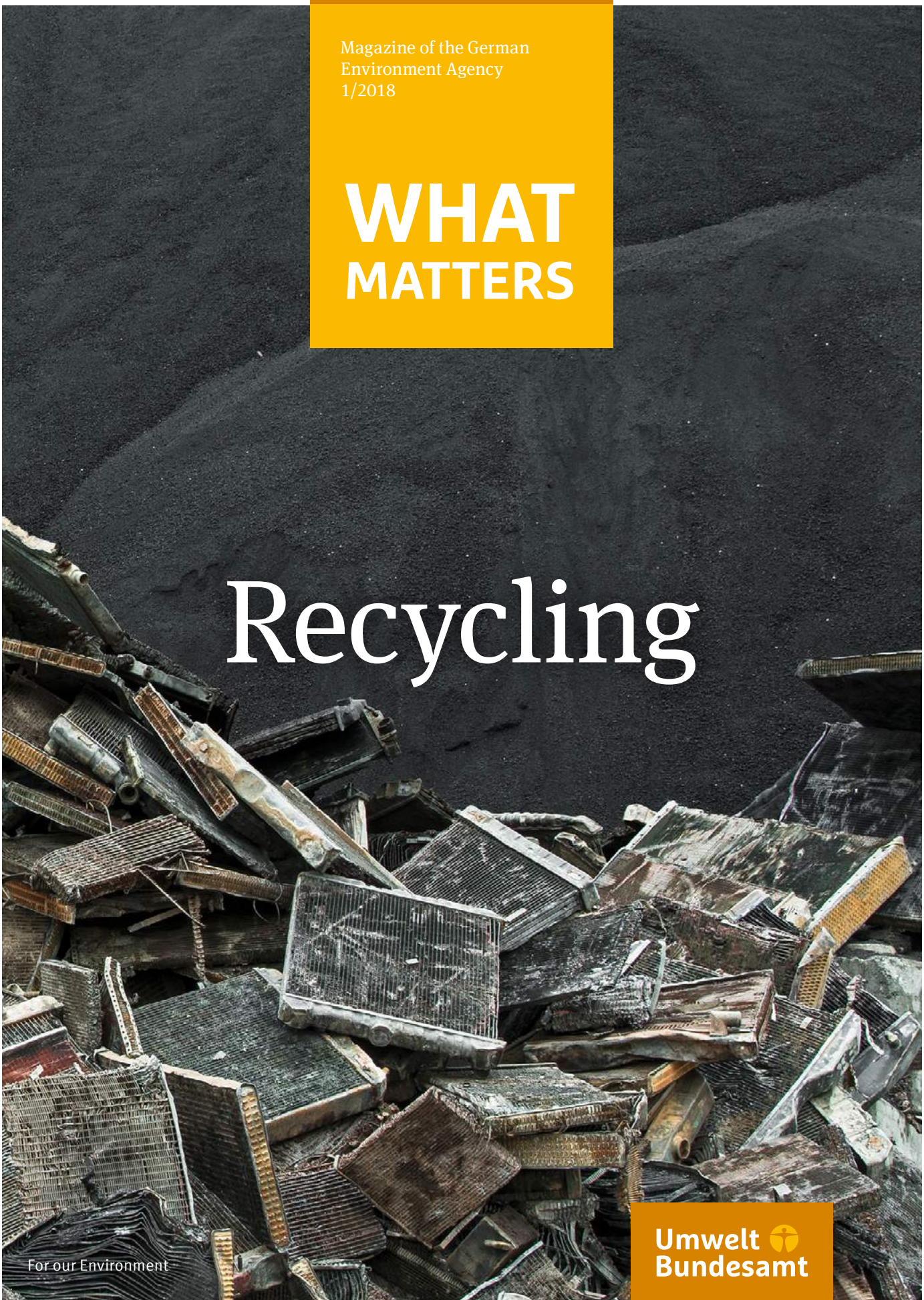
Magazine of the German
Environment Agency
1/2018

WHAT MATTERS

Recycling



For our Environment

Umwelt Bundesamt

FOREWORD

Foreword

Maria Krautzberger, President
German Environment Agency

Petroleum, sand, ores – all these resources are available on our planet only in a limited amount. And yet we live in Germany as if there were several planets whose resources we can exploit infinitely. The extraction of primary raw materials, their processing and finishing is accompanied by damaging intrusions into the environment, and substances posing a risk to the environment and health are often released. In addition, resource extraction is competing with the local population's needs for increasingly scarce natural resources such as clean water and uncontaminated land or soil.

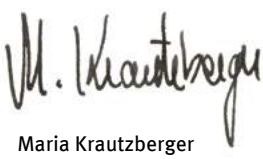
The ecological and socioeconomic consequences of our hunger for raw materials exacerbate environmental problems in many places. Large volumes of waste containing substances that are harmful to the environment and health must be managed. Garbage in the oceans, including plastic waste, is a major threat to animals and their habitats.

Only a more careful and fairer use of Earth's natural resources will help us to sustainably protect our environment. This also means producing as little waste as possible and reusing what we produce as sensibly as possible. Only then can we use the valuable raw materials much longer than before and have less need to resort to new ones.

Our recycling system in Germany has been a model for many other countries. But we should not rest on these laurels. We also have a long way to go to achieve a complete cycle of raw materials. Whether plastic, wood or batteries – we can recycle many materials much better and make them usable again.

In this issue we present important features of the existing recycling system and explain how we can continue to carry on with our pioneering role.

I wish you new insights in reading this What Matters!



Maria Krautzberger

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HIGHLIGHTS

EXPERT INTERVIEW

Is walking the new cycling?

Those who talk about environmentally friendly traffic, often talk about the bicycle. And quite rightly –cycling does not emit pollutants, bicycles need little space in the city, they can move quickly and even do something for your health. Modern pedelecs or ebikes enable long distances to be negotiated and can carry large objects. Many cities are gradually realising this and expanding their cycling infrastructure; Berlin has even passed its own cycling law.

So while everyone is talking about the bike, the most natural form of getting around i.e. walking is practically left out in the cold.

There is however nothing simpler, more environmentally friendly, quieter and more cost-effective than walking. Everyone does it every day – whether to the baker round the corner, to the underground or to the school. But in many cities, the relevant infrastructure is worse than expected: it's noisy, the pavements are narrow, one has to go long distances to cross the wider streets, and traffic lights often force you to run. Unfortunately, walking is also not really safe: more than a third (36 percent) of traffic fatalities in towns were pedestrians. The distances are often too much because many shops are still built out of town, and are scarcely reachable on foot. The German Environment Agency has therefore presented a basic concept for a national walking strategy.

The core is the goal that more people should walk. Not because they have to but because they can! The infrastructure and the cities should be so designed that walking is always a (good) option.

Pedestrian traffic needs space. However, cars usually have significantly more parking space available than is provided for pavements. Several parking spaces would be lost to accommodate people who want to walk. There are even more suggestions: in urban areas, a 30 kph speed limit should apply as standard, making it easier to cross the streets than at 50 kph. In addition, fines for anti-pedestrian behaviour should be increased. Also, parking on the pavement, on zebra crossings or intersections should be penalised. In addition, minimum building standards should apply to pavements or traffic lights where pedestrians are not disadvantaged and good accessibility on foot could be included in the Building Code.

Other countries are already much more advanced. Austria, Scotland and Wales as well as Finland and Norway promote pedestrian traffic through national pedestrian traffic strategies. Germany can do that as well, and help make cities more liveable, healthier and safer.

Dr. Katrin Dziekan,
Head of the "Environment and Transport" Section

More information: "Let's go! A basic concept for a national walking strategy"
https://www.umweltbundesamt.de/publikationen/geht-doch

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ONLY **7 %** **of old electrical appliances is disposed of through the shops. The return option is hardly used.**

DIGITAL ISSUES

The UBA data search

Tables, diagrams, graphics, maps – more than 1,300 data items can be found on UBA's website

If one wants to use this data, one can now reach the destination even faster – using UBA's data search: topic-related or data type filters enable the users to access the file and download it directly.

www.uba.de/datensuche

DIESEL

0 (zero)

This is the difference between diesel and petrol in average CO_2 emissions per km from newly registered passenger cars in 2017. Actually, 15% could have been expected because a diesel engine works so much more efficiently. But since diesels are primarily used for particularly large and heavy vehicles, the diesel's climate advantage remains a theoretical option.

PUBLICATIONS

Antibiotics and antibiotic resistance in the environment. Background, challenges and options for action

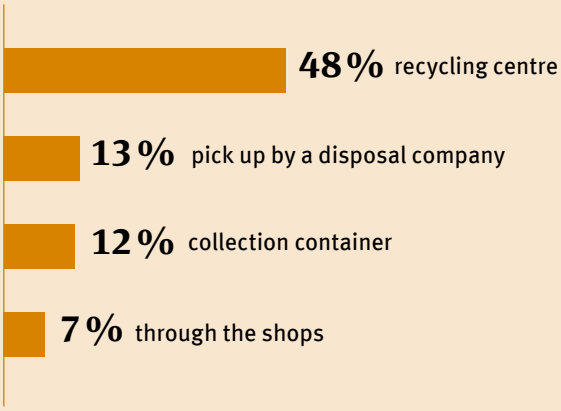
The role of the environment in the development of antibiotic resistance has been little discussed so far. In order to focus attention on this topic, UBA has put together background information and data in this publication. The results show that from UBA's point of view, the current requirements for reducing the input of antibiotics into the environment are not sufficient to adequately protect the environment and health. UBA sees an urgent need for improvement and suggests possible options for action.

https://www.umweltbundesamt.de/publikationen/antibiotika-antibiotikaresistenzen-in-der-umwelt

SURVEY

How are old electrical appliances disposed of?

Since 2017, small electrical appliances can also be returned directly to the shops – regardless of whether the device was purchased there. The only prerequisite being that the device's edge length is a max. 25 cm and the store has an electronics sales area of at least 400 m². However, this option is seldom used.

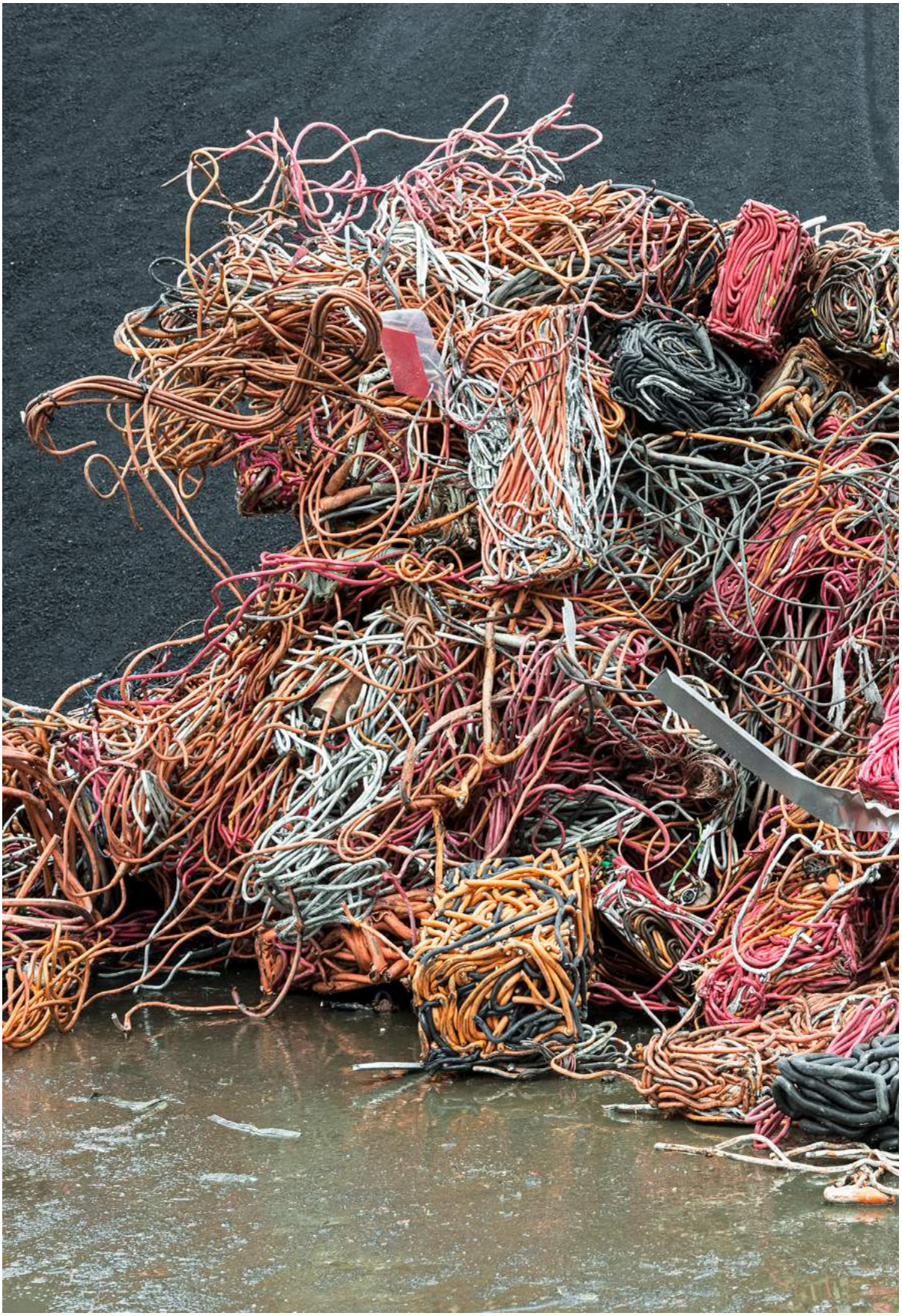


Source: UBA

TOPIC

Circular management of resources

Photos by Paul Bulteel, from the book “cycle & recycle”



The waste hierarchy included in the 2012 Circular Economy Act has five levels. Most important is waste prevention. If this is not possible, waste should be prepared for re-use or recycled where it makes ecological sense.

Only if prevention is not possible should wastes be used to produce energy, i.e. incinerated, in order to generate electricity or heat. Wastes that cannot be recycled or incinerated should be disposed of by landfilling.

Waste prevention is becoming increasingly important. Both the Waste Prevention Programme (AVP) at the German federal level and the Circular Economy Package of the EU Commission are addressing the extended use of products. The European Commission proposals to reduce the impact of certain plastic products on the environment also send out an important signal in this sense.

In Germany over the past 25 years, the circular economy has already achieved a lot: waste is now considered a raw material. It is being prepared for re-use e.g. cleaned, repaired or recovered; definitely not just disposed of. After all, about 14 percent of the raw materials used in the German industry are extracted from wastes.[1]

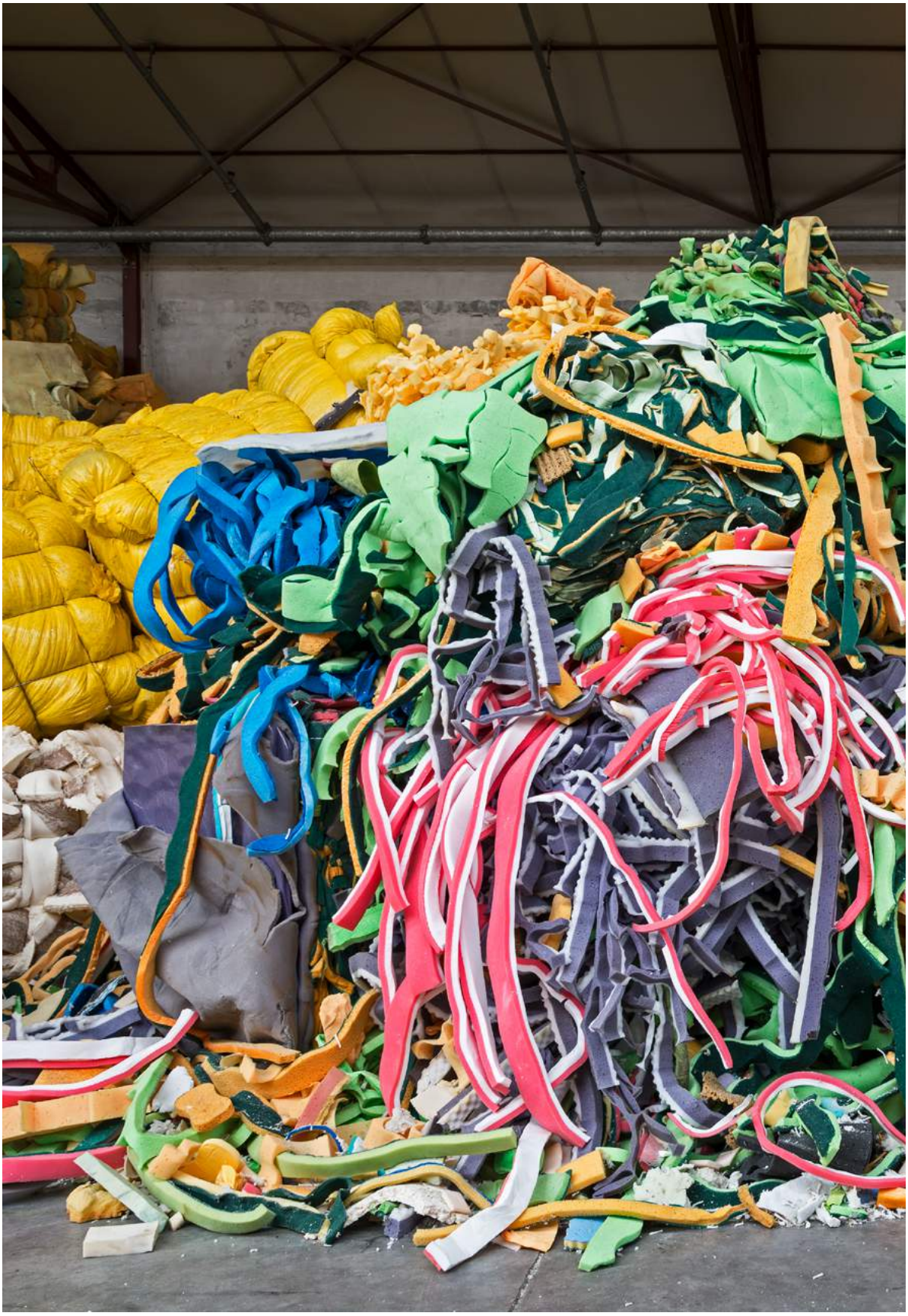
Manufacturers and distributors have taken responsibility for their products, even if they have become waste, and help them to be recycled. Examples are packaging, electrical appliances, ordinary and rechargeable batteries.

Still, that is not nearly enough. The annual volume of waste in Germany is again rising slightly. How can we reverse this trend? Ideally with an improved and, above all, holistic approach. We therefore consider all aspects from ecological product design, through sustainable production and consumption, to recycling and energy recovery. The EU Circular Economy Package also pursues this approach. The legal requirements lead to stricter recycling rates. Their calculation has also changed, reacting to many years of criticism. So far, information has been provided on the basis of the quantities fed into recycling plants (input quotas). Now the EU Commission wants to relate recycling rates to the quantities leaving the recycling plants (output quotas).

14 % of industrial raw materials are extracted from wastes.

Further efforts will be needed in Germany to comply with these new requirements. In addition, the Package includes an action plan designed to help prevent more waste and to recycle materials to a higher quality so that recyclates can be reused in equivalent applications. Successful implementation requires that all stakeholders take responsibility – from designers through producers and consumers to the state.

1 Federal Ministry for Environment, Nature Conservation and Nuclear Safety. (2018): Waste Management in Germany 2018. www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/abfallwirtschaft_2018_de.pdf.



How smooth is the circular economy?

STATUS QUO FOR MUNICIPAL WASTE

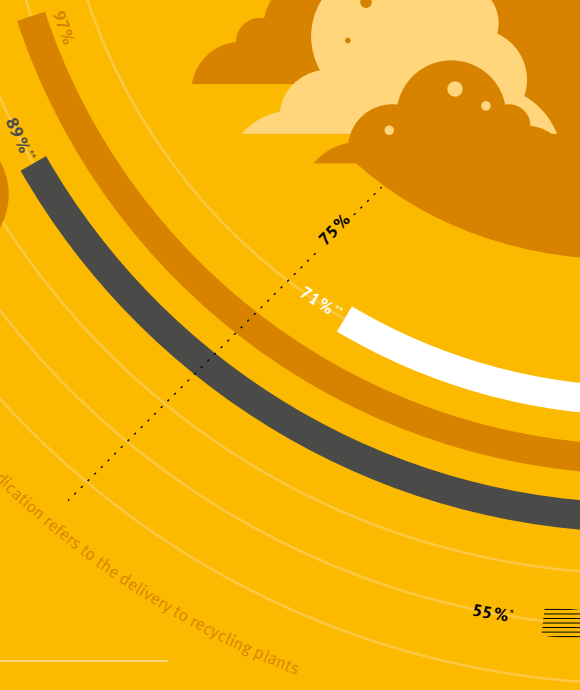
2016

Total

67%

Recycling

= **35 M. tonnes**



*DESTATIS-Data (data mixture); **Indication refers to the delivery to recycling plants

0.22
million tonnes of waste batteries (WB)

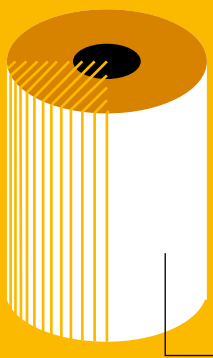
1,300 t
nickel-cadmium WB

14,800 t
other WB (akali manganese, lithium ion, etc.)

207,000 t
lead-acid WB

0.19
million tonnes of recovered secondary raw materials

WASTE BATTERIES



20.5
million tonnes of consumption

15.4
million tonnes of collected waste paper

75% return rate

PAPER

75% use of waste paper in the production of paper, cardboard and cardboard articles

2.8
million tonnes of consumption

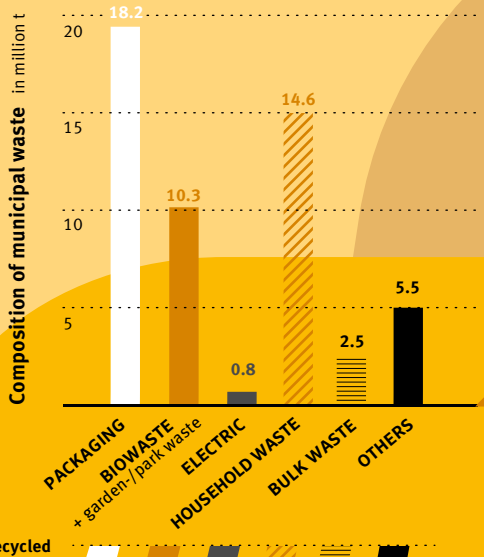
2.4
million tonnes collected and recycled

CONTAINER GLASS

60% use of broken glass in container glass production

52.1

million tonnes of municipal waste in 2016



0 % recycled

25 %

50 %

20 %*

51 %*

14.9

million tonnes of biowaste

10.3 million tonnes of municipal waste, **4.4 million tonnes** of which from biowaste bins

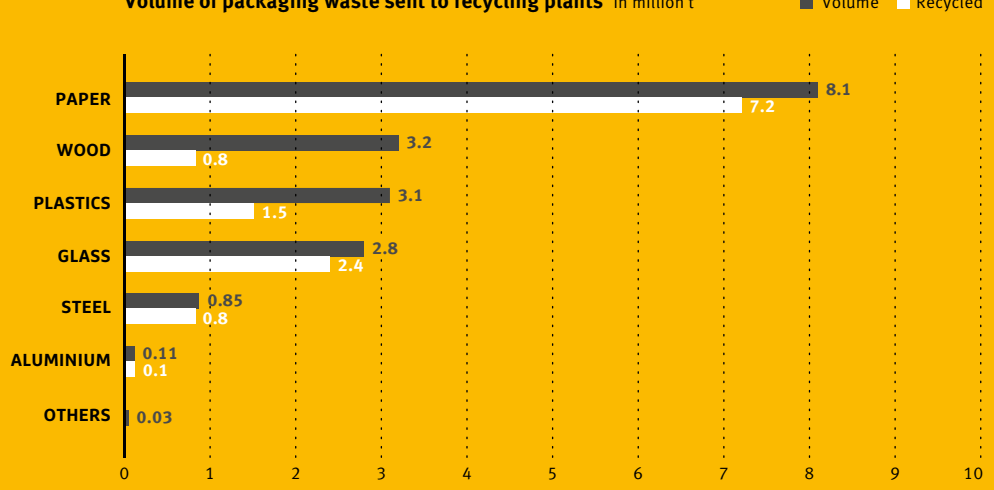
4.6 million tonnes of food processing industrial and other biowaste

3.6 million tonnes of digestates + **4.1** million tonnes of compost

BIOWASTE

Fertiliser and humus supplier for agriculture and horticulture, production of potting soil

Volume of packaging waste sent to recycling plants in million t



Further information can be found at:
www.umweltbundesamt.de/daten/ressourcen-abfall/verwertung-entsorgung-ausgewaehlter-abfallarten

How we can recycle better:

Ensuring high-quality recycling

Good quality recycling produces higher quality secondary raw materials. Recycling plastic bottles into new plastic bottles instead of park benches can save the maximum resources and energy. Naturally, this requires avoiding impurities as much as possible.

Impurities are also problematic when recycling biowaste. Conventional plastic bags can be increasingly found in composting and fermentation installations but cannot be completely removed. A part of these impurities reaches fields or gardens through compost and digestive residues. Plastic particles thus pollute the environment.

Waste paper also contains undesirable substances. Examples include bisphenols (A and S) from thermal paper (receipts), health-hazardous saturated and unsaturated hydrocarbons from printing inks and mineral oil or phthalates from plasticisers in adhesives and printing inks. Limiting values protect people who process waste paper but do not eradicate the source of the contamination. In future, stakeholders in the paper processing chain such as printing houses, corrugated board or folding boxboard manufacturers and government agencies responsible for substance evaluation and restriction proposals such as the European Chemicals Agency (ECHA) or the Federal Institute for Risk Assessment and the German Environment Agency itself, must ensure that impurities are avoided at the source, thus alleviating some of the burden from the recycling companies at the end of the chain. For example, the development of printing inks, varnishes and adhesives for paper products should always consider the future life cycle of paper fibres. For example, printing inks made from mineral oil can be replaced with safer plant oils such as rapeseed oil methyl ester. Adhesives can also be replaced with alternative products that do not contain harmful phthalates.

The EU Commission has already issued a restriction in the chemicals legislation (REACH) for bisphenol A, which may no longer be used in thermal paper as of 2020. Bisphenol S is currently under evaluation.

Metals such as copper, iron and aluminium are valuable in industry, which means that they are already subject to a well-established recycling system. Nevertheless there is still room for improvement: 100 types of aluminium and more than 2,000 types of steel and scrap metal accumulate in an immense variety of alloys. In order to regain all functional properties of the metals contained, alloys must be processed using highly sensitive processes and coated metal composites such as aluminium-steel composites must be separated to achieve a high degree of purity. Otherwise, steel or aluminium recycling is accompanied by downcycling with significant quantities of valuable metals such as tin or copper being lost forever.

Recovering smaller treasures

The recovery of precious metals such as gold is well developed due to high primary raw material prices. However, this can also be improved by separating valuable components before waste products such as computers or televisions are shredded, or through other technical innovations that increase the yield in the recycling process. The German Environment Agency recommends stipulating the mandatory separation of high-quality circuit boards in a treatment ordinance to the Electrical and Electronic Equipment Act.

Unlike gold, rare metals such as neodymium or indium are still largely lost. Both metals are predominantly required for energy transition: neodymium for wind turbines and indium for photovoltaic systems. There is not only a lack of large-scale recycling installations, but also the quantities needed to make recycling worthwhile. Future market developments regarding recycling technologies and quantities must therefore remain in focus in order to address possible collection and recovery potentials.

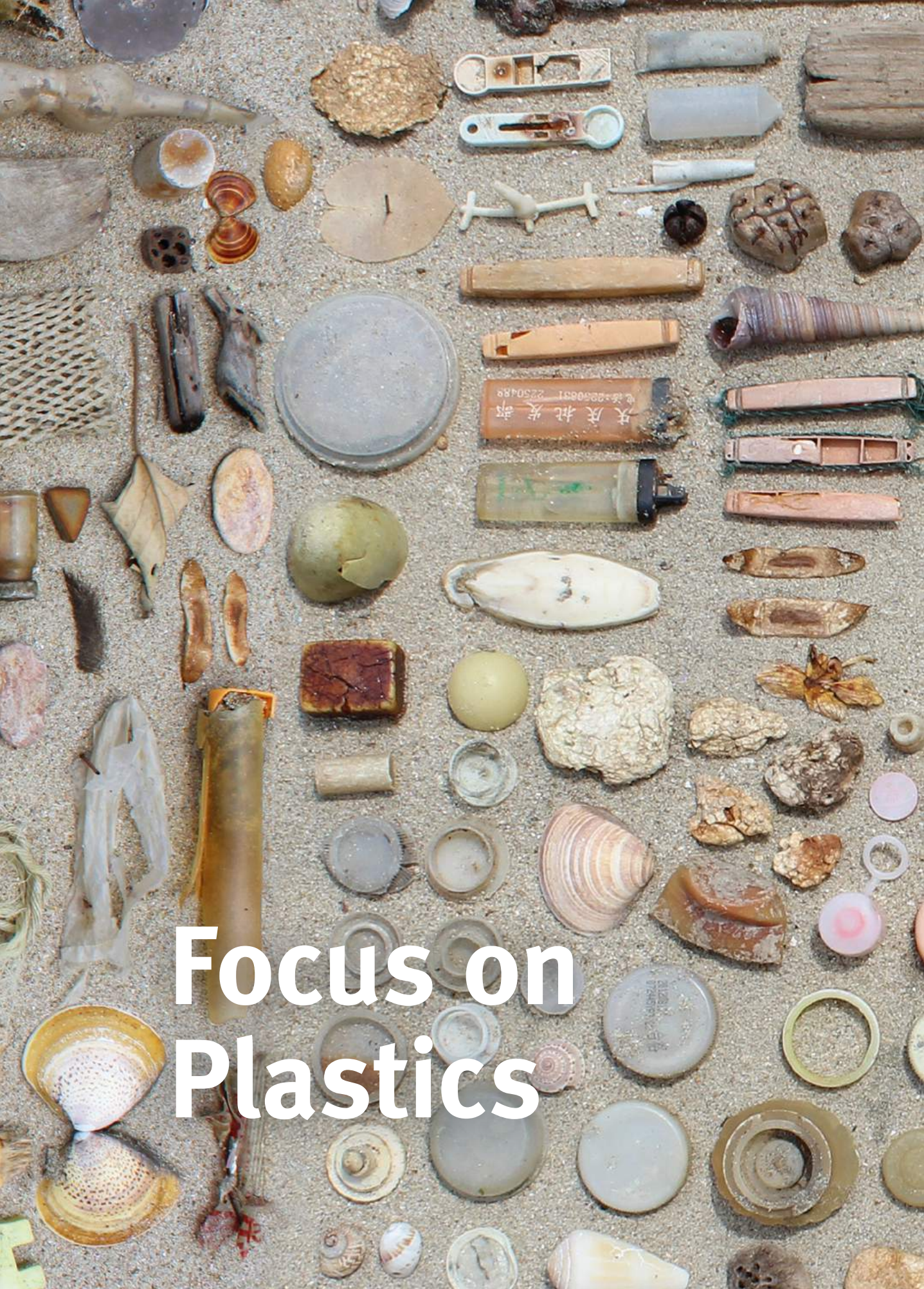
Increasing collection rates

The collection quantities should be increased for all waste streams. This is especially true for biowaste and waste electrical and electronic equipment (WEEE). So far, biowaste bins are not offered in many areas of Germany, while other areas receive only a sporadic collection. However, the goal formulated in the Circular Economy Act is the nationwide collection of biowaste. States (Länder) and municipalities are required to make the necessary efforts for the widespread introduction of a separate biowaste collection in order to comply with this legal requirement.

As of 2019, EU Member States will have to collect at least 65 percent of WEEE. In 2016, Germany only collected around 45 percent. This requires increased efforts by all stakeholders involved according to the German Electrical and Electronic Equipment Act. Among other things, the trade should provide consumers with more information about the possibilities for returning waste goods to the retail sector since consumers are more likely to visit the DIY warehouses or electrical stores than municipal collection centres. However, it is also important to regulate collection across municipal recycling centres and to limit illegal collection. Further efforts are also required to prevent illegal exports more effectively, which can be facilitated by adjusting legislation.

Untapped potentials

Some waste streams such as textiles or scrap tyres are not subject to any specific source stream regulation. As part of a research project running from 2019 to 2021, the German Environment Agency will examine which measures and regulations can be used to exploit resource conservation potentials. However, recyclable treasures can also be found in residual waste and building waste.



Focus on Plastics

Images: Liina Klauss, exhibits of plastic waste found on the beach

Plastics are lightweight and can be made into almost any shape. They make household goods cheaper and enable uses with strict hygiene requirements.

Plastics – a multi-faceted material with challenges

When it comes to plastics, there is an obvious need to improve recycling.

Plastics are characterised by a large variety of materials. They are lightweight, easily made into almost any shape and their characteristics vary widely: they protect sensitive goods during transport, they insulate homes, make vehicles lighter, make household goods cheaper and enable uses with strict hygiene requirements. Therefore, the production of plastics is increasing worldwide and has been for decades. In Germany, the total consumption of plastic products (excluding adhesives, varnishes, resins, fibres) increased from slightly more than 10 million tonnes in 2015 to 11.8 million tonnes in 2017, with half of the volume being used in packaging and construction products alone (Figure 1).[2] Despite many positive characteristics, plastics have been at the centre of negative attention for the last few years. The reason for this is the accumulation of plastic waste in the environment, especially in the oceans. It is estimated that five to 13 million tonnes of plastics end up in the Atlantic, Pacific and other oceans each year worldwide.[3] These can vary from carelessly discarded disposable cutlery to plastic garden chairs which decompose into smaller particles that accumulate in the environment and harm sea birds if they ingest plastic particles instead of food.

Whether carelessly discarded disposable cutlery or plastic garden chairs, they all decompose into smaller particles – plastics that accumulate in the environment.

2 Conversio (2018): 2017 material flow diagram of plastics in Germany. https://www.bvse.de/images/news/Kunststoff/2018/181011_Kurzfassung_Stoffstrombild_2017.pdf; 3 Jambeck, JR; Andrady, A; Geyer, R; Narayan, R; Perryman, M; Siegler, T; Wilcox, C; Lavender Law, K (2015): Plastic waste inputs from land into the ocean. Science 347, p. 768–771.

Plastic packaging protects food. But not all are necessary.

This problem has been recognised at the international, national and regional political levels and appropriate measures have been taken. The EU's January 2018 European Strategy for Plastics in a Circular Economy presented a vision on how to handle plastics in 2030 and focused on reducing littering and improving recycling.

In 2017, a total of 6.15 million tonnes of plastic waste (including waste from production and processing) was generated in Germany, 5.2 million tonnes of which came from private and commercial end use (post-consumer waste). 45.9 percent of the total plastic waste has been fed into material recycling and 0.8 percent into chemical[4] recycling. Looking only at post-consumer waste, 38 percent went into material recycling and just under one percent went into chemical recycling. At around 76 percent, recycling of used packaging accounts for the majority of recycled post-consumer plastic waste.

52.7 percent of the total plastic waste underwent energy recovery, of which 17.9 percent was used as refuse-derived fuel[5] and 34.8 percent in waste incineration plants (Figure 2). The remaining 0.6 percent was disposed of or incinerated without energy recovery.

In 2016, around 1.5 million tonnes of plastic waste was exported to EU and non-EU countries for recycling, 560,000 tonnes to China and 200,000 tonnes to Hong Kong.[6] About 600,000 tonnes of plastic waste was imported to Germany. The bulk of exports was composed of commercial plastic waste. Since China stopped importing various types of waste, especially those that are poorly sorted, there is a challenge to increase the recycling capacity in Germany.

4 Plastics recycling usually makes a distinction between material, and chemical recycling and energy recovery. During material recycling, the polymers are retained, melted down and reshaped. For example, a bottle can be made into another bottle. However, this is only possible for thermoplastics. In the case of cross-linked plastics such as thermosets (e.g. melamine resin which is used as a furniture coating) and elastomers (rubber), melting cannot perform a re-shaping process. Depending on the process, chemical recycling converts the polymers into monomers or synthetic gas or oil to produce new polymers. However, there are also processes that combine energy recovery and material recycling, e.g. recycling glass-fibre reinforced plastics in cement works where the glass fibre content serves as a mineral supplement; 5 Meaning that the plastic waste replaces a fuel such as lignite in a technical application; 6 Federal Statistical Office (DESTATIS): 2016 External Trade Statistics.

Figure 1

How plastics are used in Germany

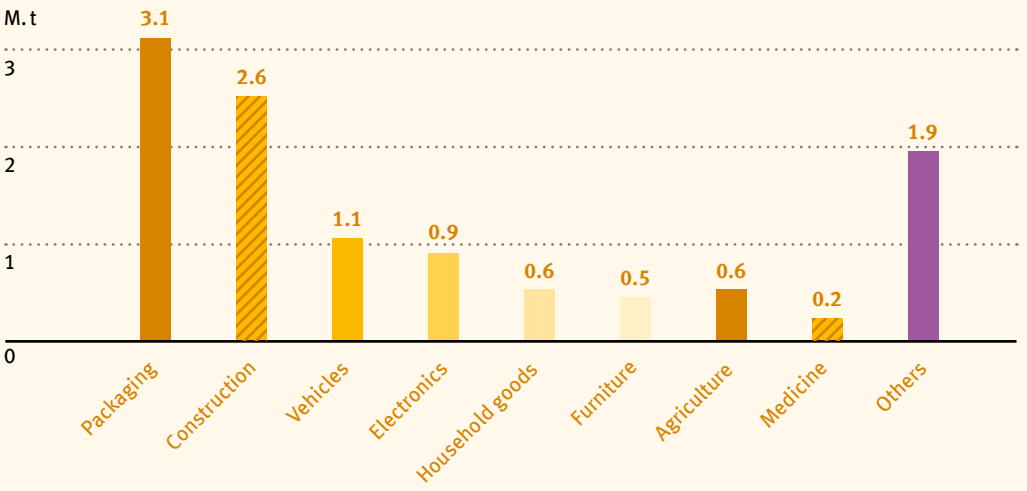


Figure 2

This is how plastics are disposed of in Germany

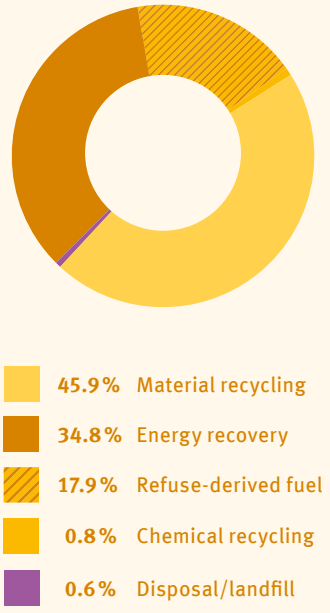
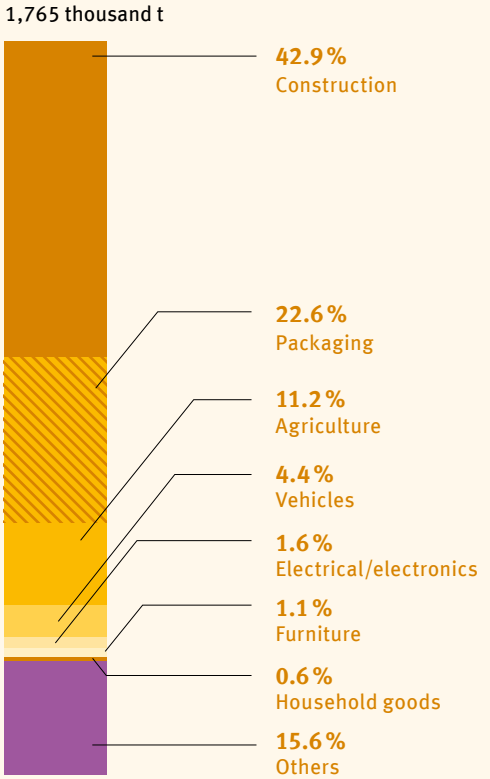


Figure 3

Where recycled plastics are used in Germany



Source: Conversio (2018): 2017 material flow diagram of plastics in Germany

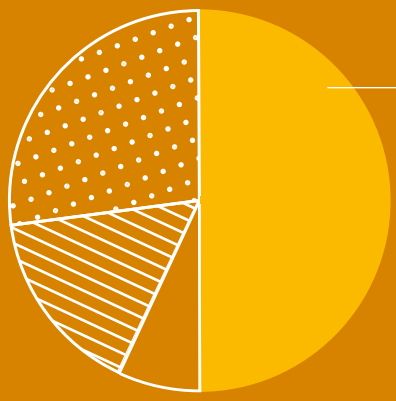
Figure 4

Waste on European beaches – what is it composed of?

27 %
Fishing equipment, e.g. nets

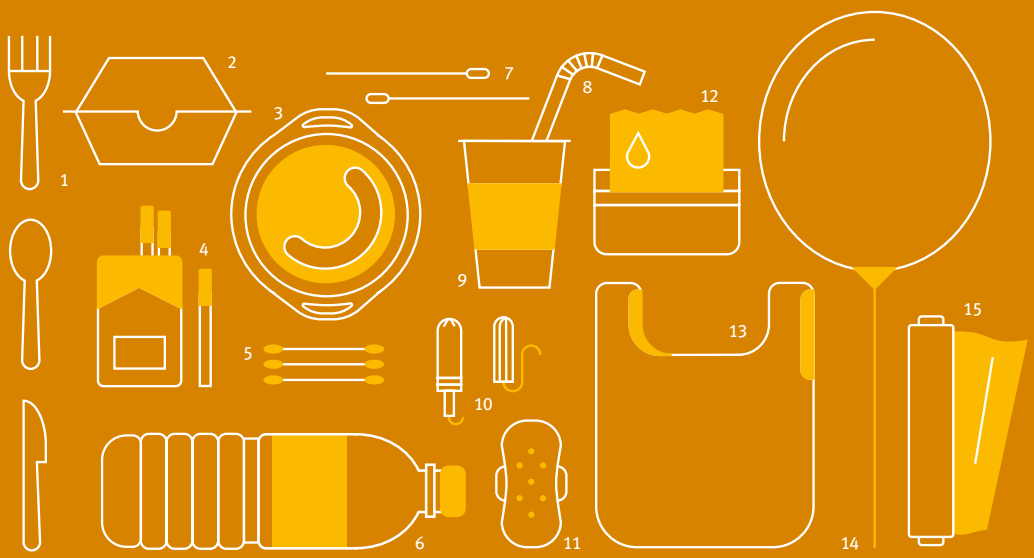
16 %
Non-plastic

7 %
Other plastic products



50 %
Single use products

The most common single use products found on European beaches:



1 single use cutlery; 2 food containers; 3 single use plates; 4 cigarette filters; 5 cotton buds; 6 single use plastic bottles and lids; 7 stirring sticks; 8 straws; 9 beverage cups; 10 tampons and tampon applicators; 11 sanitary pads; 12 wet wipes; 13 plastic bags; 14 balloon holders; 15 cling film

Many single use plastic products can be found on European beaches. The European Commission wants to change that and has put forward a proposal for a directive addressing the ten most frequently found products.

Source: European Commission (2018): Reducing Marine Litter: action on single use plastics and fishing gear, Impact Assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment, SWD (2018) 254 final.

Single use is no use.

Single use products such as single use cutlery, straws, drinking cups and the like are very often made of plastic. These products are usually used only for a few minutes. Their production therefore consumes far too much energy and raw materials compared to their service life. In addition, they are too often discarded carelessly and can end up in places such as beaches and in the sea. Indeed, about 50 percent of the waste found on European beaches is composed of single use plastic products (this refers to the quantity, not the volume) In order to counteract the littering by these products, in May 2018, the European Commission proposed that some plastic products should no longer be allowed if plastic-free alternatives are available. These include cotton buds and drinking straws. Another positive aspect of the proposals is that producers now have a special responsibility: they should not only be involved in the disposal costs of the waste generated, but also in the cost of collecting the waste from the environment.

Compared to their short service life, the production of single use products consumes too much energy and raw materials.

When implementing the proposals, it is important that single use plastic products are not simply replaced by other single use products made from alternative materials such as metal or paper. Avoidance should take precedence. Instead of unnecessarily packing fruit into plastic, the food industry should offer more unpacked products. If packaging cannot be avoided, it should be reusable as far as possible. Reuse is the best alternative to single use products – whether in the form of a returnable bottle or by bringing your own cup when buying coffee instead of having a single use cup.

The fact that preventing the use of single use plastics is possible can be seen in the case of plastic bags: the voluntary agreement of trade with the Federal Ministry for the Environment has led to the fact that plastic bags are seldom distributed free of charge. As a result, the consumption of plastic bags fell significantly, by 3.2 billion, between 2015 and 2017 as shown by the latest figures from the Society for Packaging Market Research (GVM).[7] Although the consumption of paper bags has risen by about 500 million pieces over the same period, there is still a considerable net saving.

7 http://kunststofftragetasche.info/wordpress/daten-erhebungen/

Plastics recycling

There is an urgent need to recycle more plastics.

The material recycling volume increased by 5.9 percent (from 2.67 million tonnes to 2.82 million tonnes) between 2015 and 2017. About 1.9 million tonnes of recyclate could be obtained from the total amount of plastic waste in Germany for the production of new plastic products. This corresponds to about 30 percent based on the amount of waste generated. 1.76 million tonnes of this was used in Germany for the production of new plastic products (the remainder was exported). The proportion of recyclates in the total amount of plastic processed in Germany is thus 12.3 percent; the share of recyclates from post-consumer waste is 5.6 percent.[8]

This increase in recycling volumes is good news, but there is still plenty of room for improvement. The raw plastic material is simply too valuable to not be recycled. The current situation, where China, along with other countries such as Thailand, only allows the import of plastic waste under particular conditions forces the EU to separate and recycle at a high quality. Therefore corresponding economic efforts are necessary. There is a discrepancy between the costs necessary to produce high-quality recyclates and the prices of primary plastics determined by crude oil prices.

The aim should be: converting obsolete plastic products into recyclates and to convert those into new plastic products thus replacing primary

Practical example

The innovative sorting plant for light packaging of the Meilo, Gernsheim company was supported as part of the environmental innovation programme of the Federal Ministry for the Environment, German Environment Agency and KfW (Reconstruction Credit Institute). The facility, with a capacity of 120,000 tonnes, is designed for a high output of sorting fractions for recycling in as good a quality as possible. Plastic sorting has been optimised for this purpose. All modern sorting plants perform well for form stable plastics (high-density polyethylene – HDPE, polypropylene – PP, polystyrene – PS, polyethylene terephthalate – PET). So far, only large foils (>A4) have been sorted among the foils, as they consist almost entirely of low-density polyethylene (LDPE) and are therefore easy to recycle. The Meilo plant also separates small foils and then sorts them by separating aggregates that work with near-infrared light (NIR) so that they also form a fraction with a high LDPE content at the end. The plant also produces a new fraction of flexible mixed plastics. Thus, the plant supplies an additional 18,000 tonnes of sorted fractions annually for recycling, which previously were sent as a mixed plastic fraction to energy recovery.

8 Conversio (2018): 2017 material flow diagram of plastics in Germany

Shampoo bottles become flowerpots.

plastics. The best solution is to use recyclates in the same field of application. A good example is PET beverage bottles with a deposit, using a type-specific collection allowing their recyclates to be reused in new bottles.
However, such direct cycles are not always feasible. Frequently the application areas change and packaging recyclates are converted into office equipment, plant pots or hangers.
About 60 percent of the (post-consumer) plastic waste currently generated by final consumption (private and commercial) is packaging and a further ten percent of the plastic waste comes from old electrical and electronic equipment. In other words: 70 percent of post-consumer plastic waste is subject to legal regulations of waste management product responsibility. The handling of packaging waste is currently regulated by the Packaging Ordinance and from 01/01/2019 by the Packaging Act.
Manufacturers of packaging, which typically end up at private end users and equivalent 'collection points' (e.g. schools, canteens, hospitals) and are disposed of in yellow bins or yellow sacks, must participate in a dual system and must pay fees for its disposal. The Packaging Act stipulates that these fees should now also be measured by how well a package can be recycled – the easier it is to be recycled the lower the fees.

The recovery is regulated by setting quotas. The new Packaging Act stipulates that 58.5 percent of plastic packaging will have to be fed into material recycling from 2019 and 63 percent from 2022. To enable a better overview in a market with many participants, the Central Office for Packaging Registry (ZSVR) in Osnabrück has been set up which will start operation on 01/01/2019. All manufacturers who sell retail and outer packaging in Germany, which typically ends up as waste with the end user or at equivalent 'collection points' will have to register. The ZSVR also monitors the financial support for more sustainable packaging and compliance of recycling rates. It thus serves to ensure transparency and a fair distribution of disposal and recycling costs.
There are no material-specific recycling quotas in the End-of-Life Vehicles Ordinance and the Electrical and Electronic Equipment Act.
The recycling of engineering plastics, however, has significant development potential due to the growing share of particularly valuable plastics in vehicles and electrical appliances so that recycling rates for plastics would also be a good way to recycle more plastic materials.

Practical example

The multiple extrusion supported by the Environmental Innovation Program [9] is a process in which products having a surface of virgin material and a core of waste plastic are manufactured. The window manufacturer Aluplast from Karlsruhe and the reflector post manufacturer Beilharz from Vöhringen use waste windows and reflector posts as raw materials. This prevents waste and saves resources. Even transport routes are minimised because after the delivery of new products, disused products are taken back into the manufacturing plant.

9 https://www.umweltinnovationsprogramm.de/

Ten percent of plastic waste comes from old electrical appliances and end-of-life vehicles.

Understanding waste as a raw material is unquestionably necessary, but it can only be the second step. The first priority must be to prevent waste from the outset.

Possible solutions

In order to improve plastic recycling, efforts both on the supply and demand side are required. In addition to the plastic-specific recycling quotas of packaging, plastics recycling quotas should also be used for other waste streams, for example in a treatment ordinance to the Electrical and Electronic Equipment Act. In addition, recyclates of the highest quality possible must be produced because only these can be used optimally in new products. Therefore recycling-friendly product design plays a key role here. For example, products made of a monomaterial, in this case a single plastic type, are easier to recycle than products made of composite materials. Fillers such as chalk should be avoided since this increases the plastics density and adversely affects subsequent sorting by float sink separation. The choice of colour also plays a role: bright or colourless plastics are better than colourful and dark ones. The latter always produces grey recyclates which can only be made darker. The colour variety for low-pigmented plastic recyclates, however, is much wider, and this also increases their later applications. In addition to voluntary initiatives and standards, minimum legal requirements offer another option. This is already legally possible for products that are regulated under the Ecodesign Directive, and only a matter of product-specific testing and implementation in the individual regulations. The new Packaging Act already states that fees should also be calculated according to how well packaging can be recycled.

Products made from a mono material are easier to recycle.

Standards for a minimum quality or classification of recyclate quality can help manufacturers to understand better which recyclates are suitable for their products. Extending the deposit obligation would be a solution for packaging, enhancing type-specific plastics collection.

But all these measures are only ecologically and economically viable if there is more of a demand for recyclates. Public procurement requirements and voluntary industry initiatives can contribute to this. Even minimum recyclate requirements can be a solution. The goal must be to bring significantly more plastic waste into material recycling. The EU plastics strategy also aims to recycle at least half of the plastic waste by 2030. On the basis of research results on recycling potential that has not yet been exhausted, the German Environment Agency (UBA) recommends a material recovery rate for total plastic waste of 55 percent by 2030.

Understanding material flows as a cycle and waste as a raw material has undoubtedly many benefits for the environment. However, the top priority must always be to prevent waste from the outset. Reusable solutions are a good alternative if packaging is indispensable. The ecological benefit increases with each subsequent use. All three measures – prevention, reuse and recycling – ultimately also serve the important goal: that plastics do not end up in the environment.

HINTS

Biowaste

Biowaste must be collected separately and cleanly to avoid foreign substances such as plastics to make high-quality composts and fermentation products. Fruit, vegetable remains or food waste belong in the bio bin. Unopened packs of foul sausages however do not. Either unpack and dispose of separately or unopened with the residual waste. Important to note is that plastic bags, which are sometimes used to collect biowaste, have no business in the bio bin!

Light packaging

This includes all packaging made of plastic, tinplate, aluminium or composites. Yogurt cups, cream cheese packaging and other packaging made up of several separable components should, if possible, be separated into their individual parts before they enter the yellow bag or the yellow bin. So: dispose of the yogurt cup aluminium lid, plastic cup and cardboard cover separately, otherwise it all ends up in the sorting plant aluminium fraction, where only the aluminium can be recycled, but not plastics and cardboard.

Glass

Even if it sometimes seems tedious, glass should be completely sorted by colour in the containers. Impurities can make complete batches unusable for glass recycling if they cannot be sorted correctly. This can cause inclusions in the glass if there are too many contaminants such as stained glass, china or other substances. The proportion of china in the white glass for example must not exceed a maximum of 20 grams per tonne of white glass, otherwise it will no longer be usable. Also, only packaging glass such as bottles or jam jars may be disposed of in the containers of glass collection centres.

What can individuals do?

The better consumers separate, the more can be recycled in the end. This applies in principle to all types of waste. The following hints can help recycle even better.

Residual waste

Only that which is not allowed in other bins belongs here. Waste from the residual waste bin is used to produce energy or undergoes mechanical-biological treatment. Waste incineration uses the energy content of the residual waste to generate electricity and heat. Processing of the remaining ash (slag) can produce metals and substitute building materials. The mechanical-biological treatment separates the residual waste into fractions that can be used as materials or to produce energy. Non-utilisable waste components are landfilled after biological treatment.

Electrical and electronic equipment

Our electrical appliances are full of valuable raw materials – even if they have become obsolete. Consumers can return old devices free of charge at the official return centres. Small appliances smaller than 25 cm edge lengths can be returned free of charge at any time in many large shops with 400 m^2 or more selling space for electrical appliances (such as electric stores, DIY warehouses, ...). For larger devices take-back of a comparable used device takes place when buying a new one. Online mail order companies are also obligated to this return policy and must offer return options.

Vehicles

Hand over vehicles for scrapping only to an officially recognised company (dismantling or take-back point for end-of-life vehicles). Do not sell "car wrecks" to other stakeholders because there is a risk that they will be scrapped improperly and then oil may pollute the environment. Such a sale would also be an infringement of the regulations, which can be severely punished with big fines.

Paper

Thermal paper belongs to residual waste, not in the paper bin because it still contains hormone-damaging bisphenol A. As residual waste, it is burned and the bisphenol A is destroyed. The poison can otherwise accumulate in the used paper in the paper bin. Thermal paper is often used for receipts, tickets or parking tickets.

(Waste) batteries

The legal collection rate for waste batteries of currently 45 percent has been reached – but only just. Please use the collection centres in supermarkets, discounters, drugstores or DIY warehouses to properly dispose of batteries. Only then can recyclables be recycled and pollutants be treated in an environmentally sound manner

Further information and hints:

Guide "Waste in the household – preventing, separating, recycling"
www.umweltbundesamt.de/publikationen/ratgeber-abfaelle-im-haushalt

Compost primer
www.umweltbundesamt.de/publikationen/kompostfibel

Guide "Batteries and rechargeable batteries"
www.umweltbundesamt.de/publikationen/ratgeber-batterien-akkus

INTERVIEW

Leave to stay – after retirement Dr. Holzmann will remain living in Dessau-Roßlau

“I find the wagging index finger unbearable”

Thomas Holzmann spent 28 years in the German Environment Agency, 16 of them as Vice President. Now he is retiring – and takes a look back. A conversation about Chernobyl, Dessau, the limitations of environmental policy and the UBA canteen.

What was the first environmental catastrophe that you can remember?
The first actual disaster for me was Chernobyl. I can still remember very well how my whole family were worried about whether Chernobyl would reach us, whether or not we could still eat fruit and vegetables from the garden. At that time I was a member of the Federal Health Agency which included a radiation protection institute. Emotion was huge – but it took decades to pull out of nuclear power. I found that incomprehensible. But that is obviously the way we humans work. Remember the famous warnings from the Club of Rome on climate change. Basically, we did not do enough – and that was decades ago.

Why is that so?
I think because normally people do not feel directly affected. And politics rarely deals in decades, anticipating and planning, but action is often only reactive. In this respect, the climate issue delivered little over a long time. Chernobyl, however, that should have had a much greater reaction.

Since nothing happened after Chernobyl, is there still hope concerning climate change?
I think so. I do not give up hope that people will learn. I stay optimistic. Otherwise I would not have been able to do the job.

Even the conservative think-tanks expect climate change to be expensive. Why does politics fail to accept these predictions? And can UBA play a role in that?
Over many decades we have developed economies in Germany that, let me put it harshly, are based on structured and organised irresponsibility. Corporations only calculate using quarterly reports to judge success or failure. Whether the industry is car or chemistry, it does not matter – sustainability does not fit into this system. Policy also remains stuck in the short-term, not least because of the federal system – there are always elections taking place ... What worries me is that politics does not seek more assured expertise. It maintains the right to simply disbelieve scientific expertise if it does not like the content.

That sounds fatalistic. Politics cannot think in the longer term, neither do companies – even though we need them to. So what now?
Our biennial environmental awareness studies show that people today have well-developed environmental awareness but also great concerns. Environmental issues such as energy transition, including the phasing out of lignite or the planet being littered with plastic, play a major role here. Many people today are obviously ahead of politics – and that certainly gives me hope.

People are environmental aware. But if UBA makes proposals to make driving or flying more

expensive, the public's anger will flare up. Where does this discrepancy come from?
In times when a big company is allowed to cheat its customers with impunity and is even more successful than before, you need not be surprised if people feel systematically unfairly treated. It is clear that people in such a system seek their own advantage.

How can people be inspired to be more enthusiastic about environmental protection?
What would work best? We could look at environmental issues and sustainability in pictorial form to inspire people. Not new regulations, not the wagging index finger, not always renunciation.
UBA, for example, tries to do this through regular art projects. We have just had an exhibition by Richard Fischer. He does nothing but show the beauty of flowers that are endangered or no longer exist. Everyone who sees this says, 'We must not put that in danger. That is so incredibly beautiful.'

How was it at UBA, when you began here shortly after reunification?
That was a wild time. Incidentally, in the GDR there was a perfect database on the country's environmental situation, sometimes more in depth and better than in the Federal Republic. These data were top secret. There were excellent environmental scientists in the GDR with great expertise. Of course, they suffered under the system, which always put their work on the back burner. But the requirement was to do the best possible scientific work as far as that was possible. Through this we have gained excellent scientists – albeit from a different social background. Our western UBA-socialisation was aimed at educating the public, discourse and policy advice – also as a kind of early warning system. This was something our colleagues had to learn gradually.

Was it easier to advise in politics then?
In the 90s, there were a lot of new ideas as one could be courageous and politics was courageous then. At that time Germany was also a pioneer of environmental protection compared to the rest of Europe. No longer today. How do we implement European law? Only word for word, and woe, there is still deliberation about a possible higher standard. The panache, the courage to go new ways, big pitches to make, to rebuild this state – that has given way to political despondency. I find it hard to imagine how we are going to make any big transformation in this country right now.

Did politics take more notice then?
Politics was more attentive. But there were reasons for this: with reunification many things had to be relearned and renegotiated. Environmental policy which was supported by the regulatory law until the end of the 1980s now tried to break new ground, for example with the instrument of standardisation. UBA developed differently from an organisation determined by legal contexts, waste legislation, emission protection law towards views on production and products, i.e. an industry-related view or in cross-sectional areas such as environment and transport or environment and health, ultimately a systemic view. Politicians encouraged us in this approach.

Was this when UBA became really modern?
Even when it was founded, UBA was supposed to become a new style body. In the mid-70's however, it was still somewhat unclear what was meant by that – it was only possible to achieve that after reunification. I believe that UBA are proud of the possibilities and opportunities that exist here, which still offer the scope for creative potential.

What changed with the move to Dessau?
Much less than we thought at the time. Then we believed: if UBA has to leave the capital and move to the provinces, there will be a high price to pay and we will no longer be heard. That did not happen. Ultimately, it is up to UBA how much public attention it does or does not gain. It depends on UBA how closely it works together with associations and deals with public interests. How intelligently it sets new topics. This has nothing to do with location. And we have many colleagues who feel comfortable in Dessau. So, anyone who believed that UBA could be weakened by moving to this location, was wrong.

Do you believe UBA is properly established in the region?
As Vice President, I made a strong effort to ensure UBA became established here. It is also clearly important to me that we base our headquarters here to concentrate our activities. Incidentally, I think that UBA staff should act as role models when travelling. Of course, I cannot tell them to discard their cars. It's a bit of a balancing act – not to walk around with a wagging index finger all the time, whilst being a bit lax about things: look, you have a responsibility, please accept it.

Should UBA not show that in the canteen?
I do not think that UBA's canteen should be meat free. We have to be careful that we do not end up in eco-terrorism, where we prescribe everything to people. I would find that

“In the 90s Germany was a pioneer of environmental protection compared to the rest of Europe. No longer today.”

unbearable. I need to be free to choose if I am a vegetarian, if I am vegan or if I eat meat. It is, however, important to me that the canteen meets our ecological requirements, for example by offering organic products and not supporting this appalling factory farming.

Finally, what is the next disaster you would wish to avoid?
The climate issue is of great importance, of course. However, in my opinion, the central theme will be the raw materials. In future, we have to take much more care with our resources. As resource consumption evolves around the world, we are surely leaving a dramatic situation for future generations. Nobody wants that. This does not necessarily mean total rejection, but means finding intelligent solutions – and of course UBA can and should play an important role here.

Thank you for the interview Mr. Holzmann!

German Environment Agency

UBA headquarters in Dessau-Roßlau. In the foreground the art project, “A house for the bees”.

Industry sectors at a glance: products and services with the eco-label are now available in 12 areas

40 years Blue Angel

A reliable eco-label that gives a clear direction for environmentally aware purchasing. That was the idea behind the Blue Angel when it was introduced in 1978 as the world's first eco-label. 40 years later almost everyone in Germany knows the Blue Angel.

The world's first eco-label

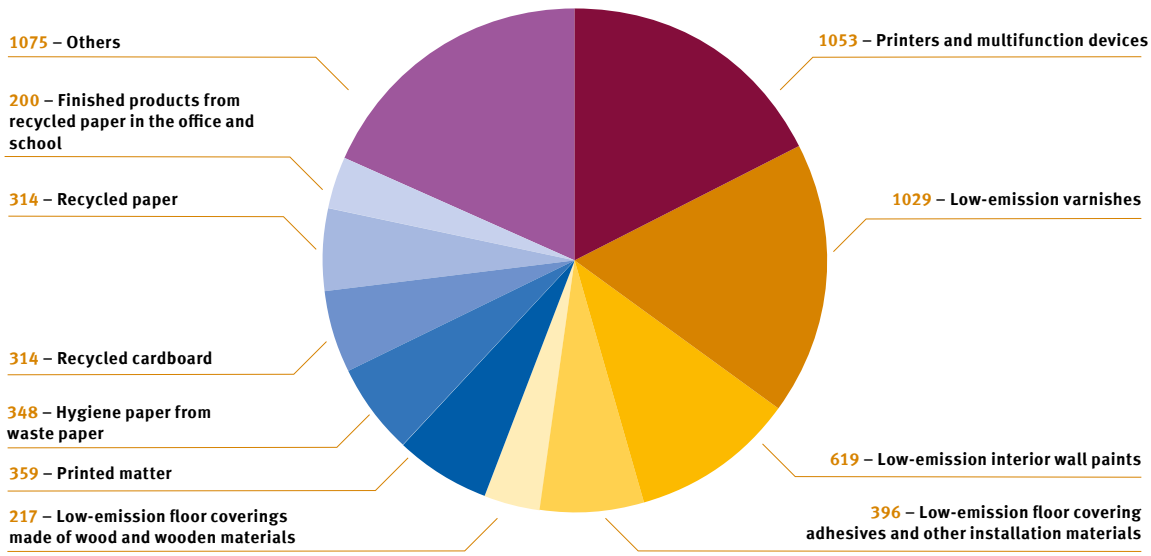
The Blue Angel is transparent and publishes all award criteria (in German and English) and backgrounds, companies, certified products and updates for each product group at: *www.blauer-engel.de*

But what exactly is the Blue Angel – and how does it work? In short, the Blue Angel is the German Federal Government's environmental symbol and characterises particularly environmentally friendly products and services. Almost every schoolchild knows exercise books made of waste paper or hardly a copier in authorities still works without recycled paper with the Blue Angel. But many other everyday products from various areas of life carry it: for example, furniture, detergents or paints. In the meantime, more than 12,000 products and services from more than 1,600 companies have been awarded the Blue Angel. Today it is not only the oldest official eco-label, but stands for an independent, transparent and ambitious labelling.

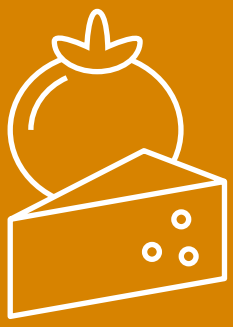
The Blue Angel guarantees that a product is less harmful to the environment and meets high standards for the protection of the environment simultaneously ensuring the same usability and quality. Based on scientific studies, our own studies and market research, the German Environment Agency stipulates product-specific requirements (award criteria) as a prerequisite for certification with the eco-label. For the evaluation, the eco-label takes a holistic view of the product life cycle from production through use to disposal and recycling.

The most important product groups: recycled paper, building products, printers and multifunction devices.

Contracts (basic and extension contracts), as of 2018



Source: Blue Angel



269 million t

Raw material consumption for nutrition: **558 kg** and **455 Euro** per month per household.

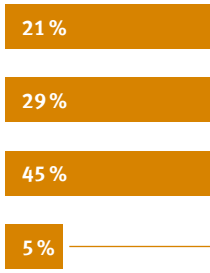
1 kg of beef

*requires almost **42 kg** of raw materials for feeding, husbandry and processing.*

1 kg of apples

*requires almost **1,7 kg** of raw materials for harvesting machines, storage, transport and distribution.*

Data on the use of natural resources for consumption 2014



Source: UBA: Resource Use in Germany. 2018 Report.
https://www.umweltbundesamt.de/daten/ressourcen-abfall/rohstoffe-als-ressource/ressourcenbericht-des-umweltbundesamtes

PRIVATE RAW MATERIAL CONSUMPTION IS DETERMINED BY *HOUSING* AND *NUTRITIONAL REQUIREMENTS*.

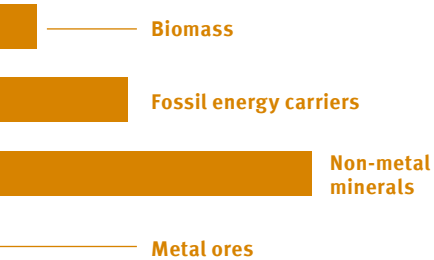
49 %

of raw material consumption can be attributed to private consumption in Germany.

16.1 t

of raw materials is consumed by everybody in Germany every year.

Distribution into material groups



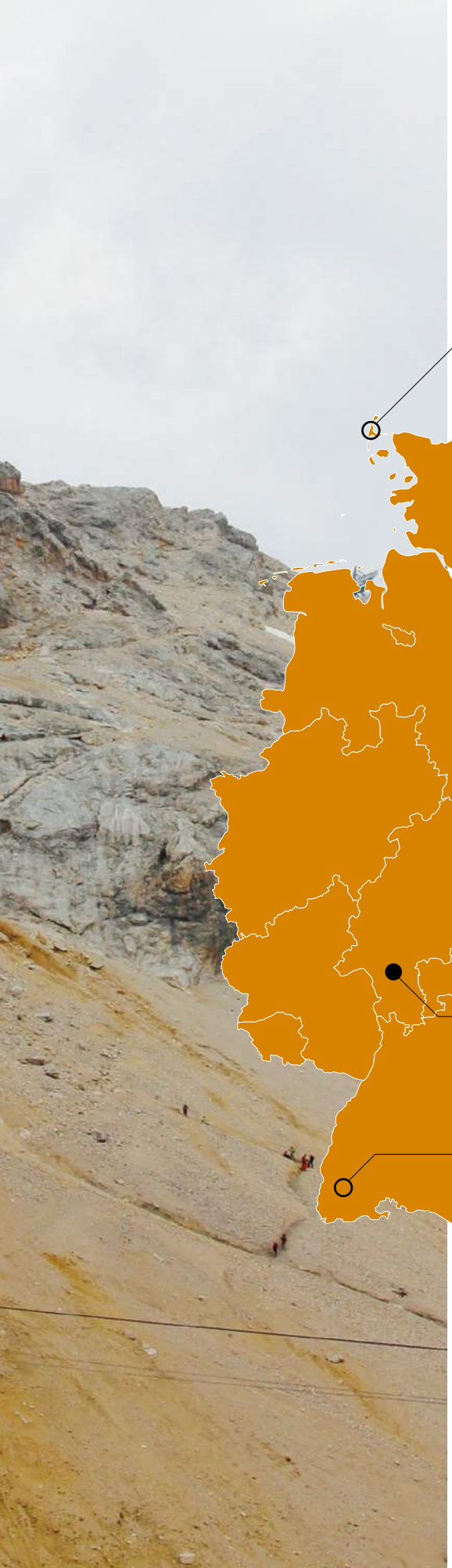
54 %

of public consumption of raw materials is concentrated in the fields of **administration, defence** and **social security.**

UBA'S SITES

One of the German Environment Agency's measuring stations is located on the Zugspitze.

UBA's sites



Headquarter Offices Measuring station

Publications as pdf:
https://www.umweltbundesamt.de/publikationen/schwerpunkt-recycling-1-2018