PLASTIC IS **FANTASTIC**

BUT LESS IS MORE: THE PATH TO A PLASTIC-FREE EVERYDAY LIFE

Interreg Baltic Sea Region
Co-funded by the European Union
CIRCULAR ECONOMY BALTIPLAST

CONTENT

The project »Baltic Approaches to Handling Plastic Pollution under a Circular Economy Context« (BALTIPLAST) aims at the prevention and reduction of plastic waste in the Baltic Sea Region, focusing on single use plastic reduction, improvements in plastic packaging and innovative collection and treatment systems at the municipality level.
A consortium of partners from Germany, Sweden, Finland, Estonia, Latvia and Lithuania will test concrete solutions at three levels of operation: Strategic and management; technological/technical; communication & behavior change.

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The project involves some key actors in the plastic waste value chain, primarily municipalities in the participating countries, as well as SMEs and large enterprises operating in the field of waste management.

NGOs and interest groups will also be involved, for the dissemination of results. BALTIPLAST contributes to EU Strategy for the Baltic Sea Region, specifically to the Policy Area of Bio-economy, dwelling on responsible use of resources, changing mindsets and consumer behavior, through cross-sectorial approaches, by up-scaling waste to integrate it to a circular economy, by testing public procurement models and by integrating circular economy policies in the activities of the target groups.

The project design is guided by co-creative innovation, through new schemes of collaboration in country clusters, as reflected in the project Group of Activities, further transferring them to a transnational level. Ultimately, BALTIPLAST may provide a long term contribution to on-going efforts to reduce the plastic that enters the Baltic Sea Region.

INTRODUCTION OF THE **PROJECT**

»BALTIC APPROACHES TO HANDLING PLASTIC POLLUTION UNDER A CIRCULAR ECONOMY CONTEXT- BALTIPLAST«

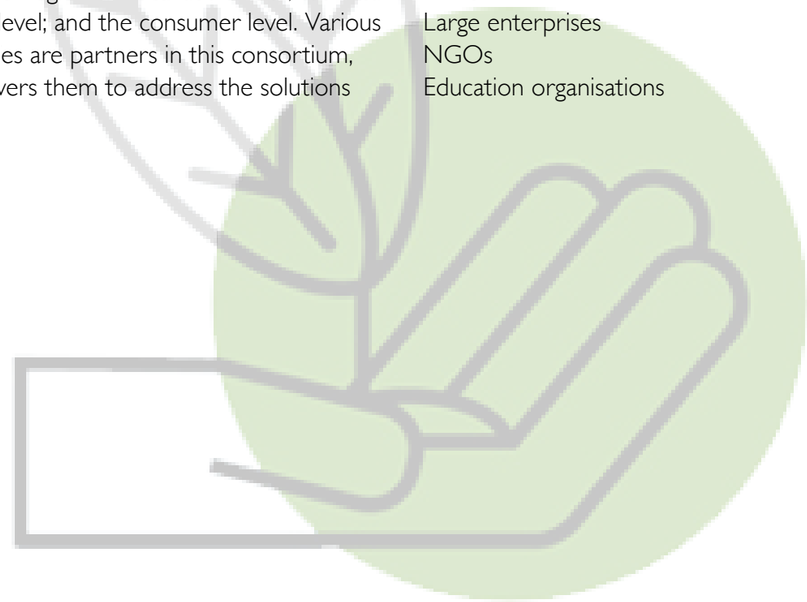
Objectives and the partnership

The project BALTIPLAST aims to foster the prevention and reduction of plastic in the Baltic Sea Region, through a diverse and consolidated consortium with partners in Germany, Sweden, Finland, Estonia, Latvia and Lithuania, along with the Union of Baltic Cities, based in Finland. The project´s main objective is to identify, test and deploy concrete solutions to handle and reduce the flow of plastic waste to the Baltic Sea, under the lenses of a circular economy. It will do so by establishing a consortium with the main some of the key actors in the plastic waste value chain, namely local authorities, universities and research institutions, associations and NGOs, as well as SMEs and large enterprises in the participating countries, that operate in the waste management field.

The collaboration is based on three levels: solution and stakeholder logic with local authorities; technical and business level; and the consumer level. Various local authorities are partners in this consortium, which empowers them to address the solutions towards their current problems. In order to have a comprehensive transfer of the solutions, various networks and associations are included in the consortium, since plastic waste has a direct connection with all of them. The universities will design the solutions in collaboration with local governments in the project countries, with inputs from NGOs and Associations.

The solutions will be tested by the cities and in cooperation with NGOs and businesses. For maximizing the transnational transfer and upscaling of the solutions, the Union of Baltic Cities will use its extensive network of municipalities, hence maximising the benefits of the project to the Baltic Sea Region.

Target Groups
Local public authorities
Interest groups
SMEs
Large enterprises
NGOs
Education organisations



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Ready for your plastic journey? LET'S GO!

The Baltic Sea is one of the most soiled seas in the world. Plastic and other waste gets flushed into the sea after being littered, is disposed illegally … This makes it even more crucial to act now – because someday, it is going to be too late to act.

Have you thought a lot about your personal plastic consumption?

If not, we would like to address you directly: Saving plastic is easier than you think! More conscious shopping, more efficient use of resources and minor adjustments in the household quickly lead to a reduction that will not only save you money but also protect the environment.

Only if you know about your own consumption, can you get to action!

This guide is designed to help you do that. You will find a variety of information on the topic of plastic: What is »plastic« anyway? How is it made and what is it made of? Why has the material become so ubiquitous and why is it such an integral part of our everyday lives? What effects does plastic have on our health? What alternatives are there? These and many other topics are intended to help you understand why it is so important to save more plastic. But you can also dive into all this information later and get straight into the practical side of things.

For this we have developed a set of materials to accompany you throughout your journey of plastic reduction.
1. this very guidebook
2. a little pocket information material
3. a digital inventory tool for you to fill out and a lit

Excited? That sounds easy, doesn't it? So, let's start!

You can either start immediately by entering the tool for the first time or start with reading in the guide to dive deeper into the plastic saving topic. It is up to you!

Scan the QR Code to start the survey:

How to use THIS GUIDE

Important information up front:

What kind of trash do we collect? We collect plastic and packaging of all kinds from the yellow bag and the recycling garbage can, as well as reusable and disposable plastic bottles.
When does the sifting and categorization of our garbage take place? We sift and categorize every Friday. This gives us new comparative values each week to measure our success.

week 1 and 2

Step 1
Taking stock

In order for you to see your actual savings afterwards, you need to record your starting point. You can choose your favourite day to start, but it is important to weigh or to estimate the weight (with help of the tool) regularly on a fixed day.
You can either use our tool (scan QR-code below) or just write your measures down in our sheet on page 42–43. Continue measuring and enjoy reading this guide book or move on to step 2 immediately.

week 3 and 4

Step 2
Set goals

Check out our comprehensive plastic-saving tips list: Which ones (see page 44–49) would you like to accomplish? Set goals!

week 5 and 6

Step 3
Implement Tips

Try to implement the tips you've picked and incorporate. Maybe share your experiences with friends and family.

Shift through and weigh your packaging waste again.

Step 4
Interim evaluation

week 7

Evaluate your success by filling out part 2 of our survey (page 51).
Amazing! You did a great job until now - keep on going, every step counts! We hope you enjoyed your journey!

Step 5
Gratulation. You did it

week 8

We are proud of you that you decided to go on your plastic journey. Let's do it!

Scan me!

Make a first inventory of your plastic consumption. Please scan the QR code above - it only takes 3–5 min

Knowledge of **PLASTIC**

Today, everyday life without plastic is **unimaginable**

You know plastic: Many of your groceries or sanitary articles are packed in it and you dispose parts of your waste in bags made from it. But there is more to it than that. Plastic has become an integral part of our lives. In fact, everyday life without plastic is unimaginable. This omnipresence has very specific effects on you and your environment.

In this chapter, we would like to explain what these are. At the same time, we want to show you: There are alternatives. But these should also be treated with caution. Before we get to these topics, we want to give you a brief introduction to what plastic actually is, how it is made and why it has become so successful.

Different types of plastic

Plastics consist of polymers as their main ingredients. Polymers are large molecules that consist of long chains of identical smaller components. Types of these molecules determine what properties the plastic material will have – how soft or hard it is, how easily it recycles or how fast it degrades in nature. Polymers are usually synthesized from oil products, but in some cases, they can be also of natural/biological origin and only treated chemically to give them desired properties.

GOOD TO KNOW

Microplastics are tiny plastic particles, usually measuring less than 5 millimeters in size.
They encompass various forms, including microbeads, microfibers, and microfragments. These microplastics can originate from both primary and secondary sources. They are pervasive in our environment and have shown their presence in various forms of consumables, including drinking water, seafood, and even the air.

Some characteristics:

- low density, therefore light
- mostly colourless, but are easily dyed
- relatively easy to shape
- waterproof
- resistant to the effects of various chemicals and microorganisms
- good insulators of electricity and heat
- Almost all polymers burn – some form poisonous compounds when burned
- easily mechanically scratched
- Some polymers slowly break down when exposed to sunlight
- Most polymers become soft and melt already at relatively low temperatures

Plastics can be broadly categorized into two types: thermoplastics and thermosetting plastics. Thermoplastics, such as polyethylene and polypropylene, are capable of melting and solidifying repeatedly without undergoing significant chemical change. They are highly recyclable, making them rather environmentally friendly options.

On the other hand, thermosetting plastics, like epoxy and phenolic resins, undergo a chemical change when heated, becoming rigid and non-malleable once set. This irreversible process makes them ideal for applications requiring high heat resistance, such as electrical insulation.

The diversity of plastics extends beyond **this binary classification:**

1 PET	2 HDPE	3 PVC	4 LDPE	5 PP	6 PS	7 OTHER
Polyethylene Terephthalate	High-Density Polyethylene	Polyvinyl Chloride	Low-Density Polyethylene	Polypropylene	Polystyrene	other
Water Bottles, Jars, Caps	Shampoo Bottles, Grocey Bags	Cleaning Products, Sheetings	Bread Bags, Plastic Films	Yoghurt Cups, Straws, Hangers	Take-Away and Hard Packaging Toys	Baby Bottles, Nylon CDs
		Check locally	Check locally			

Source: Enigma Packaging

All plastics are polymers, but not all polymers **ARE PLASTIC**

Recycling Codes

Plastic food containers and packaging are usually (but not always) marked with an arrow symbol and number: the recycling or resin identification code. Code numbers 1 to 6 identify specific, pure plastic polymers, while number 7 covers all other types of plastics and mixtures. Polyvinylchloride (PVC, code 3) and polystyrene (PS, code 6) always contain many hazardous additives and production aids/by-products. They should therefore be avoided, especially in contact with food. The other polymers are generally more health-friendly – but this is highly dependent on the respective production processes.

Common areas of application of Single Use Plastics

We can consider every plastic item that is not reused or properly recycled a single use plastic. Unfortunately, a large share of all produced plastics do not make their way back into recycling or even reusage. Depending on the design and the properties of the product, many materials are easily recyclable, allowing us to retrieve the valuable material made from the exhaustible oil resources. However, many products do not consist of a single type of plastic (mono-material) but compound material which is difficult to separate once joined. A lot of the plastic compounds can thus only be recycled thermally, in other words, burned, which causes toxic emissions. Moreover, the material is thereby removed from the material cycle.

The effects of single use plastic ending up in the environment is further illustrated in the later sections.

Due to their versatility and resistance to weathering, plastics are commonly used for:

- Construction
- Automotive
- Healthcare
- Packaging
- ElectronicsCoatings (e.g. in paper cups, but also in industrial products)

Many products do not consist of a single type of

PLASTIC

History of PLASTIC

A brief history of consumption and its consequences

Plastics have become an indispensable part of our modern lives, revolutionizing industries, and transforming everyday living. As we trace the history of plastics, we must confront not only their remarkable innovations but also the profound environmental consequences of their consumption.

Bakelite and the synthetic age

The story of plastics commences in the late 19th century when chemists embarked on a journey to develop synthetic materials as alternatives to natural resources, such as turtle shells and elephant tusks. The pioneer of modern plastics, Bakelite, was created by Leo Baekeland in 1907. Bakelite, which could be regarded as the world's first synthetic plastic, was a game-changer. It found its way into telephones, kitchenware, and countless other products, marking the onset of the plastic era.

Celluloid, cellophane, and rayon – the pioneers

In the wake of Bakelite, a wave of early plastics emerged. Celluloid, first created in the mid-1800s, became the primary material for photographic film and saw use in the production of combs and buttons.

Cellophane, a transparent packaging material derived from cellulose, became established in the market. Rayon, the first synthetic fiber, laid the foundation for the future of synthetic textiles.
These early plastics promised convenience and quickly found their way into everyday life.

During the last decade, global plastic production has **grown at an ever-increasing rate.**

World War II and the plastic warfare

The mid-20th century was a turning point for plastics, particularly during World War II. Plastics played a pivotal role in the war effort, with applications in parachutes, aircraft canopies, radars, and various military gear. Post-war, the global economy started growing and the plastic industry faced a surplus of manufacturing capacity propelling the development of consumer goods and an expanding range of plastic products. Different types of plastics were created, and they infiltrated almost every aspect of daily life, with applications spanning from kitchenware to automotive components.

The rise of the throwaway culture and plastic pollution

The growing plastic consumption mirrored the rise of the consumer culture. Disposable plastics, such as cutlery, plates, packaging, and even curtains became symbols of convenience. Yet, there was little focus on what happened after use, and this neglectful attitude towards waste started to manifest in landfills and in the environment. The world started to witness the dawn of plastic pollution.

As plastics consumption soared, so did environmental concerns. The durability of plastics, combined with their nonexistent decomposition in landfills and oceans, triggered a global crisis.

Reports of plastic pollution contaminating oceans, rivers, and natural habitats underscored the severe consequences of this synthetic material on the environment. Environmental awareness surged, eventually leading to recycling initiatives and calls for more sustainable alternatives. Despite the increased environmental awareness, people had become accustomed to the effortless life that plastic enabled and so the plastic production kept growing at an accelerating pace with no end in sight.

Source: Plastic Europe 2023 // Geyer, Roland, »Production, use and fate of synthetic polymers«,. Plastic waste and recycling. Academic Press, 2020.

THE HISTORY OF **PLASTIC**

Recycling, the much-anticipated silver bullet to pollution?

Recycling emerged as a partial solution to mitigate the environmental damage and to take advantage of the value found in plastic waste. Recycling facilities became a common sight, raising hopes of a well-functioning circular approach to plastics. However, the effectiveness of recycling has been marred by challenges such as economic feasibility, contamination of the plastic, complexity of different plastic types, and a lack of consumer awareness. Critics have also argued that by promoting recycling, the plastics industry has aimed to shift responsibility for the environmental impact of plastics onto consumers.

Towards sustainable consumption

The proliferation of plastics in everyday life has posed a multitude of challenges. Balancing the convenience plastics have to offer with their environmental and climate impact has proven to be exceedingly complex. The controversy surrounding single-use plastics, their role in pollution, and their contribution to the degradation of ecosystems has led to bans and regulations in various parts of the world. However, the quest for sustainable alternatives that maintain consumer convenience remains an ongoing challenge. Sustainable alternatives are not the only solution: there is an urgent need to reduce plastic consumption and foster a circular economy. The history of plastics is not just a tale of innovation but also one of shortsighted consumption and destructive environmental consequences. The plastic crisis demands a radical shift in how we produce, consume, and manage plastics. It is a challenge that demands an urgent response from individuals, industries, and governments. Meanwhile the evolution of plastics continues, with the timid promise of a more sustainable future on the horizon. Yet, while we draft and plan, the global plastic production keeps still growing at an accelerating pace.

Source: Frontiers, Microplastics: Global accurence, impact, characteristics an sorting, September 2022. By Prathiksha P. Prabhu Koustav Pan Jegatha Nambi Krishnan.

1862 — Alexander Parkes pantented Parkesine in 1862. Parkesine is the first man-made plastic.

1907 — Belgian chemist and clever marketeer Leo Baekland pioneered the first fully synthetic plastic in 1907.

1970 — Plastic pollution was first noticed in the ocean by scientists carrying out plankton studies in the late 1960s and early 1970s.

2004 — The first research paper on microplastic was published. The term Microplastics was first used in 2004.

2012 — The first research paper on freshwater microplastic pollution was published in 2012

2016 — The first report of microplastic in lake and estuarine sediments in India was published in 2016.

2019 — A study found to microplastic to be atmospherycally transported to remote areas on the wind.

2020 — In December 2020 microplastic particles were found in the placentas of the unborn babies for the first time.

2021 — Geologists extracted 1075 microplastics particles from package crystal and powered salt from Gujarat and Tamil Nadu.

FAQs about PLASTICS

Are all disposable products made from the same type of plastic?
NO, Conventional, or single-use plastics are non-biodegradable and fossil-based chemicals, usually made from polymers like polyethylene (PE), polyethylene terephthalate (PET), and polypropylene (PP).

If so, what are the properties of this type of plastic and what problems might it cause?
The problem with these fossil-based plastic polymers is that they cannot biodegrade They need specific conditions in waste management systems mechanical recycling, high heat, properly sorted into specific polymeric categories etc…) to be able to be degraded and repurposed.

Due to these specific conditions needed for breaking down fossil-based plastics, they damage ecosystems when not properly collected. Long term effects on the environment besides causing difficulty in waste management collection are microplastics being introduced into foods and waterways.

Fishes and sea creatures end up suffering due to the plastic invasion in the coral ecosystem.

What exactly is the plastic waste that ends up in our oceans made of?
Fossil-based plastic polymers like PET, PP and PE.

How much chemistry, energy and water are needed for this?
A LOT, because crude oil contains thousands of chemical compounds, it has to be distilled in an oil refinery where the separation into lighter components called fractions are made. These fractions go through the polymerisation or the hydro carbonisation process which determines the type of plastic being made.

What does the manufacturing process look like?
Plastics are derived from natural and organic materials such as cellulose, coal, natural gas, salt and most commonly used crude oil.

Two main processes create conventional plastics: addition polymerization and condensation polymerization. In addition polymerization, monomers link together with specific structures using peroxide as a catalyst, creating polymers like polyethylene and polystyrene. Only one monomer is added at a time. Condensation polymerization, used for polyester and nylon, involves a stepwise growth process, allowing existing chains to connect with a catalyst. After polymerization, compounds are melted, shaped into single-use plastics. Accoriding to additives and their structure they categorize into thermoplastics (soften with heat) and thermosets (retain structure).

Plastics go through manufacturing, specification, and distribution and have for various use cases. At the end of their life cycle, plastics can be recycled, but it requires high energy consumption. Non-reusable parts may end up in landfills or incineration, releasing microplastics and other harmful substances into the environment.

Why are plastics so dangerous for the environment and human health??
YES, Single-use plastics have detrimental effects on the environment and human health. Plastics introduces microplastics allowing poisonous chemicals and toxins into food sources (fish predominantly) and our bloodstreams. Microplastics are extremely plastic debris (nano plastic level) making their way into the environment due to the breakdown of plastic materials over time.

What exactly does recycling mean?
The term »recycling« refers to the return of the waste which is generated by the production or by the consumption of a product into the economic cycle.

Isn't the problem solved the moment I throw a product made of single-use plastic into the yellow bag or the recycling bin?
Throwing a product into the recycling bin helps, but it doesn't completely solve the issues with single-use plastics. Challenges include limited recycling capacity, contamination, downcycling, energy consumption, and incomplete collection. To address the problem comprehensively, reducing overall plastic consumption and supporting eco-friendly alternatives are crucial.

What is the recycling rate of the cities participating in the project

Country	Recycling rate (%)
Germany	67,6
Austria	57,6
Slowenia	57,8
Netherlands	54,2
Belgium	53,7
Luxembourg	48,3
Lithuania	48,1
Sweden	46,8
Denmark	46,3
EU 28	45,3
Italy	45,1
United Kingdom	44,3
France	42,9
Finland	42,0

Country	Recycling rate (%)
Bulgaria	36,2
Hungary	35
Czech Republic	34,1
Poland	33,8
Spain	33,5
Portugal	30,9
Slovakia	29,8
Estonia	28,1
Latvia	25,2
Croatia	23,5
Greece	17,2
Cyprus	16,1
Romania	13,9
Malta	6,4

Source: In Jigani et al. (2020): Consumers' Behavior in Selective Waste Collection: A Case Study Regarding the Determinants from Romania

How much single-use plastic ends up in our oceans?
Between 4.8 to 12.7 million tons of plastic waste end up in our oceans every year.

Why is that?
Due to improper disposal of single-use plastic products or lack of proper disposal sites and awareness of the effects of plastic waste where it is a huge problem.

How long does plastic take to decompose?
Conventional plastics can take anywhere from 20 to upwards of 1000 years to reach decomposition depending on how heavy the plastic material is. For example, a plastic water bottle can take about 450 years to decompose in the environment.

Wouldn't it be better to start one step earlier and reduce consumption?
ABSOLUTELY. Reducing plastic consumption is a crucial step to mitigate the environmental impact of plastic waste. Choosing reusable alternatives and minimizing single-use plastic usage contribute significantly to waste reduction.

Moreover, the shift to a circular economy is crucial to tackle the issue right at its source. This way, manufacturers and businesses take responsibilty for the material and additives being distributed into the market for consumption. Healthy plastics can circulate in closed loops and are no longer dangerous to humans or the environment.

Is the biggest problem the production, use or disposal of single-use plastic?
The environmental impact of single-use plastic is a complex issue, but overall, the entire life cycle contributes to the problem. However, the disposal stage, particularly inadequate recycling and the accumulation of plastic waste in landfills and oceans, is often highlighted as a significant concern. Addressing the problem comprehensively involves efforts to reduce production, promote sustainable use, and improve disposal practices through recycling and waste management.

Are alternatives made from other materials or reusable products automatically the better choice?
While alternatives made from other materials or reusable products are generally considered more environmentally friendly than single-use plastics, their overall sustainability depends on various factors. Considerations include the production process, resource use, energy consumption, and end-of-life disposal. Assessing the full life cycle of a product helps determine its environmental impact. In many cases, choosing reusable or alternative materials can be a positive step, but it's important to evaluate each option based on its specific characteristics and environmental implications.

How effective is a ban on single-use plastic?
Banning single-use plastics can be an effective measure in reducing environmental harm associated with these materials. Such bans can lead to a decrease in plastic consumption, lower pollution, and encourage the adoption of more sustainable alternatives. However, the effectiveness depends on various factors, including enforcement, public awareness, and the availability of viable alternatives. Successful implementation often involves a combination of regulatory measures, public education, and support for businesses to transition to more sustainable practices.

Does recycling make sense at all?

YES, IT DOES

What is the impact **OF ITS USE**

PLASTIC AND **THE ENVIRONMENT**

Plastic ~~and~~ in the Baltic Sea

The challenge of marine pollution, especially from plastic and packaging material, is increasing dramatically in the central Baltic Sea region.

Marine litter consists mainly of plastic and packaging material. In the Central Baltic Region, 60% of marine litter consists of plastic items and more than half of all plastics are packaging waste. Land-based sources produce most of the marine litter, while rivers are major pathways feeding the sea with litter. The three main pathways to how litter reaches the sea are 1) human (by direct dumping), 2) wind (through air), and 3) water (drains and rivers, runoff and stormwater/floods, and sewerage).

Plastics that end up in the seas can be moulded, soft, foam, fisheries-related equipment (nets, ropes, etc.), smoking-related items (cigarette butts, lighters, and cigar tips), plastic construction materials, plastic packaging (beverage bottles, bags, food wrappers, bottle caps), and household items such as toys.

One of the most important land-based marine litter sources can be attributed to recreational and tourism-related activities in the Baltic Sea area. Litter sourced from such activities usually involves the inappropriate disposal of litter by the public, either accidental or deliberate, of which a large proportion is beach litter (incl. primary or sale packaging, plastic cutlery, straws, cigarette butts, sanitary items etc.)

In addition to macro-plastic waste, there is plastic waste in the Baltic Sea, which is not visible to the human eye. Microplastic is mainly released into the environment directly from industry or by decomposing of larger-scale plastic pollution. Everyday human activities are also sources of microplastics, such as turning bottle caps and tearing off plastic packaging.

Environmental Challenges

Plastics have become a ubiquitous part of modern life, with their usage reaching staggering proportions worldwide. Microplastics, resulting from the breakdown of larger plastic items, have been found in water bodies worldwide, raising concerns about their impact on marine life and potential ingestion by humans through the food chain. The durability of plastics leads to their persistence in the environment, as they do not biodegrade readily and can accumulate in oceans and ecosystems, posing threats to wildlife.

Single-use plastics, such as bags, straws, utensils, bottles, and food packaging, are emblematic of convenience and disposability but also pose a pressing environmental challenge. These disposable items, designed for a brief, often fleeting purpose, have far-reaching consequences on the environment, ecosystems, and human well-being. The proliferation of single-use plastics is a testament to the efficiency of mass production and the allure of cheap and lightweight materials. Their convenience has reshaped consumer behaviours and supply chains, creating a throwaway culture that prioritizes convenience over sustainability. However, this convenience comes at a steep environmental cost, as single-use plastics often end up in oceans, rivers, and landfills, where they can persist for hundreds of years, breaking down into smaller microplastic particles that enter the environment and enter the food chain.

GOOD TO KNOW

Video: Environmental risk of SUP

Exposure pathways of plastics into the environment

Plastics are synthesized through the polymerization of petrochemicals, releasing a host of pollutants into the environment, including greenhouse gases. As a result, the production of plastics contributes to climate change and air pollution, affecting both the environment and public health. Another significant exposure pathway arises during consumption and use. Single-use plastics, including bottles, bags, and packaging, contribute to the extensive plastic waste stream. These items often end up in landfills or the ocean, breaking down into microplastics over time. One of the most pressing issues is the pathway of plastic pollution into our oceans. It is estimated that up to 12 million metric tons of plastic enter the marine environment each year, impacting marine life and ecosystems. Microplastics further permeate the environment through the breakdown of larger plastic items, like car tires and synthetic textiles, releasing tiny plastic particles into the air and soil. This represents yet another exposure pathway, as inhalation and ingestion of microplastics can lead to potential health concerns for both humans and wildlife.

Persistent Pollution:

Plastics take hundreds of years to decompose naturally, depending on the type. As a result, discarded plastics accumulate in landfills, rivers, oceans, and ecosystems, leading to long-lasting pollution.

Marine Pollution:

Plastic waste in the oceans is a particularly alarming issue. The world's oceans are inundated with plastic debris, endangering marine life and disrupting ecosystems. Creatures like seabirds, turtles, and marine mammals ingest or become entangled in plastics, often with deadly consequences.

Chemical Leaching:

Plastics may leach toxic chemicals into the environment as they degrade. This poses risks to both wildlife and humans, as these chemicals can contaminate water sources and accumulate in the food chain.

Resource Depletion:

The production of plastics relies on non-renewable fossil fuels, contributing to resource depletion and carbon emissions. Furthermore, the disposal of plastics consumes valuable landfill space.

Increased Production:

Global plastic production has skyrocketed. In the last 70 years, more than 9 billion tons of plastic have been produced, with a substantial portion ending up as waste.

Single-Use Plastics:

The rise of single-use plastics, such as packaging, disposable cutlery, and bottles, has exacerbated the problem. These items are often discarded after one use, contributing to the plastic waste stream.

Limited Recycling:

Despite a high potential for recycling, inadequate design and lacking infrastructure, lack of awareness, and contamination of recyclable materials hinder recycling efforts. As a result, a significant portion of plastics ends up as waste.

Plastic disposal has grown

INTO A MENACE

PLASTIC AND **HEALTH**

Is bioplastic coming to our rescue?

The journey of microplastics doesn't end in the environment; they have a disturbing tendency to enter the human body. Plastic contamination in drinking water has become a global issue. Microplastics have been detected in tap water and bottled water from various regions around the world. A study by the World Health Organization (WHO) in 2019 estimated that the average person could ingest as much as 5 grams of plastic each week, which is roughly equivalent to the weight of a credit card. While the health implications of consuming these minute plastic particles are not yet fully understood, the accumulation of such materials in the human body over time raises concerns about potential health risks.

GOOD TO KNOW

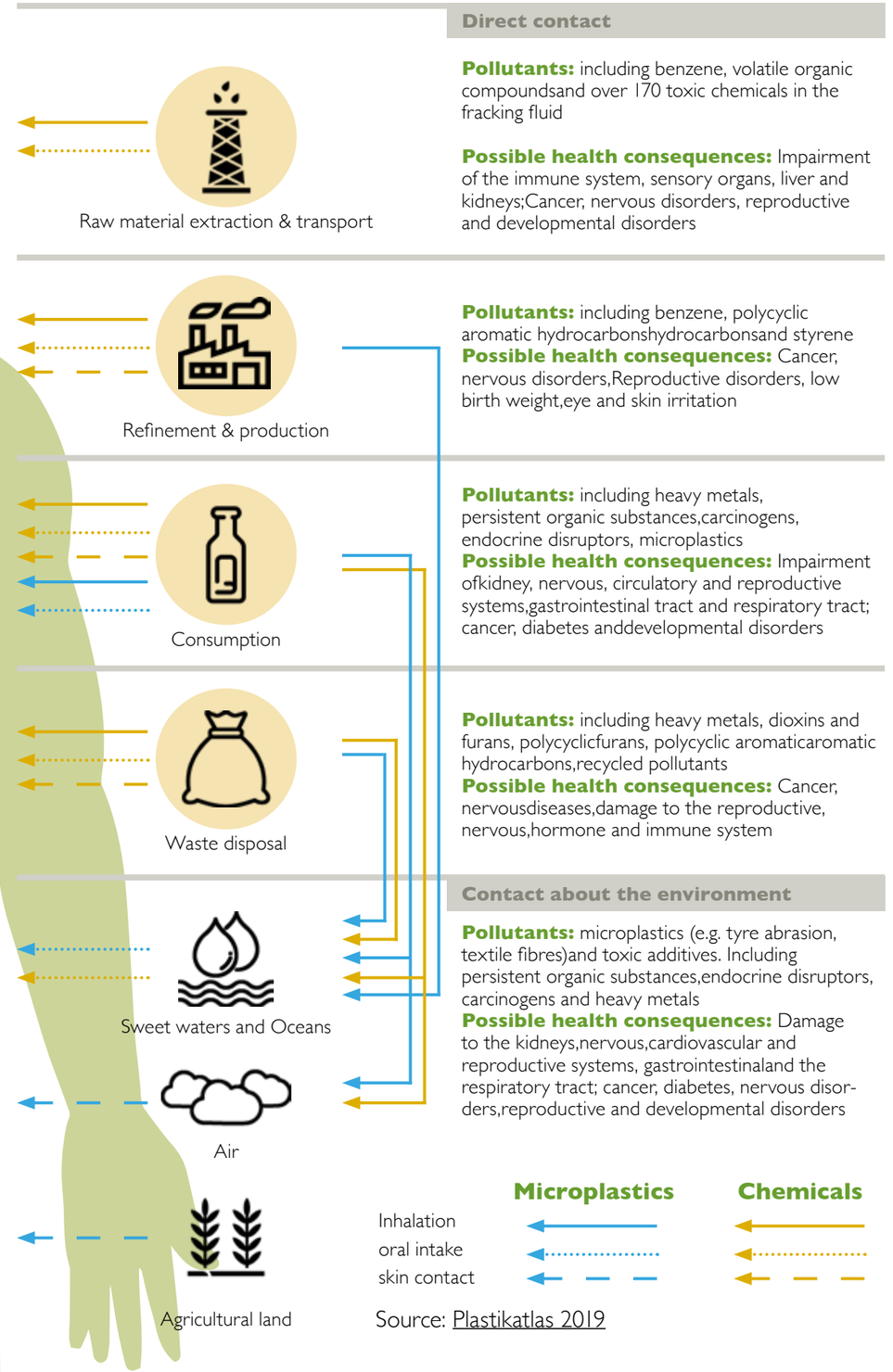
Numerous additives ensure the desired properties of the material. Thanks to plasticisers, hard PVC turns into a cihldren's pool. Fluorinated compounds are used to make outdoor jackets waterproof. Brominated substances are used as flame retardants in electrical appliances and furniture. Many of these additives are harmful to our health and can have long term serious consequences.

GOOD TO KNOW

According to a WHO study (2019) it is poossible, that we basically eat the weight of a credit card in plastic every week!

Hazards in water, on land and in the air

People are exposed to toxic chemicals and microplastics throughout the entire life cycle of plastic. The pollutants enter the body in different ways.



Source: Plastikatlas 2019

GOOD TO KNOW

In Germany, most microplastics result from car tire abrasion, contributing to about one-third of the total amount. The third-largest source is bitumen from asphalt, primarily generated by car abrasion. Lane markings, gradually worn down by car tires, rank ninth. Annually, 60,000 to 111,000 tons of microplastics enter the environment through tire abrasion.

Exposure to microplastics can occur through inhalation, originating from the breakdown of plastic items like tires and textiles. Airborne microplastics, found in urban areas with high air pollution, may pose health concerns. Mitigation involves improving tire materials, reducing microfiber shedding in textiles, and enhancing air filtration systems.

Microplastics can also enter the body via personal care products, like toothpaste, which once contained microbeads. Although banned in many countries, past usage and the persistence of microbeads remain problematic. Plastics impact human health through chemical additives, like Bisphenol A (BPA), raising endocrine-disrupting concerns. BPA exposure can happen through plastic food containers, emphasizing the need for BPA-free alternatives.

Additionally, microplastics enter food chains through seafood consumption, affecting marine organisms. As a protein source, seafood introduces microplastics to humans, impacting health. Microplastics in the air, from road traffic and industrial activities, pose another route of exposure with yet unknown health implications.

Ingesting microplastics can harm human health by physically abrading tissues and transporting harmful chemicals. The adsorption of pollutants by microplastics in marine organisms raises concerns for human consumption.

Despite concerns about the impact of plastics on human health, there's a positive shift towards solutions. Global efforts to reduce single-use plastics, advance material technology, and promote eco-friendly alternatives are gaining traction.

Through collective commitment to responsible consumption and environmental stewardship, we have the potential to create a healthier, more sustainable future.

Hazardous substances IN PLASTICS – Keynote by Martyn Futter

GOOD TO KNOW

You want to know more? Find a detailed household detox guide beyond plastics here:

Plastic and social JUSTICE

While public awareness of plastic pollution has increased, there is limited understanding of its broader context and full impacts. One exemplary topic is the relation between plastic and social justice. The United Nations observes the World Day of Social Justice annually on February 20th, highlighting the pursuit of equitable distribution in social, environmental, and economic benefits. Despite this focus, marginalized communities around the globe still face unequal access to rights and opportunities, bearing a disproportionate burden of all these – usually interconnected – issues. Regarding environmental discussions surrounding plastic waste, those communities historically have been excluded.

Plastic waste on permanent holiday

wOne part of these discussions is the export of plastic waste – mainly from the global North to the South. For example, in 2019 the EU exported a monthly average of 150,000 tonnes of plastic waste beyond its borders. Large quantities of this waste used to be exported to China. However, China took drastic measures by severely restricting the import of certain plastic waste. As a result, other countries in Asia, such as Malaysia, Vietnam, Indonesia and the Philippines, are increasingly importing plastic waste from the EU.

However, there is a high discrepancy between the sheer scale of exported plastic waste and the ability of importing countries to deal with the waste responsibly. As an example, Malaysia has an installed recycling capacity of 515,009 tonnes but now imports on average 835,000 tonnes of plastic waste each year. When countries have no ability to process plastic trash, it often ends up in open landfills - as is the case in Indonesia, where less than half of the country's waste is adequately processed. Non-recyclable plastic waste is often sent to illegal recycling factories that dispose of it by burying or burning it.

Alternatively, the plastic waste that cannot be processed is dumped in the oceans. Consumed by hundreds of aquatic species and large mammals alike, it kills millions of animals every year by entanglement or starvation.

Women and marginalised groups are most affected by plastic production and waste in the Global South

How is this improper disposal of plastic waste in the Global South linked to injustice? The disposal of plastic has a negative impact on the environment. Toxins leaking from plastic waste for example pose a major threat to the people living there, the ecosystems they inhabit, and thus to their livelihoods. Direct damage to health can also be caused by burning plastic waste - a practice of disposal that is primarily carried out by women. However, not only the disposal of plastic, but also its production is associated with aspects of injustice. The production of plastic mainly requires crude oil, which is primarily extracted in the countries of the Global South. The oil exploration threatens indigenous peoples in particular: Health challenges due to environmental pollution (e.g. from oil spills) or land grabbing for required drilling fields. These communities are also usually excluded from decision-making processes, which deprives them of any power.

In summary, plastic pollution exacerbates social justice issues, particularly in the Global South. The export of plastic waste, coupled with improper disposal, disproportionately harms marginalized communities. The production process, reliant on crude oil from these regions, further exacerbates injustices. Addressing these concerns is vital for fostering a fair and sustainable future.

What alternatives **ARE THERE**

Now you already know a lot about plastic and are certainly of the opinion that our plastic consumption has to be reduced drastically. There are various approaches to make this possible. Let's start by looking at what alternatives there are - and whether they are really that much better.«

BIOPLASTICS – **A GOOD ALTERNATIVE?**

Is bioplastic coming to our rescue?

Plastic that is biodegradable? Great, let's have it! STOP! Not so fast. Unfortunately, the term bioplastic is a little bit misleading and very confusing.

For instance, biodegradable plastics can be manufactured either from fossil sources, like crude oil, but also from renewable materials, like corn, sugar canes and leftovers from food production. Then there are also plastic blends which are a mix of fossil-based plastic and plant-based plastic. And finally, all aforementioned types of plastic can be biodegradable or non-degradable. Are you confused yet?

Let's start with the wide spread misconception that bioplastic is always biodegradable. In the case of biodegradable plastics made of fossil sources, full decomposition is only possible under certain industrial conditions. But the same also applies to most of the bioplastic produced from renewable raw materials e.g. PLA (polylactic acid), that is typically made from the starch in corn, cassava or sugarcane, but is biodegradable only in an industrial composting plant.

The decomposition process proceeds very slowly and in case of biodegradable plastic from fossil fuels no valuable compost ingredients, such as nutrients, minerals or soil-improving humus are released, meaning no substrate is developed. Meaning if you throw a cup made from biodegradable plastics on your home compost heap, it will not decompose. You might as well throw a plastic bottle there (please, do not!).

Biodegradable plastics are also manufactured in comparatively low quantities so that the establishment of a dedicated recycling infrastructure is difficult. This is why bioplastics in many countries are discarded as contaminants at composting plants and incinerated.

Bioplastic is often advertised as more »environmentally-friendly« than traditional plastics, but when the materials' life cycles were taken into consideration, that's not necessarily always true. The production of bioplastic creates additional pressures on the environment through the use of fertilisers, pesticides and agricultural machinery, as well as the consumption of water.

GOOD
TO KNOW

Thus, bioplastics can be more sustainable than normal plastic under certain circumstances. However, in most cases it is a deceptive package, which is why the following applies in Hamburg, among other places: Bioplastics in the recycling bin!

The land requirement for the cultivation of a monoculture stands in competition with food production and the use of genetically modified plants cannot be ruled out. Conventional cultivation and processing of plants causes acidification of soils and eutrophication of water bodies.

In addition, the chemical processing needed to turn organic material into plastic can, similarly to fossil sourced plastic materials, include hazardous additives and the effects of some of these substances on the environment and health are not entirely clear. However, if the source of the material for bioplastic production is discarded food waste e.g. rice husks, banana peels, coffee grounds etc. the effect on the environment could potentially be positive, as it would keep organic waste from the landfill and wouldn't need additional agricultural efforts.

As always, there is no easy solution for such a complex problem that is plastic use. We suggest to prefer buying products without plastic packaging (or as little as possible), bring your own durable alternatives (beeswax wraps, glass cans) and recycle your packaging properly. And finally, before throwing anything on your compost heap, make sure that the material is home compostable (not just biodegradable) and do a little research to determine that the producer's claims aren't greenwashing.

GOOD
TO KNOW

Bioplastics can be more sustainable than normal plastic under certain circumstances. However, in most cases it is a deceptive package, which is why the following applies in Hamburg, among other places: Bioplastics in the recycling bin!

DISPOSABLE VS **REUSABLE**

As the global population has grown and society has become more fast-paced, there has been an increased demand for, and therefore production of, more convenient, easy-to-use, on-the-go products. This demand, coupled with globalisation and trade liberalisation, has translated into consumption patterns that are taking a toll on Earth's capacity to replenish itself. In Europe, packaging alone represents 36% of municipal solid waste . While individual countries attempt to solve their waste management issues and resources continue to be depleted at a rate faster than they can be regenerated, the global economy loses about $80-120 billion in packaging that could be reused or recycled.

Currently, most waste management systems prioritise recycling as the main method of reducing the amount of waste going to disposal, which, in terms of circular economy strategies, should be considered as one of the last management options, after it has been determined that the product (or parts of it) can no longer be reused, repurposed, remanufactured or reinserted into the production line. On top of that, materials are not being recycled at a high enough rate to ensure that our waste is managed sustainably. Reuse avoids the need for resource extraction and reduces energy use compared to the manufacturing of new products and recycling. In addition, it can incentivise a shift toward more conscious consumption and reshape our relationship to products.

Reusable bottles vs. single-use bottles

The environmental impacts of single-use polyethylene terephthalate (PET), high-density polyethylene (HDPE), and reusable HDPE for fabric softener, laundry and hand washing detergents were analysed by including different types of materials for the single-use bottles: virgin material, recycled PET and HDPE; and different volumes for the reusable HDPE bottles: 1L and 3L. The largest reduction in CO2 emissions occurs after a reusable bottle has undergone between 2 and 10 cycles. In general, 10 to 15 cycles are recommended for all reusable bottles, due to other impact categories analysed, encouraging the continuous reuse of the bottles for as long as possible.

Improving options for reusable packaging

For People

Packaging counts for **36%** of solid waste in EU towns

& for Planet

Environmental Impacts of packaging **&** Solutions to address them

at different stages of the product life cycle

Production

The production of packaging materials accounts for the largest environmental impact. This is especially the case for glass bottles, which demand a lot of energy to be produced.

Environmental impact at the production stage can be greatly reduced by increasing the number of cycles (reuses) as well as ensuring the packaging is effectively recycled at the end-of-life and increasing recycled content.

Transport

Transport of packaging items can have high environmental impacts due to distance volume and weight. These items are required to be transported.

Using a different mode of transport or decentralised logistic model can help reduce transport emissions.

Number of cycles

Packaging designed to be used only once has the highest impact as the overall environmental impacts are condensed in only one cycle. The lower the life cycle of a product the higher is its environmental impact.

Well designed reusable packaging can withstand more cycles (reuses), which can halve the potential environmental impact of a packaging.

End-of-life

End of life for single-use packaging often means ending up in landfill or incineration rather than recycled.

Making sure the packaging is effectively recycled at the end-of its life, at its highest quality and within a closed loop system, can further reduce the environmental impacts of packaging.

Key measures that can further increase the efficiency and benefits of reusable systems, including:

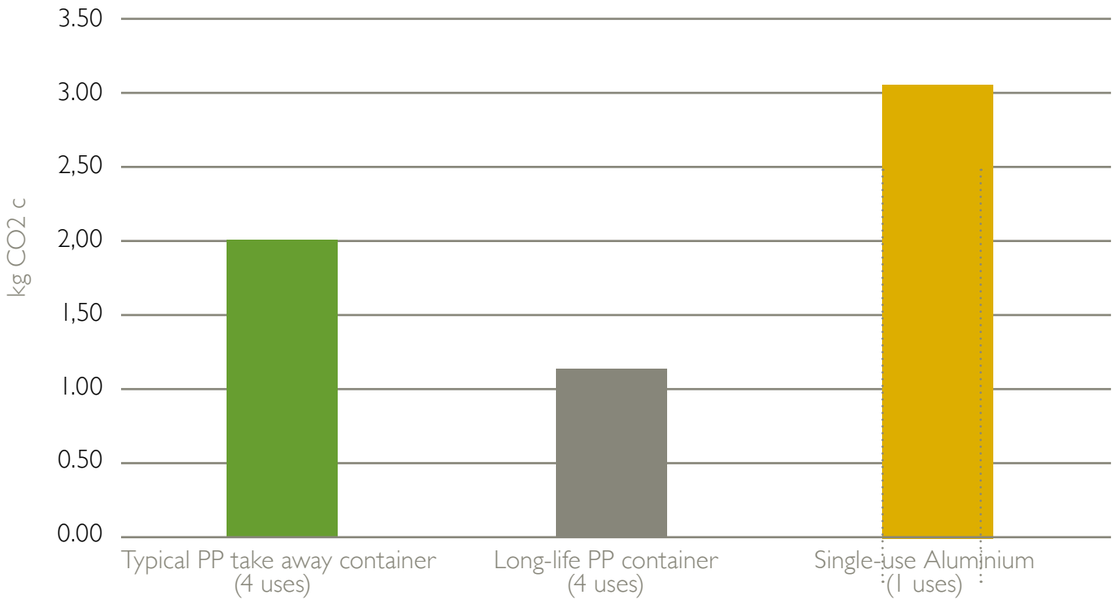
Deposit return schemes

Standardisation of packaging and polling systems

Source: Zero Waste Europe

PLASTIC **BAGS**

Impact of takeaway containers (40 meals)



Based on data from Gallego Schmidt at al., (2019). Environmental impacts of takeaway food containers. Journal of Cleaner Production 211.

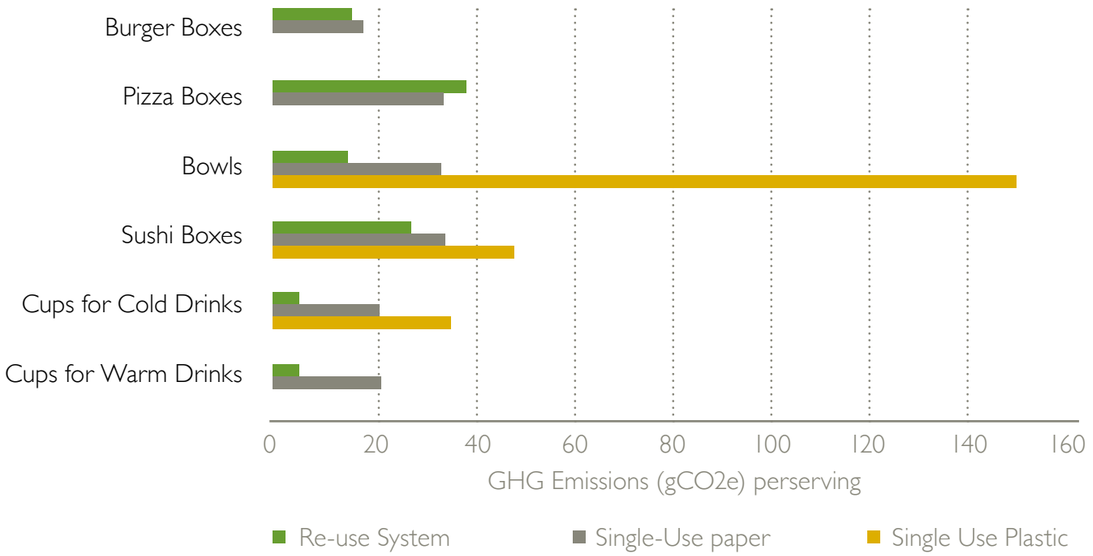
GOOD TO KNOW

- One single-use bag made from high-density polyethylene is more environmental friendly than other alternatives when used at least 4 times
- Breakeven point: 4 uses (5 assuming some single-use bags are reused as bin bags).

CLIMATE **IMPACT**

When a consumer buys a takeaway coffee (for example), some GHGs have already been emitted to extract raw materials, transform them into the plastic cup via manufacturing, and distribute it. More GHG will be emitted as the cup is managed as waste at the end of life.

A cup that is used only once embodies all the emissions from its manufacture, distribution, and end-of-life management. It may be recycled, although single-use takeaway containers are often thrown away, with some ending up as litter due to inadequate waste management.



Source: Zero Waste Europe

GOOD TO KNOW

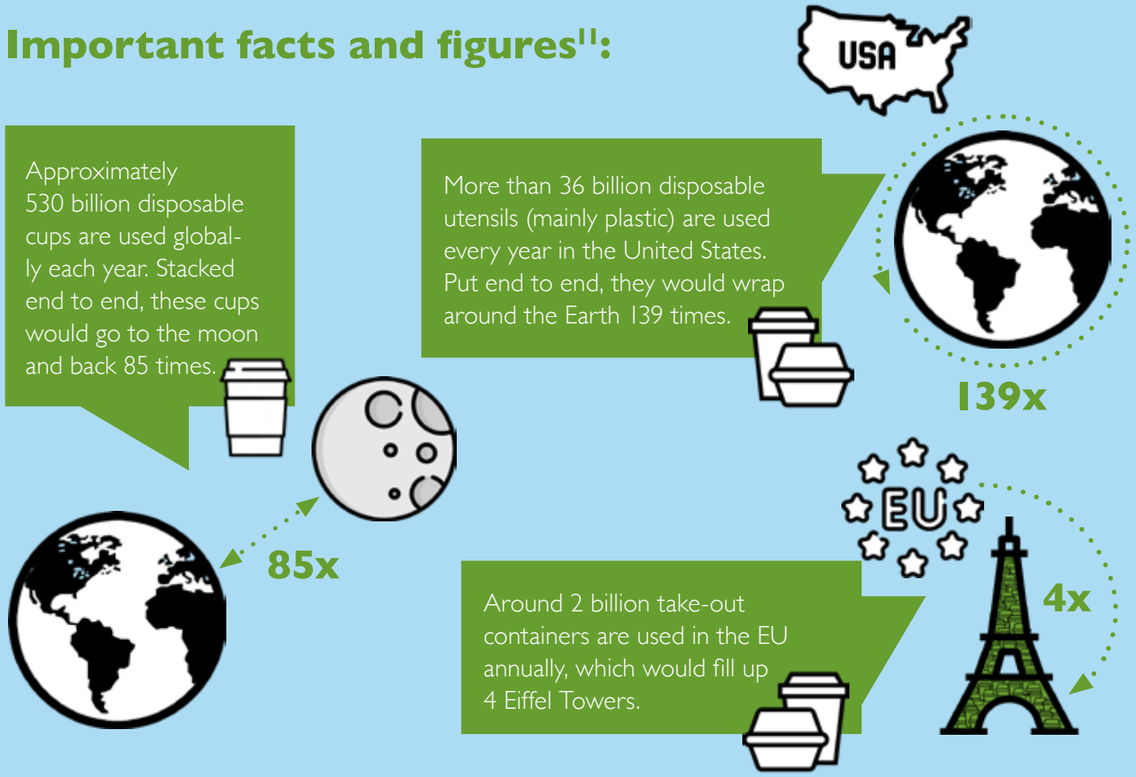
A long-life reusable container has around half the carbon impact of a typical takeaway plastic container when used 40 times. plastic takeaway containers, if reused, perform better than the single-use aluminium containers that used to be more common with takeaway food.

REUSABLE VS **SINGLE-USE**

The study »Assessing Climate Impact: Reusable Systems vs. Single-use Takeaway Packaging« (Eunomia, Sept 2023) modelled the climate change impacts associated with providing a single serving of takeaway food or drink across all six packaging formats used in Europe:

bowls; boxes for pizza, burgers, and sushi; and cups for warm and cold drinks. All results were normalised to individual servings of takeaway items.
For instance, reusable packaging impacts are allocated per serving based on the packaging's total lifetime servings.

Important facts and figures[11]:



My plastic-**WASTE**

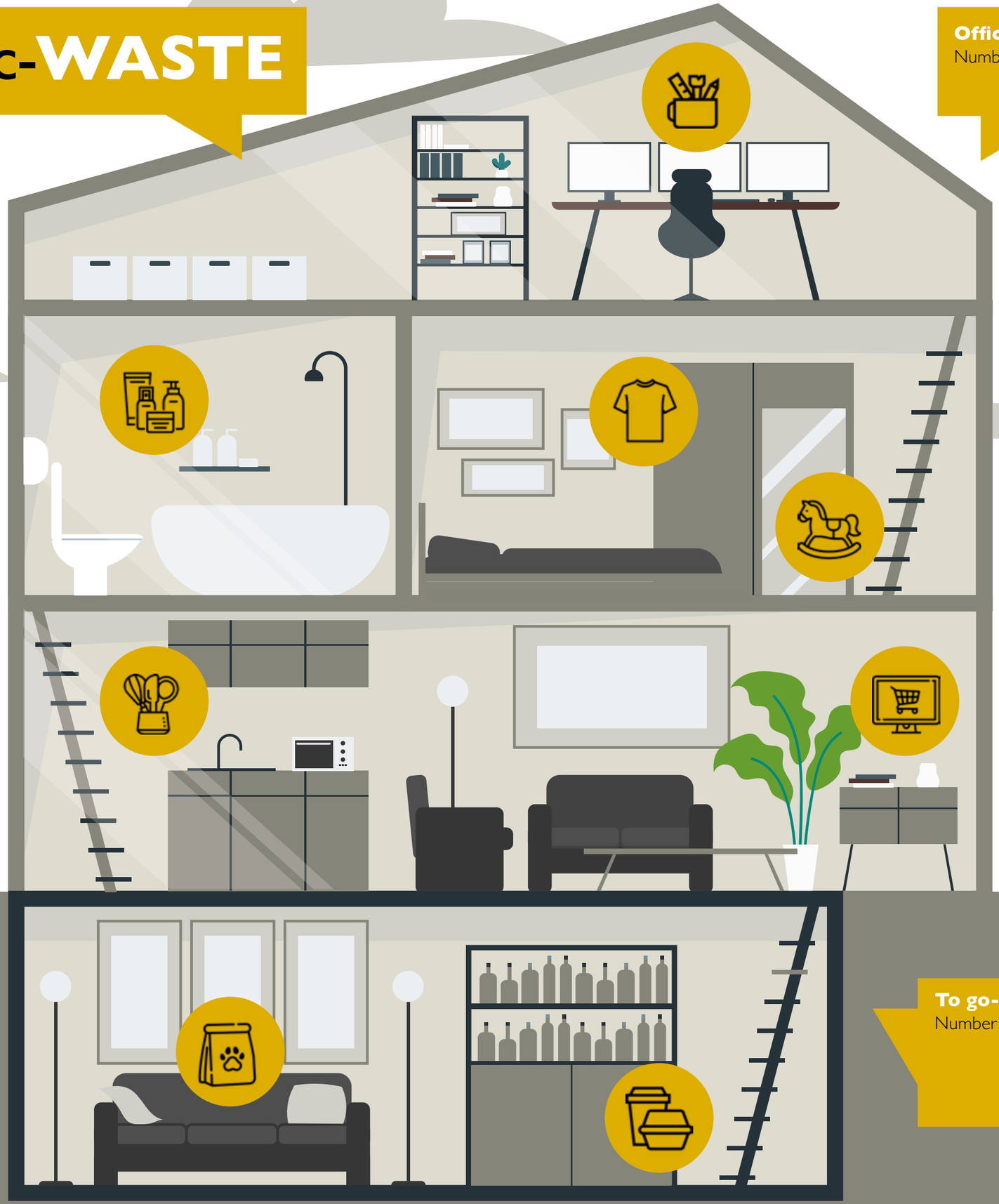
The icons should illustrate the area of origin. But you should only count the plastic pieces you put into the dustbin. For plastic saving tips, have a look on the folllowing pages.

We invite you to print this sheet and put it at your fridge.

Cosmetic & hygienic products
Number of pieces:

Food contact materials
Number of pieces:

Products for pets
Number of pieces:



Office products
Number of pieces:

PERIODE

textile
Number of pieces:

Products for children
Number of pieces:

Online Shopping
Number of pieces:

To go-area
Number of pieces:

Here are some tips **FOR YOU**

THEY ARE MARKED ACCORDING TO YOUR RESULT IN OUR QUIZ. BUT FEEL FREE TO TEST EVERY TIP YOU LIKE – ALSO THE ADVANCED ONES.

COSMETIC AND HYGENIC PRODUCTS

- Try tooth tabs instead of toothpaste from a tube, as this often contains micro-plastics. You can get the tabs in paper or loose in unpackaged stores.
- Cosmetics such as deodorant, lip balm, body lotion, scrubs and ointments are easy to make yourself.
- You can also quickly make washing powder, dishwasher tabs and cleaning products yourself.
- Make sure that plastic cosmetics do not contain microplastics.
- Use paper tissues and facial tissues in cardboard dispensers.
- Use reusable hygiene products, such as period underwear, washable tampons, dipers or menstrual cups.
- Clean with bicarbonate of soda and vinegar instead of conventional products or use detergent tabs that you can simply dissolve in water.
- Use a wooden dishwashing brush with natural bristles and a replaceable head or sponges made from natural materials such as loofahs and nettles. Buy metal dustpans and wooden brooms.
- Use washing concentrate or washing powder. The powder is usually available in cardboard packaging.
- Use solid shampoo, shower gel and a bar of soap.

FOOD CONTACT MATERIAL

- Do you have a small garden or balcony? Then grow your own fruit, vegetables or garden herbs.
- Use beeswax cloths instead of cling film or aluminum foil.
- Store food and other items in glass, wood, ceramic or stainless steel.
- Get a pan made of cast iron, ceramic, enamel or stainless steel.
- Also make other foods yourself, whether plant-based drinks, nut nougat cream or other spreads. It often takes very little time and you can make it in the quantities you need.
- Buy large rather than small packs of products that have a longer shelf life, as they require less packaging in relation to their volume.
- Bake yourself again - e.g. bread, cookies or cakes.
- Use the standard reusable systems for dairy products and drinks, for example.

Even more TIPS

FOOD AND BEVERAGES IN THE »TO GO« AREA

- Eat your ice cream in a cone or from the honey jar you brought with you instead of a coated cup.
- Don't use disposable products such as disposable tableware or straws, but use normal tableware and reusable straws instead or reusable dipers for your babies.
- Bring your own to-go cup made of stainless steel or glass or use the reusable systems of the relevant catering establishment.

ONLINE SHOPPING

- Quality over quantity: it's better to have fewer very good products than lots of mediocre products.
- Avoid shopping online. Otherwise, choose sustainable online stores that ship plastic-free.

PRODUCTS FOR PETS

- Buy fresh products for your pets in your own bag or jar.
- Buy large rather than small packs of products that have a longer shelf life, as they require less packaging in relation to their volume.
- You can also prepare the meals for your pets by cooking them yourself.
- Only offer your pets toys made from natural materials.

OFFICE PRODUCTS

- See which materials from your office supplies you can replace with alternative products, e.g. made of wood.
- A good start is to use pencils and refillable pens instead of their disposable counterparts.
- Reuse brochure covers and packet padding and use materials other than plastic (e.g. paper, fabric scraps) for secure shipping wherever possible.
- Avoid using plastic bin liners in the waste paper basket, as long as only paper and cardboard is collected there.

PRODUCTS FOR CHILDREN

- Only offer your children toys made from natural materials.
- Use reusable hygiene products, such as washable dipers.
- Share instead of buy! As children grow so fast, why not do clothes shopping on second hand portals?

TEXTILES

- Look for natural products when buying new clothes. Synthetic fibers can come loose during washing and end up in the environment
- Go to a clothes swap party and meet nice people at the same time.

OTHER / OVERALL TIPPS

- Avoid products that are packaged several times in plastic.
- Reuse plastic packaging several times, e.g. use vegetable bags from the supermarket again for bread or as a bin liner.
- It's better to use second-hand products, such as clothing, technology or toys.
- Decorate your home with real plants for a better indoor climate.
- Go shopping without packaging: in unpackaged stores, at the weekly market, from local farmers or in tea stores, sweet & chocolate shops
- Only buy what you really need or what really makes you happy. So store according to the motto: every item is a favorite!
- Share instead of buy! You can find many sharing portals online, whether for clothes, games, technology or cars.

Some advanced tips for your everyday life.
YOU HAVE A CHOICE!

Great - you have already learned so much about plastics and how to reduce them in your everyday life! As you know, the chemicals plastics contain are those substances that are most harmful to us and the environment. Therefore, we would like to give you some more rather advanced tips that you can apply not only to your plastic, but allover consumption choices you make.

Choose eco labelled products

By choosing a product with one of the eco labels below, you are making a safe and chemical-smart choice that goes beyond today's legislation. And as bonus: you encourage companies that are at the forefront! Look for the following third-party certified eco labels:

- Nordic Swan (the Nordic eco label)
- EU Eco label/EU flower (the EU eco label)
- Asthma Allergy Nordic (the Nordic Asthma and Allergy organizations label)
- Bra miljöval (the Swedish Society for Natur Conservation's label)
- GOTS (the international eco label for textiles)

Be careful with companies' own eco labels. They have not been reviewed by independent certification bodies and therefor do not necessarily imply that they are better for health nor the environment than other products that comply with the legislation.

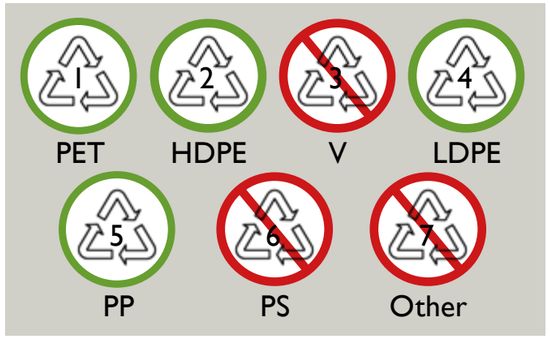
Good Environmental Choice

Look for plastic recycling symbols 1, 2, 4 and 5

You can look for the plastic symbols that indicate the type of plastic the product is made of. The symbol looks like a triangle with a number in it, and is usually placed at the bottom of the product. All plastics are, unfortunately, not marked. But it is a simple hack for those products that have a number! Number 1, 2, 4 and 5 are in general better options from a chemical point of view, they stand for:

1: PET (polyethylene terephthalate)
2: and 4: PE (polyethylene) of high density (HDPE) and low density (LDPE)
5: PP (Polypropylene)

Avoid plastics marked with 3, 6 and 7 since those plastics are subjected to release hazardous chemicals to a greater extent.



Do your shopping within EU

EU has one of the worlds' strictest chemicals' legislation. It is therefore a safer bet to buy products manufactured for the European market from European retailers. Be extra careful when shopping online, as it is not always clear who the retailer is. It has been shown that goods outside the EU pose greater chemical risks. The CE marking on products indicates that the manufacturer claims that the product is manufactured for the European market and complies with EU chemical legislation (but be careful, the CE-mark is a self-made claim not checked by any third party).

Smell and feel / use your senses

Use your senses! It is a sign that an item contains hazardous substances if it smells heavily. If it does, the smartest thing to do is not to use it. You can try airing the item outside for a few hours and see whether the smell disappears. If not, we recommend you to return the smelly item to the store. Plastic products with a sticky surface should be discarded. The sticky surface is most likely a sign of leaking plasticizers (phthalates) that are endocrine disruptors from the product.

Play with toys

Toys are made for playing with. That is why toys have stricter regulation when it comes to chemical content than other products. Let your kids play with toys and avoid giving them electronics and other plastic items. Be especially cautious with babies as they tend to put everything in the mouth.

Second hand is good, but newer than 2013. The regulation for chemicals content in toys was updated in 2013. That is why we advise you to let your kids play with toys manufactured in later than 2013.

Use the app Scan4Chem / your Right to know (reach article 33)

According to the EU's chemicals legislation Reach, you as a consumer have the right to know whether articles contain any of the more than 200 chemicals that according to the EU are considered as substance of very high concern (SVHC:s). You can easily ask companies about the chemical content in products by using the app Scan4Chem. This is how you do it:

1. Download the app Scan4Chem
2. Scan the barcode of the article or search by product name
3. Send a request about the chemicals' content to the company

By asking questions to companies, you also show that you care and can influence companies to offer non-toxic products!

Yes, you did it!

YOU ARE GREAT!

Please share your experiences with us by filling in our follow-up-survey. It only takes 3-5 min.

Scan the QR-code here:

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