





# Table of Contents

5	<b>Executive Summary</b>
9	<b>1. Introduction</b>
10	<b>2. Fast-moving consumer goods sector</b> What is the “fast-moving consumer goods” (FMCG) sector Plastic packaging dependency - a medium for the consumer goods message Branded consumer packaging creates plastic pollution globally Box 1: Plastics - a life-cycle of problems The case for single-use plastic relies on “recycling” The global waste trade - a superhighway for exporting the plastic pollution crisis Can the plastics crisis get any bigger?
17	<b>3. Survey of fast-moving consumer goods companies</b> Assessment methodology Analysis The majority of companies are not willing or able to provide many details about their plastic use Commitments allow companies to increase single-use plastic packaging FMCG companies are increasing the amount of single-use plastic units produced None of the companies surveyed know the ultimate fate of their packaging Business is stuck in a single-use packaging mindset, solutions are mainly on recyclability or recycling Box 2: The Recycling Myth Box 3: No reduction or reuse solution for sachets and snack packaging Analysis conclusions
30	<b>4. Solutions</b> Box 4: Solutions in Action False or insufficient solutions Material substitution Box 5: Bioplastics Light-weighting Relying on recycling to solve the plastics packaging problem Incineration and “waste-to-energy” Box 6: Why incineration and “waste to energy” can’t solve the plastics issue Informal recycling
36	<b>5. Greenpeace call to action</b> 1. Transparency and plastic footprint disclosure 2. Public Commitment to reduction of plastic footprint and transition plan/roadmap 3. Investments in reuse and new/ alternative delivery systems
39	<b>Glossary</b>
43	<b>References</b> <b>Appendices</b> - see separate document <b>Appendix I:</b> Assessment methodology <b>Appendix II:</b> Questionnaire <b>Appendix III:</b> Company responses

Disclaimer: all references to Greenpeace refer to Greenpeace International unless otherwise stated.



## EXECUTIVE SUMMARY

The sight of rivers, oceans and communities overwhelmed with plastic waste has become a shocking - and all too common sight. The logos and images of big consumer brands - clearly visible in this tsunami of disposable plastic - show where the responsibility lies. These brands - with their throwaway packaging - are promoting and perpetuating our modern throwaway lifestyles that are driving mass production and overconsumption. Now we are facing the evidence that “convenience” has an unacceptable cost; the health of our ecosystems and the living beings that depend on them.

Every minute of every day, the equivalent of one truckload of plastic enters the sea,<sup>1</sup> with plastic packaging being one of the highest contributors to the global plastics waste stream.<sup>2</sup> Each one of these packages - made to stand out from the crowd and win brand loyalty - is designed to be used once and thrown away, with little or no thought for the consequences. Now, as these companies look to expand in new markets, they are selling ever more individual units of **small, single portions in plastic sachets** that are not even possible to recycle.

### Accountability - the first step towards a solution

The brands driving the growth in single use plastics - the world's biggest fast-moving consumer goods (FMCG) companies - are **not being held accountable** for the growing crisis associated with the production, consumption, disposal and often pollution of single-use plastics. These companies are responsible for the majority of the throwaway products which sustain our modern “disposable” lifestyle<sup>3</sup> and are the creators of much of the plastic pollution that has led to this crisis, yet even basic information about these companies' operations, production trajectory and true plastic footprint is lacking.

For this report, Greenpeace US sent a comprehensive survey to eleven of the largest FMCG companies.<sup>4</sup> The responses show that despite commitments to reduce plastic waste through more recycling, there is no plan to truly address their plastics problem, that would put the

brakes on the growing production and marketing of single-use plastics.

### Key findings

The most concerning finding is that no company shared specific plans or commitments to reduce the total amount of single-use plastic items they are producing. There is also a basic lack of transparency undermining the credibility of any commitments. This is compounded by misleading claims from some that their packaging is “reusable” and not “single use packaging” when it contains more than one portion.

#### • **No commitments to phase out single-use plastic packaging**

- No company surveyed has a commitment to phase out single-use plastic, or clear targets to reduce the number of single-use plastic items they are producing.
- Every single corporate commitment made by the companies **allows the use of single-use plastic packaging to continue to grow.**
- All companies are wedded to a single-use packaging mindset; the solutions being explored are mainly on recyclability or recycling - which are not sufficient to address the plastics pollution crisis on their own.

#### • **Increasing amounts of single-use plastic packaging**

- Most FMCG companies are increasing the amount of single-use plastic used: all but one company reported an increase or steady state of single-use plastic.

#### • **Companies do not or are not able to reveal their plastic footprint**

- None of the companies have provided full details on their plastics footprint, although many say they plan to do so in the future.
- None of the companies surveyed know the ultimate fate of their packaging, meaning they do not know if it will continue to feed potential eco-dumping through the global waste trade.

## Impacts of plastic in our ecosystems

We don't know exactly how long oil-based plastic will take to degrade, but once in our soil, rivers or oceans, it is impossible to clean up.

- What we see washing up on shores or floating on the surface is only the tip of the iceberg. Over **two thirds of plastic in the oceans ends up on the seabed** creating a growing wasteland beneath the surface,<sup>5</sup> and the amount of plastic entering marine environments is increasing.<sup>6</sup>
- Larger pieces break apart into smaller and smaller fragments known as **microplastics**, which are not visible to the naked eye.
- Plastic has been recorded in Arctic sea ice to Antarctic sea water, to the deepest trench of the seafloor.
- Plastic waste is equally problematic on land, filling up landfill sites and clogging waterways, increasing the risk of flooding or polluting the land and air through open burning or incineration.
- Some plastics also contain and leach out **hazardous chemicals**, and microplastics can attract and concentrate these chemicals from the surrounding environment, posing further risks to wildlife and people.<sup>7</sup>

Our over-production of plastic packaging is pushing at the boundaries of the Earth's capacity to absorb greenhouse gases and polluting ecosystems with hazardous chemicals and waste.

## The recycling myth

The clamour for something to be done about this shameful problem is growing, with governments and businesses all adding their voices to a new "war on throwaway culture".<sup>8</sup> Yet so far, this is a war with no meaningful strategy. Economies with more robust waste and recycling infrastructures are collecting growing quantities of packaging waste for recycling. But what really happens to all of this discarded packaging?

- Only 9% of plastic is recycled globally; in developed countries the recycling rate for plastics collected by households is often far less than 50%, with minimal amounts recycled back into packaging.<sup>9</sup>

- Most 'recycled' packaging waste is downcycled into lower value/unrecyclable products.
- A lot of packaging is not even designed to be easily recyclable, such as the single-use sachets that are a growing trend.
- Limitations to recycling,<sup>10</sup> lack of infrastructure and lack of traceability mean that large amounts of plastic packaging will continue to become waste for the foreseeable future.

## A problem exported

Even worse, much of the packaging collected for "recycling" in the global north is exported to the global south.

- It is estimated that China imported nearly 8 million tonnes of plastic waste a year before it banned the trade in 2018.
- The next destination for these huge volumes of plastic waste is likely to be South East Asia, where the lack of infrastructure for dealing with the even larger quantities of domestic plastic waste means that these countries are already the origin of a significant portion (nearly 60%) of plastics entering the ocean.<sup>11</sup>
- The volume of plastic waste on the land and in rivers is also having huge impacts on communities in these countries, contributing to the loss of livelihoods such as fishing or tourism, exacerbating water pollution and increasing the likelihood and severity of flooding, which takes longer to recede.

The global waste 'recycling' trade means there is no way of knowing whether recyclable materials are actually recycled, downcycled, disposed of, or leaked to the environment. In the meantime, FMCG companies are accelerating their use of throwaway plastics by opening up new markets in the global south, pushing products packaged in single use and single portion plastics, to give a taste of consumer luxury to those that can't afford it.

This promotion of branded products - food, drink, cosmetics and cleaners - in one-way packaging, is driving mass production, over-consumption and is significantly contributing to the plastic pollution crisis. Meanwhile, the habit of overconsumption fuels the anxieties of modern life and puts the burden of guilt for destroying the planet onto individuals, while undermining true happiness by

keeping us from leading more imaginative, fulfilling lives.

The various solutions being proposed by companies and governments alike must be exposed as false. Now is the time to ensure that consumer goods companies commit to reduce their reliance on single-use plastics and transition to a new business model based on transparency, real solutions that are part of a more sustainable product delivery model and policies that prevent waste and pollution.

**A message to fast-moving consumer goods brands: your customers are waiting!**

It's time to face reality. Although the collective and individual efforts to collect and recycle plastics packaging are important and commendable - this is not the solution. We need to put the brakes on the production of single-use plastics, starting right now. As a major contributor to the plastics pollution crisis, the fast moving consumer goods industry must take responsibility for this problem and re-evaluate its dependency on single-use plastic. Companies must now go beyond pledges to improve recycling and commit to massively reduce and phase out their use of single-use plastic packaging, year on year.

This means an end to the business model which relies on disposable products and one way packaging, and the start of a new paradigm, that will allow the co-creation of alternative delivery systems - typically ones which have reuse and refill at their heart.

Greenpeace calls on companies, governments, and civil society to support a transition to a plastic-free future by taking immediate action to facilitate a full-scale transformation away from our current one-way packaging systems.

**Key recommendations**

Greenpeace calls on the Fast Moving Consumer Goods sector and other companies to **prioritise the following four actions:**

- **Be transparent** - publicly disclose comprehensive information about their plastic footprint and the plastics they use;
- **Commit to reduction** - set annual targets for continually reducing their single-use plastic footprint towards complete phase out
- **Urgently eliminate problematic and unnecessary plastic** - begin reduction efforts by eliminating the most problematic and unnecessary single-use plastics by end of 2019;
- **Invest in reuse and alternative delivery systems** - make significant investment in creating refillable, reusable containers and the innovation of new delivery systems that minimise the need for single-use packaging.



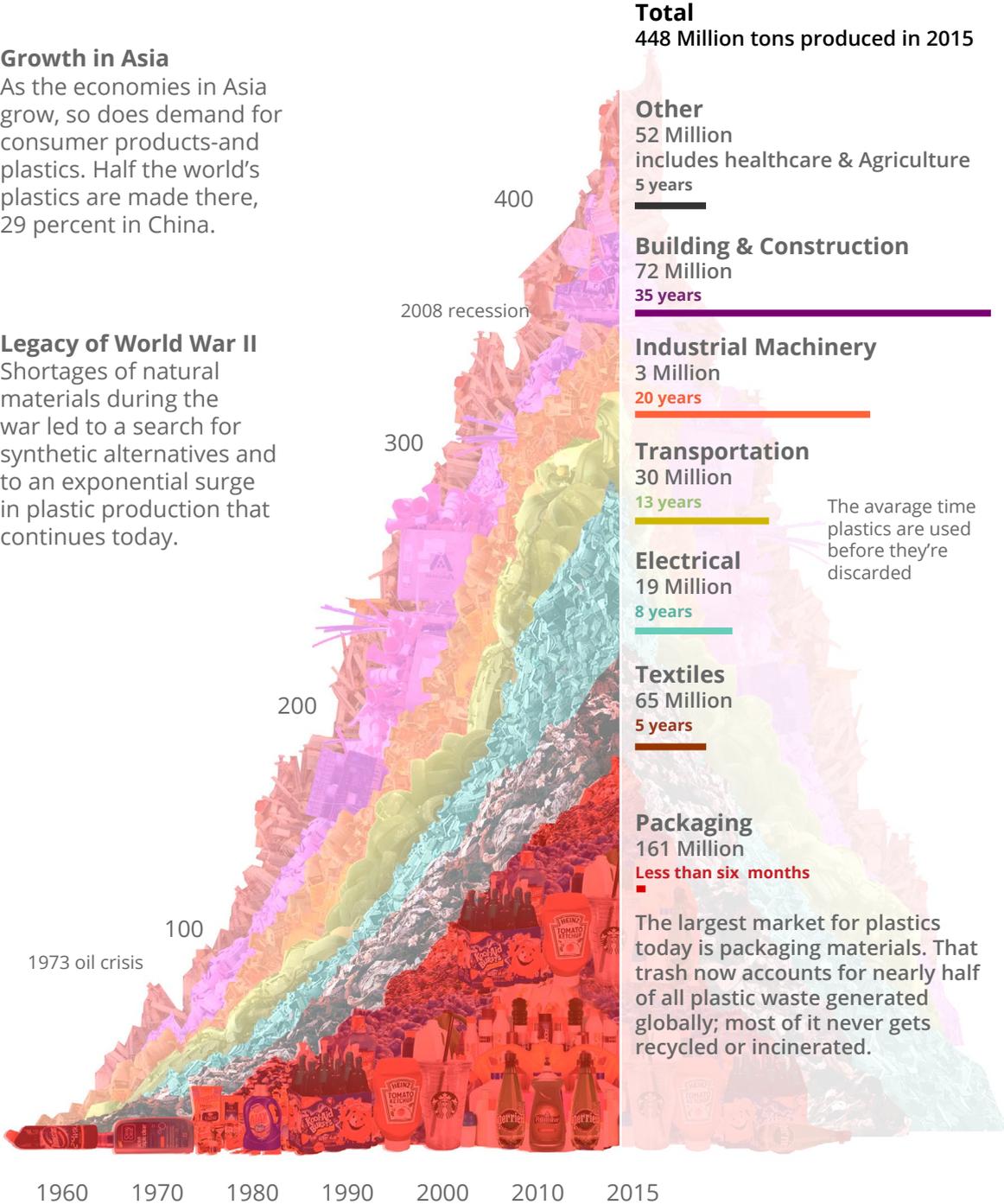
**Global plastic production by industry in millions of tons (cumulative).**

**Growth in Asia**

As the economies in Asia grow, so does demand for consumer products and plastics. Half the world's plastics are made there, 29 percent in China.

**Legacy of World War II**

Shortages of natural materials during the war led to a search for synthetic alternatives and to an exponential surge in plastic production that continues today.



## 1. INTRODUCTION

The plastic pollution crisis has become increasingly visible in recent years; shocking images of choked wildlife and piles of plastic waste in our communities and ecosystems have intensified public concern. Yet individuals might feel that it is almost impossible to avoid creating plastic waste, even when shopping for basic needs such as food. Whether we like it or not, the throwaway lifestyle is taking hold around the world - and most of the plastic packages that fill our bins and landfills, our communities, rivers and oceans come from large companies selling 'fast-moving' consumer goods. Forty percent of all plastics made in 2015 were used in packaging, the largest of all markets for plastics (see Figure 1). The promotion of branded products - food, drink, cosmetics and cleaners - in one-way packaging, is one of the drivers of mass production, over-consumption and is significantly contributing to the plastic pollution crisis.

These "fast-moving" consumer goods brands are responsible for a large part of this crisis and urgently need to reduce and eventually eliminate single-use plastic, starting with transparency by disclosing their plastic footprint.

For this report, Greenpeace asked eleven of the biggest consumer goods brands about their plans to tackle the plastics crisis. We found that none of them are taking the steps necessary to put a stop to the problem and set us on an alternative path. No company discloses their plastic footprint with sufficient transparency and all of them are relying on false or insufficient solutions, in particular that recycling plastics will be the answer to the plastics packaging problem. Unfortunately, we cannot recycle our way out of plastic pollution, recycling alone can never be a solution for the over-production of single-use plastic packaging. Although a lot of plastic is collected, little is recycled to make new packaging and much of it is exported to lower-income countries in East Asia and South-East Asia. At the same time, brands are pushing to expand their sales to markets in these countries, including the promotion of single portions of their products in unrecyclable sachets, only adding to the flood of plastics that is overwhelming their communities. These brands are effectively using the recycling- will-solve-it 'myth' to perpetuate business as usual.

The scale of the problem must be met with a fundamental shift in the system that delivers the products to people - and through the realisation that our reliance on single-use plastic is unacceptable and is pushing us beyond environmental boundaries. Consumer goods brands must dissociate their businesses from their dependency on single-use packaging and recognise their vital role in solving the plastic pollution crisis by driving innovation, scaling up and replicating solutions that already exist or could be easily developed.

Instead of promoting throwaway materialism we need "true materialism" - a switch from an idea of a consumer society where materials matter little, to a truly material society, where materials - and the natural world they rely on - are cherished. Ultimately we need to transform our cultural norms and together co-create a new normal, so that lifestyles that rely on throwaway products and packaging are no longer acceptable.

## 2. FAST-MOVING CONSUMER GOODS SECTOR

### What is the “fast-moving consumer goods” (FMCG) sector

The fast-moving consumer goods (FMCG) sector - also known as the consumer packaged goods (CPG) sector - represents one of the largest industries worldwide, valued at approximately \$493 billion in 2017.<sup>12</sup> It is mainly made up of companies that supply low-cost products that are in constant high demand, such as food, drinks, personal hygiene and household cleaning products. These “fast-moving” items, purchased on a regular basis by households, are non-durable with a short shelf life, mostly sold at a low margin in high volumes, with slim profit margins.

### Plastic packaging dependency - a medium for the consumer goods message

The fast-moving consumer goods sector is a predominant force behind the throwaway economic model driving the plastic pollution crisis. Currently, these companies are just as dependent on single-use plastic packaging to make a profit as they are on the products they are selling.<sup>13</sup> The packaging is not only a vehicle to deliver products but prime advertising real estate where companies compete for customer attention and loyalty, all selling a lifestyle that is unsustainable and a threat to biodiversity and human health.

According to KPMG, most FMCG brands employ a strategy focused on driving top-line sales, with intense competition between numerous brands with near-identical products within their category.<sup>14</sup> FMCG brands rely on predatory marketing<sup>15</sup> to capture local markets and have been criticised for creating rather than meeting the needs of poor consumers, turning luxuries into necessities over time, through advertising and promotion.<sup>16</sup> These companies make heavy investments in advertising, particularly for new products in new markets,<sup>17</sup> while keeping their input costs as low as possible to increase their bottom line profits.<sup>18</sup>

As these companies grow within the current plastic packaging dependant business paradigm,<sup>19</sup> the plastics pollution crisis will inevitably grow

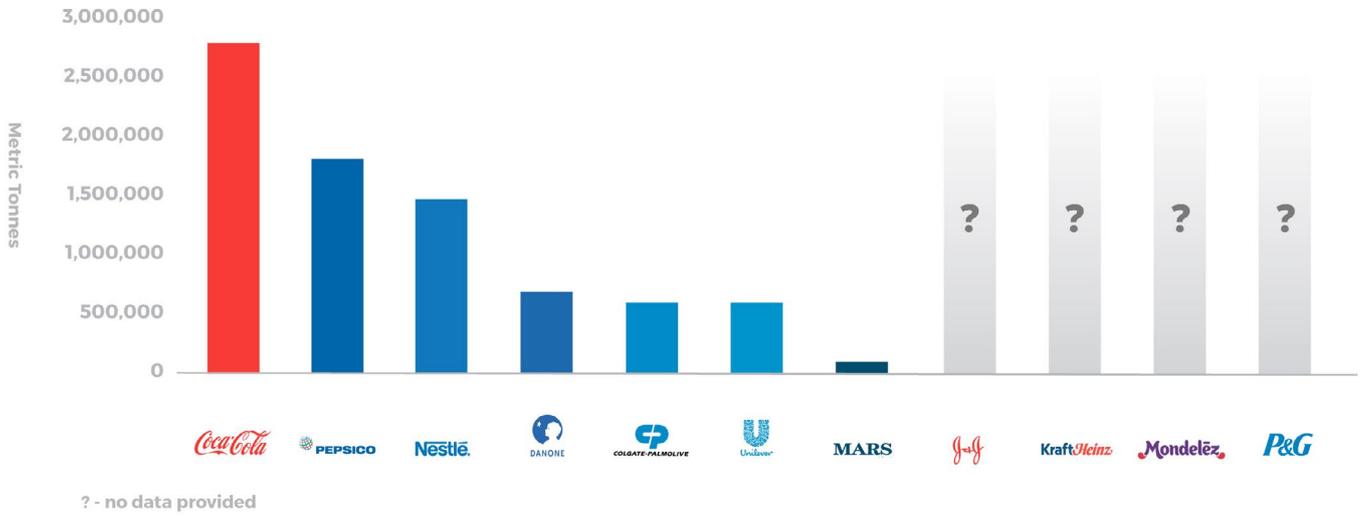
in parallel. Market saturation in the wealthiest countries has led many of these multinational corporations, mostly headquartered in North America and Europe, to pursue aggressive expansion plans in the global south; in the case of Nestlé, developing markets now account for 42 percent of its sales.<sup>20</sup> Rural communities are a focus for Unilever in South East Asia, where the growth in sales results from sachets containing individual portions of products like shampoos, toothpastes, lotions, condiments, and ready-to-eat food;<sup>21</sup> these sachets cannot be recycled and are overwhelming municipal waste infrastructure systems.<sup>22</sup>

### Branded consumer packaging creates plastic pollution globally

**Brand audit results:** Recent brand audits, where plastic packaging waste is collected and sorted according to the brand,<sup>23</sup> led by the Break Free From Plastic movement which includes Greenpeace, found that **Coca-Cola, PepsiCo, Nestlé, Danone, Mondelez International, Procter & Gamble, Unilever, Perfetti van Melle, Mars Incorporated** and **Colgate-Palmolive** were the most frequent multinational brands identified, in that order. Branded products from each of these multinational companies were found in at least 10 of the 43 countries audited.

Greenpeace US's survey of FMCG companies asked them to provide data on the quantities of single-use plastic sold in 2017. As the following graph shows, the four companies which reported the highest sales of single-use plastic products were also the top four brands identified in the brand audit, in the same order. A further four companies - J&J, Kraft, Mondelez, P&G - failed to provide any data on the total quantities of single-use plastic sold in 2017.

**Single-use plastic sold by the eleven FMCG companies surveyed in 2017**



## Box 1: Plastics - a life-cycle of problems

With plastic packaging being one of the highest contributors to the global plastics waste stream,<sup>24</sup> it is clear that its use is an important contributor to the estimated 4.7 – 12.7 million tonnes of plastic entering the ocean each year.<sup>25</sup> It is estimated that over **two thirds of plastic in the oceans ends up on the seabed** creating a growing wasteland beneath the surface.<sup>26</sup> The environmental impacts of plastic packaging are not limited to the oceans; plastics and microplastics are found throughout the environment where they can also have damaging effects. We don't know exactly how long oil-based plastic will take to degrade, but once in our soil, rivers or oceans, it is impossible to clean up.

- **Microplastics** - most petroleum plastic does not biodegrade -- it just fragments into tiny microplastics that create a plastic smog or soup. Microplastics can carry toxic chemicals and are often mistaken for food by marine life and ingested.
- Plastics and microplastics are also released from the **manufacturing of plastics** for packaging: plastic pellets - known as nurdles - the raw material for making plastic, are routinely released into the local environment by plastics manufacturers.<sup>27</sup>
- On land, the application of sludge from wastewater treatment plants was confirmed to be a significant source of microplastic pollution in the environment.<sup>28</sup>

Plastic packaging has environmental and health impacts beyond the problem of waste plastic itself, which arise throughout its entire life cycle, including:

### Oil and climate change

- 99% of plastics produced are derived from virgin fossil feedstocks,<sup>29</sup> which rely on drilling or 'fracking' for oil and gas, transport through pipelines and processing at refineries, with all the inherent impacts of these industries.<sup>30</sup> The Ellen MacArthur Foundation estimates that this represents, for all plastics (not just packaging), for feedstock and production process fuels, about 6% of global oil consumption, which is equivalent to the oil consumption of the global aviation sector.<sup>31</sup>
- The production and disposal of plastic packaging adds enormously to the environmental impacts of a product. Estimates for the UK suggest that PET bottles contribute approximately 24% of the total carbon footprint across the whole soft drinks sector, more than the impacts of distribution.<sup>32</sup>
- Recent reports show that plastics in the environment release powerful greenhouse gases such as methane, as they begin to degrade, a source not previously accounted for.<sup>33</sup>

### Hazardous chemicals

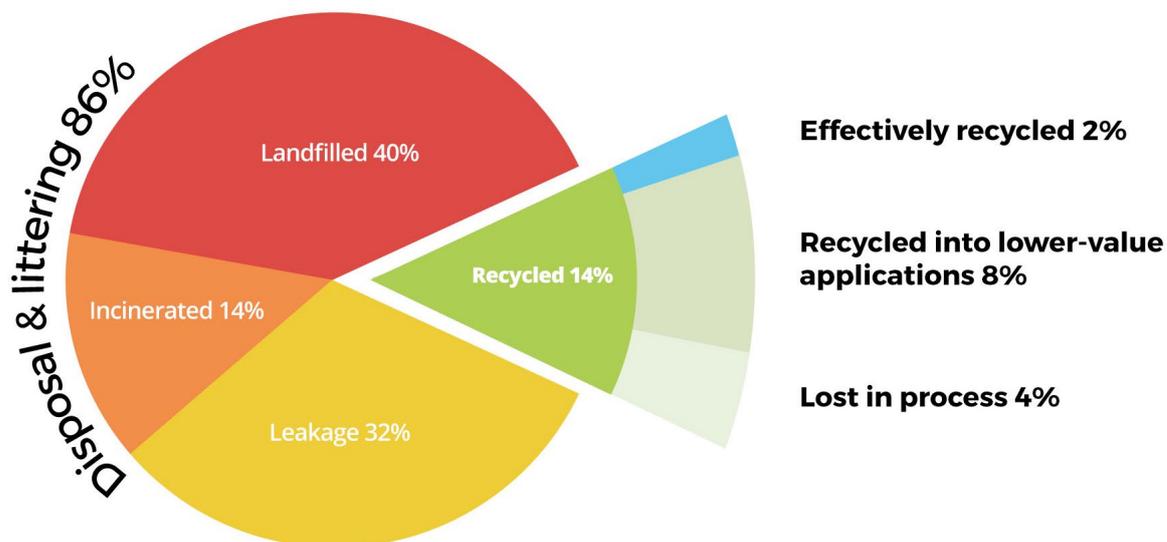
- Plastics additives can include hazardous chemicals such as phthalates (in PVC) and Bisphenol A (in polycarbonate), which have already raised concerns about impacts on health and the environment. The estimated 150 million tonnes of plastics currently in the ocean may include roughly 23 million tonnes of additives (stabilisers, plasticisers and emulsifiers) which could be released over time.<sup>34</sup>
- Microplastics can also attract and concentrate Persistent Organic Pollutants from the surrounding environment, posing further risks to wildlife and people.<sup>35</sup>

# Plastics in our ecosystems, where they come from and where they go.



## What happens to plastic waste

Total packaging waste in 2015 **141 million tonnes**



### The case for single-use plastic relies on “recycling”

There are no signs that large consumer brands plan to move away from single-use packaging as the main delivery system for their products, relying instead on recycling. The current business model is based on the assumption that ultimately all plastics packaging can (and will) be collected and recycled into new packaging or products. However, a great deal of plastic packaging is not even designed to be recycled at the moment.<sup>36</sup> But is 100% recycling ever likely to happen in reality (see Box 2)?

The World Economic Forum estimates that globally 32% of plastic packaging escapes collection systems, generating significant impacts and economic costs by reducing the productivity of vital natural systems such as the ocean and clogging urban infrastructure.<sup>37</sup> This is despite the fact that economies with more robust waste and recycling infrastructure are collecting growing quantities of packaging waste for recycling.

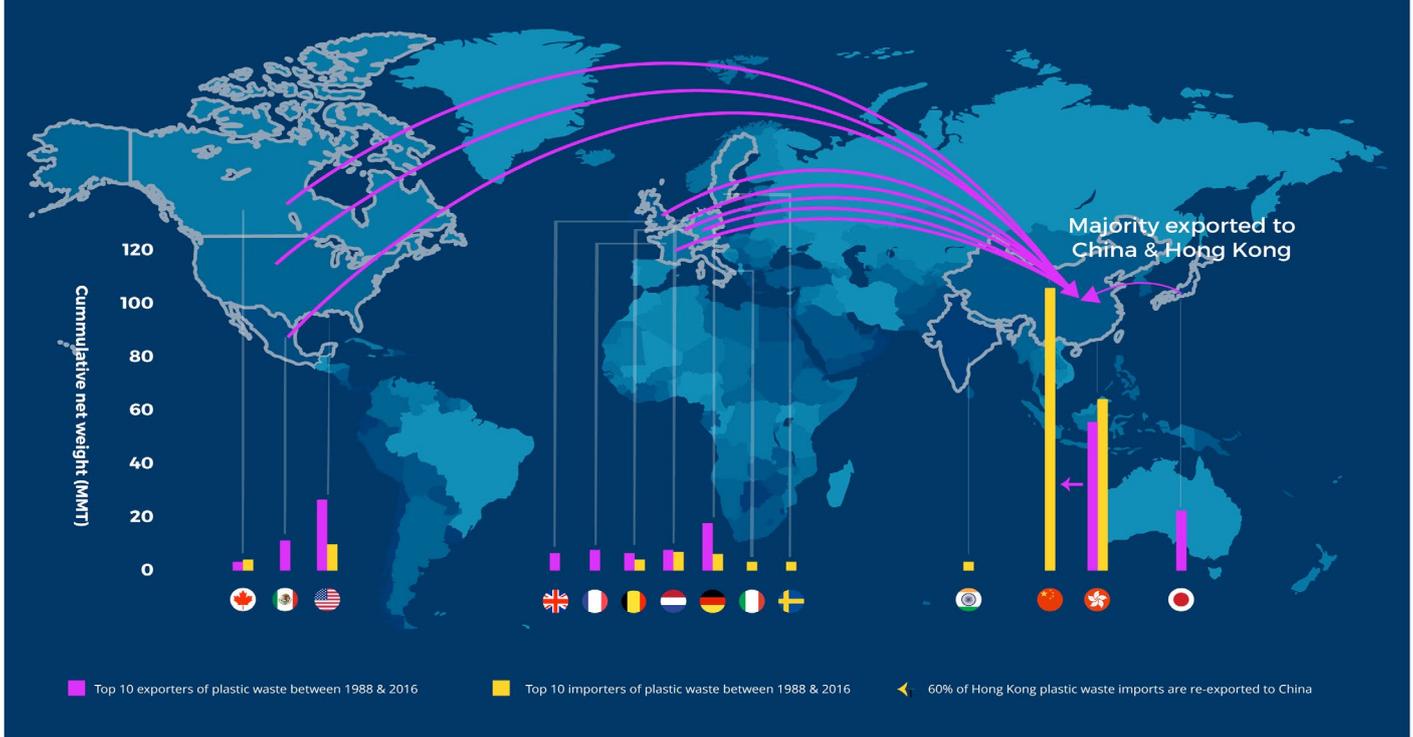
**Very little packaging is recycled back into new packaging.** Even PET bottles, the most recycled packaging, are not always collected and recycled in a manner sufficient to produce high grade quality

for reuse in the food and drink sector; Therefore recycled PET is more often downgraded and used in other sectors, most commonly textiles.<sup>38</sup> The recent brand audits show that PET, which is typically used in bottles, containers, and packaging, was found the most, followed by polystyrene (which is often not recyclable or recycled) in many locations.

Regardless of whether there are national recycling systems in place, in developed countries the recycling rate of plastics is often far less than 50% (see Box 2).

Only 9% of plastic is recycled globally, and even in Europe, where EU regulations require the collection of packaging waste,<sup>39</sup> there are reports that the total plastics packaging recycling rate was less than 41% in 2016, with households achieving a 37.8% level across the region with the balance being met by trade and industry. Although the total recovery rate was almost 80%, almost half of this material was incinerated (see Box 6).<sup>40</sup> Other sources state that only a quarter of the 25-26 million tonnes of plastics waste produced in the European Union every year is recycled; before 2018 about half of this was **exported to China**, which uses recycled plastics to make products ranging from office furniture to cable coatings.<sup>41</sup>

## Top 10 exporters & importers of plastic waste between 1988 & 2016



### The global waste trade - a superhighway for exporting the plastic pollution crisis

Clearly, global north countries have not been able to deal with their plastics problem and have been exporting the plastic packaging collected for recycling for decades: analysis of data shows that 70% of the plastic waste exported in 2016 was from higher-income countries, sent to lower-income countries in East Asia and the Pacific.

Between 1992 and 2016, the vast majority of these plastic waste exports (72.4%), mostly made up of plastic packaging waste, have ended up in China and Hong Kong, with a total of 106 million tonnes going to China over the years. Most of this was imported from 2000 onwards, peaking at nearly 9 million tonnes in 2012.<sup>42</sup>

Then, in January 2018, China implemented a ban on the import of waste - including plastic packaging - raising the question of where will it go now? It is estimated that by 2030 a cumulative amount of 111 million tonnes of plastic waste will be displaced with the new Chinese policy.<sup>43</sup>

These huge quantities of plastic waste have only added to the even more enormous problem of China's own domestic plastics waste. Although the official plastics recycling rate in 2013 of 23%,<sup>44</sup> is

relatively high, this includes the recycling of imported packaging waste, meaning that only 15% of China's own waste is recycled. The remaining 78 million tonnes of China's own waste in 2013 was not officially recycled (although this does not include statistics for the informal recycling sector, which plays an important role in the Chinese recycling industry).

Looking at the whole picture, it is not surprising that China has put a waste import ban in place. Plastic packaging collected for recycling by municipal authorities in the global north gets sent far away to East Asia and the Pacific. Even if it does get recycled once its there, as happened in China, it puts extra pressure on the local recycling infrastructure, making it harder to deal with the large quantities of domestic plastic packaging waste. Which bring us to the current plastics crisis, clearly visible in their communities, waterways and eventually in our oceans.

Along with China, emerging economies in South-East Asia such as Indonesia, the Philippines, Thailand, and Vietnam have frequently been named in recent years as the origin of a significant portion of global marine plastic pollution (estimated to be between 55 and 60 percent).<sup>45</sup> Not only are the major consumer goods brands aggressively marketing single-use plastic to these countries, with the ban on plastic waste imports to China from 2018, South-East Asia

are facing increased pressure to receive millions of tonnes of plastic waste from the global north;<sup>46</sup> there are signs that Malaysia, Thailand and Vietnam are already struggling to process and manage the tide of plastic waste from countries such as the US and the UK following the China ban.<sup>47</sup>

This could be highly problematic as most South-East Asian countries are still facing many basic problems managing their own domestic waste, with a lack of systems for waste segregation, collection and recycling, and disposal in open dumps or by open burning. In addition, waste prevention and recycling rates are very low, with the latter due to a very limited recycling infrastructure. As with other developing countries, in some South-East Asian countries recycling is mostly in the hands of the informal sector.<sup>48</sup> In addition, in most of these countries data on recycling rates is unavailable or inconsistent. The fast-moving consumer goods sector continues to push increasing quantities of products packaged in unnecessary and problematic single-use plastic into South-East Asia, particularly single portions of food or cosmetics such as shampoo in sachets - tantamount to polluting the region with plastic waste.

### Can the plastics crisis get any bigger?

**Most FMCG companies are growing at between 1 - 6% each year.** The fastest growing businesses could double their size in as few as ten years at current growth rates.<sup>49</sup> **Yet none of the biggest global companies are publicly discussing the urgent need to address their business models to remedy the environmental burden of operating single-use product delivery systems.**

With growing public outrage, governments exploring policy fixes, and a steady drumbeat of new science underscoring the impacts of single-use plastics, a fundamental transformation of the fast-moving consumer goods business model as it exists today is required for these companies to remain viable in the future. These companies are a key component in the broken system of over-consumption. Thus, as a first step it is essential that they take responsibility for their contribution to the crisis. From there, it will be easier for them to play a role in co-creating the appropriate conditions for all of us to live a life without throwaway plastic packaging.



### 3. SURVEY OF FAST-MOVING CONSUMER GOODS COMPANIES

#### Assessment methodology

In July – August 2018 Greenpeace US conducted a survey of eleven of the world's biggest FMCG companies to determine the degree to which their commitments, actions and performance are addressing the environmental and social impacts of their plastic packaging and waste. The eleven companies chosen own well-known consumer brands globally, holding important market shares across all the regions of the world. A combination of companies was chosen to cover multiple consumer goods in the beverage, food, household products, cosmetics and health sectors.

The approach was to ask a range of questions in four broad areas:

Assessment Area	Description
<b>Commitments towards phase out of single-use plastic</b>	<ul style="list-style-type: none"><li>• What commitments has the company made to achieve a world without single-use plastics?</li><li>• How has the company aligned its rhetoric with its supply chain actions and lobbying efforts?</li></ul>
<b>Plastics use changes in company packaging portfolios</b>	<ul style="list-style-type: none"><li>• Has there been a reduction in single-use plastics?</li><li>• What measures is the company undertaking to ensure that reductions continue?</li><li>• How is the company investing in alternatives?</li></ul>
<b>Initiatives being developed or adopted by the company</b>	<ul style="list-style-type: none"><li>• What innovations are being developed by the company?</li><li>• How scalable are the solutions being used?</li><li>• How is the company promoting alternative delivery formats?</li></ul>
<b>Company transparency to questions on plastic use</b>	<ul style="list-style-type: none"><li>• Has the company been open and supportive in engaging Greenpeace and the public on its actions to address single use plastics?</li><li>• Is disclosure a core part of how the company aims to demonstrate its progress towards moving towards a world free of single-use plastics?</li></ul>

To determine how companies were performing in each of these areas a questionnaire was developed and sent to the following eleven companies:

**Table 1: Eleven FMCG companies selected for the survey and their sector**

Companies	Revenue (2017)	Head Office	Beverages	Food	Household Products	Cosmetics and health
	\$35bn	USA				
	\$15bn	USA				
	\$29bn	France				
	\$76bn	USA				
	\$26bn	USA				
	\$35bn	USA				
	\$26bn	USA				
	\$93bn	Switzerland				
	\$64bn	USA				
	\$15bn	USA				
	\$63bn	Netherlands				

For more details of the methodology see Appendix I.

## Analysis

All eleven companies responded to the survey. While some data was made available, none of the companies disclosed all the information requested by our survey about their single-use plastic footprint or demonstrated a solid understanding of where their product packaging ultimately ends up. Tracking data like this and making it publicly available is an essential step to establishing a baseline for 'peak' single-use plastic usage from which to measure annual reduction targets. These numbers are also important in assessing where

investments in innovation can have the most impact.

There was a significant range of responses and commitments to addressing plastic pollution in the responses, however, no company has committed to any meaningful reduction of single-use plastic packaging items in their business. Most companies do not disclose their plastic footprints fully, and none have committed to disclose how many units of plastic packaging they sell. Notably, Nestlé is the only company that committed to disclose all information except units, which it is considering.

**None of the companies surveyed shared with us strategies which incorporate a commitment to move away from, or reduce dependence on, single-use plastic packaging materials. Every corporate commitment made by the companies allows the total amount of single-use plastic packaging units to continue to grow.**

The following section identifies Greenpeace’s key observations about the company responses.

**The majority of companies are not willing or able to provide many details about their plastic use**

Nine of the eleven companies are unwilling or unable to disclose both geographical and product

category information related to their use of plastics, an important step in taking responsibility for their role in the plastics pollution crisis. Full transparency means publicly reporting on how much plastic is used, including the number of items, what kinds of plastic, and its purpose, to establish a baseline from which to measure progress. Our research sought to identify how companies developed or marketed products in different packaging formats and whether they take into account the different end of life infrastructure capabilities. However the information supplied was not able to provide any insight into this, a finding that is consistent with research undertaken by the UN Environment Programme in 2014.<sup>50</sup>

**Table 2: Company responses to data-related questions on plastic use (plastics footprint - see Glossary)**

Companies	Data provided on use	Geographic breakdown of plastics use	Growth trajectory of single-use plastics	Use of recycled content	Commits to public disclosure of this data in the future
	Only PET		Qualitative*		Q3 2018
					Annually - start date not indicated
					Oct 2018
					
					2019
					Future - no date
					
		Region	Qualitative*		Future - no date
					Future - no date
					November 2018
			Qualitative*		Future - no date

Grey indicates company did not answer question or answered it does not use recycled content;

Light Blue = Partially; Blue = Yes

\*Qualitative: a general statement on growth but no data was provided

None of the companies have provided full details on their plastics footprint, although many say they plan to do so in the future. The three companies providing slightly more detail are, Unilever, Nestlé and Danone. Unilever previously published a detailed polymer breakdown of its packaging footprint, but hasn't done so in several years. All companies that plan to disclose further details about their footprint to the public have stated that this will happen within the next 12 – 24 months. Only one company - Nestlé - detailed the specific indicators they will be using when they report.

The lack of a geographical breakdown of plastic use means we cannot determine whether companies are adjusting their business models to reflect the inadequacies of collection systems in some countries (e.g. in Africa where 57% of plastic is not collected<sup>51</sup>) or if this is taken into account at all.

### **Commitments allow companies to increase single-use plastic packaging**

Although all companies have some form of commitment to address the use of packaging materials, none of the companies indicated clear plans to reduce the absolute quantities of plastic items (ie. the number of single-use plastic packaging units) used. There are several ways that company commitments allow the companies to increase single-use plastic packaging, including the following:

- **Reducing the weight of plastics used per product (relative reductions per sales unit)** – this commitment allows for the increased use of single-use plastics, or other materials, provided that less material is used on a per product basis (e.g. reducing the weight of a PET bottle but selling more PET bottles) (see False Solutions - lightweighting).
- **100% recyclable/ recyclability**<sup>52</sup> – this commitment allows for the increased use of these plastics without any reduction or separate measurable reuse component; it perpetuates the myth that recycling of plastics alone can solve plastic pollution (see Box 2).
- **Generic packaging reduction** – these commitments relate either to the reduction of all packaging by weight or a general percentage

reduction, without necessarily specifying the particular materials involved. The companies with these targets do not always disclose how this affects plastic used; there could be an increase in the use of lightweight plastic and a growth in total plastic units at the expense of heavier but reusable plastics or other materials. The targets for avoided materials were often not qualified with information on the total tonnage produced at the start or end point, so it's not possible to tell if the commitments would result in any absolute reductions in single-use plastics use by unit or otherwise.

- **Recycled content** – this commitment is to use, or collect, a certain amount of plastic to displace virgin material demand and create a market incentive for waste managers to invest in segregation and recycling facilities for plastic, but does not address the plastic pollution issue on its own or prevent the use of virgin plastic (see False solutions - relying on recycling).

At least three companies have mentioned that they will be committed to “take action to eliminate problematic or unnecessary plastic packaging by 2025” and “take action to move from single-use towards reuse models where relevant by 2025”. While these are both important elements, this language does not specify the scope (of the elimination/phase-out) or measurable targets of the shift from single-use to reuse, therefore they are not considered to be credible. To be credible companies would need to publish a list of products in the scope and a percentage or level of shift to reuse with intermediate milestones and dates.

None of the commitments shared by the companies included a stated ambition to reduce overall volumes of single-use plastic items being used or specific unit reduction targets. Five companies mentioned lightweighting / packaging optimization and six did not respond to the question on reduction. Reducing plastic packaging by weight through lightweighting or ‘packaging optimization’ does not address the issue of plastic pollution.

In addition to this approach the concept of multi-use or reusable versus ‘single-use plastics’ is not universally understood by the respondent companies. For example:

**Table 3. Commitments companies have made towards their reduction in use of single-use plastics (in units) versus plastic overall**

Companies	SUP phase-out dates/targets	SUP unit reduction targets ***	Reduce general packaging weight	All packaging 100% recyclable,***	Use of recycled plastic
			Relative*		Or Bioplastic
					25%
					25%**
				90% recyclability in some countries	
					Yes but no data
					
			Relative*	100% recyclability by 2025	
			Relative*		25% EU
					
			Relative*		Selective data
			Relative*		25%

Grey = No, or did not answer question; Light Blue = responded partially, with not enough detail;

Blue = Yes; No data indicates that the company provided qualitative remarks but not actual figures

\*Relative=relative reductions of plastic packaging used per sales unit ie. lightweighting; \*\* 50% for beverages.

\*\*\* See footnote 52.

• **Avoiding disposal** – any second use of the material is proposed by some companies as extending the life of the packaging. For example, if a bottle is recycled and used as clothing fibre then a beverage company may claim that their material is no longer having just one use. This definition is problematic because it undermines the distinction between product reuse and material reuse (recycling), not recognising the general rule that product reuse has less impacts than material reuse through avoiding the need for physical or chemical processing.

• **Multiple ‘servings’ as ‘uses’** – if a packaged product is not consumed in one go – such as dishwasher detergent that is used for multiple washes, or 500g of yoghurt that may be consumed over several meals - then some manufacturers claim that the packaging is not “single-use”. This definition ignores the fact that the multi-serving packaging is not refilled after it is depleted. If refilling the packaging is not designed or supported by the company, it makes no difference whether it is thrown away within one day, or one month.

Companies need to use clear, consistent and transparent definitions in order to be credible, both in their commitments and reporting, and in communicating with the public more broadly. The terms of reusable /refillable should not be confused with recycling or further use in another industry; likewise, the fact that non-refillable/reusable multi-serving or bulk purchase packs generate further single-use plastic waste by the end user should exclude their description as reusable/refillable.

**FMCG companies are increasing the amount of single-use plastic units produced.**

Only two companies surveyed, Danone and Mars, reported a reduction in the absolute tonnes of plastic used by their business, but did not indicate a reduction of total single-use plastic items. All other companies reported an increase or steady state of single-use plastic. As only Coke and Nestlé provided information on the number of units supplied relative to the weight of plastic used, it is not currently possible to know if any reductions are the result of shifting from single-use to reusable formats, other materials, or to lightweight materials.

**Table 4: Plastics use changes in company packaging portfolios**

Companies	Absolute change by weight	Relative weight per sales unit reduction	Growth in reusable formats	% Sold in single-use packaging
	+3-5%		Decrease	72%
	Increase			
	-5%			
				
				
	-7%			100%
				
	+5%			98%
				
				
	No change	-29%		

Grey indicates company did not “directly” or “specifically” answer the question; Orange = wrong direction; Light Blue = no change; Blue = reduction (however, note that this might include a reduction in ‘reusable formats’)

\*Qualitative: a general statement on growth but no data was provided

### None of the companies surveyed know the ultimate fate of their packaging

Despite the fact that all of the corporate commitments made by the companies are based on recycling or recyclability, none of the companies are engaged in the active monitoring of recycling statistics in all of the markets they operate in and none were able to identify where the final material recycling occurs (e.g. the destination of customers' recycled plastic, either in the same country/region where it was put on the market or exported

to another country). Only three respondents – Unilever, Nestlé and Danone - provided evidence of monitoring recycling rates for their main markets, and companies noted that this is a complex area due to the different levels of national monitoring and statistics within countries. Those that do monitor recycling rates rely on national statistics and stated that there were knowledge gaps where this information is not made available by governments.

**Table 5: Monitoring where plastics go at their end of life**

Companies	Know how much plastic was actually recycled by customers	Actively track information	Know destination of recycled materials
	Not Disclosed		
	Not Disclosed		
	3rd Party Statistics		
			
			
			
			
			
	Not disclosed	Not disclosed	Not disclosed
			
	3rd Party Statistics		

Grey indicates company did not answer question; Orange = No; Light Blue = Partially; Blue = Yes

Not disclosed means the company said they tracked this, but provided no details, evidence, or sources.

3rd party statistics means they look at general national statistics but haven't measured their own products or formats in any specific way.

## Box 2: The Recycling Myth

100% recyclability strategies suggest that what is **recycl'able'** will get **recycl'ed'**.

**Unlike metal and glass, plastic is not an infinitely recyclable material.**<sup>54</sup>

- The problem with any kind of plastic is that recovering 100% of the material is difficult with mechanical recycling due to quality losses, degradation and contamination.<sup>55</sup> The development of chemical recycling is still at an early stage,<sup>56</sup> it is not suitable for certain types of plastics<sup>57</sup> and the costs and amounts of energy and hazardous chemicals used need to be considered. These limitations to recycling will mean that large amounts of "recyclable" plastic packaging will most likely continue to become waste for the foreseeable future.

**Much of the plastic packaging used today is not even designed to be easily recycled.**

- This is particularly true for plastic laminates and films, (see Box 3) where there is very little incentive to collect as they are currently difficult to recycle.<sup>58</sup>

**The plastic pollution crisis, however, is not only the result of non-recyclable plastic polymers and formats being used.**

- PET bottles are the fifth most likely type of plastic packaging to appear among litter on beaches.<sup>59</sup> This is despite the fact that PET is one of the most recyclable packaging materials. In the US, the 2016 recycling rate for PET bottles was approximately 28% with less than 6% of the total PET used in bottles being reused to make new bottles.<sup>60</sup>

**Much of the plastic that is recycled is downgraded.**

- One reason is that it is more expensive and energy intensive to recycle PET back into bottles than for other uses such as fibres.<sup>61</sup> Therefore, the vast majority of recycled plastic is downgraded for use in apparel, construction materials, and other non-packaging-based applications. For example, recycled PET is used in the clothing and apparel sector, some of it to make throwaway fast fashion which is unlikely to be recycled again, ie. it is effectively 'downcycling'; in turn, the fashion brands promote such products to show their eco-credentials, while ignoring the inevitable loss of microplastic fibres into the aquatic environment through washing (another form of plastic pollution), and the short lifespan of their products. The fashion brands also serve to conveniently remove responsibility from the food and beverage industry for their single-use plastics.<sup>62</sup>

**The current recycling rate for plastics packaging is low, even in the best possible circumstances.**

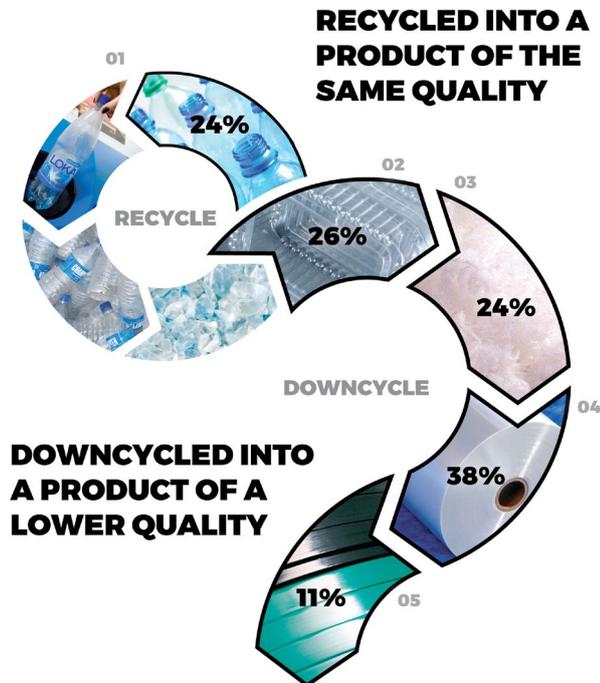
- The maximum possible levels of recycling for plastics packaging are currently reported at somewhere between 36 % and 53%: beyond this limit the recycled plastic will be either of a very low quality, or not cost effective.<sup>63</sup>

In truth the efficient collection, recycling capacity and infrastructure for plastics recycling are frequently inadequate at present, a responsibility which is usually shifted onto local governments which have little influence on the various factors that make plastics recycling so complex. Local infrastructure is lacking in many regions, for example, 57% of plastic in Africa, 40% in Asia, and 32% in Latin America is not even collected.<sup>64</sup> Even in developed countries, large amounts of plastics collected for recycling are routinely exported (see The global waste trade, p.15), with no way of knowing whether these materials are actually recycled, downcycled, disposed of, or leaked to the environment. Any improvements in infrastructure and traceability would be unlikely to be achieved on the global scale needed, and more fundamentally, would not be able to overcome the technical and economic limitations of recycling plastic in a continuous closed loop (ie. so called circularity by the industry).

In short no country, company or organisation has committed to a 100% recycling rate because of the impracticality of achieving this outcome or controlling a system that aims to do this, even in developed countries with collection and recycling infrastructure. Based on the above it is clear that we cannot simply recycle our way out of plastic pollution.

## What happens to plastics packaging collected for recycling

01. BOTTLES | 02. BLOW MOULDING APPLICATIONS  
03. POLYESTER FIBRES | 04. SHEET AND FILM | 05. STRAPPING



## Business is stuck in a single-use packaging mindset, solutions are mainly on recyclability or recycling

Striving towards recyclability has been an aim for some FMCG companies for many years, with commitments to 100% recyclable, biodegradable or compostable plastic becoming a trend more recently. There are a number of ways to increase recyclability, from single polymer use to adjusting the colours used in packaging. Achieving 100% recyclability is a relatively easy goal, when compared to the other side of the equation - the impossibility of recycling 100% of plastic packaging. The fixation on recycling as the predominant “solution” allows the focus to remain on keeping single-use packaging as the main delivery system for connecting customers to products.

Company responses indicate that sustainable packaging guidelines, when such policies exist, are mostly focussed on recyclability. Sustainable packaging guidelines should recognise that in principle the continued large scale use of single-use materials is not appropriate. The guidelines should require predominantly reusable and refillable systems or alternative delivery systems that do not depend on single-use packaging (see examples in Box 4). All materials used should be free of hazardous chemicals and avoid material substitution that risks shifting the environmental and social impacts elsewhere (for example substitution with bio-based plastics or paper whose sourcing could have impacts in agricultural or forest systems).

The approach to developing and adopting solutions differs according to the company sector, with snacks companies – Kraft-Heinz, Mars, Mondelez - reporting few plans or investment in research and development to address the non-reusability and non-recyclability of their product packaging, as shown below. Those companies with both snacks and beverage lines have predominantly provided information and investment projects on reusable packaging related to the beverage side of their portfolio (e.g. Danone, PepsiCo).

While several companies indicated projects or plans related to new delivery systems, the overall level of investment was incredibly small given the size and amount of plastic being sold by the companies; none had a comprehensive strategy with a clear plan showing how investment in new delivery systems would result in a reduction in the overall amount of single-use plastic units produced.

**Table 6: Solutions being developed or adopted by companies**

Companies	Use of sustainable packaging guidelines	Already use multi-use packaging for some products	Plan to use reusable or refillable formats	Investing directly in developing new product delivery systems	Engaging suppliers on adopting or supporting initiatives
	Recyclability*	Fountains		Recyclability*	
	Recyclability*			Confidential	
		Beverage	Beverage	Beverage	
	Recyclability*				
					
	Recyclability*	No**			Recyclability*
					Recyclability*
		Water			General
	Recyclability*	Beverage	Beverage	Beverage	Recyclability*
					
					General

Grey indicates company did not answer question or answered 'no'. Light Blue = Partially; Blue = Yes

\*Recyclability alone is not considered to be "sustainable packaging" nor is it recognised as a new /alternative delivery system to single use plastic packaging systems. Sustainable packaging guidelines - in this context - should require predominantly reusable and refillable systems or alternative delivery systems that do not depend on single-use packaging (see more details in discussion above, in Box 2 and definition of alternative delivery systems in the Glossary).

\*\*While the examples Mars provided (refillable gum bottles and bulk plastic pouches) might appear to be designed for reuse/refill the combined system of gum bottle plus accessory bulk product still requires the end consumer to dispose of the refill pouch which would appear to not be designed for refill or reuse, therefore we would still consider the combined system as one that depends on single-use packaging.



© Joshua Paul / Greenpeace

### Box 3: No reduction or reuse solution for sachets and snack packaging

No companies appear to be investigating or developing reusable systems for single-use sachets or snack packaging. The only company that reported any initiative specifically focussed on snacks packaging in flexible plastic, including confectionary and potato crisps, is PepsiCo, which reports that it is looking at innovations for collection systems, but not for re-usability. Danone, which also has non-recyclable food 'pouch' formats in use, did not disclose any work to address reusability, and although it is collaborating with other brands on the CEFLEX initiative to develop solutions for sachets/laminates, this collaboration seems focused on material reprocessing (ie recycling).<sup>65</sup>

There is a clear gap in commitments between beverages and food packaging, particularly for laminates and flexible packaging, which are also used for personal care products like shampoo. Companies seem to be excluding them from innovation as solutions are harder to find: however, without investment the situation is unlikely to change.

These low margin products sold at high volume are marketed to the large numbers of people on low incomes in the global south, where the regulatory landscape may also be less restrictive; for example legal and social consumer protection regulation on labelling, truth in advertising or marketing to minors, can be inadequate or lacking.<sup>66</sup>

This single portion strategy is also creating an artificial demand for convenience and displacing the existing tried and tested systems which provide more opportunities for local people supplying fresh local produce, who are ultimately co-opted into selling FMCG products themselves.<sup>67</sup> The brands are rewarded with expanding awareness of their products while perpetuating a narrative that places responsibility on individuals to cleanup and recycle their ever-expanding plastic pollution footprints.

## Analysis conclusions

Overall, responses to this survey reveal major concerns about how the fast moving consumer goods sector is attempting to address its contribution to the plastic pollution crisis. Despite initiatives such as “A World Without Waste”,<sup>68</sup> every commitment made by the companies surveyed allows them to continue to increase the amount of single-use plastic items they produce. Almost all of the efforts to address plastic pollution focus on recycling, recyclability and recycled content. There are no commitments to phase out single-use plastic within a specified timeframe, and no specific targets to reduce the overall number of single-use plastic items be sold. Where companies do commit to make reductions, the scope and targets are unclear; they are either included as part of a ‘general’ packaging reduction target with no specific details on plastics, or lightweighting initiatives, or the definitions used are questionable.

At the same time, the companies indicate a general increase in the number of single-use plastic items being used. While there are some examples of innovation and alternative delivery models, these initiatives are not clearly tied to strategies which aim to reduce the overall number of single-use plastic items being produced, and the ambition of these programs is remarkably inadequate given the size of the companies and the scale of the problem. Most collaboration and effort remains focused on recycling and material recovery.

Survey responses also revealed an overall lack of transparency on important details about plastic use by the companies. Though some companies made an effort to be open and candid in engaging Greenpeace, none provided detailed information about the number of single-use plastic units they are selling in different markets, and many only referred to certain lines of business, or combined plastic with other materials in sharing data about their plastic use. For a sector relying almost exclusively on recycling to address plastic pollution, the companies demonstrated a very limited understanding of where their products end up and the percentage of their products that are actually recycled in the markets where they are active. Many of the companies indicated that they intend to disclose more information about

their plastic use in the future, which would be an important step. Without better data on the amounts and units of plastic being produced, the credibility of any commitment is questionable and means that measuring progress against a baseline is challenging if not impossible.

Just days before the release of this report, nine of the eleven companies surveyed were identified as top polluters in a global brand audit by the Break Free From Plastic coalition, with plastic pollution from their brands being found on six continents.

**Companies in this sector need to fundamentally change course by being fully transparent about their plastic use, making concrete commitments to phase out single-use plastic across their businesses, with clear milestones and interim targets, and investing heavily in alternative delivery models.**

Until then, we can expect that their products will continue to prop up the throwaway culture and be found polluting oceans, waterways and communities around the world.



## 4. SOLUTIONS

To solve the plastic pollution crisis, it is necessary to look into solutions that address the problem at its source. While there may not be a one size fits all approach, all companies must begin by examining their business model that is centred on disposal, with single-use plastic packaging as the main product delivery system for their customers, and start to reimagine a model where disposable plastics, waste and virgin inputs are eliminated.

A truly solutions-oriented approach takes into account societal and ecological needs. True extended producer responsibility means thinking beyond how to deal with a product's packaging waste once it's created, by aiming to slow and close the loop for all facets of product creation, which should maximize sustainable and socially responsible inputs and outcomes.

Solutions include both immediate short term changes such as eliminating unnecessary and problematic products and packaging (for example single use straws and bags and double/triple packaging - see glossary for full definition), (re) expansion of the use of **reusable and refillable systems** and longer-term system changes in the form of changing consumption habits, for example buying less processed products/ready meals, or alternative product delivery systems (ADS).

The phase out of unnecessary and problematic single-use plastics has already been set in motion in some parts of the world. In the UK, retailer Iceland pledged to be plastic free by 2023,<sup>69, 70</sup> while Tesco committed earlier this year to remove problematic materials including PVC, Polystyrene and industrial compostable plastics among others.

These phase outs do not have to happen all at once, they should start with the most unnecessary (excess and non-essential) and problematic plastics, and should involve setting hard sunset dates to motivate and provide security for investment in innovation. Single-use plastics that have essential and necessary functions to promote public health (e.g. medical applications) may not necessarily be part of a ban in the same way as other types of packaging, but innovation is still needed.

In the long run, investment and innovation in alternative delivery systems and the expansion of

the use of reusable and refillable packaging will be crucial to spark transformational change away from a throwaway culture.

**Alternative delivery systems** can take various forms depending on the product in question, such as:

- **Shorter supply chains.** Shortening supply chains by sourcing and distributing more locally reduces the need for lightweight packaging, reduces carbon miles and allows for more innovative product delivery options that not only foster reduced waste production but also community connectedness. In short supply chains, durable and heavier reusable packaging becomes economically and ecologically viable<sup>71</sup>.
- **Making buying bulk convenient.** From zero-waste, to bulk and refill grocery stores, FMCG products are being sold to customers without the added packaging or waste, with the vendors also demanding reduced bulk packaging and waste, therefore decreasing the overall footprint of the supply chain. The success of bulk stores as well as interest in "plastic-free aisles" in supermarkets is showing that customers are ready and willing to adopt a different approach to shopping.
- **Service based business models.** To shift from single-use packaging towards alternative delivery systems, companies need to move away from their traditional business models, which are based on product sales, towards models that encompass both services and products. One of the biggest opportunities for FMCG businesses is to find ways to fundamentally shift their throwaway material intensive business models towards ones that dematerialise the economy. The greatest savings in material value are derived from the reuse of packaging as packaging, without being downgraded. Businesses that can alter their approach to investing in packaging from the one-way distribution of products to customers, to one that is a long-term part of the product itself, can also expect to deliver substantial material savings.

• **Reuse and refill models** are already employed by numerous companies and communities around



the world. Deposit return systems for refill where end users are charged a modest deposit when a refillable packaging format is purchased and then refunded upon return of the packaging, are tried and tested, with glass beer bottles being a well-known example. Allowing customers the option to bring their own containers for refill, also presents opportunities for additional packaging and cost reductions on the part of the company. Reuse and refill models require FMCGs to collaborate more closely with retailers or create direct-to-customer relationships to enable the direct reuse of durable packaging to acquire food or other goods.

Greenpeace's recommendations for immediate actions companies can take to facilitate this systemic transformation away from our current one-way packaging systems and disposable culture are presented in section 5.

#### Box 4: Solutions in Action

**Making beverages at home:** Service systems that sell or lease a product that enables home carbonation of water. Customers can consume as carbonated water on its own, or can add homemade or purchased syrups to create soft drinks. This system typically depends on customers reusing the same bottle for several years whilst the carbon dioxide aluminium canister is returnable for refilling.<sup>72</sup>

**Refillable beverage delivery:** The most well-known example of refillable beverage delivery models is milk. However, beverage types have expanded to juice and other drinks that are delivered to homes in reusable containers and returned or picked up for a refund. Drink fountain machines offer a popular way to delivery beverages and are regularly used in restaurants and convenience stores, while beverage vending machines are becoming increasingly popular ranging from hot to cold beverage types.<sup>73, 74</sup>

**Shortening supply chains:** There are examples of big retailers in Belgium and Canada who are testing the sourcing of their fruit and vegetables from the rooftop gardens of their own supermarkets.<sup>75, 76</sup>

**Refillable household and personal care products:** Stores that allow customers to refill household and personal care staples such as shampoo, detergents, other cleaning supplies, lotions and even makeup are growing in popularity. The Refill Station in Bangkok is the first of its kind in Thailand,<sup>77</sup> while several bulk and zero waste stores around the world<sup>78</sup> carry a wide range of dry goods, offering dispensers and refills as alternatives to individually wrapped products.

**Bulk snacks and treats:** Bulk food stores<sup>79</sup> have long carried non-packaged versions of many well-known FMCG snack and treat products. From chocolate bars to candy, and even chips/crisps, stores with a high turnover of customers are able to keep various product types fresh while offering a refill alternative to the individually wrapped products.

## False or insufficient solutions

Several of the initiatives, commitments or actions by companies aim to address some of the environmental impacts of conventional fossil-based plastics but are not a sufficient or adequate approach to addressing the issue of plastics pollution. These are summarised below:

### 1. Material substitution

Shifting away from fossil-based single-use plastics to single-use bioplastics, paper, metal, glass, or other materials.

**Problem:** On its own, material substitution simply shifts the burden of environmental impacts from one single-use material to another, without addressing the problems of over-production and consumption. Increased material use, deforestation, land use, competition with food production, ocean pollution, recycling challenges (see Box 2) and high energy impacts may all be associated with other materials; companies must prevent replacing one problem with another.

### 2. Light-weighting = reducing the amount of plastic used in each packaging unit

**Problem:** Changing the weight of the material

does not affect whether or not that material will end up in the ocean, and it may not even affect the volume of plastic used in single-use packaging if the amounts produced continue to grow. It also does not address the single-use plastics challenge: even company actions to reduce total volumes of plastic used by reducing the weight per unit will not make a significant difference in addressing plastic in the environment as the same number units, and therefore risk of leakage, will remain. Significant changes in packaging formats may further affect the recyclability of plastic itself. This could also present further challenges if companies move from heavy widely recyclable formats to light weight non-recyclable formats.

### 3. Relying on recycling to solve the plastics packaging problem

#### 100% recyclability commitments:

**Problem:** 100% recyclability strategies suggest that what is recycl'able' will get recycl'ed'... No country, company or organisation has committed to a 100% recycling rate because of the impracticality of achieving this outcome or controlling a system that aims to do this, even in developed countries with collection and recycling infrastructure (see Box 2).



**Commitments on recycled content:**

**Problem:** increasing the use of recycled material in the packaging material itself is one of the measures that companies should be working towards in their short-term objectives to address the system as it is today, but it will not deliver the ultimate solution of preventing plastics from entering ecosystems. These targets provide an incentive to implement end of life systems to collect and reuse materials and drive some of the complementary improvements that are needed. Also recycled content targets are usually for a limited percentage: it is still necessary to use virgin plastic. These commitments do not therefore lead

to a sustainable solution, but they do address one of the key challenges for investment in infrastructure by providing more stable demand for materials.

Both recycled content and recyclability/recycling can prevent some plastics entering ecosystems, but these measures alone are not enough.

**Commitments on “equivalent” collection:** ensuring that the same amount of packaging that is placed on the market is collected by the company.

**Problem:** in theory, this commitment would

**Box 5: Bioplastics**

Bioplastics,<sup>80</sup> often promoted as ‘sustainable alternatives’ to petroleum-based plastics by companies, are derived from very limited biomass resources and their end-of-life impacts can be as damaging as their fossil based equivalents.

For example, not all bioplastics are designed to be recyclable in the same way as conventional plastics. As labelling for bioplastic is not legally-binding in most countries, claims such as “environmental-friendly”, “biodegradable”, “compostable” frequently lead to public misconceptions about the material. They still enter the current plastic recycling processes and can lower the quality of recycled materials as many labelling, recycling and composting systems are not designed to separate and treat them adequately.<sup>81, 82</sup> They are also not necessarily designed to degrade in the marine environment and so will not reduce the quantity or risks of plastics in the ocean and the risks of physical or chemical impacts.<sup>83</sup>

Furthermore, about 80% of current bio-based plastics are manufactured using starch as a feedstock, which relies heavily on agricultural cultivation, competing with food production.<sup>84</sup> Although new technologies and feedstocks (i.e. algae, seaweed, methane, organic waste etc.) are under development, the major feedstock for bioplastic currently is from agricultural products, with more than half produced in Asia.<sup>85</sup>

With various new bioplastic polymers under development and expected to enter the market soon, the global production capacity of bioplastic is increasing. According to European Bioplastics, bio-based, non-biodegradable plastics represents 57% of current bioplastic production capacity, and more than half of the bioplastic produced is used as packaging materials.<sup>86</sup>

Replacing the growing amount of fossil-based feedstocks for plastics with biomass feedstocks, would significantly increase the existing burden on our planet’s ecosystems, and in particular forests and agricultural systems. Simply swapping to bioplastic still leads to mass disposability and cannot solve the plastic problem arising from over-consumption and the throwaway culture. Rather than being used to substitute single-use plastics, renewable biomass feedstocks should be prioritised for the production of food, as well as maintaining soil fertility and providing long-term storage of carbon in products, thereby helping to mitigate climate change.

ensure that the company would be required to invest in its major countries of operation to ensure that they have a net neutral impact on national waste systems. In addition to the lack of clarity on how the direct attribution of material collection could happen for any particular manufacturer, the bigger challenge is to ensure that these commitments are implemented in every market they operate in and not at a general global level. This distinction is critical as companies can otherwise apply a mass-balance approach to accounting for their plastics use. In other words, they could 'collect' bottles above the equivalent of their global sales in high consumption markets with advanced recycling systems already in place, whilst continuing to avoid investment in more challenging countries with underdeveloped infrastructure.

#### 4. Incineration and “waste-to-energy”<sup>87</sup>

Many businesses proudly announce that they are diverting waste from landfills, crediting themselves as a “zero waste to landfill” company. Not only is this deceptively similar to “zero waste”,<sup>88</sup> achieving “zero waste to landfill” can conceal the practice of sending waste to trash incinerators, including so-called “waste-to-energy” facilities

#### Informal recycling

In some geographies, informal recycling plays an important role in recovering parts of the plastic waste generated. The World Bank estimates that in developing countries about 1 percent of the urban population—at least 15 million people—survive by salvaging recyclables from waste. Studies suggest that when organized and supported, waste picking can spur grassroots investment by poor people, create jobs, reduce poverty, save municipalities money, improve industrial competitiveness, conserve natural resources, and protect the environment.<sup>92</sup> While recycling is not the priority solution required to solve the plastic pollution problem, in these geographies businesses and policy makers should involve workers in recycling system transitions: waste-pickers and informal recyclers must have

the power to improve materials management and to be integrated in the change to new systems and business models (e.g. new delivery systems that have been established as alternatives to disposable plastic packaging).

#### Box 6: Why incineration and “waste to energy” can’t solve the plastics issue

Post-consumer plastics are typically incinerated in mixed municipal or household solid waste incinerators. Incineration converts discarded materials into air pollutants, fly ash, bottom ash, and boiler ash/slag through burning. This process can harm human health and the planet by emitting respiratory irritants, cancer-causing dioxins/furans, heavy metals including mercury, cadmium and lead, and major greenhouse gases. Even with the most advanced pollution control equipment some pollution is still released into the atmosphere, while captured pollutants remain concentrated in by-products such as fly ash from filters and bottom ash, which are sent to landfills and may leach into soil and groundwater.<sup>89</sup> Valuable resources are lost permanently: recycling and composting conserves three to five times the amount of energy produced by “waste-to-energy” incineration.<sup>90</sup> It is also the most expensive way to manage waste and produce energy due to the low and variable combustibility of mixed household waste and the constant demand for feedstock required to keep the system operational (the “lock-in” effect).<sup>91</sup> It further perpetuates a wasteful linear economy that is based on excessive extraction and production, a throw-away culture and capital-intensive infrastructure, often disproportionately located in less privileged communities.

## 5. GREENPEACE CALL TO ACTION

Many of the world's biggest fast moving consumer goods companies say they are committed to tackling the plastic pollution crisis. However, as the results of our global survey show, their pledges rely almost exclusively on increasing recycling and the recyclability of their products.

The fact is that recycling alone is not sufficient to address the scale of the plastic pollution problem. At the moment only 9% of plastic is recycled globally,<sup>93</sup> and based on the latest data from the US some predict that plastic recycling rates there could drop as low as 4.4% in 2018, following the China waste import ban.<sup>94</sup>

Furthermore, there are no signs that the growing volumes of single-use plastics produced by the companies covered in our survey will start to reduce; all but two<sup>95</sup> report growing or steady state volumes. We do not even know the numbers of individual single-use plastic items that were produced and whether these are increasing, as only two companies reported on this.<sup>96</sup> At current growth rates, the fastest growing businesses are set to double in size in as few as ten years;<sup>97</sup> if current trends continue, their use of single-use plastic will increase in parallel.

It's time to face reality. Although the collective and individual efforts to collect and recycle plastics packaging are important and commendable - this is not the solution. We need to put the brakes on the production of single-use plastics, starting right now. As a major contributor to the plastics pollution crisis, the fast moving consumer goods industry must take responsibility for this problem and re-evaluate its dependency on single use plastic. Companies must now go beyond pledges to improve recycling and

commit to massively reduce and phase out their use of single-use plastic packaging, year on year.

This means an end to the business model which relies on disposable products and one way packaging, and the start of a new paradigm, that will allow the co-creation of alternative delivery systems - typically ones which have reuse and refill at their heart.

Greenpeace calls on companies, governments, and civil society to support a transition to a plastic-free future by taking immediate action to facilitate a full-scale transformation away from our current one-way packaging systems.

The Fast Moving Consumer Goods sector and other companies need to **prioritise the following four actions:**

### **Be transparent**

Publicly disclose comprehensive information about their plastic footprint and the plastics they use;

### **Commit to reduction**

Set annual targets for continually reducing their single-use plastic footprint towards complete phase out;

### **Urgently eliminate problematic and unnecessary plastic**

Begin reduction efforts by eliminating the most problematic and unnecessary single-use plastics by end of 2019;

### **Invest in reuse and alternative delivery systems**

Make significant investment in creating refillable, reusable containers and the innovation of new delivery systems that minimise the need for single-use plastic packaging.



© Greenpeace



© Dennis Reher / Greenpeace



More specifically these actions involve:

### **1. Transparency and plastic footprint<sup>98</sup> disclosure**

- Frequency - at least annually, going forward, setting up a benchmark year/data reference point no later than 2018;
- Scope - amount and types of all single -use and multi-use plastic packaging and product produced (ie placed on the market - directly or through third parties), globally with country by country breakdown;
- Comprehensive - meaning data needs to be based on units of product or packaging (as well as volumes), differentiated by reduction (avoided), reuse, recycling and disposal (incineration and landfill).

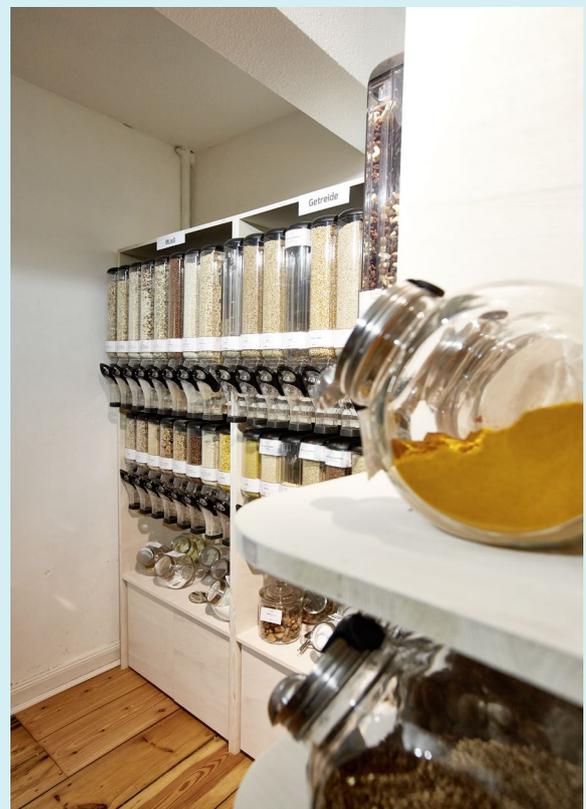
### **2. Public Commitment to reduction of plastic footprint and transition plan/roadmap**

- **Scope - create and implement a policy that:**
  - is consistent across regional, national and global operations covering the elements outlined below;
  - supports full extended producer social and environmental responsibility (EPR) (see glossary);
  - clearly excludes false solutions (see Glossary);
  - recognises the need to shift away from a throwaway culture and the role that single-use plastics role plays in this;
- **Share your plan/ roadmap:**
  - Provide clear and publicly transparent action plans, with time-bound milestones and benchmarks so that progress towards objectives can be clearly monitored.
- **Ambition**
  - Set annual targets for continually reducing your single-use plastic footprint, specifically targets for replacing single-use plastic packaging with reusable packaging and new delivery systems;

- Set a sunset date of end of 2019 to eliminate/ complete phase out of the most problematic and unnecessary single-use plastics;
- Commit to stop promoting a throwaway culture, acknowledging that we cannot simply recycle our way out of the plastic pollution crisis.

### **3. Investments in reuse and new/ alternative delivery systems**

- Invest in Research and Development (R&D) into innovative, socially and environmentally responsible ways of delivering your goods without single-use plastic packaging - for example in at least two regions pilot new innovative delivery systems that could be expanded across supply chains, avoiding niche or only high-end products;
- Prioritize implementation of reuse options and alternative delivery system development in “high leakage” countries and regions with limited waste infrastructure.



© Dennis Reher / Greenpeace

## Glossary

### Alternative delivery systems (ADS)

ADS can take various forms depending on the product in question; they could include (re) expansion of reuse and refill systems or restructuring delivery systems in other ways, for example making bulk shopping convenient, shortening supply chains to avoid the need for long storage and transport packaging or shifts to service based business models, for example leasing products or delivering services.

### Biodegradable

Biodegradable plastics are plastics that are decomposed by the action of living organisms, including bacteria and fungi. Biodegradable plastics can be bioplastics, but can also include plastics made from petrochemical feedstock (or mixes of both) containing additives which enhance biodegradation. However, They are not necessarily designed to degrade in the marine environment or to be recyclable, (see Box 5).

### Chemical recycling (of plastics)

Chemical recycling, (or feedstock recycling) of plastics, is the process of breaking down plastics into monomers and other basic chemical elements ("depolymerization"). It includes conversion processes such as pyrolysis, gasification and hydrogenation.

### Circular economy and circularity

A circular economy is a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing energy and material loops; this can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, recycling, and upcycling. This is in contrast to a linear economy which is a 'take, make, dispose' model of production.

### Compostable

Compostable plastics are those that are decomposed by the action of living organisms, including bacteria and fungi and result in compost (a mixture of organic matter that has decayed or has been digested by organisms, and can be used to improve soil structure and provide nutrients). However, They are not necessarily designed to degrade in the marine environment or to be recyclable, (see Box 5).

### Delivery System

Delivery systems are systems that supply and provide goods and services. For example the transport and packaging of food, goods, etc.

### Deposit Return System (DRS)

A surcharge on a product when purchased and a rebate when it is returned. A well-known example is when container deposit legislation mandates that a refund is given when reusable packaging is returned.

### Downcycling

Downcycling is the reprocessing of plastic waste materials or components to produce new products of lesser quality or value, (a lower quality, contaminated or polluting product) products which are not further recyclable and recycled .

### Extended Producer Responsibility (EPR)

Principle that those producing the product (or packaging) take full responsibility (social and environmental) for the entire lifecycle of the product. Used as a basis for creating financial responsibility for the end of life management of packaging in the EU Packaging Directive (Directive 94/62/EC).

Full extended producer social and environmental responsibility should include taking full responsibility for the entire lifecycle of the product and its packaging by:

- Committing and delivering on plastic footprint reduction ie elimination and reuse targets
- Addressing (internalising/assuming financial responsibility for) ocean, waterway and environmental pollution caused by your packaging,
- Conducting lifecycle and environmental assessments of all products, which include marine litter impacts as an explicit characterisation/ impact factor,
- Assessing impacts on local communities and waste pickers and ensuring that environmental impacts and social impacts on local communities are monitored and managed in accordance with your policy and relevant regulations,
- Supporting safe and healthy local jobs,
- Support waste reduction regulations and regulations that ensure that all producers, importers, service providers, buyers and retailers of fast moving consumer goods products have an Extended Producer Responsibility (EPR).

## False Solutions

- Incineration or waste-to-energy (heat or electricity) technologies
- Substitution with single-use bio-plastics or other single-use product/material substitutes (such as paper and cardboard) that can cause other environmental problems such as deforestation, habitat destruction, conversion of food crops or are not sourced from ecological agriculture, etc.
- Chemical recycling
- Downcycling
- Biodegradable or compostable materials as a marine litter solution
- Sourcing materials/feedstocks that contain or use hazardous chemicals
- Relying on recycled content as the sole way of addressing the environmental impacts of the use of single-use plastics
- Giving priority to recycling over reduction, reuse and alternative delivery systems
- Putting the responsibility of inaction or the challenge on your end-users
- Focusing on environmental clean-up initiatives

## Fracking

Hydraulic fracking is the process of drilling down into the earth before a high-pressure water mixture is directed at the rock to release the gas inside. Water, sand and chemicals are injected into the rock at high pressure which allows the gas to flow out to the head of the well.

## Hazardous chemicals

These are chemicals that show intrinsically hazardous properties, including: persistent, bioaccumulative and toxic (PBT); very persistent and very bioaccumulative (vPvB); carcinogenic, mutagenic and toxic for reproduction (CMR); endocrine disruptors (ED), or other properties of equivalent concern, (not just those that have been regulated or restricted in other regions).

Some types of toxicity make it difficult to define 'safe' levels for substances, even at low doses, for example, substances may be:

- carcinogenic (causing cancer), mutagenic (able to alter genes) and/or reprotoxic (harmful to reproduction); or endocrine disruptors (interfering with hormone systems).

## Lightweighting

This is reducing the total volumes of material used by reducing the weight per unit of packaging. However, this will not make a significant difference to addressing plastic in the environment as the same number units, and therefore risk of leakage, will remain. Significant changes in packaging formats may further affect the recyclability of plastic itself. This could also present further challenges if companies move from widely (technically)recyclable formats which are heavier to lightweight non-recyclable formats.

## Open burning

Open burning is defined as a fire where any material is burned on the ground or in an open receptacle, without any air pollution controls in place.

## Persistent Organic Pollutants

Persistent Organic Pollutants (POPs) are carbon-based chemical substances with a particular combination of physical and chemical properties. Once released into the environment, they:

- remain intact for exceptionally long periods of time (many years);
- become widely distributed throughout the environment as a result of natural processes involving soil, water and, most notably, air;
- accumulate in the fatty tissue of living organisms including humans, and are found at higher concentrations at higher levels in the food chain;
- and are toxic to both humans and wildlife.

POPs are now widely distributed over large regions (including those where POPs have never been used) and, in some cases, they are found around the globe. There is a global treaty to protect human health and the environment from the effects of Persistent Organic Pollutants (POPs), the Stockholm Convention, which entered into force on 17 May 2004.<sup>100</sup>

## Plastic

A synthetic 'polymer' material, most often made from petrochemicals, and commonly combined with other chemical additives in order to give it certain properties of flexibility, colour or durability. Plastics include but are not limited to polycarbonate, polyethylene terephthalate (PET), high-density polyethylene (HDPE), polyvinyl chloride (PVC), low-density polyethylene (LDPE), polypropylene (PP) and, polystyrene (PS).

## **Plastic additives**

- **stabilisers**
- **plasticisers**
- **emulsifiers**

All plastics products are made from the essential polymer mixed with a complex blend of materials known collectively as additives. For example:

- stabilisers prevent decomposition of the polymer during processing and are used to inhibit the reactions in plastics which cause undesirable chemical degradation from exposure to UV light
- plasticisers are used to make plastics softer and more flexible.
- emulsifiers are used in the production of polymers

Other plastics additives include antimicrobials, antioxidants, antistatic agents, lubricants, fillers, flame retardants, pigments and reinforcements. Plastics additives include hazardous chemicals such as phthalates or brominated flame retardants.

## **Plastic footprint, plastic footprint disclosure**

The amount (in units) of plastic used by a company in their supply chain for own products, packaging and transport within a defined twelve-month period, including geographical and product category information related to their use of plastics.

Full transparency means publicly reporting on how much plastic is used, including the number of items, what kinds of plastic, and its purpose, to establish a baseline from which to measure progress. The provision of sales data alone is not disclosure of a company's plastic footprint.

## **Problematic and unnecessary single-use plastic**

Problematic single-use plastics include those most commonly found in the environment (in particular oceans, waterways and beaches), non or poorly-recyclable plastics and plastic linked to hazardous chemicals and chemicals of concern. Unnecessary single-use plastics are excessive (or pointless) plastic packaging and non-essential plastic items for which alternatives exist (or could be easily developed).

## **Producer (or Importer)**

In the case of EPR and packaging the producer (or importer) normally refers to the filler of the packaging with the product (often a brand or retailer). In this report producer (or importer) would also mean actor that manufactures and/or places the product and/or packaging on the market.

## **Recyclable packaging, recyclability**

To qualify as recyclable, there needs to be a system for recycling in place that enables the user of the package to ensure it is recycled in practice wherever the item is placed on the market. Such a system for recycling should be able to prove a significant actual recycling rate.

The inherent properties of the material or the design of the product, might make it easier/harder to recycle (for example using only one material in the product, known as mono-material).

Recyclability on its own is not a sustainable packaging criteria, as there needs to be a system in place for recycling in practice (see Recyclable packaging above). Within an Alternative Delivery System, where packaging is reusable or refillable, the recyclability/recycling of materials and design of packaging used in the system is also important, as refillable containers themselves have a limited lifetime and will need to be recycled once they reach the end of their lives.

## **Reduction of single-use plastic (SUP)**

An overall reduction of the number of single-use plastic units being produced and/or sold by a company.

## **Reusable/refillable/multi-use packaging**

Packaging that is constructed of durable materials and is designed to achieve multiple uses in its existing form without any physical or chemical modification and is refilled or used for the same purpose for which it was conceived. To qualify as reusable, there needs to be a reuse system in place that ensures it is reused in practice where the item is placed on the market. Such a system for reuse should be able to prove a significant actual reuse rate.

### **Single-use plastic (SUP) and Single-use plastic packaging (SUPP)**

Single-use plastic (SUP) - Any plastic that is intended or designed for one-time use, regardless of the recyclability of any component materials.

Single-use plastic packaging (SUPP) - any plastic packaging, as above.

Examples include: plastic bags, sachets, food and non-food plastic packaging that is only used once and then recycled or disposed of.

It also includes items that can be recycled to form a material closed loop (i.e. material recycling, eg bottle to bottle recycling). Material closed loop is distinguished from product closed loop (i.e. reuse, where the physical unit and form of the e.g. bottle is retained and refilled).

### **Throwaway society or culture**

The throwaway society is a human society strongly influenced by consumerism. The term describes a critical view of overconsumption and excessive production of short-lived or disposable items over durable goods that can be repaired.

### **Virgin fossil feedstock**

Fossil fuels, eg. oil, are the raw material for oil-based plastic, which is processed into petrochemicals for plastics manufacturing. "Virgin" refers to the use of primary raw materials versus materials that are recycled.

### **Waste Picker**

A person who salvages waste materials, to sell or for personal consumption.

## References

1. European Parliamentary Research Service Blog (2013) Recycling rate and total amount of plastic packaging per inhabitant, EU27, 2011. Available: <http://epthinktank.eu/2013/11/07/plastic-waste/recycling-rate-and-total-amount-of-plastic-packaging-per-inhabitant/>
2. American Chemistry Council and Trucost (2016) Plastics and sustainability: a valuation of environmental benefits, costs and opportunities. Available: <https://plastics.americanchemistry.com/Plastics-and-Sustainability.pdf>
3. The combined top 50 fast-moving consumer goods companies have a total sales revenue of \$1.09 trillion. Consultancy.uk, 2018, The 50 largest FMCG / consumer goods companies in the world, 24 September 2018; <https://www.consultancy.uk/news/18765/the-50-largest-fmcc-consumer-goods-companies-in-the-world>
4. The eleven companies chosen own well-known consumer brands globally, holding important market shares across all the regions of the world. We chose a combination of companies to cover multiple consumer goods in the beverage, food, household products, cosmetics and health sectors.
5. United Nations Environmental Programme (UNEP), 2014, Valuing Plastics: The Business Case for Measuring, Managing and Disclosing Plastic Use in the Consumer Goods Industry. ISBN 9789280734003
6. McKinsey & Company and Ocean Conservancy (2015), Stemming the Tide: Land-based strategies for a plastic-free ocean, September 2015; <https://oceanconservancy.org/wp-content/uploads/2017/04/full-report-stemming-the.pdf>
7. Bakir A, Rowland SJ, Thompson RC, (2014), Enhanced desorption of persistent organic pollutants from microplastics under simulated physiological conditions, Environmental Pollution, Volume 185, February 2014, Pages 16-23; <https://www.sciencedirect.com/science/article/pii/S0269749113005277>
8. Financial Times (2018), Theresa May targets plastics in war on 'throwaway culture', January 2018; <https://www.ft.com/content/31125996-f62e-11e7-88f7-5465a6ce1a00>
9. Geyer R, Jambeck J R, Law K L, 2017, Production, use, and fate of all plastics ever made, Science Advances 19 July 2017, Vol. 3, no. 7, e1700782; <http://advances.sciencemag.org/content/3/7/e1700782.full> Less than 6% of discarded PET bottles, the most recyclable plastic, is recycled back into packaging in the US. National Association for PET Container Resources (NAPCOR), 2017, Report on postconsumer PET container recycling activity in 2016; [https://napcor.com/wp-content/uploads/2017/10/NAPCOR-APR\\_2016RateReport\\_FINAL.pdf](https://napcor.com/wp-content/uploads/2017/10/NAPCOR-APR_2016RateReport_FINAL.pdf)
10. The maximum possible levels of recycling for plastics packaging are currently reported at somewhere between 36% and 53%; beyond this limit the recycled plastic will be either of a very low quality, or not cost effective. The recycling levels of 36% and 53% are not yet entirely utilised. Denkstatt, 2015, The potential for plastic packaging to contribute to a circular and resource-efficient economy. Presentation at International Conference on recycling and recovery of plastics, Identiplast, Rome 29th April 2015; <https://denkstatt.eu/publications/>
11. McKinsey & Company and Ocean Conservancy 2015, op.cit.
12. Global Newswire, 2018, Global FMCG Packaging Market Will Reach USD 657.27 Billion by 2024: Zion Market Research, 27 July 2018; <https://globenewswire.com/news-release/2018/07/27/1543205/0/en/Global-FMCG-Packaging-Market-Will-Reach-USD-657-27-Billion-by-2024-Zion-Market-Research.html>
13. United Nations Environmental Programme (UNEP), 2014, op.cit.
14. KPMG, 2016, Fast Moving Consumer Goods Sector Report. KPMG Africa <https://assets.kpmg.com/content/dam/kpmg/br/pdf/2016/09/fast-moving-consumer-goods.pdf>
15. Predatory marketing: "any activity instigated—usually, by the larger manufacturer—to tangibly harm or eliminate smaller competitors." <https://www.urbandictionary.com/define.php?term=predatory%20marketing>
16. Oxfam GB, Novib, Unilever and Unilever Indonesia, 2005, Exploring the links between international business and poverty reduction: a case study of Unilever in Indonesia, page 20; Information Press, Eynsham, UK
17. Oxfam GB et.al. (2005), op.cit. Page 94, between 15 and 50% of net sales is invested in advertising.
18. KPMG. 2016. Fast Moving Consumer Goods Sector Report. Op Cit.
19. A UNEP report which quantifies the use of plastic use in monetary term shows the interdependency of the FMCG companies on plastics: 8 tonnes of plastic are consumed for every \$1m in revenue, (within this, 2 tonnes per \$1m revenue is from the plastic-in-packaging used in the consumer goods industry; another 2 tonnes per \$1m revenue is plastic-in-product; while 4 tonnes per \$1m revenue is plastic-in-supply-chain). In the soft drinks sector the proportion is even higher, with 34.6 tonnes of plastic consumed for every \$1m in revenue. United Nations Environmental Protection (UNEP). 2014. op.cit.
20. Jacobs, A. & Richtel, M. 2017. How Big Business Got Brazil Hooked on Junk Food. The New York Times, 16th September 2017; <https://www.nytimes.com/interactive/2017/09/16/health/brazil-obesity-nestle.html>
21. Hindustan Unilever Limited, an Indian subsidiary of Unilever sells 27 billion sachets a year. <https://hbr.org/2016/12/how-unilever-reaches-rural-consumers-in-emerging-markets>
22. Posadas, D. 2014. Sachets help low-income communities but are a waste nightmare. The Guardian, 22nd May 2014; <https://www.theguardian.com/sustainable-business/sachet-packaging-low-income-communities-waste-nightmare> Horodytska, O, Valdés FJ, Fullana, A, 2018, Plastic flexible films waste management – A state of art review, Waste Management, Volume 77, July 2018, Pages 413-425; <https://www.sciencedirect.com/science/article/pii/S0956053X18302447>

23. Brand audit results: These companies have been well documented as major contributors of plastic pollution and have consistently shown up in plastic waste brand audits around the world, where plastic waste collected from beaches and other locations is sorted and analysed according to their branding.
24. American Chemistry Council and Trucost, 2016, Plastics and sustainability: a valuation of environmental benefits, costs and opportunities, July 2016; <https://plastics.americanchemistry.com/Plastics-and-Sustainability.pdf>
25. Jambeck J R, Geyer C, Wilcox T R, Siegler M, Perryman A, Andrady R, Narayan R & Law K L, 2015, Plastic Waste inputs from land into the Ocean. 13 Feb 2015, Science (347) : 768-771; <http://science.sciencemag.org/content/347/6223/768>
26. United Nations Environmental Programme (UNEP), 2014, op.cit.
27. Keane, K, 2018, Fife beach 'worst' for nurdle pollution, BBC News, 21 May 2018; <https://www.bbc.co.uk/news/uk-scotland-44196556>
28. Li X, Chen L, Mei Q, Dong B, Dai X, Ging G, Zeng EY, 2018, Microplastics in sewage sludge from the wastewater treatment plants in China, Water Research, Volume 142, 1 October 2018, Pages 75-85; <https://www.sciencedirect.com/science/article/pii/S0043135418304068>  
UNEP 2018, Wastewater treatment plants – a surprising source of microplastic pollution, 22 Aug 2018 <https://www.unenvironment.org/news-and-stories/story/wastewater-treatment-plants-surprising-source-microplastic-pollution>
29. European Bioplastics, Bioplastics facts and figures; [http://docs.european-bioplastics.org/publications/EUBP\\_Facts\\_and\\_figures.pdf](http://docs.european-bioplastics.org/publications/EUBP_Facts_and_figures.pdf)
30. Center for International Environmental Law (CIEL) 2017, Fueling Plastics: Series examines deep linkages between the fossil fuels and plastics industries, and the products they produce, 20 September 2017; <https://www.ciel.org/reports/fuelingplastics/>
31. World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, 2016, The New Plastics Economy — Rethinking the future of plastics, 19 January 2016; [https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation\\_TheNewPlasticsEconomy\\_Pages.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_Pages.pdf)
32. Department for Environment, Food and Rural Affairs (DEFRA), 2012, Evidence for a soft drinks roadmap – Phase 2 Final Report, 11 January 2013; [http://randd.defra.gov.uk/Document.aspx?Document=11109\\_201304305Evidenceforasoftdrinksroadmap-Phase2Final.pdf](http://randd.defra.gov.uk/Document.aspx?Document=11109_201304305Evidenceforasoftdrinksroadmap-Phase2Final.pdf)
33. Royer S J, Ferrón S, Wilson S T, Karl D M, 2018, Production of methane and ethylene from plastic in the environment, August 1, 2018; <https://doi.org/10.1371/journal.pone.0200574>
34. World Economic Forum, et. al. 2016. The New Plastics Economy. op cit.
35. Bakir A, Rowland SJ, Thompson RC. 2014. Enhanced desorption of persistent organic pollutants from microplastics under simulated physiological conditions, Environmental Pollution (185) : 16 - 23, February 2014 <https://www.sciencedirect.com/science/article/pii/S0269749113005277>
36. The Guardian (2018); Scrap 'smorgasbord' of plastics used in packaging, councils urge, 4 August 2018; <https://www.theguardian.com/environment/2018/aug/04/only-a-third-of-plastic-food-packaging-can-be-recycled-councils-say>
37. World Economic Forum, et.al. 2016, The New Plastics Economy. op cit.
38. National Association for PET Container Resources (Napcor), 2017, op.cit.
39. Geyer R, Jambeck J R, Law K L, 2017, op.cit. European Commission, 2015, EU Packaging Directive 94/62/EC and amendments; 29th April 2015; [http://ec.europa.eu/environment/waste/packaging/index\\_en.htm](http://ec.europa.eu/environment/waste/packaging/index_en.htm) European Commission, 2015, Development of guidance on Extended Producer Responsibility; 17th August 2015 (last update) [http://ec.europa.eu/environment/archives/waste/eu\\_guidance/introduction.html](http://ec.europa.eu/environment/archives/waste/eu_guidance/introduction.html)
40. European Association of Plastics Recycling, 2018, Plastic packaging waste statistics 2016; [http://www.eupro-plasticsrecycling.org/pages/75/eupro\\_statistics](http://www.eupro-plasticsrecycling.org/pages/75/eupro_statistics)
41. Doyle A, & Burger L, 2018, EU plea to industry to reuse more plastic lacks bite. Reuters. 29th June 2018; <https://uk.reuters.com/article/uk-eu-recycling-plastic-exclusive/exclusive-eu-plea-to-industry-to-reuse-more-plastic-lacks-bite-idUKKBN1JP1E2>
42. 7.35million MT was imported in 2016. Brooks, A L, Wang S, & Jambeck J R, 2018, The Chinese import ban and its impact on global plastic waste trade. Science Advances 4(6), 20th June 2018; <http://advances.sciencemag.org/content/4/6/eaat0131>
43. Brooks, et. al. 2018. op.cit.
44. National Development and Reform Commission, the People's Republic of China. 2014. Annual report for resources use. 中国国家发展和改革委员会. 《中国资源综合利用年度报告 (2014) 》 (in Chinese) <http://hzs.ndrc.gov.cn/zhly/201410/W020141015504221663989.pdf>
45. McKinsey & Company & Ocean Conservancy, 2015, op.cit.
46. McGeough, H, 2017, How will China's waste plastic ban impact the global recycling chain? Wood Mackenzie. 5th December 2017; <https://www.woodmac.com/news/opinion/china-waste-plastic-ban-global-recycling/>
47. The Guardian, 2018, Huge rise in US plastic waste shipments to poor countries following China ban, 5 October 2018; <https://www.theguardian.com/global-development/2018/oct/05/huge-rise-us-plastic-waste-shipments-to-poor-countries-china-ban-thailand-malaysia-vietnam> Unearthed, 2018, Plastics crisis set to intensify as more countries look to restrict foreign waste, 14 June 2018 <https://unearthed.greenpeace.org/2018/06/14/china-plastics-ban-malaysia-vietnam-poland/>

48. United Nations Environment Programme (UNEP), 2017, Waste Management in ASEAN Countries; <http://wedocs.unep.org/handle/20.500.11822/21134>
49. Greenpeace International research for this report involved assessing the public statements made in 2017/2018 corporate annual reports of Nestlé, Procter & Gamble, PepsiCo, Unilever, Coca Cola, Kraft-Heinz, Mondelez, Colgate Palmolive, Johnson & Johnson, and Danone. Also see: WWF Global 2016, Asian Fast Moving Consumer Goods: A Sustainability Guide for Financiers and Companies (Packaging), 15 April 2016; [http://wwf.panda.org/our\\_work/markets/publications/?265550/Asian-Fast-Moving-Consumer-Goods---A-Sustainability-Guide-for-Financiers-and-Companies](http://wwf.panda.org/our_work/markets/publications/?265550/Asian-Fast-Moving-Consumer-Goods---A-Sustainability-Guide-for-Financiers-and-Companies)
50. United Nations Environmental Programme (UNEP), 2014, Valuing plastics. op cit.
51. United Nations Environmental Programme (UNEP), 2014, Valuing plastics. op cit. WWF Global 2016, op.cit.
52. Nine of the eleven companies surveyed have 100% recyclable or recyclability commitments by a specified date, one has 90% recyclability and one has no recyclability commitment. Some of these recyclability commitments also include reuse (eg 100% reusable or recyclable, or 100% reusable, recyclable or compostable by a specified date) but as these are aggregated commitments with no clarity on the proportion of reuse to be achieved it would allow a company to focus solely on recyclability, therefore we don't consider this a measurable commitment to reduction through reuse.
53. Mars initially responded that 100% of their primary packaging is single-use plastic. In a follow up response, the company noted an example of a single-use plastic refill pouch for gum that was the equivalent of 180 boxes. While the examples Mars provided (refillable gum bottles and bulk plastic pouches) might appear to be designed for reuse/refill the combined system of gum bottle plus accessory bulk product still requires the end consumer to dispose of the refill pouch which would appear to not be designed for refill or reuse, therefore we would still consider the combined system as one that depends on single-use packaging.
54. Plastics can be recycled up to six times. British Plastics Federation, Oil Consumption, [http://www.bpf.co.uk/Press/Oil\\_Consumption.aspx](http://www.bpf.co.uk/Press/Oil_Consumption.aspx)
55. Chemical & Engineering News, 2018, Chemistry may have solutions to our plastic trash problem, June 15, 2018, Volume 96, Issue 25; <https://cen.acs.org/environment/pollution/Chemistry-solutions-plastic-trash-problem/96/i25>
56. Packaging Europe, 2018, Chemical Recycling 101, 28 February 2018; <https://packagingeurope.com/chemical-recycling-101-plastic-waste/>
57. Chemical & Engineering News, 2018, op.cit. Ultimately "chemically recyclable polymers are the best solution to the problem of plastic trash .... Still, intrinsically recyclable plastics are a long way from commercial reality. Besides technical hurdles, there are also economic ones."
58. For example, post-consumer laminated packaging is not a targeted material for collection and is not currently recycled in the UK. A study on separating out the aluminium (but not the plastic) for recycling concluded that separating laminated packaging from residual household waste is unlikely to be considered financially viable as a stand-alone activity. WRAP, website, Recycling of aluminium plastic laminated tubes and pouches <http://www.wrap.org.uk/content/recycling-aluminium-plastic-laminated-tubes-and-pouches> Unilever has also opened a pilot plant in Indonesia for the chemical recycling of plastics in sachets (the CreaSolv® Process), which involves several steps including the use of solvents to separate the polymer from the waste fraction and other contaminants. Packaging Europe, 2018, op.cit.
59. International Coastal Cleanup, 2009, Most common and visible litter items in beaches. Plastic bottle rank goes up from 5th to 2nd place. See also report for International Ocean Cleanup. 2017. [https://oceanconservancy.org/wp-content/uploads/2017/06/International-Coastal-Cleanup\\_2017-Report.pdf](https://oceanconservancy.org/wp-content/uploads/2017/06/International-Coastal-Cleanup_2017-Report.pdf)
60. National Association for PET Container Resources (Napcor), 2017, op.cit.
61. Recycling Today (2001), Recycled PET: Should it be Used in Making New Bottles? 22nd January 2001 <http://www.recyclingtoday.com/article/recycled-pet--should-it-be-used-in-making-new-bottles-/>
62. Greenpeace Germany, 2017, Fashion at the Crossroads, 18th September 2017; <https://www.greenpeace.org/international/publication/6969/fashion-at-the-crossroads/>
63. Denkstatt (2015), op.cit. The recycling levels of 36 % and 53% are not yet entirely utilised.
64. United Nations Environmental Programme (UNEP), 2014, Valuing plastics. op cit.
65. CEFLEX, a collaborative initiative of a European consortium of companies and associations representing the entire value chain of flexible packaging. Its vision is that by "2020 flexible packaging will have a comprehensive sustainability and circular economy roadmap ... including widely recognised design guidelines and a robust approach to measure, demonstrate and communicate the significant value flexible packaging adds to the circular economy".. "By 2025 there will be an established collection, sorting and reprocessing infrastructure/economy developed for post-consumer flexible packaging across Europe". Website: <https://ceflex.eu/>
66. Karnani A, (2009), The Bottom of the Pyramid Strategy for Reducing Poverty: A Failed Promise, Ross School of Business, University of Michigan, Ann Arbor, DESA Working Paper No. 80 ST/ESA/2009/DWP/80
67. Jacobs A, & Richtel M, 2017, op.cit.

68. Coca Cola, A World Without Waste: Coca-Cola Announces Ambitious Sustainable Packaging Goal, Jay Moye, Jan 19, 2018; <https://www.coca-colacompany.com/stories/world-without-waste>
69. Tesco PLC, 2018, Tesco sets out aspiration for 'closed loop' packaging system - calls on government to support with national recycling infrastructure, 23 May 2018; <https://www.tescopl.com/news/news-releases/2018/tesco-igd-packaging/>
70. CBC Radio 2017, 'Wasted': U.K. food retailer vows to be the world's first to go plastic-free, 27 February 2018; <https://www.cbc.ca/radio/day6/episode-375-serial-killer-fallout-super-bowl-ad-pranks-plastic-free-groceries-dead-people-suck-and-more-1.4510657/wasted-u-k-food-retailer-vows-to-be-the-world-s-first-to-go-plastic-free-1.4510678>
71. Institute for European Environmental Policy (IEEP), 2018, Understanding the role of plastic packaging in the food system, 10 April 2018; <https://ieep.eu/news/understanding-the-role-of-plastic-packaging-in-the-food-system>
72. One example is the service offered by Sodastream; <https://sodastream.com/>
73. Organic Consumers Association (2018), Raw Milk Vending Machines Flourish in Europe, September 4 2018; <https://www.organicconsumers.org/news/raw-milk-vending-machines-flourish-europe#close>
74. Onusic S P, 2018. Raw Milk Vending Machine Sales Soar on the World Market. Campaign for Real Milk. Posted on January 6, 2018 <https://www.realmilk.com/international-updates/vending-machine-sales-soar/>
75. Global News (2018), Montreal supermarket offers fresh produce from its rooftop garden, 13 July 2018; <https://globalnews.ca/news/4331220/montreal-supermarket-fresh-produce-rooftop-garden/>
76. World Economic Forum (2018), This Belgian supermarket is selling produce from its own rooftop farm, 6 July, 2018; <https://www.weforum.org/agenda/2018/07/belgian-stores-tries-out-farm-to-table-growing-on-its-own-roof>
77. Bangkok Venue, Refill Station, website; <https://bk.asia-city.com/bangkok-places/shop/beauty/refill-station>
78. For a list of zero waste supermarkets around the world (Europe, Americas, Australia and Asia), see: <https://www.bepakt.com/>
79. For example, see Canadian based Bulk Barn; [www.bulkbarn.ca/en/home](http://www.bulkbarn.ca/en/home)
80. The term bioplastic, as defined by European Bioplastics, refers to both the bio-based origin, mix of bio-based and fossil fuel based origin, and/or the biodegradable character of a plastic. However, in the context of this report Greenpeace is using the term bioplastics to only consider 100% bio-based polymers as bioplastic (both biodegradable or non-biodegradable).
81. European Plastic Recyclers (EuPR), 2010, How to increase the mechanical recycling of Post-consumer Plastics: Strategy paper of the European Plastics Recyclers Association, February 2010; [http://plasticker.de/news/docs/EuPR\\_How\\_To\\_Increase\\_Plastics\\_Recycling\\_FINAL\\_low.pdf](http://plasticker.de/news/docs/EuPR_How_To_Increase_Plastics_Recycling_FINAL_low.pdf)
82. European Plastics Converters, 2013, EuPC calls on legislator to support separate collection of degradable plastic materials and ban oxo fragmentable plastics, Press Release, Brussels, 9th September 2013; <http://assobioplastiche.org/assets/documenti/news/news2013/EuPC-Press-Release-Degradable-Tests.pdf>
83. United Nations Environment Programme (UNEP), 2015, Biodegradable Plastics & Marine Litter: misconception, concerns and impacts on marine environments, Nairobi. [https://wedocs.unep.org/bitstream/handle/20.500.11822/7468/Biodegradable\\_Plastics\\_and\\_Marine\\_Litter\\_Misconceptions\\_concerns\\_and\\_impacts\\_on\\_marine\\_environments-2015BiodegradablePlasticsAndMarinelitter.pdf.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/7468/Biodegradable_Plastics_and_Marine_Litter_Misconceptions_concerns_and_impacts_on_marine_environments-2015BiodegradablePlasticsAndMarinelitter.pdf.pdf)
84. BPF (undated), Bio-based plastics: Feedstocks, Production and the UK Market, British Plastics Federation [http://www.bpf.co.uk/plastipedia/polymers/biobased\\_plastics\\_feedstocks\\_production\\_and\\_the\\_uk\\_market.aspx](http://www.bpf.co.uk/plastipedia/polymers/biobased_plastics_feedstocks_production_and_the_uk_market.aspx)
85. European Bioplastics (undated), Bioplastics facts and figures; [http://docs.european-bioplastics.org/publications/EUBP\\_Facts\\_and\\_figures.pdf](http://docs.european-bioplastics.org/publications/EUBP_Facts_and_figures.pdf) Institute for Bioplastics and Biocomposites (IfBB), 2017, Biopolymers facts and statistics: Production capacities, processing routes, feedstock, land and water uses 2017. Hannover University of Applied Science and Arts. [https://www.ifbb-hannover.de/files/IfBB/downloads/faltblaetter\\_broschueren/Biopolymers-Facts-Statistics\\_2017.pdf](https://www.ifbb-hannover.de/files/IfBB/downloads/faltblaetter_broschueren/Biopolymers-Facts-Statistics_2017.pdf)
86. European Bioplastics (undated). Bioplastics facts and figures. op.cit.
87. Global Alliance for Incineration Alternatives (GAIA), 2017, Green businesses and cities at risk: How your waste management plan may be leading you in the wrong direction. GAIA and the Tishman Environment and Design Center, September 2017; <http://www.no-burn.org/wp-content/uploads/Businesses-and-cities-at-risk.pdf>
88. Zero Waste Europe, website, What is Zero Waste? <https://zerowasteurope.eu/what-is-zero-waste/>
89. Römbke J, Moser T. & Moser H, 2009, Ecotoxicological characterisation of 12 incineration ashes using 6 laboratory tests. Waste management 29(9): 2475-82.
90. Morris J, 2005, Comparative LCAs for Curbside Recycling Versus Either Landfilling or Incineration with Energy Recovery, 4 October 2004, The International Journal of Life Cycle Assessment 10(4) : 273-284; <http://www.springerlink.com/content/m423181w2hh036n4/>
91. Vahk J, The Nordics addiction to incineration fuels the controversy on renewable energy, 2018. Zero Waste Europe, 19th April 2018; <https://zerowasteurope.eu/2018/04/the-nordics-addiction-to-incineration-fuels-the-controversy-on-renewable-energy/>

92. Public-Private-Partnership Legal Resource Center (PPPLRC), 2019, The informal recycling sector in developing countries, The World Bank Group, last updated 31st Oct 2016 <https://ppp.worldbank.org/public-private-partnership/library/informal-recycling-sector-developing-countries>
93. Geyer R, Jambeck JR, Law KL, 2017, op.cit.
94. This estimate is based on the latest data from the US and assumes Business As Usual growth in plastic waste generation. Dell, J, 2018, U.S. Plastic Recycling Rate Projected to Drop to 4.4% in 2018, 4 October 2018; <https://www.plasticpollutioncoalition.org/pft/2018/10/4/us-plastic-recycling-rate-projected-to-drop-to-44-in-2018>
95. Danone and Mars, however, neither of these companies indicated a reduction in the number of single-use-plastic units that were sold.
96. As only Coke and Nestlé provided information on the number of units supplied relative to the weight of plastic used.
97. Greenpeace International research, op.cit. WWF Global 2016, op.cit.
98. See Glossary for precise definition.
99. When considering a product or delivery system's impact, consider the complete lifecycle of the product from the origin of the material, to transport, production, distribution, capture/collection, reuse, recycling or disposal, and ensure cumulative impacts are accounted for in local market contexts.
100. UNEP, Stockholm Convention, website; <http://chm.pops.int/Convention/tabid/54/language/en-US/Default.aspx>
04. **What happens to plastic waste.** Based on Figure 1.8, Global flow of plastic packaging waste, 2015, in: United Nations Environment Programme (UNEP), 2018, Single-use plastics - a roadmap for sustainability; [https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic\\_sustainability.pdf?isAllowed=y&sequence=1](https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic_sustainability.pdf?isAllowed=y&sequence=1);
05. **Top 10 exporters and importers of plastic waste between 1988 and 2016.** Based on data from: Geyer, Roland, Jenna R. Jambeck, and Kara Lavender Law (2017) Science Advances 19 Jul 2017: Vol. 3, no. 7. Production, use, and fate of all plastics ever made. <http://advances.sciencemag.org/content/3/7/e1700782.full>
06. **What happens to plastics packaging collected for recycling,** based on data in Petcore Europe, 2016, PET collection and recycling rates in Europe significantly increased in 2016, Monday, December 18, 2017; <https://petcore-europe.prezly.com/pet-collection-and-recycling-rates-in-europe-significantly-increased-in-2016#>

## Sources for infographics

01. **Global plastic production by industry in millions of tons.** Image adapted from "A Lifetime of Plastic" in National Geographic (2018), We Made Plastic. We Depend on It. Now We're Drowning in It, by Laura Parker, June 2018; <https://www.nationalgeographic.com/magazine/2018/06/plastic-planet-waste-pollution-trash-crisis/>
02. **Single-use plastic sold by the eleven FMCG companies surveyed in 2017.** Data provided by FMCG companies in response to Greenpeace's survey.
03. **Plastics in our ecosystems, where they come from and where they go.,** sources include: Horton A A, Walkton A, Spurgeon D J, Lahive E, Svendsen C, 2017, Microplastics in freshwater and terrestrial environments: Evaluating the current understanding to identify the knowledge gaps and future research priorities, Science of The Total Environment, Volume 586, 15 May 2017, Pages 127-141; <https://www.sciencedirect.com/science/article/pii/S0048969717302073?via%3Dihub> Eunomia, 2016, Plastics in the Marine Environment, 1st June 2016, by Dr Chris Sherrington; <http://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-nvironment/>



**Coca-Cola**  
**IS THIS YOURS?**

**Author:** Madeleine Cobbing  
**Design (apart from cover):**  
William Morris-Julien

**GREENPEACE**

Greenpeace International  
Ottho Heldringstraat 5,  
1066 AZ Amsterdam  
The Netherlands

Greenpeace is an independent global organisations that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

[greenpeace.org](http://greenpeace.org)