
# THROWING AWAY THE FUTURE:

## HOW COMPANIES STILL HAVE IT WRONG ON PLASTIC POLLUTION "SOLUTIONS"

GREENPEACE

There has been a wave of public concern about the global plastic pollution crisis, heightened by the growing scientific evidence about its ecological and social impacts. As a result, more and more people from all around the world are taking action themselves, and turning to solutions that most large companies have so far failed to implement: rejecting cheap, throwaway plastic packaging, and demanding reusable and refillable options for everyday goods. Small businesses are developing many inspiring, innovative (and sometimes basic, common sense) packaging methods and models. There is a global movement to create a sustainable world with a culture focused on reusables, not disposables

In response to public motivation to resolve the global plastic pollution crisis, some of the world's largest companies that produce massive amounts of wasteful, single-use plastic packaging have started to admit that they need to act. Some have made commitments that seem aspirational, but closer scrutiny shows that they are mostly continuing on the same track by investing in false solutions that fail to move us away from single-use plastic, diverting attention away from better systems, perpetuating the throwaway culture, and confusing people in the process. This is a transformative moment for our society. The world's largest companies should not remain stuck in the past by promoting false solutions but instead should urgently reprioritize corporate business models, and follow the lead of people all over the world by kicking off a just transition away from a throwaway economy.

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Published 1 October 2019 by
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# SECTION 1

## INTRODUCTION


Plastic pollution is a threat to our environment. The equivalent of a truckload of plastic enters the ocean every single minute.[1] Once in the marine environment, plastic breaks apart into smaller and smaller pieces. In fact, studies estimate that there are anywhere between five and 50 trillion plastic particles in our oceans today.[2] These plastics are often ingested by marine animals, which can then be choked or starved.

Plastic pollution is not limited to the visible pollution in our oceans and on our beaches. The vast majority of all plastic ever produced has been landfilled or released into the environment and remains there in some form.[3] There is emerging evidence on the presence of plastic in freshwater,[4] soil,[5] and the atmosphere,[6] and still more is needed on its environmental and health impacts.[7] Plastic carries known and potential impacts to human health, at every point of its life cycle.

Ninety-nine percent of plastic begins its life as oil or gas,[8] with its extraction and refining contributing to climate change, air pollution and the potential for accidents.[9] Cumulative impacts from plastic production on surrounding communities are not always part of environmental or safety risk assessments, which tend to document the impacts of chemicals in isolation.[10] The climate impacts of plastic are grim: current estimates suggest that by 2050, global greenhouse gas emissions related to the lifecycle of plastic could make up as much as 10-13% of the available 'budget' of emissions we have left.[11] It has also been estimated that, by the end of 2019 alone, globally, plastic production and burning will emit the equivalent of 189 coal-fired power plants.[12]

Plastic also needs chemical additives to make it functional and give it desired properties such as stability, flexibility or appearance;[13] these additives can include carcinogenic and endocrine-disrupting chemicals such as phthalates.[14] Some plastics can themselves leach out hazardous chemicals, such as BPA (bisphenol-A) from polycarbonate[15 16 17 18] and phthalates from PVC. Though much is known about the dangers these chemicals pose to our reproductive system and other aspects of our health, scientists have highlighted the need for further research on the risks for human health that additives in food packaging may pose.[19] While the chemicals may be present in small amounts in each package, the full impacts of these chemicals when combined are generally not considered.[20]

Despite the increasing scientific understanding of the irreversible damage plastic can cause to our environment and communities, plastic production is projected to increase. The fossil fuel industry intends to increase production by an additional 40% over the next decade,[21] and plastic could account for 20% of the total global oil consumption by 2050.[22] Companies including Shell and ExxonMobil have invested a combined $180 billion since 2010 into plastic production, using cheap natural gas from hydraulic fracturing ('fracking') in the United States.[23] Petrochemical companies are expanding plastic production operations on the Gulf Coast of the United States,[24] where communities have long been fighting the toxic effects of oil and gas refining.[25 26] European companies are also hungrily exploiting the natural gas rush, with the Ineos Corporation making the biggest petrochemical investment in the EU in 20 years,[27 28] into plastic production infrastructure, including a "virtual pipeline" to flood Europe with cheap fracked gas from the US to make plastic,[29 30 31] a plan which has generated an international outcry. In Asia, it's also reported that petrochemical producers including Sinopec, Petronas and Hengli Petrochemical are investing billions of dollars into expanding plastic production.[33]

With cheaply available virgin plastic flooding the market, single-use plastic packaging may represent a lifeline for the oil and gas industry. However, solutions focused on improving the 'end of life' management of plastic won't work without turning off the tap.


# Time to declare Peak Plastic

Plastic packaging accounts for the largest share of global plastics manufacturing.[34] [35] [36] It is also the largest source of plastic waste in the environment, as packaging is typically designed to be single-use.[37]

Global and regional waste audits have found plastic packaging from large 'fast moving consumer goods companies' (FMCGs) such as Nestle, PepsiCo, Procter & Gamble, Coca Cola and Mondelez to be the most frequently identified branded plastic pollution collected worldwide.[38] [39] In response, many FMCGs have adopted various voluntary commitments to make their plastic packaging more recyclable, reusable, compostable, or made of recycled content. While these commitments are an important step forward, most of the plans to meet these goals have focused on false solutions: switching from plastic to other forms of single-use packaging, investing in partnerships to improve recycling and waste management, or looking to emerging technologies that enable these companies to continue business as usual rather than reducing demand for plastic.

To date, no major FMCG has made a commitment to reduce the total volume or number of units of single-use packaging it sells, or to invest significantly in reusable and refillable delivery systems, and only a handful of companies have even disclosed their plastic footprint.[40] Companies and retailers using single-use plastic packaging need to urgently adopt reduction targets, decrease the number of products they sell packaged in single-use plastic, and significantly invest in new delivery systems based on reusable and refillable packaging constructed of durable materials and designed to achieve multiple uses.



# Not all solutions are equal

Seemingly every day, large FMCG companies and retailers as well as smaller start-ups or entrepreneurs advertise a new innovation or way to reduce plastic, intended to build trust with consumers that they are leading the charge to find solutions to our plastic pollution crisis. Not all promoted "solutions" are inherently equal or equitable.

Any solution to the global plastic pollution crisis should contribute to a 'just transition'[41] to a plastic-free economy, that also needs to be equitable. Using a 'people's solutions lens'[42] to evaluate potential solutions can identify solutions that are more likely to benefit the widest array of people and our planet.

- Who makes the decisions? *Does this support and drive community self-determination? Is governance adequate so that any decisions made by companies are driven by the public good?*
- Who benefits from the solution? *Does this contribute to our collective health and the protection of our natural ecosystems, or does this allow corporations to continue to externalize the costs of doing business onto communities and our planet? Does this lead towards true systemic change?*
- Who or what else will this impact? *Will this create unintended consequences for somebody else or another part of our global environment? Is there enough information available to determine impacts?*

The plastic pollution crisis will only be resolved when companies that profit from single-use plastic declare peak plastic, and commit to urgent reductions in the amount of single-use disposable packaging units they sell. An obvious first step is immediately eliminating unnecessary and excessive packaging, such as coffee capsules. They will also need to adopt a publicly available, comprehensive plan to invest in new ways to bring products to consumers in reusable and refillable packaging that is durable, affordable and more responsibly produced. Many diverse reuse and refill options exist currently, and with innovation, even more could be developed. The Ellen MacArthur Foundation estimates that replacing even 20% of single-use packaging could be worth $10 billion in value,[43] with other benefits beyond the reduced environmental impacts, including customer convenience and choice. But fundamentally, companies also need to reimagine their business models based on the recognition that we cannot continue to produce disposable packaging that is used for seconds but pollutes our planet for generations.

**Warning: bias and inaccuracies in Life Cycle Analysis: Many companies will claim that according to Life Cycle Assessments (LCAs), plastic is the most environmentally friendly option for any type of packaging. LCAs are decision-making tools that can be used to compare various environmental or social impacts associated with all stages of a product's life, from raw material extraction through manufacture, distribution, use, and end of life. While these can be illuminating decision-making tools, they often offer a selective view depending on what assumptions are made, and what data is used or available.[44] Some LCAs show plastic as the most environmentally-friendly of several options, but these often exclude important parts of the plastics lifecycle such as the extraction of raw materials, production, the release of hazardous chemicals, end of life disposal or marine pollution. For example, a recent Danish study claimed that lightweight LDPE plastic carrier bags had the least environmental impact compared to paper, cotton and other selected materials, but the study's approach and its assumptions favor single-use practices, effectively removing the benefits of reuse from more durable materials; it also assumes, unrealistically, zero littering and leakage of plastic bags from recycling and waste management systems.[45]**

# SECTION 2

## FALSE PAPER PROMISES

Some companies are attempting to address their plastics problem by switching their disposable packaging from plastic to paper. Dunkin' Donuts have announced a switch from plastic foam cups to paper cups,[46] and McDonald's and Starbucks both announced switches to paper straws.[47] Nestle in particular has emphasized a shift to paper-based packaging,[48] proclaiming that its new paper-wrapper for its Yes! Candy bar is patent-free because it "want[s] the industry to use paper."[49] Nestle has also switched to paper straws for paper Nesquik pouches in Europe,[50] and paper packaging for Milo drinks will follow in Asia.[51] Companies tout these switches as positive moves - and receive praise for them[52] - because paper has long been seen as an environmentally sustainable material. However, in reality, this switch is problematic.

Forests play a unique role, supporting a stunning array of biodiversity, removing and storing carbon, providing sustenance and livelihood to indigenous peoples, and performing a range of ecological services that sustain life.[53] The pulp and paper industry is responsible for substantial impacts to the environment, including climate change,[54] as logging and large-scale industrial tree plantations drive natural forest loss degradation, emitting huge amounts of $CO_2$.[55] In the race to limit global warming to 1.5 degrees Celsius, cutting emissions alone is not enough. We will also have to remove massive amounts of carbon dioxide from the atmosphere; the most effective way to do this is to restore degraded forests and to reforest large parts of those areas lost in the past.[56] This is fundamentally incompatible with an increase in logging and industrial tree plantations.

Despite the fact that paper has been recycled for centuries, current paper recycling systems are failing to deliver enough quality recycled fiber in many countries, partly due to contamination in the recycling stream, leading municipalities to incinerate or landfill vast amounts of paper collected for recycling.[57] [58] Major FMCG companies that have announced shifts to paper packaging seem unaware of these limitations; none of these have committed to exclusively source post-consumer recycled fiber, and many even ignore the future recyclability of their paper packaging. For example, McDonald's announced in 2018 that it would switch its plastic straws to paper in the UK and Ireland, in response to concerns about plastic, but the thickness of the new paper straws and the use of adhesives make them incompatible with current recycling systems.[59] Overall, current paper recycling is unable to provide a sustainable route for an increase in paper packaging.

FMCG companies often promote third-party certifications, like the Forest Stewardship Council (FSC), as proof that their new paper packaging will be sourced responsibly,[60] and some FMCGs companies may see increasing their purchasing of disposable paper packaging from certified sources as a responsible way forward. Forest certification can be a useful tool, although even the most stringently FSC-certified fiber does nothing to address the fundamental impact that any logging has on a forest's ecosystem services such as storing carbon or providing homes for wildlife.

But certified sustainable logging schemes are wholly unable to absorb any additional demand, as the current supply of FSC certified fiber is limited, and also fail to ensure enough meaningful sustainability metrics. For example, current demand already outstrips the availability of responsibly sourced fiber in the United States and Canada, and it is uncertain if enough newly certified FSC fiber will come online in order to meet additional demand.[61] This has led some companies[62] to either rely on less stringent elements of the FSC system that cannot provide on-the-ground guarantees,[63] or to rely on entirely separate but substantially weaker schemes such as the Sustainable Forestry Initiative or the Programme for the Endorsement of Forest Certification.[64] It is also important to note that sourcing FSC-certified fiber in some regions does not guarantee responsible logging, including in Russia, Congo Basin and Scandinavia where FSC has struggled with massive loss of intact forest landscapes, destruction of high conservation value forest, and insufficient indigenous sovereignty and human rights processes.[65 66 67]

As one example, Swedish pulp and paper giant Svenska Cellulosa AB (SCA) is expanding operations in the Great Northern Forest, in part to meet growing demand from packaging manufacturers.[68] SCA's forestry operations are FSC-certified, but indigenous communities have actively opposed SCA's conversion of old-growth forests to plantations.[69] SCA's customers make cardboard packaging sold to Amazon, IKEA, L'Oréal, Mars, Mondelez, Nestlé,[70] Procter & Gamble, and Unilever, much of which will also be single use, and could be replaced with re-usable delivery systems relatively easily.[71]

Given the current impacts on already-limited forest resources, much larger areas of forest need to be protected and restored, not transformed into disposable packaging.  There is no way the planet can sustain additional demand from companies attempting to substitute their single-use plastic packaging with paper or cardboard; companies must commit to overall reduction of packaging and shift to alternative delivery systems like reuse and refill. This is a matter of urgency for the climate, and acting now is still possible.

# SECTION 3

# FALSE IMPRESSIONS: “BIOPLASTICS” - THE LATEST FORM OF “GREENWASHING

In response to growing public concern over conventional single-use plastics, many companies are swapping single-use plastics derived from fossil fuels with bio-based plastics, which are often erroneously promoted as biodegradable or compostable. Several companies—for example, Coca-Cola,[72] Danone,[73] Nestlé,[74] PepsiCo,[75]—are using bio-based plastics to replace some portion of conventional fossil-derived plastics in their beverage bottles, and many bags or disposable take-away food service items (cutlery, plates, etc) are increasingly marketed as “biodegradable.” These terms can be confusing for customers, especially when generic “greenwashing” terms such as ‘eco’, ‘bio’ or ‘green’ are used for marketing advantage. The word “bioplastics” does not have a standardized definition and is often used to refer to plastic that is either **bio-based**, **biodegradable** or **compostable** and can even include fossil fuel based plastic.

**‘Bio-based plastic’** refers to plastics made not from fossil fuel building blocks but from plant material, such as corn or sugar cane.[76] Bio-based plastic only represents about 1% of the plastic available on the market.[77] Though research is underway to increase the amount of bio-based material,[78] currently most bio-based plastic is still partially composed of fossil-based plastic. For example, the NaturALL bottle used by major beverage companies is currently 30% bio-based plastic, and 70% fossil-based plastic.[79]

The majority of bio-based plastic is derived from agricultural crops, which compete with food crops, threatening food security and driving land use change and agricultural emissions.[80] [81] Globally, the production of agricultural commodities is the leading cause of deforestation and habitat destruction,[82] and agricultural crops, forestry and other land uses are responsible for a quarter of the greenhouse gas emissions globally.[83] A growing share of agricultural land is used for non-food crops, mostly farmed on large industrial plantations which displace both natural habitat and small-scale farmers.[84] While some FMCGs like Unilever have made commitments to ensure that their bio-based plastic comes from sustainable sources, the commonly-cited Bioplastic Feedstock Alliance is not a third-party certification standard.
While many consumers may believe that all bio-based plastic will naturally decompose if littered or landfilled, this is not necessarily true. Both conventional fossil-based plastic or bio-based plastic can be engineered to degrade under certain conditions; these are known as either **degradable or biodegradable plastics**.[85] [86] However, the heat and humidity conditions required are rarely, if ever, met in the natural environment,[87] [88] [89] and when that biodegradable plastic does break apart, it may not fully disappear but instead fragment into smaller pieces, including microplastics, which can be ingested by animals and enter the food web.

The impression that that these products are more ‘natural’ because they are from plants is also false: production of bio-based plastic can involve similar chemical additives to conventional fossil-based plastic.[90]

**Compostable plastic:** Another confusing marketing term associated with bio-based plastics and biodegradability is the claim that a disposable item is compostable. Compostable plastic is engineered to fully decompose (as opposed to breaking into small fragments) under certain conditions[91] that are met in either industrial composting facilities, or, less commonly, in home composting systems.[92] But not all municipalities have industrial composting, and many cannot recycle compostable plastic packaging, and thus it is most likely to be landfilled or incinerated, making it little different to conventional single-use plastic.

While some new technologies promise bio-based packaging made from non-agricultural crops like algae, methane or seaweed,[93] these are emerging technologies and processes and will require transparent assessments on a range of impacts. Some bio-based packaging materials that are grown according to agroecological farming principles or make use of local agricultural waste or by-products may be a component of an overall plan to eliminate single-use plastic packaging, provided these materials do not compete with land for food crops or soil fertility needs; for example, in tropical areas, food products may be wrapped in banana leaves. Overall, a highly precautionary approach to industrially-processed bio-based plastic packaging should be taken.

# SECTION 4

# OUR RECYCLING SYSTEM: DOOMED BY PLASTIC

FMCG companies and the plastics industry have long promoted the idea that recycling is the best way to keep plastic out of the landfill,[94] but more than 90% of all the plastic ever produced has not been recycled.[95] Plastic is far more likely to end up in landfills, incinerators or in the environment than to be recycled. Nevertheless, corporate commitments to confront plastic pollution have overwhelmingly focused on increasing recycled or recyclable content, promoting recyclability or technological recycling solutions. However, numerous exposés have demonstrated that recycling systems have failed to deliver on the promise to both recover enough material to reduce demand for virgin plastic or to ensure proper disposal,[96] [97] [98] objectives that are unachievable, due to the inherent difficulties posed by the nature of plastics, the mixtures of plastics and the enormous amount produced.

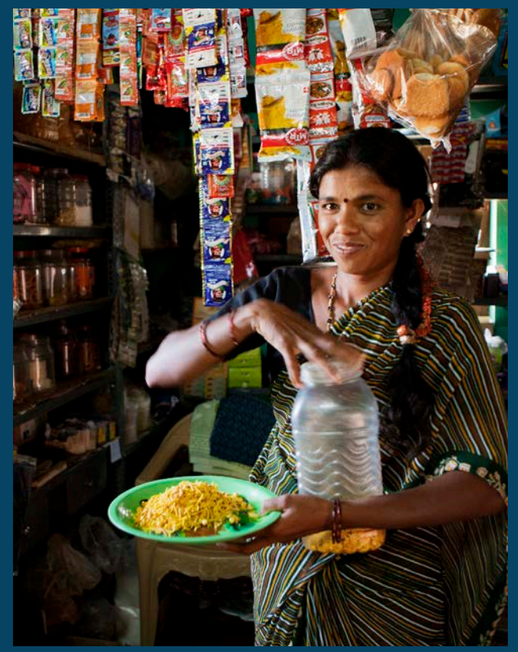
Recycling systems cannot keep up with the huge volume of plastic waste generated. Even in Germany, which has one of the highest recycling rates in the world based on collection, more than 60% of all plastic waste is burned, and only 38% recycled.[99] In the EU as a whole, 31% of the plastic waste collected in 2016 was reported as recycled[100] - despite the fact that much of this is exported to lower income countries where its ultimate fate is unknown. This pattern is repeated In the US, where just 9% was recycled in 2015 (the most recent Government data available),[101] while the amount actually recycled domestically may be as low as 2% of the total plastic waste, according to one analysis.[102]

Plastic packaging made of polyethylene terephthalate (PET) (e.g.soda and water bottles) and high density polyethylene (HDPE) (eg. milk jugs, laundry detergent containers),[103] are commonly recyclable in many municipal systems, but recycling rates for these are still shockingly low: half of the PET sold is never collected for recycling,[104] and only 7% of those bottles collected for recycling are turned into new bottles.[105] Much of the plastic packaging is “downcycled,” which means that instead of making a new plastic package from an old one, the plastic is reprocessed into products of lesser quality or value which are not further recyclable and not possible to recycle.

Flexible plastic packaging such as wrappers, sachets, pouches, shrink-wrap, and savory snack bags now dominate grocery stores - the market for this grew by 19% just in 2017[106] - and this type of packaging is often made of multiple materials that make it difficult if not impossible to recycle.[107] Recycling collection facilities not equipped to handle the complexity of these materials have become overwhelmed.

**Sachets: a single serving of uncontrollable plastic pollution.** **A sachet is a particular kind of plastic packaging typically used to sell small or single portions of food and personal care products such as soap, shampoo and deodorant. Southeast Asia accounts for almost 50% of the global sachet market; 855 billion sachets were sold globally in 2018, and at current growth rates, 1.3 trillion will be sold in 2027.[108] [109] In North America and Europe, this packaging is known as 'on the go' (for example, ketchup packets or daily doses of vitamins) or 'trial size.' In Southeast Asia, the 'sachet economy' was pioneered by Unilever,[110] where products in sachets are aggressively marketed by FMCGs to low-income consumers in rural communities unable to afford larger containers. Because the package is a combination of plastic and other materials (like foil), it cannot be recycled: waste sachets are therefore overwhelming municipal waste infrastructure systems in South East Asia, imposing an intrusive double standard which exploits global inequity.**

**Rather than developing accessible reusable packaging systems, FMCGs seem intent on continuing to sell products in sachets. Nestle acknowledges the problem but has done little to address its use of sachets directly,[111] and Unilever is using downcycling and is now turning to new chemical-based recycling technologies to deal with the unrecyclable sachets (see Section 4).[112] Unilever Philippines is reported to sell more than half of its products in plastic sachets.[113] In 2012, Unilever developed a Sachet Recovery Program in the Philippines to downcycle sachets into cement pavers, which were then donated to schools and communities.[114] While the company initially collected between 4.5 million and 10 million sachets annually,[115] this is a small portion relative to the 27 billion sachets Unilever sold in Southeast Asia in 2016[116] or the estimated 59.7 billion sachets used annually in the Philippines alone.[117] Unilever is now promoting its use of the CreaSolv process[118] which uses chemical solvents to dissolve the plastic sachets to make new flexible plastic; a pilot plant in Indonesia processes 3 tonnes of plastic daily.[119] However, Unilever offers little information about the potential health impacts of the solvents or the efficiency of the technology. Instead of focusing on these false solutions, Unilever needs to prioritise the innovation of environmentally responsible reusable and refillable systems for their customers in Southeast Asia.**



What, then, happens to the plastic waste that is collected but not ultimately recycled? There are no countries where all plastic packaging is effectively recycled domestically, therefore most of this 'low-value plastic' is dumped in landfills, burned in incinerators which emit greenhouse gas emissions and pollutants into the air,[120] or littered into the environment. The vast majority of all of the plastic that has ever been produced globally has been released to the environment, with 12% incinerated, and 79% landfilled or released into the natural environment.[121]



# There is no "away"

Within the small percentages of plastic that are reported as 'recycled' is another important component to this story - the global plastic waste trade. Plastic not recycled domestically is typically been packed into mixed bales and largely exported to other countries to deal with. The United States, for example, exported one third of its recyclable plastic waste, and until 2018, half of that was destined for China,[122] where low environmental standards and cheap labor costs made the recycled material attractive to use in the manufacturing sector.[123]

Field investigations of municipal waste in Southeast Asia have detailed unpermitted recycling operations, open burning, complaints of health symptoms suggestive of environmental pollution, among other problems.[124] Sorting of waste is typically done by informal laborers known as waste-pickers, who often lack the resources to sort cleanly and safely.[125] While one study reports that large amounts of plastic waste enter the ocean via several large Asian rivers,[126] this does not mean that Asian countries are more responsible for the world's plastic pollution: much of that discarded plastic may have originated in North America or Europe, where plastic generation per person is higher than in many Asian countries.[127]

In 2018, China banned the importation of foreign waste, and plastic waste exports around the world dropped by 50% as plastic waste collected for recycling began to stockpile or head for improper disposal.[128] Some plastic waste was redirected to nearby countries, like Indonesia, Malaysia and Thailand,[129] which were already struggling with municipal recycling infrastructure clogged by non-recyclable waste. Some of those countries in turn adopted their own restrictions on plastic waste imports[130] and have since began to return containers of waste to the originating countries.[131] [132]

**Burning Waste:** **In the EU the majority (41.6%) of plastic waste collected in 2016 was incinerated,[133] and incineration of plastic waste in Europe increased by 61% between 2000 and 2016.[134] This rush to burn is also happening in China, which has 231 operating incinerators, with another 103 planned (for comparison, Europe has 500 incinerators).[135] According to one analysis, the US could be burning 13% of its plastic waste, or six times the plastic waste that it recycles.[136] Waste incineration is an inefficient way of generating energy and an irresponsible form of waste management.[137] Incinerating plastics creates air pollutants, fly ash, bottom ash, and boiler ash/slag; it 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 - contributing to the climate crisis.[138] [139] It is also an environmental justice issue; for example, approximately eighty percent of the waste incinerators in the US are located in low-income communities, communities of color, or both.[140] Facilities are often costly to run and require a constant stream of waste, so waste incineration encourages generation of disposable material. Despite the known pollution generated by incineration, Nestle Philippines has announced it is sponsoring recovery of plastic waste to burn in kilns that make cement,[141] a highly polluting practice.[142]**

It’s abundantlyclear that recycling can only ever make a small dent in the rising quantities of plastics being produced and the inevitable plastic waste. Therefore, the efforts made by most FMCGs and retailers to clean up beaches, improve recycling and recyclability, or educate their customers are - at best - misdirected and at worst, creating a smokescreen of activity to mask the problem. Some have begun increasing package labelling to indicate whether or not it is recyclable; these labels, like How2Recycle in North America, are potentially misleading in that each municipality has different capacity to recycle different types of plastic, so what is recycl*able* is not necessarily recycl*ed*. Focusing only on end-of-life strategies for plastic waste also ignores the human health and environmental consequences of the entire plastic life cycle.[143 144]

Recycling has a part to play as an important sub-strategy for the transition to a plastic-free economy, but is it not a substitute for the overall reduction in single-use packaging, and certainly not a justification for increased plastic production. In this transition, any continued recycling needs to meet the highest social and environmental standards, and take its rightful place in the waste hierarchy, under ‘avoid’ ‘reduce’ and ‘reuse’.

# SECTION 5

# CHEMICAL RECYCLING TECHNOLOGIES - TOXIC TECH DISGUISED AS THE SOLUTION

Commitments to increase recycled content in packaging by at least 37 FMCGs are translating to a demand for up to 5 - 7.5 million metric tons of recycled plastic by 2030, an increase of 200-300%.[145] But these promises crash into a significant real-world barrier: the complex plastics and mixed materials used in flexible plastic packaging and labels are not practically recyclable in conventional recycling processes and can't produce new plastic of the required quality.

Conventional recycling methods, also known as **mechanical recycling**, essentially chop up plastic and re-formulate it without changing the chemical structure. This works well for downcycling plastics into other materials but less well for creating 'like-new' plastic due to quality loss, degradation and contamination.[146] The low cost of virgin feedstock combined with these limitations means that while that some plastics are technically recyclable, the difficulty recycling them en masse means that no practical market exists, so recycling rates are low.[147] This is the case with polypropylene, the base plastic for much of the flexible packaging on the market, like yogurt cups or squeeze bottles.[148]

Thus, the availability of recycled material is much lower than the demand. With FMCGs anxious to label their products as both recycled and recyclable, the plastics industry and lobby is promoting the perception that full recycling will someday be possible, and companies are turning to potentially risky emerging technologies - collectively known as **chemical recycling**.

# Chemical Recycling

Chemical recycling is an umbrella term for several technologies, most of which are in their infancy. Big brands often describe chemical recycling in their promotional materials using terms such as “enhanced recycling” or “advanced recycling” to give the false impression that these technologies are benign. Information about the environmental and health impacts of many of these technologies is currently limited, but there are serious concerns about emissions of hazardous chemicals and their intensive use of energy. There are various forms of these emerging technologies, which convert plastic waste into basic chemical building blocks (polymers or monomers), including:[149]

- using **chemical solvents** to purify waste plastics,
- **chemical depolymerisation**, in which the plastic polymer chains are degraded into their original building blocks, such as monomers, and
- **thermal depolymerisation** and cracking (breaking the chemical bonds, as used in petroleum refining) also known as **gasification** and **pyrolysis**, which can produce hydrocarbons such as gas or oil (plastic to fuel) as well as ‘like-new’ plastic materials.

Chemical solvents and depolymerisation decontaminate the plastic, but the plastic that results from the process is still of degraded quality. They also require a single-stream of plastic waste and therefore face the same collection barriers as mechanical recycling. Thermal depolymerisation, on the other hand, can process mixed plastic waste as well as address the degradation problem, but it brings other serious concerns, particularly the creation of potentially hazardous byproducts.

Gasification converts plastic waste into a gas; pyrolysis, sometimes called ‘plastic-to-oil’, makes plastic waste into tar oil by exposing it to high heat; the oil can then be used for fuel, to make new plastic, or other chemical applications. While this may technically differ from burning as it is not combustion, it is still thermal destruction using high heat (and a lot of energy) and can create hazardous byproducts.

Gasification and pyrolysis are not new technologies - they have been used for decades as alternatives to waste incineration, however they have a failed track record due inefficiency, emissions pollution, and environmental impact.[150] [151] Despite these failures, new development of gasification and pyrolysis for waste plastics reprocessing is currently being inaccurately promoted as a modern way to achieve a ‘circular economy.’ Examples of some companies investing in this risky technology include:

- Mars Incorporated, which claims to be testing capacity to use pyrolysis to meet its commitment to increasing recycled plastic.[152]
- Saudi Arabian Chemical giant SABIC, which has even co-opted the ‘circular economy’ language by launching “certified circular polymers,” or plastic made from pyrolysis (in other words, plastic waste made into oil which is made into like-new plastic).[153] Unilever and Tupperware will use this plastic.[154] [155]
- Agilyx, a company manufacturing jet fuel and recycled polystyrene from polystyrene waste.[156]

Investment in new chemical recycling infrastructure is risky in that it will ‘lock in’ demand for plastic waste in order to generate more plastic as well as non-plastic by-products. One analysis estimates products produced by chemical recycling to be worth $120 billion, with the production of gas and oil from these processes projected to be 14% of that value.[157] It is critical for FMCGs to ensure that meeting their commitments to increase recycled content will reduce the use of virgin plastic, not drive new fossil fuel generation.

# Promoting chemical recycling in a regulatory vacuum

Neither the US nor the EU has coherent regulations or agreed definitions for these technologies as a group, creating further confusion when industry or FMCGs promote new recycling technologies. The plastics lobby group American Chemistry Council encourages regulators to see 'plastics-to-fuel' not as recycling or waste disposal but as manufacturing processes, or even energy production,[158] despite also promoting these technologies and companies through the "Chemical Recycling Alliance."[159]

To promote acceptance of the technology, the plastics industry employs multiple high-profile industry alliances, like the American Chemistry Council's Chemical Recycling Alliance[160] the Alliance to End Plastic Waste,[161] and positions plastics-to-fuel as a technological marvel (one plastics industry spokesperson has even compared plastics-to-fuel technology to "going to Mars"[162]). PepsiCo and Procter & Gamble have joined the Alliance to End Plastic Waste, a partnership of mostly plastics and petrochemical producers which aims to raise $1.5 billion to improve recycling and waste management infrastructure and develop recycling technologies,[163] including chemical recycling, although these are small investments compared to the $180 billion investment into the expansion of plastic production.[164]

Despite the many concerns mentioned above and the fact that chemical recycling is not yet technically or economically viable,[165] FMCGs are promoting these technologies under the guise of "recycling" in their corporate responsibility materials.[166] Many petrochemical companies have invested in various chemical recycling start-ups in Europe and North America,[167] which are partly funded by some FMCGs. Procter & Gamble, PepsiCo, Nestle, L'Oreal, Coca-Cola, Kuerig and Danone have all invested in chemical recycling technologies or have entered into purchasing agreements for future product,[168] [169] [170] even though many are not yet producing material at significant commercial scale and are still in a laboratory, pilot or construction phase.[171] For example:

- Procter & Gamble developed a process using chemical solvents to convert polypropylene, which it has licensed to a startup that will sell material to Nestle and L'Oreal.[172] [173]
- PepsiCo. has touted its intentions to incorporate chemically recycled PET by 2020, despite the fact that PET produced by its supply partner will not be commercially available until mid-2020.[174]


# Banking on a false solution with unknown environmental and health impacts

Details of these recycling processes are often not disclosed, obscuring information about their costs, efficiency, environmental impacts such as air or water pollution, or risks to workers. Despite describing them as 'closed loop' or referring to the 'circular economy' in their promotions,[175] most processes are highly energy-intensive,[176] require costly infrastructure, and generate waste (such as additives and contaminants). Even with technologies that are more advanced, there is limited evidence that they are environmentally safe or efficient at transitioning to a low-carbon economy,[177] much less away from single-use plastics.

Given the limitations of mechanical recycling, FMCG commitments towards increased recycled content are dependent on the use of chemical recycling which has not been proven to be safe, efficient, or environmentally responsible, and furthermore is still years away from being a commercial reality.[178] Despite high-profile investment and promotion as a solution, chemical recycling is expensive, inefficient and not enough is known about the impacts of these potentially polluting processes. FMCGs and retailers are banking on theoretical solutions in order to claim that their non-reusable and non-recyclable plastics are made from recycled content and are 'recyclable'. Meanwhile, focusing on these new technologies could delay innovation into responsible solutions. And while recycling has a limited but important role to play in the short-term, to solve the plastic pollution crisis, we need to create less single-use plastic in the first place.

# SECTION 6

# CONCLUSION:
# WE NEED A REUSE REVOLUTION!

The plastics crisis we are already in shows that the promise of recycling has already failed. But the new chemical recycling technologies promoted by big brands are are no silver bullet either. We could be waiting years before these become a commercial reality, only to find that they come with a high ecological cost and have already locked us into a never-ending growth of plastics production.

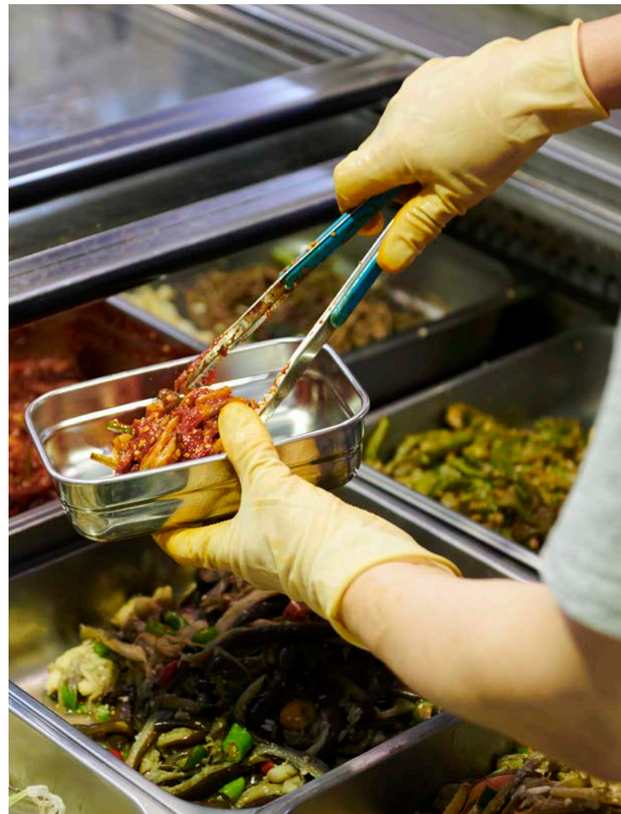
What of the other solutions offered by big food and big plastic? It's easy to promote natural alternatives - such as paper and card - and alternatives that sound 'natural' - like bioplastics, that come with unanswered questions. But the volumes and scale of resources that would be needed would put unacceptable pressures on natural resources such as forests and agricultural land, which are already straining from overexploitation.

This is not an adequate response to the plastics crisis or the climate crisis. It's clear that we cannot afford to wait. It's also fortunate that other solutions exist, which can be implemented relatively quickly, that will benefit both people and the planet.

As a priority, we call for the reduction of units sold in single-use packaging, and for **investment in solutions focused on reuse, refill and other systems not dependant on disposables**. Ultimately companies need to rethink how products are delivered to the consumer. In the transition to avoiding throwaway plastic, replacing virgin plastic with non-toxic, recycled (and recyclable) plastic only has a limited role in addressing plastic overproduction.

There is no silver bullet, one-size fits all option for new reusable/refillable packaging that will be applicable to every company, product or geography. We propose, however, that FMCGs and retailers urgently prioritize investment into the delivery of reuse and refill options that meet the following criteria:

- **Affordable:** Producers must take responsibility for the cost of the material, the refillable/ reusable packaging and its collection, and not create only 'premium' reusable containers for well-off consumers.
- **Durable:** Materials should be long-lasting and as strong as possible, to have the least amount of health and environmental impacts.
- **Non-toxic:** Reusable containers should be free of hazardous chemicals, extending not just to chemicals that have been regulated or restricted in certain regions but to all chemicals that have intrinsically hazardous properties.[179]
- **Convenient:** Consumers should be able to access a range of reusable and refillable products to fit various lifestyles, and reuse shouldn't just be available to customers online, for example. Reusable packaging should be collectible, and companies should take responsibility for designing collection systems to ensure that reusable containers don't become disposable. Retailers should allow customers to bring their own reusable containers as well as offer collectible options.
- **Simple:** A transition to an agricultural system designed around ecological principles would include more consumption of food closer to the point of production, meaning that we would need less packaging and transportation.
- **Supports a just transition to a plastic-free economy:** values manufacturing and delivery workers, small business owners, and consumers more than profits for upper management



What FMCG companies and retailers need to do:

**Prioritize Reduction**
Companies must publicly commit to phase out single-use plastics immediately, and achieve absolute reductions in the total number of single-use plastic packaging units (not lightweighting existing products). Companies should prioritize problematic and unnecessary plastics that are frequently littered or harmful to human health, or frequently not recycled despite recyclability claims.
FMCG companies must engage retailers to pilot alternative delivery systems.

**Invest in Innovative Alternative Delivery Systems**
Companies have incredible power to collaborate with consumers to re-imagine our supermarkets or shopping experiences to deliver products without sacrificing the planet.
Be flexible and creative to meet a variety of consumer needs. There are multiple ways that reuse and refill options can work for consumers; no single option will be the best for everybody.

**Be Transparent**
Companies must track and annually disclose their use of plastic, including the number, composition, and weight of items containing single-use plastics.
Companies should review the policies taken by their trade associations and either work to ensure those associations act in accordance with their values or sever their relationships.

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Zero Waste Europe (2019), op.cit. "The potential roll-out of such technologies at industrial scale can only be expected from 2025-2030 and this is an important factor when planning the transition to a Circular Economy and notably the decarbonisation agenda."

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# PHOTO CREDITS

Cover © Greenpeace
*Merci Ferrer stands and looks at the mountain of trash at a dumpsite in Dumaguete City, Philippines.*

Page 1 © Bente Stachowske / Greenpeace
*Plastic rubbish floats covered by oil in Havana harbour, Cuba.*

Page 2 © Fully Syafi / Greenpeace
*A plastic bottle of Nestle stacks among imported plastic waste at a dumpsite in Mojokerto, East Java, Indonesia. According to a Greenpeace report, Southeast Asia countries including Thailand, Vietnam, Malaysia and Indonesia have accepted more imported plastic waste, since China banned plastic waste imports in January 2018.*

Page 3 © Nandakumar S. Haridas / Greenpeace
*Greenpeace Malaysia has been conducting a field investigation on the broken system of recycling and how it impacts Malaysian society. The findings were shocking: a new 'dump site' of plastic waste from more than 19 countries -- most of them are developed countries. The investigation found illegal practices, and blatant violations causing environmental pollution as well as harming people's health conditions.*

Page 4 © Greenpeace
*Global Anti Incineration Alliance Philippines Executive Director Froilan Grate shows a discarded pack of a Nestle product as he stands on a trash-filled shoreline along Manila Bay in Navotas City, Philippines.*

Page 6 © Ulet Ifansasti / Greenpeace
*Young acacia plantation beside peatland forest inside the PT Sumatra Riang Lestari (PT SRL) pulpwood concession in Rupat Island, Bengkalis Regency, Riau Province. PT SRL is a supplier to APRIL, the pulp & paper division of the RGE Group. On 28 January 2014, APRIL announced its intention to continue to use rainforest logs until at least 2020.*

Page 8 © Christian Åslund / Greenpeace
*Aerial view of SCA's, tree nursery in Timrå, the boreal region of Sweden. It is the biggest nursery of its kind where SCA among other plants produce the invasive species Lodgepole Pine (Pinus Contorta) before being planted out in nature, often replacing natural forests.*
*Page 10 © Fred Dott / Greenpeace*

Page 12 © Kosaku Hamada / Greenpeace
*Many tarry residues were found at Chinase beach and dead streaked shearwater was found and oil was attached to its feathers. The dead cause remains unknown, it is under investigation by Ministry of Environment.*

Page 14 © Vivek M. / Greenpeace
*Ananthamma, a local woman, runs a small shop from her home in Vadigere village, an activity enabled due to the time saved by running her kitchen on biogas. The community in Bagepalli has pioneered the use of renewable energy in its daily life thanks to the biogas Clean Development Mechanism (CDM) project started in 2006.*

Page 16 © Greenpeace
*A trash-filled river is seen in Barangay Bagumbayan North in Navotas City, Philippines.*

Page 18 © Greenpeace
*In occasion of World Clean Up Day Greenpeace Africa, along with Break Free From Plastic movement, organized cleanup activities and brand audits on 5 continents and inspired people to participate. The brand audit results will put the spotlight on big brands and hold them accountable for their contribution to the plastic pollution crisis.*

Page 21 © Marco Garcia / Greenpeace
*Campaigners visit James Campbell National Wildlife Refuge on Oahu Island to document and bear witness to plastic pollution. Greenpeace is tracing plastic found in the ocean, communities, and shorelines back to the companies that produce it. The activity is part of Greenpeace visit with the Arctic Sunrise ship.*

Page 22 © Simran McKenna / Greenpeace
*Hurricane Harvey aerials. A refinery storage tank sits surrounded by flood waters in Baytown, Texas more than a week after Hurricane Harvey slammed into the area. The human impacts of Hurricane Harvey have been staggering, and the greatest concern is for the people struggling in its aftermath. This disaster makes clear once again that coastal Texas and the wider Gulf region are on the frontlines of sea level rise and extreme weather heightened by climate change, as well as the toxic impacts from fossil fuel infrastructure.*

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*Greenpeace Malaysia has been conducting a field investigation on the broken system of recycling and how it impacts Malaysian society. The findings were shocking: a new 'dump site' of plastic waste from more than 19 countries -- most of them are developed countries. The investigation found illegal practices, and blatant violations causing environmental pollution as well as harming people's health conditions.*

Page 24 © Soojung Do / Greenpeace
*The market, which aims to be zero-waste, requires the sellers to bring products with no single-use plastic packaging and to encourage the up-cycling of items.*

Page 25 © Jung Park / Greenpeace
*Seoul office created 'Plastic Zero Grocery store map' with volunteers in April and 'Mangwon market' is one of the places in the Map. In this traditional market, people can purchase many items with their own carrier bags to avoid plastic package. Also, this market runs a campaign called 'Almaeng' meaning packaging free. The market tries to encourage people to shop without plastic bags in many ways such as rending eco-bags for free and providing discount coupons once customers bring their own containers.*

Page 26 © Isabelle Rose Povey / Greenpeace
*Carrots with no packaging for sale in a supermarket.*
*Waitrose supermarket Unpacked scheme offers customers a range of unpackaged products with the aim of saving thousands of tonnes of unnecessary plastic. Refillable zones have dispensers for customers to refill their own containers.*

Page 33 © Greenpeace
*Merci Ferrer walks on a dumpsite in Dumaguete City, Philippines.*

Back cover © Ecoton / Fully Handoko
*People collect plastic scraps and paper to take to a local factory, where it is burned as fuel. One small truckload earns 10 USD. Bangkun Village, Pungging District, Mojokerto Regency.*


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