THE Ethical CORPORATION MAGAZINE

PLASTIC WASTE BRIEFING

July 2023

Inside the global battle to turn the tide on the plastic waste epidemic

CAN WE SAVE OUR SEAS?

- Tyre-makers feel heat over microplastics
- To fix recycling, first turn off the plastic tap
- The rocky quest for truly sustainable packaging

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Welcome to the July 2023 issue:

Plastic waste briefing

After a nail-biting couple of days in Paris, there was relief when 170 countries gathered to discuss a legally binding pact to curb plastics pollution agreed to develop a first draft ahead of the next negotiations in Nairobi in November.

Among them, a "high ambition coalition" of 60 governments called for legally binding rules for plastics across their entire lifecycle, from production, to product design, to waste management.

They were supported by the Business Coalition for a Global Plastics Treaty, convened by the Ellen MacArthur Foundation and WWF, and endorsed by more than 100 organisations.

The urgency of a treaty cannot be under-estimated, with between nine and 14 million tons of plastic waste ending up in oceans every year, threatening marine ecosystems and entering global food chains, a tide of plastic that is projected to triple by 2040 without intervention, equal to 50kg of plastic per metre of coastline worldwide.

As WWF special envoy Marco Lambertini pointed out: "Over the past five years, the number of national and voluntary actions to tackle the problem has risen, yet plastic pollution has simultaneously continued to increase by 50%, underlining that common rules for all countries is the only way forward in combating plastic pollution."

According to the Breaking the Plastic Wave report by Systemiq and The Pew Charitable Trusts, more than 800 species are already known to be affected by marine plastic pollution, including all sea turtles and 44% of marine bird species, while the social and environmental impacts of marine plastic could be as high as $2.2 trillion per year.

With chemical companies the world over investing hundreds of billions of dollars in new plastic factories, even if all current major industry and government commitments were met, the report said, there would only be a 7% reduction in annual rates of plastic pollution flowing into the ocean.

That's because some key initiatives, such as the EU's single-use plastics directive, are too narrowly focused, while industry commitments, like the ›

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CHERYL RAVELO/REUTERS

New Plastics Economy Global Commitment and the Alliance to End Plastic Waste, are primarily focused on post-consumer waste in low-leakage countries, rather than upstream solutions such as elimination, reuse and new delivery models.

"In effect, plastic production is becoming the new engine of growth for a petrochemical industry potentially facing declining demand for oil in transportation and energy, raising concerns about the creation of a 'plastic bubble' whereby new investments risk becoming stranded assets," the report warned.

Yet the situation could be turned around. If the world were to "apply and robustly invest in all the technologies, management practices, and policy approaches currently available, including reduction, recycling and plastic substitution, in 20 years there would be about an 80% reduction from the current trajectory in the flow of plastic into the ocean."

In this month's issue of The Ethical Corporation magazine, we dive deep into the plastic waste epidemic, looking at the agenda for sustainable business across the entire value chain.

Angeli Mehta explains the Wild West environment that surrounds plastics recycling and why, despite all the pledges to use more recycled material, it still only makes up a tiny fraction of new plastics manufacture.

She also looks at how the tiny Greek island of Tilos is striving to become the first zero-waste island.

Mike Scott focuses on efforts to lift recycling rates among consumers, with clearer labelling, deposit return schemes and pay-as-you-throw measures.

He also looks at how limited take-up of TerraCycle's Loop reuse platform, launched with great publicity four years ago, illustrates how the second R in the waste hierarchy, reuse, barely gets a look-in from brands and will struggle to get to scale.

Mark Hillsdon reports on innovative projects in Indonesia, India and Brazil to improve the livelihoods of the waste pickers who are supplying brands such as The Body Shop and L'Oreal with recycled plastic.

Microplastics are most closely identified with the fashion industry and plastic pellet production, but as Sarah LaBrecque reports, the tyre industry is the leading contributor, and the switch to electric vehicles is only making matters worse.

Catherine Early looks at the market penetration of bioplastics, and finds that biodiversity and recyclability concerns are leading brands to recalibrate plans to replace virgin plastic with bio-based materials.

With companies turning to paper in their flight from plastic, she also reports on Canopy's Pack4Good initiative, which is seeking to avoid the unintended impacts on the world's dwindling forests.

I report on how Mura Technologies is looking to create a true circular plastics economy with its first commercial-scale plant in the UK, a startup trying to stop Iceland's plastic waste exports, and how Tetra Pak is seeking to replace the aluminium in its aseptic packaging to crack its recyclability challenge.

And we end the magazine with a comment from Cate Lamb, global director for water security at CDP, on why companies need to report transparently on their plastic risk to combat widespread greenwash over plastic reduction claims.

In August we will be reporting on another tough question, how to make green the new black in the fashion industry. ●

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NET ZERO EUROPE 2023

6th – 7th September **London**

Decarbonising Corporate Europe

Key metrics:

200+	40+	60%	70%
Attendees	**C-suite & Executive Speakers**	**Senior Leaders**	**Corporate Attendance**

Top speakers:

Christopher Hook
Global Head of Sustainability

Uber

Karin Svensson
Chief Sustainability Officer

VOLVO

Adam Elman
Head of Sustainability EMEA

Google

Rodney Berkeley
Director for Sustainability & Infrastructure

Department for Business & Trade

Marisa Drew
Chief Sustainability Officer

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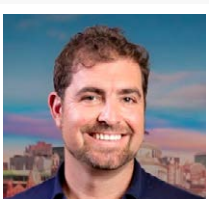

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NET ZERO USA 2023

2-3 October, 2023 **New York**

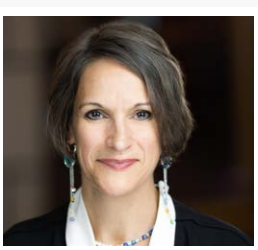
#NetZeroUSA

Decarbonizing Corporate America

Key metrics:

250+	60+	20+	22+
Attendees	**Expert Speakers**	**Sessions**	**Hours Of Networking**

Leading Net Zero speakers attending in October...



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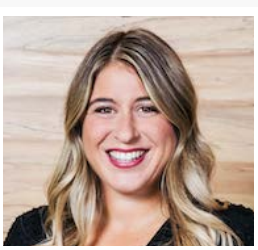
Chris Fox
Chief Sustainability Officer

HANES Brands SUSTAINABILITY



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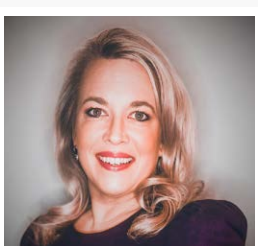
VP Sustainability

WHOLE FOODS



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ERIC GAILLARD/REUTERS

A marine biologist looks at a sea sample taken from the Mediterranean off the coast of France as part of a study into microplastics.

ALL AT SEA
in an ocean of toxic chemicals

Angeli Mehta reports on the complex challenges that mean just 9% of plastics are recycled

Recycling is promoted as a solution to the plastics crisis engulfing humanity, but despite all the pledges to use more recycled material, it still only makes up a tiny fraction of the feedstock for plastics manufacture, and just 9% of plastics are ultimately recycled.

There are two imperatives for improving on this: cutting the greenhouse gas emissions associated with plastics manufacturing – put at 3% of global emissions – and ending waste.

But recycling plastics is not straightforward, and many polymers can't easily be transformed back into their building blocks for a closed loop. As a result, they are burned, landfilled or dumped.

In June, negotiators working to agree a global plastics treaty met in Paris to discuss measures to ›

end plastics waste, ranging from cutting production to waste management. Not unsurprisingly, the plastics industry thinks measures should be taken downstream, but as Yoni Shiran, who leads on plastics for consultancy Systemiq, puts it: "There's a wide recognition, certainly for most countries, that we need to be holistic in this approach. The solution here is much more complex than any one part of the value chain, or any one solution, or any one country."

Shiran co-authored a U.N. Environment Programme report ahead of the negotiations that proposed a complete systems overhaul to eliminate problematic and unnecessary plastics, expedite reuse and recycling and encourage sustainable alternatives. Such shifts could cut the outflow of mismanaged waste by over 80% by 2040, the report said, but they require strong and enforced global regulation – something a business coalition of more than 80 organisations has called for. A "high ambition coalition" of governments, now numbering 60, has committed to developing a legally binding instrument to address the whole lifecycle of plastics.

JILL GRALOW/REUTERS

A scientist uses tweezers to find microplastics.

> **The solution is more complex than any one part of the value chain, or any one solution, or any one country**
>
> **YONI SHIRAN, Systemiq**

Plastics get labelled by polymer type, such as the ubiquitous PET (polyethylene terephthalate) used for water bottles, but they're actually a complex mixtures of chemicals that can include processing aids, colourings, flame retardants and plasticisers, along with unintentional additions during manufacturing or use that can impact recycling.

PET trays, for example, can't be put in the same recycling stream as PET bottles because they contain a wider range of chemical additives. Mixed layers of different plastics can't be recycled because they resist separation.

The constituents of plastics are a closely guarded secret that requires detective work to unravel. At present a team at the U.S. National Renewable Energy Laboratory (NREL) is trying to identify additives in over 20 commodity plastics.

'CHEMICALS OF CONCERN'

Other researchers have identified upwards of 10,000 chemicals that may have been used in plastics production. Aside from their effect on recycling, we're also coming to realise that many impact the environment and human health, because they can leach out during the plastics lifecycle. These "chemicals of concern" can disrupt hormones, cause cancers and poison humans and other organisms. But the science is evolving, and safe levels (if any) aren't clear. Even where the science is beyond doubt, such as on persistent organic pollutants (POPs) regulated under the Stockholm Convention, some are exempted for use in plastics.

Shiran suggests that ultimately legislation will be needed to force transparency around the chemicals used, including processes and volumes, as well as to proscribe unsafe chemicals. "Many of the companies who are selling the stuff don't know, exactly. So, they're also asking about regulations. Sometimes (they're) asking people at Systemiq or others, 'please tell us which chemicals of concern should we just phase out of our supply chains and which not', because they're confused."

He adds: "It's all a massive confusion, partly maybe even intentional confusion, because some people benefit from this confusion." Getting a definitive list of substances to be banned is going to be difficult ahead of a treaty next year, but an evolving list could be updated over time as we learn more about what to restrict. ›

A new report from Greenpeace highlights research that concludes that toxicity can build up in recycled plastics, either through contamination or as a result of the recycling process itself. The Organisation for Economic Co-operation and Development (OECD) has begun to look at the chemical content of recycled plastics to assess what happens when different materials are mixed and whether additional chemicals are introduced during use.

The automotive industry – a major user of plastics – is possibly the farthest forward in understanding the materials used in manufacturing, with an International Materials Data System and a global database of hazardous materials.

When it comes to the plastics industry, an umbrella body, the International Council of Chemical Associations (ACCI) is developing a database of additives that will detail applications and existing scientific assessments. It also plans a risk assessment framework for additives. The aim is to have both ready by the end of treaty negotiations next year. The work will be shared with regulators.

RECYCLING BY DESIGN

There is a big difference between a material being theoretically recyclable and being designed to be recycled in practice. The Ellen MacArthur Foundation suggests that for recycling to happen at scale, at least 30% of a material needs to be recycled across a population of 400 million people (about the size of the EU).

That means streamlining the polymers we use to get scale, says Shiran. "Right now, it's the Wild West – people use any polymer, any additive, any colour, any size, any shape."

The Consumer Goods Forum has developed "golden design rules" such as using only transparent or uncoloured PET, reducing plastic over-wraps and removing PVC, fibres and aluminium foil from flexible packaging, while the OECD has developed design guidance for manufacturers, including additive considerations.

At a recent webinar, Ann Tracy, chief sustainability officer at Colgate-Palmolive described how it opted for HDPE (high density polyethylene), commonly used for plastic milk bottles and which can be ›

Bottles made from PET on a conveyor at a recycling plant in Switzerland.

REUTERS/ARND WIEGMANN

COLGATE-PALMOLIVE

Colgate-Palmolive opted for HDPE for its recyclable toothpaste tubes.

In Europe just 17% of PET bottles put on the market end up recycled into new bottles. Far more ends up in textiles, which will not be recycled

recycled (potentially up to 10 times) to replace the multiple layers of different plastics used to make its toothpaste tubes. "It took quite a few years to get it right, because (HDPE is) a rigid plastic, and we had to make it feel like a tube," Tracy said.

Significantly, Colgate-Palmolive has shared the technology with competitors, with the aim of having three out of four toothpaste tubes recyclable by 2025.

Ideally, plastics would be mechanically recycled, which means they are broken down and reformed into pellets for processing back into plastic. It's the least expensive process in terms of infrastructure and energy requirements. Researchers at NREL find mechanical recycling of the most widely consumed polymers, including PET and HDPE, comes out ahead of chemical processes, in terms of economics and environmental impact, on one cycle.

But there are quality implications, with many plastics being "downcycled", and material losses including in the form of microplastics, which get washed into watercourses.

And even PET, which in theory can be mechanically recycled many times, isn't. In Europe, just 17% of PET bottles put on the market end up as recycled content in new bottles. Far more ends up in textiles, which will not be recycled. Consultancy Eunomia estimates the recycled content of PET bottles could improve to 75% with greater use of deposit return schemes, encouraging manufacturers to switch to clear PET, and by making closed loop recycling a priority.

The industry has been investing in so-called "advanced recycling" techniques of pyrolysis and gasification, which use high temperature and pressure. These require large amounts of energy and emit greenhouse gases and pollutants, while the output typically doesn't get used to make new plastics. The NREL researchers assessed them as having 10-100 times the economic and environmental impact of virgin polymer production.

In May, seven chemicals companies in the World Economic Forum's Low-Carbon Emitting Technologies initiative – BASF, Covestro, Dow, Mitsubishi Chemical, SABIC, Solvay and LyondellBasell – signed an agreement with the Dutch independent research organisation TNO to establish an R&D Hub for Plastic Waste Processing. ›

PURECYCLE

The hub will focus on developing new technologies for waste processing with a lower CO2 footprint and greater levels of plastic waste recycling.

EMERGING SOLUTIONS

The most promising chemical recycling processes are only now coming out of the lab. But "there's no one technology to rule them all. All of them have trade-offs, all of them might be good for one thing, but not so good for another," says NREL lead researcher Taylor Uekert. "We need to collaborate, to figure out how we can most optimally combine these technologies to tackle the problem."

Some solutions are emerging. In June, U.S.-based PureCycle was due to begin testing the first resin produced at its polypropylene recycling plant in Ohio. The first off taker will be Proctor & Gamble, whose scientists developed the solvent technology.

PureCycle estimates its process uses 79% less energy and will produce 35% fewer carbon emissions than for new polypropylene production. Its solvent is recovered and re-used. Crucially, the process doesn't break down the polymer chain, but just how many times the resin can be recycled depends on what happens in subsequent processing.

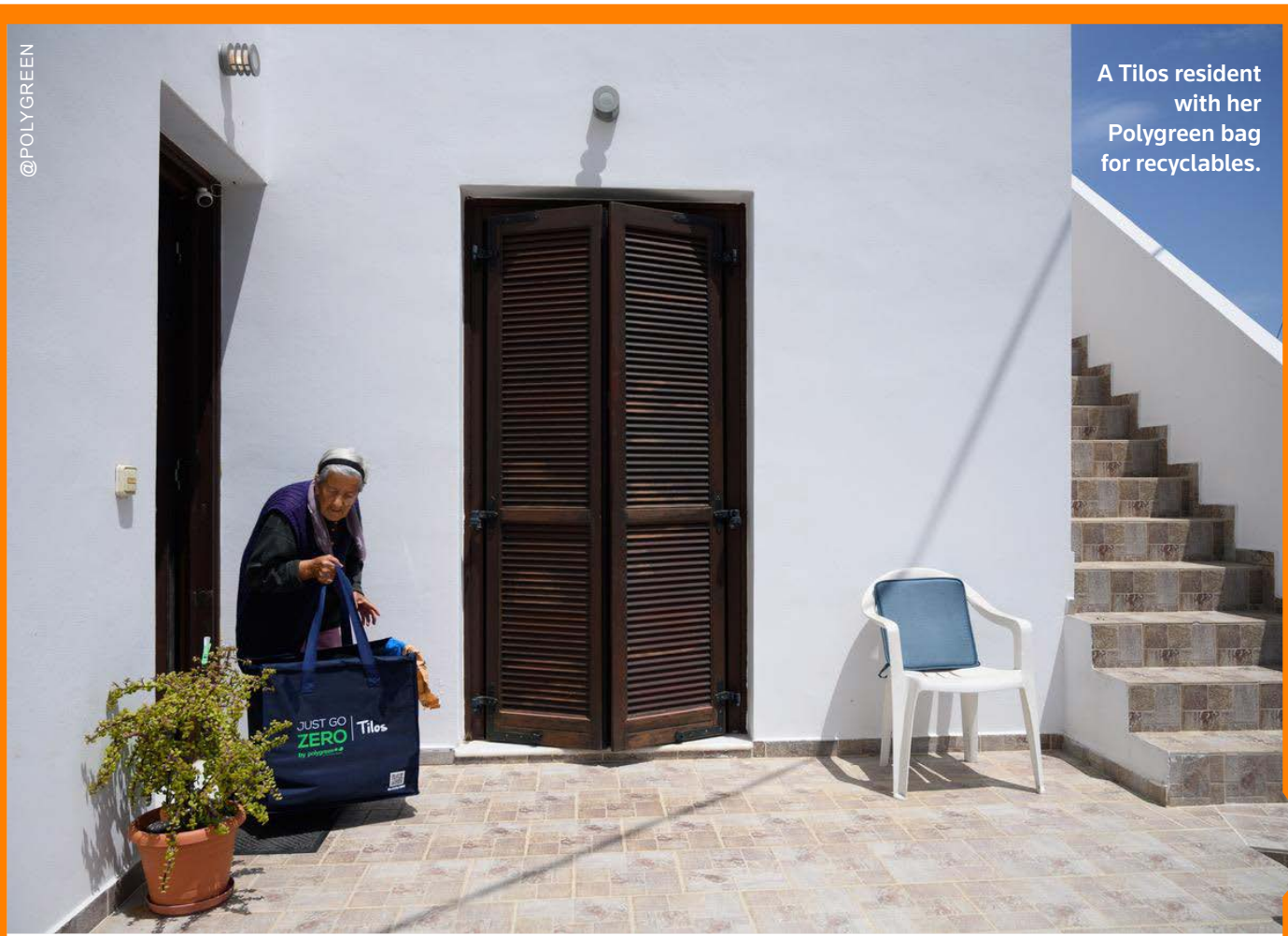
Two European firms are focused on returning PET to its original building blocks for repeated recycling from PET bottles or textiles without losses in quality. France-based Carbios has developed an enzyme process to break down the polymer and aims to have the first industrial scale plant in operation in 2025, with backing from Indorama Ventures, a recycled PET resin producer. Carbios says its process results in a 51% reduction in carbon emissions compared with the manufacture of new PET.

U.S.-based PureCycle wil be producing resin at its polypropylene recycling plant in Ohio.

Dutch firm Ioniqa has built a 10,000 tonne plant to demonstrate its solvent technology, which turns all types of PET applications back into the monomers. It claims the process emits 75% less emissions than manufacturing PET from oil. Ioniqa is working on expanding its process to other plastics.

Recycling alone can't solve the plastics crisis. As UNEP's report makes clear, other necessary steps involve eliminating problematic and unnecessary plastics, as well as avoiding the use of plastics through re-use or refill models. Streamlining the types of plastics that remain would generate economies of scale as well as make sorting for recycling easier. That would also keep the carbon locked up if the industry is to meet its climate obligations.

Angeli Mehta is a former BBC current affairs producer, with a research PhD. She now writes about science, and has a particular interest in the environment and sustainability. @AngeliMehta.



A Tilos resident with her Polygreen bag for recyclables.

How a tiny Greek island is throwing out the concept of waste

For Athanasios Polychronopoulos, founder and chairman of Greece-based circular economy specialist Polygreen, the word "waste" is an anathema.

"The existing waste model is a cancer to our society. I'm using this word deliberately," he says. "In 10 or 15 years' time we'll look back at what we did and ask: why did we throw (away) all these valuable materials?"

His company has just implemented a zero-waste project on the tiny Greek island of Tilos, and is looking to prove that it can scale in the United Arab Emirates, which is aiming for zero waste by 2030.

Polygreen took away all public bins on Tilos and painstakingly showed households and businesses how to sort their waste into recyclables, organic waste and non-recyclables. An app provides feedback on how much each household has produced and whether they've put materials into the correct bins.

This programme of behavioural change has produced dividends: over the course of the past year, the 745 residents of the Aegean island have reduced their waste by almost 40%, compared with what they produced before Polygreen arrived. Just 12.6% of it is non-recyclable, but Polygreen wants to get that down further, to 5%.

At the local recycling centre, materials are sorted into 25 streams – so well sorted and compressed that they have a value. The islanders benefit from free compost made from their organic waste, while the non-recyclable materials, such as used toilet ›

Polygreen workers carry out the daily collection of recyclables on the tiny Greek island.

roll and disposable nappies, get dried and shredded to become fuel for cement kilns. In Greece, this is the only industry licensed to receive such treated waste, and is obliged to filter pollutants before they reach the atmosphere.

Polychronopoulos attributes the success of the initiative to three factors: "If you give them (the islanders) a service with respect, they respect you. If you are consistent, they will believe in you. If you are transparent, they will become your allies."

The big question is whether his model can work on a bigger scale. The first step is to take the initiative to some 150,000 people in a district of Abu Dhabi. Polygreen plans to train locals, who will in turn train households, drawing on management expertise from the international business school Insead, and even on virtual reality.

Household bins will be weighed, and again citizens will get data via an app. "We'll slowly educate people to produce less waste, to produce better recyclables and then, through the app, we'll also introduce them to products that are reusable," says Polychronopoulos.

He's discussing potential measures with the government that could support its activities, such as increasing landfill taxes and fines for dumping waste.

Atalay Atasu, a circular economy specialist at Insead, is working with the company to investigate scale-up from a situation where Polygreen can talk to households individually and build relationships, to one where that's impossible.

"There are many layers to the plastics waste problem. What this company is doing is attacking it at the source to change consumer behaviour," says Atasu. "The consumer has to be part of the solution."

That doesn't mean businesses don't have a responsibility to redesign their products and to build recycling infrastructure, but "you need to find a way to create incentives for consumers to reduce waste and to sort waste properly, so that efficient processing can happen and you maximise recovery rates so you retain value in a circular system". The other issue is who pays for the reduction in quantities of waste?

What it takes for the Polygreen business model to make economic sense, however, is an open question. "I would like to see this business model become economically viable everywhere," says Atasu. "It's better for the environment."

Angeli Mehta

Mura looks to create 'true circular plastics economy' with first UK plant

Advanced plastic waste recycling technologies, such as pyrolysis and gasification, are touted by the chemicals industry as the solution to the ever-growing plastic waste epidemic, because they can tolerate mixed plastics and films, which can't be handled through traditional mechanical recycling.

But their heavy energy usage, emissions of toxic pollutants, and low levels of conversion into new plastics have put a question mark around their environmental credentials. (See All at sea in an ocean of toxic chemicals)

A UK company, Mura Technology, is aiming to change all that with a technology that uses water heated to supercritical temperatures to break down the bonds in waste plastic, instead of combusting the plastic itself.

The company's first commercial-scale plant, at Wilton on Teesside, will open later this year, recycling an initial 20,000 tonnes per year of plastic waste, such as films, pots, tubs and trays, which are currently sent to landfill or incinerated.

The company claims the process creates a "true circular plastics economy" because the oils derived from the waste can be used to produce new food-grade plastic, with no limit to the number of times it can be reprocessed.

Geoff Brighty, the UK company's chief sustainability officer, told a recent conference in London that Mura's HydroPRS technology works in a similar way to pyrolysis, which is the thermal processing of a substance in the absence of air. But instead of applying heat directly to plastics, it heats water under supercritical conditions to crack the polymeric material in plastic back into short-chain hydrocarbons. "You aren't creating a char or a waste material, meaning we have very high conversion efficiencies (high 80s or maybe even low 90s) and you are putting less energy into the system," said Brighty.

A lifecycle assessment by the European Commission's Joint Research Centre this year found that HydroPRS had a global warming potential about 50% lower than pyrolysis, and 80% lower than incineration. Researchers at the University of Warwick, found that the process doesn't create the same harmful byproducts, such as dioxins, "and helps to maximise higher product yields" of recycled plastics.

"By diverting plastics from energy from waste," Brighty said, "we estimate a net saving of 1.8 tonnes of CO2 for every tonne we process."

The system is tolerant of mixed, contaminated plastic waste, including polystyrene and agricultural plastic waste.

"Millions of tonnes of plastic waste in this country go to incineration each year," Brighty said. "We want to change that. The point is to complement the existing mechanical recycling infrastructure by diverting it away from energy from waste."

Besides producing different grades of plastic, one byproduct of the process is a heavy wax residue, the result of stripping off the waxes in waste plastic packaging.

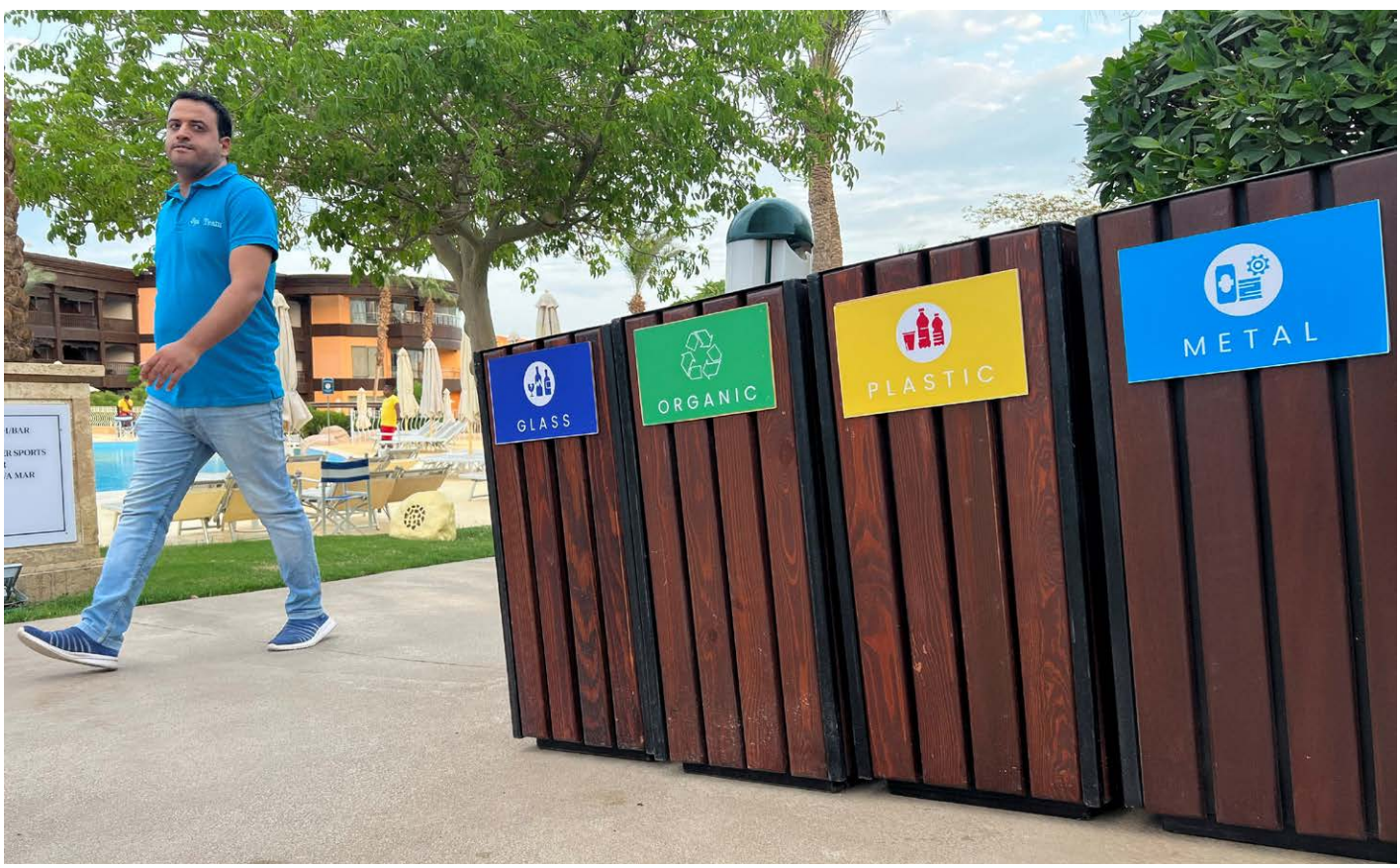
"It's effectively a bitumen binder that can be used to decarbonise road-making," said Brighty.

Mura has partnered with large chemicals companies including Dow and Chevron Phillips Chemical, which has an equity stake, and has a pipeline of projects in Europe and the U.S, with four 100,000 tonnes per annum sites under development in Germany and four of the same capacity under development in the U.S. It has also licenced Mitsubishi to use its technology. By 2025 the company says it will have 1 million tonnes of capacity in operation or being constructed globally.

Terry Slavin

To tackle plastics waste, we need to get consumers on board

Mike Scott reports on efforts to lift recycling rates with clearer labelling, deposit return schemes and pay-as-you-throw measures

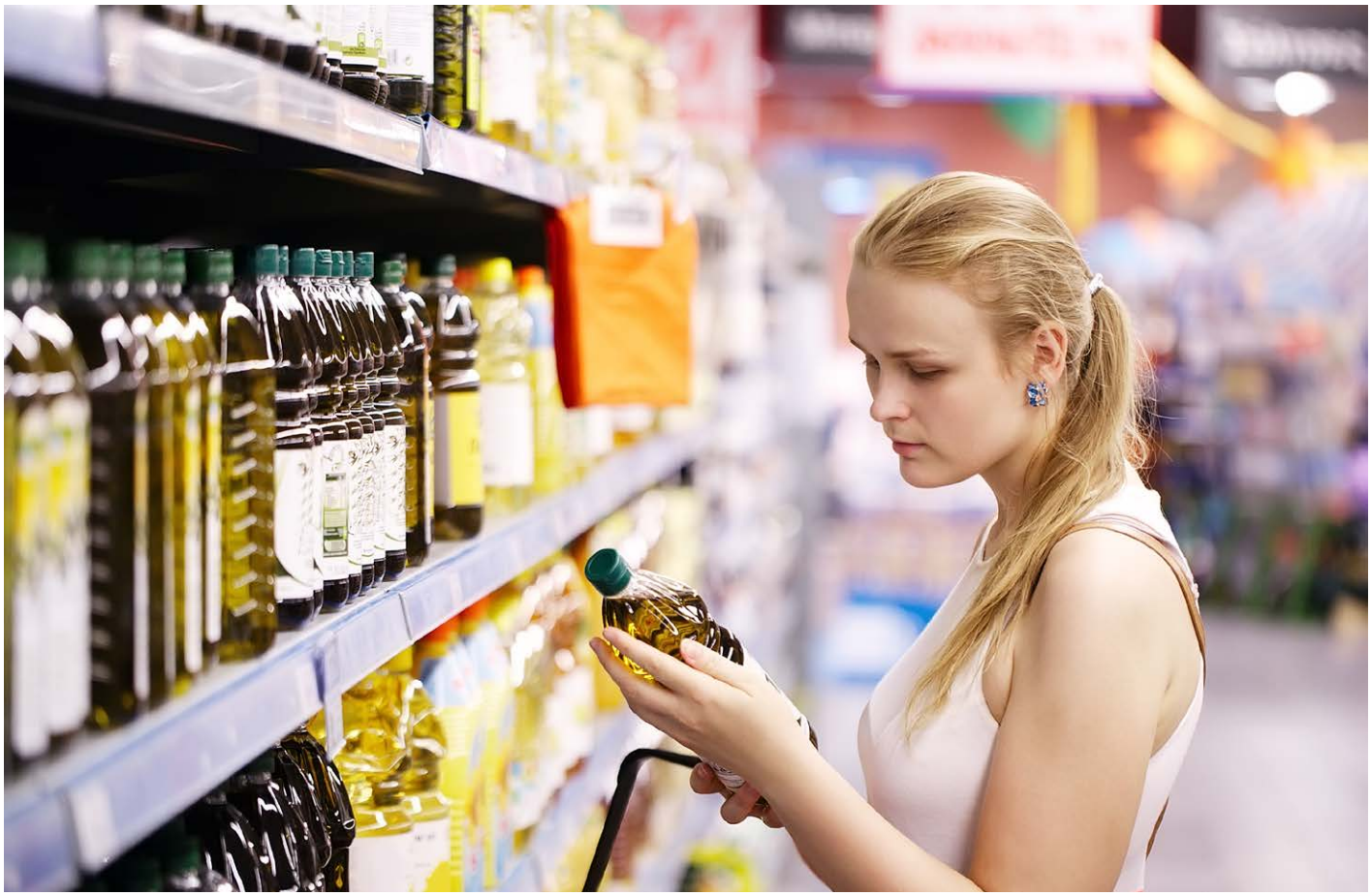


REUTERS/SAYED SHEASHA

Almost all plastic packaging finds its way into the hands of retail consumers, so they will be an essential part of efforts to increase dismal rates for plastics recycling, which vary from as low as 4.5% in the U.S. to 32.5% across Europe and 44.2% in the U.K.

Consumers are increasingly aware of the environmental issues around plastic, thanks to TV programmes such as Blue Planet and publicity about issues such as ocean plastics and the Great Pacific Garbage Patch. According to Trivium Packaging, 79% of consumers are looking for products that come in sustainable packaging, and 63% claim they are less likely to buy products with packaging that is harmful to the environment.

But they are often confused by the wide range ›



D13/SHUTTERSTOCK - WOMAN

of sustainability callouts, labels and features on products. The first step is to identify which products are best suited to reuse and refill. Here, on-pack labelling is key.

Chris Williams, chief executive of ISB Global, a provider of waste management software, said there's a need for more transparent pack labelling. "Unfortunately, misleading labels confuse the public about what can be recycled, often leading to incorrect or no action – such as using black bin bags as a default option."

This was backed up by research this year for the UK's OPRL (On-Pack Recycling Label) scheme, with more than half of 5,000 consumers surveyed saying they cannot always understand whether packaging can be recycled.

"Our survey showed that 42% of those who are unsure about recyclability will take a guess. This means that items are placed in recycling containers where they may contaminate the recycling stream," said Margaret Bates, executive director at OPRL, which provide recycling and refill labels to 95% of the UK groceries market.

"Another 22% of our respondents told us that when they are unsure, they choose not to recycle. In both these cases, potentially recyclable packaging is falling through the gap, for want of clear information."

Recycling needs to be simpler, much more widely available and the default option for consumers, says Jayne Paramor, strategic technology manager for plastics at WRAP, the Waste Reduction Action Programme. "The complexity of materials in the system has been a big challenge for many years," says Paramor. "Industry recognises that it's their job to make changes and tell consumers what they need to do with the material. ... We need to eliminate (the use of) plastics that are difficult to recycle."

One of the most effective methods of boosting collection rates of recycling plastics is through ›

Nearly 80% of consumers look for products that come in sustainable packaging.

> **Our survey showed that 42% of those who are unsure about recyclability will take a guess, potentially contaminating the recycling stream**
>
> MARGARET BATES, OPRL

deposit return schemes (DRS), says Regina Mestre, packaging and logistics analyst at Rabobank. "In European countries with DRS, the average return rate is above 90%. In Germany, where the scheme collects glass, plastic and aluminium, it is 98%."

Such schemes, which pay consumers to return empty packages, are important for producers in the EU, where new rules require them to use an increasing proportion of recycled plastic in their containers, because they increase the supply of material that can be recycled. The EU says single use beverage bottles must include 30% recycled material by 2030, increasing to 65% by 2040. Many producers have complained that they are unable to produce 100% recycled plastic because there is not enough supply, in part because high energy prices have increased the cost of recycling.

Innocent Drinks chief executive Nick Canney, speaking on a panel at Reuters Events Responsible Business Summit in June, said lack of supply and high prices for recycled PET led the company, which is a B Corp, to pull back from a plan to double the proportion of recycled plastics in its bottles to 100% from 50%, and spend the money on other sustainability initiatives. "The cost (of recycled PET) is very, very high and I'm not even sure there's enough of it around." (See Meet the world's unsung environmental stewards: waste pickers)

Raffi Schieir, director of Bantam Materials and Prevented Ocean Plastic, which produces a recycled plastic material of the same name, says: "One of the key things required in our discussion about plastic waste is a change in mindset and the way this material is perceived. By giving value to plastic waste, we make it a resource worth investing in, not just something to be discarded or sorted into bins according to inconsistent council guidelines."

WIKIMEDIA COMMONS

The UK, however, has managed to turn DRS into a political hot potato, with the government opposing plans in Scotland to include glass bottles in its deposit return scheme, and requiring that parts of the Scottish scheme align with schemes planned for the rest of the UK, which are much further away from fruition. As a result, the Scottish scheme has been delayed until at least October 2025.

The EU is looking to boost its plastic recycling rates, partly through new Extended Producer Responsibility (EPR) rules, which state by 2026 all packaging must say either "Recycle" or "Do not recycle". The bloc has a target that 65% of waste be recycled by 2025, rising to 70% by 2030, The UK has a target of 65% by 2035 under its own EPR regulations.

RETAILER RECYCLING

Many retailers are increasing the amount of waste they take back in store, including previously unrecyclable soft plastics. In the UK, for example, supermarkets from Waitrose to Aldi now provide drop-off points where customers can deposit packaging ranging from crisp packets to cling film. The plastic that Waitrose collects is sent to a processing plant and turned into new products such as shrink wrap, rubbish sacks and plastic furniture. ›

REMO CASILLI/REUTERS

A plastic bottle deposit machine in a metro station in Rome, Italy.

Williams of ISB Global, says that "this is a significant change because it puts an additional obligation on organisations to collect, reuse, recycle and dispose of packaging materials".

Many municipalities around the world, including more than 7,000 in the U.S., have introduced pay-as-you-throw (PAYT) waste policies, which mean householders pay for each bin they put out for disposal, according to the World Economic Forum. Examples include Seattle, Berkeley, Austin and Portland, Maine.

Such tools are highly effective, the WEF adds. In Massachusetts, for example, towns with pay-as-you-throw systems generated 30% less waste per household in 2020 than towns that didn't use this approach.

However, the WEF warns that "this strategy can be controversial at the start. Even though everyone already pays for trash collection and disposal, either through their rent or local property taxes, pay-as-you-throw can feel like a new tax when it is broken out and charged separately."

Williams agrees: "Introducing PAYT schemes will concentrate people's minds on the amount of waste they produce, leading to better consumer habits and a measurable reduction in waste." Williams adds. "Schemes are already in place in some areas, and it's likely that they are being considered elsewhere. Introducing these schemes, alongside rebate schemes for recycling, will motivate people to recycle more and throw away less."

The scale of the plastics problem is so huge that we need an "all of the above" approach that addresses consumers when they are shopping, in store or at home, as well as when they come to dispose of their waste. We need to replace plastic where possible with more sustainable choices, reduce the amount that is used when there is no alternative and give consumers clear information about what material is being used and how it can be recycled, reused or returned at the end of its life.

Mike Scott is a former Financial Times journalist who is now a freelance writer specialising in business and sustainability. He has written for The Guardian, the Daily Telegraph, The Times, Forbes, Fortune and Bloomberg.

TETRA PAK

Tetra Pak trials removing aluminium layer in bid to crack recyclability challenge

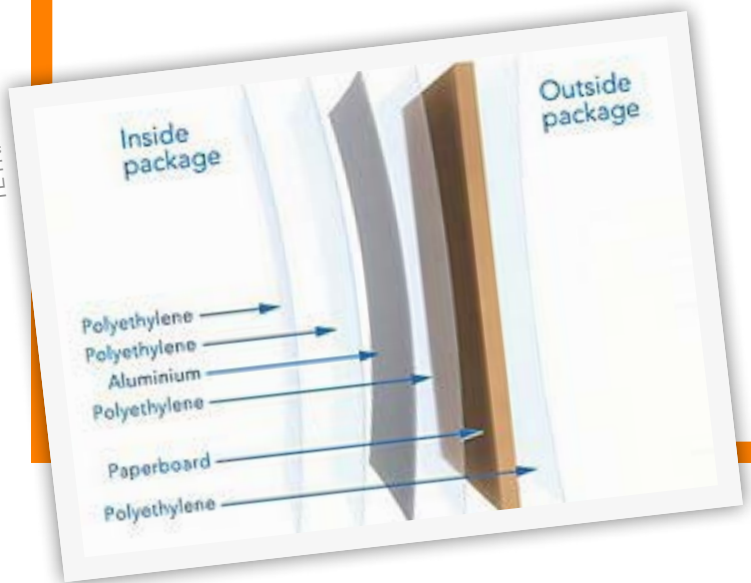
Ask a municipal recycling authority what part of the waste stream is trickiest to handle, and there's a high chance you'll get a two-syllable response: Tetra Pak.

The Swedish-Swiss drinks packaging giant produced a mind-boggling 193 billion of its ubiquitous cartons last year, but despite on-pack labels in many markets saying its packages are recyclable, globally only about a quarter of them were actually recycled, meaning that three in four ended up in landfill, incineration or washed up in the world's waterways. Even in recycling king Europe, the recycling rate averaged only about 50%.

Raquel Noboa, chief executive of Irish environmental education consultancy Fifty Shades Greener, is one of many commentators who have been highly critical of Tetra Pak for failing to deliver on its recyclability claims. "The best thing we can do is avoid buying and disposing of Tetra Pak, where possible," she advises.

Tetra Pak points out that its aseptic processing and packaging technology has made it possible to protect perishable foods without refrigeration and enable even remote corners of the world safe access to nutritious food. But it has struggled to lift stubbornly low recycling rates due to its packages' multi-layered design, comprising paper, plastic and a thin layer of aluminium, which plays a critical food safety role.

In individual markets around the world, the ›



TETRA PAK

ERIC VIDAL/REUTERS

Tetra Pak cartons in a supermarket in France.

company has had to work with governments and local partners to come up with solutions, and recently announced a joint investment with Stora Enso to triple the annual recycling capacity of beverage cartons in Poland, from 25,000 to 75,000 tonnes. In the UK, for example, where it worked with individual councils, retailers and recycling specialist Sonoco to establish a specialised recycling facility in Halifax, only 45% of the local authorities in the UK that collect Tetra Pak for recycling at kerbside send them to the facility, leaving it vastly under-utilised.

Tetra Pak, whose long-term plan is to develop an aseptic package that is fully renewable, recyclable and carbon-neutral, has invested heavily in innovation – nearly 30 million euros last year and 40 million euros a year planned over the next few years – replacing plastic caps with biobased alternatives (See Brands put brakes on bioplastics over biodiversity and recyclability concerns) and recycled polymers, and increasing levels of FSC-certified cardboard.

But the layer of aluminium is the real sticking point when it comes to recyclability. That's why it was a big breakthrough when news came that Tetra Pak had conducted trials swapping out the aluminium layer of its packaging for paper and was planning to begin testing the new aluminium-free packages in the field.

"Technology verification in the field is going to happen very soon, though I can't disclose the market," Davide Braghiroli, the firm's director of packaging solutions, told The Ethical Corporation.

He said the innovation has been made primarily to reduce Tetra Pak's carbon footprint. Despite being thinner than a human hair, it contributes around a third of the packages' greenhouse gas emissions.

The company also believes that cartons with a higher paper content will also be more valuable for paper mills, since there will be a higher proportion of fibres for them to extract. The FSC-certified paper used in the new carton will be sourced from the same suppliers as the existing paper layer, but will be specially engineered as a barrier layer, Braghiroli says.

Research by Tetra Pak found that some 40% of consumers confirmed they would be more motivated to sort waste for recycling if packages were made entirely from paperboard and had no plastic or aluminium.

Asked her response to the latest innovation, Noboa commended Tetra Pak for efforts to make its packaging recyclable, but added.

"Innovation needs to concentrate on creating reusables only and eliminating any single-use items so we can reduce waste, not increase recycling. Recycling itself has been proven as a system that is currently broken, increasing the recyclability of any packaging will not reduce the strain our human actions are putting on nature." ●

Terry Slavin and Catherine Early

Customers at a station for refilling shower gel at a Body Shop store on Bond Street, London.

SIDDHARTH CAVALE/REUTERS

Can refill turn into a REVOLUTION?

Mike Scott reports on new research showing that consumers are keen, but without big brand buy-in circular packaging models have struggled to get to scale

One of the problems with plastics is that they are incredibly durable, yet they are often only being used once, meaning that the plastics mountain just grows and grows. This durability, however, also means plastics, and other materials such as aluminium, hold enormous potential to be reused or refilled.

"The benefits of refillable packaging are extensive, ranging from reduced material use, lower carbon emissions, decreased water consumption and enhanced palletisation efficiency," says Suzy Shelley, sustainability and materials lead at brand design agency Pearlfisher.

Products that are used multiple times a day, or those with high water content that could be removed for shipping and diluted by the user, are ideal for refillables from a sustainability standpoint, says Jo Barnard, creative director at industrial design consultancy Morrama.

New research from consultant and campaign ›

UNILVER

An aluminium refillable washing detergent bottle.

> **Despite an increasing number of reuse pilots, many are fragmented and not embedded in a business strategy that could lead to reuse at scale**
>
> ELLEN MACARTHUR FOUNDATION

group City to Sea and supply chain specialists Re says that consumers are also keen, with 69% of respondents likely or very likely to try products in returnable packaging if they are available where they shop.

More than half (53%) said they were more likely to buy from a brand that offered products in prefilled returnable packaging, rising to 84% among those that had previously bought products in returnable packaging.

But while a number of companies, including The Body Shop and L'Occitane, have introduced refillable aluminium bottles that can be refilled in store, such circular systems are far from being adopted at scale.

According to the Ellen MacArthur Foundation, reuse scarcely gets a look-in among the hundreds of companies that have signed the Global Commitment to have 100% "reusable, recyclable or compostable" plastic packaging by 2025. "Reuse ambitions remain limited, as very few brands and retailers have a reuse strategy in place. Despite an increasing number of reuse pilots, many are fragmented and not embedded in a business strategy that could lead to reuse at scale," it said in its 2022 progress report.

This lack of interest is seen in the slow uptake of TerraCycle's Loop prefillable service since it was launched in 2019, Loop has partnered with some of the biggest fast-moving consumer goods (FMCG) groups, as well as major retailers such as Tesco in the UK, Carrefour in France, Aeon in Japan and Walmart in the U.S., offering a limited range of its products in packaging that was designed to be reused 100 times or more, or be easily recycled. Consumers are incentivised to return the packaging because they pay a deposit. The products in the trial phase ranged from razors to orange juice, electric toothbrushes to tampons.

Focusing on prefills, rather than refills, gets around many of the issues, including hygiene, that have discouraged consumers from returning their empty bottles for refilling to the companies that accept them.

Under Loop, the customer buys a product, either online or in store, pays a small returnable deposit, and then returns the packaging via courier or to their nearest store to get their deposit back. The containers are then cleaned by Loop and refilled by the product manufacturer, ready to be sold again.

While Tesco ended a year-long trial of the platform online and in 10 UK stores last year, ›

Clemence Schmid, general manager for Loop Global at TerraCycle, said Loop remains present in 100 stores in Japan and 50 stores in France. Carrefour in France aims to increase that to 500 stores, while the partnership with Walmart in the U.S. is also being expanded, she said.

CONSUMER CONVENIENCE

TerraCycle has learned that the scheme is more effective if consumers can "buy anywhere and return anywhere", rather than having to return packaging to the store they bought it from, or only from home, says Schmid.

> **There is little incentive to get my washing detergent and shampoo delivered if I could get them cheaper at the supermarket when I'm shopping for groceries**
>
> **JO BARNARD,** Morrama

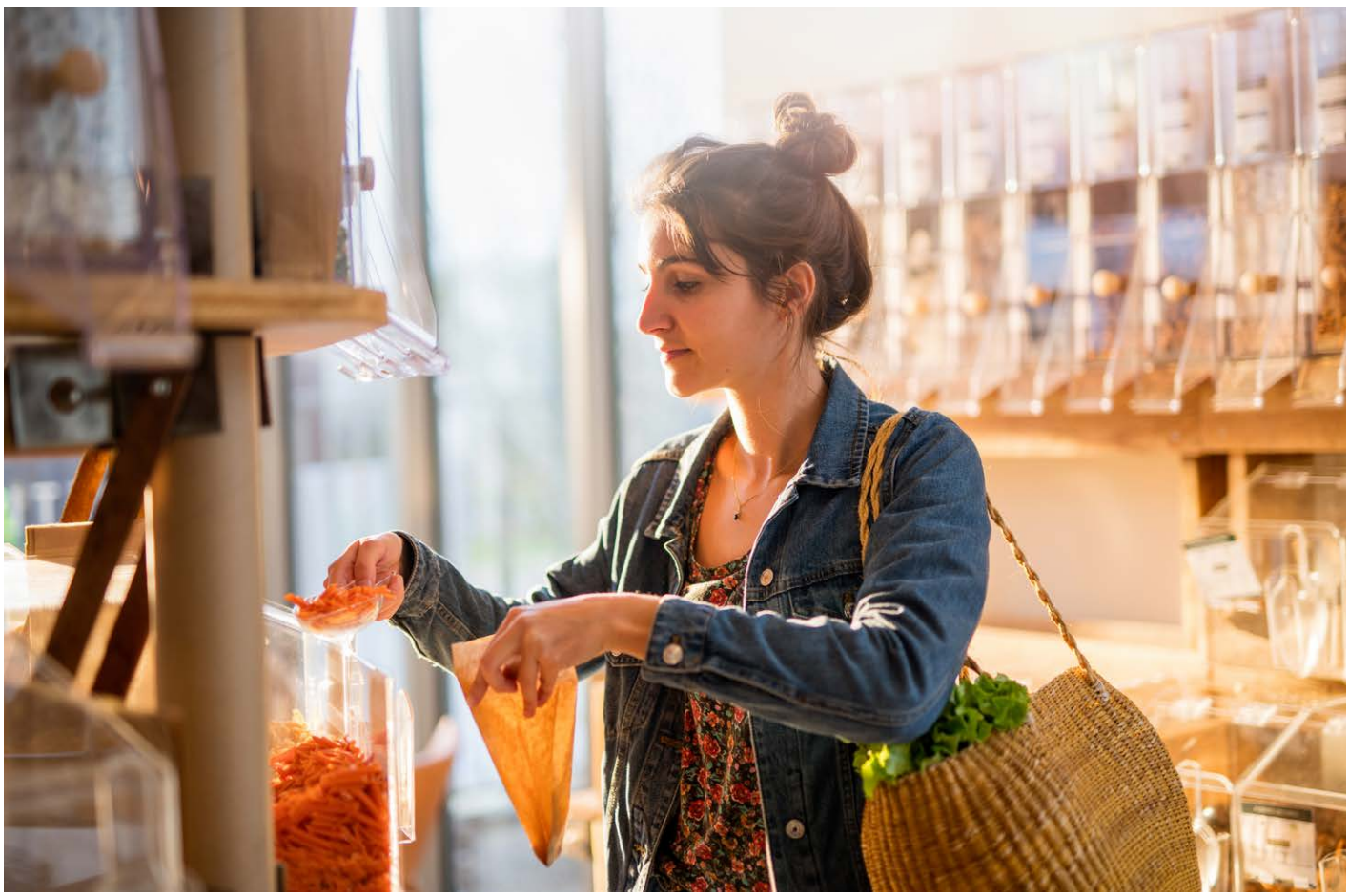
At the same time Tesco was trialling the scheme in the UK, McDonald's was partnering with Loop to pilot reusable cups in some locations. A Loop spokesman was reported as saying in 2020 that consumers could buy shampoo in reusable packaging at, say, Tesco and return it to McDonald's, and vice versa.

Tesco did not want to comment for this article, but in a report on the results of the Loop trial, Ashwin Prasad, the company's chief product officer, said "For a prefill packaging proposition to succeed as a genuinely accessible and affordable option in the long term, it will need scale."

The report said if all customers in its 10 pilot stores had switched their ketchup, cola and washing-up liquid purchase to the reusable Heinz Tomato Ketchup, Coca-Cola and Ecover alternatives, reusable packaging would be used more than two and a half million times a year, with vast implications for reducing plastic waste.

"We want to work out how to build an even better proposition that can better integrate the operational complexities of a reuse proposition into our business and enable us to achieve greater scale, as more customers become ready for it," the report said.

The key to successful reuse and refill programmes is that they must be convenient for consumers," ›



JACK FROG/SHUTTERSTOCK

Research suggests consumers are keen to buy refillable products or try returnable packaging.

TESCO

A Loop refilling station in a Tesco store. The company ended its trial of the platform online and in 10 UK stores last year.

says Ignacio Gavilan, director of sustainability at the Consumer Goods Forum.

Morrama's Barnard said the issue with Loop and other similar platforms is that the delivery, collection, cleaning and the cost of the more durable packaging are ultimately going to be passed on to the user.

"There is little incentive to get my washing detergent and shampoo delivered if I could get them cheaper at the supermarket when I'm shopping for my groceries. I believe in-store solutions are more likely to take off," she says.

"We are now used to taking reusable shopping bags to the supermarket, so it's not a big step to take refillable packaging. More and more stores are offering bulk refill options for cleaning products and dry food options at a lower cost than the packaged alternatives, so there is a clear incentive to the customer."

Products that are used multiple times a day, or those with high water content that could be removed for shipping and diluted by the user are ideal for refillables from a sustainability standpoint, she adds. "However, expected brand loyalty is also a key consideration. Toothpaste is a good example of a product that appears ripe for refillable packaging, but purchasing behaviour shows that we are not loyal to toothpaste brands and more often just choose whatever is on offer."

Homethings uses materials that dissolve in water for refill sachets.
HOMETHINGS

Nevertheless, there is a multitude of innovative products and services coming to market. Leveraging the fact that many household cleaning products are 90% or more water, companies such as Neat are offering reusable (and often non-plastic) dispensers along with concentrated refills. Users just add water at home, reducing the amount of packaging required, the weight of products to be transported and thus emissions from freight.

Brands such as Mack and Homethings are using materials such as PVA and PVOH, which dissolve in water, for refill sachets. Meanwhile, Modern Milkman, has just launched The Refillables, a range of cereals with a refillable pot that contains sensors, enabling the company to track and trace the packaging.

Packaging analysts Smithers forecasts that the market for refillable and reusable products will grow 5% a year, reaching a value of $53.5 billion by 2027. But without greater buy-in from the big brands, it is difficult to see how.

Mark Hillsdon reports on innovative projects in India, Indonesia and Brazil to improve livelihoods and supply brands with high-quality plastic

THE BODY SHOP/FLICKR

Meet the world's unsung environmental stewards: WASTE PICKERS

JOSUE DECAVELE/REUTERS

Children play in the Las Vacas river in Guatemala, amid piles of plastic piled up on the banks.

There are an estimated 20 million waste pickers across the world, an informal army of street cleaners whose work goes largely unrecognised. Yet to some they are environmental stewards, clearing away the flotsam and jetsam of everyday life, often in countries where regular waste collection services are non-existent.

They tread a precarious path, with little protection, minimal wages and no formal contracts. Andrew Almack, founder of Plastics for Change, a for-profit social enterprise, describes the fragmented, decentralised world of waste picking as "the last frontier".

But despite efforts to forge better working conditions for plastic waste pickers at recent discussions around a Global Treaty of Plastic Pollution, there are fears things are set to get worse before they improve.

The global trade in trash, e-waste and discarded fast fashion typically travels from the Global North to the Global South. Yet waste plastic breaks the mould. Discarded bottles and packaging can move both ways, with high-value polyethylene terephthalate (PET), used in plastic bottles, collected across Asia and Africa and sold to recyclers and processors in Europe.

Almack believes the system is stalling as manufacturers pull back from commitments to increase their use of recycled plastic, opting instead for cheaper virgin material, even though it is made from fossil fuels and produces four times as much CO2 per ton as reusing existing plastic.

The Ellen MacArthur Foundation's latest progress report, Global Commitment 2022 shows that, after two years of small decreases, virgin plastic use has returned to 2018 levels among the hundreds of companies that have signed up to cut their use virgin plastic by 19% by 2025.

Almack says the drop in demand from brands is having a huge knock-on effect for millions of waste workers who rely on collecting plastic as the main household income.

Plastics for Change's work is focused on India, a country that produces more than 25,000 tonnes of plastic waste every day, with around 40% left littering the environment. The work centres around ›

SIPHIWE SIBEKO/REUTERS

Waste pickers pull trolleys loaded with recyclable materials in Kliptown, near Johannesburg, South Africa.

Brands who want socially responsible supply chains should have visibility in the tiers below the mill

ANDREW ALMACK, Plastics for Change

a huge network of small neighbourhood scrap shops, which collect the trash from waste pickers, sort it and sell it on.

Almack is trying to bring more structure to the process and greater visibility across the waste plastic supply chain. "Traditionally, the entire informal waste system works on exploitation," he says, with no rules to ensure people are paid a minimum wage, or stipulating the number of hours they work. "It's all unregulated," he says.

Much of his team's work involves trust-building, and working with scrap shop owners who have had little contact with authority and are naturally sceptical and resistant to change. The scrap dealers are financially incentivised to adopt Fairtrade practices and are compensated for the cost of compliance. The shops are then independently audited, helping to build greater transparency across the recycled plastic supply chain.

The recycled plastic can then be sold on an ethical sourcing platform developed by Plastics for Change that connects waste collectors with global brands and provides a consistent supply of high-quality recycled plastics that comes with an ethical stamp of approval.

Creating this demand for recycled plastic helps to increase its value, explains Almack

Using recycled plastic can give brands a powerful differentiating factor and help them into consumer demands for more sustainable products. Instead of just purchasing a finished bottle to fill with shampoo, says Almack, "the brands who want to make progress towards socially responsible supply chains should have visibility in the tiers below the mill."

That means specifying recycled plastic that comes from a certified ethical standard as part of their procurement agreements. "That's a game changer," he says, "and (then) the entire supply chain is mobilised." ›

Both L'Oreal and The Body Shop, which last year bought 617 tons of plastic waste through Plastics for Change in India to incorporate into its recycled packaging, are partners in the programme.

INDONESIA

Another country where waste pickers are helping to tackle waste is Indonesia, with nearly 5 million tons of plastic left uncollected or dumped every year. Sam Bencheghib established Sungai Watch to stem the flood of plastic from rivers into the ocean. He uses floating barriers to collect the plastic and then works with community groups to sort and upcycle the waste.

"Indonesia is home to one of the world's largest population of waste pickers," explained Bencheghib in an email. "Unfortunately, many regions and cities in Indonesia do not have sufficient waste management infrastructure and it is normal for households to burn their trash or throw it into a river.

"Most waste pickers, however, only collect the valuable materials, such as metal or plastic PET bottles (which they sell on to aggregators, who act as middlemen that then sell to the recyclers). But the less valuable materials, such as plastic bags, sachets, Styrofoam and all of the other materials, stay in the rivers."

Sungai's team of collectors haul out more than 2,000kg of plastic every day, sorting it into 30 material categories. The organisation now employs more than 100 people, paying them significantly higher wages than the average waste picker.

Sungai is partly funded through brands sponsoring river barriers, although they only work with partners that align with their values. "We still remain selective to ensure that the brands we work with are actually walking the talk," says Bencheghib.

Sungai recently teamed up with Marriott International to sponsor 15 barriers and remove 100,000kg of plastic from rivers in one year. The partnership was to meet a commitment by Marriott Indonesia to phase out its single-use plastic packaging in bedrooms by the end of 2023.

"We need today's brands to not only support our work … but also take a public stand on what they are doing internally to fight against plastic pollution," he adds. ›

BVRIO

BVRio has used plastic credits to pay fishermen in Rio's Guanabara Bay to collect waste.

RICARDO MORAES/REUTERS

The mangrove ecosystem in Guanabara Bay is improving as a result of efforts to clear plastic waste.

BRAZIL

Things are slightly different in Brazil, where the government has helped informal waste pickers – or catadores – to organise themselves into more than 1,000 cooperatives, as well as providing equipment and technical assistance. The non-profit BVRio has been working with many of the cooperatives for the last 10 years, explains its circular economy specialist Pedro Succar, and helped Rio's Coopama cooperative buy new trucks, which have allowed it to scale up its rubbish collecting by 300%, while taking on 50% more staff.

The trucks were bought using plastic credits supplied by the Alliance to End Plastic Waste. This new funding mechanism is described a "game changer" by Succar, although it needs to be used in tandem with efforts to improve recycling capacity and raise awareness about over-consumption" of plastics.

BVRio has also used plastic credits to pay fishermen in Rio's Guanabara Bay to spend two days a week collecting waste rather than fishing. Dwindling stocks had already cut their catch, but a year on there are reports that marine wildlife is returning, and the mangrove ecosystem – so important as a habitat for young fish – is improving.

> **To tackle the socio-economic challenge for waste workers, we need to enable local investment at a global scale**
>
> **KOMAL SINHA, Verra**

The credits are supplied by the Italian social enterprise Ogyre, and the plastic catch is recorded and validated by BVRio. It's this third-party verification that Succar believes is crucial and could help plastic credits avoid the pitfalls that have beset their carbon equivalents. "You can't have the same company issuing the credit as audits it," he says.

Discussions around plastic credits featured strongly at the recent Paris negotiations, where they were touted as a potentially powerful mechanism to inject private capital into plastic recycling, given that there is predicted to be a $40 billion gap in governments' ability to fund recycling capacity by 2040.

Global standards setter Verra issued the first credits under its new plastic waste programme, which pays companies and communities around the world for every tonne of plastic either collected or recycled. The three projects issued credits so far are Second Life in Thailand, a social enterprise that is helping communities both collect and recycling waste on remote Thai islands; Far North Queensland in Australia, which is collecting agricultural waste from banana farms, preventing plastic from entering the Great Barrier Reef; and Deekali Plastic Recovery in Senegal, which is using the money to improve the country's plastic waste recycling infrastructure.

The company says projects certified under the programme "create measurable, verified impacts in line with environmental and social safeguards that alleviate health risks and facilitate additional social benefits for the informal waste sector". (See How plastic credits could help Iceland live up to its green image)

Komal Sinha, Verra's director of plastics and sustainable development policy and markets, says: "To tackle plastic pollution and the socio-economic challenge for waste workers across regions, we need to enable local investment at a global scale. That will drive impactful plastic waste collection and recycling projects now, so we can deliver immediate impact."

Back in India, Almack believes that if companies are serious about building their sustainable credentials, now is the time to act. "Brands need to leverage their purchasing power. This is the only way to historically ensure that supply chains have transformed," he says. "(They) need to recognise that the informal waste economy is the backbone of the circular economy."

Mark Hillsdon is a Manchester-based freelance writer who writes on business and sustainability for The Ethical Corporation, The Guardian, and a range of nature-based titles including CountryFile and BBC Wildlife.


TERRY SLAVIN

Sigurður Grétar Halldórsson, general manager of Icelandic recycling technology company Pure North.

How plastic credits could help Iceland live up to its green image

The land of ice and fire exports 95% of its plastic waste. Terry Slavin meets a startup trying to get a home-grown solution off the ground

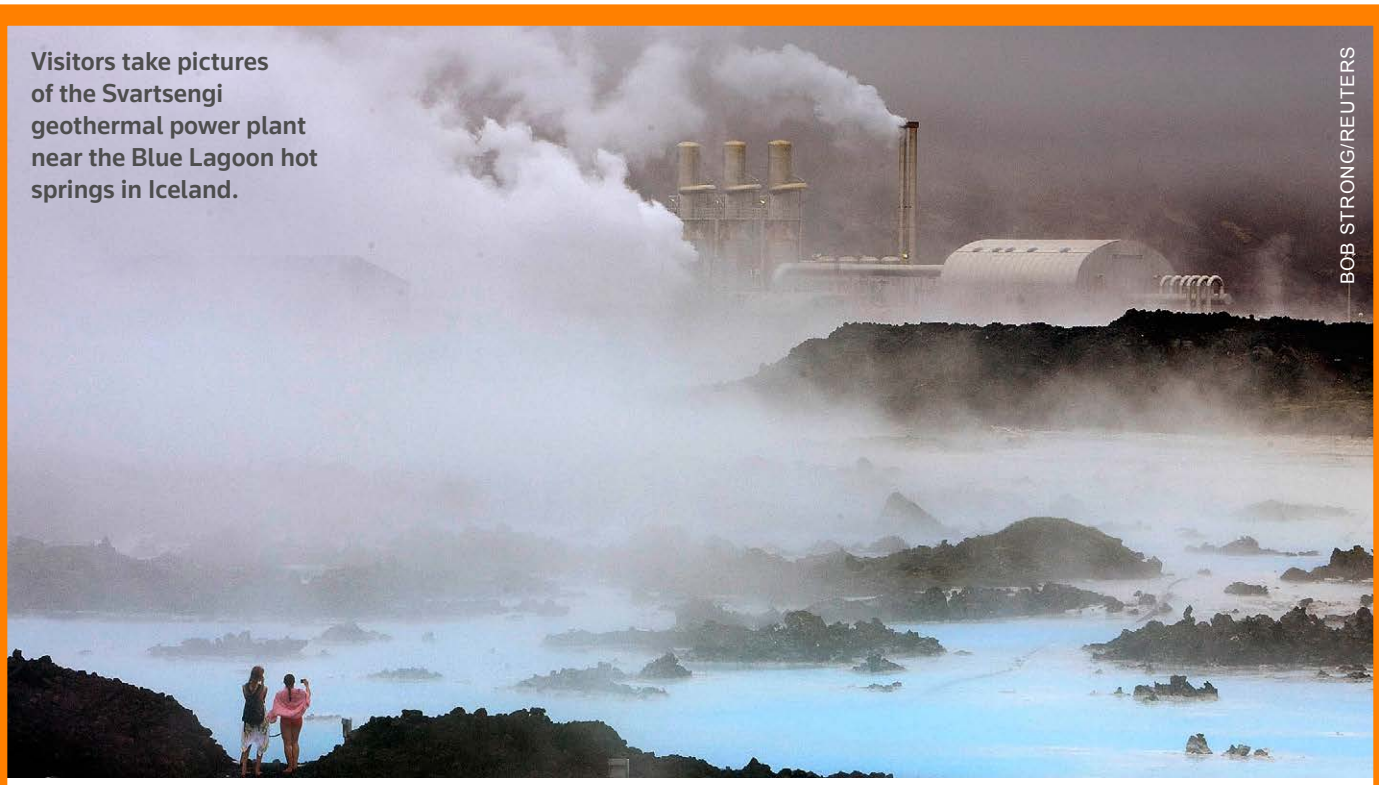
For Icelandic recycling firm Pure North, the ability to earn money from selling plastics credits would be a game changer in its efforts to make the tiny country on the fringes of Europe lift its paltry recycling rates.

While 3 million tourists a year flock to Iceland for its breathtaking mountains and glaciers, and it has a thriving climate tech industry drawn by plentiful hydro and geothermal energy, the land of ice and fire has a dirty secret: it has one of the lowest recycling rates among OECD countries, at 17%. And only a fraction of waste is handled in Iceland, with 95% of plastic waste exported to Scandinavia and the Netherlands, with some of it also making its way to Asia.

"Iceland has built its image on clean energy and being green, but we have to act on it. We can't just ship (our waste) somewhere else and expect it to be taken care of," says Sigurður Grétar Halldórsson, general manager of the seven-year-old technology company. "Iceland should be the place to import waste to recycle, because of the energy we have here."

Pure North's chemical-free mechanical recycling technology uses waste heat and steam from the country's plentiful geothermal energy to turn six types of plastic waste into new polymers. Its process of shredding, cleaning, sink-floating and then dewatering, drying and shredding the polymers into new plastic pellets is comparatively energy-efficient, generating 93kg of CO_2 for each ton of recycled film, 82% lower than the EU average, the company said.

Until now it has mainly been fed a diet of agricultural sector films, with farmers, who would otherwise have to ›



Visitors take pictures of the Svartsengi geothermal power plant near the Blue Lagoon hot springs in Iceland.

pay to have their problematic waste plastics removed, instead paid to supply them to Pure North, which earns its income from the recycled plastic pellets.

But the company, the only recycling facility on the island, is now targeting the domestic waste market. It already has 35%-40% of the recycled plastic waste market, and is looking to double that, and expand into other areas, including cardboard and food waste, in the next couple of years.

So when the company heard last year about global standard setter Verra's plastic waste reduction programme, they began the long process of applying for certification. (See Meet the world's unsung environmental heroes). After a third-party audit in April, they are now in the final stage of validation.

If Pure North succeeds in getting verified, it's clear that income from the plastics credits offer a crucial lifeline to the company. According to its report for Verra, Pure North has been operating at a net loss since it started in 2017 due to high operating and capital costs. "Loans, grants from the government and influx of capital from investors were all necessary to start the operation, and only via continuous outside funding has the operation been able to continue," the report said.

"The additional revenue that we foresee via plastic credits will be a game changer for us," said Börkur Smári Kristinsson, the company's chief innovation officer.

"What we have heard through conversations with multiple stakeholders and interested parties on the market is that plastic credits could be valued at 500 to 800 euros per tonne of recycled plastic. Our annual recycling output is very low compared to the industry average so we hope and believe that the credits we can issue, we will be able to sell."

He added: "We are still importing so many plastic products from virgin plastic that could be relatively easily manufactured in Iceland."

The other revenue stream the company wants to explore is licensing its technology for use far beyond Iceland's shores by municipalities and heavy industries.

Access to cheap and plentiful geothermal energy is not a prerequisite Halldórsson said. Its technology can be applied as long as there is a ready supply of waste heat as well as waste plastic.

Pure North has already spoken with a leading European plastic producer about potentially licensing its technology, using excess heat from its processes to produce a line of recycled plastics for its clients. "The steam (from geothermal) is not essential. It just proves the concept," he says.

He pointed out that Pure North has the capacity to produce 4,000 tonnes of recycled plastic, whereas the chemical company is producing 10 times as much virgin plastic.

"You can see the potential is huge."

INTS KALNINS/REUTERS

A 2020 report found tyre dust was the biggest single source of microplastics.

Rising microplastics in seas puts pressure on tyre industry

Regulators and brands have been slow to wake up to the devastating environmental impact of tyre dust, Sarah LaBrecque reports

There's a race going on at the moment. Sailors from across the world are speeding across the planet's oceans as part of the Ocean Race, a six-month event that takes teams from the warmth of the Mediterranean to the isolated depths of Point Nemo in the middle of the South Pacific Ocean, with eight other stops along the route. The competition has made headlines recently, and not only for smashing a world record.

In every sample of water taken by sailors along the route, they have found microplastics, and in concentrations far greater than were seen during the last race in 2017-2018. Although scientists noted that their instruments were more sensitive than previously, concentrations are up to 18 times higher. Even at Point Nemo, 320 microplastic particles were found per cubic metre, compared with between nine and 41 in the last race. The highest concentrations were found in coastal areas, with up to 1,712 per cubic metre discovered off the coast of South Africa.

Microplastics, which are defined as particles less than 5mm long, have become tiny menaces to the environment and human health, and efforts to both understand their effects and mitigate their release are ramping up. A 2020 report from Systemic found that tyre dust was the biggest single source, contributing 78% of the total mass. Plastic pellets – also called nurdles, which come from industrial manufacturing – contribute 18%, and textiles and personal care products account for 4% combined.

REUTERS/JAMES REDMAYNE

Scientists assess microplastic pollution on Manly Cove Beach in Sydney, Australia.

> **These chemicals have a devastating impact on wildlife, and accumulate into the food chain**
>
> IMPERIAL COLLEGE LONDON

Studies looking into tyre and road wear particles (TRWPs), which are a mix of tyre fragments and road surface particles, suggest chemicals and particles arising from tyres are polluting the air we breathe and leaching into bodies of water and surrounding environments.

"These chemicals have a devastating impact on wildlife, and they accumulate into the food chain where they will ultimately pose a significant risk," said one recent study from Imperial College London. Another, in Nature Communications, found evidence in 2020 that TRWPs travelling on the wind are an even more significant source of ocean pollution than through rivers.

Despite these and other findings, stretching from the mid 2000s, regulators have not acted. "No one's breaking any rules," says Nick Molden, founder and chief executive of Emissions Analytics, an independent UK-based company that tests vehicle emissions levels.

Along with developing their own tyre-wear abrasion tests, the company has also recently launched an initiative called the Tyre Emissions Research Consortium, which aims to bring together independent researchers who are tackling the problem. Within a few weeks of launching, Molden says about 400 people are already involved.

A concerted research effort is clearly under way, ›

REGIS DUVIGNAU/REUTERS

An employee works at the Michelin tyre company's factory in Clermont-Ferrand, central France.

so why is it taking so long to solve this problem?

For a start, researchers haven't necessarily been joined up with the auto industry, says Molden, pointing out that there are a lot of scientists looking at aquatic pollution arising from TRWPs, but "those guys weren't typically interfacing with the auto industry and the auto industry regulation".

FINDING ALTERNATIVES

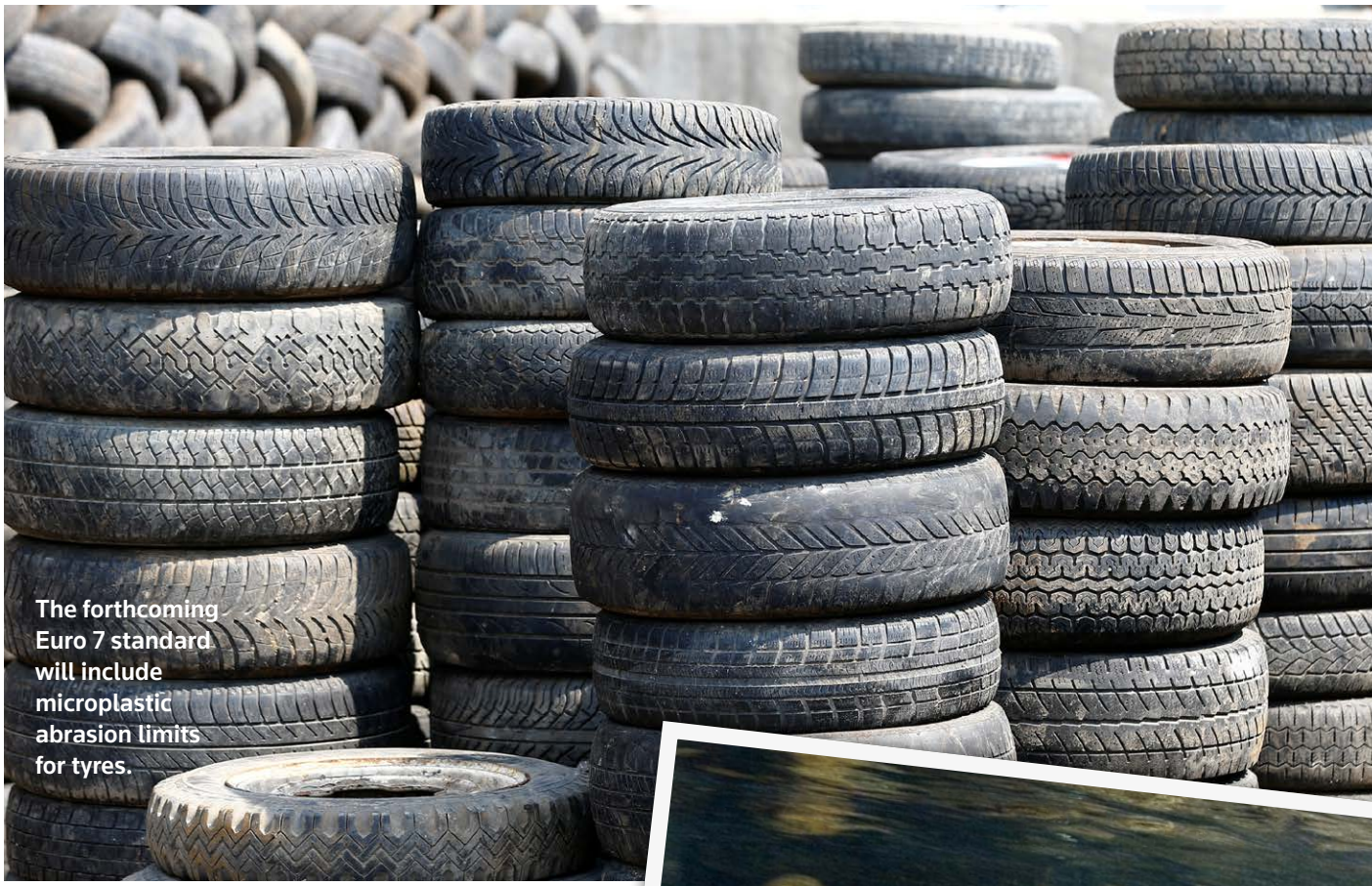
A landmark study published in Science in 2020, however, has increased the level of urgency among tyre manufacturers. It was discovered that a chemical arising from car tyres, known as 6PPD-quinone, was responsible for a mass die-off of coho salmon off the west coast of the U.S. The chemical, a product of 6PPD, which is used as a preservative, has now also been found in Australia. "That's what really galvanised everything," says Molden, "it showed that chain of causality."

But finding an alternative material is proving challenging. "There is no known replacement for 6PPD today that will provide the same benefits to the tyre in terms of safety, and have no consequences on the environment," says Cyrille Roget, scientific and technical communications director at Michelin.

It's something that will require a global level of action and collaboration to address, he says. "If you want to replace 6PPD, you need to understand, what are the effects? Why does this product, after being transformed by ozone, have such an effect on that particular species of salmon? Because if you don't understand that, there is a chance that the replacement product could be worse, that it could adversely affect some other species because you have not understood the problem initially," he says.

Michelin is part of an initiative led by chief executives called the Tire Industry Project (TIP), which was formed in 2005 and is convened by the World Business Council for Sustainable Development. One of its focus areas is TRWPs, and, according to Gavin Whitmore, senior manager, TIP communications, the findings of the 2020 Science paper were significant. It "prompted TIP to expand its programme of sponsored research to further scientific understanding of the transformation process that results in this newly identified chemical, and the potential for impacts on other salmonids (a family of fish species that includes coho salmon)."

TIP's stance on the overall risk of TRWPs to human health and the environment, is, however, ›



LEONHARD FOEGER/REUTERS

The forthcoming Euro 7 standard will include microplastic abrasion limits for tyres.

NOAA FISHERIES/REUTERS

not aligned with conclusions drawn by much of the scientific community. According to its website the "presence of TRWPs in oceans has not been demonstrated..." and its "sponsored studies have indicated that TRWPs do not pose risk to human health".

Whitmore says that they have supported seven new studies that they anticipate will be published during the second half of this year, "adding to the 18 published research papers that we have supported since 2009. We are committed to understanding any potential impacts of TRWPs and welcome the growing body of TRWPs-related research."

Although Molden describes TIP as an "industry-friendly" research group, he senses a change of attitude. Companies are realising "that actually, there is more of a problem here than we were letting on and we possibly need to do something about it", he says.

REGULATION AHEAD

With the average tyre releasing about 4kg of microplastics over its lifetime, equating to a global annual total of 6.1m tonnes, action is urgently needed. So where do solutions lie? According to Roget, Michelin's number one priority is to reduce the quantity of particles that are being released, through understanding how the tyre interacts with the road and making design adjustments, while concurrently exploring bio-sourced, renewable and recycled materials for use in its tyres. Over the last five years, Roget says Michelin has been able to reduce TRWPs by 5%.

A study has linked a chemical arising from car tyres to a mass die-off of coho salmon off the west coast of the U.S.

Molden says the more premium brands tend to perform better than cheaper imports. "We tested 300 tyres and if you rank them by potential environmental effects, there is a big difference between the best and the worst," he says.

Regulation, helpfully, may be on the horizon. ›

NICK CAREY/REUTERS

One elephant in the room is the fact that EVs can wear out tyres up to 50% faster, due to being heavier

The forthcoming Euro 7 standard will tighten up emission standards for petrol and diesel cars, including microplastic abrasion limits for tyres and particulate emissions for brakes. The new limits have not yet been published, but Molden says they might be set at about 150mg per km. A typical car sheds about 70mg per km. That sort of a limit will "get rid of the worst ones", he says, with the limit likely gradually being brought down over time.

There are other, indirect solutions as well, such as designing road surfaces to be less abrasive or more porous. You could also create better water retention systems next to roadways, suggests Roget.

One elephant in the room is the fact that electric vehicles can wear out tyres up to 50% faster than their conventional counterparts, due to being heavier. This, in turn, means higher rates of abrasion. How is this being addressed? "It's a difficult problem," says Molden. "The government won't want to put a spanner in the works of electrification."

Roget says Michelin tyres have lower rates of abrasion than other brands and are therefore naturally a better choice for heavier EVs. But at the end of the day, the issue is somewhat out of its hands. "What we try to do is to offer the best tyre possible to reduce the global footprint of tyres under a specific definition... But we are not designing vehicles."

As EVs continue their unstoppable rise and the Euro 7 standards incrementally pass through the legislative process, we could do with taking some inspiration from the Ocean's Race sailors. That is, to significantly speed things up.

Sarah LaBrecque is a freelance writer who splits her time between Ottawa, Canada and Hertfordshire. She writes about sustainable business and ethical living for publications such as the Guardian, Positive News, and for a range of B2B clients.

MARCO DE SWART/REUTERS

Brands put brakes on bioplastics over biodiversity and recyclability concerns

Lego is rethinking plans to replace plastics in its famous bricks, reports Catherine Early. It's not alone

Consumer concerns about plastic pollution have led many brands to look at bio-based alternatives.

Global production capacity of bioplastics is set to grow from around 2.23 million tonnes in 2022 to approximately 6.3 million tonnes in 2027, according to trade body European Bioplastics.

By far the largest application remains packaging, which consumed 48% of the total market in 2022. Major brands that are using bioplastics include Coca-Cola, which introduced its PlantBottle made from 30% plant-based plastic in 2009, and in 2021 unveiled a prototype made from 100% plant-based plastic, including the cap and label. ›

Industries such as automotive and transport, agriculture and horticulture, electrics and electronics also use bioplastics, with their relative share in the overall market expected to increase moderately, European Bioplastics says.

Still, the penetration of bioplastics in the overall plastics industry remains minute, at around 1%. "Even a steady growth rate doesn't mean we have much of a market," says the organisation's managing director, Hasso von Pogrell.

Feedstocks for bioplastics manufacture vary from corn starch – most frequently used in the United States – to sugarcane in Asia and a mixture of sugar beet and potato starch in the EU, he says. But new feedstocks are emerging, including algae, biowaste and CO2 taken from the atmosphere.

Bioplastics have attracted criticism for incentivising land use change, as forests are cleared for feedstock production, and for confusing consumers and the waste industry over disposal. Campaign organisation WWF has convened the Bioplastics Feedstock Alliance since 2013, in an effort to bring corporations together to source bioplastics responsibly. Its members include McDonald's, Coca-Cola, Lego and Nestle.

COCA-COLA

Coca- Cola introduced its PlantBottle made from 30% plant-based plastic in 2009.

> **None of those questions about sourcing are asked with fossil-based plastics. It takes time to deal with the complex issues**
>
> ALIX GRABOWSKI, WWF

WWF's position is that there is a role for bioplastics alongside recycled plastics, to maintain the quality of a product. However, it stresses that it must be responsibly sourced, which depends on the feedstock used, local conditions and the production process.

WWF does not back any particular feedstock over another, arguing that each should be examined on a case-by-case basis. Even lifecycle assessments can only be used as a preliminary method to evaluate a feedstock, since they do not capture land use change impacts, it says.

In terms of disposal, bioplastics can be recyclable, compostable or neither depending on their chemical structure, but they must be reused, recycled or composted to reduce end-of-life impacts, it says.

Materials should be paired with an appropriate waste management system in order to be circular. Above all, WWF stipulates that materials should not be designed to end up in nature, which is a reference to potential issues with biodegradable or compostable plastic if collection and processing is insufficient to recover the material.

FEEDSTOCK IMPACTS

The due diligence required by companies before they adopt use of bioplastics is high and has contributed to a lack of take-up, acknowledges Alix Grabowski, WWF's director of plastic and material science. "None of those questions about sourcing are asked with fossil-based plastics, so it does take time and effort to establish supply chains and to deal with the complex issues," she says.

In addition, bioplastics are still much more expensive than virgin fossil plastic, which are made cheap by subsidies, she says.

Lego is one company that is rethinking its use of bioplastics. It launched trees and bushes made from sugarcane-based bio-polyethylene in 2018, and has expanded use of the material to around 150 elements, so that half of all Lego sets contain at least one of the plant-based elements.

In a blog, the company's senior environmental sustainability specialist, Maria Rosenberger Petersen, said that when it first started considering using more sustainable materials in 2015, there was an expectation that it was only a matter of time until bioplastics had a prominent role in the plastics industry, and its products.

However, the company has since realised that ›

it needs to consider biodiversity and the impact on water bodies in the growing and harvesting of feedstocks, as well as just carbon. "If we, in the pursuit of reducing our carbon footprint, risk destroying local environments and jeopardising biodiversity, we need to have oversight of and be able to positively manage the consequences," she wrote.

Consumer confusion over bioplastics has also become a concern for Lego, alongside the lack of standards and governance to ensure that it can communicate accurately with the public and gain its trust, she wrote.

Maria Feast, from the creative buying team at Lush cosmetics, echoes issues with the complexity of bioplastics. Lush mostly uses its own closed-loop recycling system to source its plastic packaging, but is often sent bioplastics by prospective suppliers, so has set up a working group to assess them.

"They require a lot of information, which we can't always get, such as about feedstocks. For example, we need to know if corn is genetically modified as we don't allow that under our buying policy," she says.

Tetra Pak is a major user of bioplastics for its Tetra Rex plant-based packaging. The bioplastic it uses in the packaging lids is certified to the Bonsucro Chain of Custody standard, meaning it is fully traceable to its origin. (See Tetra Pak trials removing aluminium layer in bid to crack recyclability challenge)

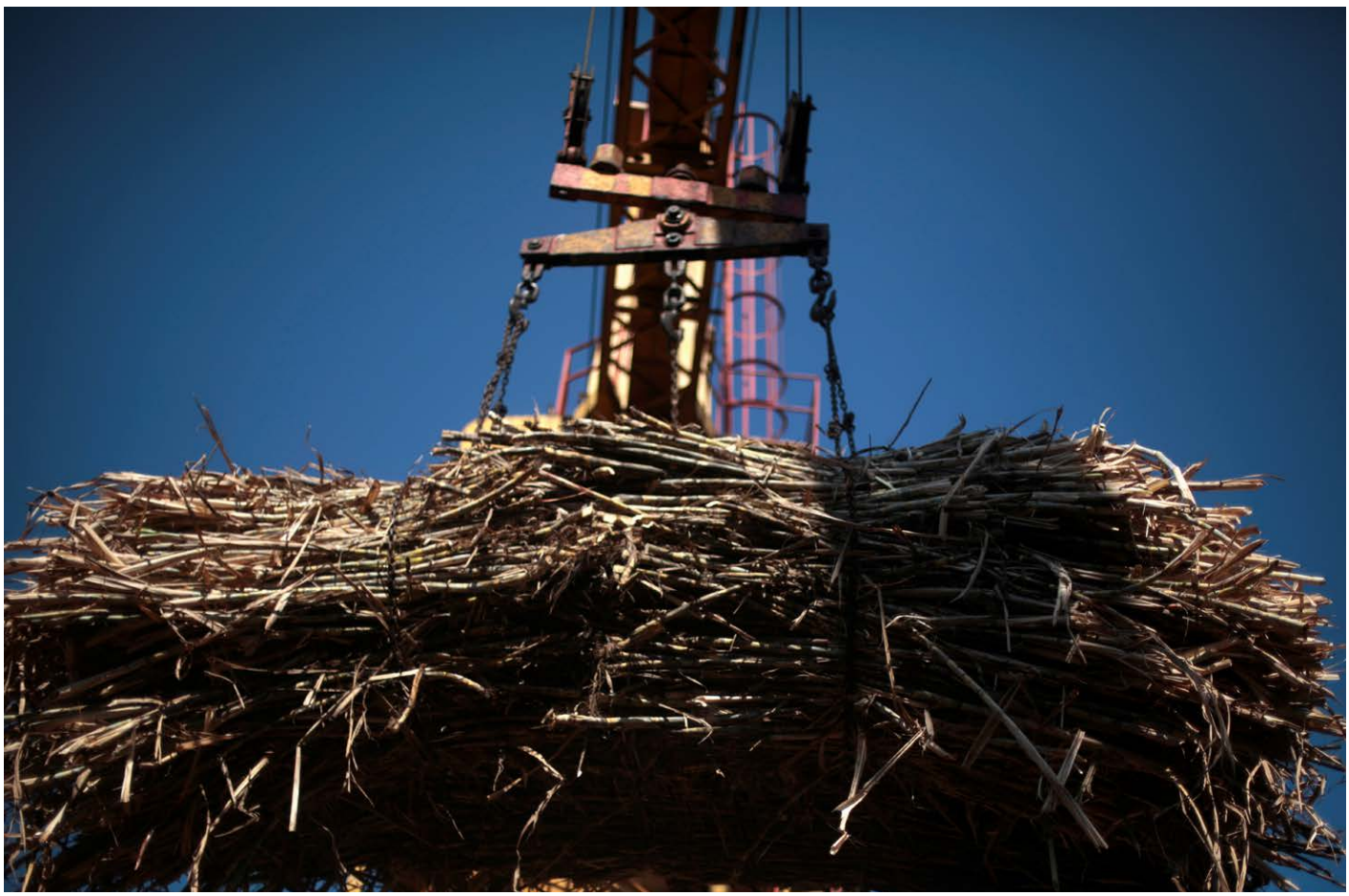
But Tetra Pak's use of bioplastics is limited to around 10% of its global products, with half of this a hybrid of bioplastic and fossil plastic. Davide Braghiroli, packaging solutions director at Tetra Pak, explains that lack of supply and the price premium associated with bioplastics has forced it to limit use to regions where consumer demand is highest, such as France, Germany and the Nordics.

"We are trying to create a supply and demand situation where this option is given to customers that want it, because this option is also giving communication opportunities," he said. The company hopes to expand bioplastic packaging globally, but has no date for this, he says.

DISPOSAL DILEMMAS

Confusion over disposal options has also been an issue for the bioplastics industry. Some bioplastics are compatible with existing recycling streams, such as Bio-PET and Bio-PE. However, compostable bioplastics, in particular, are often accused of misleading or confusing the public, since they are compostable only under particular conditions found in industrial composters, for which infrastructure may be lacking. ›

Feedstocks for bioplastics manufacture include sugarcane, corn and potato starch and sugar beet.



REUTERS/JUAN CARLOS ULATE

REUTERS/REGIS DUVIGNAU

A bottle made from sugarcane pictured with bagasse sugarcane and the raw material.

Victor Dewulf, chief executive of recycling technology provider Recycleye, is critical of the use of such materials, arguing that their design assumes that they will end up in the environment, a fate that is unlikely in Europe at least, where most countries have reliable recycling systems.

"For countries in south-east Asia, where you do have a lot of plastics ending up in the environment, they may be a better solution, but in Europe it is making it harder to reason to recycle PET (so) it is basically a contaminant."

Bioplastics Europe refutes this argument, saying that all plastic waste needs to be sorted out, considering how many different types there are, and that fossil-based plastics contaminating composting facilities is a far greater problem than the other way around.

> **For countries in south-east Asia, where a lot of plastics end up in the environment, bioplastics may be a better solution**
>
> **VICTOR DEWULF, RECYCLEYE**

In the UK, a group of retailers and packaging experts from non-governmental organisations (NGOs) and academia have come together to examine the practicality of collecting, sorting and treating compostable packaging through existing bio-waste collection and treatment routes.

The Compostable Coalition's advisory board includes Tesco, Marks and Spencer, WWF and the non-profit On-Pack Recycling Label. The two-year project was granted 1.2 million pounds in funding by government agency Innovate UK in September 2022, and will feed back the findings of its work direct to government.

Despite the complexities, there is increasing recognition of bioplastics in policy globally. In the U.S., president Joe Biden in March announced a target to replace 90% of plastics with biomaterials within the next 20 years, building on a September executive order to boost the nation's biomanufacturing industry.

In the EU, clarification on where bioplastics can be environmentally beneficial and how they should be designed, disposed of and recycled are included in a potential regulation on packaging ›

REUTERS/NEIL HALL

waste, which is due to be finalised by the end of the year. The bioplastics sector could also be affected by initiatives under the Green Deal on sustainable products, green claims and the green taxonomy.

Meanwhile, the United Nations Food and Agriculture Organisation in December 2021 recommended the replacement of non-biodegradable, conventional polymers with biodegradable, bio-based polymers for agricultural uses such as mulch films, fishing gear, tree guards and shelters, and plant support twines.

Bioplastics Europe is pushing for the role of bioplastics to be recognised through the Global Treaty to End Plastic Pollution, currently under negotiation. A paper produced by the United Nations Environment Programme to inform potential content of the treaty includes an option encouraging the use of "safe, sustainable substitutes and alternatives to traditional plastics, such as alternative materials and biodegradable or compostable materials".

These could reduce the health risks associated with plastic pollution and promote circularity in the plastics industry, as well as promote innovation and open new sustainable market opportunities, it states.

However, Paula Chin, senior policy advisor on consumption at WWF-UK, believes that ultimately, the priority for business and governments should be on reduction and reuse of packaging, rather than switching one material for another, bio-based or not.

"There's still all this switching activity going on as they try to just kick into the long grass the challenge of transforming our retail systems to support more reuse or refill systems.

"There's policy initiatives looking at how can biomaterials play a role within a circular economy, but I think talking about reuse and how that can be enabled and mainstreamed has more than caught up with that."

Lush has set up a working group to assess bioplastics.

Catherine Early is a freelance journalist specialising in the environment and sustainability. She writes for Business Green, China Dialogue and the ENDS Report among others. She was a finalist in the Guardian's International Development Journalism competition.

In the flight from plastic, companies urged to think outside the box

Catherine Early reports on Canopy's Pack4Good initiative, which is seeking to avoid unintended environmental consequences of moving to paper

REUTERS/TIM WIMBORNE

Could the drive to find plant-based alternatives to plastic packaging have unintended consequences for the world's forests that are just as environmentally damaging?

Three billion trees are cut down every year to meet the global demand for paper packaging, which has grown by more than 65% in the past 15 to 20 years. The switch to e-commerce, which uses seven times the amount of packaging as store-based retail, could drive growth of at least another 20% in the next five years, according to Nicole Rycroft, founder and executive director of ›

REUTERS/BEN NELMS

the Canadian environmental not-for-profit, Canopy.

Canopy has been working to turn this situation around through its Pack4Good initiative, launched in 2019, to highlight the fact that plastic is not the only problematic form of packaging. "We can't just trade one environmental disaster for another," Rycroft says.

Pack4Good now has 389 brands representing some $200 billion in annual revenues working on transforming their packaging supply chains to protect forests. It promotes alternatives such as recycled pulp and paper; alternative fibres such as agricultural waste; and, where forest fibres cannot be avoided, certification by the Forestry Stewardship Council.

Innovation in design to avoid the need for packaging altogether is also a focus. Fashion brands were the first to sign up, but many food and drink brands are part of the initiative now. Alternative fibres such as straw could enter mainstream use for paper production in the next few years, Rycroft says. Straw can already be used to make paper, but it tends to be made in very old mills, using older production systems and a very chemical-intensive process.

These are being replaced or upgraded with cleaner production technology that uses 70-90% less water, as well as lower energy and chemical inputs, and land use. It also provides a new revenue for farmers and reduces burning of straw typically used to dispose of it, she says.

Canopy has been awarded $60 million over six years through The Audacious Project to work on scaling up next-generation paper and viscose production to 60 million tonnes by 2033. "Within this decade, we're going to have replaced at least a third of the wood fibre currently being used to make paper packaging and textiles, and we'll have eliminated the use of all ancient and endangered forests from the packaging and viscose supply chains," says Rycroft.

There will be a significant shift even in the next two to three years, she believes, as mill upgrades and builds are already in the pipeline, including Nafici in China and ReStalk, an innovator planning to build its first European plant in France at the end of 2023, while a couple of ventures in the U.S. and Canada are moving forwards, she says.

An Indian plant already in operation produces paper from straw at price parity with that made from wood fibre, according to Rycroft. While paper from European plants may be more expensive to ›

Three billion trees are cut down every year to meet the global demand for paper packaging.

start with, with cheaper feedstock costs and much lower uses of water, energy and chemicals, the operating costs are likely to be around 30%-60% of a mill producing wood fibre, she says.

Commitments by brands under the Pack4Good initiative to purchase the output of the mills has pump-primed investment in the plants, which can cost up to $300 million, she adds.

"Brands are increasingly aware that climate change is already disrupting supply chains. There are extensive forest fires, there are floods, the market for recycled paper fibre is very, very tight. So there's a real hunger in the marketplace to see lower carbon, next generation options on the market. They just need to know there's a stable supply, and at the volumes they need," she says.

One solution that businesses are opting for is closed-loop recycling for paper. Scotland-based Cullen has seen demand soar for its moulded pulp packaging, made from recycled byproducts of its corrugate packaging business, as businesses look to secure large supplies of plastic-free packaging.

It is increasing production to one billion units per year, a 67% increase from 2021-2022. There is growing demand from retailers, health services and food and drink producers across the 34 countries it serves, according to David MacDonald, Cullen's owner. The firm is being asked to make an increasingly diverse range of plastic packaging, such as trays, protective inserts and transport packs, he adds.

"I've been doing this a long time now and trying to replace plastic has always been a big push for us. We've had brick walls, to be honest, because it's all about price, but in the past two years, we've seen our customers demand to be more sustainable," he says.

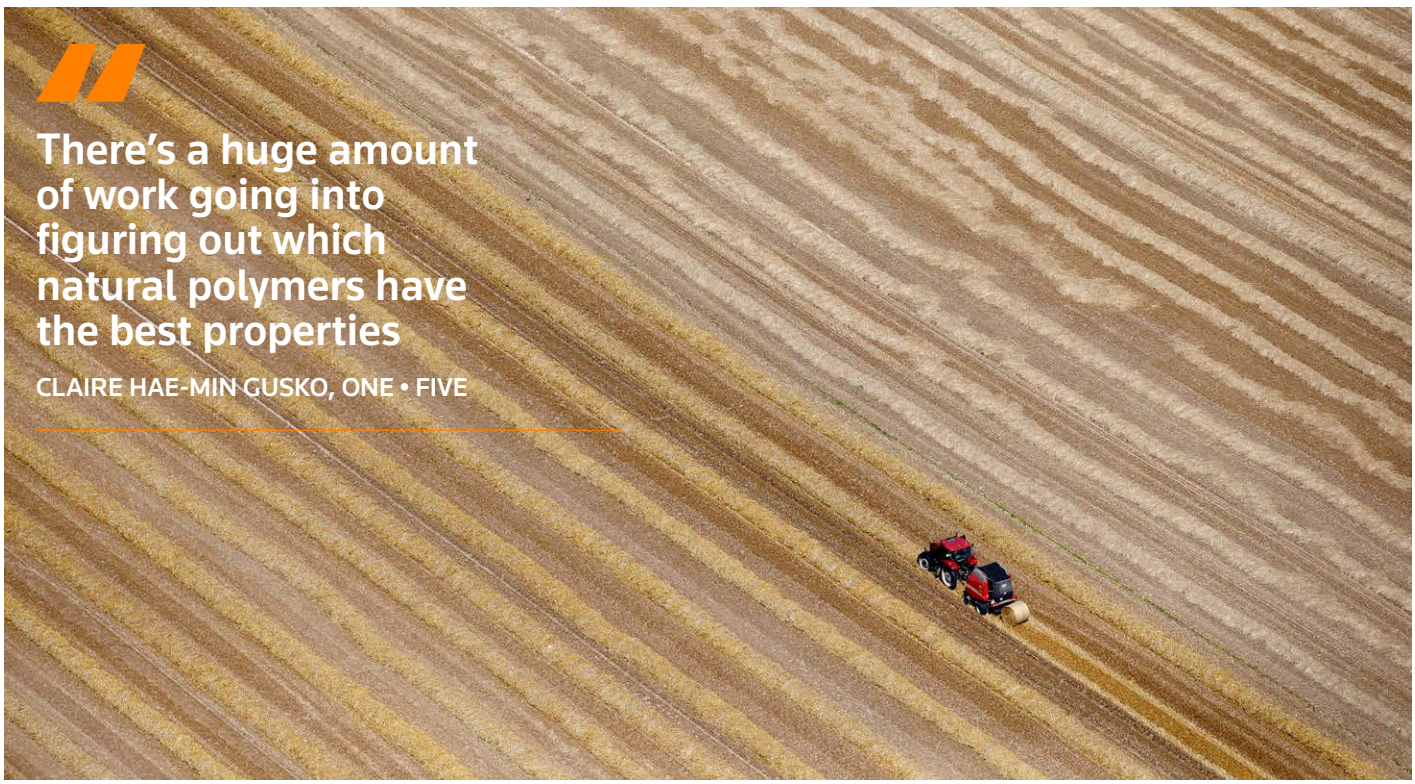
Along with a big increase in demand for paper, other novel materials, including mushrooms, seaweed, cork and crustacean shells, are being actively considered as alternatives to plastic for packaging by entrepreneurs and corporations searching for the holy grail of sustainable packaging.

These products must achieve scale in order to compete with plastics, both in terms of cost, and to secure contracts with large corporations, which need secure supply on a large scale. Many are invented by startups or universities, which face all the typical issues with becoming mainstream, such as obtaining finance to commercialise.

"There's a huge amount of work going into figuring out which natural polymers have the best properties, including the shelf life that industry expects for their core product," says Claire Hae-Min Gusko, co-founder of Hamburg-based biomaterials company One • five (pronounced one point five).

The German company aims to bridge the gap between the startups and research institutes developing innovative solutions and corporations looking for suppliers of plastic-free packaging by forming partnerships where corporations can test early prototypes in real life.

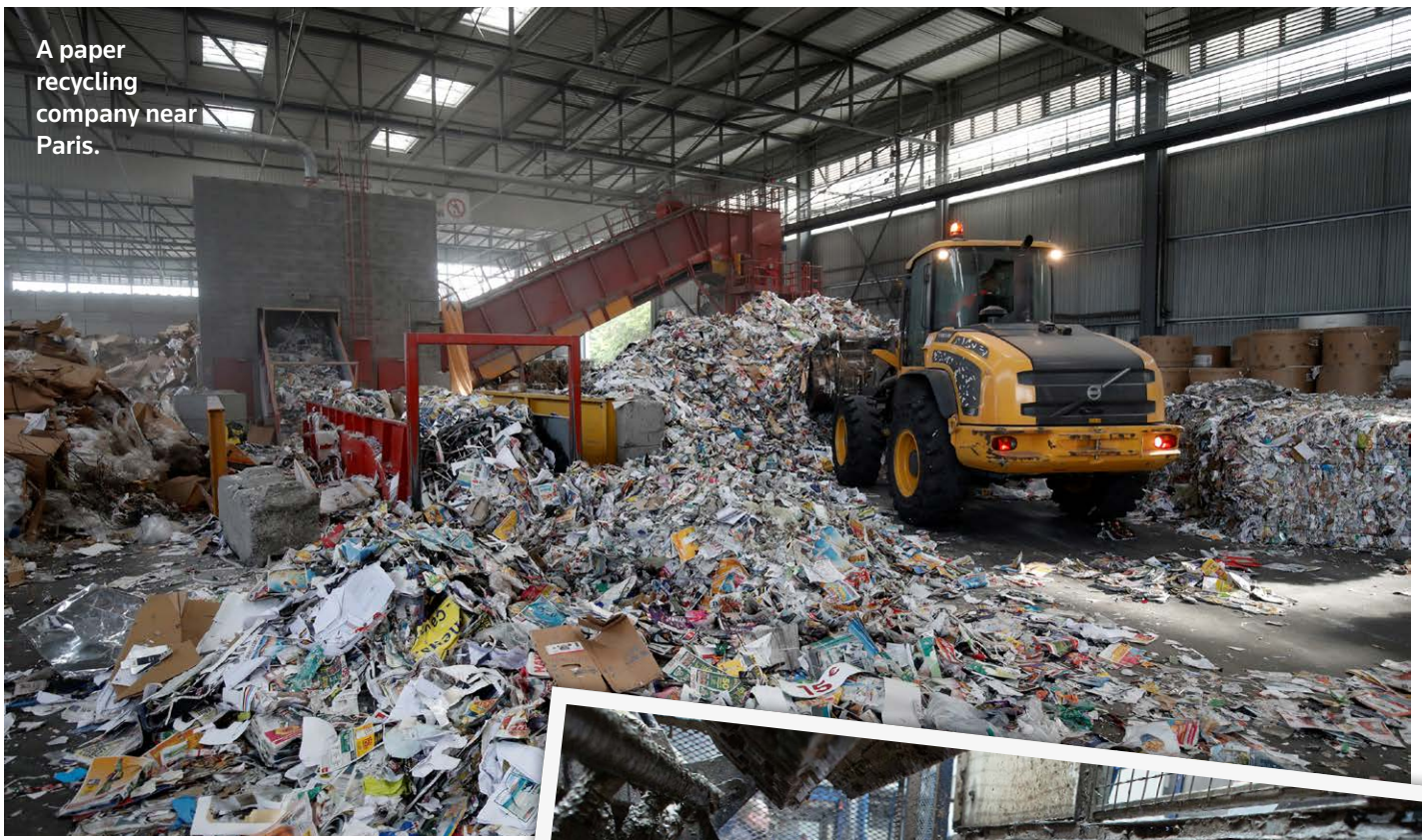
"The difficulty with scaling up is usually reflected ›



Alternative fibres from agricultural waste products such as wheat straw and being used to make packaging.

REUTERS/PASCAL ROSSIGNOL

> **There's a huge amount of work going into figuring out which natural polymers have the best properties**
>
> CLAIRE HAE-MIN GUSKO, ONE • FIVE



A paper recycling company near Paris.

REUTERS/BENOIT TESSIER

in cost - the less scale there is, the more expensive the material usually is," Hae-Min Gusko explains: "These are relatively young technologies, if you compare how much more research and time has gone into the traditional petro-plastics."

While traditional plastic has a well-known chemical structure that is easy to understand many features of biomaterials are far from understood, she points out. The chitin from a seashell has a different chemical structure from that from fungi. "If you're trying to create the same film every single time, but your biomaterial is organic, it will have slight deviations, which makes production more difficult to really perfect," she says.

However, discovering something new about biomaterials is what makes working in this area exciting, Hae-Min Gusko says. "Every time you work with those materials, you're pushing the boundaries and understanding something that somebody before you hasn't."

Cosmetics company Lush is considering expanding its use of cork to store products, following success with its cork pot, which was introduced in 2019 to hold its solid shampoo and soap bars. The cork is sourced from Portugal, where it is harvested without harming the tree, after which it regrows for a future harvest.

Cork forests sequester carbon, and benefit local wildlife, such as the Spanish black pig, explains Maria Feast from the Lush creative buying team. Lush worked with Portuguese firms Cork Connections and Ecointerventions on the cork pots, while the machines used to manufacture them were designed by its own engineers.

According to Feast, Lush is currently working on another plant-based packaging material which can be wild harvested in Ecuador. It is not yet signed off, so Feast cannot reveal details. "No-one is doing anything like this on the market," she says. ●

Catherine Early

CULLEN

Scotland-based Cullen makes moulded pulp cartons from byproducts of its corrugate packaging business.

COMMENT

‘We don't have time to wait for a global plastics treaty. We need to start now, with disclosure’

AGUSTIN MARCARIAN/REUTERS

Cate Lamb of CDP says transparency about plastic risk would cut down on unsubstantiated claims and promises

The fact that the second round of global plastics treaty negotiations began in Paris with resistance last month reflects both the truly transformational significance of this treaty and the scale of the task in developing this ground-breaking agreement.

Among companies, there is a growing and welcome awareness of the urgent need to stem the plastic crisis across value chains. In just the past month, we saw a new investor coalition managing $10 trillion in assets, coordinated by the Dutch Association of Investors for Sustainable Development (VBDO), urging companies to cut their plastic consumption, and the G7 commit to ending plastic pollution by 2040.

A vision statement by the Business Coalition for a Global Plastics Treaty was endorsed by 102 companies, including Fidelity, Borealis and Danone, signalling their readiness to work towards “a circular economy in which plastic never becomes ›

Activists protest in front of Coca-Cola's offices in Argentina last year.

COMMENT

waste or pollution, and the value of products and materials is retained in the economy".

However, with increased awareness comes the risk that companies may be tempted by strategies that prioritise immediate improvement in brand optics but are not built on a foundation of transformative action.

In its Brand Audit Report 2018-22, Break Free From Plastic named Coca-Cola, PepsiCo, Nestle, Unilever and Mondelez International as the top five plastic polluters in the world. At the same time, several of these same corporations were in the firing line over their plastic-related environmental claims, which an investigation in 2022 by the Changing Markets Foundation called "a litany of misleading claims".

Despite countless companies laying claim to sustainable plaudits, an additional 6 million metric tonnes of waste was generated in 2021

CATE LAMB

Despite countless companies laying claim to "sustainable" plaudits in the past few years, an additional 6 million metric tonnes of waste was generated in 2021 compared with 2019 — still almost entirely made from fossil fuel-based "virgin" feedstocks. The gap between the volume of virgin plastic that is generated and the global capacity to manage plastic waste effectively remains vast. We cannot recycle our way out of the plastic crisis – and nor do we have time to waste on unsubstantiated claims and promises.

To be able to act with integrity and effectiveness, companies must develop a robust understanding of how they contribute to the plastic pollution crisis, the financial, commercial, legal and reputational impacts, opportunities and risks they must manage and the actions they intend to take to turn the situation around.

Disclosure of this information, on an annual basis, is essential to showing that their plastics-related claims are valid. Critically, it also provides decision makers with clear, comprehensive, comparable data on the production, use and disposal of plastics across the global economy.

How does this relate to the negotiations in Paris? If harnessed correctly, the global plastics treaty presents an opportunity for real change across the private sector. After the Paris Agreement, climate-related disclosure increased by 233%, and the ›

Women sort through plastic bottles at a recycling plant in Dhaka, Bangladesh.

RAFIQUR RAHMAN/REUTERS

COMMENT

THOMAS PETER/REUTERS

number of companies setting science-based targets has skyrocketed in the last three years, paving the way for governments around the world to mandate climate disclosure for companies and financial institutions.

The good news is that we have the capability and existing frameworks to achieve the same for plastic pollution, but we must rapidly scale their use. What we need now is for policymakers to cement mandatory corporate plastics disclosure as a core mechanism of the global plastics treaty to ensure that the corporate ambition that is starting to increase actually turns into action and that we have a mechanism to track progress globally.

Of course, multilateral policy often takes years to develop and implement, and we don't have years to wait. Companies must start now. Earlier this year, we at CDP requested 7,000 of the world's biggest plastic polluters to disclose on their plastic-related impacts for the first time through our water security questionnaire.

We know that environmental disclosure works: 38% of first-time disclosers have emission reduction targets in place, but by just their third year of disclosure, this number rises to 69%. Whilst many elements of the global plastics treaty are under debate, it is clear that plastic-related disclosure at scale will be the foundation of transformative action to end plastic pollution and waste.

Smoke billows from a petrochemical plant in Japan. $400 billion in investments in petrochemicals and plastics are at risk of becoming stranded assets.

As the world steps closer to a historic plastics agreement, tackling the full life cycle of plastic pollution offers us all a huge opportunity to transition to a sustainable economy, an economy in which businesses innovate and communities thrive.

Companies must act now to get ahead of regulation, boost their competitive advantage, and build trust amongst their stakeholders. At the same time, investors, policymakers and consumers alike must use the momentum of global plastics treaty to disclose their plastic-related impacts if we are to be in with a winning chance of beating plastic pollution.

Cate Lamb manages CDP's global water security programme. She is a board member of the Science-Based Targets Network, and was a High-Level Climate Champion Lead for Water for UNFCCC COP26.