



**REDEFINING
THE
PLASTICS
ECONOMY**

With growing concern across the plastics value chain a number of ambitious initiatives have recently been launched. However, a joined-up, cross-sector effort is needed to improve communication between producers and recyclers, and to develop national and international standards.

By Maxine Perella

The spotlight on plastics waste has intensified in recent months in a series of high-profile launches and campaigns. Brands like Adidas, Ecover and Procter & Gamble are helping to mainstream the issue, whilst offering circular solutions – albeit in limited numbers – in the form of upcycled ‘ocean waste’ trainers and ‘beach plastic’ shampoo bottles.

While such initiatives have yet to scale, it’s a sharp indication that demand is growing for better capture and repurposing of end-of-life plastics. This January in Davos, the World Economic Forum (WEF) launched its latest New Plastics Economy report in association with the Ellen MacArthur Foundation (EMF), setting out an ambitious plan to recycle 70% of plastic packaging globally, from the current rate of 14%. The report, which forms part of EMF’s wider New Plastics Economy initiative, is significant as it has the backing of more than 40 industry leaders from across the global plastics value chain.

LACK OF JOINED-UP THINKING

To achieve these higher recycling rates, the report calls for greater harmonisation and adoption of best practices for collection and sorting systems. According to

the study, 50% of plastic packaging could be profitably recycled if improvements were made to both packaging design and end-of-life management systems – this would bring in an additional \$90-\$140 per tonne of mixed plastics and help remedy the \$80-\$120 billion of plastic packaging material value lost each year to the economy.

Given the disparate nature of plastics collection systems at almost every level – national, regional, and global – any moves towards harmonisation are considered highly challenging. There are emerging examples, like WRAP’s recycling consistency framework in the UK, and the work of the Closed Loop Fund in the US to develop replicable models for kerbside recycling, but these remain few and far between and don’t specifically target separate plastics collections. Similarly across Europe, most plastic packaging is collected as co-mingled material and capture rates remain woefully low, averaging 12%.

“The systems are hyper-fragmented in what can be processed and what capabilities exist,” says Terracycle’s CEO Tom Szaky, whose company specialises in upcycling hard-to-recycle waste streams. “What’s even worse is that packaging designers are constantly adding more vari-



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ety, which in turn is creating more fragmentation.”

Szaky says one of the biggest problems is the lack of joined-up thinking between start-of-life and end-of-life considerations. “Historically, the packaging design and production world, and the recycling world have had a very hard time communicating with each other. Packaging designers are designing what they think is the best package, but usually there’s no line of sight for how to recycle it.”

One pragmatic solution, he suggests, could be to establish recycling ‘review courts’ whereby new plastic packaging types are assessed by reprocessors to determine their recyclability before being placed on the market. These appraisals could initially occur at a national level, before being scaled up for greater cross-border convergence.

A NEED FOR BETTER LEGISLATION

Szaky maintains that recyclers are largely driven by economics rather than environmental concerns, and so will only recycle more materials if there’s value to be derived from doing so. He points to Extended Producer Responsibility (EPR) as an effective push mechanism in this regard, but says there’s more appetite to do that in regions like Europe, which are more accepting of regulation.

Certainly within the EU, plastics packaging legislation is set to become more stringent. The European Commission’s Circular Economy Package has set a prospective 55% plastics recycling and reuse target for 2025 for EU member states, and in January the Commission published a roadmap for its forthcoming plastics strategy, due out later this year.

The roadmap makes no mention of harmonisation, but does highlight a need for better definitions and standards for biodegradable plastics, as well as technology innovation for mixed plastics processing. On a positive note, collaboration between recyclers is starting to happen. The European Association of Plastics Recycling & Recovery Organisations (EPRO) has helped develop EuCertplast, an EU-wide certification for post-consumer plastics recyclers that aims to homogenise opera-

tional practices. EPRO says it has engaged with the EMF on its New Plastics Economy agenda – while supportive of the overall aims, the organisation believes more ongoing dialogue is needed.

“In seeking greater convergence of plastics collection and sorting systems, you need to take into account local, regional, national, political and cultural differences,” says EPRO secretary general Peter Sundt. “National waste legislation can also vary quite significantly, with different priorities in terms of the waste hierarchy. There is no one single solution – if you try to impose too much harmonisation, you may soon meet resistance.”

Like Szaky, Sundt points to EPR as a useful lever. “We believe that there should be some harmonisation at EPR level,” he says. “A key focus now in Europe is the circular economy package – higher recycling targets will require more international cooperation, including on packaging design, which is welcome and will hopefully accelerate action on collaboration.”

One multi-stakeholder alliance that could bear some fruit here is the Polyolefin Circular Economy Platform (PCEP) launched last year. PCEP seeks to develop EU-wide quality standards for sorted plastics, harmonise test methods for recycled plastic materials, and develop packaging design guidelines and assessment protocols in line with circular principles.

To help support this work, one of the co-founders PlasticsEurope has set up a Plastics Packaging Circular Economy Group in order to strengthen engagement with all actors along the plastics value chain to promote lifecycle thinking on packaging solutions.

BEYOND EUROPE

In regions like the US, where the waste hierarchy isn’t so enforced and landfill is cheap, opportunities for cooperation are harder to come by. That said, the Closed Loop Fund (CLF) – a social impact fund with \$100 million to invest – is prioritising better plastics recycling as a clear value opportunity. “There is a lot of best practice in terms of business models and technology innovation that can happen and that can be leveraged across the

US,” says CLF’s head of external affairs, Bridget Croke.

One area the CLF is focusing on is the use of robotics and artificial intelligence in future MRF technology. “It’s very emerging in the MRF and recycling space, but there are companies that are leveraging artificial intelligence to identify and discretely sort material types which will reduce contamination and make it more profitable to recycle this stuff. That’s an example where we feel you could create a lot of industry harmonisation in a cost-effective way.”

She adds: “We are also considering ways to enable MRF [operators] to come to us and say they want a loan to improve their infrastructure, and robotics can be a part of that.”

Asked how plastics collection and sortation systems can be streamlined across different US states, Croke acknowledges that it’s unlikely complete harmonisation will ever happen. “There’s a different model for MRF sophistication depending on the market you’re in, so that’s where harmonisation becomes challenging. I think there’s a need for market segmentation, and to have a few different models that work in different regions and markets.”

Croke says CLF’s approach here is to allocate funds according to three main market segments: mature recycling – these tend to be the denser, larger markets on the US coast; sub-standard recycling; and recycling ‘deserts’ – which can include both rural regions and dense, urban dwellings. “In large municipalities it’s very easy to make the case for a hi-tech MRF that has a lot of automated sortation equipment... in smaller communities it’s much harder to justify that cost, so it’s going to require a different set of solutions.” —

TOWARDS A CIRCULAR ECONOMY: EXTENDED PRODUCER RESPONSIBILITY MAKES A DIFFERENCE

THE LATEST EMF REPORT ‘A NEW PLASTICS ECONOMY: CATALYSING ACTION’, WHICH WAS LAUNCHED AT THE WORLD ECONOMIC FORUM IN JANUARY, FOCUSED, ONCE AGAIN, ON THE GLOBAL IMPACT OF HUMAN ACTIVITIES ON NATURE. IT RAISED A NUMBER OF QUESTIONS AND SUGGESTED CONCRETE ACTIONS FOR A GENUINE SYSTEM SHIFT GUIDED BY CIRCULAR ECONOMY PRINCIPLES.

The European Union has been discussing the transition towards a Circular Economy for some years now. The debate pivots around waste legislative proposals defining efficient waste management practices with a 2030 horizon and other sustainable patterns of consumption and production required to close the loop.

Plastics are at the core of this transformation. This is why the European Commission is set to publish, by the end of this year, a specific EU strategy on plastics. It will focus on decoupling plastics production from virgin fossil feedstock; improving the economics, quality and uptake of plastic recycling and reuse; and reducing plastic leakage into the environment.

As mentioned by the EMF report, we also promote a collaborative approach between the public and the private sector across the whole value chain. The fact that so many leading businesses have committed to working within the New Plastic Economy towards a genuine system shift becomes central to the initiative’s success.

This is precisely what the Extended Producer Responsibility (EPR) is about. Its basic feature is that actors across the packaging value chain – and in particular manufacturers, importers and retailers – assume a significant degree of responsibility for the environmental impact of their products throughout their life cycle. This includes products’ ‘upstream’ impact linked to the selection of materials, product design and production processes as such, as well as ‘downstream’ impact relating to the products’ use and disposal. EPR moreover provides incentives for eco-design

while contributing to sustainable production and consumption policies.

The ambitious target for plastic packaging recycling (50%) suggested within the EMF report is equivalent to the one being currently discussed by the European Parliament and the Council of the European Union, albeit with different timing. We do, actually, believe that harmonisation on EU level is needed. However, for these efforts to be workable, some policy solutions are yet to be found. Amongst these lies the issue of how best to calculate how much waste is actually recycled.

Following our own assessment of the effect of recycling measurement on the circular economy, we believe that recycled waste should be measured at the gate of the recycling plant. In fact, reliable data can only be ascertained upon waste entering the recycling plant.

At the same time, we are fully committed to ensuring that waste materials that are accounted for as recycled have adequate quality attributes. This is why we are also proposing that, in parallel, specific quality standards for waste materials be introduced at EU level, building on current national best practice. —



Joachim Quoden
Managing director of EXPRA



SMARTER PLASTICS FOR A NEW PLASTICS ECONOMY

Trying to achieve a circular economy with existing plastics is like trying to fit a round peg into a square hole. Doing better means embracing change. One example of what that change might look like is Aquapak's dissolvable and 100% recyclable PVOH packaging films.

By Zoë Lenkiewicz

Our performance on delivering a plastics circular economy is poor, with 95% plastic packaging material value being lost after a short, single use.

End-of-life has not been a consideration in the historic development of plastics. Whether a material could be recycled or composted simply wasn't a factor; but times have moved on, the world is filling up with plastic waste, and so end-of-life has moved front-of-mind.

Where the 'traditional' or historic plastics have failed with sustainability, they have succeeded in being cherished by some in the waste management sector. Despite the absence of positive end-of-life characteristics, some conservatives think we are better off sticking to the familiar (PP, PE and PVC) rather than looking to progressive, new materials with circular end-of-life benefits.

This reluctance to trial materials with true circular economy potential is proving a barrier to progress.

"Dreaming of a simpler world where plastics are pure streams with no additives, and there are no laminates or composites... is just dreaming," says John Williams, director at Aquapak Polymers. "The world isn't like that now and it won't be in the future. We demand more and more functionality in our plastics, which means ma-

terials are getting more complex. We have to be smarter not simpler."

EMBRACING CHANGE

There is a well-known business book called 'Who Moved My Cheese?' by Dr Spencer Johnson. A motivational business fable, its story teaches us to expect change, embrace change and make the most of it. Right now, drastic change is taking place in the materials and resource management world, and those who adapt to change will be the ultimate survivors.

"The waste management sector has typically considered itself to be a reactive industry," says Williams. "But in a circular economy, waste managers suddenly become influential. Some people understand this, and they are the ones at the table."

Aquapak is a British tech company that has developed a library of polymers based on polyvinyl alcohol (PVOH), the flexible and dissolvable plastic used in laundry liquid pods, surgical stitches and medicine capsules. The team at Aquapak has been working on the formulae for five years and is about to launch its 100% recyclable, flexible plastics lines for packing products such as crisps or replacing the clear plastic films used on meat packaging, etc.

With its first UK factory opening imminent, the company is in deal-making talks with some big brands. "When peo-

FACTS

20 YEARS

Plastics production will double over the next 20 years with packaging being the largest application.

3%

Flexible packaging is expected to rise 3% a year to \$248 billion by 2020.

\$10 BILLION

Pouches are the fastest-growing segment, accounting for \$10bn of the total.

8 MILLION

Tonnes of plastic packaging 'leaks' into the ocean each year.

ple resist new materials outright it can be frustrating,” says Williams, “But thankfully, while some are saying this can’t be done, others are saying yes, it can.”

PVOH is water soluble, with the degree depending on the blend of polymers, formulation, thickness and temperature. The material is hydrophilic and breaks down into harmless organic components in the presence of large amounts of water much quicker than standard hydrophobic plastics, which can take many hundreds of years.

As a packaging material, Aquapak’s formulated PVOH films are highly functional, with barrier qualities outperforming current market-leaders for many applications. It is non-toxic and has FDA approval which opens up the potential for manufacturers, brand owners, retailers and reprocessors to have access to a multi-functional, high performing and durable plastic film that can be 100% recyclable and 100% recycled.

At end-of-life, since PVOH dissolves in water, the film separates easily from other materials (such as a rigid plastic food tray or a cardboard sandwich box), reducing contamination throughout the recycling stream.

Using chemical recycling instead of mechanical processes makes the separation and recovery of PVOH both affordable and efficient. According to Aquapak, its notable advancement is the ability to recover its polymer back out of solution in a pure, uncontaminated form. It can be repelletised at the sorting facility and sold directly back to manufacturers in a closed loop.

In order to allow the technology to scale rapidly, Aquapak PVOH pellets are compatible with existing polyethylene (PE) blow film production facilities, so no investment is required by the blown film manufacturers, and as demand for the products increase, operations can be scaled up and extended.

SUPPLY CHAIN

A New Plastics Economy is clearly not just about new materials, it’s about new processes. We cannot achieve a circular economy using the same approaches we have always used. As Einstein said, insanity is



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doing the same thing over and over again and expecting different results. If traditional plastics are a barrier to more sustainable resource use, then let’s change to something that allows circularity.

Equally, if the new plastics have value, then it’s in the interests of the waste management companies to separate it and sell it, not say ‘we don’t want it’.

“We need engagement and collaboration all along the supply chain. The waste management industry needs to be part of this change so that new materials don’t get rejected. Likewise, people working on new materials need to think about end-of-life from day one; it’s a completely different approach to resource management,” explains Williams.

Waste managers can now influence supply chains, since they are a fundamental part of the materials cycle. Likewise, if a new material manufacturer talks with the waste sector about the value of the material and how it can be retained, it will demystify the new material and bust the myths that surround it.

According to Williams we need these new conversations in order to deliver a circular economy.

No-one will have a magic bullet. It takes demonstrations, trials, and engagement with packaging technology partners. “With new materials, we are successfully building end-of-life into the process, and now we need to work on the scale and cost to help bring these superior materials to market,” he says.

Otherwise, we will be stuck with the plastics we are using today, which are not a good fit for the 21st century. As Buckminster Fuller said, “You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.” —