

Plastics in Packaging

Issue 238: August 2021

SWITCH IT UP

Brand owners move to bridge the gap between climate rhetoric and action

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The tipping point

Whether it's turtle necks (supposedly engulfed in packaging waste) or bottlenecks, plastics as part of a circular economy is an emotive subject, with plenty of issues still to be solved. **Steven Pacitti** reports

It is not a tax! I repeat, it is not a tax! In a month where Europe's Single-Use Plastics (SUP) Directive came into force, and Italy's €450 (\$533) a tonne plastics packaging tax was due to launch (it's now delayed until January 2022), Emmanuelle Maincent of the European Commission (EC) was at pains to convince delegates at Petcore Europe's annual conference that a plastics contribution proposal is definitely, absolutely, and defiantly not a tax.

Starting this year, EU Member States will have to pay a 'national plastics contribution' into the EU budget, commonly called the 'EU plastic tax', but as Maincent explains, it's neither a tax, nor does it oblige the Member States to levy a national tax on plastics waste. But, fundamentally, however you 'package' this, the purpose of the 'contribution' is to raise revenue for the EU budget. Indeed, it was first mooted in 2018 as a way of partially closing the impending 'Brexit gap' in the EU budget caused by the UK's departure from the union.

In the confines of a conference focused on sustainability and the circular economy, however, Maincent was keen to promote the contribution as a means to incentivise recycling policy across Member States.

"It will support the waste strategy of reducing waste and fostering recycling," she said. "This will help to achieve the targets of 50 per cent recycling by 2025 and 55 per cent by 2030."

Each Member State has to pay €0.80 (\$0.95) per kilogram of plastics packaging waste that is not recycled, which equates to €800/tonne (\$946), with monitoring conducted under the auspices of the Packaging and Packaging Waste Directive.

"It will apply retroactively from January 2021," she explained. "The aim is to support recycling policy and not penalise recycling."

In response to one delegate asking if the EU would consider taxing all crude oil

imports as a way of increasing revenues and incentivising sustainability targets, she stated that the EC is bound by rules but is working on a possible carbon border tax to create a level playing field.

The EC launched the Circular Plastics Alliance (CPA) in 2018 in order to help plastics value chains boost the EU market for recycled plastics to 10m/t by 2025, and Laure Bailargeon, policy officer for chemicals and plastics at the EC, provided delegates with an update.

"EU action continues after Covid-19, with the launch of the EU Taxonomy tool on 'sustainable activities' in April 2021, to help investors understand whether an activity is environmentally sustainable, and an updated industrial strategy in May 2021 with green transition as a key part, including the circular economy and increased recycling," she said. "Voluntary commitments and pledges are important, plus value chain cooperation, and we have 280-plus signatories."

She stated that the alliance has delivered 80 per cent of its declaration, so what about the remaining 20 per cent? "The CPA needs to engage with Member States and non-governmental organisations to translate pledges into reality," she added.

Seeking clarification on the plastics contribution proposal, one attendee asked who is expected to foot the bill for the tax. While admitting that there is "no free lunch", Maincent repeated, again, that it is not a tax but a "statistical contribution" based on plastics packaging waste.

"It could be a ban, a regulation, or something else, or a tax, depending on how the individual Member State wants to approach it," she replied. "National treasuries pay the fee."

So, in short, it could indeed be a tax. Commenting that the fee has no time limit for review, Maincent was asked by Petcore's Mike Neal about what action would be taken against all materials, given that plastics packaging is a minor part of total packaging, and packaging is a minor part of total waste. She replied that no additional measures would be taken.

Coca-Cola Great Britain plans to transition to 100 per cent recycled plastics in all of its bottles of 500ml or less from next month, as brands match their sustainability rhetoric with action



Even rPET flake took on a large premium over virgin resin in 2020

Credit: ALFA

Taxiing on the runway

Moving from taxes that aren't taxes to attempts to kick-start a surge in recycling: a review of capacities, collections and growth in rPET makes it painfully obvious that collection is the bottleneck to the market. A lack of significant growth to feed capacity is making it hard to satisfy demand, and that supply-and-demand imbalance is making it challenging for all parties involved in rPET.

"In 2019, there was an uplift in collection and it presented positive signs," explained Helen McGeough, senior analyst for plastics recycling and global analyst team lead at ICIS. "It rose higher (5 per cent) than consumption growth (4 per cent), which was the first time that this has happened. However, a lack of harmonisation in collection systems produced varied rates across Europe."

And therein lies the problem. But beyond that, average yield has also been dropping so there is pressure due to contamination levels in the collected material.

Discussing the 1.4m/t of rPET produced in

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2019, McGeough explained that usage in packaging applications accounted for 70 per cent of output, and that is the strong trend moving forwards. The food-contact bottle market as an end use for rPET rose 7 per cent in 2019.

"In 2020 – when we collate all of those figures – I would expect the share for food-contact bottles to have risen to 50 per cent,

from 32 per cent in 2019. Brand owner pledges are all exceeding the SUP mandate," she commented.

Naturally, the unprecedented challenges that 2020 brought to the world will be felt in the recycling sector. McGeough explained: "We saw drops in crude and virgin as a result of lockdowns in April 2020, and a massive substitution away from rPET, particularly in the sheet sector. Operating rates at recyclers were hit badly in the summer of 2020, and for flake and pellet, rPET took a large premium over virgin PET in September. Flake was always very competitive with virgin PET, but even that took a premium of €200/t (\$236) last year, and food-grade pellet reached almost €700/t (\$828) more."

Casper van den Dungen, vice president of Plastics Recyclers Europe (PRE) estimates that the impact of Covid-19 has been 10-15 per cent lower volumes of available material for recyclers.

In addition, testing cycles for recycled polymers, especially polyolefins, were postponed, and hygiene concerns pushed substitution back to virgin.

"To reach the SUP target of 2025, we'd need a 60 per cent growth in collection volumes," warned McGeough. "We'd need a 6 per cent average growth rate per annum to achieve the 2029 target, but we're languishing at 2 per cent and need a stimulus; harmonisation perhaps, or maybe deposit return schemes (DRSs). The 2025 target is 75 per cent but we're currently at 64 per cent, with 2020 likely to represent zero growth, or potentially a minus rate due to the pandemic. We are facing a challenge to meet the target."

Returning to the burgeoning food-contact bottle market, she suggested that an 11 per cent annual compound growth rate would be required in food-grade rPET usage in order to reach the SUP 2025 target, which is hard considering the collection rates.

"We'd need to see a four times volume increase from the 2019 figure to achieve the ambition, but the goalposts keep moving," she

Dimensional and thickness measurements for plastic containers and preforms.

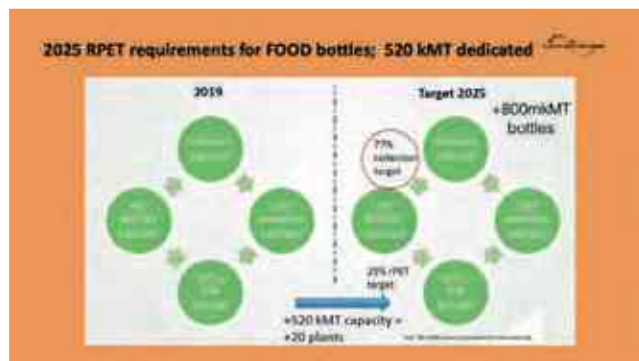
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Above left: Austrian converter ALPLA has invested heavily in recycling in recent years. **Above right:** Plastics Recyclers Europe's Casper van den Dungen pointed to the 77 per cent collection target and warned that recyclers can only afford big investments if the supply can be guaranteed

said. "The end markets keep looking for higher and higher recycled content rates."

Executive director for Petcore Europe, Christian Crepet, said that a survey conducted into DRS markets found that once all are functioning by 2025, 3m/t of capacity would be available.

"The largest consumer markets, with the exception of Germany, have no DRS plans so it will affect the shortfall," commented McGeough. "The UK is once again reviewing a DRS and so that has impacted the potential start date."

Another area that presents potential for collection uplift across Europe is pots, tubs and trays (PTT), and the UK has made good progress in that regard.

"Thermoformers, which have been one of the major consumers of rPET bottle flakes, are looking for alternative sources of post-consumer recyclate (PCR) with the aim of [creating] a true closed loop," explained Ana Fernández, global innovation director for the FCP Division of converter Klöckner Pentaplast. "Out of 1m/t of PET sheet consumed across Europe, just 15 per cent is collected. In Europe, by 2025, we should see the collection of 400,000t of PTT and 550,000t by 2030. It's difficult to find material coming from trays."

To make all of this possible, Fernández believes that a robust recycling stream must be established with suitable bale specifications and improved sorting, and she thinks that watermarks and other identification technologies must be implemented.

"A major challenge lies in the ability of collection and sorting systems to capture enough PCR PET trays of consistent quality," she explained. "Trays need to be sorted from PET bottles for separate reprocessing in dedicated lines."

Fernández outlines what she thinks is required to improve PTT reprocessing: "We need to adapt de-labelling equipment from bottles, and also lower washing temperatures to prevent crystallisation and fragility. There are different opinions here. Some recyclers want to

use lower temperatures, and some recommend those higher than [for] bottles in order to remove the higher organic load with trays, so some testing is required here.

"Grinders also need to be able to produce bigger flake sizes, and if the feedstock has multiple layers then we should have optional equipment for delamination.

"Multilayer delamination is a key issue, either through hot washing using high pressure and friction, or chemically-assisted delamination using reactants to degrade, dissolve or minimise bonding capabilities and to separate layers. Delamination allows recyclers to work in a PET mechanical recycling process without pre-sorting needs."

There are several projects underway across Europe looking to incorporate recycled content from PTT in food packaging, and Fernández wants packers and retailers to help close the loop by asking for PCR from thermoforms.

"The target is to reach 30 per cent tray-to-tray by 2025, and we need to adapt systems for trays that reduce friction and the production of fines, as bottle recycling systems are very aggressive," she added. "In some countries, trays are mixed with bottles."

But how can the delamination plants be harmonised? Fernández admits that different technologies and packaging are a challenge. For example, in northern Europe, most packaging is mono-PET, whereas southern Europe has a higher content of multilayers, perhaps due to the weather and the types of food typically consumed.

"We need to work towards mono-materials and use them in all possible applications, which will give us a good base of the right material specifications," she urged. "But some applications will require high barrier. Alternatives to multilayer, such as oxygen scavengers, are hindering the recyclability of mono-PET."

In a similar vein, Alessandra Funcia, head of sales and marketing at masterbatch and compound manufacturer Sukano, explained that the formation of a Petcore Working Group on Opaque and Functional Bottles has a vision

to see all such PET bottles and trays designed for recyclability, collected, sorted and recycled.

"Ninety per cent of functional opaque PET bottles are white," she said. "In 2020, the Special Industry Group developed a PET white light barrier from recycled materials. This year, opaque white rPET will reach a demo industrial scale of 22m/t."

Meanwhile, there is an ongoing push for better sorting technologies, design for recycling, bottle-to-bottle whites, and bottle recyclate for insulation or fibres.

Breaking the bottleneck

Across the EU27+1 in 2020, there were ten producers of virgin PET in Europe generating a combined 3.34m/t of resin, according to trade association the Committee of PET Manufacturers in Europe (CPME). Indorama is far and away the largest producer at more than 1m/t of capacity (34 per cent of the market total), followed by Neo Group, JBF, Equipolymers, Novapet, Plastiverd, Alpek UK, Plastipak, Control PET, and Polisan.

CPME's chairman Antonello Ciotti commented on the challenges of balancing the need to feed an estimated nine billion consumers by 2050 with the carbon dioxide emissions generated by food loss, which is higher without plastics packaging.

"According to the state of play presented by Axens and Eunomia, there were 3.45m/t of PET bottles placed on the market in 2018, while rPET production was 1.35m/t," he said. "Just 810,000t was suitable for bottle-to-bottle, and the maximum average rPET content was 23 per cent. This poses a lot of issues."

With 5.55m/t of PET placed on the market, a collection rate of 2.15m/t underlines the main issue for the market.

"The European PET value chain must adhere to new EU Directives in terms of collection rates," added Ciotti. "Of high concern is the lack of rPET content definition and imports of so-called 'food-grade flakes' from non-EU countries."

Ciotti wants politicians to recognise the role that the European PET Bottle Platform has to play in the circular economy. "Politicians need to consider legislation against colour, like they have in Japan, while direct printing on bottles can contaminate rPET and some labels come off easily and sink. What can be done to make sure that we actually recycle 100 per cent of post-consumer waste, not just PET?"

PRE's van den Dungen, who is also group business development recycling director for Switzerland's Resilux, does not necessarily expect a migration away from colour to clear PET.

"I give a Swiss answer," he said. "Everyone is pushing towards 50 per cent rPET content in Switzerland, and we're making green, blue and brown pellets for various bottles. We just have to make sure that we get the right sortability in place to achieve the circular economy."

Marc de Voogd, general manager for ALPLA France and Iberia, does, however, see a trend for clear PET: "All large clients are looking at clear material and colour labels or sleeves, and there are even some voices in the PE section looking at bottles that are not necessarily clear, but darker with a coloured sleeve."

ALPLA has invested heavily in expanding its recycling activities, and de Voogd indicates an average spend of €50m (\$59m) a year between now and 2025. He expects 25 per cent of its worldwide total processed material to be PCR by that time.

"Soon, our production capacity will be 100,000t of granules made of post-consumer PET bottles, and 50,000t of granules made of post-consumer PE bottles (HDPE)," he explained. "We have 100 per cent rHDPE, rPP, and rPET bottles, along with extrusion blow moulded PET, 100 per cent rPET with up to 50 per cent Social Plastic, and up to 25 per cent recycled beach plastics. In the milk market, we have super-lightweight HDPE bottles with up to 40 per cent recycled content."

"The vision for PET bottles in the EU is for a waste rate reduction to less than 10 per cent through design for recycling, better sorting, and chemical recycling, while full bottle-to-bottle recycling is possible through 70 per cent mechanical and 30 per cent chemical recycling. A collection rate of 99 per cent could be possible with deposit systems in every country."

"All of these technologies already exist, so it's our vision of a future circular economy."

Van den Dungen added that in Europe there is 6m/t of recycled plastics. "We have seen the Union of European Soft Drinks Associations pledge 50 per cent rPET content by 2025 and an increase in 100 per cent rPET launches," he said. "Likewise, some have accelerated acquisitions of recyclers in order to make 100 per cent rPET."

When it comes to potential harmonised EU standards for feedstock and applications in food-grade, van den Dungen points to the missing Regulation 282/2008. "This tells us what rPET is going to do in food-grade, so it delays transparency in the level playing field because it can involve big investments. We are waiting to find out what we have to do according to the law to keep us all safe," he said.

According to Euromonitor International, the 77 per cent collection target by 2025 would generate another 800t of bottles compared with 2019, and another 500,000t of extra capacity, ideally for bottle-to-bottle, which would equate to 20 additional plants.

"We have seen some increases in plants, but not the volume of four-to-five a year," cautioned van den Dungen. "And that is to do with collection. Investments are normally close to 25,000-30,000t and that represents €35-50m (\$41-59m), which is a lot of money. We can only afford to make these big investments if we can guarantee supply. A chain reaction starts after a new DRS is guaranteed."

On the subject of 2025 targets, van den Dungen points to uncertainty about collection expansion timings as a result of a lack of supply-side infrastructure.

"Delivery times for rPET wash plants are close to 12 months," he said. "Good order books for 2020-21 have brought a corresponding increase in wash capacity, but its feedstock is lagging behind."

He also believes that markers and tracers, as well as artificial intelligence, can help to upgrade non-deposit feedstock to the required quality levels.

PET is undoubtedly a great material that fits nicely into a circular economy model, but work still needs to be done to hit various targets across Europe. PET bottle collection is the main improvement needed, with the start-up of new DRSs likely to initiate rPET capacity expansions in those countries. In addition, dedicated bottle-to-bottle rPET capacity is required to meet targets, and standards will be needed for feedstock and rPET for mineral water or carbonated soft drinks.

But, above all else, remember that it's not a tax.

** Next month, we ask where circular PET is headed, and what opportunities exist beyond recycling.*

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