RECYCLED PET MARKETS ADAPT TO NEW REALITIES

By Mark Victory, Contributor: Helen McGeough
Recycled PET Markets Adapt to New Realities

By Mark Victory, Contributor: Helen McGough  November 2019

Transformation of the global trade of plastics waste started in January 2018 when China’s waste import ban took effect. Having imported around 2m tonnes of polyethylene terephthalate (PET) waste annually, for consumption by the domestic fibre industry, China’s plastic waste imports dropped significantly, by almost 100%, in 2018. Sources of plastic waste imports include Japan and Europe, with exports to China falling by over 90% in 2018. Conversely for the rest of Asia imports increased by over 75% in 2018 after building up in 2017 (+33%).

This has completely changed the dynamics of the market. China is no longer a route for recycling and the expectation is that countries now deal with their own waste. Initially, this means greater contamination in existing streams as the typical low-quality volumes exported are integrated back into the domestic stream.

However, this should stimulate a greater focus on collection and sorting infrastructures to improve quality, as well as design for recycling becoming a priority in the conception of new product/packaging.

There is an increased focus on recycled PET (R-PET) in Asia with end users looking for quality supply sources amid insufficient volumes.

PET producers are looking at ways to plug the gap in supply and offer more sustainable solutions. A major Chinese producer has developed the capability to make PET with recycled content of around 25%. The company is awaiting customer feedback before starting production.

New capacities for R-PET are also being planned. Veolia plans to open a 25,000 tonne/year plant in Indonesia in Q1 2020. Thai PTT Global Chemical and Austria’s ALPLA are collaborating on a feasibility study for a new R-PET facility. And Germany’s ALBA Group is evaluating a 35,000 tonne/year R-PET plant in Japan.

The change in trade flows of plastic waste has not just impacted waste volumes, it has produced new trade in bale, flake and even food grade R-PET across markets that are unprecedented. None more so than Europe.

It would require a significant increase in European collection rates and recycling techniques in order to reach current regulatory and brand-led sustainability goals, ICIS analysis shows. Hence the growing interest in imports of recycled feedstock and product from outside the region.

The European Commission has set a 50% re-use target for municipal waste by 2020, under the Waste Framework...
Directive (65% by 2035). There is a separate target for plastic packaging, 55% of which must be recycled and 100% recyclable by 2030. The EU Council has also adopted a 90% separate collection target for plastic bottles by 2029, (77% by 2025) under separate legislation.

“In order to reach these targets collection would need to grow at ~7%/year in Europe, but as the ICIS study into European R-PET industry in 2018 showed, growth was just over 2% and projected at 3-4% to 2020, which is far from what is required,” Helen McGeough senior analyst, plastics recycling at ICIS said.

The study also showed a 63% collection rate of post-consumer PET across Europe, with 2.1m tonnes of PET bottles collected. Actual collection rates, though, vary greatly from country to country from 21-96%. The European Commission has identified 14 countries as at risk of missing 2020 recycling targets.

A ban on single-use plastic products for which market alternatives exist will come into effect by June 2021. Extended producer responsibility schemes covering the clean-up costs for products such as fishing gear and tobacco filters will be introduced between January 2023 and December 2024, depending on product. The EU has also backed other bans – intentionally added microplastics by 2020 and oxo-degradable plastics.

Such legislative measures are spreading across the world and driving firms throughout the petrochemical and packaging industries, to adopt increasingly ambitious sustainability targets beyond mandated minimums because consumer demand has already begun to shift away from single-use plastics.

Many plastic bottle manufacturers, for example, are targeting at least 50% recycled material by 2030, or shifting to other materials such as bio-based or non-plastic alternatives. However, alternatives often have the same or a larger environmental impact than traditional plastic packaging, because of higher energy usage, CO2 output and weight.

The R-PET chain is perhaps the key example of the extent of the shortage of material because it is currently the most widely recycled plastic in Europe and has the most developed market and infrastructure.

Because of cross-contamination from other plastics and losses due to the mechanical process, average wastage rates across Europe – which also vary country to country – are at around 30-35% according to market estimates, rising from around 25% in 2009.

Taking the most optimistic figures, this would leave a theoretical maximum of 23% R-PET content across the packaging industry, if they managed to reach a 100%
share of the R-PET market. Currently, the bottle and sheet industry hold a 67% share of total R-PET supply, enough for an average 16% R-PET content. Coupled with this, other sectors such as fibres and chemical recycling projects are increasingly seeking a higher share of post-consumer PET waste.

Packaging producers are also investigating a switch to other materials including PET because of the misperception, caused by the headline collection rates, that R-PET material – particularly food-grade material – is in abundant supply. An additional limit is food-grade pellet production, which currently stands at around 300,000 tonnes/year in Europe, or around 9% of overall PET plastic bottle demand.

Coupled with this, to achieve European Food Standards Agency (EFSA) approval, recycled material must contain less than 5% contaminants (including from other plastics), 98% of the material used in reprocessing must have been sourced from food-contact applications, and there must be full and provable traceability throughout the chain.

“The challenges for the R-PET supply chain are evident, but without collaboration throughout the chain these will remain difficult to overcome. There is now some recognition by packaging producers and brands that the supply of recyclate they are getting out of the supply chain is heavily influenced by what they put in. Hence the dual targets by major players to move their packaging to recyclable, as well as contain recycled content,” McGeough said.

For R-PET, the major feedstock is used plastic drinks bottles. And reaching the 98% threshold is not currently a challenge. But for other recycled material such as recycled polyethylene (R-PE), recycled polypropylene (R-PP) and recycled polystyrene (R-PS) where multiple forms of waste are collected in kerbside schemes, proving provenance of material to reach the 98% content threshold is prohibitive.

The structural undersupply of food-grade pellets at a time when minimum recycled content levels are being set is the leading cause of R-PET food-grade pellet prices reaching a record high spread with virgin PET spot prices of 56-57% in September 2019.

“The capacity for food grade R-PET is set to increase, with market sources stating projects totally near 250,000 tonnes will be coming on stream in the next two years. However, further investment is still required to grow capacity at the same rate as demand. Over 15% growth/year in food grade R-PET supply is required to meet the mandatory targets for the SUP directive based on ICIS growth assumptions for PET consumption, which is lower than most brands voluntary targets but again the growth found from the 2018 study shows it fell short at 8%.”

Structural shortages of material, along with technical limitations such as opacity of material and loss of tensile strength, have led companies to explore other avenues for reaching sustainability commitments such as chemical recycling or bio-based materials. Chemical recycling allows waste, such as multi-layer PET trays from food packaging...
and textiles, which is currently difficult to recycle, to be depolymerised back to monomer.

Contamination levels, colouration, EU consumer standards and traceability mean that not all post-consumer waste collected is suitable for use in applications such as food-contact. Depolymerised material has the same properties as virgin material and is therefore seen by many chemical companies as the holy grail of recycling, with different methods even taking post-consumer product all the way back to crude.

Nevertheless, typical concerns around chemically recycled material include the cost of the process and yield. Also, industry expectations suggest that it will take at least 5-10 years for chemical recycling to reach an industrial scale – too late to hit European legislative targets. Another major barrier is, as with recycling, waste collection. Chemical recycling will be directly competing for volumes where mechanical recycling already exists, making cost-basis ever more crucial, while for products where mechanical recycling is immature, supply chains will need to be developed.

“Industry’s engagement in sustainability is evident, but how these pledges are being implemented and supported either financially or through collaboration is unclear in many areas. The crux of the supply chain issue falls to collection, in terms of both quality as well as quantity, and remains the biggest mountain to climb because who is going to pay to improve, build or expand the infrastructures required?” according to McGeough.

While in previous decades recycling was a fringe issue for the petrochemical market and was not generally a focus in packaging demand, it’s now taking centre stage. As a result, companies are coming together to try to develop circularity solutions throughout the supply chain.