

Advances in plastics recycling processes towards the creation of a circular economy

The development of a circular economy to address the plastic waste emergency hinges on the creation of demand for high-quality recyclates. STADLER, a leading supplier of sorting plants for the recycling industry, has experienced a shift in the market, with more than 80% of its projects for plastic recycling plants in 2020 involving significant upgrades of the facilities to achieve the consistent, high-quality output required to enter the plastics circular economy.

Plastic is an exceptional product, with numerous benefits that have made it indispensable to modern life. Its extreme durability, however, creates a difficult end-of-life issue which needs to be addressed with urgency. The solution lies in a shift towards a circular economy where plastic is re-used or recycled, never becoming waste. The recycling industry has a central role to play in this process, with the challenge of maximizing the amount of plastic it recovers from waste and producing an output of consistent, high-quality Post-Consumer Resin (PCR) that can compete with virgin resin.

Technology advances in the last 10 years have revolutionized the industry. Today, it is possible to sort plastics very efficiently, at very high percentages: a STADLER mechanical sorting plant can achieve up to 95%, and with electrostatic or washing equipment it can be close to 100%. NIR detection, laser technology and artificial intelligence play a big role in this changing market.

Mr. Miloš Krása, STADLER Sales Manager for the Czech Republic and Poland, says: “There are many routes to pursue, focusing on purity, recovery rate, simplifying the process, monitoring material movement or improving the identification of the plastic materials. Modern technologies and new technical developments will help us to continue improving the sorting process and achieve better results with simpler solutions.”

“Finding a way to identify the infeed material would help to improve the process. With exact information on what is contained in the infeed material and in which amount, the plant can be adjusted accordingly and sort more effectively. Currently, we work with material composition data provided by the customers, but it varies depending on the season and the provenance (village or city),” continues Miloš Krása.

The current trend is towards replacing manual sorting with automation. In these fully automated sorting plants, manpower is dedicated to controlling the process, and carrying out maintenance and service work. These facilities can process large amounts of materials but require significant investment and are more complex to operate and manage.

A growing demand for effective plastics recycling

Social awareness is putting growing pressure on stakeholders to change the way they operate. Public policy is increasingly requiring manufacturers to use certain percentages of plastic waste or recycled content in new products.

Europe is leading the way on public policy towards recycling and the circular economy, as Miloš Krása remarks: “some European states have a very good system of waste management in place, with a high level of recycling technology. Of course, there is the other side of the coin, and not all countries do as well as that. However, waste management and the associated recycling technologies are improving in general. Awareness about waste and how to reuse materials is growing across the world, and consequently the pressure to take action is increasing. Nevertheless, the difficulties hindering the installation of new sorting plants to address the issue are not always legislative or due to the lack of proper waste management systems; in many cases, they are also financial.”

Many big brands have made commitments to better manage the end-of-life of their plastic products and packaging. Manufacturers are also finding new uses for PCR, so that recycling doesn't have to be limited to bottle-to-bottle transformation. It is now possible to make pallets with recycled plastic. Considering that 95% of products are transported on wooden pallets, there is a two-fold environmental benefit of converting to plastic pallets. Another innovative use of PCR is railroad ties, also replacing wood. They are extremely durable, they are not vulnerable to water and insects, and competitive in price. Other uses that are becoming increasingly popular are underground water treatment septic tanks, replacing concrete, and tanks for water retention plants under parking lots.

Social pressure, policy changes, new uses for PCR: all these factors are driving a growing demand for high-quality PCR that can be converted into new products.

Towards a plastics circular economy: the recycling industry is evolving

The recycling industry is responding to this demand, upgrading its facilities to achieve the consistency and high quality needed for PCR to enter the plastics circular economy, and to increase their processing capacity.

STADLER is at the heart of this evolution, developing the advanced technology that recycling plants need. “We are constantly innovating and developing new processes, adapting our customers' plants to their changing needs. We are seeing firsthand that the industry is stepping up to meet this new demand: last year, plant upgrades and expansions accounted for more than 80% of our projects in the plastics sector, an increase in excess of 38% compared to 2019,” adds Miloš Krása.

An issue that has slowed down the demand for PCR is the perceived lack of consistency, which can potentially damage the manufacturer's equipment or affect their end product's quality. However, technology advances have resolved this: the testing equipment has come a long way, to the point where it is possible to have a very reliable feedstock. The customer can trust that every single truckload of PCR that comes into their plant, which they are mixing with their virgin material, is consistent from one year to the next, from one load to the next. This is very important.

The technology is now available to process plastics efficiently and produce consistently high-quality PCR that can be used to make new products – not necessarily consumer-facing or food grade, but products that have a valuable place in the market. Manufacturers recognize there is a problem and want to do something about it. As their awareness of these

possibilities grows, the demand for PCR will increase, driving the development of a plastics circular economy.

STADLER in the Central European Markets

STADLER has been locally active in the Czech Republic for the past 5 years. During this time, the company has established its presence in the market, and plans to open its first STADLER sorting plant in this country in the near future. Miloš Krása explains: “significant investments will be needed in the coming years in order to meet the requirements of the EU and its climate targets, and STADLER is ready to contribute to these efforts.”

A large number of companies operate in the waste sector in the Czech Republic. Some of them run their own collecting systems and big sorting facilities for processing the material, while others cooperate with local collecting companies. Whatever their operation, they will all have to adapt their facilities to fulfil EU requirements. “Our discussions with plant operators show that there is a significant demand for renovation of recycling plants,” adds Miloš Krása. “We receive many enquiries about improving even small plants in order to achieve better results. With our knowledge and technology, we can upgrade simple plants or modify existing facilities, and integrate new machines for higher throughput and better yield. There are also discussions about the construction of new sorting plants to process MSW and lightweight packaging waste, in order to recover valuable materials.”

“Waste processing companies in the Czech Republic are taking action to meet the demands of the EU. They are dedicating a lot of effort into adapting their existing facilities to the new requirements, as well as designing brand-new, advanced sorting plants with the best technologies available in the market,” concludes Miloš Krása.

About STADLER

STADLER is dedicated to the planning, production and assembly of sorting systems and components for the waste disposal and recycling industry world-wide. Its team of over 450 qualified employees offers a tailor-made full service, from conceptual design to planning, production, modernisation, optimisation, assembly, start-up, conversions, disassembly, maintenance and servicing of components to complete recycling and sorting systems. Its product range includes ballistic separators, transport conveyor belts, screening drums and label removers. The company is also able to provide steel structures and electrical switch cabinets for the plants it installs. Founded in 1791, this family-run company’s operation and strategy is underpinned by its ethos of delivering quality, reliability and customer satisfaction, being a good employer and providing strong social support. For more information, visit www.w-stadler.de

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