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THE FOURTH DIMENSION

Why machinery manufacturers are telling customers to forget the word impossible in the factory of the future

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Taming of the screw

Erema's Manufacturing Execution System, re360, lends itself to the idea of a 'smart factory'.

Left: Plastics waste is a multifaceted challenge that will require innovation, said Erema's Gerold Breuer

As recycling of production scrap and the use of recyclate in packaging applications and beyond gathers increasing momentum, companies such as Erema need to show industry what is possible. Steven Pacitti reports from Ansfelden

Recycling: Everyone's talking about it! And while not everyone is actually doing it, changes are most definitely afoot. In-house and in-line recycling are most certainly en vogue in the plastics industry as packaging converters plan to loop their edge trim and production waste back into the line.

Austrian recycling machinery firm Erema has seen this sustainability trend at first hand with sales of its Intarema K, for example, which is an automatic processing system for recycling edge trim, doubling in this financial year alone.

By the end of March, the company had sold more than 40 of the systems in a year, which it rationalises by saying that companies are concentrating on recycling clean edge trim as they seek to reach higher levels of film quality and meet expanded production requirements. This is one of the factors behind Erema's increased sales of about 17 per cent this year.

Business development manager Andreas Dirnberger comments: "The material alone accounts for around 80 per cent of the manufacturing costs of flexible packaging. If you consider the usual edge trim figure of around 10 per cent in blown film manufacturing, recycling is a must-have in terms of cost efficiency."

Edge trim can be transferred directly from the blown film plant, without pre-shredding, to make recyclate that can be returned to the production process.

Blown film line producer Hosokawa Alpine, for example, has a machine built by Erema in its technical centre for that very purpose. And another, Coveris Flexibles Austria, runs blow and cast extrusion lines, printing and finishing machines, and 20 recycling systems supplied by Erema. The company has been using fully automatic edge trim processing systems from Erema for many years.

According to head of marketing and business development, Gerold Breuer, 60 per cent of the Austrian firm's sales is currently from production waste recycling, although he does expect it to reach a level footing this year with post-consumer recycling (PCR) systems as the case for them becomes more appropriate.

"Look at the market trends," said Breuer, during an interview at the company's Ansfelden headquarters. "Not only politics but also the plastics industry is becoming increasingly involved in the reuse of plastics as raw material. This corresponds with the brands' intent to produce recyclable products in the first place as well as to use recycled plastics in their production. Meanwhile, Borealis fully acquired the German recycler MTM, and LyondellBasell is now a 50/50 partner in QCP with SUEZ, a French company specialised in water and waste management. So resin producers have entered the recycling sector, meaning that raw material suppliers have added recycled material to their product portfolio. Five years I'd have said you are mad, but recycling is changing extremely fast and so does the whole plastics industry!"

Breuer explains that chemical and physical recycling options are on the horizon, with the latter likely to be important in countries where material streams might not be pure because of a lack of waste management infrastructure.

"Unilever has some physical solutions in Indonesia, for example, whereby they dilute PE from a polluted stream and extract it."

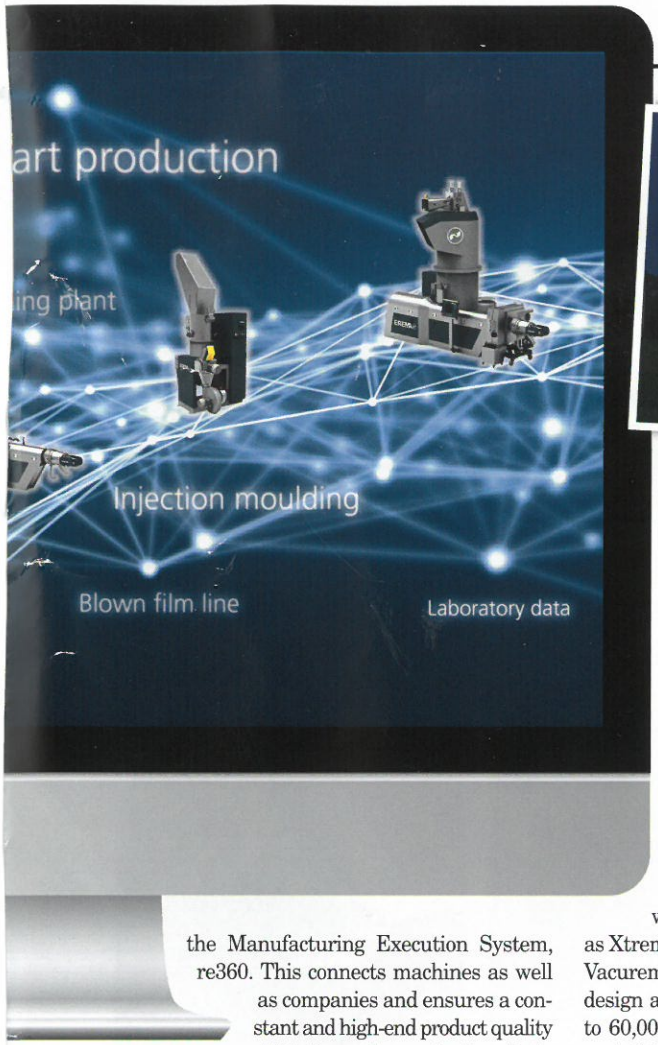
Breuer admits that plastics waste is a multifaceted challenge that will require continued innovation in technology, materials and design in order to create a circular economy. Politics and brand owners are already driving this. If the EU's objective is to make all plastics packaging in Europe recyclable or reusable by 2030, then much work needs to be done in the recycling sector.

"For 50 per cent of packaging to be recycled then we are looking at 10 million tonnes of regranulate required by 2040," explained Breuer. "PCR is increasing significantly and a stable supply and quality is needed."

As the recycling industry morphs, so does Erema, and the company is no longer just a supplier of machinery and systems. In addition to online measurement systems for viscosity and colour, the company now also sells software.

To further increase the recycling trend, the quality of the recycled plastics must be matched to the particular application and, above all, be transparent and embedded in the preceding processes, like washing or sorting, and in the following processes, like injection moulding or film production.

In order to make use of the vast amount of machine, quality and process data in a worthwhile and user-friendly way, Erema has developed



Erema was founded in 1983 in Ansfelden, Austria

the Manufacturing Execution System, re360. This connects machines as well as companies and ensures a constant and high-end product quality within the entire production chain – keyword 'smart factory'.

"This was previously already common in injection moulding, with the likes of Engel. Two of these systems are already in use at the customer. While we won't become a software company, the point is that Industry 4.0 is taking us more and more in that direction," said Breuer. "The circular economy is not possible without collaboration. It is crucial."

To emphasise the point, Erema is part of CEFLEX, a project run by a European consortium of companies representing the whole value chain of flexible packaging. Along with machinery maker Bobst, GEA and polymer producer Borealis, Erema was involved in the development of a Full-PE pouch. The reason behind this is that PE/PET pouches cannot be recycled into films, whereas PE pouches can be used again in other PE film applications.

"Recently Henkel, for example, showcased the Full-PE material for laundry detergents or the Megaperls pouch during a Circular Packaging Event at GEA in The Netherlands," he said. "As an industry we need to show what is possible."

Erema is also showing more than it used to as well. "We're now showing end product to customers, not just machines."

Another recent collaboration that has kept Erema busy is with Italian machinery supplier Sipa, in which Erema's Vacurema technology for bottle recycling is combined with Sipa's RENEW machine for making preforms. The first machine was completed in August 2017, built in Italy and sold to Kyoei Industry Company, Japan. Preforms using this technology will be manufactured at Kyoei Industry and gradually introduced for part of Suntory Beverage & Food Limited's PET bottle products from summer 2018 onward.

"The inline manufacturing of preforms with food-contact approved melt is a unique process," said Breuer, who added that Sipa refers to the system as Xtreme RENEW, while Erema markets it as Vacurema Inline Preform. "Depending on the design and the preform weight, it produces up to 60,000 preforms an hour, which represents up to 1,000kg of material."

During Drinktec in 2017, Erema gauged significant interest in the system from major players and is expecting some major trials in Europe and the US.

In the process, flake is created by pulverising and washing recovered PET bottles and is treated at high temperature and low pressure to enable the direct manufacture of preforms. Melted flake is poured into the moulding machine at a constant pressure to ensure uniform quality. The elimination of crystallisation and drying processes associated with traditional preform manufacturing is said to reduce carbon dioxide emissions by 25 per cent.

Suntory and Kyoei were good customers to start with as they have a strong track record in promoting activities to reduce the environmental impact of PET bottle manufacturing, such as by developing Japan's first bottle-to-bottle mechanical recycling system in 2011.

Two years ago, Erema made the decision to create a subsidiary called Pure Loop, specialising in shredder and extruder technology. This involves special technology for big parts and for production waste and the business will sold the 100th integrated shredder-extruder combination this spring.

A collection interesting projects lines the walls of the customer centre that Erema built in Ansfelden in 2012, and Breuer explained that the company conducts about 300 customer trials a year.

"With our laboratory equipment we analyse the input material of our customers and also test the regranulate after the trials with blown film, cast film and injection moulding machines directly with us. Our systems are thus tested for the respective end application."

Everyone is talking about recycling, and that can only be good for a company like Erema, which finds itself talking increasingly further upstream, and even downstream as the quest for recycled content heats up.

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The Intarema TVEplus series is said to set new standards in the recycling of difficult to process materials