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PLAST ECHO

POLISH MAGAZINE OF THE PLASTICS INDUSTRY

SEPTEMBER 2024

Circular plastics
in Poland and Europe

Recycling
a mission worth the effort

Chemical recycling
does it really not work?

Paweł Wiśniewski
Editor-in-Chief

We are delighted to welcome you to the International Edition of Plast Echo, where innovation meets the evolving challenges of the global plastics market.

Let's start with a quick trip through history – because as any good entrepreneur knows, understanding the past is key to navigating the future. Poland's journey from a centrally planned to a market economy is a story worth telling. It began with the implementation of the Balcerowicz Plan in 1990. Led by Finance Minister Leszek Balcerowicz, this radical set of reforms rapidly liberalised prices, opened markets and privatised state-owned enterprises, laying the foundations for a free market economy. While the public was understandably anxious and had mixed feelings about the future, these reforms ultimately laid the foundations for Poland's robust growth.

Poland's accession to the European Union in 2004 was another pivotal moment. The EU's single market boosted trade, foreign investment and economic growth, while structural funds modernised infrastructure and reduced regional disparities. But these benefits also brought challenges, as foreign competition put pressure on local industries. Once again, public opinion was divided – some embraced the new opportunities, while others feared the impact of increased competition.

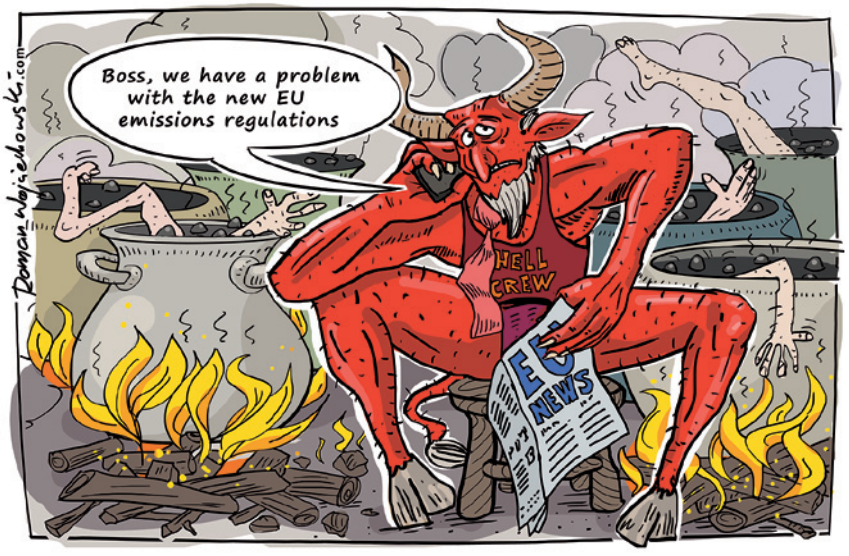
Today, Poland is a shining example of resilience within the European Union, with a strong economy, low unemployment and a thriving manufacturing sector. But let's not get too comfortable. Recent years have shown us that even the strongest economies face challenges. Poland, like its European neighbours, is struggling with excessive inflation driven by energy costs and geopolitical tensions caused by Russia.

In difficult economic times, such as downturns, tensions rise and debates intensify. This uncertainty has raised questions about whether the European market remains truly "free". Some argue that the market is now over-regulated, limiting business flexibility and stifling innovation, while others believe that these regulations are essential for sustainability and fairness across the EU. Just as there was no going back to a centrally planned economy in Poland in 1990, there is no going back to the traditional 'take, make, dispose' economic model today, as it fails to address the issues of resource scarcity and increasing waste. The circular economy is therefore not just an alternative, but a necessity if we are to ensure sustainable development and protect our planet for future generations.

The plastics industry is at the heart of this debate. EU legislation has a profound impact on the sector, focusing on environmental protection, waste management and health and safety. Key legislation includes the Single Use Plastics (SUP) Directive, REACH, the Packaging and Packaging Waste Directive, the Waste Framework Directive and the Waste Electrical and Electronic Equipment (WEEE) Directive. In addition, the EU's ambitious Plastics Strategy, part of the wider Circular Economy Action Plan, aims to make all plastic packaging recyclable by 2030.

These regulations are driving industry towards more sustainable practices, which is great news for the planet. But let's face it – they are also demanding significant adaptation and innovation from businesses, particularly small and medium-sized enterprises (SMEs), which may struggle to keep up with the fast pace of change. The balance between necessary regulation and business flexibility remains a key issue.

In exploring these topics, we aim to provide an in-depth look at the challenges and opportunities that lie ahead. Whether you're experienced or new to the industry, understanding the complex dance of market forces is key to navigating the future. So buckle up – it's going to be a thrilling ride through the world of plastics!



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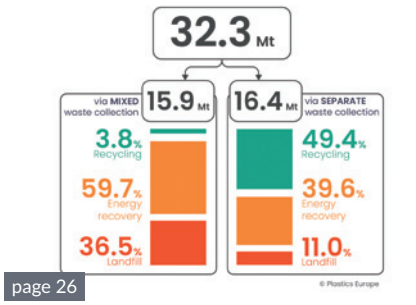

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Plastics
that **shape the future**

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LEGO bricks use more bioplastics and recycled materials

When the LEGO Group published its financial results for the first half of 2024, it showed a significant increase in the use of plastic resins from sustainable sources. The company has increased the proportion of raw materials from renewable and recycled sources.

In the first half of 2024, an average of 22% of the plastic pellets used to make LEGO bricks came from renewable and recycled sources. 30% of the resin purchased in the first half of the year was certified mass balance. This is a significant improvement compared to 2023, when 18% of resin for the whole year was certified mass balance, representing 12% of raw materials from sustainable sources.

In recent years, LEGO has extensively tested various materials from sustainable sources. One success story is bio-opolyethylene (bio-PE) made from sugar cane, which the company uses to make flexible botanical elements. Another innovative material is arMABS copolymer (transparent ABS), which contains the raw material from recycled kitchen countertops. It is used to make elements such as light sabers and car windows and windscreens. LEGO is also working on a material called ePOM, the process for which is expected to use advanced technology combining renewable energy and CO_2 from bio-waste.

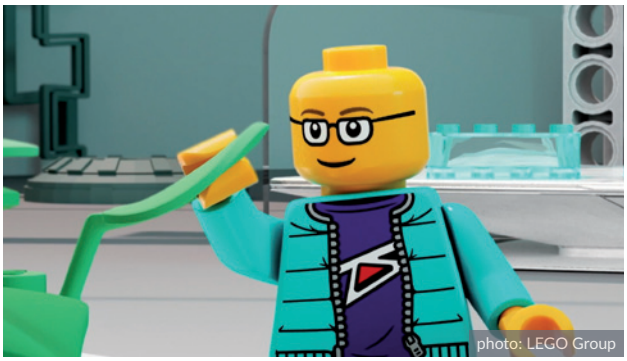
photo: LEGO Group

Not all attempts have been successful. One example is recycled polyethylene terephthalate (rPET). Despite initial enthusiasm and prototypes, after 2 years of testing the company decided not to develop this material further because it did not meet the requirements for quality, safety, durability and did not contribute to a significant reduction in carbon emissions.

In the coming years, LEGO aims to increase the proportion of sustainably sourced raw materials to more than half of its materials, in line with the mass balance rule. The company plans to continue its efforts to reduce the use of virgin fossil materials.

Premium-look PET bottle from Alpla

Safe, affordable and sustainable: the new PET bottle for the Polish mineral water brands Staropolanka and Krystynka embodies what Alpla stands for and impresses with its high-quality look based on the existing glass version.

Same shape, familiar feel, but lighter and more spacious? Alpla's premium PET bottle makes it possible. Weighing only 32 grams, it is only a sixth of the weight of the glass version. What is saved in material enriches the enjoyment. With 380 millilitres of water, the plastic bottle holds a whole 50 millilitres more with the same external dimensions. In addition, the new bottle is fully recyclable.

photo: ALPLA Group

At first glance, PET and glass bottles look like two peas in a pod. The visual similarity is intentional and was also a challenge for the Alpla development team. Step by step, the premium PET bottle for Staropolanka and Krystynka mineral water in Poland came closer to the original design. About a year after the launch, the pilot phase was successfully completed in autumn 2023. The high-quality plastic bottles will soon grace the shelves of Polish supermarkets.

The tried-and-tested bottle shape guarantees high quality and can be filled on existing lines without additional investment. Even the distinctive aluminium cap is a perfect match for the bottle, complementing the shape and label to ensure brand recognition. There were many good reasons for launching the PET bottle: rising glass prices, logistical advantages due to lower transport weight and an expected significant CO_2 reduction of roughly two thirds compared to glass.

Unlike the disposable glass bottle, the premium PET bottle can be used in the future Polish deposit system for beverage packaging from 2025. The Alpla team is already focusing on "design for recycling" in the development phase, setting the course for future recycling.

New legislation creates optimism for plastics recycling in Europe

Despite the tension felt by the plastics recycling market in Europe, new legislation provides reason for optimism. Recycling machine manufacturer Erema has invested in the very latest technologies in recent years to pave the way for a plastics circular economy. Trade fair visitors interested in the latest processes can discover the company's extensive product portfolio at Fakuma from 15 to 19 October in Friedrichshafen.

"We see new legal requirements such as the PPWR as an opportunity to demonstrate our expertise. The European recycling industry has the know-how to meet these requirements, which gives Europe a significant competitive advantage," says Markus Huber-Lindinger, Managing Director at Erema, in the run-up to Fakuma.

The new EU PPWR (Packaging and Packaging Waste Regulation) prescribes a significant increase in the proportion of recyclates used to make packaging products by 2030. In other sectors, such as the automotive industry, the European Commission and well-known manufacturers are also calling for a higher proportion of recycled materials. State-of-the-art recycling processes are needed to achieve the necessary quality standards and provide a consistent supply of recycled pellets.

Innovative solutions are needed to achieve the recycling quotas in the food grade packaging sector. Over the past 25 years, the Vacurema series of machines has become established for the production of food-safe rPET. Erema technologies for the recycling of PO materials (polyolefins) have also already been approved by an American food safety authority: the combination of the Intarema TVEplus with the ReFresher module allows recycled PO pellets from defined input streams to be reused in food packaging in proportions of up to 100 percent.

Südpack's recyclable concept combines floatable top webs with mono-APET trays

Ahead of the Fachpack 2024, film manufacturer Südpack unveiled its latest innovation: PET floatable lidding films. Used on mono-APET trays, the low-density, sealable top webs can be separated during recycling from the APET bottom webs, producing cleanly recycled materials for infeed into the different material flows. This offers a sustainable market alternative for safe packaging of sliced meat, ham and cheese in peelable, thermoformed and MAP packagings.

photo: SÜDPACK

The PET floatable lidding films provide equal performance and processing reliability to conventional lidding films. The product family includes a peelable version as well as a top web featuring Multipeel for excellent opening and reclosing. Consumers appreciate the extra convenience of secure closing and perfect protection for a longer shelf life of the packaged food. Multipeel PET floatable helps cut the carbon footprint of products in two ways: recyclable packaging and longer food freshness.

Peel PET floatable is a premium product in terms of packaging safety and performance. The extra-thin lidding film (45 µm) securely seals against PET trays, even when contaminated with fats. It peels easily off the tray and does not tear or roll up. The high oxygen barrier also ensures optimal product protection. Good antifog properties keep the lidding film clear. This ensures an attractive presentation at the POS because consumers consider it a hallmark of quality of both product and packaging. Another advantage is that Peel PET floatable does not require expensive adjustments to production machines. The high performance films can be optimally processed just like conventional lidding films on thermoforming packaging machines and tray sealers. Excellent sealing properties and a large processing window guarantee high versatility as well as maximum packaging and process reliability.

NASA tests polyimide as electrical insulation for aerospace applications

BARplast provided the thermoplastic polyimide Aurum that has been tested by NASA. The researcher of the NASA's Glenn Research Center in Cleveland, Ohio, tested thermoplastic Polyimides that demonstrated interesting properties, making it a candidate for the electrical wiring requirements for future aerospace transportation technologies.


photo: BARplast

In a NASA White Paper presented at the Sampe conference in May 2024 the researcher points out that there are: "electrical wiring requirements for next-generation air and space transportation engineering designs, with continuous operation temperature requirements of up to 200°C". The objective of this study was to assess the potential of thermoplastic polyimides as a high-temperature electrical insulation solution. Furthermore, the white paper highlights the need of: "thermoplastic electrical insulation materials systems to improve thermal management in high power density electric motors" and it states that "a melt processable PI with high service temperatures is of interest as an electrical insulation candidate material. Additionally, melt processing enables facile dispersion of fillers within a polymer matrix which can impart additional functionality such as thermal conductivity".

Aurum is a semicrystalline TPI suitable for powder coating, injection moulding, and extrusion coating, with the highest glass transition temperature in its class. The extrusion processing of Aurum for wire insulation is highly economical, allowing for extremely thin layers and offering high elasticity as well as good compatibility with cooling and lubricating oils.

Aurum, a polymer produced by Mitsui Chemicals Inc. and sold by BARplast in the USA and Bieglo in Europe, has one of the highest glass transition temperature (Tg) of 245°C (473°F) of any commercially available thermoplastics.

Join the industrial trade fairs in Poland

Check out the calendar for 2024/2025

FASTENER® POLAND

International Trade Fair for Fastener and Fixing Technology

7th edition: **25-26 September 2024**
8th edition: **15-16 October 2025**

EXPO Krakow

PACKAGING Innovations

International Packaging Trade Fair

16th edition: **09-10 October 2024**
17th edition: **September 2025**

EXPO Krakow

SYMAS® MAINTENANCE

International Trade Fair for Powder & Bulk Solids Technologies
International Trade Fair for Suppliers of Maintenance Products and Services

15th edition: **16-17 October 2024**
16th edition: **15-16 October 2025**

EXPO Krakow

KOMPOZYT-EXPO®

International Trade Fair for Composite Materials, Technologies and Products

13th edition: **16-17 October 2024**

EXPO Krakow

INNOFORM®

International Cooperative Trade Fair of Tools and Processing Industry

7th edition: **04-06 March 2025**

BCTW Bydgoszcz

JEC FORUM CENTRAL EUROPE

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Hotel Holiday Inn, Krakow

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Turning CO_2 into plastics

Borealis, a leader in advanced plastic solutions, and eFuels innovator Infinium have joined forces to produce low-carbon-footprint plastics from waste carbon dioxide (CO_2) emissions. This collaboration introduces Infinium eNaphtha, a sustainable alternative to traditional fossil-based naphtha, as a feedstock for creating polyolefins – plastics used in everyday consumer goods like packaging, appliances, and medical devices.


photo: Borealis

Infinium eNaphtha, produced at the company's facility in Corpus Christi, Texas, is now being supplied to Borealis' facility in Porvoo, Finland. This groundbreaking product enables the manufacturing of plastics with a significantly reduced carbon footprint, using existing facilities and recycling processes.

Infinium CEO Robert Schuetzle emphasized the importance of this innovation in decarbonising plastics production, while Mirjam Mayer, VP Circular Economy Solutions at Borealis, highlighted the role of atmospheric carbon in advancing circularity in plastics.

This partnership exemplifies how industry leaders can collaborate to create sustainable solutions that meet the growing demand for environmentally friendly products.

Marcel Perrevort new CSO of Reifenhäuser Group

Marcel Perrevort has been appointed as the new Chief Sales Officer (CSO) of the Reifenhäuser Group, marking a significant change in leadership for the family-owned machine and plant manufacturer. Perrevort succeeds Ulrich Reifenhäuser, who has held the position for more than 25 years and led the company through decades of growth and innovation. This change is an important step in the ongoing generational change in the company's management structure.

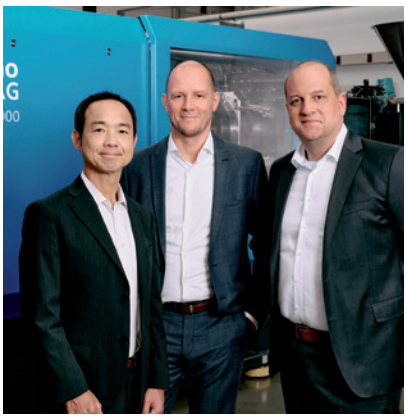
Marcel Perrevort, 46, brings a wealth of experience to his new role. After more than a decade in various sales and management positions within the Reifenhäuser Group, he was most recently Managing Director of Reifenhäuser Blown Film. In his new role as CSO, Perrevort will be responsible for developing and implementing the Group's sales and service strategy, with a particular focus on expanding the company's international presence and improving customer focus.

Although stepping down from his role as CSO, Ulrich Reifenhäuser will continue to contribute to the industry through his involvement in various associations and committees within the plastics sector. He will also continue to be available to the Reifenhäuser Group as a representative and consultant, with adjusted working hours, to ensure that his expertise and experience continue to benefit the company.

Sumitomo (SHI) Demag announces leadership transition

Sumitomo (SHI) Demag has announced a significant leadership change as part of its succession plan. Effective September 1, 2024, Christian Maget will take over as CEO, following the retirement of Gerd Liebig, who has led the company for nine years. Maget, who has been with the company since 2013, brings deep internal knowledge and will continue overseeing human resources and IT, alongside his new responsibilities. He praised Liebig's leadership, noting his contributions to expanding global capabilities, advancing sustainable manufacturing, and driving innovation.

Joining Maget in the new management team, Anatol Sattel will step into the role of Chief Sales Officer (CSO), focusing on strengthening international sales, customer service, and cooperation with Japan. Sattel, who joined the company in 2017, has been instrumental in the success of the medical technology team. The management team is rounded out by Takaaki Kaneko, who will continue as Chief Operating Officer (COO).



This leadership transition marks a new chapter for Sumitomo (SHI) Demag as it continues to drive forward its strategic goals and maintain its competitive edge in the industry.

New polymer colourants derived from recycled content from Avient

Avient Corporation, a premier provider of specialised and sustainable material solutions and services, announced the launch of OnColor REC Polymer Colourants, formulated with pigments derived from recycled content, including end-of-life tires. They offer an alternative to traditional carbon black formulations and can help manufacturers reduce their product carbon footprint (PCF).

OnColor REC Polymer Colorants can perform comparably to traditional carbon black in plastics. They are versatile, can be used in multiple resins, and are available in standard and custom colour formulations. Additionally, they meet strict regulatory requirements, passing Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) and Restriction of Hazardous Substances (RoHS) standards and certification by TÜV Rheinland. Proposition 65 letters are also available.

"We are excited to announce the launch of OnColor REC Polymer Colourants in response to our customers growing demand for sustainable colourant options," said Felipe Reichert, Global Marketing Director for Colour, Additives & Inks at Avient Corporation. "This product underscores our commitment to sustainability and innovation, providing our customers with high-performance, eco-conscious solutions."

OnColor REC Polymer Colourants are available in the United States and Canada for use in a wide range of industries and applications, including automotive, wire and cable, building and construction, appliances, electrical and electronics, industrial moulding applications, textiles and fabrics, and office furniture. A PCF calculation for using them is available upon request.

Simplifying product carbon footprint calculations with Wittmann new software

By 2050, the EU wants to be climate-neutral. The resulting Green Deal will make it mandatory for manufacturing companies to gradually reduce their CO_2 emissions. The product carbon footprint (PCF) is therefore coming into focus. Information about the carbon footprint of individual products is a prerequisite for implementing effective measures to reduce greenhouse gas emissions.

The PCF includes emissions from the entire life cycle of a product – from raw material production to recycling. The calculation can be correspondingly complex. With a new software, the Wittmann Group is simplifying this process for its customers. In the future, the software will be available as a new functionality of TEMI+, the Wittmann Group's MES.

As soon as a production cell is clicked on the extended dashboard of the TEMI+ solution, the processor receives a complete overview of the production progress. The relevant key figures are displayed for each individual cycle. The CO_2 emissions are now added there – each indicated in grams per cycle. When using a single-cavity mould, this value corresponds to the PCF. When using multi-cavity moulds, this value is divided by the number of cavities to obtain the PCF.

The calculation of CO_2 emissions is based on two values. One is the energy consumption of the injection moulding production cell and the other is the shot weight, in other words, the amount of raw material processed per cycle.

The energy consumption of the production cell is automatically measured cycle by cycle either directly by the MES or by using the iMAGOxt software. The CO_2 emissions resulting from the energy consumption depend on the production location.

For Germany, for example, with the current electricity mix, the factor is 0.354 g CO_2 per Wh. This value is stored in the MES or shared from the customer's ERP so that the system can automatically calculate the CO_2 footprint of the production cell.

The CO_2 footprint of the raw material is also a predefined value. It is provided by the material manufacturer and entered into the MES.

Neste expands chemical recycling logistics infrastructure

Neste is expanding its logistics infrastructure for liquefied recycled raw materials at its refinery in Porvoo, Finland, including materials such as liquefied waste plastic and liquefied rubber tires. This lays the foundation to handling larger amounts of liquefied raw materials to support Neste's strategic aims to advance chemical recycling and transform the Porvoo refinery into a renewable and circular solutions hub.

The new logistics installations comprise dedicated unloading facilities: at the refinery's harbor, Neste is building an unloading arm with a heating system as well as pipelines to connect the harbor with dedicated storage tanks. Unlike regular crude oil, liquefied waste plastic or discarded rubber tires require heating to stay liquid. At the same time, the systems need to come with higher resistance to corrosion. In addition to the unloading arm and pipelines, Neste is also building a vapour recovery unit, contributing to emission control of the operations.

"The transformation of our Porvoo refinery into a renewable and circular solutions hub will require many individual steps and adjustments," explains Jori Sahlsten, Senior Vice President of Refinery and Terminal Operations at the Porvoo refinery in Neste's Oil Products business unit. "The new logistics infrastructure is one of these steps. It puts us in

a good position to process larger and continuous volumes of liquefied recycled raw materials. This will be needed when we start using the new upgrading unit, which is able to process 150,000 tons of liquefied waste plastic per year".

The new logistics infrastructure is expected to be completed in 2024. It will, therefore, be available when Neste finishes construction of its liquefied waste plastic upgrading unit at the Porvoo refinery, which is currently being built as part of the project Pulse, planned to be finalised during 2025. At the upgrading unit, the liquefied raw materials are turned into high-quality feedstock for the plastics and chemicals industry.

MEYER KC SERIES OBJECT SORTER

Suitable for removing non-PET bottles in PET bottles, non-PE polymer in milk bottles/daily chemical products, and non-PP polymer in lunch boxes, thanks to its hyperspectral imaging system for precise multi-category sorting.

The intelligent whole bottle transmission system, featuring a screed device and anti-rolling conveyor belt, ensures stable and efficient sorting with high output, significantly reducing manual labor and operation costs.

PET BOTTLES

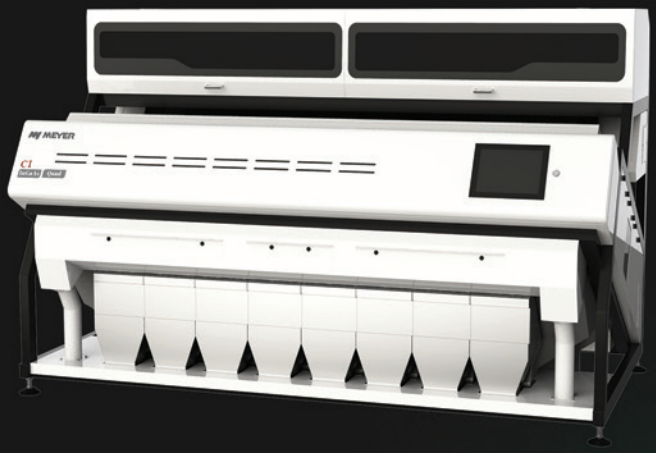
CANS

HDPE BOTTLES

TETRA PAK

MEYER CI SERIES POLYMER SORTER

MEYER CI Series Polymer Sorter is designed for precise polymer sorting and purification, utilizing ultra-high-definition cameras to achieve efficient separation of PET, PE, PP, PVC, and more. With advanced InGaAs composite infrared technology and multi-band identification, it accurately sorts various polymers, ensuring high-quality purification.



PET

HDPE

PP

PVC

OTHER

Sustainable soft-rigid material solutions from SABIC and Lubrizol

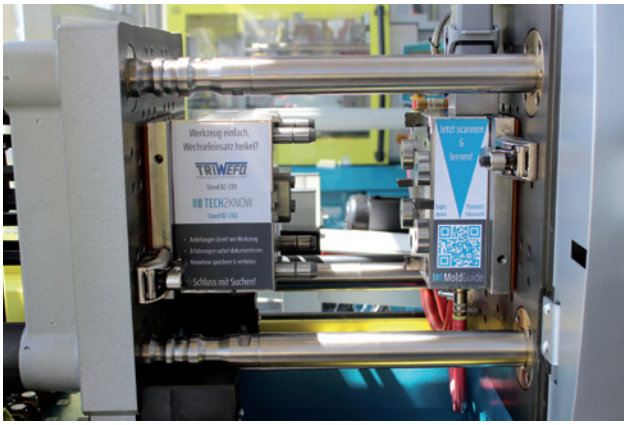
SABIC, a global leader in the chemical industry, and The Lubrizol Corporation, a leader in specialty chemicals, have developed compatible material solutions well suited for various applications in the consumer electronics and mobility industries, among others. These solutions, which combine soft and rigid materials, can help customers advance their sustainability goals, enhance the protection of ever-thinner and more vulnerable applications, and streamline manufacturing through part consolidation.

The solutions feature SABIC's LNP specialty compounds and copolymers, which function as rigid substrates, and Lubrizol's soft Estane Eco TPU (thermoplastic polyurethane) materials, which are 2-shot injection moulded onto the substrates. The SABIC thermoplastics may enable thin-wall moulding to reduce raw material consumption, or deliver chemical resistance for durability. Lubrizol's Estane Eco TPUs are formulated with bio-based content and are manufactured at certified ISCC+ facilities.

Potential applications for these complementary materials include laptops, cell phone cases and other electronics devices where durability, drop protection and a non-slip surface are needed. One potential application is a laptop

case featuring glass fiber-reinforced LNP Thermocomp compound as the rigid substrate and Estane Eco TPU as the soft, overmoulded polymer. The SABIC material provides high modulus, low warpage, good ductility and non-brominated/non-chlorinated flame retardance along with impact resistance and weatherability. The Lubrizol Estane Eco TPU offers chemical and abrasion resistance. These soft and rigid material combinations could also show promise for industries other than consumer electronics where features such as ergonomics or enhanced haptics are needed.

Tech2Know digital platform to support inexperienced staff



At Fakuma 2024, Tech2Know will present a ground-breaking digital solution, the MoldGuide, which is set to revolutionise the injection moulding industry by improving knowledge transfer and reducing production downtime. Visitors to the event will be able to experience the MoldGuide first-hand at the BOY injection moulding stand, where it will be demonstrated on a TriWeFo precision mould.

The MoldGuide addresses a common challenge in the industry: unexpected errors during injection moulding operations, which can lead to costly downtime and waste, especially when inexperienced operators are involved. Traditionally, such issues are quickly resolved by experienced professionals, but for newer employees or career changers, even minor problems can escalate without proper guidance.

Tech2Know's MoldGuide provides an easy-to-use, cloud-based platform that stores all relevant operating information for equipment, such as injection moulds, in an easily accessible and didactic format. This allows operators to quickly find solutions and instructions, reducing errors and preventing extended downtime. The platform also allows users to document and share their own experiences, contributing to a continuously updated knowledge pool that can be accessed via a machine-specific access code.

"The growing shortage of skilled workers means that more and more companies are relying on career changers," explains Dr Thornagel, owner of Tech2Know. "Efficient knowledge transfer and active knowledge storage are becoming critical business success factors. MoldGuide is designed to be easily integrated into existing business processes, making it a practical solution for modern manufacturing environments.

Moretto: drying and conveying systems with unique features

In today's competitive plastics processing environment processors are always searching for ways to improve their processing capabilities. This ongoing search is geared towards equipment that allows for greater flexibility and fast production changes.

The Moretto Mobilux family of Mobile Drying and Conveying systems couple high-performance dehumidifying dryers, drying hoppers and conveying systems onto compact mobile carts that can be easily moved in and out of locations as needed. Unlike drying hoppers or complete drying systems that are mounted to the throat of a processing machine, the Mobilux Dryers include all necessary equipment for high-performance drying, yet can be moved where and when it is needed. Additionally, many processors find this mobility a convenient feature for prepping the dryer and pre-drying the resin in a non-production area, prior to moving the cart into a processing position.

Moretto offers two families of mobile drying systems for both higher and lower throughput processing needs. The CRX Comb series of Mobilux Dryers is built around Moretto's popular X Comb dryer. Each CRX Comb model includes a honeycomb wheel of 100% Zeolite desiccant, and is equipped with anti-stress technology preventing over-drying and automatic modulation of drying air for optimum drying performance with minimal energy consumption. Part of Moretto's patented anti-stress technology is the manipulation of air flow to adapt to drying needs while maintaining a consistent drying quality. Only two parameters are needed, material type and throughput: all the rest is automatic. The dryer automatically manages all the other parameters such as residence time, process temperature, air flow and anti-stress. In this way, X Comb is able to apply the proper treatment for each type of polymer.

The larger series of CRX Mobilux drying systems is built upon Moretto's XD 20 series dryers, equipped with a twin-tower drying system capable of producing uniform 75°C dew points. The XD 20 Series, unlike other twin-tower dryers on the market, employs a Variable Frequency Drive (VFD) controlled blower for modulating air flow to the hopper to meet performance and energy-reduction standards.

Netstal increases its sustainability performance and receives Ecovadis Silver

Silver follows bronze: Netstal continues to rise in the Ecovadis ranking and is awarded the silver medal for its initiative to date. This puts Netstal in the top 15 percent of all companies assessed by Ecovadis over the past 12 months.

"We are proud of the silver medal we have just won. Sustainability is very important to us and is firmly anchored in our vision and corporate policy. We see the protection of the environment and climate protection, as well as the protection of people, as important cornerstones of our business. We will continue to build on this to develop even further in the coming years," says Renzo Davatz, CEO of the Netstal Group.

The silver rating confirms Netstal's further improved sustainability performance in the dimensions of environment, labor and human rights, ethics and sustainable procurement. Scope 1 and Scope 2 CO_2 emissions were reduced by a further 17 percent compared to the previous assessment period. Water consumption was also further reduced. The recording of Scope 3 emissions in downstream processes that take place outside the company was also optimised.

"We now know the CO_2 emissions of our injection moulding machines that are used productively by our customers. This information is very important for us in order to further optimise the energy efficiency of our technology and further reduce Scope 3 emissions", says Michael Rocholl, Head of Quality and Process Management. "The annual review by Ecovadis helps us to understand our ESG framework even better and provides guidance on which areas and measures we should focus on in the future. We have defined further measures in all dimensions with which Netstal can operate even more sustainably".

The power of twin-screw extrusion by MAS

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Challenges and prospects for the Polish plastics converters industry under EU regulations

The Polish plastics industry faces significant challenges, including rigorous EU regulations such as EPR and PPWR, volatile raw material prices and growing competition from alternatives. However, the shift towards a circular economy and advances in recycling technology offer significant opportunities. Companies that embrace innovation and sustainability will thrive in this evolving landscape. Adaptation is essential for future success

Robert Szyman
General Director of the Polish Union of Plastics Converters (PZPTS)

The plastics processors industry is currently undergoing a period of dynamic transformation driven by a number of factors, both internal and external.

At present, the key challenges faced by the sector are environmental awareness and new legislation: growing public awareness of the environmental impact of plastics is leading to increasingly stricter regulations. The Single-Use Plastics (SUP) Directive, Extended Producer Responsibility (EPR) and other new regulations are forcing companies to seek more sustainable solutions. Other challenges for the sector include:

- Fluctuations in raw material prices: The price of crude oil, the main source of raw materials for the production of plastics, remains highly volatile and has a direct impact on production costs.
- Competition from alternative materials: Bioplastics, composite

materials and other alternatives to traditional plastics are gaining popularity, increasing rivalry on the market.
- Changing consumer preferences: Consumers are increasingly opting for products made from so-called "green" and recycled materials, forcing manufacturers to adjust their offerings.
- Logistical challenges: Disruptions in supply chains, caused previously by the Covid-19 pandemic and now by armed conflicts, are hampering access to raw materials and components.

Opportunities and trends

- Circular economy: Transition to the circular economy model, in which plastics are recycled and reused many times, is creating new business opportunities.
- Technological innovation: Developments in recycling technology, new manufacturing methods and the use of biodegradable materials are opportunities to create more sustainable products.
- New uses for plastics: Plastics are increasingly used in fields such as medicine, energy and construction, opening up new markets.
- Cooperation with science and business: Collaboration with research centres and other businesses is making it possible to develop innovative solutions and accelerate the transformation of the industry.

What does this mean for plastics processors?

Plastics processors must adapt to the new market conditions and take a number of measures, such as:

- Investing in research and development: Developing new products and technologies that meet sustainability requirements.
- Working with raw material suppliers: Seeking suppliers that offer high-quality recycled or certified raw materials.
- Optimising production processes: Minimising energy and material consumption, reducing waste.
- Building brand awareness: Promoting its products as green and sustainable.
- Adapting to new regulations: Keeping abreast of changes in regulations and adapting operations to new requirements.

In summary, the plastics processing industry in Poland faces many challenges, but at the same time has tremendous opportunities. Companies that are able to adapt quickly to changing market conditions and introduce innovative solutions will gain a competitive advantage and be able to succeed in the future.

EPR – what about the costs?

The primary environmental goal of the Extended Producer Responsibility (EPR) mechanism, in addition to the obvious net costs of managing waste from packaged products, should be to recognise and reward those containers that prove to be the most recyclable. The production of such containers should also come at the lowest possible environmental cost and have a negligible carbon footprint. Indeed, the ethic of EPR is for manufacturers to take full responsibility for their products, including the costs associated with packaging waste management.

Companies whose packaging generates greater waste or is more difficult to recycle should pay higher packaging waste management fees to reflect the additional costs associated with the processing thereof. While the EPR system can stimulate greener packaging solutions, the final decision on packaging is up to the producers of goods. Such eco-modulation, in addition to having a positive impact on the environment, also generates additional financial burdens for producers. If it were not for environmental guidelines, the choice of packaging by producers of goods would be based solely on quality and price. The Life Cycle Assessment (LCA) methodology, however, has proven that one does not have to exclude the other. LCA is a method that measures the sustainability of a product over its entire life cycle – and it is often plastic packaging that performs best in this assessment. The lightness of the plastic materials, which allows to reduce the transportation weight of both raw materials and finished goods, is one of the key factors. In addition, the strength of plastics enables the use of less material to produce a single item, which results in lower consumption of natural resources. The low production temperature of these materials also means lower energy requirements and fewer emissions.

The plastics processing industry in Poland faces many challenges, but at the same time has tremendous opportunities

Beyond that, what else is new in the plastics converters industry?

EU SUP Directive and the public debate around it

Poland has implemented the provisions of the EU directive restricting the use of certain single-use plastic packaging. The Single-Use Plastics (SUP) Directive makes it mandatory to permanently affix caps to plastic bottles. This change is intended to protect the environment from additional pollution, the amount of which has been effectively reduced by this simple means. The directive is a response to a real problem – among the litter found on EU beaches, plastic caps ranks high in the 4th place.

Another limitation are the restrictions placed on the use of foamed polystyrene packaging, especially those intended for takeout food packaging. Loose polystyrene pellets, which easily separate from the packaging, pose a serious threat to the environment, leaking into the soil, water and living organisms. While they take many years to decompose, the tiny particles that find their way into nature can cause serious damage to ecosystems. The EU has recognised this problem. As a result, a ban on such disposable boxes has been introduced.

Nevertheless, the chaos in the world of commerce, where there is a trend toward taxing all single-use plastic packaging, is considerable. This includes containers that are used to serve portioned products on the spot.

For instance, one may encounter a charge on packaging in which lard is served. It is difficult to say unequivocally whether such a product should be classified as intended for direct consumption from the package. Due to numerous doubts and appeals from traders, the Polish Ministry of Climate and Environment has published detailed explanations and answers to frequently asked questions on the issue of packaging taxation.

Deposit system and newly drafted packaging regulations

We keep hearing the following questions raised in the public space: why do we need a deposit system when packaging can be collected through the municipal waste disposal system? Isn't yellow bag recycling enough?

The main challenge in achieving a complete tightness in the circulation of beverage packaging are consumers' habits related to where they consume beverages. As statistics show, about 40% of them are consumed outside the home. This makes it difficult to collect clean packaging or leads to it being mixed with other waste, or, in the worst case, we find it littering nature or the streets.

This is just one of the many problems that the deposit system is trying to address. The Ministry of Climate and Environment has announced an amendment to the current regulations to improve the mechanism, but the main principles will remain the same.

The new European Packaging and Packaging Waste Regulation (PPWR) is in the final stages of negotiations. PZPTS has prepared an analysis on the status of the PPWR tripartite talks. The analysis focused on key aspects of the internal market, such as provisions to prevent fragmentation, exceptions to bans on certain materials, and reduction and recycling targets. The document was sent to the Polish Permanent Representative to the EU and to the Ministry of Climate and Environment.

We also sent a letter to Aleksander Zieliński, Head of the Environmental Policy Section, who represents Poland in the Working Party for Environment of the Council of the European Union, voicing opposition to the proposal of the Council and the European Parliament. It concerned the exclusion of packaging containing less than 5% plastic from limits on recycled content.

Another unexpected change in the PPWR draft, which emerged at the end of February, was the inclusion of transport packaging in the 100% reuse limit, while the European Commission had proposed a 10% level limit in its initial draft. Such a tightening raised concerns not only in the PPWR – a number of national and European organisations sent protests to the Commission and the European Parliament pointing to the lack of a better environmental option and the availability of alternatives. Such a regulation would result in huge additional costs not only for processors, but also for product manufacturers, and for the logistics and trade sectors.

Why do we need EPR?

Extended Producer Responsibility (EPR) applies to all packaging placed on the market, while other systems, such as the deposit one, focus on specific types of packaging. That's why business calls for earlier introduction of EPR or simultaneous introduction of both systems.

Indeed, the combination of the two systems brings tangible benefits not only to the environment, but also to the economy. This symbiosis gives the opportunity to recover clean, high-quality raw material in a much larger quantity than traditional collection. By guaranteeing a high level of recovery of clean raw materials, the deposit system reduces the consumption of new raw materials and the greenhouse gas emissions associated with packaging production.

Meanwhile, EPR ensures that responsibility for waste management rests with packaging manufacturers. This incentivises the design of sustainable and easily recyclable products, spurring competition for equally innovative and better solutions.

However, the deposit system should not be introduced on its own, before the EPR mechanism, as this could have negative consequences. In such a situation, municipal systems would be deprived of valuable resources. Sale of recycled resources provide stable income and reduce waste collection fees for residents. In the absence of EPR, these fees would continue to rise.

There is no doubt about the important role of the EPR system, and all stakeholders almost unanimously call for its rapid introduction. What else is EPR going to be responsible for?

EPR regulation will have a significant impact not only on manufacturers, but also on final buyers. Consumers who choose products housed in multi-layered, composite packaging and/or

containing smaller portions, and who purchase more packaged products, will incur higher costs. Currently, however, these costs are covered collectively – in waste collection fees. It is worth adding that when it comes to recycling regulations, the responsibility does not lie solely with the producers.

The basic and necessary means for effective waste recycling and reuse is proper household waste segregation. Without this element, the whole process becomes much more difficult. Recovering raw materials from mixed waste not only significantly impacts the environment but also is more expensive and less effective. We need to keep in mind that, at the end of the day, the consumer will always pay for it in waste collection fees and/or in the price of the product. However, these two sources of costs can be effectively minimised through a well-designed EPR system (businesses) and good separate collection (consumers).

European recycling competition on the rise

Our analysis for the "Eko bez kantów" portal shows that industrial production has declined. We noted a proportional trend in the number of orders, while the cost of recyclates, i.e. recycled plastic from recycled materials, fell by 50% last year. The decline in demand for domestic plastics is also a result of the massive import of cheap products from Asia. The plastics industry is particularly negatively affected by the intensive growth of PET imports – they are up by 20% (the second quarter of 2023 vs. the second quarter of 2022). Similar trends apply to other plastics and materials in the plastics family. All this has contributed to a decline in demand for domestic products, while at the same time exports of plastic waste have increased by 18% over the same period.

Thus, as the editors of the "Eko bez kantów" portal point out, "*a paradoxical situation has arisen, in which the ecosystem of closing the circulation of raw materials in Europe, which has been years in development, has suddenly been subjected to the free-market economy. The only difference is that the non-EU competitors did not have to meet the exorbitant environmental standards and have lower energy costs, as – among other reasons – they have not introduced an embargo on crude oil from Russia. As a result, the EU market has been flooded with cheaper raw material from China, Egypt, India, Indonesia, Turkey and Vietnam. And often it is primary material, with better properties than recycled plastic, and additionally 30% cheaper.*"

Such changes in the market have had a tragic impact on local manufacturers – as a result, many smaller plastic recyclers have been driven into bankruptcy. The answer to the problem of Asian imports is the European Union's decision to impose anti-dumping duties. •

Unlocking the full potential of recycling is key

Interview with Emilia Tarlowska, Public Affairs and Communications Director, Plastics Recyclers Europe

How do you expect the results of the recent EU elections to affect the European Union's environmental objectives, particularly in relation to the Green Deal and the evolving economic and geopolitical landscape?

In the wake of the EU elections, the dynamics in the European institutions are bound to change and with them the Union's objectives. While the strategic priorities of the institutions are consistent with the Green Deal objectives, especially delivering on carbon neutrality and EU competitiveness, the current geopolitical and economic landscape will influence the modalities. War in Ukraine, inflation, and energy crisis, to name a few, are taking more place in the public debate, and therefore will impact the interplay between the different actors, as well as the course of upcoming legislative files.

With von der Leyen's rebranding of the Green Deal to the Clean Deal, the commitment to environmental issues shall remain, but with a shift towards a greater role in the competitiveness of the EU's industry. Furthermore, issues such as products made in the EU, sustainable growth, a level playing field, together with increasing the EU's independence on resources are some of the key topics the EU will continue to focus on.

Addressing the shortcomings of the current plastic waste management systems in Europe shall also stay high on the institutions' agenda. This, in turn, will be key to sustaining the growth of plastics recycling capacity in Europe and will be vital for a positive impact on the EU's environment and competitiveness.

In this scenario, framework files like the revised Packaging and Packaging Waste Regulation and Ecodesign for Sustainable Products Regulation, constitute the centerpiece of legislation geared at driving the plastics industry transition in the long run. Next to setting ambitious and measurable recycling targets, they boost uptake of recyclates and put in place the much-needed harmonisation of recycling and plastics manufacturing practices across EU Member States, stimulating investments in the sector and safeguarding the EU Green Deal's environmental objectives – all flagship policies that PRE has been advocating since its inception.

Although the revision of PPWR was a crucial step forward, it represents today only the start of the work that will drive plastics circularity in the EU. The new, ambitious targets must be now backed up by robust methodologies and transparent verification systems. To unlock the full potential of plastics recycling, the new mandate will need to work on all the secondary legislation stemming from crucial legislative files, including the aforementioned PPWR and ESPR, among others. Keeping the ambition high in the development of these files is indispensable to fight greenwashing and achieve the ultimate goal of solving plastic waste management issues.

How do the PPWR and ESPR frameworks shape the future of packaging and product sustainability in the EU, and what challenges do you foresee in implementing the secondary legislation necessary to achieve these ambitious circularity and environmental goals?

PPWR and ESPR are comprehensive frameworks that will overhaul the current rules on packaging and product manufacture and end-of-life management. They can be compared to a puzzle with many missing pieces that will only be put together with the adoption of their secondary legislation. Today, we have the chance to find the pieces which fit best to create a resilient, competitive plastics and plastics recycling value chain in the European Union.

> *The new, ambitious targets must be now backed up by robust methodologies and transparent verification systems*

The PPWR sets a clear direction for circular packaging. Structured around pillars including recyclability, minimum recycled content, reuse, and collection, it is geared at securing high-quality input materials for recycling processes and equally boosting their uptake in high-quality applications. This will drive the decoupling of recycled plastics prices from their virgin counterparts and increase their competitiveness. It represents an important opportunity for the whole plastic value chain to further invest in expanding recycling facilities and technologies.

On the other side, the ESPR will introduce high-level environmental requirements to significantly improve the circularity, energy performance, and other environmental sustainability aspects of products placed on the EU market, including recyclability and recycled content uptake, to name a few.

With a high number of secondary legislative documents that will need to be developed in the coming years, the real work starts now. The ambition of these legislative files, which will define the criteria and terms for compliance of the different targets, should be kept high with the underlying objective of improving how packaging is disposed of and produced.

What is the role of Design for Recycling in reshaping plastic product manufacturing, and how can third-party certifications such as RecyClass ensure that recyclability claims are both reliable and in line with industry practice?

Design for Recycling should be a prerequisite for changing the way plastic products are made. Defining detailed and data-backed design for recycling criteria, along with performance levels and recyclability assessments, will improve waste sortability and feedstock quality in new products. However, to avoid quick fixes or temporary solutions, secondary legislation must be based on methodologies and protocols representative of the industrial practices and be driven by a scientific-based and results-oriented approach.

When it comes to proving the recyclability of packaging, third-party certifications and reliable audit schemes such as those of RecyClass, will allow consumers to make environmentally conscious choices, as sufficient and authentic information will be provided regarding the environmental performance of the product.

With the new recycled content targets introduced by PPWR, how do you see the plastic packaging sector adapting to ensure that packaging can be recycled back into the same applications, and what challenges do you anticipate in meeting these high quality recyclate requirements?

The new recycled content targets set by PPWR for all plastic packaging, including food contact and sensitive applications, will require the uptake of high-quality recyclates back into the same applications. According to these new targets, post-consumer recycled plastic uptake will need to increase massively across the whole plastic packaging sector. Therefore, to be fully sustainable packaging will have to be recycled back into packaging and only if not feasible to other high-end applications. This will in turn allow for keeping the resource in the loop as long as possible.

How can the European plastics recycling industry remain competitive in the face of current market challenges, and what role do third-party certification and robust enforcement methods play in ensuring a level playing field for both EU-based and imported materials?

Considering the current market challenges, it will be equally important to work on a level playing field, which is a must for the European plastics recycling industry to retain its competitiveness. To give an example, EU recyclers are subject to robust legislation and safety requirements. However, these cannot always be verified for imported materials, leading to a lack of level playing field. To overcome this downturn, it is imperative to ensure the same rules in terms of standards for separate collection and sustainability requirements are applied to all players in the market.

When it comes to improving the traceability of imported materials, independent third-party certifications will help solve the current problem in the market by verifying the origin of waste. Such schemes must be based on a chain of custody model which includes verification of waste origin, how it is recycled and to whom it is supplied.

Furthermore, these requirements will need to be paired with a robust methodology that ensures strict enforcement. This is imperative to avoid greenwashing while ensuring the safety of consumers and maintaining the environmental goals of the EU.

Today, plastic recyclers' voice is on the path to being increasingly heard

As the voice of plastics recyclers gains more recognition, what key actions and investments are needed in the upcoming 2024–2029 EU term to solidify plastics recycling as a cornerstone of the circular and decarbonised economy, particularly in the context of secondary legislation for PPWR, ESPR and other related directives?

Putting plastics recycling at the heart of the public debate and the circular plastic transition was a journey, nevertheless today, plastic recyclers' voice is on the path to being increasingly heard. Securing further investments in the sector together with a high level of ambition in the secondary legislations – the PPWR together with the ESPR, the End-of-Life Vehicles revision, and the Waste Framework Directive – will guarantee that sustainability will become the priority for other product manufacturing and industries in the years to come.

The 2024–2029 EU term will be decisive in building a robust legislative framework which recognises the plastic recycling industry as a cornerstone in the transition towards a circular and decarbonised EU. •

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Circular plastics in Poland and Europe

The latest data from Plastics Europe's *The Circular Economy for Plastics: A European Analysis* report shows that while the circular transition of the plastics system is picking up pace, there is still much to be done. Poland – with its deposit return scheme still under development and its inefficient extended producer responsibility scheme – is struggling to keep up with the European average, but urgent action to increase the availability of circular feedstock is needed all across the continent

On the pathway to a circular plastics economy

The concept of a circular plastics economy is defined as "a sustainable model where plastics remain in circulation longer, their use is reduced [1], and they are reused and recycled at the end of their life span." As noted in the report, this makes it possible to retain the value of plastic waste as a resource while reducing CO_2 emissions and preventing plastics from ending up in landfill, being incinerated or polluting the environment, including the oceans. This year's report discusses in detail the different recycling technologies and the types of plastics made from non-fossil-based feedstock, that is, bio-based plastics, bio-attributed plastics and plastics derived from carbon capture and utilisation.

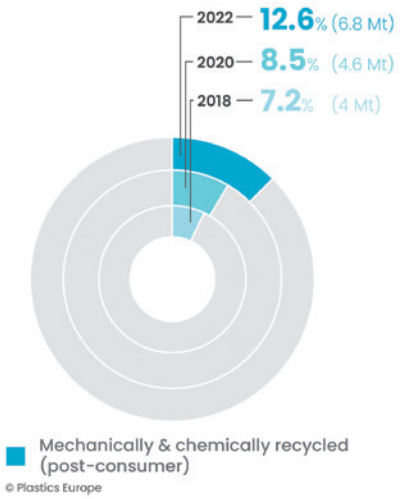
As previously noted, "circularity is the fastest, most affordable, effective and reliable method for reducing plastics waste and GHG emissions from the plastics system" [2]. *The Circular Economy for Plastics: A European Analysis* shows that the circular transition of the plastics system accelerated considerably in 2018–2022. This is evidenced, for instance, by the 70 percent increase in the availability of post-consumer recycled plastics since 2018 (to 6.8 million tonnes in 2022) [3] and by the fact that circular [4] plastics now make up 13.5 percent (7.3 million tonnes) of all plastic resins converted into new products and components in Europe. As a result, Europe's plastics system is now more than halfway towards achieving the intermediate goal set out in the Plastics Transition roadmap, which is to use 25 percent of circular feedstock in new products by 2030. As regards recycled plastics, the recycling rate reached 26.9 percent (8.7 million tonnes) in 2022. This means that for the first time in history, more plastic waste is recycled than put into landfill, which is an important milestone on the path towards a circular plastics economy in Europe.

Post-consumer plastic waste collection and management in Europe
Source: *The Circular Economy for Plastics: A European Analysis* (Plastics Europe, 2024)

Recycling as the main source of circular feedstock

In 2022, European manufacturers relied on a variety of sources of feedstock to produce circular plastics. The main source was mechanical recycling, which accounted for 13.2 percent of all feedstock, whereas the share of bio-based and chemically recycled plastics was only 1 percent and 0.1 percent, respectively. The use of circular plastics also varies between the different target sectors, with the highest demand coming from packaging, building/construction and agriculture. Against that background, other sectors such as automotive and electricals/electronics continue to lag behind.

The report also notes that in order to maximise recycling rates, it is necessary to significantly increase investment in sorting and recycling capacities, including those in chemical recycling. Innovative chemical recycling technologies are needed as a complement to mechanical recycling in order to tap the resource potential of plastic waste, especially the waste that is currently sent to landfill and incineration. Furthermore, improved



Post-consumer recycled content in new products in Europe
Source: *The Circular Economy for Plastics: A European Analysis* (Plastics Europe, 2024)

Extended Producer Responsibility (EPR) schemes and other mandatory measures that incentivise mixed waste sorting also play and will continue to play an important role in increasing separate waste collection. Finally, fostering market demand for recycled plastics is another factor that may play a vital role in encouraging the necessary investment.

Challenges still remain

While many of the indicators show general progress towards circularity, the report also points to a number of challenges that require particular attention. For example, incineration with energy recovery increased by more than 15 percent from 2018 (to 16 million tonnes in 2022), and approximately 25 percent of plastic waste is still sent to landfill (7.6 million tonnes in 2022), even though a considerable portion of such waste could be recycled. The authors of the report emphasise that unless urgent steps are taken to increase the availability of circular feedstock, it will not be possible to sustain the current rate of progress and meet either European-level or industry-level circularity targets.

One of the challenges identified in the report is the growing competitiveness gap between Europe and the rest of the world. According to the authors, "Europe's share of global plastics production decreased from 22 percent in 2006 (53,9 Mt) – when Plastics Europe began tracking global production data – to 14 percent in 2022 (58,8 Mt), with China, North America and the Middle East accounting for 32 percent, 17 percent, and 9 percent respectively." As a result, Europe is becoming "increasingly dependent on imports which do not necessarily meet EU sustainability standards," and the ability of European plastics producers (as well as many sectors that rely on plastics) to invest in circularity may be undermined. Hence, restoring the competitiveness of the European plastics sector is becoming vital to the EU's economy.

Circular plastics in Poland

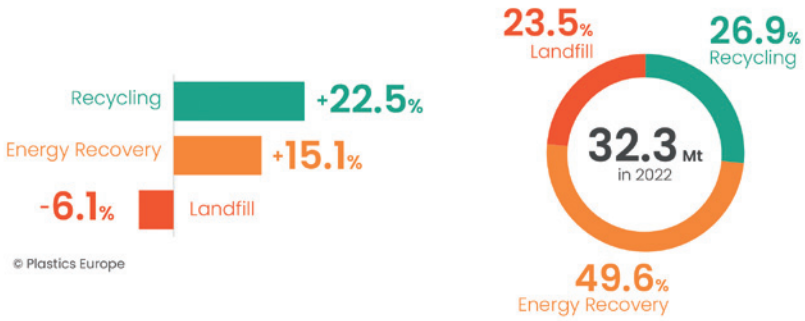
According to the available data, 2,365,000 tonnes of plastics were produced in 2022 in Poland, including 69.3 percent from fossil-based feedstock, 19.2 percent from post-consumer recycled plastics and 11.5 percent from pre-consumer recycled plastics. Polish converters used 3,896,000 tonnes of plastics, of which 83.6 percent came from fossil-based feedstock, 10 percent from post-consumer recycled plastics, 6.2 percent from pre-consumer recycled plastics and 0.2 percent from bio-based feedstock. Overall, circular feedstock accounted for 10.2 percent of all feedstock in new plastic products and components in Poland in 2022.

The recycling rate was 21.2 percent, corresponding to 452,000 tonnes of plastic waste being recycled. While still below the European average, these figures point to a gradual improvement as the recycling rate grew 8.7 percent compared to 2018. In line with the overall European trend, agriculture, building/construction and packaging are leading the market when it comes to the use of recycled plastics in Poland.

More to be done in the end-of-life phase

The report shows that the share of post-consumer plastic waste collected separately in Europe is, for the first time, slightly higher than the share of waste from mixed collection streams and stands at 50.7 percent (16.4 million tonnes). In Poland, however, most plastic waste is still disposed of as part of mixed waste rather than through separate collection, the latter having a share of 43.1 percent. This is a negative development that requires decisive remedial action, especially considering the fact that the recycling rate for separately collected plastic waste in Poland is as much as 15 times higher than for waste from mixed streams.

Too much waste is still being sent to incineration and landfill despite the adverse environmental impact of these processes and the loss of valuable material. While the share of incineration with energy recovery in Europe has increased by 15 percent since 2018, Poland has seen even more impressive growth at 24 percent in comparison with 2018. At the same time, landfilling of post-consumer plastic waste has been decreasing steadily (–6 percent since 2018). While this is a fa-



Post-consumer plastic waste treatment in Europe in 2022. On the left: change from 2018 to 2022. On the right: 2022 data for EU 27+3
Source: *The Circular Economy for Plastics: A European Analysis* (Plastics Europe, 2024)

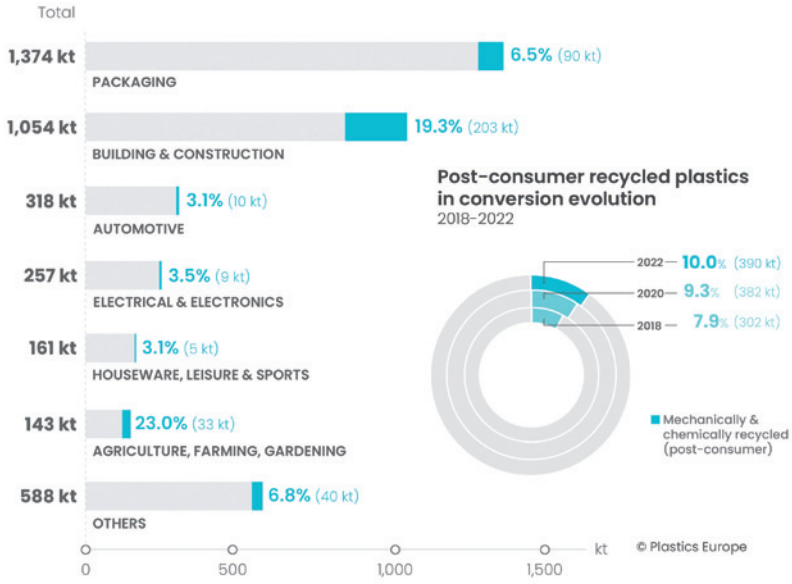
vourable trend, the report emphasises that the share of plastic waste sent to landfill is still too high (in 2022, the figures stood at 25 percent for Europe and 43,6 percent for Poland). What is more, the trend is moving in the wrong direction as the quantity of post-consumer waste sent to landfill has in fact increased since 2016. Another unfavourable trend concerns separately collected waste, 11 percent of which was still landfilled in Europe in 2022 despite the fact that the Landfill Directive imposes a ban on the landfilling of separately collected waste by 2030. In Poland, the share is even higher at 26 percent.

Circularity and the economic situation

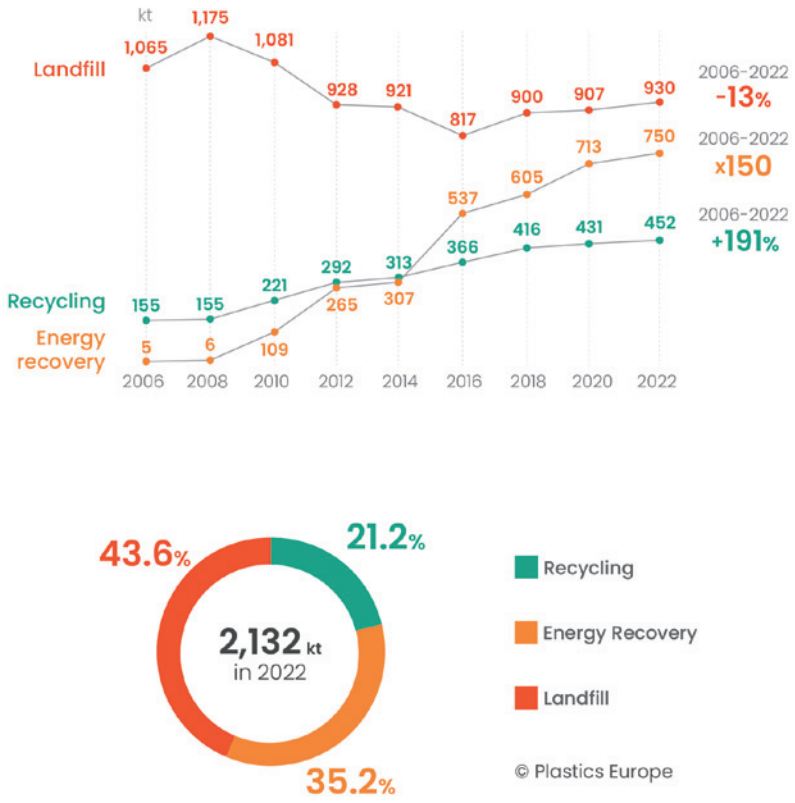
Despite some progress towards circularity, economic statistics for Poland paint a mixed picture of the plastics industry. According to Eurostat data, overall industrial production in Poland fell 1.0 percent in 2023 compared to the previous year; in the chemical industry (which includes polymer production), the drop was as large as 8 percent. In the case of plastic and rubber products, there were some positive signs up to September 2023, but then production began decreasing from October onward. Seasonally adjusted indicators for the sector remained stagnant throughout most of 2023. Poland remains a net importer of plastics in primary forms and a net exporter of plastic products with a trade balance of –3,076,000 tonnes and 1,098,000 tonnes, respectively. Importantly, with Germany being Poland's main trading partner in the import and export of both plastics and plastic and rubber products, the condition of Poland's economy is directly dependent on that of its German counterpart, which is currently not showing any signs of significant recovery. Data from Poland's Central Statistical Office also confirms the downward trend. The significant decreases in production volumes observed in Q1 and Q4 2023 across the manufacturing industry and in the rubber and plastic products sector continued in Q1 2024.

Country-level statistics from the Central Statistical Office indicate that the level of employment in the sector remains steady; another positive development is that capital expenditure in the industry is also increasing. While the chemicals and chemical products sector showed little overall growth in 2023, the rubber and plastic products sector grew considerably to PLN 7.4 billion (compared to PLN 6.1 billion in 2022).

Although industrial production in Poland fell 1.0 percent in 2023 year on year, the plastics industry and its allied industries in the EU+27 [5] – including the food and beverages, electricals and electronics, building and construction, and automotive sectors – recorded an increase in production. The fastest-growing sector was the automotive industry with an increase in production of 12.3 percent compared to the previous year. The food and beverages sector and the electricals and electronics sector grew



Post-consumer recycled plastics in conversion in Poland in 2022
Source: *Tworzywa sztuczne w obiegu zamkniętym. Polska 2022* (Plastics Europe, 2024)



Post-consumer plastics waste treatment in Poland in 2006–2022
Source: *Tworzywa sztuczne w obiegu zamkniętym. Polska 2022* (Plastics Europe, 2024)

more slowly at 1.5 percent and 1.4 percent, respectively. "Looking at the big picture, the periodic upward and downward fluctuations in the industry contribute to economic uncertainty in Poland and leave Polish businesses in a limbo. If you combine this with the legislative pressure, the industry is faced with even greater challenges," said Anna Kozera-Szałkowska.

Closer collaboration with policy-makers

Following the Plastics Transition roadmap, the authors of *The Circular Economy for Plastics: A European Analysis* point out how policy-makers could support the transition to a circular plastics system through appropriate policies and regulatory frameworks. One of the major enablers is public procurement, which can play a crucial role in promoting circularity – for instance by including circular plastic content as a criterion in public tenders. Furthermore, the authors point to the need to adopt a mass balance model (which is already used in sectors such as renewable energy, wood production or fair trade cocoa/chocolate) as a means of determining the content of chemically recycled plastics in new plastic products, and to introduce more ambitious recycled content targets for sensitive applications.

The report emphasises that collaboration between all actors within the European plastics system and policy-makers and regulators needs to be intensified. This is why the authors call upon the European Commission to urgently initiate a Clean Transition Dialogue with the plastics industry so as to identify the roadblocks and propose the solutions and investments that will enable the creation of a sustainable, net-zero circular plastics system in Europe. •

[1] As the report emphasises, "it is important that any consideration of reductions of plastics applications is science-based, material neutral and considers the role of these applications. Any such measures must be accompanied by a clear impact assessment that includes all environmental indicators (including environmental footprint, water consumption, land use, etc.)."

[2] See the 2022 report titled ReShaping Plastics: Pathways to a Circular, Climate Neutral Plastics System in Europe.

[3] The figures for 2022 and historical waste treatment data were recalculated using the new calculation methodology established under Directive (EU) 2018/852.

[4] According to the Plastics Transition roadmap, circular plastics can include post-consumer recycled plastics, bio-based plastics and plastics derived from carbon capture and utilisation; this category excludes pre-consumer recycled plastics.

[5] European Union + Norway, Switzerland and the United Kingdom.

About the report: The biannual report titled The Circular Economy for Plastics: A European Analysis *aims to support the transition of the plastics system in Europe by increasing all stakeholders' understanding of the developments and trends within the circular plastics economy. The data it provides is vital for guiding and benchmarking the transition of the plastics industry and wider plastics system against its transition ambitions, and has an important role to play in supporting evidence based policy-making.*

The complete report and infographics showing data for Poland can be downloaded at www.plasticseurope.org/pl. If you have any questions concerning the report, please contact Plastics Europe Polska (connect.pl@plasticseurope.org).

Recycling: a mission worth the effort

Interview with Erica Canaia, CEO of Fimic S.r.l.

What is recycling for you and how important is it in your life?

For me, recycling is a mission. When I started it many years ago, in 2011, I didn't have any idea about the efforts that all recyclers put into improving recycling and avoiding waste in general into the environment. I also focus on this mission with my young son, teaching him the importance of avoiding all waste, from water to rubbish, as well as other general topics like reusing everything that we have in our lives.

Judging by your activity, for example on social media, you are very involved in spreading awareness of plastic, recycling and related issues. I think this proves that you truly are a woman with a mission. How did this part of your professional journey begin?

From the very beginning I believed that social media can be a great support – like any other tool in our lives. Depending on how we intend to use it, it can be helpful or disastrous. In my opinion, social media – if used well – can be a tool, an instrument that can be used to better communicate with many people that you cannot normally reach.

In this case, LinkedIn in particular is helping me to reach many people who are also outside our recycling world, our plastic world, and raise their awareness of plastics and the many other benefits of this material. Plastics has been demonised by the media for many years, but it is not an evil material, every single product has its own application. Plastic is the most useful when used correctly.

In this case, for example, I write a lot of posts about gas emissions, trying to change the perception of plastic as a polluter and explaining with scientific data and information that plastic is still the right choice in many applications.

Trying to avoid talking about plastic every single day, I'm also putting my life on social media explaining the challenges of balancing family and work for a woman entrepreneur. Having a normal life with a child, I try to explain female leadership and how I try to be the greatest leader possible for my guys.

I think that this is also useful because many people approach me to thank me for my posts, as some of these help them to reflect and think deeply about certain topics. For this reason, I feel that social media and my online activity can be valuable for a lot of people.

> *We constantly run tests in our internal laboratory to guarantee high results and supreme quality for end products*

You have been professionally involved with Fimic for more than a decade. Please give us a little insight into the company's business profile: what kind of recycling equipment do you manufacture?

Fimic is a family-owned company based in the north-eastern Italy that launched 61 years ago, manufacturing customised guillotines for cutting industrial waste bales and rolls. But it was in 1996, when we improved the melt filtration technologies available at the time, with the first Fimic backflush filter entering into service, followed next year by the "scraping" system, that we started to make history in the plastics recycling industry and we've been known for almost 30 years as specialists in automatic, self-cleaning melt filters.

Fimic is active in the plastics recycling market with different types of automatic melt filters – we target highly contaminated plastic materials, especially post-industrial and post-consumer plastics. Not only do we manufacture melt filters, but we also design and develop new technologies that allow us to deliver cutting edge solutions and provide those who choose our technology an increasingly efficient line of work and productivity. Also, at Fimic, we constantly run tests in our internal laboratory to guarantee high results and supreme quality for end products.

We are specialised specifically in 2 product lines: designing and manufacturing automatic and continuous melt filters and guillotines for the plastic recycling industry. As already mentioned, our different types of automatic melt filters target contaminated plastics, especially post-industrial and post-consumer ones, and are designed to allow the customer to choose the filter according to the final application, filtration, processed material and hourly production. Based on these parameters, Fimic is currently able to supply 5 different types of filtration with 5 filter models and is the only company on the market specialising in filtration with such a diverse range of models.

What are the most important values that guide you while planning the next steps in the company's development?

My most important value is the team, so I try to create a company that really works. Together. "Together" means taking into account the needs of others in the team. We all need to be happy with what we do and feel that we are part of something great, which is the company. I prefer to have happy people at Fimic, and whoever is not happy, I try to understand why and help them. If it is not possible, I prefer them to change their position outside Fimic, because we need people who are satisfied and happy with the work they do in our company.

Another important value is customer satisfaction – knowing what our customer needs and recognising how we can really take care of them.

What actions does Fimic undertake to ensure that the company's activities fit in best with the principles of a circular economy?

For example, we avoid any waste during our activities – which could be wasted water or disposable coffee cups – so we have our ceramic coffee cups because, as you know, Italians drink a lot of coffee during the day and we prefer to avoid the mono-use or the bio in this case. We take the circular economy into account every day when we research and develop new products, we think deeply about whether every single product will have an impact on the circular economy or not – if not, we are not going to produce items that we think are not ethical.

It is worth mentioning that Fimic also runs its own spare parts portal. Is it very popular with customers? What is the feedback from users?

You have to take into consideration that when I started in 2011, many customers used to e-mail me asking for spare parts. For this reason, when we realised that the number of requests for spare parts was increasing, we decided to create a portal that is like Amazon, where the customer can find his own spare parts. This year we improved it, so depending on the machine the customer has, he will find the right spare parts, components with the precise diameter, or the exact part depending on the year of production of the model.

The portal is used by 90% of our customers. Obviously, the big companies – like multinational ones – have their own orders and documents that must be assigned to the part, but they open the spare parts portal anyway to check which part they really need, and of course every product has a picture and the price. Also, we are already developing and strategically thinking about Black Friday in November – every product will be discounted for this special event.

Fighting greenwashing and the lies being spread about plastic is an important endeavour, there is no doubt about that. What do you think the recycling industry should be doing to help end these bad practices – ideally, once and for all?

In my opinion, the plastics recycling industry should be speaking louder, because we have the information and knowledge to identify when companies are applying greenwashing actions; for example, when they are making products that are not recyclable at all, but promoting them as recyclable just by putting a label on them. We need to show people, consumers, that a product is or is not recyclable.

For example, I brought in a shampoo whose label said that the packaging contained 30% less plastic. I wrote an e-mail to customer service asking why it should have 30% less plastic, and they replied that it was 30% less compared to other products in the same line. So I brought in 3 different shampoos, weighed them on a scale and demonstrated that was not true.

That is what we had to do – share our knowledge with people and demonstrate what is false and what is true. Educate and tell the truth about plastic, that it is not an evil, destructive material as it has been demonised.

At this year's Plastics Recycling Awards Europe, you won the Plastics Recycling Ambassador category. What are your thoughts on this latest achievement and what are your plans for future projects?

I'm happy to see that my efforts are having an impact, and that people are interested in plastics recycling. This gives me extra motivation to keep sharing information about this topic and promoting its benefits. As for my future projects, they focus on bringing our industry together and enhancing plastic's reputation. •

Interviewed by Agata Mojcner

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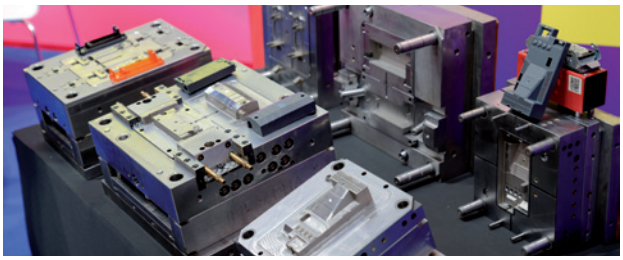
At the world's leading trade fair for industrial plastics processing, 1,636 exhibitors present a wide range of products and services, providing a comprehensive overview of all plastics technologies. It is particularly renowned for its leadership in injection moulding technology, with strong positions in extrusion and thermoforming.

Innoform 2025



4 –6 March 2025
Bydgoszcz, Poland

This trade fair in Bydgoszcz is the only event in Poland dedicated specifically to the moulding industry, located in the heart of Poland's Tool Valley. It consistently attracts owners, management teams, and technical personnel from production facilities specialising in metalworking and plastics processing.

MEET THE PLASTICS COMMUNITY

AMI Plastics World Expos 2024

11–12 September 2024
Brussels, Belgium

Now in its fourth year, this Brussels event brings together the world's leading compounding, recycling and extrusion companies. Over two days, attendees can network, explore innovation and gain insight through technical presentations, seminars and industry debates.

Central European Plastics Meeting

24–26 September 2024
Budapest, Hungary

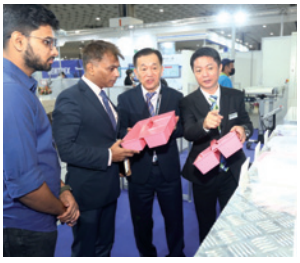
Attendees are invited to participate in three days of B2B meetings, inspiring plenary sessions and a technical exhibition. They will connect with plastics industry leaders, expand their networks and explore the latest trends, innovations and market insights in plastics and recycling.

FachPack 2024

24–26 September 2024
Nürnberg, Germany

This European exhibition is a key event for packaging, technology and processing. For over 40 years it has provided a comprehensive overview of the packaging industry, covering product packaging solutions, product aids and materials, technology, logistics and printing solutions or printing.

Taipei Plas 2024



24–28 September 2024
Taipei, Taiwan

This major event for the plastics and rubber industry will feature 400 exhibitors on 1,800 stands and will focus on innovative materials, advanced manufacturing and the circular economy. It will also introduce three new zones dedicated to bio, recycled plastics and green products.

Plastics Recycling Show Europe 2025

1–2 April 2025
Amsterdam, Netherlands

This leading event in continental Europe is dedicated to the plastics recycling industry and includes an exhibition, conference and awards ceremony. It covers the entire supply chain, from the development of raw materials and recycling processes to the incorporation of recycled polymers into new products.

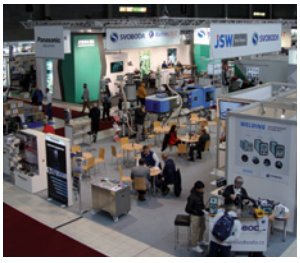
Plastpol 2025

20–23 May 2025
Kielce, Poland

Central Europe's leading event for the plastics and rubber processing industry attracts thousands of people for lively discussions, business deals and new ventures. The show hosts industry seminars and awards for outstanding professionals, making it a comprehensive platform for innovation and networking in the sector.

WHERE AND WHEN?

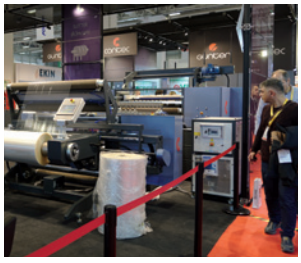
MSV International Industrial Fair 2024



8–11 October 2024
Brno, Czech Republic

MSV, Central Europe's leading industrial trade fair, attracts a highly professional audience. It presents key sectors of the mechanical and electrical engineering industry, with a strong focus on machining, forming and Industry 4.0, with an emphasis on digitalisation in production.

Plast Eurasia Istanbul 2024



4–7 December 2024
Istanbul, Turkey

The largest plastics industry fair in the Eurasian region. A key meeting point for industry professionals, attracting thousands of local and international visitors. The event showcases a wide range of products including plastics machinery, recycling technologies, automation and raw materials.

JEC World 2025

4–6 March 2025
Paris, France

Global trade show for composite materials and their applications. It is the "place to be" for composites with hundreds of product launches, awards ceremonies, startup competitions, conferences, live demonstrations, Innovation Planets, and networking opportunities.

GreenPlast 2025

27–30 May 2025
Milan, Italy

The event focuses on sustainability, material recovery, recycling and energy efficiency. The event will feature machinery for injection moulding, extrusion, blow moulding, thermoforming and recycling, additive manufacturing, biodegradable and recycled polymers, and services.

Improving plastic packaging recyclability

The European Union has set an important goal: by 2030, all plastic packaging on the market must be reusable or recyclable in a way that makes economic sense. This is part of a wider plan to create a circular economy, where resources are reused and waste is minimised.

One of the cross-industry initiatives to improve the recyclability of plastic packaging and promote a circular economy in Europe is RecyClass, which has developed recycling design guidelines to help the packaging industry meet the challenges set by the EU.

The guidelines are designed to help companies design packaging that is easier to recycle. They provide clear advice based on scientific research, making it easier for manufacturers, recyclers and other stakeholders to improve the recyclability of their plastic products.

The guidelines have been updated to reflect the latest advances in recycling technology. For example, they now include new advice on the use of laminating adhesives, which are important for recycling flexible packaging without contaminating other materials. The guidelines also include recommendations on the use of specific materials such as ethylene vinyl alcohol (EVOH) in polystyrene (PS) packaging and specific adhesives for labels in high density polyethylene (HDPE) rigid packaging.

RecyClass has worked closely with international organisations such as the Association of Plastics Recyclers in the USA. This collaboration helps to standardise recycling practices worldwide, making it easier for global companies to meet different recycling requirements.

A key part of the guidelines is the emphasis on testing. Independent test facilities have carried out detailed tests on various packaging components. For example, they have tested how different closures on polypropylene (PP) and HDPE containers affect the recycling process. These tests help to ensure that the guidelines are based on real-world conditions and provide reliable advice to industry.

The guidelines also highlight the importance of designing packaging that is easy to recycle. For example, ensuring that labels on HDPE packaging can be easily removed is critical to keeping the recycling stream clean and preventing contamination.

A useful feature of the RecyClass initiative is the RecyClass Online Tool. This tool has been updated to reflect the latest guidelines and is designed to help packaging designers and manufacturers assess the recyclability of their products. By entering specific details about their packaging into the tool, users can receive a recyclability rating based on the latest guidelines.

The updated guidelines and online tool are expected to have a major impact on the plastic packaging industry. By providing the tools needed to design packaging that is both functional and recyclable, RecyClass will help companies keep pace with increasing regulations and consumer demand for sustainable products. In addition, these resources are key to the industry's move towards a circular economy. By enabling more plastic waste to be efficiently recycled, they help reduce the environmental impact of packaging and help companies meet their sustainability goals.

RecyClass guidelines list:

- PET bottles (clear/light blue and transparent coloured)
- PET trays (transparent clear)
- HDPE containers & tubes (natural, white and coloured)
- PP containers & tubes (natural, white and coloured)
- EPS containers
- PE films (natural and coloured)
- PP films (natural and coloured)
- PS containers (natural, white and coloured)
- HDPE & PP Crates and Pallets

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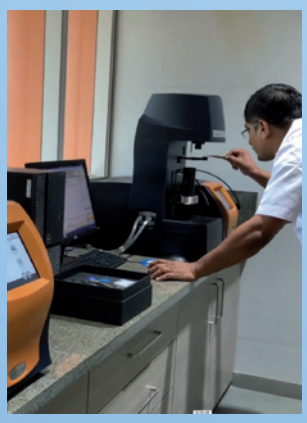

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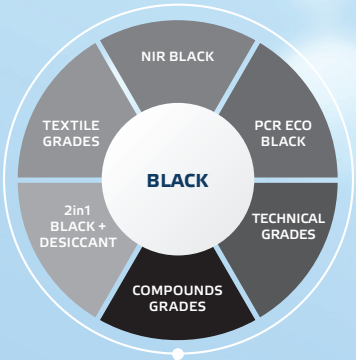

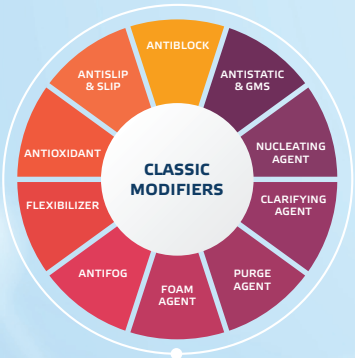

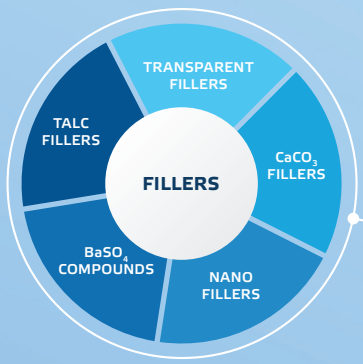

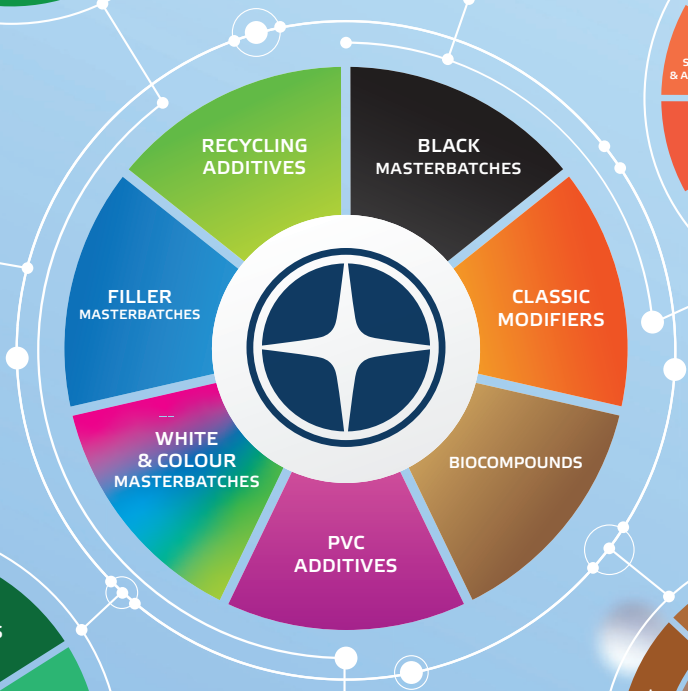

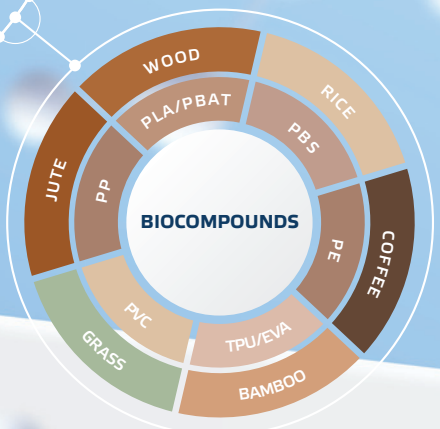

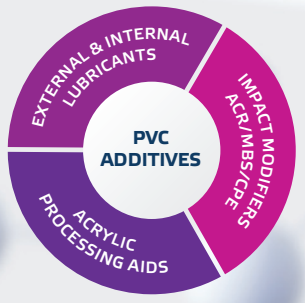

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Chemical recycling – does it really not work?

László Bűdy
CEO, myCeppi

In mid-July 2024, The Guardian reported the bombshell news that British oil giant Shell is backing off its highly ambitious chemical recycling plans in its 2023 Sustainability Report, published in March 2024. In fact company even claims that "In 2023, we concluded that our ambition to convert 1 million tons of plastic waste into pyrolysis oil per year by 2025 is unachievable" [1]. Reasons include the scarcity of waste and the regulatory uncertainty. Of course, Shell still wants to participate in the creation and development of the circular economy, and consequently they will continue their investments in pyrolysis plants both in Moerdijk (Netherlands) and in Singapore, although these will be smaller capacities of 50 kt/year. Aside from the two reasons mentioned, Shell did not provide any details about the "reasons for the withdrawal", and the information itself is just a few lines in the 96-page report. At this point, we can only suspect the background to the decision.

The current chemical recycling capacity in Europe is less than 400 kt/year, of which less than 300 kt/year produces pyrolysis oil. Current plastics industry demand is an order of magnitude higher. Plastics Europe members have committed to creating 2.8 million tons of new chemical recycling capacity by 2030, 80% of which will be gasification and pyrolysis plants. However, there are many regulatory uncertainties around chemical recycling. Chemical recycling is still a source of debate. Environmentalists and researchers have long debated the feasibility and validity of chemical recycling, with many citing the release of pollutants and

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toxic substances when plastics are heated/boiled, which are seriously harmful to the environment. The counter-argument, however, is that chemical recycling does not actually mean real carbon dioxide savings compared to virgin polymer production. One of the main objections raised by environmentalists is that the weight of the oil produced by pyrolysis is less than half that of the loaded waste, although in the case of very clean, sorted and homogeneous waste the recovery can be as high as 80%. They also mention as a problem that pyrolysis oil alone cannot be used on its own, but must be mixed with "virgin naphtha" before processing. In general, the production cost of repolymers produced by chemical recycling can be up to twice that of conventional virgin polymers. The industry estimates that the price of repolymers produced in this way can be up to 2.5–3 times the price of conventional polymers. It is imperative that large chemical companies would like to enter the recycling market, as the mandatory recycling targets for 2025 and 2030 are approaching, demand is bound to increase, and most processors need both virgin and easy-to-process polymer solutions.

Past experience shows that in cases where mechanical recycling has solved the problem of molecular chain degradation, as in the case of rPET, the price of food-grades can be up to 30–60% higher than that of virgin PET. The same is not true for the price of mechanically recycled polyolefins. Although there was a period of a few months in 2021–2022 when the price of some recycled polyolefins exceeded virgin polyolefins, this was more of an exceptional transition due to different price dynamics. Currently, the status quo is more prevalent, with recycled polyolefins costing 70–80% of virgin polymer prices, as they are typically used in lower quality finished plastic products to reduce costs. Of course there are, or rather will be, regulations that could raise the price of mechanically recycled polyolefins. An example is the plastic tax that can be applied to plastic products made from pure virgin polymer. But the penalty is useless if we still can't produce the right regranulate for food and pharmaceutical packaging, so this is not an incentive, it's just a tax.

The basic belief of plastics converters is that if politicians make the rules, they will add the solutions. There will be plastic granules, like "virgin" but with "re" written on the bag. Unfortunately, this is not the case, the regulation was adopted before the solution. Moreover, the existing solution, mechanical recycling, is also limited. According to Jim Flitterling, president and CEO of DOW Chemical, only 15% of future demand for recycled polyethylene can be met by mechanical recycling, with the remaining 85% requiring chemical recycling. Unfortunately, we have to agree, due to the properties of polyolefins, degradation and contamination from use and recycling, limiting their usability and even circularity. Due to the repeated mechanical recycling, the stabilisers, additives and increasing impurity content used, after 2-3 rounds polyolefins will be a difficult to understand molecular stack, it is easy to see that the path of recycled polyolefin-based plastics will inevitably lead to pyrolysis or the power plant furnace.

The great advantage of mechanical recycling is that the technology is available, there are very good working solutions, there are many technology suppliers on the market, and technical development is continuous. Another big advantage is that, compared to chemical recycling, it has a lower energy demand and thus a smaller carbon footprint. A big disadvantage is that the quality of the final product can be directly derived from the available waste. Since waste of stable, continuous quality is not available, the reproducibility of the product is questionable, and there is no continuous quality available. As a result, converters have to adapt to changing quality. In most cases, this is not possible, as most plastics converters produce a product with fixed parameters, based on a fixed recipe. The physical properties of the input, which can vary from day to day, do not allow stable production. In addition, European machinery is not designed for low-quality polymer input. Mechanically recycled regranulates, which necessarily contain physical impurities, cause rapid premature wear and tear of "delicate" machinery.

In contrast, repolymers produced by chemical recycling do not have such problems. A very good solution provided it's indeed environmentally friendly, actually has a smaller carbon footprint and works with mixed plastic waste. These last two characteristics are not yet proven, and are the subject of debate. In order to make serious investments in chemical recycling, regulatory support is needed, i.e. recog-

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nition of chemically recycled plastics as a circular product. This would allow them to be included in various recycling target numbers. Chemical companies would like to have access to plastic waste streams, similar to mechanical recyclers. Last but not least, they want the Mass Balance Approach to be recognised as a tool for calculating recycled content. In return, they promise not to compete with mechanical recyclers for waste resources. But will this really be the case?

A minor digression. Pyrolysis oil as a raw material is stimulating the fantasies not only of the chemical industry, but also of the major players in the transportation sector. Oil produced by catalytic pyrolysis can even be used to fuel aircraft. How good the ads for the most polluting mode of transportation would sound: "...fly carbon-free...". With the ETS soon to be extended to the population and transportation, zero-carbon fuels will have the advantage, demand and prices for ash oil will increase significantly. Competition for plastic, waste, homogeneous and clean waste with high oil yields will grow rapidly. There is concern that the plastics industry will have less and less waste. What's more, mathematically it's easy to see that during chemical recycling we multiply by a number less than one at each technological stage; the yield of ash oil is less than one number, as is oil conversion, refining, cracking and polymerisation. For the time being, it is impossible to determine how much recycled plastic can be obtained from a ton of plastic waste through the chemical recycling process, but a long and energy-intensive process chain must be established.

Do we have enough plastic waste? No. There is a lot of garbage. The big challenge is how we can turn trash into useful waste. The key to this are the citizens. We need to educate the public on how they can easily produce recyclable waste instead of garbage. To solve the "plastic waste hunger" in the near future, we need to convert garbage into waste, mostly high quality waste, in increasing quantities. This requires much more sophisticated waste collection. In the case of PET, which is considered the most solved, the European collection rate for PET bottles was only 60% before the widespread introduction of DRS systems. With DRS systems, this rate is expected to increase significantly, reaching up to 80% where they have been introduced. However, in the largest segment, polyolefins, the situation is not so simple, products and applications are diverse, and there is no possibility of introducing a deposit fee.

For example, packaging materials not contaminated with food, PE and PP films, can be collected separately at the household level, bags, films, broken and used household utensils and furniture. The most important thing is that this waste should not be mixed with other already contaminated packaging materials. Collection of waste in schools and public facilities should be facilitated. However, donating waste also at collection points at gas stations cannot be ruled out. The situation should be made somewhat similar to the metal collection campaign in socialist countries in the 1950s. Since the situation is similar, a sympathetic "green" decision was made, the scientific basis for which is unclear and ambiguous. Implementation methods, whether mechanical or chemical, require resources and energy, and are by no means environmentally friendly. One thing is certain, however, the consumer must pay for the investment and return. Moreover, there is no guarantee that the desired results will be achieved.

Returning to the initial thesis: in the end, what did Shell want to achieve? Probably nothing, it just so happened that setting up and profitably operating a high-capacity pyrolysis plant in the short term doesn't seem realistic due to regulatory uncertainty, limited waste availability and immature technology. It is relatively easy to change regulations, but increasing the amount of usable waste is more difficult. Most important, however, is solving the problem of converting mixed and contaminated plastic waste into pyrolysis oil and chemical raw materials in 100,000-ton plants. Pyrolysis oil will be one of the key products of the future not only for the chemical industry, but also for transportation. However, creating the necessary capacity is time-consuming; according to pessimistic estimates, it will take up to 15–20 years to set it up. One more question remains: will the total carbon footprint of these technologies really be smaller than that of conventional fossil sources? •

[1] Shell Sustainability Report 2023, p. 45

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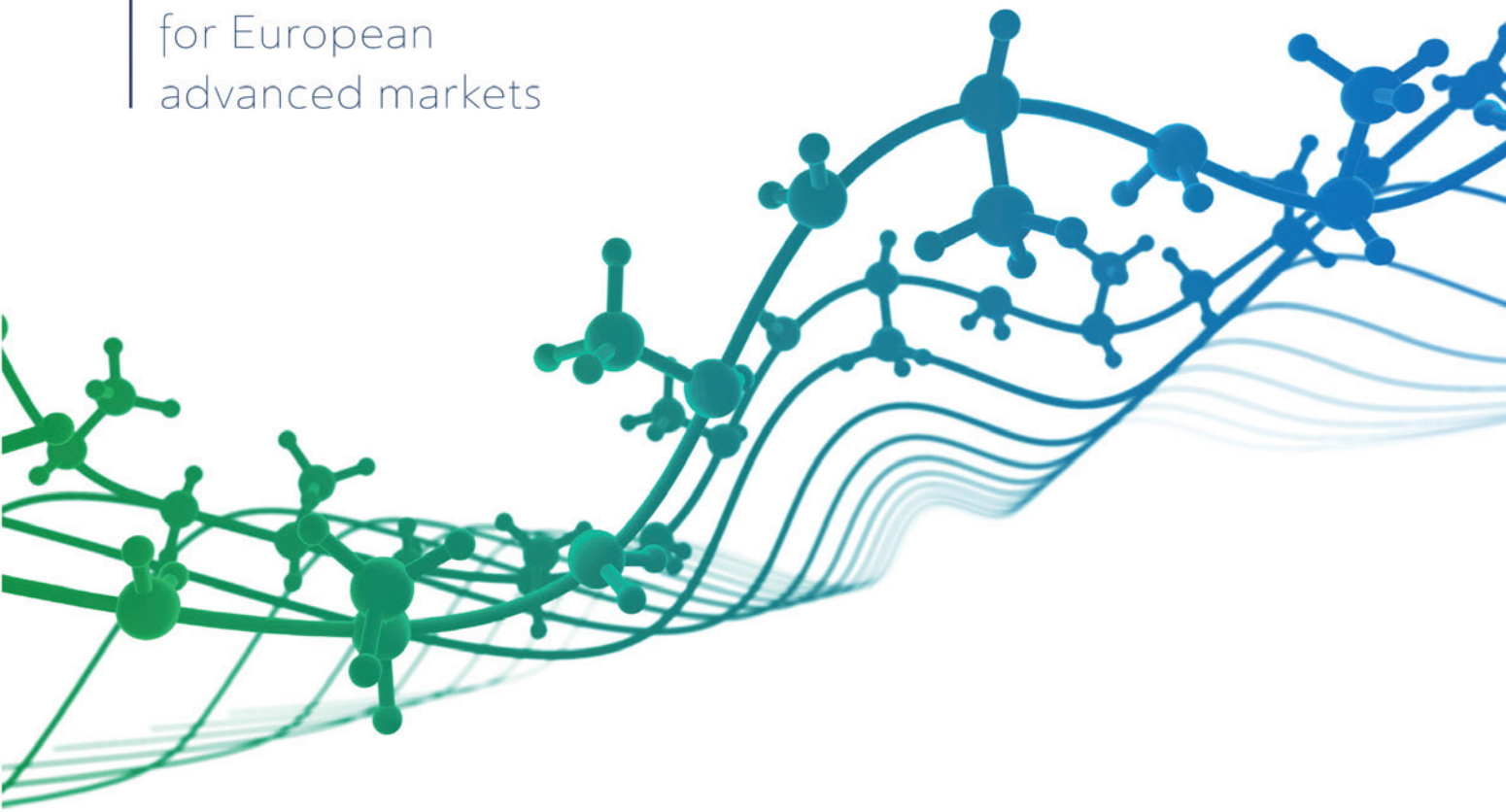

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Bole Europe: a company committed to growth

Interview with Vladimir Dunajewski, CEO Bole Europe Technology Co. Ltd Sp. z o.o.

Let's start from the beginning. What is Bole and how would you briefly characterise the company?

Bole is a high-tech company that focuses on the research, development and production of precision plastic injection moulding machines. Highly developed German technology manufactured in China including design, production, assembly, testing, sales and after-sales service, provides customers with complete, professional injection moulding equipment for plastics processing.

The company currently sells its machines to more than 70 countries, with major representations in India, South Korea, the USA and Europe.

A few words about the company's history?

Bole Intelligent Machinery Co. Ltd. was founded in 1998, and its founder Mr. Kui WeiLiang already had extensive experience in the plastics market at that time. The 1990s were a time of tremendous development in China's industry. The Chinese economy was very receptive to novelty and innovation, and thus opportunities to expand into new markets were also opening up. The country's economic development and experience in the market led Mr. Kui, seeing opportunities for growth, to set up a new enterprise to manufacture plastics processing machinery. Mr. Kui's excellent knowledge of processing technology and the opening of an R&D department allowed him to create a production line of the first thousand-ton injection moulding machine in 2002, which was developed using proprietary intellectual property rights.

Where are you present in Europe?

Bole Europe Technology Co. Ltd. was officially opened in 2019, and is a 100% owned company of injection moulding machine manufacturer Bole Intelligent Machinery Co. Ltd.

In terms of location, the main office is located in Mysłowice, Poland. A well-developed road and rail infrastructure, proximity to major motorways and the industrialisation of the region were key factors in the choice of office and warehouse space. In turn, Poland's central location on the map of Europe makes it possible to deliver injection moulding machines to customers throughout the continent within a few or several hours.

The company started with just a few people and the team has grown considerably. It is a multicultural, young team with enormous potential. The team includes people from Poland, Germany, China, Czech Republic, Slovakia and partners in Italy, France, Spain and Portugal. It is a multicultural melting pot where new ideas and innovative solutions are generated.

In return, Bole has a large stock of 50 machines and the ability to supply products "off the shelf", making the company very popular with customers. The quality and availability of our injection moulding machines allows us to compete with the world's largest established brands.

But 2024 also marks the company's expansion into further European countries...

Yes, in February this year, UK-based Bole Machinery UK became a direct part of Bole Europe Technology. This expansion of Bole's presence in the UK market marks a milestone in the company's history, although it must be said that Bole has been present in the UK market since 2015, when our company's injection moulding machines were first delivered to the UK market.

The UK is a difficult market, but through our work there we have become an established player. In the beginning, the English team acted as an agent and now, thanks to our efforts, we have transformed it into a Bole division.

The integration of Bole Machinery UK into Bole Europe Technology is an example of our company's commitment to the UK market. This strategic move will bring many benefits to customers and is also a key step in Bole's European expansion strategy.

The second extremely important event in our company's calendar is the founding of Bole Intelligent GmbH,

based in Germany. It is no secret that the DACH region (Germany, Austria, Switzerland) is the largest, but also extremely demanding and specific in Europe, so the German company will provide significant support to Bole Europe's activities in these markets.

One of the main areas of activity for Bole Intelligent GmbH in Germany will be research and development in cooperation with German research centres and institutes in the fields of mechanical engineering and process engineering for plastics and metals. The focus is on the future of plastics and metal processing, including the processing of recyclates and biopolymers, light metals, as well as new process technologies in the packaging, automotive and medical sectors. The R&D department in Europe also enables us to optimally support our customers in implementing their ideas into parts in the future.

Let's move on to the machine offering that you address to European customers.

For several years, we have been offering proven solutions in the production of precision injection moulding machines. Our portfolio includes energy-efficient hydraulic injection moulding machines with a central clamping toggle and servo-hydraulic drive (EKS series),

servo-hydraulic two platen injection moulding machines (DK series) or electric injection moulding machines with an integrated hydraulic system (FE series). Of course, we are also able to offer a range of customised solutions.

The product range includes almost 100 specifications and 6 main series. The range of clamping forces is from 50 tonnes to 6,800 tonnes and the range of injection weights is from 0.01 grams to 160 kilograms.

Please tell us what your machines are characterised by?

For servohydraulic and electric injection moulding machines, what certainly sets us apart is our patented central clamping toggle, which allows the entire clamping force to be delivered to the mould, where with external toggle systems this result can be up to 20% lower.

The EKS range of injection moulding machines is characterised by low energy consumption, as demonstrated by tests carried out with customers in Poland and other countries, and by the extensive range of equipment already available in the basic version, which can also be personalised to suit the chosen production profile, i.e. 2K, IML, MuCell, etc. Thanks to its modular design, we can adapt the clamping system to the dimensional needs of the injected part, allowing us to provide our customers with exactly the solution they require.

Thanks to the optimised design of the injection moulding machine, including the patented central clamping toggle I mentioned earlier, the EKS series can boast very high operating culture, repeatability, reliability and accuracy during production. It is worth mentioning that the EKS series is based on components from world-leading manufacturers such as Siemens, Rexroth, Balluff, ABB, Keba, Keiki or Schneider, which ensures long service life and easy availability of spare parts. EKS series injection moulding machines are available as standard in the short-circuit force range from 50 tonnes to 6,800 tonnes.

This year saw the launch of our new EKS series injection moulding machine, EVOlution. With our intelligent drive technology, smart solutions in the combination of axis drives have not only reduced energy consumption, but also raised the precision of the machine during start-up and in the process to the level of an electric machine.

Our DK series two platen injection moulding machines, on the other hand, have many advantages that make them the choice of renowned plastics processors. These include break resisting tie bars with minimised risk of breakage under maximum load and bending, high precision and rigidity linear rails, or a fast, smooth, quiet and efficient locking system. On the other hand, tie bar clamp nuts with progressive tooth pitch allow for even loading of all components and prolonged service life. These advantages are truly numerous.

Machines in this series are available from 520 tonnes of short-circuit force. They are equipped as standard

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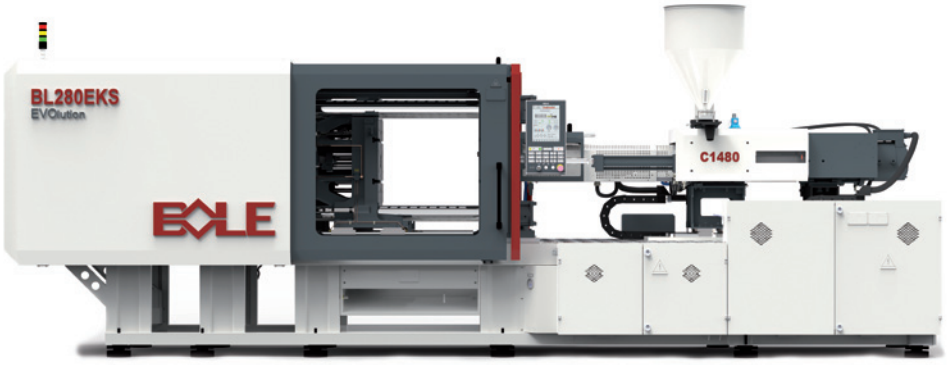


with servo drives, linear rails under the unit and moving platen, and all the necessary interfaces to automate the production process.

Of course, mention should also be made of electric injection moulding machines, which are characterised by a reduction in energy consumption and at the same time its efficient conversion into work. Our FE series injection moulding machines are highly precise, with a positioning accuracy of up to 0.01 mm, enabling excellent repeatability. In turn, high movement speeds and intelligent management via the machine controller enable the production of demanding moulded parts.

A small hydraulic system integrated in the machine is used for less sensitive functions, such as injection unit movements and ejector, while allowing the machine to operate the mould cores directly. FE series electric injection moulding machines are produced in the closing force range from 110 to 350 tonnes.

Who uses your machines and in which industries are they mainly used?

The range of industries using injection moulding machines is very wide. Most often our machines can be found in the machine parks of companies in the automotive, construction and household goods industries. The end customers for our products are major market players such as Bosch, Whirlpool, BSH, Castorama, Kia, Hyundai, BMW. Production includes items such as technical parts, precision automotive parts or aesthetically pleasing household goods.

The trade fair season is starting. Where can we see your injection moulding machines in the near future?

Autumn 2024 is the Czech MSV trade fair and the excellent German Fakuma. Next year we will also be present at Plastpol in Poland. 2025 is, of course, the K fair, where we will present an impressive stand, but we will also be present at specialist trade fairs dedicated to specific industries, such as the Euroguss and Kuteno.

How do you differentiate yourselves from your competitors?

This is a difficult question and in answering it I cannot limit myself to one aspect. First of all, the technical side, here we always try to be one step ahead of the competition. Above all, we consistently develop our machines. Already in 2018, we introduced linear guides as standard equipment on our servo-hydraulic injection moulding machines in the EKS series. I would add that at the 2022 K show, one of our competitors offered this as an additional option.

We also use a direct-mounted servo drive on the plasticising system on our machines. This has been standard equipment on the EKS series since 2023. This year, we also retrofitted our injection moulding machines as standard with infrared heaters, which significantly reduce energy consumption.

Anyway, in the field of technology, we are always trying to be one step ahead, as demonstrated, for example, by Thixomolding – technology dedicated to magnesium alloys.

And what is this?

The demand for durable, lightweight products has driven the significant growth of magnesium thixomolding. Its many advantages make it a suitable choice for manufacturing parts found in automotive, consumer products, defense, electronics, handheld devices and sports equipment. As a result, magnesium thixomolding is becoming the favored capability in producing various products in all markets.

Bole has a significant achievement in the field of thixomolding. Our company has a long-standing partner-

ship with Shanghai Jiao Tong University, with which we share a laboratory. Thanks to its patented technology, our concern is able to produce injection moulding machines with the largest injection and has satisfactory solutions for material modification to achieve adequate anti-corrosion properties, high conductivity and greater strength.

> *Bole is continuously developing its product portfolio, thus supporting customers at every stage of a project to meet their diverse requirements, thereby increasing both its own and its customers' competitiveness*

For years, our company has been committed to the development and innovation of fibre-reinforced thermoplastic composite moulding technology: from standard injection moulding, long fibre-reinforced thermoplastic injection moulding (CIML), to online hot injection moulding (OIHM). Following market trends, Bole is continuously developing its product portfolio, thus supporting customers at every stage of a project to meet their diverse requirements, thereby increasing both its own and its customers' competitiveness.

Secondly, we think globally, act locally. We are developing our direct sales network. Our agents are present in Germany, the UK, Poland, the Czech Republic, Slovakia and in Lithuania, Latvia and Estonia. At the same time, we are expanding our network of agents using companies that are well known in the local markets. They are currently covering demand in Italy, France, Spain, Portugal and the Benelux countries.

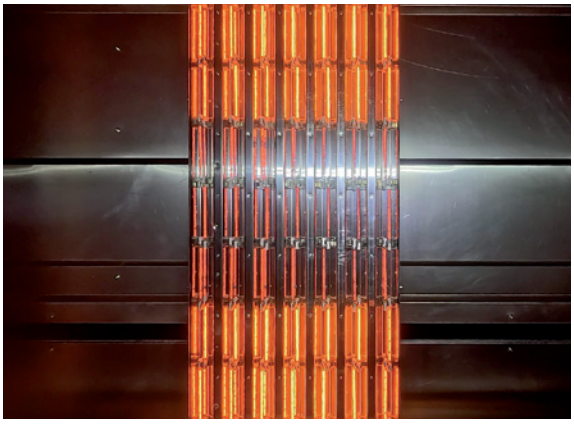
And the third is our vision. As I mentioned before, we always try to be one step ahead. This is what drives us. Our primary goal is to provide valuable and reliable solutions in the field of plastics processing. And, humanly speaking, we just want the market to be better as a result of our work. This vision reflects our commitment to both innovation and social responsibility. We want this to be motivating for both employees and customers who want to be part of this change. •

ENERGYLINE series vacuum thermoforming machines

TOOLS FACTORY has been producing and supplying modern plastics processing machines to the European market for 25 years. These are mainly vacuum thermoforming machines, offered in several functional types, in various sizes and with a wide list of equipment options. This allows you to adapt the devices to individual and different customer requirements. Innovation, efficiency and durability are the main emblems of the TOOLS FACTORY banner

ENERGYLINE vacuum thermoformers ensure maximum electricity savings during the process of heating the plastic before forming. They are designed to save energy needed for production and resources needed to construct machines.

Their most important distinguishing feature are specially constructed heaters equipped with a movable, wandering panel with halogen emitters. The range of movement, as well as the speed and power of the emitters assigned to a given position are controlled in the steering program. This "dynamic" method of heating the plastic ensures better heat distribution, more uniform energy distribution, no overheating of the surface and, as a result, **large heating energy savings of 40–50%.** An additional benefit is a significant reduction in the number of installed heating elements, and



Forming window of the ENERGYLINE machine with a visible wandering panel and set of halogen emitters working with dynamically variable heating power

thus **a reduction in the power installed and required in the machines**, ranging from 60 to 75%, depending on the size of the working area. This significantly reduces the power of the electrical connections required for the device.

ENERGYLINE machines can be used to form all types of thermoplastics, and the control program allows you to adjust the process parameters and speed to the material properties and achieve optimal quality results. The thermoforming process can be carried out in manual or automatic mode for one or many cycles (option with automatic sheet feeder). The standard equipment of the machines includes many modern solutions, and the list of additional options (automatic feeder, forming window regulation, proportional valves, central cooling system, plug assist, QR code scanner, etc.) allows the machine to be adapted to the required production profile.

The energy consumption meter and analyser installed in each machine allows for optimisation of the heating process and the entire production process. We also offer the possibility of individually adjusting the heating power of the machine (panels) to the customer's needs. ENERGYLINE thermoforming machines are offered in various sizes and can also be adapted to the customer's needs in this aspect.

ENERGYLINE can be truly called a groundbreaking and revolutionary solution in the field of vacuum thermoforming of plastics. To sum up, here are the most important reasons for this:

- **A new dynamic heating solution, wandering heating panels in heaters**
- **Heating energy savings of 40–50% compared to traditional quartz heaters**
- **Average energy consumption 0.10–0.25 kWh/kg of material (test results for typical materials range from 0.13 to 0.25 kWh/kg)**
- **Low heating power – from 22 to 100 kW (two heaters) depending on dimensions**
- **Reduced the number of heating elements needed**
- **Reduced the weight and nominal dimensions of machines**
- **Short delivery time for the machine – from 3 to 5 months**

Watch video

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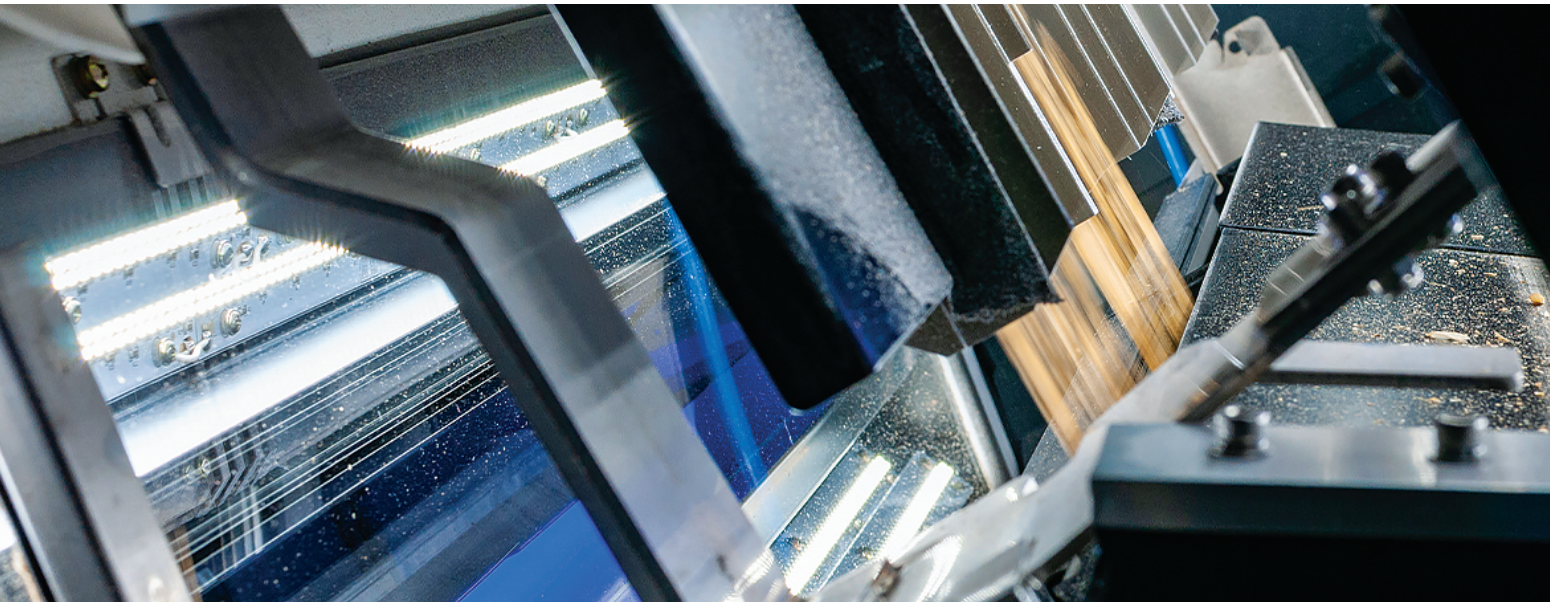

Colour and polymer sorting of HDPE/PP: a key element of modern recycling

The largest HDPE packaging recycler in Poland has recently installed a state-of-the-art polymer sorter from Meyer Europe to improve recycling efficiency and product quality. This new technology, featuring advanced AI and Ultra-HD cameras, enables precise separation of HDPE and PP flakes, which is crucial for the production of high quality post-consumer recycling (PCR) regranulates.

Atus Group is the largest recycler of HDPE packaging in Poland, producing and delivering solutions for the construction industry across Europe. The company was established in 2003, and they have been continuously growing since then, improving processes, introducing innovative solutions and earning the trust of new customers.

In recent weeks, a polymer sorter from Meyer Europe – a manufacturer of intelligent optical separation devices and X-ray inspection systems – has been installed and begun operating within the Atus Group recycling line assortment. In addition to the previously delivered Meyer CG.P series colour separator, a Meyer CI8 series polymer sorter has been installed in one of the production halls. This device is equipped with an Ultra-HD colour camera system supporting the polymer separation process. The system uses multispectral cameras operating in infrared wavelengths, enabling precise identification and separation of HDPE/PP flakes. The device uses Maglev 3.0 ejectors developed and patented by Meyer, the operation of which allows to minimalise material losses. The entire process is supported by the AI Deep Learning System and intuitive software with remote control capabilities.

What are the goals of installing optical sorters in the HDPE/PP material processing process?

Optical polymer sorting, especially HDPE (high-density polyethylene) and PP (polypropylene), is playing an increasingly important role in modern waste recycling. With the growing amount of plastic waste, the need for effective sorting and recycling has become an urgent challenge. The use of a polymer sorter in the recycling process brings numerous benefits that enhance efficiency, quality, and sustainability. Sorting allows for better utilisation of available secondary raw materials, while increasing the amount of material that can be further processed. A well-prepared separation process results in more homogeneous and cleaner raw materials, which translates into better quality of final products.

“Recently, Atus Group puts greater emphasis on the importance of delivering “high quality” products to our customers. The high purity of the HDPE material significantly affects the quality of the HDPE regranulates we produce. The proper operation of the CI polymer sorter, supplied by Meyer Europe, allows us to increase the operational flexibility of the company and enable adaptation to changing

market requirements", comments Jakub Barnaś, owner and director of the Atus Group.

"Understanding the quality requirements and guidelines that Atus Group set as priority goals from the outset of the project and after conducting several technological tests at our Test Center, it became clear that the systems used in our equipment – featuring full-range RGB vision systems, broadband LED lighting, multispectral polymer cameras, our patented Maglev 3.0® defect ejection and Target Positioning 3.0® systems – enabled Atus to achieve the most satisfying polymer separation results for HDPE/PP available in the market. Combined with the previously implemented advanced solution for colour sorting of HDPE PCR regrinds, we have increased the factory's production flexibility which allowed for recycling a larger amount of HDPE waste, with less loss of good product while maintaining stable, highest quality of the final product", explains Piotr Okoń, Sales Director at Meyer Europe.

Polymer sorting of HDPE/PP flakes is a crucial step in process of improving the quality of Post-Consumer Recycling (PCR) regranulates, especially for the production of white and transparent packaging. Atus Group uses a combination of advanced optical sorters – the Meyer CG series colour sorter and the Meyer CI series polymer sorter, which enable precise separation of different material fractions. This process results in regranulates that not only exhibit better quality but also greater stability and consistency. The high sorting efficiency translates into more reliable production of PCR packaging, that meets the highest market standards.

The solutions implemented at Atus Group represent a step towards even better outcomes, benefiting the entire packaging industry and the circular economy (CE).

Each batch of granulate from sorted HDPE and PP fractions is tested in a modern laboratory located on the company's premises. Tests conducted using a differential scanning calorimeter (DSC), along with MFR tests and strength tests, ensure the optimal selection of fraction parameters and guarantee the highest quality of samples. As a result, the company's clients can be sure that the products meet the highest quality standards. The high precision of Meyer optical sorters is confirmed by the phenomenal results of these tests.

Optical sorting of HDPE/PP polymers is a key technology in modern plastic recycling. Through cooperation with other sorting technologies, integration into complex production lines, and the ability to enhance the quality of recovered material, optical sorters contribute to increasing the efficiency and profitability of recycling processes. Despite challenges related to the diversity and volume of waste, their role in sustainable waste management is set to grow in the coming years.

Meyer Europe, representing one of the world's leading manufacturers of optical sorters, offers innovative devices for optical material separation. Meyer's portfolio includes advanced colour and polymer sorters, designed for the recycling of plastics such as PET, HDPE, PP, PVC, as well as ferrous and non-ferrous metals, and many other demanding materials that require precise quality enhancement. Customers interested in expanding their business have the opportunity to perform a test on their own materials at Meyer Europe's Test Center in Michałowice, near Warsaw.

Atus Group is the largest HDPE packaging recycler in Poland, providing solutions for the construction industry across Europe. The company focuses on raising social awareness and contributing to positive change by reducing waste, using already processed and safe raw materials, reducing pollution and carbon footprint. Atus Group demonstrates that it's possible to innovate in production while maintaining high quality standards. •

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Enyax, plastic and the environment

photo: depositphotos.com/pl

Enyax was born following the need to give continuity to projects with high technological content, in particular innovation for the protection of the environment and the development of renewable forms of energy.

In the plastics sector, Enyax holds know-how of the following materials: biodegradable and compostable plastics.

Technological and regulatory evolution have generated the need to develop a biodegradable and compostable product, such that it can be easily included in production cycles, accepted in the commercial sector and compliant with current regulations.

Bio-Dì® (www.bio-di.com) was therefore developed, a latest generation biopolymer, the creation of which occurs through a stage polymerisation process, while the stable morphology of the Bio-Dì® biopolymer allows create biodegradable and compostable products with increased resistance and stability characteristics. The same stability of the proprietary formulation allows the biopolymer to be processed through classic systems, without making any modifications and following the production models applied internationally. Unlimited product availability allows converters to promote continuous operations without interruptions due to lack of material; this peculiarity turns into a competitive advantage of great importance.

The formulation and specific know-how of the biopolymer are the result of years of research which have led to the achievement of a stable product that complies with current legislation.

The high technical/mechanical characteristics such as resistance, reuse, recyclability, determine easy acceptance by the final consumer and by the producer as they do not have to change their habits, of process on the industrial side, and of use on the consumer side.

Enyax has an innovative department dedicated to the research and distribution of biodegradable and compostable compounds, with high product quality standards, intended for different production areas. The activity is based on agreements with important companies in the sector, both Italian and foreign.

In fact, the Enyax distribution network is present in all regions of Italy and in several European countries.

Among the main growth objectives Enyax aims to: develop in a substantial sales network in Europe and in the world of proprietary products and develop products auxiliary and complementary to industrial production for the plastics sector.

We also avail ourselves of the collaboration of important research centers and universities as well as having our own internal analysis and quality laboratory.

Enyax is ISO 9001 certified and is in the process of certifying other quality and management systems. •

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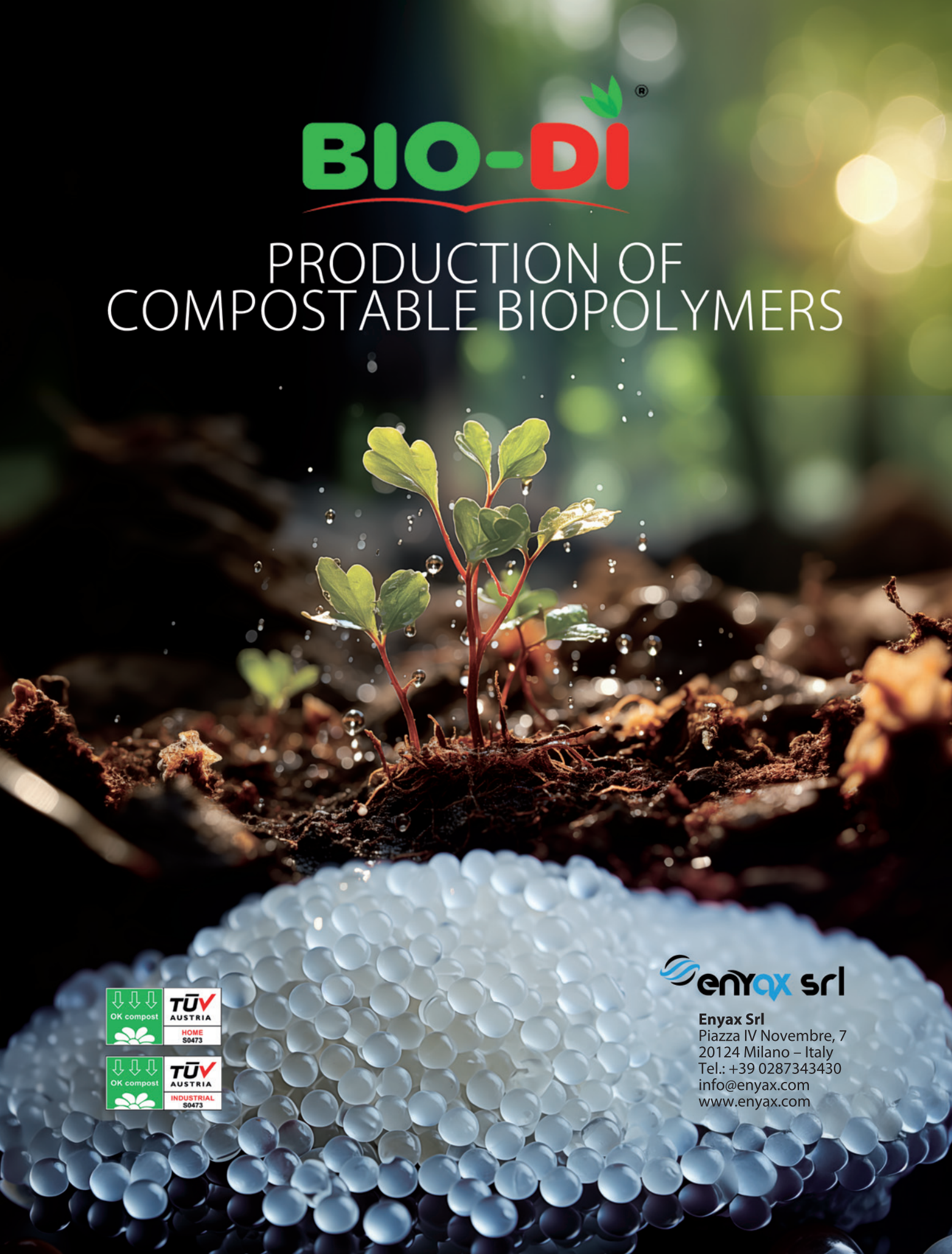
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The power of twin-screw extrusion by MAS

Recycling plastics is a crucial area in advancing the circular economy. MAS is at the forefront of this effort, offering innovative and customer-focused solutions designed to optimise the recycling and upcycling of plastic fractions. Our expertise in plastic upcycling and advanced extruder technology sets us apart.

Revolutionising recycling with twin-screw extruders

The conical, co-rotating twin-screw extruder is at the heart of MAS's technology, a game-changer in the recycling industry. This sophisticated machinery is engineered to handle various plastic materials, from the lowest bulk density regrind and flakes to virgin materials and fibers. The design ensures superior homogenisation and degassing, providing robust performance and reliability.

Key advantages

- **Energy-efficient processing:** Our extruders deliver process energy precisely where needed, ensuring optimal efficiency and cost-effectiveness for each recycling application.
- **Large feed openings**, quick homogenisation, and high throughput streamline the recycling process. This ensures reliable recycling of input material with the lowest bulk density and highest quality level.

- **Compact design:** The advanced-designed processing unit ensures short residence time and optimal melting without compromising material quality.
- **Integrated compounding:** This technique achieves superior results by combining recycling and compounding. Direct feeding of the main input stream of recycling material enables recycling and compounding without side-feeding equipment in one operational step.

Technical highlights of MAS twin-screw extruders

Our twin-screw extruders' conical and co-rotating design is central to enhancing performance. This design supports the simultaneous recycling and compounding of multiple products, such as regrind, flakes, and fibers, for all kinds of polyolefins, PET, and a wide range of engineering plastics.

Outstanding features

- **Superior granulation:** Our extruders ensure better film granulation than traditional extruders, leading to higher-quality end products.
- **Purity and quality:** The technology eliminates material inclusions, such as adhesives on films, ensuring maximum product purity.
- **High recycling rates:** Achieves significantly higher and better PET quality, contributing to more efficient and sustainable processes.
- **No material jams:** The conical design prevents material jams at the inlet, ensuring smooth and continuous operation.

Driving the circular economy with innovation

At MAS, we are committed to embracing reduce, reuse, and recycle. By reducing the use of virgin polymers, advancing the reuse of plastics, and developing cutting-edge recycling equipment, we aim to close the loop and contribute to a sustainable future. Our advanced extrusion technology is energy-efficient and forward-thinking, allowing valuable resources to be reused continuously.

Tailored solutions for a sustainable future

MAS's technologically sophisticated and customisable recycling machines and systems create significant value for the future. Our equipment is designed to help maximise resource utilisation, reduce waste, and drive the sustainable transformation of the plastics industry.

Why choose MAS

- **Customer-focused solutions:** We tailor our equipment to meet your recycling needs.
- **Economic efficiency:** Our technology ensures cost-effective operations, delivering excellent value.
- **Sustainable innovation:** We continuously innovate to promote sustainability and efficiency in recycling.

MAS is dedicated to providing premier recycling equipment solutions that help make the most of valuable resources while promoting sustainability and efficiency in the recycling industry. Our conical, co-rotating twin-screw extruders represent the pinnacle of precision and performance, making us a trusted partner in the journey towards a circular economy.

Discover how our innovative solutions can drive the sustainable transformation of your plastic recycling processes. Embrace the future with MAS and experience the power of twin-screw extrusion.

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Find our top recycling equipment in major recycling plants worldwide.

We look forward to your inquiry. •

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Innovative solutions appear as the AMULET project enters its final phase of implementation

After 3 years, the project "Advanced Materials and Manufacturing Technologies united for Lightweight", with the acronym AMULET, is entering its final implementation phase. It is an important milestone in this journey that started in September 2021. Over the past 2 years, 15 dynamic teams, each comprising 2, a maximum of 3 SMEs from different sectors, have gone through the AMULET program.

- AMULET aims to help SMEs become more competitive globally by using technology expertise to create new and personalised products
- The 15-month programme boosts each team (a consortium of 2–3 SMEs) with up to 120,000 EUR and technical support
- In its third and final year, promising results include solutions such as new 3D printing methods and pioneering durable materials.

AMULET!

The "Advanced Materials and Manufacturing Technologies united for Lightweight" project funded by the European Commission's Horizon 2020 programme, enables European SMEs to increase their global competitiveness by consolidating novel value chains for multi-sectoral industrial applications made possible by advanced materials and related manufacturing technologies as key enabling technologies (KETs), ultimately contributing to decarbonisation, and resource efficiency through weight reduction and cost reduction.

With funding of up to 120,000 EUR, the teams went through a 15-month programme to innovate and improve their processes, supported by 13 expert partners from across Europe. Find out more about the AMULET's 15 finalists here: https://amulet-h2020.eu/amulet-final-event/.

Milestones

To reach the ambitious goal of a decarbonised and efficient circular economy, lightweight construction was identified to play a key role. Thereby, the application of advanced lightweight materials such as polymer-based composites, ceramic matrix composites and light metal

alloys has already enabled significant weight reductions while increasing performance over the past decades. However, the application potential of advanced lightweight materials that has been achieved scientifically and technically has not yet been fully exploited by small and medium-sized enterprises.

The trans-European project AMULET aims to exploit this innovation potential of SMEs through a cross-regional, cross-sectoral, funded knowledge exchange. This will establish new, pan-European value chains for advanced lightweight materials.

We are getting closer to the grand finale!

The AMULET project is fast approaching its finale. It is time to announce that we have begun preparations for our Final Event. It will occur on 16–17 October 2024 during the 13th International Trade Fair for Composite Materials, Technologies and Products Kompozyt-Expo® in Krakow, Poland.

The AMULET project aimed to harness the innovation potential of SMEs that were creating new value chains by supporting the penetration of advanced lightweight materials in the industry.

AMULET focused on 3 advanced materials: light metal alloys, ceramic matrix composites, polymer-based composites and their applications in four sectors: building, aerospace & aeronautics, energy and automotive. During the final event, we will present the joint work on advanced lightweight materials and the results that we achieved.

Meet us at the booth D44a!

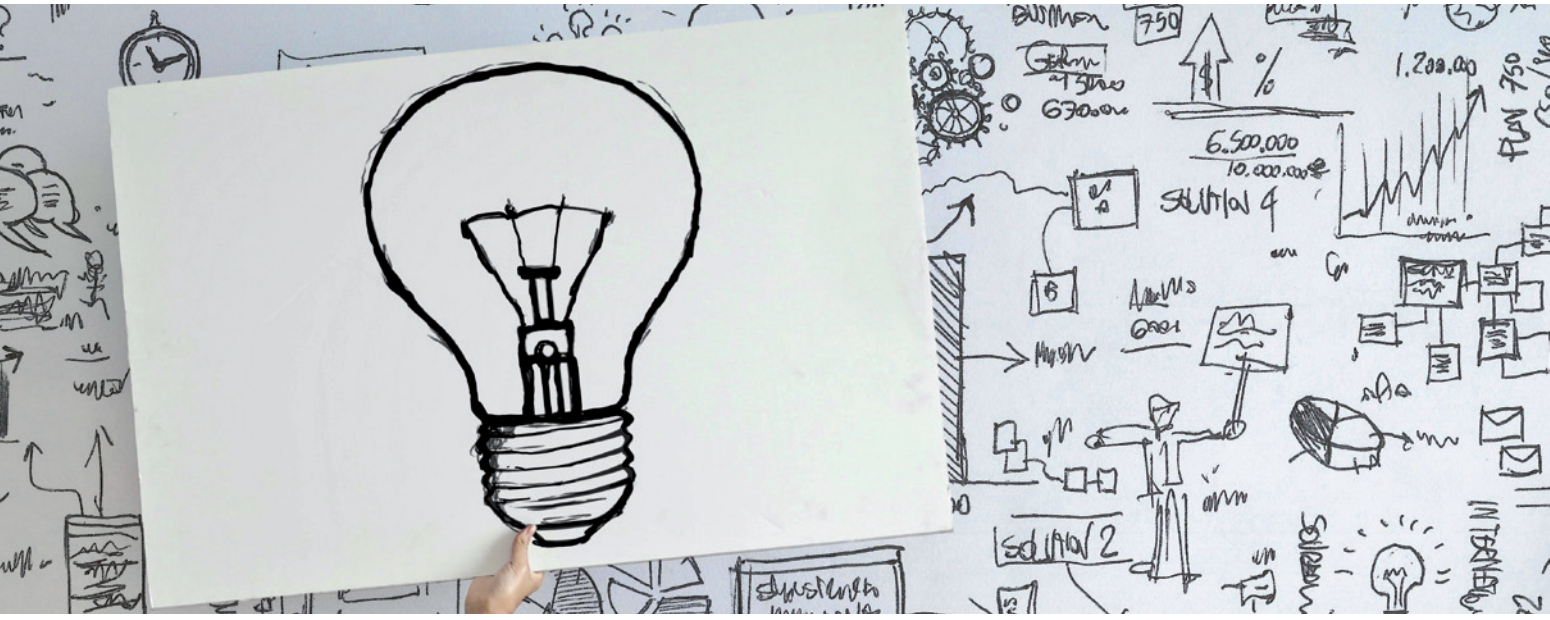
You will have a unique opportunity to:

- Meet with project partners and establish business contacts
- Get to know the assumptions of the project and what we have managed to achieve during its implementation
- Explore the innovative solutions of our 15 finalists.

All those who visit the AMULET project booth will have the possibility to meet all consortium partners, learn about the assumptions and objectives of the project, and, above all, meet our 15 finalists – various consortia from all over Europe – who have successfully passed all stages and completed their projects with the AMULET cascade funding programme support.

Stay tuned!

Visit our website www.amulet-h2020.eu under the Final Event tab, where we will keep all the information up to date. •



Game-changing, art-driven manufacturing solutions emerge as Better Factory project is coming to an end

- **Better Factory aims to help manufacturing SMEs to become more competitive globally, by using art and technology expertise to create new and personalised products**
- **The 16-month programme boosts each team (consisting of a manufacturing SME, an artist and a technology provider) with up to EUR 200,000 funding and technical support**
- **In its fourth and final year, the promising results include solutions such as new 3D printing methods and pioneering durable materials**

As the Better Factory project enters its fourth and final year, it marks a significant milestone in this journey which began in October 2020. Over the past three years, 16 dynamic teams, each comprising a manufacturing SME, an artist, and a technology provider, have passed through the transformative Better Factory programme – yielding some pioneering art-driven solutions for the manufacturing industry.

About Better Factory

Better Factory, funded under the European Commission H2020 programme, empowers European manufacturing SMEs to enhance their global competitiveness by harnessing the combined expertise of artists and technology providers. Through generous funding of up to €200,000, teams embark on a 16-month journey to innovate and refine their processes, supported by the project's 28 expert partners who are located all over Europe.

Throughout the programme, the participating conventional factories have been transformed into lean-agile production facilities, capable of manufacturing new and personalised products along with existing ones. Some examples include: IoT corks and sustainable wine production, a new circular material for young tree growth, a smart digitised envelope, zero waste metal production, eco-friendly diving fins, sustainable durable drinking straws, among others.

Current milestones

The project is yielding promising results from the first round of seven Knowledge Transfer Experiments (KTE) teams. Simultaneously, the second round of nine teams is utilis-

ing invaluable insights gleaned from the initial round to craft their innovative solutions.

Concrete outcomes

Each team has made significant strides in their respective manufacturing domains, yielding promising results. Among these remarkable achievements, we spotlight five transformative technologies from the first and second rounds of experiments.

- **LOOP** (from the OCD 3D team)

LOOP, an algorithmic marvel, enables the creation of large-scale 3D printed objects reminiscent of crochet or willow weaving. This breakthrough breathes new life into traditional crafts, expanding the horizons of 3D printing. Notable benefits include the utilisation of 3rd life waste, a 50% reduction in printing time, and minimised material consumption. LOOP is currently employed by SME The New Raw in crafting a diverse array of artistic vessels and benches.

- **FoundObjects** (from the Better CNC Factory team)

FoundObjects is an open source Grasshopper tool that ingeniously repurposes leftover sheet material from CNC projects. This innovation significantly reduces material waste and CO_2 emissions, necessitating fewer sheets for equivalent output, thus boosting productivity. The versatile tool finds application in a wide range of manufacturing processes.

- **FOLD Printing** (from artist Isaac Monté in collaboration with the FOLD team)

FOLD Printing leverages calcium carbonate, abundant in stones and shells, to create a durable yet lightweight printing material. This renewable and fully recyclable solution not only conserves energy but also produces zero waste. It holds immense potential in local recycling loops utilising waste materials like eggshells and marine shells.

- **SMART ENVELOPE** (from the SMARTENVELOPE team)

It is a new type of envelope which was designed to be smarter in use and in reuse. It is a reusable envelope with a personalised QR code connected to a web platform. The sender of the envelope can decide where the code directs to before sending the envelope. On the other side, the receiver of the envelope can reuse it by turning it inside out and sending it off again, also with the option to decide where the personalised QR-code directs to.

- **IOT CORK** (from the IOWA team)

It is an internet-connected barrel cork that monitors wine production in the cellars along a variety of parameters relevant to the wine production process. The device, which closes the barrel just like any other cork, includes sensors and a wireless battery. It comes with a web app to monitor and plan interventions.

APPS and RAMP

In addition to the 16 teams innovating within Better Factory, the project has produced two pioneering tools for manufacturing SMEs to utilise: RAMP and APPS. These solutions will continue to be developed into the fourth year of the project, with updates to be published on the Better Factory website.

The Robotics and Automation MarketPlace (RAMP) brings together data insights, ready-made software and tools and a community of manufacturers and service providers in a true one-stop shop, built to accelerate European SMEs in manufacturing and robotics.

APPS, which is short for Advanced Production Planning and Scheduling, are combination of software services and hardware infrastructure that integrate technologies like 3D printing and Additive Manufacturing to create materials more efficiently, reducing energy consumption, costs, and waste.

Towards the future

In the final months of the Better Factory project, a comprehensive catalogue featuring all 16 Knowledge Transfer Experiments and their innovative outputs will be made available for download. Additionally, a guide detailing how regions and networks can adopt “The Better Factory” methodology will be provided, facilitating collaborative ventures between artists, SMEs, and technology providers for transformative results.

More information can be found on the website www.betterfactory.eu. •

BETTER FACTORY

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 951813.

Embrace innovation with the INDUSAC project

In today's fast-evolving industrial landscape, innovation is a necessity. European companies face many challenges that demand creative solutions. The INDUSAC project fosters collaboration between industry and academia, creating a fertile ground for technological advancements. If your company is grappling with specific challenges, INDUSAC offers a unique opportunity to turn obstacles into stepping stones toward success

What is the INDUSAC project?

INDUSAC, funded by Horizon Europe, bridges the gap between industry and academia to develop innovative solutions. By submitting a challenge, companies access a vast network of researchers and students eager to tackle real-world problems.

Why submit your challenge?

1. Access to expertise: INDUSAC connects you with top academic institutions and research centres in Europe, ensuring your challenge is addressed by leading experts using cutting-edge technology.
2. Competitive edge: By participating in INDUSAC, your company can implement novel solutions faster, enhancing your competitiveness and market position.
3. Networking opportunities: Beyond solving specific challenges, INDUSAC fosters a collaborative ecosystem. Engaging with researchers and students can lead to long-term partnerships, knowledge sharing, and future collaborative projects.
4. Free of charge: Participating in the INDUSAC project comes at no cost to your company. This allows you to explore and implement innovative solutions without any financial burden.
5. Multiple challenges: Each company can submit up to 3 challenges, maximising the potential for diverse and impactful solutions.

How to participate?

Companies are invited to submit their challenges through the official website. The closest cut-off date is 15 November 2024.

To make the best use of the chances of having your challenge selected, it is advisable to submit well before the cut-off dates, allowing ample time for the application review process.

What makes a good challenge?

A well-defined challenge is crucial for attracting the right expertise. Clearly articulate the problem your company is facing, including relevant background information and desired outcomes. The more precise and detailed your challenge, the better the chances of finding an effective solution.

Swift solutions

Once your challenge is accepted, it will be addressed by teams composed of European students and researchers. They will work intensively from 4 to 8 weeks to develop and propose innovative solutions tailored to your specific needs.

Take the next step

The future of European industry lies in collaboration. By submitting your challenges, you address immediate problems and contribute to a culture of shared knowledge and progress. Embrace this opportunity to innovate, grow, and lead in your sector. For more information and to submit your challenge, visit www.indusac.eu

The clock is ticking – don't miss out on this chance to propel your business into the future. •

INDUSAC

This project has received funding from the European Union's Horizon Europe Programme under grant agreement No 101070297.

4th-6th March 2025
Bydgoszcz, Poland

7th International Cooperative Trade Fair of Tools and Processing Industry

INNO FORM®

Why Poland? Why Bydgoszcz?

- Poland, next to Germany and Portugal, is a leading manufacturer of tools for plastics processing.
- The INNOFORM® Trade Fair is the only one event in Poland dedicated to the injection mould and its environment.
- In the Kuyavian-Pomeranian Voivodeship there are the largest number of companies in the tooling and processing industry in Poland – nearly 1,000 enterprises, including about 60 tool shops.
- Bydgoszcz Industrial Cluster Tool Valley – co-organizer of the fair – is the only organization in the country that associates and represents the moulding industry. It is a member of five international industry networks and cooperates with similar organizations in many countries.
- The excellent location of the region in the central part of Poland is conducive to the development of industry and export – nearly 80% of Polish producers of special tools sell their products for export.
- The sector produces about 3,000 moulds in Poland, most of them for the following industries: packaging, automotive, household appliances, electronics, construction and furniture.
- The scientific and technological background is at a high level, which guarantees access to knowledge and qualified technical staff.

BYDGOSZCZ INDUSTRIAL CLUSTER TOOL VALLEY

Targi w Krakowie

See more

Excellent quality through effective filtration

Since 1999 Bagsik is a dynamically developing company specialising in providing advanced solutions for the plastics industry. At the beginning as sole proprietorship, over the years gaining clients over Europe and worldwide, up to nowadays, owning construction office and specialised workshop. It has been the company's mission for 25 years providing customers with the highest quality machines and devices that contribute to optimisation of production processes and achieving excellent results.

Ecological and geopolitical pressures for recycling materials are forcing new investments into the plastics industry. As a main product in company's portfolio, innovative filtration machines gain a significant share of projects.

Screenchangers for plastic filtration are the result of many years of experience and advanced technologies. They ensure effective elimination of contaminants, which translates into excellent quality of final products. The offer includes many models that can be adapted to individual needs and specifications of customers. A characteristic feature of rotary screenchangers is maintaining a constant pressure during the change of the filter without the need to stop the line.

An inherent element of modern production lines is precise and reliable process control. Because of this fact, since several years we sold 10,000+ precision pressure and temperature sensors. A wide selection of high-quality pressure and temperature sensors enable accurate monitoring of production process parameters, ensuring full control over production, improving process stability and product quality.

To meet the expectations of the most demanding applications, we have developed a gear pump department. Advanced gear pumps for plastic are reliable and efficient, enabling precise pumping of materials and maintaining a stable production flow. The use of these devices allows to eliminate fluctuations in the final product and ensures the highest quality.

As PVC production increases, the market requires solutions for recycling it. Comprehensive lines for filtration and granulation of hard and soft PVC are an ideal solution for manufacturers who are looking for versatile and high-performance production systems. The lines allow to achieve excellent quality of granulate.

Existing on the market for 25 years, we must constantly develop our competences, skills and opportunities that we can offer to our clients. In recent years, Bagsik has invested in the latest technologies: 3D scanning devices and a modern CNC machine park, which allow the improvement of the quality and precision of the offered products. •

Bagsik
25 YEARS ANNIVERSARY | 1999-2024

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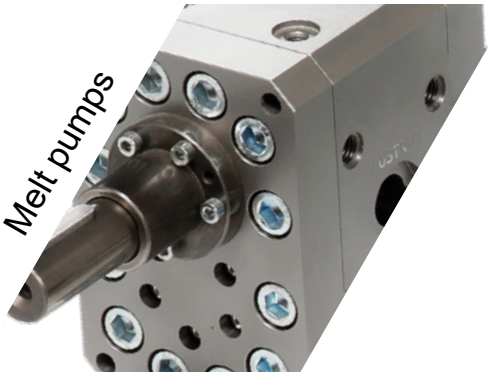

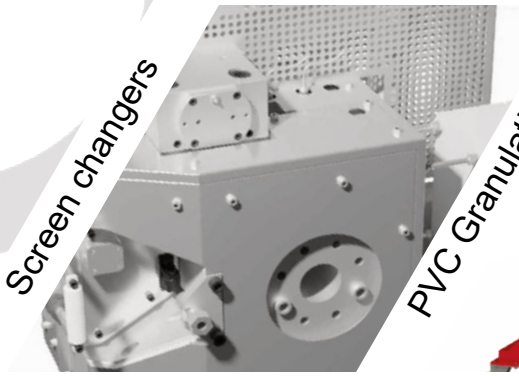

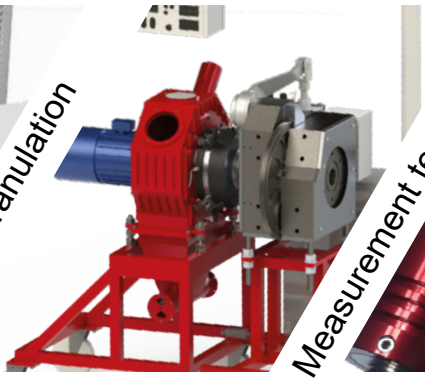

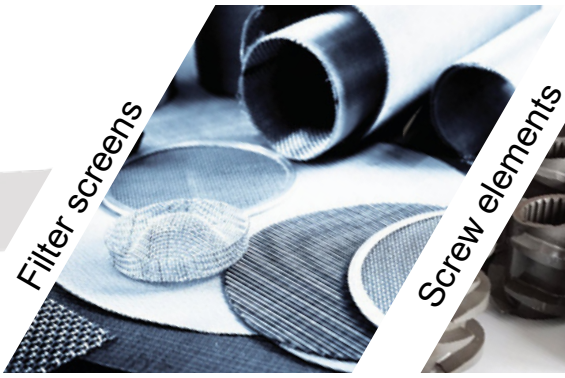

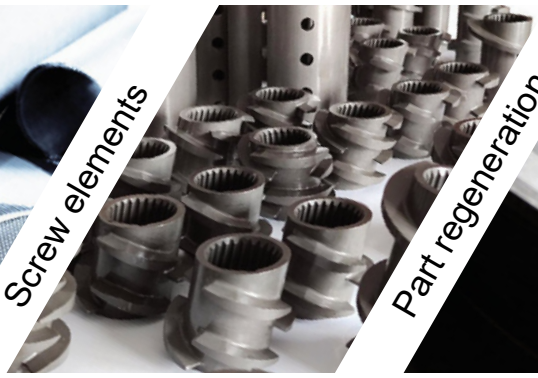

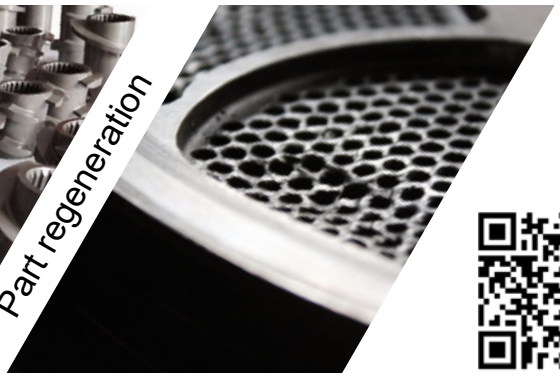

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Innovative plastics manufacturing for a sustainable future

Gondek is a family-owned business that has been a prominent player in the plastic manufacturing industry for over 35 years. The company has earned its reputation through a combination of skilled craftsmanship, cutting-edge technology, and a relentless focus on quality. Gondek's growth from a local manufacturer to a global supplier is a testament to its commitment to excellence and customer satisfaction

Diverse product range

Gondek's product portfolio covers a wide range of industries including furniture, construction, automotive, footwear and fencing. The company specialises in the production of durable plastic components such as furniture accessories, hydraulic parts, special caps for aluminium profiles and customised solutions. Gondek's ability to deliver customised products makes it a preferred partner for companies with specific and complex needs.

Advanced production capabilities

Gondek's manufacturing facilities are equipped with state of the art machinery that is constantly maintained and upgraded to ensure top performance. The company's 35 highly skilled employees work in spacious production halls and warehouses covering several thousand square metres. This enables Gondek to handle orders of all sizes with efficiency and precision. Gondek's commitment to technological advancement is also reflected in its R&D efforts, where new materials and processes are developed to keep pace with industry trends.

Quality and innovation

At the heart of Gondek's operations is a commitment to quality. The company uses only the finest recyclable materials and adheres to strict quality control procedures. From raw material selection to final product inspection, every step is carefully monitored to ensure products meet the highest standards of excellence. Innovation is also a core principle at Gondek.

The company's R&D team is dedicated to exploring new technologies and improving existing products, ensuring that Gondek remains at the forefront of the plastics manufacturing industry.

Sustainability initiatives

Gondek is committed to environmental responsibility. The company has implemented numerous sustainable practices, such as reducing energy consumption through efficient machinery and recycling 98% of production waste. In 2022, Gondek furthered its commitment to sustainability by installing photovoltaic systems, increasing its reliance on renewable energy sources.

Partnerships and a global reach

With a strong presence in both domestic and international markets, Gondek has established itself as a reliable supplier to various industries including metallurgy, automotive and mining. The company's strategic loca-

tion and robust logistics network enable it to serve customers worldwide, providing customised solutions to meet diverse needs.

A customer-focused approach

Gondek's approach to customer service is personal and comprehensive. The company works closely with customers to understand their specific requirements and provides support throughout the process, from initial enquiry to final delivery. Gondek also provides additional services such as packaging, labelling, assembly and despatch to ensure that customers receive a complete and satisfactory solution.

Looking ahead

As Gondek continues to grow, the company remains committed to its core values of quality, innovation and sustainability. With a solid foundation and a forward-thinking approach, Gondek is well positioned to maintain its leadership in the global plastics manufacturing industry. •

Visit website

GONDEK

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+48 338 763 525
gondek@gondek.com.pl
www.gondek.com.pl

How to reduce energy consumption in injection moulding machines?

Reducing the electricity costs of production machines is currently one of the biggest challenges in the plastics processing industry. Our solution effectively lowers the energy consumption of machines. For injection moulding machines equipped with hydraulic systems, the benefits can be substantial.

For example, the annual savings for a single injection moulding machine with a clamping force of 2000 tons could reach up to 70,000 PLN at current electricity rates. This amount is expected to increase with ongoing energy price hikes.

Save up to 30% on injection moulding machine energy costs!

Dopak's proprietary ESS (Energy Saving Systems) reduces the energy consumption of hydraulic injection moulding machine drives. It is the only solution on the market that does not require modifications to the machine's construction or its factory installation. Additionally, it is easy to use and fits all types of hydraulic injection moulding machines operating in industrial plants. The ESS system can reduce energy consumption by up to 30% for the hydraulic drive of the machine.

Energy consumption reduction system for hydraulic injection moulding machines

Equipped with a microprocessor-based PLC controller, the system analyses signals from external sensors installed on the machine and adjusts the supplied energy based on real-time cycle requirements. The operation of the inverter in the system is safe for the injection moulding machine's electric motor, thanks to the use of the VPL (Voltage Peak Limiter) module, as confirmed by research reports.

SMART algorithm – set and forget

A new addition to our range is the ESS system version with the revolutionary SMART optimisation algorithm based on machine learning. It allows for hands-free adjustment of optimisation to current production cycle conditions. The system learns each newly installed mould and ensures that optimisation parameters are always adapted to changing machine operating conditions, such as variations in injected material or hydraulic oil temperature.

The SMART algorithm continuously monitors the process, checking for any deviations from the planned production cycle time. If an anomaly occurs, a quick learning procedure is immediately initiated, and a new optimisation profile is created based on the best parameters for the current operating conditions.

The system user can define the priority of cycle time and its tolerance. This feature provides full control over the production factor that is currently most important to them.

ESS ONE or ESS X2

Depending on the injection moulding machine's design, two system solutions are available: ESS ONE or ESS X2. The first is intended for machines with a single motor in the hydraulic drive system, while the second is used for multi-motor machines.

Quality and safety

ESS systems are built with components from a global leader in industrial automation. Installation is carried out according to standards and regulations, undergoing factory FAT tests and SAT procedures post-installation. The quality of execution is confirmed by appropriate protocols and compliance declarations with EU directives: electromagnetic compatibility and low voltage. •

Watch video

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The company supplies highly specialised pressure and temperature sensors for the extrusion process, as well as filter screens for any screen changer. The company's main products are continuous screen changers and gear pumps.

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High-tech company that focuses on the research, development and production of precision plastic injection moulding machines. Highly developed German technology manufactured in China including design, production, assembly, testing, sales and after-sales service and providing customers with complete, professional injection moulding equipment for plastics processing.

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With over 40 years' experience, the company excels in the manufacture of plastic products. The company offers a complete range of services from concept to production, including injection moulding, extrusion, ultrasonic welding and printing.

Rutalia Masterbatches & Additives

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Fimic Srl

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Leading manufacturer and specialist supplier of automatic self-cleaning melt filtration technology. Offers a range of five different models of automatic melt filters capable of handling highly contaminated plastics, especially post-industrial and post-consumer plastics, and a range of screw pump solutions that allow post-consumer plastics melted by the extruder to be easily transported to the filter without the use of gears.

GM Color Sp. z o.o.

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The company offers a portfolio of Gryfilen® polypropylene, a high-quality thermoplastic material designed for a wide range of applications. A new state-of-the-art integrated PDH-PP complex in Poland, produces 437 kt/a PP, in 3 types: homopolymers, impact and random copolymers.

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Erfor is a new brand from Koltex Plastic Recycling Systems. It represents a new generation of machines that form a complete plastic recycling system. Individual solutions, but one common goal – higher performance.

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The company produces advanced optical sorters and X-ray inspection systems, specialising in recycling, food safety, and agriculture. Their main products include polymer, object, and colour sorters, plus X-ray detectors. Meyer offers expert guidance, professional installation, and authorised service across Europe, backed by years of experience in field of optical sorting.

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European leader in the production of flexible and rigid films (laminates and composites) for high volume food packaging. The films are used to produce a wide range of packaging formats, mainly for the food industry, such as flow packs, APET or APET-PE tray lids, vertical pouches and stand-up pouches. The company extrudes or manufactures rigid and semi-rigid films for thermoforming packaging for trays and vacuum packaging formats.

Sick man of Europe

Krzysztof Nowosielski
ML Polyolefins

Recently, the word "crisis" has been used with extraordinary frequency in public discourse, referring to the economic sphere. Unfortunately, the past few years haven't been kind to business; it's been a constant bouncing from wall to wall, a swing in the economy and mood. I wonder how long the situation will last, through which we're stuck in constant uncertainty about what the coming months will bring. The bolder "prophets" indicate that the economy will start to improve after the holidays. Those with a more pessimistic outlook suggest that not much will change before the end of the year. Yes, the market will probably recover slightly after the holidays and the return to everyday life, but... well, "slightly". On the other hand, what should we base our optimism on? In today's globalised market, the economy is a system of interconnected vessels, and why should Poland or the rest of the EU see a recovery? The world's two largest economies, the US and China, show no signs of economic prosperity. The same goes for the European hegemon, Germany. There are more and more voices (and from Germany itself) saying that the country has once again become the "sick man of Europe". The plethora of texts by German journalists pointing to the economic stagnation of Europe's strongest industry is no coincidence. For this year, Berlin's projected economic growth is estimated at 0.2%. This isn't an impressive figure.

Poland remains one of Europe's growth tigers, although we can only dream of the results of the 1990s. However, I'm far from feeling *schadenfreude*, as it turns out that without Germany's decent economic performance we're not able to leapfrog a certain point where our growth becomes impressive compared to other – EU and global – economies. Unfortunately, we're still economically dependent on our western neighbour. But shouldn't this neighbour blame itself for its current problems?

The continent's most important football event has just ended in Germany. Our neighbours had a lot to boast about when they hosted the 2006 World Cup, impressing fans from all over the world. This time, however, their image has been tarnished. Germany's famous infrastructure proved inefficient, German punctuality on the railways was a pipe dream, and the country proved unusually dangerous for visitors.

Isn't this organisational mess the aftermath of years of neglect and lack of reform? The last economic reforms that had a real impact on Germany's successes were carried out by Gerhard Schröder's government; thanks to them, Angela Merkel's 16-year reign passed in prosperity. On the one hand this wealth was squandered on social spending for the many migrants who didn't contribute to the German economy as workers, and on the other, allowed to work on projects to ensure continued German hegemony on the continent. Only that these programmes have mainly led to decarbonisation, the dependence of the national economy on raw materials from Russia – the Germans have deluded themselves with an apparent friendship with the Kremlin, probably unable to understand that Russia always looks after its own interests first and foremost, and that compromises are for it a temporary means to an end – and a progressive deindustrialisation, consisting of a number of factors. Among the most important is the destruction of its own independent energy potential – which has resulted in rising energy prices and destroyed the profitability of domestic industrial production. A second problem is the depopulation of the workforce, with the need to relocate jobs to other countries. And the third is the belief in the myth of the strength of one's own economy, for which globalisation is, from a certain point onwards, a salvation rather than a threat. As a result, without the support of national legislation, companies move production to other countries where energy and labour costs are lower and the labour force is available. Globalisation has proved to be a double-edged weapon, and today China and Central and Eastern Europe play an important role in the production of German goods.

A separate paragraph is devoted to the desperate attempts to speed up the "industrial revolution". The Germans, who have always excelled in the production of cars with internal combustion engines, decided to accelerate the development of electric cars, but it turned out that both the American Tesla and the Chinese competitors were winning the battle. So for now, they've fallen behind economically in this aspect, while they haven't been able to save themselves in the conventional car sector because they've already removed many models from their range.

However, there may be some light at the end of the tunnel. Before the European Parliament elections, a German politician announced that he would lift the ban on the production of combustion cars in the EU if he won. Recent news also suggests a desire to protect the steel industry and an attempt to restore stability to the energy market, which would make both the German and EU economies more competitive by lowering energy prices. This would indicate that all isn't lost and that politicians on the other side of our western border are waking up to the crisis that now threatens Germany's position as Europe's industrial centre. It's about time, because countries like Poland need a solid German economy to catch up. Of course, German politicians are primarily concerned with the interests of their own industry, but decent growth on the other side of the Oder is an important basis for good economic performance in Poland. And this is the turn of events we should be cheering. •

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