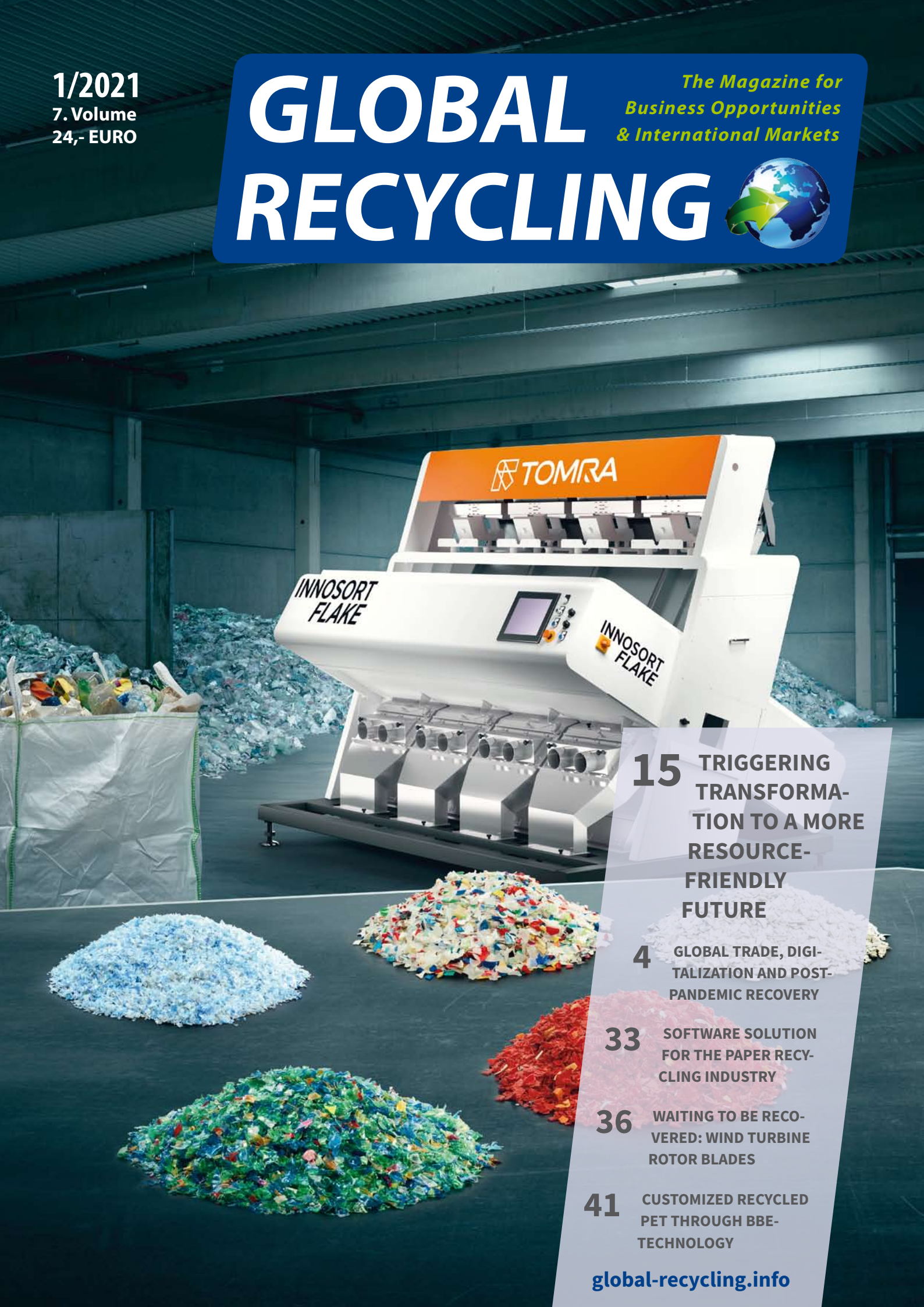
1/2021
7. Volume
24,- EURO

GLOBAL RECYCLING

The Magazine for Business Opportunities & International Markets



global-recycling.info

WASTE-TO-RESOURCES 2021

9TH INTERNATIONAL SYMPOSIUM CIRCULAR ECONOMY, MBT, MRF & RECYCLING - RESOURCES AND ENERGY FROM WASTE CONFERENCE AND EXHIBITION

ONLINE EVENT 18TH - 20TH OF MAY 2021

70 Presentations
CONFERENCE IN ENGLISH LANGUAGE

12th of May introductory seminar on selection of waste treatment technology and mechanical biological treatment; in English

PATRONAGE: SVENJA SCHULZE, GERMAN MINISTER OF ENVIRONMENT

- Waste management, Zero Waste
- Hydrogen economy
- Waste management in Asia
- Latest plants and plant concepts
- Liquefaction, chemical recycling
- Pyrolysis, Plasma, Gasification
- Machinery for separation/sorting
- Separation and processing of metals
- Solid recovered fuels (RDF)
- Mineral- and C & D waste
- Recovery out of incineration ashes
- Processing of plastic waste
- Processing of organic waste fractions
- Paper industry, medical and other waste

www.waste-to-resources.eu

Supported by
ISWA International Solid Waste Association
www.iswa.org

Media Partners
WASTE MANAGEMENT WORLD
GLOBAL RECYCLING

Organisers
ICP
www.icp-ing.de
wasteconsult INTERNATIONAL
www.wasteconsult.de

Recycling for the Future

Brigitte Weber
Editor-in-Chief

Recycling today will have an impact tomorrow: On 18 March – Global Recycling Day – recognizing recycling as an essential industry stood at the center of this annual event. At the same time, a spotlight was shining on people, places, businesses and activities that have continued to support the recycling efforts during the pandemic, Ranjit Baxi, President of the Global Recycling Foundation, had emphasized some weeks before this international event. Ten individuals and organizations were recognized as Global Recycling Heroes "who have continued to make significant impact towards recycling in the last 12 months and whose efforts will contribute towards a greener future of our world".

In this context, Ranjit Baxi has three wishes: First, he wants everyone to follow the Recycling Heroes and "to go the extra mile to reduce, reuse and recycle more". Secondly, he wants manufacturers "to move more rapidly to reduce use of bio and composite plastics, which are difficult to recycle due to their heterogeneity but increase the use of easy to recycle plastic resins or plastic recyclables in their manufacturing cycles". And thirdly, on Global Recycling Day, he informed about an initiative to show what everyone can do in a global campaign of reforestation, which plays an important part in the carbon cycle.

Ranjit Baxi stands up for more recycling, given the increasing volumes of waste worldwide. He is assisted by Arnaud Brunet, Director General of Bureau of International Recycling (BIR): "Combating climate crisis is a joint global endeavor with all of us acting together to reduce waste and promote recycling by using the Seventh Resource*) helping to save millions of tons of CO_2 emissions."

Therefore, recycling is part of the solution. Among the main characteristics of a well-established industry belongs – aside from being relevant – also the degree of digitalization and automation. Both developments are increasingly included in the processes of the waste management and recycling sector. The use of appropriate technologies is not yet possible in all parts of the world, although there is a growing trend towards digitalization, automation and standardization – regarding not only recycling itself but also international trade. GLOBAL RECYCLING presents some examples for the latter from page 4 onwards. The manufacturers for machinery and plants – such as TOMRA (page 15) – are also active in this innovative field and provide smart technologies. How sophisticated software can support an increase in efficiency is described by PICVISA (page 19), AMCS Group (page 33) and Panizzolo Recycling Systems (page 44).

We hope you get a lot of new and useful information from reading this current magazine.

Yours
Brigitte Weber (weber@msvgmbh.eu)

*) The term "Seventh Resource" means the materials, which we recycle. Other primary resources are water, air, coal, oil, natural gas and minerals, according to "Recycling: The Seventh Resource Manifesto", published by Global Recycling Foundation and BIR.

Cover Photo: TOMRA Sorting Recycling

European Union:

RAW MATERIALS ALLIANCE OFFICIALLY OPERATIONAL

Two months after the launch of the European Raw Materials Alliance by the European Commission, ERMA became officially operational in November last year.

As reported by the newly established alliance, an "impressive number of over 300 partners from industry, research, government institutions and civil society" discussed how Europe's raw materials supply could be secured to enable the EU's green and digital transition. ERMA's mission is to focus on increasing the EU's resilience along particularly critical value chains. Therefore, it plans to "employ an agile process to swiftly examine and approve concrete investment projects, backed up with suitable EU financing", according to a press release.

At the kick-off "meeting" in November, an investment process coordinated by EIT RawMaterials was presented as well as an investment update, where a current status of 23 investment cases has already been given priority. Those cases could reach a significant volume of up to 10 billion Euro, covering rare earths/magnets, raw materials for energy storage and conversion (and others for materials contributing to other industrial value chains), in more than 14 European countries. Concerning rare earths for magnets and motors, ERMA aims to strengthen the domestic supply chain. "Possible investment cases include brown- and greenfield mining addressing various aspects of circular economy including recycling, processing and product design". Concerning advanced materials for energy storage and conversion, the alliance supports the domestic production of, for example, ore concentrates and primary and secondary cell-grade energy storage materials. "This way, gaps in the battery value chain in Europe can be closed," it stated. "Concrete investment scenarios range from greenfield mining to processing and refining to provide input material for battery, solar and fuel cell production."

The Network

ERMA network brings together a growing number of organizations from the public and private sectors covering the entire raw materials value chain. The alliance focuses on the most pressing needs, that is, increasing EU resilience in the supply chains for rare earth magnets and motors, batteries and fuel cells.

The alliance is an open and inclusive initiative and will involve all relevant stakeholders, including industrial actors along the value chain, Member States and regions, trade unions, civil society, research and technology organizations, investors and NGOs.

https://erma.eu/about-us/join-erma/

ERMA partners are invited to submit potential investment projects to strengthen domestic sourcing and improve the supply of secondary raw materials through resource efficiency and circular economy, the alliance emphasized. "All proposals will be collected, classified and evaluated. Selected proposals will be linked to investors via a matchmaking approach and accompanied from financing to implementation."

Since the presentation of the EU Action Plan on Critical Raw Materials and the launch event in September 2020, the European Raw Materials Alliance had attracted a growing number of public and private sector stakeholders, it stated.

https://erma.eu
https://eitrawmaterials.eu

Photo: Gerd Altmann / pixabay.com

GLOBAL TRADE, DIGITALIZATION AND POST-PANDEMIC RECOVERY

The global spread of the Coronavirus not only disrupted international value chains. It has also accelerated the digitalization process in many countries around the globe.

According to the OECD (Organization for Economic Co-operation and Development), digital trade has an essential role in helping to mitigate some of the consequences of Covid-19. The benefits of digital trade were already apparent before the pandemic, but the current crisis has accelerated the digital transformation. "These developments underscore the need for governments to further enable digital trade to mitigate the economic slowdown and support a more rapid recovery," the brief on "Leveraging Digital Trade to Fight the Consequences of Covid-19" underlined in July last year.

The physical distancing measures to tackle the spread of the virus had resulted in a considerable reduction in workplace mobility – declining by 55 percent relative to the period January-February 2020 – and an increase in mobility around residential areas, the OECD gave account. "For many people, this has resulted in job losses, with wider economic and social consequences. However, others have

been able to continue working remotely." The ability to work from home not only depends on the extent to which job functions can be performed remotely, but also "on the capacity to leverage digital technologies, the degree of adoption, and the stock of skills needed to thrive in a digital economy". Working remotely also would require access to information and communications technology (ICT) goods and reliable digital networks – an area where trade could play an important role.

UNLOCKING THE POTENTIAL OF CIRCULAR ECONOMY

Digitization concerning the circular economy is not new. In 2018, the knowledge and innovation community (KIC) – EIT Climate-KIC – already published the study "Digitalization – unlocking the potential of the circular economy".

As pointed out by the community, supported by the European Institute of Innovation and Technology (EIT), digitalization is progressing rapidly. "For the first time, we have the opportunity to scale up circular economy business models swiftly and widely to put us on course for a more sustainable future." With sustainability becoming a key part of the global agenda, the circular economy would be a crucial tool for decoupling economic growth from further unsustainable resource use and increased CO_2 emissions.

In the survey, the researchers interviewed 14 EIT Climate-KIC start-ups and innovation projects to learn more about the benefits of adopting circularity. Moreover, the aim was to understand the challenges that hinder its uptake better.

The study identifies four key drivers in the digital circular space: technology, market structure, policy and skills, and knowledge – evidenced by the real-world experience of the partners. "Their insights reveal tremendous opportunities, but also expose the systemic barriers, which need to be addressed before we can fully benefit from the potential of innovative circular business models," the press release said.

www.climate-kic.org/wp-content/uploads/2018/08/ClimateKICWhitepaperFinalDigital_compressed.pdf

Furthermore, the pandemic had an impact on how and what people consume. "With many bricks and mortar businesses experiencing temporary closures, consumers have turned to online solutions to purchase the goods and services they need. The type of goods and services purchased has also changed," the OECD pointed out. "The demand for medical and ICT goods, many of which are transported across different borders and arrive directly at home in parcels, has grown. At the same time, the demand for services, including many that are digitally deliverable such as streaming media or teleconferencing services, has also increased."

The intergovernmental economic organization, which has 37 member countries representing– along with key partners – about 80 percent of world trade and investment, is convinced that international trade, and in particular digital trade and related policies, "can play an active and important role in supporting economic activity in times of confinement and in launching the wider economic recovery".

Global value chains

As is well known, the worldwide lockdown due to the pandemic has disrupted the global value chains (GVCs). Moreover, it has resulted in a change to industrial production networks, Xiaolan Fu, University of Oxford (Technology and Management for Development Centre), wrote in the official UNCTAD document "Digital transformation of global value chains and sustainable post-pandemic recovery". Together with the trend before the Covid-19 crisis, "especially driven by the Fourth Industrial Revolution and trade protection, the pandemic is set to reinforce the regionalization, localization and diversification trends of GVCs, and business leaders are now thinking about changing the way business is organized," he underlined. According to the information provided by WTO and UNCTAD, it was estimated that the cost of world trade could increase as much as one-third and that of global foreign direct investment (FDI) by 30 percent to 40 percent. In early March last year, when the pandemic had not yet expanded globally, UNCTAD reported that the coronavirus had already cost GVCs 50 billion US-Dollar, Xiaolan Fu described the situation. "Such a deep drop in global trade and FDI has far-reaching implications for economies and societies."

In 2020, the pandemic hit the global value chains in three ways. Firstly, it had disrupted transportation systems and almost cut off access to the logistics of supply chains in some cases. "In the past several decades, multinational enterprises (MNEs) have sliced their production processes into fine segments and relocated these small parts of the process to different locations around the world in order to maximize their profits," he stated. Intra-industry trade

of spare parts and components within global value chains would account for more than 60 percent of global trade. "In such a production and trade model, stable and on-time logistics is very important to the supply chain. When any part of the chain is blocked, all the subsequent production activity is affected." For example, in Japan, car manufacturing was hampered because some outsourced spare parts could not be delivered on time, and no stock had been maintained due to the lean production system. According to the author, in the first half of last year, 1,675 sailings have been canceled, representing 13 to 17 percent of the proforma sailings for the major shipping alliances. As a result, supply chains had been disrupted. Furthermore, also measures like the closure of workplaces and public transportation put significant constraints on labor inputs into production.

Additionally, there was a sharp fall in demand. "It was not significant in January and February when China was the epicenter," the author wrote. However, from March 2020, as the virus spread globally, cancellations of orders were widely reported. Another result was a decline in commodity prices (20 percent). The total amount of trade was predicted to fall by 50 percent, he referred to information from UNCTAD.

According to Xiaolan Fu, the pandemic has had different impacts on different sectors and countries. The magnitude of the effects was depending on four factors: the contact intensity of the industry, the degree of fragmentation of the value chains, the extent of digitization in companies and countries as well as the distancing measures adopted by a country.

"COVID-19 AND E-COMMERCE"

A study on impact on businesses and policy responses.

Since the outbreak of the new coronavirus disease pandemic, the United Nations Conference on Trade and Development (UNCTAD) aims to raise awareness of the opportunities emerging from the crisis through increasing the uptake of e-commerce and digital solutions. At the same time, it has voiced concerns about the risk of rising digital inequalities, particularly in the least developed countries (LDCs).

The study is based on the results of a survey that investigated the impact of Covid-19 on e-commerce businesses from early March to the end of July 2020. It focuses on 23 countries, mainly LDCs, in Africa and Asia-Pacific. Most of the survey respondents presented in this study are from countries that have benefitted from an eTrade Readiness Assessment. Some others have been involved in the eTrade for Women initiative or sought UNCTAD assistance in developing an e-commerce strategy.

A total of 257 representatives of e-commerce businesses – out of 699 invited – responded to the survey and shared their experience following the pandemic's outbreak. Businesses have been divided into two groups: companies selling at least parts of their goods or services online and third-party online marketplaces. The responses from the private sector were complemented by public sector responses from 12 countries, elaborating on measures taken during the Covid-19 crisis to support e-commerce as well as to use this type of business activity for economic recovery efforts.

According to UNCTAD, the study highlights how successful initiatives at the country level, building on public-private cooperation, have been crucial in responding well to the crisis and limiting its adverse impacts. It would showcase the policy measures that the private sector has found the most impactful to empower Covid-19 recovery strategies.

"At the same time, it sheds new light on how the pandemic has reinforced pre-existing bottlenecks in the e-commerce ecosystems," UNCTAD emphasized. "To conclude, this study reiterates the importance of mobilizing more international support and national commitment towards reforms, as well as investments, in key policy areas to enhance developing countries' digital readiness for e-commerce."

https://unctad.org/system/files/official-document/dtlstict2020d12_en.pdf

Source: United Nations

Automation and digitization support economic recovery

For the post-covid economic recovery, automation and digitization are likely to be the star features, Xiaolan Fu is convinced. These two sectors had already played an essential role in the global fight against the virus. Several novel services have emerged during the pandemic, he stated. These would include remote tracking and detection (including infections), robotic cleaning in hospitals, and the delivery of medicine, live materials and notices by drones. "Tele-health, e-business, online education, online entertainment, and online conference and office systems have also grown rapidly and are contributing to the global response to Covid-19 and thus to society and the economy." Due to increasing demand, some sectors – and even "new" domains such as the online provision of various services – have grown rapidly during the pandemic. "Some countries will fill the gap of relocated GVCs by investing heavily in star future sectors in the digital economy, innovation in digital applications in traditional industries, and the development of digital infrastructure," he argued. "These sectors will be new engines of economic growth."

Furthermore, lessons from the pandemic and the trade war "will push business to build more resilient production systems and supply chains". Digital transformation of industries and production systems would be a popular choice for companies in both the manufacturing and services industries, he predicted. Engineers could manage the production process by remote control. That would make the production process less contact-intensive, hence less affected by social distancing and restrictions on human mobility. "Therefore, digital transformation – including smart manufacturing, smart services, e-government and digitized green transformation supported by 5G, Big Data, cloud technology, the Internet of Things and blockchain technology – will transform or even revolutionize manufacturing and the provision of private and public services."

OPPORTUNITIES IN THE INDIAN E-WASTE MANAGEMENT MARKET

According to market research and business consulting firm, Frost & Sullivan, the e-waste management market in India is expected to offer major opportunities for existing as well as new participants in the market.

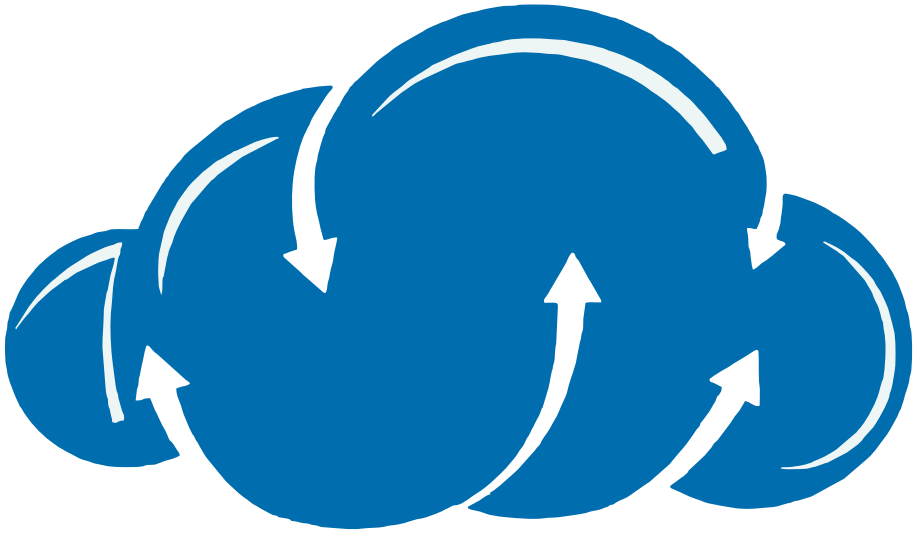
With current levels of installed capacity catering just to 25 percent of the total e-waste generated in 2019, capacity additions are highly likely during the study period. Frost & Sullivan predicts that the market will touch 11.5 million tons by 2025.

The study "Assessment of Growth Opportunities in the Indian eWaste Management Market" would delve into various insights on the current state of the e-waste management market in India and jot down the drivers and restraints to its growth. "The increase in the number of dual-income families, the burgeoning electronics industry, the rapid growth of IT companies, and progressive policies that aim to improve the formal channel are the key growth drivers in the market," the company underlined. At the same time, the increasing market would be restrained by a general lack of awareness about proper e-waste management, the presence of a large unorganized channel, and the capital-intensive nature of the e-waste management market. Furthermore, the high level of capital expenditure would also be a huge barrier for entry into the market.

As reported, the various sources of e-waste, including large household appliances, consumer electronics, and IT and telecom equipment are described. "Commonly-used recycling technologies are also discussed in detail to provide a perspective of the current landscape of the market. The research service also talks about top companies that have established robust e-waste management programs." While strategic partnerships were sure to help find success in the market, "this study also offers insights into other growth opportunities available in the market and lays down the critical factors to consider for succeeding in the industry," Frost & Sullivan stated. The presence of an unorganized channel and its impact on the e-waste management market including safety issues are also discussed. "Growth opportunities involving the unorganized sector have been identified and analyzed."

Photo: O. Kürth

https://store.frost.com/assessment-of-growth-opportunities-in-the-indian-ewaste-management-market.html



Graphic/Photo: TradeCloud

THE PRACTICE OF DIGITAL TRADING

TradeCloud aims to bring the commodities industry into the digital world, leveraging technology to improve the trading experience and make it more accessible.

Singapore-based company TradeCloud is a communications platform designed specifically for the physical commodities industry. By its own account, it provides a secure and compliant environment, open to all market participants. Furthermore, the firm supports its members to find the commodities they need at competitive prices. "It also provides a network of post-trade services such as logistics, finance, and documents, all connected on the TradeCloud Commodities Web, centered around blockchain technology."

According to the company's information, the platform – online since October 2017 – has more than 500 member companies in about 60 countries. It currently serves mainly the metals industry and plans to expand into other sectors.

Simon Collins, Co-Founder and Chief Executive Officer of TradeCloud, explains the practice of digital trading about physical commodities.

Mr Collins, which are the differences between TradeCloud and other digital marketplaces?

TradeCloud is a peer-to-peer platform. Unlike Exchanges, it is a Network of like-minded people and resources that deal in physical commodities. Consider it as an AirBnB or Amazon of the physical commodities business where people can connect, communicate, and collaborate easily and securely! With TradeCloud, you can interact with both internal and external stakeholders in the trade-cycle with full visibility for the whole team, wherever they are. It also ties communications directly to contracts, eliminating the need for manual filing of emails, chats, and documents. It is a one-stop-shop for your scrap trading requirements.

How does the trade process work?

The process itself is simple and neat! You could perform price discovery on our platform by sending a proposal (buy or sell) in a one-to-one, one-to-many or one-to-all format,

for which you shall receive prompt and structured feedback. Our platform helps you generate fully automated contracts, which then get stored with your back-office for reviews and connecting with service providers, like trucking or shipping companies. You can chat with the right parties and share details securely using e-documents features. The summary of your trades will always be visible on the customizable dashboards for your reference and your team. The system is robust, transparent and secure, where you can grant access to multiple stakeholders as per your unique requirements. The data is securely stored on the Microsoft Azure Cloud and recorded via R3 Corda Blockchain – making it easy to trace and impossible to tamper or lose (unlike physical documents!).

Which technical requirements are necessary for companies that intend to use TradeCloud for partaking in digital trading?

None, our platform is software and device-independent. Meaning our customers are not required to install any software on their laptops. You could use it on any smart device like desktop, laptop, mobile (via iOS and Android apps) and be notified on-the-go. Furthermore, we provide training sessions and complete after-sales support to all our clients.

For which industries do you currently trade raw materials on TradeCloud? Are recycled materials also included?

Simon Collins,
Chief Executive Officer, TradeCloud

We are focused on the Metals and Energy sector. That includes both Ferrous and Non-Ferrous Recycled Products. You will find all ISRI specifications, and we can even add new specifications should a customer require them.

What are your aims for the future?

We aim to be a multicommodity platform. Currently, we are looking into Plastics Recycling, Agricultural Products and Precious Metals. Furthermore, we want our customers to demand commodities of their choice, which we can include, making it an on-demand platform. We have a flexible infrastructure that makes this all possible.

Is it possible to use the platform to pay for goods or to finance trade – even on an international level?

With our connected services partners (such as Contour), our clients can connect with financiers that enable payments both domestically and internationally with complete security and transparency. Connected services such as trade finance, inspection companies and tracking are a big part of our 2021 development.

Is TradeCloud a secure communication platform? Do you guarantee that you can protect the identity of the trading partners?

At TradeCloud, we are committed to keeping all information private and secure. Trust is a vital ingredient to our success. TradeCloud uses Microsoft Azure Cloud to store all data; security is built into the platform from the ground up. Azure Cloud is ISO Certified and has a 24/7 cybersecurity team proactively scanning for potential breaches. We use world-class, high-end encryption for all data in transit. We continue to monitor the latest available technology to keep TradeCloud's data safe.

How can TradeCloud (together with its partners) significantly reduce the risk of fraud in the commodities industry?

Over the past few years, the metal industry has been the victim of headline-hitting frauds. Such crimes have partly come about due to the industry's continued reliance on paper documents – Contracts, Bills of Lading, Certificates of Origin, Warehouse Receipts, Insurance certificates, Letters of Indemnity – to name the most common.

At TradeCloud, our goal was to build a communications platform specifically designed for the commodities industry. That meant that data security was our top priority. Traditional communication channels – such as emails, 3rd-party chats or calls – are often the weakest link in the

IT chain. For example, the problem with email is that once it leaves your IT environment, it can be easily hacked. Plus, with all of us receiving so many emails every day, it can be easy to miss something malicious. Email has been the root cause of many of the recent frauds and losses in the commodities industry.

TradeCloud comes as a secure channel to connect, communicate and collaborate with all parties. On the platform, all trade-related information is readily available and secured. The key to keeping communications private is to keep them within a secure environment. The TradeCloud environment is a closed system, making it far less susceptible to attack.

Additionally, our connected services partners provide their array of services to serve the unique needs of our clients. With Roambee, you get on-demand shipment tracking and monitoring solution. With Contour, you can streamline the administration process and create digital Letters of Credit. With Bolero, you get Electronic Bills of Lading to transfer goods control easily and efficiently. To sum it up, we, with our partners, are solving grass-roots issues for our clients in their day-to-day business.

How will digital commodity trading evolve in the future?

In my opinion, it will move with continuously evolving technologies. With more and more companies adopting Blockchain and Cloud computing technologies, the TradeCloud Commodities Web is growing stronger. We have more partners lining up with their unique array of connected services to provide with the ever-growing needs of our clients. The digitization of the commodity trading industry is a journey, which we are all in together. If you want to have a competitive edge, you need to be at the forefront of technological change.

Mr Collins, thank you very much for the interview!

https://tradecloud.sg

About Simon Collins:

- CEO & Co-Founder of TradeCloud, Director of EdgePetrol, and an investor in several technology-based start-ups.
- Simon was formerly head of Metals & Minerals trading for Trafigura, as well as being a member of Trafigura's management board.
- Simon has over 30 years' experience in the commodities trading business complimented with broad product and regional experience.
- Connect with Simon on LinkedIn www.linkedin.com/in/simon-collins-70718112b/

PATENTED COAL-DISPLACEMENT FUEL TECHNOLOGY

Key patents were granted in several countries of the world as Ecogensus expands solutions for the circular economy.

According to USA-based Ecogensus, a technology company in the resource recovery and waste management industry, it has been granted patents in several countries, including a patent for its proprietary coal-displacement fuel in Indonesia, Japan, Taiwan, and Argentina. Furthermore, the American firm has a portfolio of five issued patents in the United States covering its fuel, process, system and process vessel design. Ecogensus also has pending applications across the world and is continuously expanding its intellectual property portfolio. In October last year, the provider reported that the European Patent Office intended to grant a patent for the company's process of converting solid wastes into fuel (European Patent Application No. 15 854 145.8).

The produced fuel is designed to replace coal

"Ecogensus systems efficiently convert mixed solid wastes, including plastic waste, into a high energy fuel," the technology firm underlined, pointing at its flagship system. The Model EGS-5000L is a ruggedized, transportable waste conversion system designed for deployment and installation at transfer stations, recycling centers, or directly at the landfill. As reported, it is capable of processing 40,000+ pounds of garbage per day.

The produced fuel is designed to replace coal, including for large volume users such as coal power stations, the homepage describes the advantages. "Ecogensus works with strategic developers, licensees and industry partners, who, in turn, can aggregate supply from multiple facilities."

By its own account, the company has deep expertise in combustion and plant conversion to alternative fuels.

www.ecogensus.com

CELAB: TOWARD A CIRCULAR ECONOMY FOR LABELS

CELAB (Circular Economy for Labels) is an industry initiative founded by companies in the self-adhesive label industry. The aim is to create greater circularity for its products by enhancing and promoting matrix and release liner recycling worldwide.

With a shared goal of creating a sustainable self-adhesive labeling industry, more than 30 companies from around the world have announced the creation of this new consortium. According to the initiative, CELAB will operate as a coalition, empowered to reach across the entire value chain to promote a circular economy for self-adhesive label materials. It is designed "to facilitate collaboration at a global level and encourage the universal adoption of best practices while fostering regionally appropriate initiatives and cooperation".

The moment had arrived to create a globally focused platform for recycling solutions, Paul Nathanson, a Senior Principal at Bracewell LLP and spokesperson for CELAB, emphasized in a press release. "Brands are eager to communicate their commitment to sustainability in response to consumer demands to reduce their carbon footprint. With increased recycling capability gradually emerging from suppliers, producers, waste management, chemical recyclers and others, we see a tremendous opportunity to facilitate collaboration with partners up and down our industry's value chain." Due to the wide variance in production processes and recycling capability in different markets, CELAB's structure includes a Global Steering Committee and regional branches. The committee sets priorities for the consortium. The regional branches create workstreams on various aspects of matrix and release liner recycling, including analyzing technical issues, promoting the use and creation of recycling networks and solutions, interacting with government regulators, and educating the industry and public, the initiative gave account.

Membership is open to all companies in the self-adhesive label supply chain who commit to CELAB's objectives and are willing to help support its work. The newest member is the American producer Sustana Fiber.

www.celabglobal.org

Europe:

MORE THAN 2.7 BILLION EURO FOR CIRCULAR ECONOMY

In 2019 alone, five European national promotional banks and institutions and the European Investment Bank (EIB), which form the Joint Initiative on Circular Economy, provided a combined financing of 2.7 billion Euro for circular economy projects.

The initiative, launched by the six largest public financial institutions in the EU, aims to finance at least ten billion Euro of investments to support the circular economy over five years (2019-2023). Its members are the Bank Gospodarstwa Krajowego (BGK - Poland), the Caisse des Dépôts Groupe (CDC - France), including Bpifrance, Cassa Depositi e Prestiti (CDP - Italy), the European Investment Bank (EIB), Instituto de Crédito Oficial (ICO - Spain) and KfW (Germany). They supported projects across a variety of sectors including agriculture, industry and services, mobility, urban development, waste and water management, EIB gave account. "The projects span over all stages of the value chain and lifecycle of products and services, from circular design to value recovery."

The most recent companies and projects supported include:

- CREAPAPER, a German start-up for circular paper production and innovative packaging. It produces paper from grass, which not only saves wood as a raw material but also results in significantly lower CO_2 emissions and water consumption
- Vestiaire collective, an online marketplace that allows its more than nine million users to sell and buy second-hand luxury fashion pieces
- Winnow is to develop software and hardware solutions to reduce food waste in professional kitchens
- Aquaservice, a leading Spanish water service provider that reuses and recycles all its material and carries out maintenance with a repair and reconditioning program
- Palazzo delle Finanze (Firenze), a recovery intervention of the existing buildings aimed at the establishment of new productive uses and annexed offices as well as the complete redevelopment of the area outside the complex
- Starmeat, top quality meat processing Polish manufacturer using an innovative process to reduce wasted meat

The Joint Initiative on Circular Economy (JICE) provides loans, equity investment, guarantees and technical assistance to eligible projects and develops innovative financing structures for public and private infrastructure, municipalities, private companies of different sizes as well as for research and innovation projects.

In addition, it contributes to the ongoing initiatives led by the European Commission by building knowledge through dedicated working groups and developing financing schemes. In that sense, it will increasingly engage in circular economy knowledge dissemination activities that will help develop and spread a circular economy culture across European business and financial landscape.

www.eib.org/de/publications/joint-initiative-on-circular-economy

FINANCED: 90 RENEWABLE ENERGY PROJECTS

Abu Dhabi Fund for Development (ADFD), one of the leading financial institutions in the United Arab Emirates (UAE), has been supporting the country's effort towards driving energy transition at home and around the world by financing innovative renewable-energy projects.

As reported, the fund has consistently increased its portfolio of such undertakings. By now, it has funded 90 projects over a decade at a total value of about 4.7 billion Dirham (converted 1.28 billion US-Dollar). Cumulatively generating 9,755 MW (megawatts) of electricity, these projects benefited 65 countries. "Such initiatives form the core of development, and the UAE realized that years ago, which prompted it to host the headquarters of the International Renewable Energy Agency (IRENA)," the Director General of the Fund, Mohammed Saif Al Suwaidi, was cited.

Photo: Drpixel / stock.adobe.com

In 2013, ADFD, in collaboration with IRENA, launched an initiative with a commitment of – converted – 350 million US-Dollar to support renewable energy projects in developing countries. Since then, the initiative led to the production of about 208 MW of clean energy through 32 projects in 26 countries.

In the same year, the UAE Ministry of Foreign Affairs and International Cooperation launched the UAE-Pacific Partnership Fund, intending to step up the UAE's development cooperation with the Pacific island countries across different sectors. The scheme supported renewable energy projects through allocating grants with a total value of – converted – 50 million US-Dollar, financed by Abu Dhabi Fund for Development and implemented by Masdar. The initiative included ten solar photovoltaic (PV) projects and one wind farm, which collectively produces a total of 5.7 MW energy, thus meeting most of the islands' energy needs.

The UAE-Caribbean Renewable Energy Fund, with a value of 50 million US-Dollar was launched to deliver renewable energy projects across 16 Caribbean island nations to help reduce reliance on fossil-fuel imports, increase energy access and enhance climate change resilience. The fund is a partnership between the Ministry of Foreign Affairs and Cooperation (MoFAIC), ADFD and Masdar.

Examples of projects financed by Abu Dhabi Fund for Development include undertakings about waste as well:

- A waste-to-energy plant project in Maldives, for which ADFD provided a concessional loan of – converted – six million US-Dollar in 2015, aimed to address the country's waste management and energy challenges. The project, covering three Islands of Vandhoo, Addu and Kulhudhuffushi, recently received a attestation from the Global Innovation Institute (GINI), a leading international professional certification, accreditation and membership association in the field of innovation.
- Abu Dhabi Fund for Development has also contributed 33 million US-Dollar towards developing a 30 MW waste-to-energy facility in Sharjah (UAE). The project is the second of its kind in the Middle East and North Africa region and will be the flagship project of the Emirates Waste to Energy Company, a joint venture between Masdar and Bee'ah. The facility is being built to help Sharjah achieve its zero-waste-to-landfill target and the UAE's objective of diverting 75 percent of municipal waste from landfills this year.

www.adfd.ae/english

Goal:

PLATFORM TO TRACK PLASTIC WASTE AND RECOVERY

IBM and the Alliance to End Plastic Waste announced their collaboration to design a new data platform hosted on IBM Cloud to help track plastic waste and recovery globally.

According to the Alliance, the platform – called Plastics Recovery Insight and Steering Model (PRISM) – "will aim to serve as a single source of consistent actionable data helping inform how NGOs, value chain participants, communities, regulators and other organizations improve waste management decisions and programs". It would be designed to allow stakeholders to convene and unite various data sets to collaborate and address the problem with plastic waste through data. Areas of focus would include plastic consumption and collection; plastic waste generated and leaking into the environment; waste management and recycling solutions in place; additional data sets as the tool will be expanded.

"The platform will be designed to enable users to easily integrate and scale disparate datasets without compromising their existing security", a press release said. "Development began with the support of IBM Garage – a framework where organizations can work with IBM to fast-track innovation and results by combining technology, design and business strategy."

www.endplasticwaste.org
www.ibm.com

INDIA: FIRST PLANT FOR TREATMENT OF C&D WASTE

In October last year, in India, the first recycling plant for construction and demolition waste was launched. The company Ramky Enviro Engineers Limited, together with the New Okhla Industrial Development Authority, inaugurated the facility, which is located at sector-80, Noida, Uttar Pradesh, under a public-private partnership basis. As Indian media informed, it can recycle up to 300 tons of waste per day, including the collection, transportation, processing and management of construction and demolition waste.

According to a recent study, India manages to recover and recycle only about one percent of its construction and demolition waste. Ramky Enviro Engineers Limited intends to launch similar plants across the country, the media announced.

INTENTION: BUILDING A RECYCLING "SUPERCENTER" IN SAUDI ARABIA

The Saudi Arabian Oil Company (Saudi Aramco), Shell & AMG Recycling B.V. have signed a memorandum of understanding (MOU) to evaluate the feasibility of creating a venture in support of Saudi Arabia's vision to maximize value from its vast natural resources.

According to a press release, the Kingdom of Saudi Arabia is becoming a globally important region for the supply and demand of vanadium, "and desires to enable the development of a world class vanadium recycling industry". In support of this initiative, Shell & AMG Recycling B.V., along with Shell Catalysts & Technologies, intend to explore the feasibility of building a catalyst manufacturing and recycling "supercenter". This "future plant" in Saudi Arabia would "enable Saudi Aramco to refine its crudes in an environmentally sustainable manner through the manufacturing of fresh residue upgrading catalysts required to convert heavy oil fractions into valuable products and recycling the resulting spent catalysts and gasification ash which are otherwise hazardous wastes". Furthermore, it would have the ability to make significant contributions toward the circular economy by bringing state-of-the-art technologies to the Kingdom, "enabling the realization of renewable energy and GHG emission reduction goals in the region".

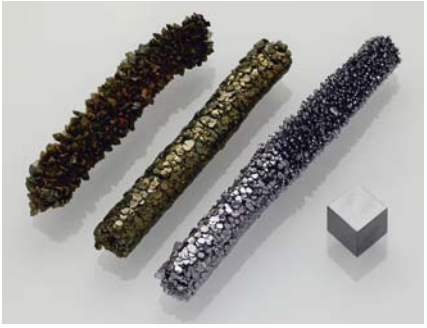


Photo: Alchemist-hp / wikimedia

Tom Eng, Senior Vice President and Head of TOMRA Recycling

TRIGGERING TRANSFORMATION TO A MORE RESOURCE-FRIENDLY FUTURE

The Norwegian multinational collection and sensor-based sorting machine manufacturer TOMRA is engaged to enable a circular economy through smart sorting technologies and close collaboration with its customers around the world.

This applies also to TOMRA Sorting Recycling located in Mülheim-Kärlich (Germany), an important part of the Norwegian parent company, TOMRA. More than 7,400 TOMRA Sorting Recycling systems have been installed in about 100 countries worldwide. These machines support the company's customers to extract higher-purity fractions from recycling and waste streams, to maximize both yields and profits. GLOBAL RECYCLING talked to Tom Eng, Senior Vice President and Head of TOMRA Sorting Recycling, about the company's perspective on recent and future trends in the recycling industry including digitalization, Artificial Intelligence and Deep Learning as well as the contribution TOMRA makes to enable the shift to a more sustainable future and a circular economy.

Mr. Eng, 2020 has put digitalization at the forefront of our daily lives. What does digitalization mean for the recycling industry?

I think we should start with a small definition of 'digitalization'. In a broader perspective, digitalization describes the way analog and physical information is transferred into digital formats. At TOMRA, we refer to digitalization as a process of leveraging digital technologies to turn digital data into valuable knowledge. Using the information collected, fact-based decisions can be made and tangible improvements in both plant performance and business, in general, be realized.

The recycling industry is at the advent of discovering the power of digitalization, ushering in a new era of data-driven process optimization. It opens a new wealth of opportunities as it allows for gathering more information, which in turn, can be evaluated and the respective actions are derived to optimize plant performance. TOMRA Insight for instance allows us to connect to these possibilities. Our cloud-based platform turns optical sorters into connected devices through the generation of valuable data, processing it into actionable information. Data is accessible whenever you want and wherever you are, making it easy to follow up on the sorting performance and adjust settings if necessary. When considering the current global pandemic, digitalization has taken on a whole new meaning and accelerates the transformation to a better-connected industry, smarter and more efficient operations.

TOMRA Insight dashboard

How widespread is the use of digital approaches in the industry?

Those at the forefront of today's sorting and recycling technology are already using the latest technology to realize higher and more stable sorting performances, but these are exceptions rather than a rule. Compared to other industries, digitalization in recycling is still in its infancy. To further advance the case, the respective infrastructures must be set up and scalable, global and impactful solutions be developed and implemented. Here, collaboration across sectors and industries is essential. TOMRA is working diligently to help create an ecosystem of partners to deliver effective and efficient solutions. A good example of our commitment to cross-value-chain collaboration is the creation of our Circular Economy Division in 2019, which actively accelerates the transition to a circular economy and investigates future solutions.

TOMRA's machines incorporate the latest technologies. Where do you see the biggest advancements made in recent times?

Plant operators and recyclers are exposed to handling ever-changing waste streams. In response to this, the solutions required are increasingly based on the use of Artificial Intelligence and its subset called Deep Learning. Whereas Classical Machine Learning requires feature engineering, Deep Learning draws from vast amounts of data to 'learn' how to complete a specified task, allowing the machine to sort complex fractions for which a solution previously did not exist. Moreover, optical sorting technology using robotic 'arms' as an alternative to classical valve blocks to eject materials is creating a buzz in the industry. We are undertaking further investigations in this field and will continue to focus on enhancing detection methods.

In whichever form AI is employed, recyclers and plant operators harnessing its potential have a better opportunity to increase circuit automation, reduce manual labor, lower operating cost, improve sorting consistency and elevate safety.

How does TOMRA employ Artificial Intelligence and Deep Learning?

Optical sensors in circuits have employed AI algorithms to sort material for over 30 years and so do ours. Only in 2019, we officially introduced GAIN, a deep learning-based sorting add-on for our AUTOSORT® machines. The first version of GAIN has been trained to eject silicone cartridges from PE-streams allowing for a heightened purification of the sorting result. Unlike common marketed sorting technology, TOMRA offers a combination of Deep Learning and RGB

Photos: TOMRA

color cameras as well as NIR spectroscopy sensors. This is indeed a unique advantage and contributes to delivering the best classification and detection results in complex applications. Having closely worked with customers and partners, we have extended our deep learning-based application portfolio and look forward to officially sharing it with the market in due time.

Last year, TOMRA introduced the new generation of AUTOSORT®. In how far does the machine differ from previous versions?

We introduced the first version of our AUTOSORT® in 1996. Since then, it has always been our flagship and has undergone years of optimization. With the latest update launched in 2020, the unit incorporates SHARP EYE and a new generation of FLYING BEAM® as standard. SHARP EYE increases light efficiency, enhances sorting precision and improves the separation of difficult to target fractions. FLYING BEAM®, the illumination unit positioned inside the scanner box, guarantees a homogenous light distribution across the entire conveyor belt, thus leading to better detection of materials and consistent sorting performance. The integrated use of both technologies enables AUTOSORT® to consistently deliver high performance in terms of sorting accuracy across all target fractions – even in the most complex of applications. Optionally available are DEEP LAISER®, the first fully integrated deep learning system on the market for excellent object recognition.

AUTOSORT® is used for various applications. Are flake sorting applications among these?

Flake sorting is another important pillar of our product range, for which we offer dedicated high-performing machines, namely AUTOSORT® FLAKE and INNOSORT FLAKE. While AUTOSORT® FLAKE is our high-end polymer flake sorter used when quality demands are high and contamination levels are low, INNOSORT FLAKE sorts more contaminated flakes as small as two millimeters by both color and material and is more flexible in its set-up. Unique in the market, we offer our customers a 'one-stop shop' solution consisting of our AUTOSORT® for bottle sorting and one of our flake sorters for subsequent flake purification. This integrated approach paves the way to cleaner end products and recycled PET and PO resin, which are increasingly asked for in the market. Especially recycled food-grade PP will be high in demand in the future, but due to the technological burden to separate food-grade PP from non-food-grade PP, supply is still short. To further promote this, TOMRA has joined a consortium of various experts to find identification technologies to generate food-grade PP compliant with the necessary regulations and approved for being used for food packaging.

AUTOSORT, AUTOSORT FLAKE and INNOSORT FLAKE

Apart from technologies, which general advancements can you anticipate for the industry in the long-term?

The recycling industry is a very dynamic one. Responding to the global waste crisis as well as market and consumer demands, global efforts that emerged in recent years have produced a tidal wave of new agendas, collaborations and legislations catalyzing the transition to a more sustainable future. Brand owners for instance will experience a completely different ownership by designing products for recycling and fulfilling the demands of Extended Producer Responsibility concepts, which are increasingly gaining ground to reduce waste generation and improve recycling rates. Moreover, products might be equipped with watermarks or digital codes to allow for traceability, and waste management infrastructures will be built in developing countries to reduce the amount of waste and close the loop. The waste hierarchy, a set of priorities for the efficient use of resources including the three R's (reduce, reuse, recycle), will further guide us in the transition to a more resource-friendly future. Although each component has a crucial role to play, we see the most potential in advanced mechanical recycling, the full capabilities of which have yet to be explored and demonstrated by the support of collaboration and targeted investments. What we'd like to see in the future and actively contribute to is that waste of one company becomes resource of another and that recycled products (rPE, rPP, rPET) are used in preference to virgin materials – a scenario that should become commonplace.

Which role do you assign to TOMRA in support of these developments?

In our position as leading provider of sorting technology and industry pioneer with decades of proven field experi-

ence, we take responsibility within the value chain, closely work with our partners and customers as well as other stakeholders to support the creation of necessary waste management infrastructures and jointly develop forward-thinking solutions. A good example of this is our pilot plant for post-consumer plastic waste sorting and advanced mechanical recycling we are operating together with Borealis and Zimmerman Recycling. Besides, we use our memberships in organizations such as the Alliance to End Plastic Waste, the New Plastics Economy, Nextloopp and many more to share our industry knowledge with other industry pioneers to jointly accelerate the transition to a greener future in which resources never becomes waste.

To conclude, we are optimistic about the future and will continue to harness the combined power of smart, data-driven technology and collaboration – the trigger for transformation.

www.tomra.com/en/sorting/recycling

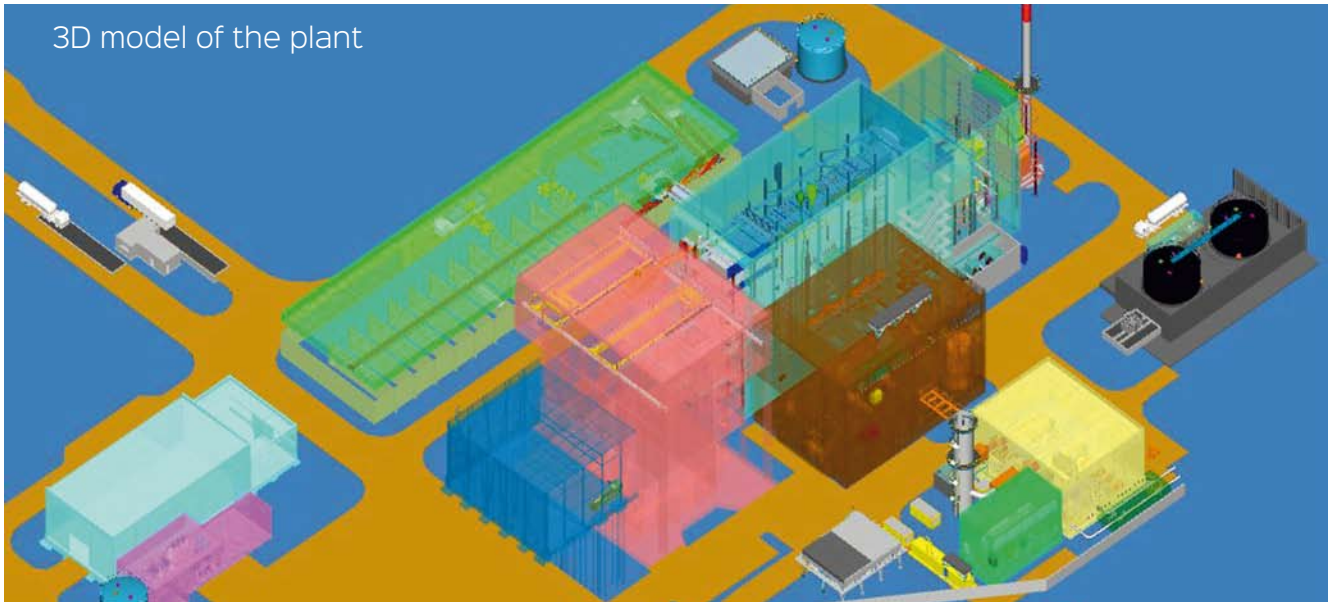
Poland:
NEW WASTE-TO-ENERGY PLANT

Doosan Heavy Industries & Construction (DHIC) and its subsidiary and consortium partner Doosan Lentjes have been awarded the turnkey contract to supply a new waste-to-energy (WtE) plant in Poland. As reported by Doosan Lentjes, the new facility in Olsztyn is the first joint WtE project between the Korean EPC (engineering, procurement, and construction) company DHIC and its German engineering technology subsidiary. It will be based on Doosan Lentjes' proven water-cooled counter-reciprocating grate and boiler as well as flue gas cleaning technology.

Contracted by the plant owner and operator, Dobra Energia dla Olsztyna, the consortium will deliver the entire one-line plant including combustion grate, boiler and dry Circoclean flue gas cleaning, and Selective Catalytic Reduction (SCR). Furthermore, civil works and two gas-fired peak load boilers (PLB) along with site management will be part of the supply. "Co-funded by the EU, the plant will meet all European requirements concerning recycling and disposal, while, at the same time, complying with the emission limits according to the new BREF documents (Best Available Techniques Reference)."

The new plant is intended to be completed in 2023. Then it will be capable of processing up to 110,000 tons of refused derived fuel (RDF) per year produced by the citizens of the greater Olsztyn area. Covering roughly 30 percent of the district heating demand in the region, it will help to compensate for the heat loss that will accompany the closure of the local coal-fired Michelin power plant soon. "This will ensure a continuously reliable and secure supply of district heating to the local citizens," Doosan Lentjes assured. "At the same time, using the energy contained in the waste offers a sustainable alternative to fossil fuels. Besides, the thermal treatment of the waste makes it possible to reduce the landfill space required."

www.doosanlentjes.com



Graphic: Doosan Lentjes GmbH

Advertorial:

BRAIN by PICVISA:

PRODUCTION PROCESS CONSULTANCY THROUGH DEEP LEARNING TECHNOLOGY

After the first three, we are now in what is theoretically known as the fourth industrial revolution. This new era builds on the changes generated by the Digital Revolution (the previous period) and is marked by the convergence of digital, physical and biological technologies. The advances made in Artificial Intelligence have taken this technology almost from fiction to a consolidated practice in a matter of a few years. Industries and production processes of all kinds have been completely transformed or are on the way to doing so as a result of its application, while new business models have emerged.

Photo: PICVISA

Driving automation

The servitization of the industry is already a fact. From worrying only about manufacturing their product and leaving the associated services to third parties, more and more manufacturers are taking the lead and offering them directly. In this new era where everything can be connected, customers prefer complete solutions to standalone products. In this context, BRAIN by PICVISA was developed; a consultancy, analysis and feasibility studies service aimed at those industries interested in promoting the automation of their plants. By applying Vision and Artificial Intelligence technologies, data from the production processes are collected. Based on these data, the viability of the project is assessed not only from a technical point of view but also from the Return on Investment (ROI).

Based on the gathered information, businesses can act to improve certain processes, maximize their efficiency and, ultimately, become more competitive.

Artificial Intelligence for all industries

BRAIN by PICVISA is a service for any industry requiring detailed object and material recognition and analysis solutions (packaging, recycling, textile, pharmaceutical ...).

With the AI-based flow analyzer ECOFLOW, valuable process information is monitored and captured for decision-making. All this data (trends, alarms, maintenance warnings, consumption habits ...) together with other data generated by the rest of the ECOPACK, ECOGLASS, ECOPICK equipment are processed, converted into information and presented in the form of a customized proposal that goes beyond the integration of a machine.

Customers who choose BRAIN, receive a complete business improvement proposal, based on the opportunities offered by Artificial Intelligence, to convert a waste plant into a 4.0 plant in an optimal way.

Full-scale tests at the Test Centre

To develop this service, PICVISA has a Test Centre located in Barcelona where the company can conduct performance tests, material studies and the mentioned feasibility tests. With 800 m^2, the Test Centre is a laboratory for industrial-scale waste recovery and recycling tests where the performance and production of PICVISA equipment can be confirmed for a wide range of waste. The plant is fully automated and incorporates state-of-the-art machine vision and sensor technology with its equipment: an ECOPICK robot unit, an ECOPACK 2000DT, an ECOGLASS 1000 and an ECOGLASS 1500. PICVISA has been helping recycling plants to increase their productivity with Machine Vision and Artificial Intelligence solutions for over 20 years. BRAIN by PICVISA is the result of the knowledge and experience built by the company over the last two decades.

www.picvisa.com

PRAGUE TO PILOT DYNAMIC WASTE COLLECTION

The city of Prague, capital of the Czech republic with over 1.3 million inhabitants, will pilot dynamic waste collection via automated collection routes based on the Collection Efficiency Analysis's result.

In December last year, Sensoneo, a global provider of smart waste management solutions, has announced the first European capital with whom they will partner on a large-scale deployment using their waste management solution. As of spring of 2021, the Czech city will pilot collecting waste via automated routes to dynamically respond to changes in waste production and the city's infrastructure. According to the information, dynamic waste collection is part of a project focused on demonstrating environmental and economic benefits, which result from large-scale deployment of the Sensoneo solution. "Given the scope and the tools applied (over 130.000 bins and 150 collection vehicles), it is an ultimate and revolutionary model example at a global level," the company emphasized. "The project is co-funded by the Horizon2020 program of the European Innovation Council."

Thanks to efficient collection planning, the city of Prague could systematically decrease the environmental impact related to the waste collection process, maximize the efficiency of the currently available vehicles (trucks) and employ flexibility in the case of unanticipated changes. „The ongoing pandemic of COVID-19 is one such example, as it is profoundly changing traditional waste generation patterns and standard collection frequencies, and the current routes are not able to flexibly cope with these changes."

As reported, the project includes the following procedures:

- Collection Efficiency Analysis (AS-IS ANALYSIS) for all waste commodities using Sensoneo's method, based on processing all currently available data related to containers, vehicles and realized routes. In this way, weak points and opportunities for savings and improvement of the service quality were identified;
- Set-up of the new cycling routes and frequencies (TO-BE ANALYSIS) to increase the continuous efficiency and quality of service, combines the shortest possible routes, on-time collection, and maximum possible utilization of vehicle capacity with the long-term goal to reduce the number of vehicles used during waste collection;
- Collecting waste via automated routes (flexibly reflecting daily specific requirements) using Sensoneo's navigation. That would facilitate the employment of drivers without prior driving experience in particular districts or particular routes;
- Final evaluation – showcases savings (time, cost, fuel, emissions) with a BEFORE-AFTER comparison.

Along with the above, the project also includes the realtime monitoring of 550 containers for electronic waste with Sensoneo sensors to optimize waste collection, ensure sufficient free capacity for citizens and thus support the recycling of this commodity, the company assured. The operation part of the project would take one year.

www.sensoneo.com

Photos: Sensoneo

MONDELĒZ INTERNATIONAL SUPPORTS GLOBAL EFFORTS FOR PLASTIC RECYCLING

The American multinational food and beverage company, which is a spin-off by Kraft Foods Inc from its North American grocery-foods products, has announced its support for global efforts designed to increase recycling rates for plastic waste, including flexible films.

Furthermore, the firm selling its snack and food brands in 150 countries called for greater collaboration across the industry to develop and implement Extended Producer Responsibility (EPR) programs to help realize a more circular economy. As reported, Mondelēz International is a signatory of the Business Call for a UN Treaty on plastic pollution, which calls on governments to adopt a more harmonized approach to policymaking, to increase infrastructure investments and to coordinate infrastructure development to address plastic waste.

"We need concerted and collaborative action to advance recycling systems that cater to flexible films, so that more of the light-weight, multi-layer plastics that are used in the confectionery and snacking industries can be economically and practically collected, reprocessed, and ultimately reused, instead of ending up in the environment," Rob Hargrove, Executive Vice President of Research, Development & Quality for Mondelēz International, was quoted. Plastic films would help to keep food safe and decrease food waste, but their recycling rates had to be improved significantly. "Alongside the significant financial contributions that we will make through voluntary and mandatory programs, we are advancing public and private partnerships and recycling programs to build better infrastructure so that these materials are not only designed to be recycled, but actually get recycled."

Mondelēz International is supporting initiatives in markets that promote the circular economy and closed-loop recycling systems when those programs take account of flexible films, the information said. With engagements in approximately 15 locations – including Germany, France, Italy, Spain, Poland, the UK, Brazil, Colombia, India, the USA and Australia – the company's EPR contributions would cover markets that account for around 40 percent of its global revenue base. "In addition, the company is an active member of the U.S. Plastics Pact, the UK Plastics Pact and a signatory to the Ellen MacArthur Foundation's New Plastics Economy Global Commitment. Mondelēz International has also contributed to the European Brands Association's (AIM) digital watermarking program, Holy Grail 2.0, and is one of several companies working with The Consumer Goods Forum on plastic waste."

By its own account, it has already made significant progress on its packaging recyclability targets, removing 65,000 tons of packaging from its portfolio between 2013 and 2020, and is on track to achieve its 2025 goal for 100 percent of packaging designed to be recycled with ~94 percent of all packaging already designed to be recycled. "All of the paper and carton board, and some of the rigid plastics and flexible plastic films used by Mondelēz International, is already designed to be recycled. In addition, all fiber packaging used to store, ship and display its products around the world is sourced from sustainable sources, whether that be recycled or certified deforestation-free." Furthermore, the company has committed to using recycled plastic content in the tubs for its cream cheese range, as well as in the packaging for a brand sold in the UK. The shift in the UK and European packaging would occur in 2022 and form "part of the company's move to decrease the use of virgin plastics across its packaging footprint and to encourage the adoption and use of food-grade recycled content in consumer product packaging," the firm emphasized.

www.mondelezinternational.com

Graphic: Mondelēz International

Aim:

THE PRODUCTION OF MORE CERTIFIED POLYMERS

The companies Sabic and Plastic Energy will build "the first commercial unit" to produce Sabic's certified circular polymers, which – as part of the TRUCIRCLE portfolio – are made from the upcycling of mixed and used plastic.

Photo: Sabic

According to the information, the facility will be based in Geleen (the Netherlands) and put into operation in the second half of 2022. The project will be realized under a 50-50 joint venture called SPEAR (Sabic Plastic Energy Advanced Recycling BV) and is being executed with a Top Sector Energy Subsidy from the Ministry of Economic Affairs in the Netherlands.

As part of the project's market foundation stage, Sabic (a global leader in diversified chemicals) has worked together with Plastic Energy (a pioneer in chemical plastics recycling), leading customers and converters to produce and commercialize certified circular polymers since early 2019. The certified circular polymers are produced using Plastic Energy's recycling technology to convert low quality, mixed, and used plastic – otherwise destined for incineration or landfill – into TAC-OIL. That will be used in the production process alternatively to traditional fossil materials to create new circular polymers.

SWEDISH FIRM INVESTED IN IT-RECOVERY SERVICES

In October last year, Swedish company Elanders AB signed a contract to acquire 70 percent of the shares in Swedish company Azalea Global IT AB, which is specialized in value recovery services regarding IT equipment.

Azalea Global IT manages the entire chain from purchasing used IT equipment and restoring and resetting it to then selling it to a network of customers, Elanders gave account. The acquisition of Azalea is a part of the company's investments within sustainable services that contribute to a circular economy.

Value recovery services makes up an important part of the firm's service area Life Cycle Services and through it "Elanders helps its customers handle their outdated IT equipment such as cell phones, computers, network equipment, servers, monitors and printers". Since a large part of these products' environmental impact comes from the manufacturing process, the goal is to extend their lives as long as possible. In cases where a product has reached the end of its useful life, it is recycled in the most environmentally friendly way. Elanders also ensures that all sensitive data is erased from the equipment to prevent company secrets or personal information from coming into the wrong hands, the company said. Currently, many items were used three or four years before being sent to recycling. Significant environmental gains are instead generated by restoring and reusing them for another three or four years.

By its own account, Elanders has been active for many years in Value Recovery Services on the European and Asian markets. The acquisition of the Swedish company Azalea Global IT AB provides it with a stronger foothold on the Nordic market. "Azalea is specialized in Value Recovery Services and manages the entire chain from purchasing used IT equipment and restoring and resetting it to then selling it to a network of customers," the buyer underlined. "Many of these customers want to reduce their environmental impact by buying used IT equipment."

The acquisition of 70 percent of the shares in Azalea was intended to be finalized in the fourth quarter of 2020. Elanders has an option to acquire the remaining shares in the company, which can be used in 2024.

www.elanders.com
www.azaleait.se

UBQ WINS QUALITY INNOVATION AWARD 2020

UBQ Materials, an Israeli-based cleantech startup, has been recognized as the best in "circular economy and carbon neutrality innovations" for its technology transforming landfill-destined waste into a bio-based, infinitely reusable thermoplastic.

As reported by the company in January this year, the prize was one of 25 awarded by the Finnish Quality Association after a strict methodology evaluation based on novelty value, usability, learning, customer orientation and effectiveness.

According to the information, UBQ's patented process converts unsorted organic household waste – food, paper, cardboard and mixed plastics – into a bio-based raw material substituting oil-based plastics in product manufacturing. Every ton of the produced material would remove the equivalent of nearly 12 tons of carbon dioxide from the environment. In the opinion of Quantis, a global environmental impact assessments leader, "this qualifies UBQ Material as the most climate positive thermoplastic on the market".

As underlined by the company, the emerging UBQ ecosystem touches on a series of industries, from fashion and retail to restaurant and automotive:

- The company is partnering with Arcos Dorados, the largest independent McDonald's franchisee in the world with restaurants throughout Latin America and the Caribbean, to incorporate UBQ material into the brand's plastic serving tray. In this first phase, 7,000 serving trays made with it will be introduced throughout Brazil.
- Last year, global retail solutions provider Mainetti announced its partnership with UBQ Materials to introduce the new standard for product innovation and sustainability in the fashion industry. Mainetti's "exclusive collaboration with UBQ for hangers offers brands across the fashion and retail industries a cost-effective method to significantly reduce their carbon footprint and a new way to put action towards the current waste crisis," the Israeli firm gave account.
- The company has also announced a collaboration with Daimler, manufacturer of Mercedes-Benz, for the implementation of UBQ material in car parts.

First full-scale production facility

In September last year, UBQ Materials announced its plans to establish its first full-scale production facility in the Netherlands, joining its pilot plant in southern Israel. The Netherlands facility would have an annual production output of 70,000 tons.

The company is supported by an international advisory board that includes Roger Kornberg (Nobel Prize Winner in Chemistry), Connie Hedegaard (former EU Commissioner for Climate Action) and John Elkington (a world authority on corporate responsibility and sustainability).

www.ubqmaterials.com

TAIWAN: COUNTING FIRMLY ON CIRCULAR ECONOMY

Taiwan was once known as „Garbage Island“. In several steps, the island managed the transition from an agricultural to a high-tech industrial economy. If it is already a „Recycling Leader“ too, as media announced, remains to be seen.

Taiwan, evolving from an agricultural economy to a nation focusing on the “development of foundational designs and applications for recycled plastic waste materials”, has three main reasons, says an article published by the Wenzao Ursuline University of Languages at Kaohsiung, Taiwan. First of all, limited natural resources force Taiwan to import 99 percent of its energy resources, 80 percent of necessary minerals and 70 percent of its food. Furthermore, the country is a major player in several global industries, especially in information and communications technology and biotechnologies. Therefore, Taiwan needs permanently available and cheap resources for production. Thirdly, the country is known for its densely populated urban areas with a severe scarcity of land. Thus, the creation of new ground for landfills is problematic.

Strong opposition

In 1993, the waste collection rate on the island reached up to 70 percent. However, without any recycling involved. By the mid-1990s, two-thirds of the island’s landfills reached or nearly reached their limits and caused protests and blockades. As their expansion was no option, the Environment Protection Agency planned to build 36 new incinerators. The proposition came upon strong opposition of the public against incinerators and landfills. Additionally, rapid economic development led to increased volumes of waste.

Photo: Markus Winkler / pixabay.com

Therefore, the government had to enforce substantial policy changes towards recycling waste and waste reduction and drafted new waste management frameworks to encourage practices that result in generating less waste.

Ranking-position 5

In 2018, the average Taiwanese person produced 850 grams (1.9 pounds) of waste daily, down from 1.20 kilograms (2.6 pounds) 15 years ago. Taiwan's recycling quota between 2001 and 2016 increased from 12 to 55 percent, showing the third-largest surge over the last fifteen years after Germany and Wales, the European Environmental Bureau gave account. Regarding reported recycling rates of municipal solid waste, in 2019, with 58 percent, the country achieved ranking-position five and with 55.4 percent number two in the longlist for adjusted recycling rates of household waste.

Many hidden numbers

However, the Taipei Times cited Taiwan Watch Institute secretary-general Herlin Hsieh who was skeptical because of "many hidden numbers". Although officially about three million tons of waste were notified to be incinerated, more than 4.2 million tons were burned. The sum of waste disposed of by informal and private collectors is not added to the total amount of waste. However, the recycling volume is included in the nation's recycling statistic and falsifies the recycling quota. Waste collectors intermixed electronic waste from other countries to receive subsidies. An estimated 60,000 end-of-live computer monitors were found near a collector's plant – piled up. All in all, for Herlin Hsieh, the recycling figures show a "gross overestimation".

A well-operating program

A study in 2020 certifies Taiwan's "well-operating waste minimization and resource recycling programs". Correspondingly the before mentioned Kaohsiung study indicates a landfill disposal rate reduced by 98 percent and several landfills that fell from 187 in 2007 to 83 in 2017. About 25 incinerators with a daily capacity of ca. 24,000 tons are in operation, treating 97.47 percent of the non-recyclable waste. Approximately 65 percent of the processed garbage is household waste, while 35 percent counts as industrial waste. And the country's economy generates 3,130,735 tons of refuse for disposal and 4,113,808 tons of recyclable waste recycled.

Photo: Presse750 / Dreamstime.com

Infrastructure under pressure

But according to a study on "Municipal Solid Waste and Utility Consumption in Taiwan" in 2020, the infrastructure of waste treatment is not only under pressure due to natural disasters like typhoons and earthquakes. It also has to deal with many of the operating incineration plants that are reaching either a major service period – in the worst case, that means struggling with low capacity – or their end-of-life. Some municipalities want their waste to be treated or disposed of by facilities of other cities and counties. Above all, Herlin Hsieh figured out that incineration plants preferred the treatment of industrial waste. Household waste, in contrast, was not prioritized. The facilities were constructed under the motto "one incineration plant for each municipality" and were designed for processing household waste. However, transferred to local governments and run by private companies, they were allowed to accept industrial waste. By treating household waste, their operators earn more than 1,000 New Taiwan-Dollar (35 US-Dollar), instead of burning industrial waste between 1,500 and over 2,000 New Taiwan-Dollar (53-71 US-Dollar).

A growing recycling market

Anyhow, recycling developed. According to the Environmental Protection Administration, Executive Yuan, the recyclable waste recycled by implementing agencies from 2007 to 2017 totaled 2,408,429 to 4,113,808 tons. In 2015, an online magazine characterized Taiwan as a growing recycling market and expected a recycling boom. The article showed the number of recycling firms increasing from about 100 in the 1980s and 1990s to more than 1,600 at present. In March 2017, the online-newspaper Taiwan Today even published that the national waste management and recycling business, operating everywhere in terms of transport, sorting, cleaning, incineration or reuse, was "a hundred-billion-dollar industry connecting 6,000 firms and involving 230,000 jobs". Taiwan's Industrial Development Bureau of the Ministry of Economic Affairs stated that the recycler's revenue increased from one billion US-Dollar ten years ago to 2.2 billion (US-)Dollars in 2014.

Plastics recycling – the most successful

The plastics recycling industry turned out to be the most successful. Already in 2014, the Taiwanese Environmental

Protection Administration specified a recycling rate for plastics of 73 percent and reported the collection and treating of 180,000 tons of used plastic to raw materials worth 140 million US-Dollar. More than that: The national Food Hygiene Policy determined not to turn recycled containers into food containers. So, nearly two-thirds of Taiwan's PET bottle plastic is recovered to textile fibers, requested by local textile companies like the Far East and Shin Kong or foreign producers for shoes and sportswear like ADIDAS. The authors Ching-Yan Wu, Mei-Chih Hu and Fu-Chuan Ni are sure that this "made Taiwan a leading global partner among recycling industries and, in green supply chains for textiles, information technology, and electrical and electronic components". Taiwan's PET bottle recycling rate in 2018 reached as high as 95 percent, the Department of Information Services, Executive Yuan, announced.

Change to sustainability

Following the Kaohsiung paper, the Taiwanese government plans to change the industrial base into a sustainable circular economy. Likewise, the goal of most small and medium enterprises is to cut reliance on imports like rare earth or fossil fuels and to increase productivity. Contract chipmaker Taiwan Semiconductor Manufacturing Company, for example, wanted to reach an internal waste recycling rate of 61 percent by 2020 and is said to capture and reuse 95 percent of its waste products. Electronics producer ASUS intends to recycle 20 percent of its global waste by 2025 and recycled a 12.2 percent recovery ratio of total products sold. Packaging paper manufacturer Cheng Loong Corporation uses 94 percent of its raw materials from recycled paper. And steel manufacturer China Steel Corporation provides by-products from its steel production for other producers.

Demanded: International standards

"The number of sustainability reports for Taiwanese companies has risen significantly over the last years", says the Kaohsiung paper. Nevertheless, it also wants to draw attention to the fact that small and medium enterprises need government-led assistance to realize a transition into a circular economy. That is not only necessary because of increasing domestic regulations and related national policies. It is also essential considering demanded standards set by international customers or investors. In 2018, the Department of Investment Services, Ministry of Economic Affairs named a few: JX Nippon Mining & Metals and Tanaka Precious Metals from Japan invested in the recycling of gold, silver, copper, iron and others. The U.S. firm Nippon Refine and World Resources Company both focus on copper, nickel and zinc recycling. The Singtex Industrial Co. produces fabrics from coffee-ground fibers.

Governmental measure taken

During the last years, several numbers of governmental measures got off the ground. The Waste Disposal Act for example, adopted to provide a framework throughout the institutionalization and industrialization of Taiwan's waste recycling sector, has gone through 14 legal revisions, the latest in 2017. The Recycling Fund greatly advanced recycling in Taiwan by supporting the purchase of more than 1,300 recycling vehicles for municipalities since 1998: Money from the special income fund has also financed 273 storage facilities for 326 municipal collection squads since 1998, the Environment Protection Agency gave account. The 'Five Plus Two Industry Innovation Plan' was adopted to substitute the innovation-driven economic growth. One of its goals is a circular economy, to be realized by fostering large-scale energy resource recycling centers, promoting international cooperation, and establishing cross-sector cooperation platforms for circular economy cooperation and industry resources linking and matching. Accordingly, in 2018, the government forced plans to establish several test sites for circular economy pilot projects: In fact, the Ministry of Economic Affairs drafted a program that would focus on recycling industrial waste from three companies such as gypsum from Formosa Plastics Group, slag from China Steel Corp and paper from Chung Hwa Pulp Corp. Given 19.61 million tons of industrial waste generated in 2018, 16.01 million tons or 81.6 percent were recycled, while the remaining 18 percent stemmed from these three firms, according to Minister Without Portfolio Chang Ching-sen.

Welcome to invest

In a brochure titled "Taiwan. Key innovative industry – circular economy" (🌐 www.roc-taiwan.org/uploads/sites/29/2018/03/Circular-Economy.pdf), the Department of Investment Services, Ministry of Economic Affairs, clarified the governmental roadmap and its potential. "With a complete ecology of industrial chains and clusters, Taiwan is an ideal place for energy and resource integration technologies and waste recycling", the paper underlined. It confirmed that the policy focus is lying definitely on circular economy, opening "developing business opportunities in the new materials market". With interesting potentials offered: "International enterprises are welcome to invest in Taiwan for joint ventures, technology transfer, or joint development for advancement into the new materials market in the Asia-Pacific region." Business Sweden, a business developer with a unique mandate to help Swedish companies grow global sales, was convinced. "Altogether, this new scenario presents promising opportunities for Swedish suppliers of equipment and services in Taiwan. Now is also the opportune moment to engage in new research projects and collaborations", the agency commented in August 2019.

Photo: Teinesavaii / wikimedia

SAMOA: CIRCULAR ECONOMY IN PROGRESS

The Independent State of Samoa aims at minimizing the volume of wastes generated on the islands. Moreover, the goal is to divert more materials away from disposal sites with limited capacity.

The Polynesian island country, consisting of two main islands (Savaii and Upolu), two smaller inhabited islands (Manono and Apolima), and several small uninhabited islands, is working on the implementation of the circular economy. In July last year, the Geojournalism website Pasifika Environews reported that the Ministry of Natural Resources and Environment (MNRE) of Samoa – with the support of the European Union's Pacific-EU Waste Management Programme (PacWastePlus) – has selected electronic-waste (e-waste) as the country's priority waste stream. At that time, the final stages of the development of the in-country project were announced along with related activities to improve e-waste management at the national level.

As reported, the ministry, with funding and technical support from PacWastePlus (a 64-month project financially endorsed by the EU and implemented by the Secretariat of the Pacific Regional Environment Programme [SPREP] across 14 Pacific island countries and Timor-Leste), would seek to provide safe e-waste collection and dismantling facilities. Furthermore, MNRE would encourage the Samo-

ans "to return e-waste for recycling and reducing e-waste deposited into landfill, illegally dumping and burning of e-waste". The project would support the Samoan government's commitments in the Samoa National Waste Management Act 2010 and contribute to the achievement of the National Waste Strategy 2019-2023 on effective implementation of regional and international conventions (Stockholm/Minamata).

More than one year earlier, in March 2019, the country had launched a public-private partnership (PPP) on e-waste. According to the SDG Knowledge Hub, which is managed by the International Institute for Sustainable Development (IISD), MNRE entered into a partnership with the Samoa Stationery and Books (SSAB) and Hewlett Packard Enterprise (HP) in New Zealand to minimize the impacts of e-waste on the islands. Users of HP products can safely dispose of their toners and ink cartridges through a collection and shipping program paid for by HP New Zealand.

That is only one example of the government's activities. In 2020, a glass crushing pilot was realized; used glass bottles are granulated and will serve as "sand". As a result of a grant from The Coca-Cola Foundation to the Samoa Recycling and Waste Management Association (SRWMA), plastic bottles for recycling and aluminum cans will also soon be recycled, the newspaper Samoa Observer reported online in November last year. The initiative intends to promote proper waste management practices in collaboration with the National University of Samoa (NUS) and the Australian Pacific Training Coalition (APTC), the NUS homepage informed. The project would aim to provide custom-made segregate waste stations for collection and "promote proper recycling and waste management practices through community engagement marketing strategically targeting consumer behavior change", which would be carried out by the university. There is also a Samoa Waste Oil Management Program (SWOMP), headed by Nissan Samoa.

Samoa Recycling and Waste Management Association (SRWMA)

Samoa's ambitions to convert to a circular economy took a step forward with the launch of the Samoa Recycling and Waste Management Association (SRWMA). On this occasion, the Director General of the Secretariat of the Pacific Regional Environment Programme (SPREP), Leota Kosi Latu, applauded the association's creation as a positive development for the island country. "This is the first of its kind in the Pacific Region and one which other Pacific Island countries can emulate," he was quoted by the trade magazine The Recycler. The SPREP works with major donors, including the World Bank and the European Union, through the Pacific Regional Infrastructure Facility, to establish recycling hubs around the region. According to Leota Kosi Latu, at that time, Samoa had made tentative recycling steps but had "plenty of progress still to make". Most of the country's waste was sent to landfill.

Samoa's waste generation

According to the figures provided in Samoa's National Waste Management Strategy (2019-2023), the population of Samoa was 195,843 in 2016; in 2023, the total population is estimated to be 207,075, with an annual population growth rate of 1,605 about persons/year.

The amount of waste generation and the discharged quantity as well as the waste composition were surveyed in November 2017. "The audit was conducted by collecting waste samples from selected 40 households with 365 persons in five villages for one week," the information said. As a result of the survey, the waste generation amount was identified as 1,060 grams/person/day; the discharged waste volume was 387 grams/person/day.

The country's quantity disposed of was estimated at 76.4 tons per day in 2017 (2011: 71.4 tons/day). Major waste categories in discharged waste were organic (green waste and food scrap with a share of 43 percent), followed by plastics (16 percent), paper and cardboard (13 percent) and diaper (12 percent).

As described by the Pacific Department of the Asian Development Bank (ADB) in 2014, most households kept wastes on a raised platform, "ready for collection by a waste pickup truck". The objective of these platforms was to keep scavenging animals away from the waste. That was a major issue in the past. "This unconventional collection system is widely accepted," ADB gave account. At that time, it was also common for households to compost green waste on their properties and to segregate and use food waste, such as taro and banana peelings, as animal feed. Around five percent of the Samoan households either burned their wastes or dumped them within their property boundaries or vacant areas. Commercial solid waste was stored in a range of steel materials and other containers.

Some years later, improvements were achieved: recycling promotion through the Reduce, Reuse and Recycle (3R HEART) community awareness program; strengthening of landfill operations; and development of a landfill operation training program, the Pacific Region Infrastructure Facility (PRIF) described the situation in 2018. At that time, three recycling operations on the main island of Upolu would source steel and nonferrous scrap from abandoned vehicles and the local landfill and export "approximately 12 x 20-foot shipping containers a month to Australia, the Republic

of Korea, and New Zealand". Whitegoods, PET bottles, paper and cans were exported to Indonesia and New Zealand. Used lead-acid batteries were sent to Fiji, India, New Zealand and Singapore.

There are two approved landfills, Vaiaata (Savaii Island, with an area of 9.8 acres) and Tafaigata (Upolu Island, with an area of 15.4 acres), including related functions or facilities of landfills. As stated, there is no system in place to monitor the remaining capacity and operation. At Tagfaigata landfill, recyclables are separately collected by registered waste pickers and recyclers based within the landfill site and sold. According to the Samoan strategy paper, there is also a composting yard at the landfill "but currently not fully functioning due to lack of staffs with relevant skills". The country's National Waste Management Strategy (2019-2023) has been developed as an integrated waste management strategy to address priority actions to be taken for the years from 2019 onward. Important areas are:

- Enhance environmental awareness of the public on waste-related issues and the countermeasures
- Strengthen operational planning on solid waste management (SWM)
- Implement regular survey for basic SWM data collection
- Study feasibility of future SWM options
- Establish an efficient monitoring system for SWM operation
- Strengthen legal framework and enforcement
- Improve the capacity of officials related to SWM
- Improve chemical and hazardous waste management

Investment promotion

In its terms, the Independent State of Samoa provides a highly favorable investment environment and is committed to creating an attractive investment climate for both local and foreign investors. "The country has displayed great political and economic stability over the last ten years and, with relatively low labor costs, a favorable exchange rate and a well-managed economy," the Ministry of Commerce, Industry and Labour (MCIL) emphasized on its homepage.
www.mcil.gov.ws/services/investment-promotion-and-industry-development/investment-promotion/

According to the Samoa Investment Guide, there are investment opportunities in the Engineering and the Services sector, including paper recycling and environmental services.
www.mcil.gov.ws/storage/2020/08/Samoa-Investment-Guide-2020.pdf

MALTA UPGRADES THE INFRASTRUCTURE

In December last year, the Ministry for the Environment, Climate Change and Planning (MECP) of Malta had launched a public consultation addressing the Waste Management Plan for the Maltese Islands 2021-2030, which is mandated under the European Union Waste Framework Directive and to be transposed in local legislation.

As reported by the ministry, Malta's annual municipal waste generated per capita is currently higher than most EU countries (at an average of 640 kilograms in 2018, according to Eurostat) while landfilling is still the predominant waste treatment option and the recycling rate the lowest amongst EU Member States (about 10 percent in the same year).

The status quo is not an option, MECP underlined. "Waste prevention and improved management is not only a central aspect in supporting Malta's transition towards a resource efficient and circular economy, but also in reducing pressure on Malta's waste logistics and infrastructure and our dependence on either exporting waste or landfilling where land availability for such purpose is limited."

Photo: etfoto / stock.adobe.com

Through the projected Waste Management Plan, the strategic objectives are to:

- Maximize the resource value in waste through different management options
- Innovate by designing waste prevention initiatives to lower Malta's per capita generation rate
- Reform the collection system to increase economies of scale, harmonize collection practices and modernize the collection fleet
- Build the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta's targets
- Study the feasibility of an enhanced producer responsibility framework to complement Malta's transition to a circular economy and reflect further on the true cost of waste management
- Promote further the involvement of the private sector in waste management

As described in the consultation document regarding the newest Waste Management Plan, Malta currently treats waste through a combination of material recovery center (Sant' Antnin), mechanical biological treatment plants, thermal treatment facility, WEEE storage facilities and as a least preferred option engineered landfills. Now the country is busy at work upgrading the infrastructure.

ECOHIVE

In the opinion of MECP Minister Aaron Farrugia, Malta's recycling situation has already improved. He expressed this conviction during a visit to the ECOHIVE complex in Naxxar, where WasteServ Malta Ltd – a company responsible for organizing, managing and operating integrated systems for waste management – is investing around two million Euro in an automated sorting line. The project will be part-financed by the European Union Cohesion Fund and is expected to be completed by the end of the year. In the future, around 41,000 tons of material will be processed using specially designed machinery that will automatically collect and sort the different types of metal, cardboard, and plastic, the minister underlined according to a report provided by WasteServ in January this year. The separated and baled materials could be sold to be transformed into other products.

According to the consultation document, ECOHIVE is home to four new waste management plants. "The biggest investment of its kind, and it will help us make the most of ALL our waste," MECP emphasized. As reported, the process for a new high-level plant to replace the Marsa incinerator has started. In September 2020, WasteServ in conjunction with the ministry had announced the launch of the new ECOHIVE project, which is intended to transform the waste management infrastructure in Malta. Tenders for procurement were already published.

The waste-to-energy facility, called ECOHIVE energy, is meant to process waste that cannot be easily recycled. It will be treating 40 percent of non-recyclable waste generated in Malta diverting it away from landfill disposal, WasteServe announced. With a capacity of 192,000 tons annually, this 185 million Euro investment is expected to be put into operation in December 2023.

In the section of ECOHIVE recycling, a new material recovery plant will be designed to process co-mingled recyclables. With an investment of 20 million Euro, the Material Recovery Facility is expected to have an annual capacity of 70,000 tons. Here, the recyclables – namely paper, plastic and metal – are to be separated through an automated sorting process. "Waste will undergo a series of procedures that refine the material stream, extracting specific materials that can be recycled leading to higher quality materials for recycling." It is the intention that this plant will be commissioned in 2024.

The Organic Processing Plant (ECOHIVE organic) will treat organic waste. Using the heat generated by the waste-to-energy facility for pasteurization, the plant will convert waste into biogas and agricultural compost. It is expected to process around 120,000 tons of organic waste on an annual basis. Around 118 million Euro will be invested to reduce the volume of biodegradable waste going to the landfill. Last, but not least, there will be a new Thermal Treatment Facility replacing the one in Marsa, WasteServ informs on its homepage. As ECOHIVE hygienics, it will also form part of the ECOHIVE project. The facility will process hazardous waste such as clinical and pharmaceutical waste "using environmentally sound technology". Energy in the form of heat would also be generated in the process.

Other facilities

With an investment of 15 million Euro part-financed by the Cohesion Fund, the Multi-Materials Recovery Facility (MMRF), located in the Ħal Far area, is expected to start operations during the third quarter of 2021. "The processes performed at this facility are directed towards deviating recoverable materials away from landfill, in line with waste management targets emanating from the Waste Framework Directive 2008/98/EC," WasteServe underlined. The plant will be accepting electrical and electronic equipment (WEEE) as well as tires, wood, mattresses, flat glass, expanded polystyrene, textiles and gypsum products. In July 2020, the company inaugurated a new rudimentary sorting line within the Sant' Antnin complex, "which will be instrumental in creating a more streamlined and efficient

mechanism for the sorting of dry recyclables disposed of in grey and green bags". The complex also includes the Sant' Antnin Mechanical and Biological Treatment (MBT) plant. WasteServ has been treating all organic waste at this facility since October 2018.

The Thermal Treatment Facility (TTF), situated in Marsa, consists of an incinerator which uses heat to process abattoir waste, clinical waste and other hazardous waste streams. The incinerator, inaugurated in December 2007, replaced the two old incinerators and helped increase the efficiency of operations. To operate its high temperature furnace, it is powered by electrical energy, Heating Gas Oil (HGO) and tallow produced in the autoclave plant, which was installed in 2015. The Materials Recovery Facility (MRF) and the Waste Transfer Station (WTS) in Xewkija (Gozo) were set up for the reception, sorting and transportation of non-hazardous wastes coming from Gozo and Comino. The dry recyclable waste is sorted, compacted and baled at the Materials Recovery Facility (MRF), using a semi-automated mechanical process. Once baled, this is sold to registered waste brokers directly from the facility in Gozo.

Additionally, WasteServ will be opening four Reuse Centers to enhance its Civic Amenity Site experience and to further widen the concept of a circular economy, a press release in January said. These centers, which are expected to be opened by the end of the year, "will offer used and 'pre-loved' items such as ceramics, toys, books, and loose furniture which still hold value and can be reused".

www.wsm.com.mt/en

OUTLOOK: GLOBAL PAPER RECYCLING MARKET

According to BIR Paper Division President Jean-Luc Petithuguenin (Paprec, France), the recovered paper market had a good start in 2021.

Photo: O. Kürth

Many experts agreed this would be a positive year for raw materials, Jean-Luc Petithuguenin wrote in the "World Mirror", published in January by the Bureau of International Recycling, the sole global recycling federation. However, the branch needs to adapt "to new international regulations and additional constraints which, in some ways, could provide a competitive advantage". But the main question is "how the Covid-related healthcare situation will evolve and how it will affect the economy".

The good outlook for the paper recycling market is confirmed by a market report, which has been added to ResearchAndMarkets offering. As reported in 2020, the "Global Paper Recycling Market" was estimated to be 45.5 billion US-Dollar and is expected to reach 56.2 billion US-Dollar by 2025, growing at a CAGR (compound annual growth rate) of 4.3 percent. According to the information, significant factors are promoting the global paper recycling market's growth. Those were attributed to the increased threat towards rapidly depleting resources. "This has led to a conscious awareness of sustainability among the consumers and business enterprises with the increased adoption of eco-friendly products. Besides, recycled paper also offers various cost-benefit advantages as well as a favorable impact on the environment. These factors are further boosting the market growth." The costs associated with the machinery as well as the inefficient waste collection mechanism and the segregation system could be a deterrent to the market growth.

The Indian market intelligence and advisory firm Mordor has found similar positive trends. According to the information, the recovered paper market is projected to grow at a CAGR of 2.7 percent over the forecast period 2021 to 2026. "As corrugated containers and boxes are extensively used as packaging products for transportation and shipping, there is an excellent demand for recovered paper derived from old corrugated containers that can be recycled and reused for packaging purposes". The burgeoning demand for corrugated boxes for packaging was encouraging the growth of this market.

www.bir.org, www.researchandmarkets.com, www.mordorintelligence.com

SOFTWARE SOLUTION FOR THE PAPER RECYCLING INDUSTRY

Irish headquartered AMCS Group has created an enterprise grade cloud and software platform, which is inspired by global market trends, driving automation and delivering end-to-end standardization and optimization of all business processes.

The AMCS platform is for all lines of business, the Irish group emphasizes. “It suits single waste stream companies but also scales to the large multi-line of business companies, providing the complete pallet of waste related services. All in one platform.”

In all industries quality counts. This applies also to paper recycling, as the industry uses recovered paper to process it into new paper. How can the platform help to raise the standard of paper recycling and meet the markets’ needs? Conor Dowd from AMCS Group answered the questions of GLOBAL RECYCLING.

Despite Covid-19, the paper recycling market appears to be relatively stable in 2021. However, the recovered paper market is volatile, and the industry’s demand for different types of recovered paper varies. How can your software solution be of help here?

One of the key focus areas for AMCS is to enable suppliers and paper processors to supply the highest quality feedstock material for the mills. With this objective in mind, we developed a comprehensive grading module that allows users to inspect each load and record a very detailed breakdown of composition, moisture content, level and type of contamination, etc. The user can also record multiple images of the material. This evidence can be used to provide a feedback loop to the wastepaper suppliers to improve the quality of the feedstock. There is also a commercial dimension to the grading in that the process is linked into the price charging mechanism so the actual price paid

Photo: Jochen Zellner, LK Neustadt/Aisch-Bad Windsheim / abfallbild.de

or charged for the material can be adjusted to reflect the percentage of contamination and non-conformity with the expected composition. This grading feature is also complemented by a granular recording of the paper stock as it moves through the processing cycle of the paper merchant so the operator has complete visibility on stock levels (own or third-party broken down by material type), stock status (unprocessed, work in progress, shredded, baled, loose or finished goods). We believe that functionality like this allows paper processors and their suppliers to produce the highest quality recyclate and to have real-time and granular visibility on their available stock so they can ensure high-quality outputs at the best margins possible. This approach can help increase the quality and sustainability of prices for all recovered paper types.

Does the AMCS Enterprise Management Software meet the needs of all market participants? Including wastepaper collection, sorting, processing, and paper mills that are using waste paper?

The AMCS Platform Enterprise Management Software is a modern, integrated and modular solution and the solution can be used by all market participants including wastepaper collectors, processors, brokers and paper mills. Our solution was designed as a recycling-specific, process-driven platform so it offers specialist functionality and support for all recycling activities (e.g. paper, metal and plastic, etc.). Our experience is that generic ERP systems that address general requirements (e.g. manufacturing) do not provide sufficient paper-specific functionality to automate a recycling operation.

Our AMCS Platform solution comprises of the following modules:

- Transport and Dispatch – collection of material
- AMCS Mobile for the driver to assist collections
- Scale/Weighbridge to manage both incoming and outgoing loads
- Grading – inspection, grading, re-classification of all or part of loads, charging adjustments
- Contract and Pricing Management
- Stock Management – reporting of all stock types, status, costs and value
- Production Management – tracking of material through production process to finished good status
- Customer/Supplier Portals – allows the sharing and exchange of relevant data between partners
- Brokerage of Material – sale of third-party material
- General Accounting – invoicing, cost accumulation, margin calculation, AR, AP, etc.
- Outbound Logistics – links sale of material to stock on-site or off-site
- Export of Material – shipping documentation, images, customs, and so on
- Demand Planning – plan material supply to achieve optimum inventory levels
- Data Analytics – provide data-driven insights for smarter decision making with both self-serve report writer and a Datamart

Photo: AMCS

Conor Dowd, Product Marketing Manager

One of our most recent implementations was in a large North American paper mill where they are using specific AMCS Platform modules such as the scale/weighbridge, contract and price management, demand planning and grading modules.

What could be a solution for a company that has to deliver a certain quality of recovered paper in a specified quantity for its customer (the paper mill)?

In this scenario, the paper processor or broker can use our Demand Planning module to build a plan to source the feedstock material either from inputs from their production processes and/or from third parties. The Demand Planning module supports this planning process with automated and integrated workflows from creating the plan through to sourcing the specific feedstock material. It provides full visibility into requirements, schedules and costs with real-time data for informed decision making.

Paper and cardboard manufacturers using recovered paper need high-quality raw materials. To what extent is the quality control part of the software?

As stated above, the measuring and recording of quality along with evidence-based feedback loop to the supplier is a key deliverable for our software. We offer a very advanced but user-friendly grading application to ensure that the material is correctly classified and of sufficient quality to meet the end-user specification.

Knowing how much inventory there is and a demand plan for the production line also means that purchasing managers are in a better position to play the market. Is it possible to realize demand management for both sides – recycler and producer?

This is a key business outcome for the AMCS Platform to provide real-time visibility on available stock and the status

of the demand plan so the purchasing manager knows what has already been contracted and what needs to be sourced and on what terms. Our Demand Planning module provides the purchasing manager with the digital tools to ensure that there is a continuous supply of the correct material over a period to meet the production needs.

In addition, we also offer a digital engagement portal solution to link purchasing managers with suppliers to improve interaction and co-operation between partners. Purchasing managers can publish their demand plan and suppliers can provide details of their supply. This portal provides transparency and visibility for all parties and it allows partners to supply important order information like material details, terms, availability, etc. and it eliminates spreadsheets, emails and telephone calls.

The AMCS Portal can be used to digitize other interactions like tickets, manifests, invoices, self-billing, confirmations, purchase orders, and so on. This digitalization of all the interactions between the purchasing manager and the supplier creates efficiencies, drives margin expansion and reduces the risk of a shortfall in material to support production requirements. The purchasing manager could also hold an e-auction to secure the best terms.

Is the AMCS software suitable for a worldwide application?

AMCS is the leading global provider of digital transformation solutions for recycling operations. We have over 600 staff operating in over 14 countries worldwide. Our AMCS platform solution is used by over 2,000 customers in over 30 countries worldwide and on every continent. These clients range from smaller independent paper collectors and processors to the largest global recyclers that are key players in the Circular Economy. AMCS Platform is designed for global use as it is a SAAS-based solution offering multi-currency and multi-lingual support.

www.amcsgroup.de/amcs-platform/

Photo: Steffen Hoeck / Pixabay

Waiting to Be Recovered:

WIND TURBINE ROTOR BLADES

At a campaign rally in late February 2020 in Colorado Springs, former President Donald Trump declared that “after a period of time, wind turbines get tired, they get old, they get rusty, and a lot of guys say hey, their useful life is gone, let‘s get the hell out of here”. However, the reality is slightly different. Apart from the fact, that wind power plants are not abandoned due to rust, but mainly due to local and state laws or other stipulations: Especially turbine blades are corrosion-resistant, contain valuable raw materials and are waiting to be recovered.

According to WEA, the World Wind Energy Association, in 2017 almost one million wind power units were installed. The worldwide ranking is led by China with 752,000 installed units, followed by USA with 161,000 units and the United Kingdom with nearly 29,000. The rest of the world shows a total of 69,000 units with Germany (17,000), Canada (11,500) and Japan (11,500) at the front. A study on wind turbine blade waste in 2050, conducted at the University of Cambridge Institute for Manufacturing, came to the estimation of 43.4 million tons of resulting blade waste by weight in 2050. For the best case – caused by low manufacturing in-process waste rate, low new installed capacity and long blade lifespan – it could result in 21.4 million tons. In favor of high waste volumes including highest waste rates, high new installed capacity and short lifespan, the waste could reach 69.4 million tons. The research indicated that China will be possessing 40 percent of the waste, Europe 25 percent, the United States 19 percent and the rest of the world 16 percent.

A mix-up of material

The challenge in treating rotor blade waste lies in their material composition. Generally, rotor blades are made of fiber-reinforced polymer composites. The reinforcing fiber consists of glass, carbon, aramide or basalt; hybrids with a combination of glass and carbon fiber exist as well. They are agglutinated with a matrix of polymers, especially thermosetting plastics like epoxide resins, polyester, vinylester, polyurethane or thermoplastics; usually 60 to 70 percent fiber is combined with 30 to 40 percent resin. The sandwich core material is delivered by balsa wood, difficult to raise and consequently often substituted by polyvinylchloride in the form of PVC foam or PET (Polyethylene Terephthalate). The blade is coated by PE (Polyethylene) or PUR (Polyurethane). And finally, the blades contain metallic leads of copper or aluminum wiring as well as steel bolts for lightning conduction. This mix-up of substances complicates further treatment.

Not popular: thermal utilization

In 2011, National Wind Watch, Inc. published an article stating that "because the wind-turbine industry is relatively young, there is only a limited amount of practical experience on the removal". So "the most common route is incineration". But, at that time, even the burning in combined heat and power plants was evaluated critically: The remaining ash – 60 percent after incineration – might have been pollutant and was either landfilled or recycled as a secondary construction material. And it could not be excluded that the emissions contained hazardous flue gasses and the glass fiber spares caused problems at dust filters. According to an article published in 2020 by Danmarks Tekniske Universitet based near Copenhagen, incinerating for energy recovery was called a solution currently used in Denmark. But it has its drawbacks including not combustible glass fiber, disturbance of the gas cleaning system, and large amounts of fly ashes that need to be disposed of or used. However, even now, the thermal utilization of rotor blades is not popular: The material can only be treated in manageable quantities, which may cause problems like blockading of the incineration plants and cannot find sufficient customers. In late December 2019, Remondis' press spokesman Michael Schneider made evident that even special engineering facilities refuse to accept that sort of waste and that in Germany just one single plant treated such material. He declared that "everything, except for rotor blades, is very well recyclable"; in his opinion, "rotor blades of wind energy plants are special refuse".

Photo: VEOLIA Umweltservice West GmbH

900+ blades landfilled

Another method of treating abandoned wind turbines could be dumping or – more sanitary – landfilling. In Europe, this is increasingly difficult thanks to toughening EU waste rules. As rotor blades contain around 30 percent of organic substances like resins and sandwich materials, they must not be landfilled. In June 2005, Germany, for example, introduced a landfill disposal ban on glass fiber reinforced plastics; Austria, Finland and the Netherlands forbid composites from being landfilled. Unlike in Europe, landfilling of turbine blades might become popular in the United States. In September 2019, three windfarms in Wyoming partnered with the Casper Regional Landfill. Their goal was to dispose of more than 900 blades, made from fiberglass and judged un-recyclable. "Casper is the only landfill in the state that has the certification to show that it is environmentally responsible", Casper Solid Waste Manager, Cynthia Langston, gave account. There is not only the ecological aspect that leads the landfill operators to that decision: The profit for them totaled 675,485 US-Dollar, the regional online-magazine Wyoming News Now reported. However, the American Wind Energy Association assesses the landfilling as the safest and cheapest method. Greg Alvarez, the association's spokesman, is sure that "all of the blade waste we may be producing over the next 30 years is equal to .015 percent of all the new municipal waste that goes into landfills in one year". Although the transport of up to 82-meter large units is an enormous cost variable in treating, this model could perhaps be used as an example throughout Northern America. The Electric Power Research Institute shares this belief. In May 2020, EPRI Senior Technical Executive Ken Ladwig assumed: "By 2050, the industry could send approximately four million tons of wind turbine blades to U.S. landfills."

Recycling

If refurbishment, reuse or repurposing of blades are not possible, recycling and recovery appear to be the next op-

tions. According to a new technical report on wind turbine blade recycling, released by the Electric Power Research Institute (EPRI) in April 2020, there are three vital recycling methods: pyrolysis, use in cement kilns and re-grind or re-use respectively. Pyrolysis describes a process used to recover glass or carbon fibers, char, and/or gases for energy. After re-sizing the blades, they are decomposed in conventional heating ovens in an inert atmosphere at 450 - 700°C. The treatment in cement kilns comprises three steps: grinding limestone to get a mixture, the heating of this mixture to up to 1000°C or even more, and finally grinding the resultant clinker material into cement. In Germany, the cement kiln process is already being used commercially for glass fiber wind turbine blade disposal, while in the U.S. no commercial facility yet exists for this purpose. Finally, re-grind and re-use mean mechanical processing of the material to various sizes or different forms like chunks, needles or powder by cutting, shredding, crushing or milling. Following the EPRI paper, the list of recycling and recovery techniques could be completed by chemical solvolysis, vacuum cracking, wet chemical breakdown, fluidized bed pyrolysis (i.e. gasification), electrochemical treatment, high-voltage fragmentation, microwave pyrolysis, and ultra-high temperature gasification.

Companies established

In 2012, a scientific article on the recycling of composite materials balanced: "Various technologies, mostly focusing on reinforcement fibers and yet to be commercialized, have been developed: mechanical recycling, thermal recycling, and chemical recycling. However, lack of adequate markets, high recycling cost, and lower quality of the recyclates are the major commercialization barriers." Meanwhile not only the question of how to slice the rotor blades is off the table: Cutting by waterjet, diamond wire, hydraulic scissors or a demolition claw is well known, and Veolia developed a special rotor blade saw used to cut up the blades into small pieces on-site. But in the last years, several companies have been established in the field too.

In Germany, for example, the so-called composite recycling developed in 2011 offers a 100 percent recycling quota for glass fibers, as it allows the efficient energetic and substantial recovery of the material. Bremen based GreenTec Award excelled neocomp GmbH shredders the blades and separates metal containing parts. Half of the resulting granulate – fibers and resins – is thermally utilized by established processes and delivers electricity for the cement industry. The residual glass ash can be used as a substitute for silicate or raw sand. The German Wind Energy Association (BWE) estimates that in this way, the use of 1,000 tons of fiberglass reinforced plastic can save about 450 tons of coal, 200 tons of chalk and 200 tons of sand. In February

Foto: Hammel Recyclingtechnik GmbH

2016, an online magazine wrote that "Germany maintains the world's only industrial-scale factory for reprocessing wind turbine blades".

R3Fiber and ReFiber

In Spain in 2017, EDP Renewables and Thermal Recycling of Composites joined for a pilot project to develop the R3Fiber technology. The technology allows a thermochemical transformation converting the resins of combustible gases and liquid fuels into reusable glass or carbon fibers. Mass, energy and materials are said to be reused without producing additional waste. The resulting fiberglass or carbon fiber is similar to the composites used to manufacture the original blades.

R3Fiber must not be mixed up with ReFiber, a technique practiced by the Danish Refiber Aps company. The shredded material is fed continuously into an oven with a temperature of 500°C, pyrolyzing plastic into synthetic gas. A second oven cleans the glass fibers, metals and dust are removed, glass fibers and polypropylene fibers are then mixed. Finally, another oven melts the plastic fibers and connects them with the glass fibers to a stable insulation slab.

CHZ Technologies' Thermolyzer technology is a controlled pyrolysis processing, recycles all liquids, tars and oils from composite materials and converts them into clean synthetic gases. The company is establishing several processing facilities in the U.S., intending to treat 100 tons per day of turbine blades combined with other materials like poles or railroad ties. According to EPRI, the procedure converts organic polymer materials into clean fuel gas and recoverable char with reinforced carbon and glass fiber for reuse in another polymer product.

In the discussion

The techniques just mentioned are based more or less on thermolysis or thermal decomposition. However, other methods are subjects to scientific discussions too. Researchers at the Fraunhofer Institute for Wood Research, for instance, developed a technique to extract balsa wood from the rotor blades. This tropical wood is much too valuable to be burned, physicist Peter Meinlschmidt was convinced. A master thesis, submitted to the University of Utah in 2016, investigated whether recycling of wind turbine blade composite material was suitable as an aggregate in concrete. And the Journal of Cleaner Production published a scientific article about the effectiveness of wind turbine blades waste combined with sewage sludge. The result: Co-pyrolysis can enhance the sewage sludge sequestrated carbon quantity through the introduction of other carbon-containing precursors.

Re-grinding with potential

Global Fiberglass Solutions delivered a different approach. It was said to be the first U.S.-based company to commercially recycle wind turbine blades into viable products. GFS used a mechanical breakdown process to reduce the size of the blades by grinding the material, removing metal bolts and fasteners, separating the shredded pieces by gravity and receiving particles between fibrous and powder consistency. GFS' Chief Executive Officer Karl Englund anticipated the utilization of 99.9 percent of every blade and the handling of an amount of about 6,000 to 7,000 blades per year. In January 2019, the company began the commercial production of its recycled EcoPoly brand pellets, made out of thermoplastic fiberglass and suitable for injection molding and extrusion manufacturing processes. The pressed pellets and fiberboards were expected to get a new task in flooring, the building of walls or other outdoor applications. In an interview, GFS's chief technology officer Karl Englund estimated that the method could cost the wind farm owner less than solid waste disposal. But in February 2020, Ken Becker, executive director of an economic development agency, acknowledged that the company was "struggling financially". It seems that replenishment was lacking. Meanwhile, the GFS homepage presents only its recycling services for thermoset composite fiberglass materials; the subpages for wind turbine blade recycling are inactivated.

Various technologies, mostly focusing on reinforcement fibers and yet to be commercialized, have been developed: mechanical recycling, thermal recycling, and chemical recycling.

Techno-economic differences

In its comprehensive report on wind turbine blade recycling, the Electric Power Research Institute provided a "techno-economic" ranking of the three most applied recycling methods. The comparison shows that mechanical processing faces "steep challenges", lacks attractive end products and misses economic rewards. Cement kilns are seen as more sustainable but seem twice as expensive as solid waste disposal. Pyrolysis for the recovery of carbon fiber turns out to be more attractive than the recycling of glass fiber. But it is valid for all options that economic profit can only be seen if the sales of recycled materials plus the value of energy recovery are higher than the sum of amortized capital costs and operating costs. If the result is negative and a manageable loss, the wind farm owner has to pay for his end-of-live material. If the loss is expensive, he will (and currently does) choose to dispose of his material as solid waste.

Grinding and co-processing staying behind

In their study on "Accelerating Wind Turbine Blade Circularity", released in May 2020, WindEurope, Cefic (European Chemical Industry Council) and EUCIA (Association of the European Composites Industry) started another calculation comparing six different composite recycling technologies:

1. Gasification in a fluidized bed for the recovery of fibers and fillers as well as energy in the form of heat and gas
2. Solvolysis to extract mineral compound and fibers
3. High voltage pulse fragmentation for matrix pieces and fibers
4. Pyrolysis to recover fibers, fillers and char as well as hydrocarbon products
5. Mechanical grinding of fiber-reinforced plastic resulting in a matrix and fiber-rich powder and waste material
6. Co-processing in cement kiln reactors for the production of heat and clinker cement.

In the technologies number one to four, the potential material value of carbon fiber surpasses the processing costs. The highest earnings, but also the highest expenses, were calculated for the solvolysis. The relative highest profit

turned out to be delivered by pyrolysis, especially as this treatment draws profit from the potential material value of glass fiber. Mechanical grinding and co-processing stay far behind since the value of glass fiber material exceeds the process costs. However, the margins only reach a quarter of the profits of gasification and pulse fragmentation, a fifth of pyrolysis and a sixth of solvolysis.

Waste-neutral blades coming up?

According to the WindEurope, Cefic and EUCIA study, the main technology for recycling composite waste today is through cement co-processing. Various technologies already exist or are developed, and an increasing number of companies offer composite recycling services; these solutions are not yet widely available and cost-competitive. Regarding the output, composite recycling at the moment is a cross-sector challenge and a challenge for the wind industry competing against sectors like building and construction, electrical and electronics, transportation, marine, production waste, aeronautics, consumer and tanks and pipes. That is why the paper warns: "Actually, the (low) volumes of composite wind blade waste make it challenging to build a recycling business based mainly on this waste stream. All the composite-using sectors must work together to find cost-effective solutions and value chains for the combined volume of composite waste." So, the designing of fully recyclable or reusable wind turbines is desirable, but literally still "in the air".

But there is hope. In January 2020, Vestas Wind Systems, – in its own words – Denmark-based "world's largest supplier of wind energy" by turnover, announced to produce zero-waste wind turbines by 2040. They are already focusing on improving the recyclability of all wind turbine blades since "incremental targets will be introduced to increase the recyclability rate of blades from 44 percent today to 50 percent by 2025, and 55 percent by 2030".

CARBON-NEUTRAL RECYCLED PET

Austria-based ALPLA Group, is offering "the world's first carbon-neutral recycled PET".

The firm switched its PET Recycling Team plants in Wöllersdorf (Austria) and Radomsko (Poland) to a mix of electricity from renewable sources to produce climate-friendly rPET (= recycled polyethylene terephthalate). "This step has already had a big impact on the carbon footprint of our food-grade regranulate – according to the calculations, emissions are cut by up to 90 percent compared with virgin material," Georg Lässer, Head of Recycling at ALPLA, is quoted. "The feedback from the market regarding this further development has been very good."

Now, the recycling company and global manufacturer of plastic packaging across 46 countries is offering its customers carbon-neutral rPET based on the purchase of certificates. The remaining, unavoidable emissions relating, for example, to delivery of the input material to the plants are then offset with carbon certificates.

ALPLA operates its recycling plants for PET and HDPE in Austria, Poland, Spain and in joint ventures in Mexico and Germany. By signing the New Plastics Economy's Global Commitment in October 2018, the company pledged to achieve certain goals by 2025: All packaging solutions are to be fully recyclable and the volume of recycled materials is to increase to 25 percent of the total materials used. A sum of 50 million Euro has been earmarked for ALPLA's expansion of its recycling activities.

Photo: ALPLA

Projects with a social background

The multinational company has also selected specific projects in cooperation with the climate neutrality alliance "Klimaneutralitätsbündnis 2025" and the NGO Helioz. A reforestation project in Nicaragua is being supported. In China, traditional coal-fired stoves are being replaced with ovens run on biomass. "These not only vastly reduce emissions but also prevent the health implications caused by harmful exhaust air," the firm underlined. In Ethiopia, 5,000 household packages (modern stoves, vegetable seeds, seedlings, training) are being financed. In regions in Asia and Africa, ALPLA is supporting the organization Helioz, which provides solar devices that monitor water disinfection using PET bottles.

www.alpla.com/en

CUSTOMIZED RECYCLED PET THROUGH BBE-TECHNOLOGY

The BB Engineering VacuFil process enables the re-utilization of PET – or polyester*) – waste into high-end textile filament and fiber products in defined qualities.

Sustainable handling of natural resources is a global task, the Germany-based company BB Engineering (BBE) underlines. This would relate in particular to the further development of the circular economy for post-consumer or post-production waste. For this reason, the recyclability of PET (polyethylene terephthalate) products made by the industry is attributed special significance. Modern resource-friendly packaging would not be conceivable without PET and commodities generally made from chemicals. As a raw material that is – along with polyolefins and polyamide – such a dominant raw material, that polyester must be also recycled.

The recycling of polyester materials and the possibilities for converting the waste into new high-end products within the polyester filaments, fibers and nonwovens market are state-of-the-art. Across the globe, consumers in the markets are demanding sustainable products and the careful utilization of resources – increasingly in the textile sector as well. Leading fashion companies, sports apparel and furniture manufacturers and the automobile industry are focusing on sustainable products and products made from recycled materials to a greater extent. Today, they are already telling suppliers of filaments, fibers and nonwovens that they soon will be switching from exclusively virgin polyester to recycled polyester – in some cases up to 100 percent – for the manufacture of their textile products. Consumers' social awareness has been the trigger for this development.

The original idea – namely to manufacture sub-premium goods using recycled polyester raw material, for example

Visco+ filter components – the heart of the BB Engineering's VacuFil recycling system

for use in insulating materials – is short-sighted from today's perspective. Recycled polyester has long been prevalent within the high-end textile segment. Viewing polyester as a valuable resource rather than as waste is an important and proper development.

VacuFil recycling process: reproducible quality

Fibers and filaments made from recycled bottle flake material require corresponding single-variety collection or pre-sorting of the bottle material being recycled and comprehensive cleaning before they are shredded into polyester flakes. It is then possible to spin these flakes directly into POY (Partially Oriented Yarn) filaments (DTY [Drawn Textured Yarn] in the downstream process), staple fibers, nonwovens and BCF (Bulked Continuous Filament) endless filaments. Today, the technology is so refined that the products achieve a quality standard that corresponds to virgin material in many applications.

However, there are also many cases in which the material quality and/or property achieved does not comply with the market requirements. For numerous textile applications, parameters such as viscosity and homogeneity are crucial and must be subject to virtually no fluctuations. In other words, to enable recycled polyester to be used here in the first place necessitates its pre-treatment. And this is carried out by the VacuFil recycling process, a BB Engineering GmbH development. The VacuFil technique enables the manufacture of extremely homogeneous, viscosity-stable rPET melt and hence a precisely definable and reproducible raw material for downstream processes (for example a spinning plant). As a manufacturer of components and systems for producing manmade fibers, BB Engineering (BBE) is familiar with the dire impact that even the smallest viscosity deviation has on the spinning plant process. With the VacuFil process, the company has succeeded, depending on the intended end application, in aligning the melt with the process in a targeted manner. Macro- and microscopic melt homogeneity is achieved through homogenization drying, controlled plasticizing, gentle filtration and controlled vacuum degassing.

Matthias Schmitz, VacuFil Product Manager, and Dr. Klaus Schäfer, Managing Director

BBE – a joint venture between Brückner Group GmbH (a world market leader for machines for the polyester foil industry) and Oerlikon Textile GmbH & Co. KG (a world market leader for systems for the manmade fiber industry) – is a pioneer in the development of processes for using recycled materials. This applies particularly to polyester flakes, which are converted into contemporary, market-appropriate products for filaments, fibers and nonwovens for manmade fiber industry consumers.

"Our decades of competence kicked in while we were developing the VacuFil. What Oerlikon Barmag brings to the table as a technological leader in the field of filament yarn spinning systems, BBE complements with considerable know-how in the area of extrusion and filtration and systems construction and engineering", Dr. Klaus Schäfer, CEO of BBE, was quoted. As a result of its association with the Brückner and Oerlikon Textile groups, BBE was aware of the requirements of the further-processing industry in terms of granulate and melt made from recycled polyester.

When it comes to the downstream processes with the VarioFil spinning system – the basis for spinning high-end manmade POY and FDY fiber filaments for textile and industrial applications that have been tried-and-tested for decades now – BBE is already an established manufacturer of compact and flexible systems for the manmade fiber industry. VarioFil R spinning systems have been used for converting PET re-granulates and – directly – PET flakes into POY/DTY for both textile and carpet applications. And spin-dyed products made from PET recycled granulates are also being produced using VarioFil systems.

Photos: BBE

In the downstream processes, the melt can either be first granulated or fed directly into the end product's manufacturing process. Recycled polyester, produced using the BBE VacuFil technique, can even be used for more challenging downstream processes, including the manufacture of FDY (Fully Drawn Yarn) filaments, for example. Here the material is subjected to extreme loads throughout the entire manufacturing process. In the FDY single-stage process, the filaments are drawn and taken up at speeds of up to 4,500 meters per minute.

Tests for global customers

VacuFil premiered at the ITMA 2019 in Barcelona. Since then, numerous tests have been conducted on the pilot system at the Remscheid site using authentic waste material supplied by various customers. Various target viscosities and starting materials are not a problem for the VacuFil thanks to the innovative key component, the Visco+ vacuum filter. A reactor is not required. The VacuFil unites gentle large-scale filtration and swift intrinsic viscosity build-up for consistently outstanding melt quality. The attached vacuum unit is automatically regulated and "removes volatile contamination, ensures a controlled IV increase and additionally achieves an ideal melt homogeneity, which is vital for the downstream spinning performance," the company assures. Comprising an inline viscosity measuring unit connected to the vacuum system, the IV can be continuously and reliably adjusted. Hence, producers can generate the specific kind of recycled polyester they require for their application. "The excellent degasification performance additionally relieves energy-intensive pre-drying." With their modular structure and a performance spectrum of between 300 and 3,000 kilograms/hour, "VacuFil systems open up various possibilities for processing polyester waste". The entire recycling process is controlled and monitored by Oerlikon Barmag's GUIDE system, guaranteeing the accustomed reliability. "With an optional 3DD mixer, the market-proven mixing technology manufactured by BBE, producers can not only add additives to the melt, but they can also easily change rPET ratios in the main melt from between five and 50 percent stream in order to comply with legal standards."

Customer requirements can be optimally catered for with various system configurations. "The close collaboration between the future operators of the system and our experts ensures that projects are successful," Matthias Schmitz, VacuFil Product Manager, is cited. With BBE's process visualization system, customers always would have a close eye on the broad operating window and the optimum operating point. The company's customer-centric approach is also available throughout the coronavirus pandemic. BBE offers digital video conferencing to continue providing access to their technology for their global customers.

www.bbeng.de/recycling-technology.html

*) Editor's note: Polyethylene terephthalate (PET) is actually polyester. When this type of plastic is used for bottles, containers and other applications, it is called PET. In the context of textile applications, PET is referred to by its common name, polyester.

Ukraine:

RECYCLING OF PESTICIDE PACKAGING WASTE

The Ukrainian European Business Association (EBA) announced the launch of a project on the recycling of used packaging.

In Ukraine, the packaging waste of plant protection products is mostly discarded or reused for counterfeiting, the association described the current situation. "These factors significantly increase the risk of environmental pollution and adversely affect human health. In all civilized European countries, this kind of packaging waste is subject to disposal." To solve this issue, the EBA intends to implement the project "Responsible management of pesticide packaging waste".

According to the information, it will unite world producers to introduce a European recycling mechanism in Ukraine. Its implementation would increase the volume of collection and recycling of PPPs' packaging, analyze logistics routes to optimize the collection process, establish communication between all entities, and increase the efficiency of such packaging waste management.

Moreover, it is planned to launch an online platform that will establish and optimize communication processes between market participants and monitor the "life cycle" of containers from the time of use of the pesticide, then when containers are categorized as waste, and until their recycling or disposal.

www.eba.com.ua

Panizzolo Recycling Systems Software:

CONTRIBUTING TO PROFITABILITY IN SCRAP TREATMENT

Panizzolo Recycling Systems integrates the internal development of a software system for the control and management of its recycling solutions. What were the reasons to add a software system to the company's portfolio? On the occasion of the recent launch of the Compact Refining Plant, Panizzolo Recycling Systems discusses this question, among others, with Andrea Simoni who, alongside the manager Denis Zanin, has programmed the operator interface of the recycling plant.

What is the Panizzolo software and why is it developed internally?

The software development was based on our direct experience in the treatment of metal scrap. The operator interface takes place via touchscreen and therefore we have designed simple screens of the entire treatment cycle, with an immediate understanding of monitoring and adjustments also in real-time. Owning the software and, in parallel, also the wiring diagram is essential for us. Technology is always constantly updated, and external consultants could have slowed down the company's research and development. Otherwise, we can quickly install upgrades and latest-generation technologies for the benefit of productivity, security and logical management. We also pay attention to the translation of the entire operator interface, a necessary element to further simplify its use.

How is the software structured?

The software has a logic common to all Panizzolo recycling machines while, for more complex waste treatment plants, it includes more specific additional sections. Going into detail we find two levels of parameters. On the one hand, we have the settings for essential operating safety and logic. This includes, for example, the start-up and shutdown phases. There, especially in the refining plant, the electricity must be optimized and the flow of material must always be constant.

Photos: Panizzolo Recycling Systems

Unlike the second level, the parameters can be freely set, both during the testing phase and at a later time by the customer. Specific sensors record the trend in real-time, allowing the software to understand if the mill works correctly or if it must intervene to restore production balance. The parameters are always editable, even in real-time, and are located in a special section called “Recipes“.

How would you describe the operating logic of the “Recipe“ section?

In our experience, we know that scrap, in addition to diversifying into categories, is never homogeneous in composition. A concept that is as simple as it is fundamental. For this reason, we have developed the “Recipes“ section. The customer clearly and intuitively displays the fundamental parameters, personalizes the types of treatment, and can also make changes during processing.

It happens that you need to work or test other types of material. Instead of changing the parameters used for daily processing, it is possible to select a new recipe and set completely new data. Once confirmed, these parameters can be unique with personalized names. With our software, we don‘t just want to avoid overloading the machinery but we want to allow continuous and balanced processing, which can bring benefit to final quality, hourly productivity and component integrity.

Does training, therefore, play a fundamental role?

Absolutely, during the testing phase, we optimize the first recipe together with the customer and his operators. We are already able to load our predefined treatment parameters; however, once in the field and with the actual scrap, we proceed to confirm these calibrations. We follow a precise procedure, bringing the production to a steady-state and explaining every single step to the operators: what parameters to touch and how they influence, what we recommend keeping an eye on, how to intervene according to the situations and much more. Our goal is to provide a solid starting point and allow customers to make their own experiences. With the testing of the Compact Refine Plant, we pay more attention to these phases, as each component is designed to bring a certain production benefit.

In addition to your experience, how does the software help you in training?

The monitoring graphs allow you to better clarify the grinding of the hammer mill. If the treatment cycle is a continuous start and stop, at the end of the day or the end of the month, the software will highlight the accumulation of work vacuums, confirming the gap between working hours and actual production. The graphs allow you to maximize productivity and at the same time avoid overloading or blocking the mill. With the training, we try to pass as much information as possible to the operators. However, if the customer has specific needs, we are always present with advice and assistance in post-sales.

What are the benefits of Panizzolo software for maintenance?

In case of malfunctions, the software indicates the area to be checked, attaching an explanation of the problem and avoiding the operator wasting time with generic alarms. Specific warnings appear periodically for routine maintenance, the execution of which must be confirmed manually, and then remain stored in the internal memory. Being owners of both the software and the wiring diagram, we are doubly efficient on the assistance side. We have full competence of all the electronics installed, even if only trivially for a matter of spare parts, while the control panel is supplied already prepared for internet connection for remote assistance.

www.panizzolo.it

MELDGAARD RECYCLING PROCESSED IBA IN PORTUGAL

Meldgaard Recycling has sent a mobile plant to Portugal to process 30,000 tons of incinerator bottom ash (IBA). The processed material is then used in the Portuguese building industry.

In December and January, the mobile plant was separating ferrous and non-ferrous metals from the bottom ash received from Waste-to-Energy plants. The produced ash aggregate is then to be used in the building industry and eliminates the need for bottom ash disposal. That means that all incinerated waste is 100 percent recycled, the Denmark-based company emphasized. The ferrous and non-ferrous metals were sent directly to smelters, where they are recycled. Meldgaard Recycling has about ten mobile plants operating in Europe and the USA and processes more than one million tons of bottom ash per year.

www.meldgaard.com

A NEW LEASE OF LIFE FOR BOBBY CARS

Children love them, mostly the boys from the age of around two: What is meant are toy cars, called Bobby Cars. With UNTHA shredding technology, Metran gets the best out of rigid plastics compounds.

The good news: Just because a Bobby Car is broken does not mean that it has reached the end of its life. In fact, it will be used to manufacture a new toy car or plastics parts, thanks to the optimized breakdown of the composite materials for further sorting. Among other things, Metran Aufbereitungsges.m.b.H. in Kematen an der Ybbs (Lower Austria) specializes in the processing of rigid plastics, a fairly new waste collection category. In the XR3000C shredder by UNTHA, the company has found the perfect solution for single-phase shredding.

The company focuses on the material recycling of industrial metals such as aluminium, zinc, copper and stainless steel as well as high-grade plastics, all from waste materials. The family business has been operating from the Kematen site since 1984 and employs a staff of 45. It is part of the Müller-Guttenbrunn Group, which has 600 employees worldwide.

Metran has been studying material compounds and how to break them down in order to recover precious raw materials for quite some time. The shredding of plastic parts was a particular challenge, which the recycling specialist sought to solve by utilizing the most innovative and efficient solutions on the market. “During our research, we came across UNTHA and were able to test the XR directly on our premises with the materials we are looking to process – rigid plastic parts that are collected by the municipality. We realized that the unit is exactly what we had been looking for and that it delivers the cut we require to obtain a two-dimensional output sized five cm or smaller for further processing”, explains Gunther Panowitz, Managing Director at Metran. A stationary version of the new XR3000C has been in operation in Kematen since July 2020. Experience has shown that the UNTHA shredder is also ideal for other material flows, for instance for breaking down more complex copper compounds.

Rigid plastics – a challenge

The particular challenge that Metran had to face was the single-phase shredding of rigid plastics that are bonded with iron and metals. With its iron handlebar and axle, the Bobby Car is the perfect example for such a structure and has become something of a mascot for Metran. Ski boots, children’s car seats and garden furniture are other classic items in the collection of rigid plastics. Metran receives these items from the municipal waste collection, shreds them in a single step and separates iron and metal using magnets and separators for non-ferrous metals. The cut plastics are placed on downstream separators and sorted by the plastics arm of the company, MGG Polymers, into groups of identical materials such as PP, PE, PES, ABS and even PC or PC ABS, using extrusions systems. These fulfil the same criteria as new plastics and may be recycled indefinitely. With the XR3000C and its competence when it comes to single-phase shredding, Metran has found the right shredder for precisely this sort of application. The company is particularly impressed with the compatibility of the blade blocks, the rotor and the stator with the iron and metal parts that are attached to the plastic components, and with the geometry of the shredded parts.

Other benefits for Metran are the low electricity consumption, straightforward maintenance and high throughputs of up to 10 tons per hour. The operator describes the characteristics of the XR3000C as robust, reliable and durable. Thanks to the drive system, high throughputs are possible while using less electricity at the same time. “The XR shredder by UNTHA constitutes the perfect solution for shredding rigid plastics such as Bobby Cars. We are able to break down the material compound, separate iron and metal from plastics and prepare them for further sorting. We also tested the unit for other materials, such as complex copper compounds and cables, and are impressed with its flexibility and robustness. The machine is expensive, but it absolutely does what it says on the tin”, is how Managing Director Gunther Panowitz sums up the experience made at Metran.

Photo: UNTHA

www.untha.com
www.mgg-recycling.com

LET YOUR BALER COMMUNICATE

Orwak, a Swedish provider of solutions for sorting and recycling waste materials, suggests that balers should be able to communicate. That would simplify the collection of bales at customer sites in the recycling business.

According to the company, which belongs to the Sulo group since January 2020, machine-to-machine (M2M) communication is part of everyday life. "We expect most advanced tools we use to be connected, enabling us to monitor and control it from a distance. It is reasonable to assume that this also applies to professional equipment such as balers, which compact and bale cardboard boxes and plastic foil." Therefore, Orwak provides this option also for its vertical balers. As underlined, "Connect 2.0" is a modem-based M2M communication service empowering the baler to send notifications such as "full bale" and "maintenance required" as push notices. "Vital information is also transferred to the web portal, where the Connect user can log in and easily monitor the fleet of balers and gather interesting baling statistics," the manufacturer of compaction equipment assures. "It provides unique supervising opportunities, and a premium option is the built-in scale for measuring the bale weight and giving full control over the bales produced." By this means, recycling companies could

Photo: Orwak

- keep track of the bale production;
- optimize logistics and plan the bale collection route;
- use a cost-saving administrative tool by monitoring the status of the baler and detect error codes.

Orwak Connect is available for the balers types Compact, Multi 9020S, Power and Tom.

www.orwak.com

FORREC AND THE TREATMENT OF END-OF-LIFE TIRES

Forrec produces single machines and complete plants for the treatment of any type of municipal and industrial solid waste, and for almost 15 years has been present on the market with reliable and effective solutions.

Forrec's complete system allows obtaining a rubber granule with a size between 0.8 and 4 mm. With this recycled rubber from ELTs (end-of-life tires), innovative eco-sustainable products are made, which find application in very different sectors.

From products for the building industry, such as acoustic vibration insulation, playgrounds, soccer pitches, multi-purpose sports flooring and products for animal welfare. There is also the sector of roads and infrastructures, where, alongside „modified" silent and durable asphalt, we find cycle paths, street furniture and elements for road safety. The panorama is completed by design products, objects and new compounds made by combining recycled rubber and thermoplastic materials.

Various treatment lines of this type have been installed by Forrec in different areas of the world and are currently operational. Over time, however, it has been noticed that the supply of granules of this size is much higher than the demand and sometimes the market value does not justify the investment. For this reason, especially in some specific geographical areas, projects aimed at using a shredded rubber granule reduced to a size that can be used by cement plants as a high-yield fuel (given the high calorific value of rubber) are underway. The energy recovery of ELTs represents a fundamental component to ensure 100 % of the virtuous cycle of ELT recovery.

The term TDF (tire-derived fuel) is used to indicate tire fuel. Energy recovery from ELT-derived materials is mainly carried out in cement factories, whose high operating temperatures ensure compliance with emission limits and allow to make the most of the high calorific value of rubber, which is comparable to that of pet-coke.

Moreover, the use of this process allows recovering combustion residues, ashes and steel, as materials, which are incorporated into the finished product, thus avoiding the use of further virgin raw materials, with environmental and economic benefits for companies and the community.

Speaking of WTE, the most delicate phase is that of primary shredding for the production of TDF (tire-derived fuel). This treatment requires that the output product be of well-defined dimensions and with the characteristic of a clean-cut and not frayed. Considering the importance of this waste, Forrec has developed the TX1600 shredder to meet the specific requirements of this market segment, without neglecting productivity and keeping an eye on the relationship with production costs.

www.forrec.eu

Photos: Forrec srl Recycling Systems

NEW SORTING PLANT IN MEXICO

Operadora de Ferrocarril y Manejo de Rellenos (OFMRS) has joined forces with German manufacturer Stadler Anlagenbau to develop a plant in the city of Cuautla (Morelos, Mexico) capable of managing comprehensive waste treatment for 16 municipalities in Morelos and a small part of Mexico City.

Mexico is one of the world's ten largest producers of Municipal Solid Waste (MSW) on account of its vast size and large population. The country generates around 120,000 tons of waste a day, which adds up to 44 million tons a year. This situation has been further aggravated by an increase in waste – estimated at between 3.3 and 16.5 percent according to a study (🌐 www.gob.mx/cms/uploads/attachment/file/569684/Residuos_COVID.pdf) conducted by the Instituto Nacional de Ecología y Cambio Climático de México – due to the country's lockdown period, which has affected patterns in consumption and medical treatment. In this situation, the new sorting plants based on the automation of waste management take on even greater importance for their potential to improve the environmental situation in Mexico and boost the circular economy, the German plant constructor stated.

The new sorting plant inaugurated by OFMRS was a testament to this trend towards automation. According to Natalya Duarte, Sales Manager for Mexico at Stadler, this project was born of the vision shared by OFMRS and the manufacturer on waste management. "The aim was to recover different types of recyclable packaging and materials and re-distribute them back into various production chains, as many times as possible. This innovative business and management model makes such projects feasible, as well as making them more profitable due to the highly-efficient sorting process and high purity levels of the materials." As reported, the plant can sort by type of polymer and color.

With facilities spanning 3,800 square meters and a maximum output of 640-700 tons/day, OFMRS sorts, classifies, compacts and commercializes municipal solid waste, recovering materials including cardboard, paper, carton packaging, plastic, glass, and ferrous and non-ferrous materials. Biogas is also recovered from organic waste and fed to two Guascorde power generators; the energy generated is supplied to two companies in the state of Mexico through the power supply network owned by state-owned power utility CFE.

Closed-loop system

The plant's automated closed-loop system comprises ten cutting-edge machines and thirty-five recirculating conveyor belts, Stadler informed. The process starts with the reception of the MSW, which undergoes several processing stages, including the removal of 'non-recoverable' waste. Then it is sorted into three groups: firstly, fine, metal and organic waste, which is sent to a reject container; secondly, flat or 2D waste (cardboard, paper, plastic wrap and carton packaging); and finally, bottled or 3D waste (PET, HDPE, PP, carton packaging and aluminum). The last two types of waste are forwarded to a manual sorting area. Finally, the conveyor belt feeds the materials into the compactor, and the final product is ready: recoverable waste bundles of cardboard, paper, plastic wrap, carton packaging, PET, HDPE, PP and aluminum.

Photo: Stadler

To improve work practices, productivity, Occupational Health and Safety (OHS) and environmental protection, OFMRS has been operating to international ISO 9001 quality, ISO 45001 OHS and ISO 1400 environmental standards since mid-2020. According to Natalya Duarte, this is the "first project in Mexico that involves different parties in the recycling chain to protect the environment. It is also the first national project that sets out to industrialize and professionalize the process, seeking the highest efficiency and purity levels and adhering to the strictest quality standards, including ISO." Stadler works closely with clients to optimize its integrated projects, the plant provider underlined. The company supplies clients with advice and support throughout the whole project and during the business model proposal. The after-sales service includes maintenance plans and spare parts stocking in greater volumes and for longer periods.

www.w-stadler.de

HaloSep:
DEMONSTRATION PLANT FOR FLY ASH RECYCLING

In November last year, the HaloSep facility at Danish waste management company Vestforbrænding was inaugurated in a digital event, which represented the start of the operational test period.

The facility, a joint project of Stena Metall and Vestforbrænding, is "the world's first full-scale HaloSep plant", the information said. It would convert fly ash from incineration processes into useful resources such as metals and salt, as well as purified fly ash. The project was part-financed by EU-LIFE, the European Commission's financial instrument supporting environmental, nature conservation and climate action projects.

In the process, flue gas ash and acidic scrubber liquid are neutralized

The problem with fly ash
In many countries around the world, incineration plants create electricity and district heating from waste. However, this processing method generates flue gas waste – fly ash – which contains chlorides and heavy metals and is classified as hazardous waste. Therefore, this problematic by-product must be disposed of in special landfills, causing carbon dioxide emissions due to transportation and costs for landfill fees.

According to the information, HaloSep offers a new, sustainable solution for recycling and cleaning fly ash. The process recovers valuable metals from the ash that, instead of being lost, can be used again, Stena Metal described the advantages. The plant would also extract salt, which could be used on roads or in industrial applications. "What remains is a purified form of ash that is not classified as environmentally hazardous and can, therefore, be deposited locally at regular landfill sites." This process would reduce the overall volume of fly ash produced by about 40 percent due to the recycled material being separated. "The ultimate goal is for the remaining ash to be used in the production of construction materials."

As reported, HaloSep has already generated interest in several parts of the world, and it is not expected to decrease as the demonstration plant starts to deliver results.

www.lifehalosep.eu

Photo: Stena Metal

INDEX

DIGITAL AND EVEN MORE DIVERSITY: WASTE-TO-RESOURCES 2021

May, 18 – 20, 2021, online

Waste-to-Resources 2021, the 9th International Conference and Exhibition on Circular Economy, MBT, MRF and Recycling is not only completely digital this year, it has also significantly expanded its focus. Starting with optimized collection, more than 70 presentations from 25 countries map the latest developments in the circular economy.

Supported by the International Solid Waste Association ISWA, the following blocks of topics await you from May 18-20:

- Waste management and zero-waste strategies
- Circular economy during the Corona crisis
- Treatment and recovery technologies
- Fire protection in waste treatment and recycling plants
- Practical experience and new plant concepts
- Processing and recovery of organic waste fractions
- Recovery of metals and precious metals
- Mineral and construction waste
- Plastic waste
- Liquefaction and chemical recycling
- Hydrogen economy
- Waste management and recovery for selected waste types
- Separation and processing of waste fractions
- Wet and steam-based separation and treatment processes
- Pyrolysis, plasma, gasification
- Slag utilization
- Geomechanical properties of MBT output
- Waste management in Asia
- Waste management in emerging and developing countries

As always, day passes are also available.

www.waste-to-resources.eu

COLOMBIAPLAST 2021

June, 22 – 25, 2021, Bogota (Colombia)

According to the organizers, Colombiaplast is the most important international trade show and networking event for the plastics, rubber, petrochemical and packaging industry of the Andean, Central America and the Caribbean Region. It is organized by ACOPLÁSTICOS (Asociación Colombiana de Industrias Plásticas) and Messe Düsseldorf (the organizer of K, the world's no.1 trade fair for plastics and rubber, held every three years in Düsseldorf, Germany). The latter acquired an equal share in Colombiaplast and is involved in organizing the event.

The exhibition will focus on the essential solutions for a sustainable industry, showing the exhibitors and visitors the latest developments in technology, raw material, production and process control, the organizers proclaimed. It would be the center of business and industry contacts.

www.eng.colombiaplast.org

INTERNATIONAL CONFERENCE ON TECHNOLOGY AND ENTREPRENEURSHIP

August, 24 – 27, 2021, Kaunas (Lithuania)

According to the organizers, IEEE TEMS International Conference on Technology and Entrepreneurship (ICTE) 2021 aims to bring together researchers and practitioners worldwide to share their knowledge and experience on leading digital transformation in business and society. "The interactive and collaborative atmosphere during the Conference as well as synergetic effect of interactions between academia and business will give significant input to the advancement of your research, international networks and business practice," one can read on the homepage.

The conference organized by Kaunas University of Technology (KTU), Lithuania, will host an Industry Forum inviting speakers from industry leaders worldwide. Additionally, visits to key labs and research institutes that advance digitalization through research

will be organized, and opportunities to visit companies leading in innovations and digital transformations will be provided (depending on the situation of COVID-2019). Interested persons can attend physically or virtually.

Major topic areas include:

- Digital transformation empowered business model innovations
- Sustainable innovation in rapidly changing markets, e.g. healthcare, food, transportation, etc.
- Entrepreneurial leading and managing of innovation
- Sustainable consumption in a digital society, e.g. healthcare, food, tourism, etc.
- Circular economy through digitalization
- Role of entrepreneur in digital transformation across different business markets and ecosystems
- Effect of digital technologies on sustainable business growth
- Collaborative behavior and collaborative value creation in digital entrepreneurship
- Leveraging digital transformation for societal change
- Sustainability in digital entrepreneurship
- Digital transformation in finance

https://2021-icte.ieee-tems.org/

Photo: Gerd Altmann / pixabay.com

GLOBAL RECYCLING – The Magazine for Business Opportunities & International Markets

7. Volume 2021
ISSN-Print 2365-7928, ISSN-Internet 2365-7936

Publisher:
MSV Mediaservice & Verlag GmbH
Münchner Str. 48, D-82239 Alling GT Biburg, GERMANY
Tel.: +49 (0) 81 41 / 53 00 20, Fax: +49 (0) 81 41 / 53 00 21
E-Mail: msvgmbh@t-online.de
Responsible for the Content: Oliver Kürth

Editors:
Brigitte Weber (Editor-in-Chief)
Tel.: +49 (0) 26 43 / 68 39, E-Mail: weber@msvgmbh.eu
Dr. Jürgen Kroll, E-Mail: kroll@msvgmbh.eu

Advertising Sales:
Diana Betz, Tel.: +49 (0) 81 41 / 53 00 19, E-Mail: betz@msvgmbh.eu
Julia Huß, Tel.: +49 (0) 81 41 / 22 44 13, E-Mail: j.huss@msvgmbh.eu

Advertisement Price List No. 37 currently valid.

Media Planner 2021: global-recycling.info/media-kit

Publication Frequency:
The magazine appears three times a year. If the magazine cannot appear due to force majeure, such as a strike, this shall not give rise to any claims against the publishing house. Attributed contributions do not necessarily represent the opinion of the editors. For unsolicited sent-in manuscripts and photo material the publishing house does not assume any liability. No part of this publication may be reproduced, included in online services and the Internet or transmitted by any means without written permission of the MSV GmbH. All information have been compiled with the greatest care, however, no responsibility is taken for the correctness.

Printers:
StieberDruck GmbH, 97922 Lauda-Königshofen

Closing for the Next Issues:
2/2021 – 11.06.2021 (Release Date: 08.07.2021)
3/2021 – 13.09.2021 (Release Date: 08.10.2021)

facebook.com/eurecycling
twitter.com/recyclingportal
instagram.com/msvgmbh/
de.linkedin.com/company/msv-gmbh
global-recycling.info • eu-recycling.com • recyclingportal.eu

eREC

Digital Recycling Expo and Conference for Circular Economy and Waste Management
3.–8. May 2021 and 4.–9. October 2021

The Recycling Expo and Conference "eREC" is a virtual platform for the recycling industry that facilitates the national and international exchange between companies and customers. Companies can use this platform to present themselves, their newest products, and innovations and enjoy the advantages of online networking. Accordingly, the digital recycling expo and conference is the best opportunity to present oneself to customers without any travel costs involved.

Furthermore, every exhibitor can create his virtual stand and upload brochures, videos, or information material accessible to all visitors. Moreover, visitors can visit all booths, see new products, and get in touch with the exhibitors via live chat option. Apart from presenting the newest products and ideas, every exhibitor has the chance to take part in the extensive framework program – either as a passive participant or as an active speaker. All visitors can access the framework program and take part in webinars or live contributions, which focus on different topics of the recycling industry.

Just a few clicks and all visitors, exhibitors, and speakers can easily access the virtual world of the new "Digital Recycling Expo and Conference for Circular Economy and Waste Management".

Join us – it is time to go online.

www.erec.info

Become a partner or an exhibitor! Phone: +49 (0) 81 41 / 22 44 13, E-Mail: mail@erec.info

VacuFil

PET Recycling Line

NEW

April '21:
Visit VacuFil live!

Book your digital appointment with our Sales team now:

High-quality rPET for high-quality products

VacuFil is an innovative PET recycling line with direct feed to your pelletizer, spinning line or other downstream application. The Visco+ unit takes care of the requested IV-boost with simultaneous homogenization. Hence, VacuFil ensures the exact melt quality you need – reliable and reproducible!

- ✓ IV-increase up to 30%
- ✓ IV-homogeneity
- ✓ Compact size
- ✓ Spinnability POY, DTY, FDY, BCF
- ✓ Patent pending

www.bbeng.de · sales@bbeng.de · +49 2191 9510100

BBE ENGINEERING
The Valueneering Company®

oerlikon barmag