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SENNEBOGEN
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Recycling: Widening Acceptance

Brigitte Weber
Editor-in-Chief

Globally, recycling is gaining more and more acceptance – and this sector is by far not only a men's world. Internationally, there are many examples of income-creating activities for women regarding recycling. They work, for instance, in a solid waste management project in Jordan, funded by the Government of Canada and carried out by UNDP (United Nations Development Program) in coordination with the Ministry of Local Administration. They establish their own company to make money by creating quality fabric from recycled textile waste, collecting recyclable PET plastic from households or manufacturing bricks and tiles from plastic scrap and sand in Africa, to name but a few.

In the USA, the Institute of Scrap Recycling Industries (ISRI) has established the "Women in Recycling Council (WIR)" in 2021. This mentorship program "taps into existing knowledge, skills, and experiences of high-performing individuals and connects them with other ISRI members who want to expand their knowledge and develop their skills to advance their career". Partnered together for one year, mentors and mentees meet monthly to discuss important issues for them and their business.

The number of women in leading positions increases, too. The latest example of this development is Susie Burrage, the new elected President of the Bureau of International Recycling (BIR). She is a businessperson and serves – on a voluntary basis – as president of British and European recycling organizations and as national and international ambassador for this sector. As the representative of the world recycling federation, the recycling professional explained her objectives during her mandate and underlined the positive development of the markets in an interview (page 28 onwards).

Business opportunities can be found everywhere in the world. For example, industry experts believe that Pakistan has to invest in waste treatment, recycling, and disposal in the near future because of the insufficient infrastructure in the country (page 4). Moreover, the Galapagos archipelago, composed of 127 islands, islets and rocks, is confronted with a growing amount of waste (page 32).

In Poland, a new recycling line for post-consumer beverage cartons started operations. According to the investors, it has the potential to triple the annual recycling capacity of beverage cartons in the country from 25,000 to 75,000 tons (page 22). The recently launched "CIRCULOSE Supplier Network" intends to bring recycling pulp to the market (page 37). And the German research project EnEWA is developing a solution for recovering and recycling paper from mixed waste streams (page 40).

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

Yours
Brigitte Weber (weber@msvgmbh.eu)

Cover Photo: Muhammad Rehman / pixabay.com

THE GLOBAL TEXTILE RECYCLING MARKET

As per the latest research report published by Extrapolate, the global Textile Recycling Market is expected to grow to 9.89 billion US-Dollar by 2032, with a compound annual growth rate (CAGR) of nearly 4.3 percent between 2023 and 2032. In 2022, it was valued at 6.45 billion US-Dollar.

The growing environmental concern about waste production and rising social awareness about textile recycling, would propel the textile recycling market growth, the market research company, headquartered in the United Arab Emirates, emphasized. Textile recycling has several environmental and economic benefits, including reduced land and water pollution, reduced reliance on virgin fibers, reduced use of chemical dyes, and optimal energy and water consumption. It has also recently emerged as an effective method for sustainable development in the apparel industry.

Trends

However, this global market is relatively small and in a developmental phase; it is fragmented, with an increasing number of small-scale key players, Extrapolate informed. "To increase revenue generation and market share, key players have adopted several business strategies such as technological development, expansion, and mergers and acquisitions."

The Regions for Green Textiles (RegioGreenTex) project's 43 partners met in Brussels to kick off a three-year project that could change how textile recycling is managed, the company reported. The undertaking would help small and medium-sized enterprises (SMEs) turn textile waste into valuable resources. "RegioGreenTex is a quadruple-helix partnership initiative aimed at mapping and reducing the challenges that currently exist in the implementation of a circular economy model within the textile ecosystem across the European Union (EU), according to a press release from the European Apparel and Textile Confederation (EURATEX)."

Growing Awareness

Consumers' awareness of textile recycling has grown due to government and non-profit initiatives. On account of rising awareness, there has been a significant increase in the donation and collection of waste textiles, which fuels the global recycled textile market. The business saves a lot of money by using recovered textiles. "In addition, recycled textiles are significantly less expensive than virgin materials," Extrapolate stated. Furthermore, virgin materials are not always readily available, delaying production and impacting overall manufacturing costs; thus, switching to recycled textiles is advantageous. Moreover, recycled textiles such as wool, cotton, and polyester would require less and simpler processing, which increases the demand for recycled textiles.
Asia Pacific is the largest market for textile recycling owing to several factors such as the strong industrial base, depletion of raw materials, awareness of the environmental impact of waste, and heavy industrial discharges from mills.

North America is expected to grow at the fastest CAGR and contribute significantly to the textile recycling market's growth, the company announced. "The United States produces the majority of the textile waste in the region. As a result, organizations that reuse or recycle used clothing are likely to drive the recycled textile market. Furthermore, rising government and consumer awareness is expected to spur market growth. As a result, the number of reused textiles is substantial, while textile waste generation is low."

extrapolate.com/enquire/retail/textile-recycling-market/87502

Photo: Fotoschlick/ stock.adobe.com

Photo: Muhammad Rehman / pixabay.com

Insufficient Infrastructure:

BUSINESS OPPORTUNITIES IN PAKISTAN

Industry experts believe that the pressure to invest in waste treatment, recycling, and disposal will increase in the foreseeable future. That will lead to business chances.

The Islamic Republic of Pakistan would generate approximately 49.6 million tons of solid waste and 4.36 billion cubic meters of domestic and industrial wastewater a year, Dr. Muhammad Khurshid, a Ph.D. in natural resources management, wrote in Pakistani "Tribune" in June last year. Approximately 60 to 70 percent of solid waste and merely one percent of the total wastewater is treated before its disposal.

According to a study by Dr. Saima Shafique and Tom Clark on waste management in the country through the SWITCH-Asia SCP Facility (funded by the European Commission), Pakistan generates 48.5 million tons of solid waste annually. On average, nationwide waste generation ranges from 0.24 to 0.65 kilogram/capita/day, and this has been growing at a rate of 2.4 percent annually, the authors stated in the report published in 2022. Not all of the over 220 million Pakistanis have access to services such as waste management.

As reported, in most places, the local authorities and municipal governments carry out waste management, "with the informal sector playing a huge role in waste collection and separation". There is a shortage of material recovery and sorting facilities and sustainable options for waste treatment. "Most municipal waste is either burned openly or dumped in vacant lots," the authors wrote. The government of Pakistan would estimate that the daily solid-waste generation is around 87,000 tons, "but there are alternative sources that challenge the veracity of this figure".

Karachi, for example, Pakistan's largest city, has the highest amount of daily waste generation; the metropolitan city's more than 20 million inhabitants produce a waste volume of 9,000 to 13,500 tons per day. Dr. Muhammad Khurshid quantified the amount of municipal waste at 16,500 tons daily. According to his account, Lahore (10 million people) generates 7,650 tons, Faisalabad (7.5 million inhabitants) 5,017 tons, Rawalpindi (5.9 million people) 4,500 tons,

Peshawar (2.9 million inhabitants) 2,048 tons and Quetta (600,000 people) 716 tons each day.

"The problem is so persistent and ubiquitous that many locals report it as a major nuisance and health concern," the authors of the SWITCH-Asia report pointed out. "Bureaucratic hindrances, urban sprawl, very low levels of public awareness on the subject, and a lack of both planning and capacity have been cited as the main causes for the unfortunate state of the existing solid waste management system in Pakistan." Though collection rates were moderate at 60 to 70 percent, only a small volume would reach final disposal. "Municipalities employ street sweepers and sanitary workers in addition to their own staff for the collection of waste, which is carried out with the help of donkey carts, open trucks, trolleys, wheelbarrows and suchlike. Collected waste is dumped in temporary storage spaces, where scavengers pick through it for recyclables, hence informal channels are established for recycling. Rather than being sent for treatment, for disposal in landfills or to incineration facilities, as it would in developed countries, waste rarely goes beyond final dumping in Pakistan."

Over the years, the government had engaged several external consultants, with the support of multilateral development agencies, to elaborate solid-waste management guidelines and some preliminary literature on "waste to energy" and composting, the authors of the SWITCH-Asia report informed. "The city of Lahore in Punjab was the first city in the country to have a formalized waste management system, in the form of the Lahore Waste Management Company. Although similar interventions had been planned for other provinces through programs such as the Sindh Cities Improvement Investment Program (SCIP) and the planning of a landfill site in Peshawar, these interventions have thus far achieved only limited success."

Government regulations

As stated, there have been many policies in Pakistan which would support the concept of waste minimization through the 3Rs, calling for mechanisms to improve the efficiency of waste management in the country. "However, due to budgetary and institutional constraints, these policies have not been successful in instigating any lasting change to the waste landscape in the country."

The legal regulations regarding waste include:

- The Pakistan Environmental Protection Act 1997;
- National Environment Action Plan (NEAP) 2001;
- Draft Guidelines for Solid Waste Management 2005;
- National Environment Policy 2005;
- National Sanitation Policy 2006;
- National Climate Change Policy 2012;
- National Development Strategy 2012;
- Hospital Waste Management Rules 2005 & 2014;
- Punjab Environmental Policy 2015;
- Draft Hazardous Waste and Hazardous Substances Rules, 2016.

"The success of these policies has also been limited by the lack of availability of accurate data on type, quantity and composition of solid waste produced in Pakistan," Dr. Saima Shafique and Tom Clark wrote. "To date, there has been only one state-led waste quantification initiative in the country, when the Ministry of Environment and Urban Affairs Division initiated the 'Data Collection for Preparation of a National Study on Privatization of Solid Waste Management in Eight Selected Cities of Pakistan' in 1996. Subsequent research has either built on these estimates or new estimates have been calculated by academic researchers in private studies."

Implementation of waste minimization measures

There are also implementations of waste minimization techniques and 3Rs being managed through a combination of public and private institutions. In Pakistan, public institutions and bodies are assigned with providing 3R-related support:

- Ministry of Climate Change;
- Pakistan Environmental Protection Agency (Pak-EPA) / Provincial EPAs;
- National Cleaner Production Center Foundation (NCPC);
- National Productivity Organization (NPO);
- City-wide solid waste management companies, such as Lahore Waste Management Company, Faisalabad Waste Management Company, Gujranwala Waste Management Company;
- Provincial Waste Management Boards;
- Provincial Water and Sanitation Departments.

As reported by Dr. Saima Shafique and Tom Clark, there are also initiatives from private companies and the manufacturing sector, "but their practices have been limited to within their own respective organizations". Since plastic pollution is an ubiquitous problem, most private initiatives focus on dealing with plastic waste. For example, in 2019, Unilever pledged to halve the use of virgin plastic in their packaging by 2025. That included their operations in Pakistan. "The corporation has also vowed to collect and process more plastic than they sell. These targets will mainly be achieved through shifting away from single-use packaging towards multi-use packs (reusable and refillable formats) and alternative packaging solutions, such as so-called 'naked' products." For eliminating plastic waste, Unilever would invest and collaborate to improve waste-management infrastructure in many of the countries in which it operates, it

purchases and uses recycled plastics in its packaging, and it participates in Extended Producer Responsibility schemes.

WWF and Coca-Cola Corporation were an example of a partnership aimed at plastic recovery. “Initiated in 2019, their program collected PET bottles in three shopping malls in Lahore and sent them to a partner recycling facility. The initiative also promoted general public-awareness campaigns through monetary and other incentives in the malls.” Furthermore, Proctor and Gamble Pakistan has waste reduction at the center of its sustainability agenda, the authors informed. By 2018, 86 percent of packaging produced by the company in Pakistan was recyclable, and the corporation aims to increase this figure to 90 percent by 2030.

The Pakistan government, through the Ministry of Climate Change, has taken steps to deal with plastic waste, too, such as imposing a blanket ban on using polyethylene bags in Islamabad in 2019. “It should be noted though that this isn’t entirely new. Previous governments have made multiple attempts to institute a provincial ban on polyethylene bags over the last decade but failed.” In addition, multilateral development banks – for instance, the World Bank – supported implementing waste management programs in Pakistan. The Punjab Green Development Program is currently supporting the Punjab government in limiting and regulating the consumption of single-use plastics in the province, the authors informed.

Proposed: a sustainable model for Pakistan

According to Asif Iqbal, Yasar Abdullah, Abdul Sattar Nizami and Faiza Sharif from the Government College University in Lahore, and Imran Ali Sultan from the Government of Punjab, Pakistan is a developing country with an unstable economy and productivity growth, causing a high inflation rate. Therefore, in their opinion, the government had to focus more on the current crises in the food and energy sector, which are considered basic necessities for citizens, they wrote in the article “Assessment of Solid Waste Management System in Pakistan and Sustainable Model from Environmental and Economic Perspective”, published in October 2022. In such circumstances, the solid waste management (SWM) sector was a less-priority area for policymakers and politicians, as evident from the priorities of Sustainable Development Goals (SDGs), they stated. Pakistan would need more focus to improve waste collection efficiency as it found less than 75 percent in almost all cities except Lahore with 84 percent. For sectorial sustainability, they propose three separate waste collection streams – residential, commercial/ institutes and bulk waste – based

Political Situation in Pakistan

Political struggles for power and an economic crisis caused the situation in Pakistan to become more unstable this year. Following the parliament’s dissolution by the country’s president, Arif Alvi, on August 9 this year and the resulting resignation of the government, a new government is to be elected within 90 days. However, there is no specific date yet.

Pakistani Prime Minister Shehbaz Sharif had previously announced the step. Until the planned parliamentary election, an interim government will run the affairs of the South Asian nuclear power. Anwarul Haq Kakar will serve as the acting head of government.

Investments find a ready welcome

The government has hardly any financial resources on hand. Therefore, Pakistan relies on the involvement of the private sector and international donors. According to GTAI, experts estimate that more than 100 billion US-Dollar will be necessary for investments by 2030.

A good address for investment opportunities is the Pakistani Board of Investment (BOI), which was established “with broad-based responsibilities of promotion of investment in all sectors of economy, facilitation of local and foreign investors for speedy materialization of their projects, enhancement of Pakistan’s international competitiveness and contribution to economic and social development”. The wide range of services provided by the agency would also include information on the opportunities for investment and facilitating companies looking for joint ventures.

invest.gov.pk

Tenders can be found on the internet: invest.gov.pk/upcoming-tenders?language_id=en, nepra.org.pk/tenders.php, ppra.org.pk/

on the physical characteristics of garbage. The residential waste consists of kitchen waste, raw material for compost manufacturing, and commercial areas' waste was primarily rich in recyclables, requiring a centralized material recovery facility (MRF), the authors emphasized. "The facility will help hire the services of the informal sector, i.e., scavengers trained in waste separation, which will help integrate the informal sector into the circular economy."

Bulk waste, for instance, debris, would help improve the internal road infrastructure at disposal sites. "Recovery of recyclables, compost manufacturing and methane capturing from disposal sites will generate direct revenue for the municipalities. Considering the local socio-economic situation and lessons from the SWM sector, a simple and flexible sustainable model is proposed to increase the sector's efficiency."

Power Generation from Waste

With its plans in the waste-to-energy sector, the government is aiming less at power generation and more at waste disposal, stated Germany Trade & Invest (GTAI), the Federal Republic of Germany's international economic promotion agency, in April this year. To make investment more attractive, Pakistan's energy sector regulator, the National Electric Power Regulatory Authority (NEPRA), has announced a competitive pre-tariff per kilowatt-hour for waste-to-energy projects. In August 2018, NEPRA permitted the construction of the first waste-to-energy plant worth 220 million US-Dollar. It is to be built in Lahore with a capacity of 2,000 tons of waste per day and 40 megawatts. Lahore Xingzhong Renewable Energy Company, a joint venture of three Chinese companies, is carrying out the project. Completion is scheduled for 2023.

The Sindh government signed memorandums of understanding with Dutch company Khan Renewable Energy and U.S. firm Green Waste Energy in early 2023. The plan is to install two waste-to-energy power plants. The project aims to process 3,000 tons of waste daily to generate 50 megawatts of electricity. The investment is estimated at 500 million US-Dollar. The project is also scheduled to be completed this year.

UNATERRA VENTURE CAPITAL AND EIT CLIMATE-KIC JOIN FORCES

The partnership would represent a shared commitment to support businesses enabling them to meet the climate challenges and forming the building blocks of a new economy.

In July, UnaTerra Venture Capital Impact Fund and EIT Climate-KIC, Europe's leading climate innovation agency, have signed a strategic investment partnership. As reported, both parties intend to work together "on accelerating climate action with a shared ambition to generate transformative climate impact and respond to the pressing biodiversity loss challenge".

Both organizations are collaborating as part of the new Investing for 1.5-degree Celsius initiative, led by EIT Climate-KIC. According to the information, UnaTerra joins the EIT Climate-KIC community, providing further momentum to the implementation of the European Green Deal and Horizon Europe Innovation Missions, while EIT Climate-KIC joins the ecosystem of UnaTerra as one of the selected partners for this European impact investing platform.

Under the partnership, EIT Climate-KIC would provide UnaTerra with strategic guidance, climate impact advice, and portfolio-shaping support. The initiative includes "the generation of a uniquely diverse pipeline of investment opportunities through the ClimAccelerator programme, unparalleled reach across the EU innovation landscape through place-based innovation programmes and systemic impact guidance drawn from across the EIT Climate-KIC network", a press release pointed out. UnaTerra would aim to inject additional innovation capital and "provide scale support to the most promising innovators from across Europe".

"We know that a just, climate-resilient, beautiful future is possible. But to get there, we need to invest in it," Kirsten Dunlop, CEO of EIT Climate-KIC, was quoted. "We need to create and connect solutions in integrated ways, and we urgently need to mobilize funds and investors who wish to bring that future into being." Limiting global warming below two degrees Celsius (C) would only be possible through profoundly transformative innovations in business and economic models.

"At UnaTerra we want to scale solutions, at speed, that lift the world out of climate change and biodiversity loss," Luca Zerbini, CEO and Founding Partner of UnaTerra, concurred. "This requires investing as a means, not an end, to go where markets have failed and impact has fallen short. Delivering both, a fair financial return, and more importantly, promote and scale prosperity for both people and the planet."

climate-kic.org
unaterra.vc

INTERNATIONAL FINANCE CORPORATION (IFC) INVESTS IN NEW BRAZILIAN FUND

IFC – a member of the World Bank – invested up to 780 million Brazilian Real (equivalent to circa 150 million US-Dollar) in a new infrastructure debt fund managed by Pátria Investimentos Ltda., a leading independent investment firm in Latin America. The goal is to help enhance Brazil's competitiveness by supporting critical infrastructure investments while also helping boost capital markets development.

The fund will have a target size of five billion Brazilian Real and invest on infrastructure projects in sectors that are key to boost economic growth in Brazil, IFC explained. "The fund will also help tackle climate issues, as it will focus on solutions and technologies that mitigate emissions in sectors such as renewable energy, digital infrastructure, transport, waste management, and water & sanitation."

According to the information, Pátria Investimentos is an experienced Brazilian fund manager with over 26.5 billion US-Dollar equivalent of assets under management, and it has a long-standing relationship with IFC, which includes debt facilities and equity investments.

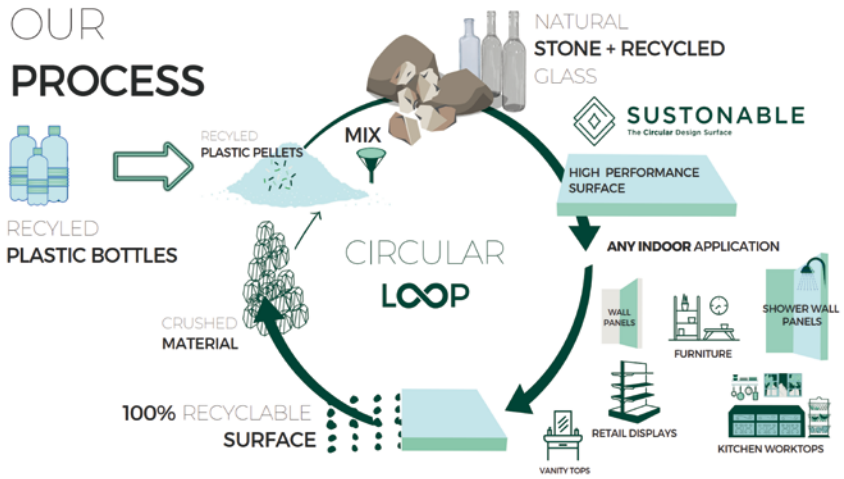
ifc.org/en/home, patriainvestimentos.com.br

A MATERIAL MADE FROM STONE AND RECYCLED PET

Cordis, the EU's Community Research and Development Information Service, has added a new video about Sustonable in its series of explanatory videos titled "Make the Connection".

Materials imitating natural stone are popular for countertops and other furnishings but have a heavy environmental impact. As reported, the EU-funded Sustonable project has found a way to produce such surfaces using less energy and water and just half of the raw materials. The solution combines crushed stone with recycled PET to create a material that looks and feels just like composite stone.

Each square meter of the material would contain around 100 plastic bottles, preventing them from going to landfill, Cordis informed. "The patented material is not only more environmentally friendly but also cheaper to produce and lighter than engineered stone, making it easier to transport and install. What's more, it can be recycled and reused, contributing to a circular economy."



Source: Sustonable

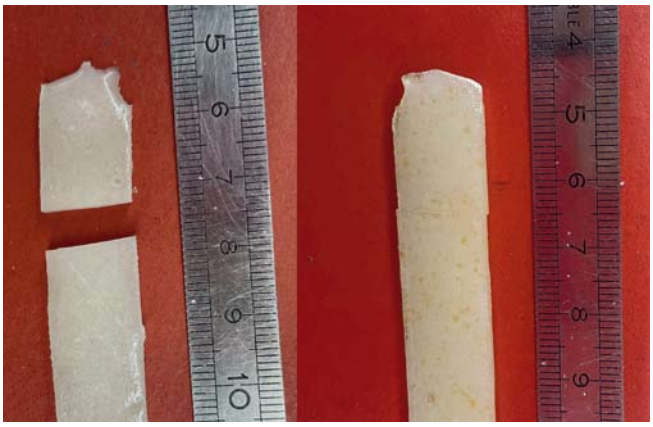
- sustonable.com
- audiovisual.ec.europa.eu/en/video/I-234886

Recyclable:

A NEW EPOXY RESIN

Researchers at Swiss Federal Laboratories for Materials Science and Technology – Empa have developed an epoxy resin-based plastic that is fully recyclable, repairable and flame retardant. They are now looking for industrial partners.

Epoxy resins are tough and versatile polymers. In combination with glass or carbon fibers, they are used, for example, to manufacture components for aircraft, cars, trains, ships and wind turbines. Such epoxy-based fiber-reinforced polymers have excellent mechanical and thermal properties and are much lighter than metal. Their weakness: They are not recyclable – at least not yet. Now Empa researchers led by Sabyasachi Gaan at Empa's Advanced Fibers laboratory seem to have found a solution. As reported, the new material is fully recyclable, repairable and also flame retardant – all while retaining the favorable thermomechanical properties of epoxy resins.

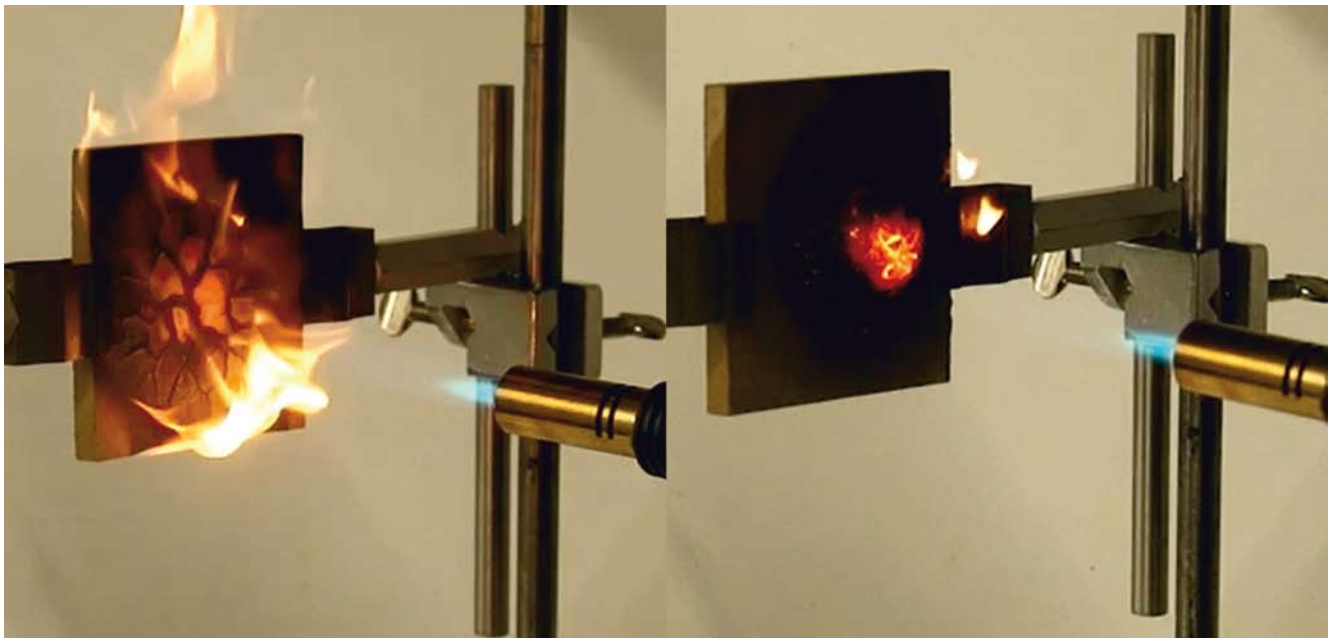


Not usually possible for thermosets: The cut in the material can be repaired by applying heat and pressure

"Recycling epoxy resins is anything but trivial, because these plastics are so-called thermosets," Empa underlined. In this type of polymer, the polymer chains were closely crosslinked. These chemical crosslinks would make melting impossible. Once the plastic had hardened, it could no longer be reshaped. "This is not the case for thermoplasts, such as PET or polyolefins. Their polymer chains lie close together but are not chemically linked to each other. When heated, these polymers can be melted and formed into new shapes. However, because of the lack of crosslinks, their mechanical properties at elevated temperatures are generally not as good as those of thermosets."

A new kind of polymer

According to Empa, the new epoxy resin that has been developed in collaboration with national and international



The new epoxy resin is flame retardant due to its phosphorus content, as seen on this burn test of an untreated MDF sample (left) compared to a sample coated in the new polymer

Photos: Empa

partners is technically a thermoset, but can be reshaped like a thermoplast. The key is the addition of a very special functional molecule from the class of phosphonate esters into the new resin matrix. “We originally synthesized this molecule as a flame retardant,” co-inventor of this technology and Empa scientist Wenyu Wu Klingler was cited. However, the bond the molecule forms with the polymer chains of the epoxy resin is dynamic and can be broken under certain conditions. This would loosen the crosslinking of the polymer chains so that they can be melted and reshaped.

Such materials, also known as vitrimers, are considered particularly promising. “Today, fiber-reinforced composites are not recyclable at all, except under very harsh conditions, which damage the recovered fibers,” Wu Klingler informed. “Once they have reached the end of their service life, they are incinerated or disposed of in landfills. With our plastic, it would be possible for the first time to bring them back into circulation again.”

As underlined by Sabyasachi Gaan, the vision for the future “is a composite material, in which both the fibers and the plastic matrix can be completely separated and reused.” The researcher sees an opportunity in carbon-fiber-reinforced plastics in particular, which are used in the construction of airplanes, trains, boats, cars, bicycles and more. “The production of carbon fibers requires a lot of energy and releases an enormous amount of CO_2. If we could recycle them, their environmental footprint would be a lot better – and the price a lot lower.” Moreover, the recovery of valuable elements like phosphorus connected to the matrix polymer would be possible.

A material for numerous applications

Fiber-reinforced composites are not the only application for the new polymer. For example, it could be used to coat wooden floors, as a transparent, resistant layer that has good flame-retardant properties – and where scratches and dents can be “healed” with a little pressure and heat. According to Gaan, flame retardancy, recyclability and repairability are a given. Additionally, the Empa researchers could “optimize all other properties depending on the intended use”.

The researchers are looking for industrial partners to pursue further applications of the material. They are convinced that the chances of commercial success are good. As stated, in addition to all its other advantageous properties, the modified epoxy polymer is inexpensive and easy to manufacture.

empa.ch

GLOBAL WASTE PAPER MANAGEMENT MARKET TO GROW

According to the report reseller Market Reports World, the global Waste Paper Management market was valued at 36,080 million US-Dollar in 2022 and is anticipated to reach 42,830 million US-Dollar by 2029. The latest report on this market would provide a comprehensive analysis of the market's current size, trends, share, and economic analysis, as well as a forecast for the year up to 2029. Prospective buyers get a sample PDF of the report at marketreports-world.com/enquiry/request-sample/23575926.

SUCCESSFUL PAPER AND CARDBOARD RECYCLING IN THE U.S.

Paper and cardboard continue to be some of the most highly recycled materials in the United States, as mentioned in an update by the American Forest & Paper Association. In 2022, the paper recycling rate was nearly 68 percent, holding approximately stable to the 2021 rate, and the recycling rate for cardboard boxes was more than 93 percent, an increase over last year's rate. More than two-thirds of the paper used is recycled and used to make new sustainable paper products that people use every day. But why is paper recycling so successful in the USA? As reported by the American Forest & Paper Association, the paper and wood products industry is inherently circular. The products are made from renewable resources – trees – and recycled paper and are easily recycled. Paper recycling is also successful because of the millions of people who recycle daily and the industry's ongoing investments.

afandpa.org

MASTERFLEX AND REMONDIS COOPERATE

German-based companies Masterflex SE and Remondis Recycling GmbH & Co. KG have entered into a long-term strategic cooperation. They aim to set up "a circular-flow economy for industrial products made of engineering plastics" and to implement it in the market for hose and connection systems as an example. The Masterflex Group develops and manufactures connection and hose systems. With 14 operating units in Europe, America and Asia, the group – by its own account – has a virtually global presence. Remondis is a private recycling, service and water management company represented in more than 30 countries across three continents.

masterflexgroup.com
remondis.de/en/

AMERICAN RECYCLER JOINS HEALTHCARE PLASTICS RECYCLING COUNCIL

As reported by the Healthcare Plastics Recycling Council (HPRC), Casella Waste Systems, Inc. has joined the organization.

"Casella is the largest recycler and most experienced fully integrated resource management company in the Northeastern United States, providing solid waste collection and disposal, transfer, recycling, and organics services to more than 900,000 residential, commercial, municipal, institutional, and industrial customers," the information said. "Casella also provides professional resource management and consulting services to over 10,000 customer locations in over 40 states nationwide, including hospitals, medical manufacturers, medical packaging companies, life sciences, and pharmaceutical companies to customize resource management programs unique to the healthcare industry and their individual sustainability goals."

HPRC is a private technical coalition of industry peers across healthcare, recycling, and waste management industries seeking to improve the recyclability of plastic products within healthcare. The organization is active across the United States and Europe, working with key stakeholders, identifying opportunities for collaboration, and participating in industry events and forums.

hprc.org

SMS: GREEN TRANSFORMATION DRIVER FOR IMPROVED PROFITABILITY

In the financial year 2022, SMS group boosted its order intake to 4.6 billion Euro. According to the company, the main drivers of this strong growth were the green transformation of the steel and metals industry as well as robust economic activity in India and the USA. Sales also rose considerably to 3.1 billion Euro (previous year: 2.6 billion Euro). For the current fiscal year, SMS expects a further increase in order intake, amounting to up to six billion Euro. Turnover for 2023 is expected to rise to more than 3.5 billion Euro.

sms-group.com

ASAHI KASEI INVESTS IN STARTUPS FOCUSED ON CARBON NEUTRALITY

Internationally active Japanese technology group Asahi Kasei has established a “Care for Earth” investment framework as a new initiative for carbon neutrality. The group intends to invest 100 million US-Dollar worldwide in early-stage startups that aim to solve issues in environmental fields such as hydrogen, energy storage, carbon management, and bio-based chemicals over the five years up to the fiscal year 2027. Since 2008, Asahi Kasei has advanced corporate venture capital (CVC) activity to create new businesses by investing in startups and performing joint developments with them. Based in Silicon Valley since 2011, this activity has facilitated investments in over 50 startups in the US, Europe, China, and Japan, resulting in numerous collaborations.

asahi-kasei.com

New SINTEF Project:

RECYCLING EPS FROM CONSTRUCTION SECTOR

Tons of reusable polystyrene ends up as plastic waste when buildings are demolished. Researchers want to see more recycling and reuse.

According to the Norwegian independent research organization SINTEF, stringent energy efficiency requirements in the building sector mean installing more insulation than ever before. "Every year, we manufacture and import tens of thousands of tons of plastic pellets for the production of insulation materials. At the same time, we are sending volumes of insulation materials equivalent to one-third of what we actually use to landfill and combustion plants." In order to prevent so much plastic waste from ending up in landfill or combustion ovens, new systems for waste sorting, disposal, reuse and recycling of building materials had to be developed.

That would benefit both the industry and the environment, Birgit Risholt, a researcher at the Norwegian science institute, is convinced. The Senior Research Scientist at SINTEF is heading the project 'Sirkulær EPS' (Circular EPS), which aims to recycle EPS (Expanded Polystyrene) insulation materials from the building and construction industry.

"The establishment of a so-called 'circular economic value chain' will improve access to insulation materials and reduce the need for the expensive disposal of demolition waste" SINTEF underlined. The goal is to adapt materials reuse and recycling to future needs; the work is being carried out in collaboration with the building industry.

The entire industry has to get behind this approach

As reported, the project owner is the company BEWI (formerly Jackon), which supplies construction systems and insulation materials to the building and construction industry. "It is now looking to take the lead in the use of recycled materials. BEWI's objective is to use as much as 50 percent recirculated raw materials in its future manufacture of EPS, which is a more ambitious target than is required by current regulations. In order to achieve this goal, the company will have to get access to large volumes of EPS waste from the construction sector, both from new-build projects and demolitions." At present, used EPS can be recovered from buildings throughout Norway. It takes up a lot of space and is thus expensive to transport. Used EPS may also be contaminated with dirt or chemicals. For these reasons, a logistical system is needed to compress used EPS to make it ready for transport, as well as a method for separating and removing contaminating substances.

"We're very pleased to have companies such as Optimera and Franzefoss Gjenvinning on our team during this project. Together, we'll succeed in finding a logistical solution", Tone-Cecilie Lie, Senior Sustainability Manager at BEWI, was cited. "But in order for us to get hold of sufficient used EPS, the entire value chain will have to get behind the new approach. We can never have enough partners."

Assessing the potential for reuse

SINTEF is acting as coordinator and research partner during this project. Its role is to make an assessment of existing building stock to find out how much EPS there is and the potential for its reuse. It is also important to find out if the materials can be reused in their current form, or if they have to be processed in some way. "Before we can reuse EPS that is recovered from demolished buildings, we have to make sure that it doesn't contain any harmful substances", Birgit Risholt informed. "For example, we know that some EPS used in the 1980s contains brominated flame retardants. It will not be possible to reuse this kind of material in new buildings." Further-

Photo: O. Kürth

more, SINTEF will be testing different technical building solutions involving recycled EPS in its laboratories.

Researchers will also be looking into costs, market scenarios and the need to adapt the regulatory framework to make recycling and the trade in such materials easier, the research organization assured.

Looking for EPS from demolition projects

BEWI's factory in Fredrikstad in southeastern Norway has already initiated the test manufacture of EPS using recycled raw materials. When the project partners met at the beginning of June, they were able to pool their experience as a basis for preparing plans for their future research activities. "We're going to need a great deal of used EPS from demolition projects, so if you're looking to renovate a large roof or demolish a building that has EPS in its construction, don't hesitate to get in touch with us", Birgit Risholt was quoted.

sintef.no/en/

NESTE TO INVEST FURTHER IN FACILITIES FOR LIQUEFIED PLASTIC WASTE

Finnish company Neste intends to upgrade its facilities for liquefied plastic waste at its Porvoo refinery in Finland.

With the investment of 111 million Euro, the producer of renewable fuels, who is also developing chemical recycling to combat the plastic waste challenge, announced to build the capacity to upgrade 150,000 tons of liquefied waste plastic per year. "Upgrading is one of the three processing steps turning liquefied waste plastic into high-quality feedstock for new plastics: pretreatment, upgrading and refining," Neste informed in June this year. The investment would be part of the company's broader project (PULSE = Pretreatment and Upgrading of Liquefied waste plastic to Scale up Circular Economy), which has received an EU Innovation Fund grant of 135 million Euro "if fully implemented and is targeting a total capacity of 400,000 tons per year".

Pretreatment and upgrading of liquefied waste plastic play an important role in Neste's approach to chemical recycling. They would allow the company to increase flexibility for processing lower-quality plastic waste and scale up processing the liquefied waste plastic into high-quality petrochemical feedstock in its existing refinery in Porvoo. "We have developed our capability to process circular raw material at the Porvoo refinery over the recent years and are now set to build a respective facility," Markku Korvenranta, Executive Vice President of Neste's Oil Products, was quoted. "The new facility processing 150,000 tons of liquefied waste plastic, is planned to be finalized in the first half of 2025."

According to the company, the project will see Neste building new assets as well as leveraging existing assets through retrofitting, to scale up chemical recycling fast and efficiently. The upgraded liquefied waste plastic would then be processed in the conventional refinery, which will replace a portion of the fossil resources processed at the Porvoo refinery.

neste.com

Photo: Neste

Neste's complex refinery in Porvoo, Finland

A Burning Issue:

MITIGATING RISKS AND ENSURING SAFETY IN THE EVOLVING RECYCLING INDUSTRY

The number of fires in the recycling industry is increasing. As we move towards more sustainable practices, increased fire risks are changing, and it is paramount that waste handling sites are able to understand and mitigate these risks.

Hannu Sartovuo, vice president of Dafo Vehicle, discusses why these risks are changing, the lack of regulation in the industry and how small changes can minimize downtime and loss of income for recycling facilities.

The growing hazards

The fire risks at recycling facilities and waste centers are not a new phenomenon, with over 300 fires taking place per year between 2001 and 2013, most individuals are aware of the fire risks that occur due to the combustibility of the materials – paper, plastic, wood and cardboard – that are present at recycling centers. However, despite this knowledge leading to investment into the safety of the industry, the number of fires is on the rise, with fire incidents increasing by six percent at recycling facilities in 2022, when compared to 2021. Fires can range from a minor incident to a complete burnout, though, no matter the size, a fire can cause downtime and damage to a facility, limiting the amount of waste that can be recycled and compromising the income for a recycling plant.

In a twist of fate, one of the culprits for the increasing number of fires is the increase in the number of lithium-ion batteries in the recycling and waste environment. Batteries are driving the sustainability charge, however, due to their increased presence and fire risk, incorrect disposal, which is becoming more and more common, is leading to more fires in waste handling sites.

Nevertheless, lithium batteries that have been disposed of incorrectly are not the only issue. The machinery used in the waste and recycling industry, such as shredders and mobile crushers also present risks. This machinery works long hours with combustible material, which can easily build up in the engine compartment and belly pan of a machine. As the engine and exhaust creates extreme heat during long periods with minimal downtime, fires can easily start, and with plenty of fuel in the waste handling facility, these fires can easily spread.

Understanding the impacts

Due to the flammable material in the recycling center, the effects of a fire can be catastrophic, easily spreading and taking days or weeks to extinguish. That is because the chance of re-ignition is extremely high, as flammable materials come into contact with hot surfaces in the facility.

Materials on fire in a recycling center does not just cause downtime and damage for the owner of the facility but also has additional environmental and social impacts. The burning of materials can release toxic gases and chemicals such as nitrogen oxides, sulfur dioxides, carbon monoxide and dioxin. This does not only negatively affect the environment, which can cancel out the benefits of a recycling plant, but also those who live in residential areas close to recycling plants.

In turn, this can negatively influence the number of recycling plants that can be built, as councils and residents will likely oppose having a facility built near their home due to potential fire and the subsequent release of these gases. This could limit the amount of recycling a country is able to take part in due to a lack of infrastructure.

Photos: Pearl Communications / dafo

Regulatory oversight

Despite the Environment Agency implementing a 21 part fire prevention plan for activities that include the storage and handling of combustible waste, the section that discusses the plant and equipment has three vague requirements:

- Have a maintenance and inspection program for static and mobile plant and equipment
- Fit vehicles with fire extinguishers
- Keep mobile plant that is not being used away from combustible waste.

This lack of stringent regulation and specificity for the waste handling industry creates grey areas in fire safety that can lead to increased risks and damage to facilities, as the responsibility lies with insurers and individuals who might not be aware of the changing risks. When implementing a risk

assessment, it is important to consider a myriad of factors to understand exactly how they will affect the recycling plant as a whole. For example, it is not just a case of fitting the vehicles with fire extinguishers, but understanding where the risks occur – hydraulics, exhaust, engine and belly pan – and ensuring that fire suppression systems are located to stop a fire before it fully spreads.

Protecting the future of recycling

As legislation can often lag behind change, it is imperative that risk assessments and fire suppression systems are updated as technology changes. For example, as electric and hybrid machinery becomes more popular, risks will change, as lithium-ion batteries present a fire risk both on and off the conveyor belt.

Therefore, with risks on the rise and the industry ever-evolving, every risk must be considered to ensure the UK can continue to recycle as much waste as possible, minimizing the potential for downtime, damage and disruption to the industry.

■ To find out more about understanding the risks in your industry, visit Dafo Vehicle: dafo-vehicle.com

Meeting Targets under EPR for E-Waste Recycling:

AN EVIDENCE-LINKED APPROACH

In today's fast-paced digital age, electronic devices have revolutionized our lives, making them more convenient and efficient. However, this digital evolution comes with a shadow: the exponential rise of electronic waste, or e-waste. As countries grapple with the environmental and health hazards of e-waste, Extended Producer Responsibility (EPR) has become a global imperative. In this article, we delve into the significance of auditable targets in the context of EPR and how they drive sustainability. Our focus centers on India's pioneering e-waste recycling company, publicly listed on the Bombay Stock Exchange and acknowledged by the Prime Minister of India.

E-waste in a Nutshell

E-waste encompasses discarded electronic devices, spanning from smartphones and laptops to refrigerators and industrial machinery. The global volume of e-waste generated is staggering and continues to grow. The improper disposal of e-waste can lead to toxic emissions, soil contamination, and the release of hazardous substances, posing significant environmental and health risks.

The Emergence of Extended Producer Responsibility (EPR)

EPR is a policy approach that holds producers accountable for their products' entire lifecycle, including responsible disposal and recycling. In the realm of e-waste, electronic device manufacturers and importers must assume responsibility for properly managing their products once they reach the end of their useful life.

The Significance of Auditable Targets

Auditable targets are the linchpin of EPR programs, serving as quantifiable objectives that producers must meet to demonstrate their compliance with e-waste management regulations. Auditable targets are pivotal for several reasons:

1. Accountability: Auditable targets delineate clear responsibilities for producers, ensuring they are answerable for managing the e-waste generated by their products.
2. Environmental Impact: Setting targets reduces the environmental footprint of e-waste by fostering responsible recycling, resource recovery, and the prevention of hazardous substances from polluting the environment.
3. Resource Conservation: By specifying targets for recycling and recovery, auditable targets promote the sustainable utilization of valuable resources inherent in electronic devices, such as metals, plastics, and rare minerals.

India's EPR Pioneers

India has been at the forefront of EPR initiatives, exemplified by its first e-waste recycling company, Eco Recycling Ltd. This company is publicly listed on the Bombay Stock Exchange and has received accolades from none other than the Prime Minister of India.

Eco Recycling Ltd: Leading the Way

Eco Recycling Ltd has set a remarkable precedent by aligning with India's evolving EPR regulations and wholeheartedly embracing auditable targets. The company's unwavering commitment to environmental stewardship and sustainability makes it an exemplary model of responsible e-waste management.

Evidence Linked & Auditable Collection in Action

Auditable targets under EPR encompass various crucial aspects:

1. Collection Targets: Producers are mandated to collect a specified percentage of the e-waste generated by their products. That incentivizes the development of efficient collection networks and infrastructure.
2. Recycling and Recovery Targets: The e-waste collected must undergo recycling, with valuable materials recovered. That promotes resource circularity and sustainable practices.

Photo: PDU / fotolia.com

3. Consumer Awareness: Producers are obligated to invest in consumer awareness and education programs to ensure end-users comprehend the importance of responsible e-waste disposal.
4. Record-Keeping: Meticulous record-keeping is imperative to showcase compliance with auditable targets. Thorough documentation of e-waste volumes, recycling processes, and regulatory adherence is essential.

The Eco Recycling Ltd Success Story

Eco Recycling Ltd not only embraces auditable targets but consistently surpasses them. The company's unrelenting dedication to environmental protection, ethical recycling practices, and technological innovation has propelled it to the forefront of the e-waste recycling industry.

Prime Minister Narendra Modi's Appreciation

The recognition of Eco Recycling Ltd by the Prime Minister of India underscores its commitment to sustainable e-waste management and its pivotal role in realizing India's vision of a cleaner, greener nation.

In Conclusion:

EPR and auditable targets are not mere buzzwords; they are the cornerstones of responsible e-waste management in our increasingly digital world. The narrative of Eco Recycling Ltd, India's pioneering e-waste recycling company, publicly listed on the Bombay Stock Exchange and esteemed by Prime Minister Modi, underscores the immense potential for businesses to champion sustainability. As the world grapples with e-waste challenges, Eco Recycling Ltd serves as a shining example of how auditable targets, when embraced with dedication and innovation, can lead to a brighter, more sustainable future. Through evidence-based target attainment, we pave the way for a circular economy where electronic devices enrich our lives while preserving the environment for generations to come.

■ B.K. Soni, Chairman & Managing Director, Eco Recycling Ltd.
Email: bksoni@ecoreco.com
ecoreco.com

An Innovative Approach to E-Waste:

NEWICON COLLABORATES WITH THE ROYAL MINT

Tech company Newicon has partnered with The Royal Mint to address one of the UK's most pressing environmental challenges – managing electronic waste.

Newicon joined forces with The Royal Mint's Commercial Director Mark Loveridge and Darren Hunt, Head of Business Development, and Geoffrey Sampson, Director at Circulogic, at a workshop in Bristol to explore the issue.

The workshop focused specifically on identifying challenges within the electronic waste industry. Ross Harrington, Newicon's Head of Design, led an ideas-storming session on finding ways to:

- Eliminate complexities of recycling end-of-life IT equipment;
- Find sustainable e-waste management solutions;
- Improve logistics and product supply chain visibility;
- Reduce the amount of waste electronic equipment shipped overseas and end unregulated disposal and smelting.

Photo: Newicon

"The Royal Mint is continually striving for original products, inventive processes, and sustainable solutions. Whether it is extending expertise into precious metals investment products such as DigiGold or facilitating innovative ways to recover precious metals from electronic waste," says Mark Loveridge.

Reflecting on the success of the session, Mr. Loveridge added, "The Royal Mint is looking to the future and making it brighter. Therefore, an innovation workshop into a reality seemed the perfect fit."

To learn more about The Royal Mint initiative go to: royalmint.com/aboutus/press-centre/turning-electronic-waste-into-gold/

■ Newicon's workshop innovation toolkit, used during the session, is available online. For more information, go to newicon.net/contact.

BONFIGLIOLI'S COMPLETE RANGE OF SOLUTIONS FOR RECYCLING PROCESSING AND MACHINERY

Bonfiglioli conceives, designs and produces custom solutions for collection, downsizing and sorting of waste materials. Recycling is a key component of waste management to reduce pollution and landfill waste; in order to ensure high-quality operations and the best result in the recycling process, the company provides a complete range of innovative products for Mobile and Industrial Primary shredding solutions.

The company has been active in the recycling industry for a long time, and thanks to various product developments and expansions, the team built a solid reputation in this sector. Now the company offers a complete range of solutions to meet any need in this demanding, crucial sector. The wide range of planetary gearboxes are manufactured in a production process that is firmly focused on the specific needs of Bonfiglioli's customers. These solutions are developed with the highest levels of customization, which requires right from the initial design phases, in-depth interaction between the customer and the Bonfiglioli team to ensure that all of the required specifications and variants are known for a product that perfectly meets expectations.

That is why the pre-sales and after-sales teams, spread strategically over all continents, play such a crucial role and why ensuring complete support is at the heart of the company's global success. The product range and its proven reliability are only the starting point of a profitable relationship.

Solutions for recycling plants

From inverters to gear motors and drives, all the components by Bonfiglioli are customized and designed based on the customer's needs for recycling many different kinds of waste, like tires, metal, paper and plastic. Always with the highest level of customization:

- Primary shredding: Totally integrated machine design and performance are the key features of the planetary products for primary shredding equipment;
- Secondary shredding: A planetary torque rating over 2 MioNm guarantees a complete range of shredding machine applications. Thanks to a high peak load capacity, planetary gears offer best-in-class mechanical performance;
- Conveying: Thanks to an extensive selection of features and space efficiency, Bonfiglioli offers products (such as the F Series and the A Series) for conveying systems. High dynamic response and energy efficiency are signature features. Plus, cost-effective and extended service intervals guarantee low cost of ownership;
- Compactors: An offer of versatile, robust and energy-efficient solutions, such as the C Series, that meet all compactor requirements.

R3 Series

The R3 Series is the perfect range of products for the application in recycling plants and specifically in primary shredding machines. Compact and powerful, their planetary gear train makes them the ideal choice for all severe duty applications where shock loads and impacts are more the rule than the exception. Plus, the configuration is highly flexible, thanks to several options for mounting, gear layout, output shaft and motor interface. So, you can always have a tailor-made solution for your recycling needs. According to the torque needed, R3 Series can be equipped with 1, 2 or 4 hydraulic motor adapter; an electric motor adapter is either available upon request. It features several benefits:

- Easy installation and quiet operation
- High torque capabilities (peak torque from 129,000 to 370,000 Nm)
- Surface protection class C3, C4 and C5
- Gear ratios from 56 to 117
- Synchro drive and axial piston hydraulic motors

Components for stand-alone recycling machines

Bonfiglioli designs and produces custom solutions also for more compact stand-alone machines used for small loads:

- Reverse vending machines: High reliability and long operating life are the stand-out features of the recycling machine products, which are fully integrable with Bonfiglioli drives for a complete package solution;
- Stand-alone shredder: gearmotors, inverters and planetary drives that are reliable and long-lasting

Bonfiglioli believes that product development relies on passion, efficient processes and on the ability to understand customers' needs. Therefore, first, the company team identifies these needs after an in-depth analysis. Then, through dedicated calculation tools, the team simulates the transmission's capabilities and performance, allowing it to reduce development time. Ultimately, the alignment stage allows the company to adapt the proposal according to key factors such as performance, installation and maintenance.

bonfiglioli.com/international/en

AKTID INTENDS TO ACCELERATE ITS INTERNATIONAL GROWTH

French private equity fund Initiative & Finance "Tomorrow" has recently acquired a significant stake in the provider of solutions for sorting solid waste, Aktid. The investment was accompanied by Crédit Agricole des Savoie, historical partner of the Chambéry based company. According to the company, Aktid has now all the cards in hand to implement its international development projects. The French firm that designs and constructs non-hazardous solid waste sorting and recovery facilities has doubled its turnover in one year to 80 million Euro. "The workforce has also increased significantly with the creation of about thirty jobs last year, to meet the expectations of public and private customers," the company that employs nearly 110 people stated.

"This dynamic will be able to continue internationally thanks to the support of Initiative & Finance's 'Tomorrow' fund and Crédit Agricole des Savoie. This growth strategy should be based on both a targeted external growth policy and organic growth in territories offering attractive fundamentals and prospects."

Aktid's partner, Initiative & Finance "Tomorrow", would intend to accompany the project and support its development thanks to its financial expertise and the experience of its team in supporting SMEs towards a change of scale internationally. Committed to environmental issues, it would confirm the relevance of Aktid's project, which is positioned in a market considered as strategic. Since its creation in 1984, Initiative & Finance has carried out nearly 350 growth and buyout capital transactions and has contributed to the emergence of many mid-sized companies. A former subsidiary of the Natixis group, the management team became independent at the end of 2010 and now manages nearly 650 million Euro in capital on behalf of leading French and European institutional investors and family offices. The fund "Tomorrow" invests in companies from various sectors that contribute to implementing solutions to the challenges identified by the Sustainable Development Goals as defined by the UN, with a particular focus on those related to solving environmental challenges.

initiative-finance.com/en/home
aktid.fr/en/

Poland:

NEW RECYCLING LINE FOR BEVERAGE CARTONS

The plant has the potential to recycle the entire volume of beverage cartons sold in Poland, with additional volumes from Central and Eastern Europe.

With a joint investment of approximately 29 million Euro by Stora Enso and Tetra Pak, a new recycling line for post-consumer beverage cartons started operations in Poland. As reported by both companies in a joint press release, Stora Enso has invested approximately 17 million Euro into a new repulping line that will recover the carton fibers, and Tetra Pak, along with Plastigram, have invested a total of approximately 12 million Euro to build the new line. "The line has the potential to triple the annual recycling capacity of beverage cartons in the country – from 25,000 to 75,000 tons – and provides scope to absorb the entire volume of beverage cartons sold in Poland, as well as additional volumes from neighboring countries, including the Czech Republic, Hungary, Slovakia, Latvia, Estonia and Lithuania," the investors are convinced.

Featuring an annual capacity of 50,000 tons, the line at Stora Enso's production unit in Ostrołęka (Poland) handles solely beverage carton material separation, detaching fibers from polymers and aluminum. "The fibers are then recycled into carton board materials, effectively contributing to material circularity by turning used paper-based packaging into new paper-based packaging materials. This new paper recycling facility is complemented by Czech company Plastigram Industries that, together with Tetra Pak, is industrializing a solution to recycle polyAl into new products." The non-fiber component of carton packages is known as polyAl, which designates the layers of polyolefins and aluminum being used as barriers against oxygen and humidity to protect the food content in aseptic carton packages.

"For decades, we have been working to enhance beverage carton recycling capacity, co-investing with recyclers, technology providers and suppliers in new equipment and facilities," Lars Holmquist, EVP Sustainability & Communications at Tetra Pak, was cited. "In 2022, Tetra Pak contributed nearly 30 million Euro to collection and recycling projects worldwide, with plans to go further and invest up to 40 million Euro annually over the next years. As part of the Alliance for Beverage Cartons and the Environment (ACE), we support the industry's ambition to increase the collection for recycling rate of beverage cartons to 90 percent and the recycling rate to 70 percent in the EU by 2030. I am very pleased to see that our collaboration with Stora Enso translates into one of the largest recycling hubs for beverage cartons in Europe, contributing to this ambition."

Hannu Kasurinen, EVP Packaging Materials at Stora Enso, is pleased as well. "This new modern solution marks a significant addition to European recycling capacity and a concrete step forward in the circularity of consumer packaging," he said. "In addition to complementing the current scope of our production site in Poland, the recycling facility will significantly contribute towards the recycling and waste reduction goals of the EU's proposal for a Packaging and Packaging Waste Regulation."

As emphasized, the new line is set to ramp up the recycling of beverage cartons throughout Central and Eastern Europe, "signaling the beverage carton industry's willingness to support the circularity goals of the proposed EU Packaging and Packaging Waste Regulation (PPWR), and showcasing the pivotal role of recycling in helping the green transition of the food packaging sector". The packaging industry invested approximately 200 million Euro to increase the capacity for beverage carton recycling in the EU and plans to further invest 120 million Euro by 2027.

storaenso.com/en, tetrapak.com

Photo: Stora Enso/Tetra Pak

"CHEMICAL RECYCLING HAS HUGE POTENTIAL"

According to the German industry association Verband Deutscher Maschinen- und Anlagenbau (VDMA), chemical recycling has recently been presented more and more often as a solution to the plastics problem.

As emphasized, the future perspective is that plastics from various applications that cannot be recycled mechanically can be broken down to their basic components using chemical processes and, therefore, be put to new, high-quality utilization. In an exchange with experts from the involved stakeholders, the trade associations Plastics and Rubber Machinery and Waste and Recycling Technology are discussing in which areas and to what extent chemical recycling can complement the established recycling processes.

In the VDMA series "Let's talk about Chemical Recycling", Jochen Schofer, Head of Sales of the Recycling Business Unit at Coperion GmbH, evaluates the current development.

Mr. Schofer, what contribution can chemical recycling make to the circular economy?

In principle, it can make a big contribution. But it only works properly together with mechanical recycling. And it will only work if the circular economy is accepted not just in Germany or Europe, but throughout the world. In many parts of the world, however, there are still either only fragmented waste collection systems, depositing systems and similar systems, or none at all, that are able to generate a sufficient waste stream for recycling. At the moment, an increasing number of large corporations are jumping on the chemical recycling bandwagon, all of them operating internationally. There is hope that they will contribute considerably towards the implementation of the necessary infrastructure in all parts of the world.

Jochen Schofer: "Chemical recycling is still in its infancy, but has huge potential"

Chemical recycling has huge potential. The results achieved so far are very promising. Nevertheless, chemical recycling is still in its infancy, while mechanical recycling is already established. Chemical recycling has particular potential because there are many plastics that cannot be processed mechanically, and more and more will be added. For example, in the construction sector, think of the many mixed plastics that are released when a house is demolished, or in the automotive industry. That is precisely why chemical recycling has to make a big contribution to the circular economy.

In which areas is chemical recycling superior to mechanical recycling?

The major advantage of chemical recycling over mechanical recycling is that it can be used to recycle all types of plastic. You no longer need a single type of material stream, as you do with mechanical recycling – for example, only polyethylene or polypropylene. Chemical recycling can also be used to recycle composites. However, the prerequisite is that you have a large material stream, because only then can the process be operated economically. Some large plants for chemical recycling with throughputs of up to 25 tons per hour are already being planned.

Which recycling method does the machine manufacturer Coperion primarily rely on?

As a machine builder, we have made it our goal to support the plastics industry as best we can on its path to a circular economy. We develop solutions for chemical recycling, mechanical recycling, and even for many other processes, such as solvent-based recycling. Here, two different polymers are separated from each other, and the solvent is degassed in the extruder. We offer technologies for processing all plastic material streams for well-sorted as well as poorly sorted ones. But the question is whether you put the energy into pre-sorting or, in the case of chemical recycling, into processing the oil quality afterwards. Because the worse the product to come out of the reactor, the more processing it requires. Here, too, it's all about economic efficiency in the end. Because the chemical recycling process is very energy-intensive, it is advisable to focus more on the upstream steps in the case of high throughputs. For smaller plants, it may also make economic sense to invest in processing the recovered oil.

Were there any technological challenges?

As pioneers in processing technology for virgin plastics, we have modified our product range in such a way that we can also serve the recycling market with innovative solutions. In recycling, we deal with contaminated materials, low bulk weights or high moisture contents. Therefore, we have made

Photo: Coperion GmbH

many developments, adjustments and optimizations to our technologies. Especially for chemical recycling, for example, we have developed a new technique that makes it possible to reliably degas chlorides directly in the extruder.

Will the waste problem be solved through the circular economy?

Both systems, mechanical and chemical recycling, are not silver bullets. Both make a great contribution to solving our waste problem, but much more needs to be done. Above all, product design should completely avoid poorly recyclable plastics. Because if more and more poorly recyclable plastics enter the market, they threaten to end up being burned instead of recycled. A great contribution would therefore be to simply not produce and use the poorly recyclable plastics in the first place. That should be our first goal for a functioning circular economy.

- vdma.org/plastics-rubber-machinery
- coperion.com/en/

PARTNERSHIP TO MANUFACTURE FIBER FROM POLYCOTTON TEXTILE WASTE

Circ, a USA-based mixed textile recycling company, and Acegreen Eco-Material Technology Co, subsidiary of Taiwan-based Acelon Chemicals & Fiber Corporation, have established a strategic partnership. The partners aim to manufacture filament lyocell for the fashion industry and collaborate on research and development projects.

As reported, the partnership builds upon the commercial success that Circ and Acegreen have achieved already, as demonstrated in a recent product release with Zara Woman. “As part of a shared, long-term commercial vision, Acegreen will continue manufacturing filament lyocell utilizing Circ’s reclaimed cotton derived from polycotton textile waste. The formal partnership comes after several years of R&D collaboration, which recently transitioned to commercial-scale production.”

Circ has developed a technology system and integrated industrial process that returns clothes to the raw materials from which they were made, the firm informed. The process would be capable of separating and recovering mixed polymer streams, “specifically any blend of polyester and cotton, which account for most fabrics manufactured, and hence, most of the clothing that hangs in our collective closets”. As underlined, Circ’s solution is projected to substantially reduce carbon emissions created by the fashion industry. The fashion industry is responsible for harvesting 300 million trees annually to manufacture manmade cellulosic fibers (MMCF), including viscose and lyocell, for the textile industry, Circ referred to information from Canada-based non-profit organization Canopy. “Using Circ’s patented process and integrated manufacturing approach and other technologies currently using waste cotton feedstock, Canopy estimates that we can transition the entire MMCF market off tree pulp ‘using only 25 percent of the world’s wasted and discarded cotton and viscose fabrics, thereby saving forests, reducing municipal and industrial waste to landfills, and reducing carbon emissions, energy and water use’.”

Photo: FirminoGennarino / pixabay.com

- circ.earth, acegreen.com.tw/en/

Shoe Recycling:

FASHION FOR GOOD LAUNCHES NEW PILOT WITH BRAND PARTNERS

Netherland-based organization Fashion for Good launches a new pilot with brand partners adidas, Inditex, Target and Zalando, and footwear recycling company FastFeetGrinded. The aim is to test and validate an "innovative footwear recycling process to support the uptake of recycled content in footwear, driving the change towards a more circular footwear industry".

Photo: FastFeetGrinded/Fashion for Good

According to Katrin Ley, Managing Director of Fashion for Good, this project would be a first in the footwear industry "to allow us to understand the sustainable recycling technologies and infrastructures needed to accelerate the transition towards a circular future. By fostering collaborative partnerships like this, where companies come together to share knowledge and validate innovation, we pave the way for scalable solutions."

Globally, 24 billion shoes are added to the market each year, and a staggering 90 percent of shoes were either landfilled or incinerated, the organization referred to World Footwear Yearbook (2020) and Vivobarefoot. "To tackle this challenge, Fashion for Good has launched a new pilot with partners adidas, Inditex, Target and Zalando, in collaboration with innovator FastFeetGrinded, aiming to test and validate the footwear recycling process and support the uptake of recycled materials in footwear." The partners would divert pre- and post-consumer footwear to the recycling company that is part of the Dutch Heilig Group; the firms of this group offer international technical solutions to many industrial markets.

As reported, FastFeetGrinded can deconstruct any type of pre- and post-consumer shoe, breaking it down into its macro-components. These materials are then subsequently grinded down into smaller high-purity granulates, which the company utilizes to create material streams for repurposed use. "The next step involves FastFeetGrinded's extensive network of supply chain partners, who will produce output products, such as outsoles, midsoles, and flip flops."

The brands would closely evaluate the products' quality and purity, aiming to showcase the potential of the applied footwear recycling technology and pave the way for scalable solutions.

With the demand for raw materials expected to triple by 2050, urgent action is needed to reduce the dependence on virgin resources, Fashion for Good underlined. "FastFeetGrinded, as a key recycling innovator, plays a crucial role in providing the industry with secondary raw materials, catering to the rising market demand and regulatory requirements for recycled content." To meet demand, FastFeetGrinded would operate in a 4,000 square meter facility and are already planning a global expansion.

- fashionforgood.com
- fastfeetgrinded.eu

New Investment:

ALPLA'S PET RECYCLING PLANT

The Austria-based company invests 60 million Euro in a PET recycling plant in South Africa to recycle around 60,000 tons of PET bottles per year from 2025 onwards.

ALPLA is known for developing and producing plastic packaging solutions. Based in Austria, the family company has a long history and more than 30 years of experience. The company's future plans now include strengthening its commitment in South Africa. After opening its new headquarters in Lanseria near Johannesburg in 2022, the next step is marked by building a recycling plant in the South African coastal town of Ballito, north of Durban. Construction started in summer 2023, and completion is planned for autumn 2024. In total, ALPLA is investing around 60 million Euro in strengthening the regional circular economy.

As communicated by the company, in the future, almost 60,000 tons of PET bottles will be recycled per year, and 35,000 tons of mechanically recycled rPET flakes and pellets will be produced, the majority of which ALPLA will process to produce its own bottles.

"Our goal is a bottle-to-bottle cycle at the location of our activities. In this way, as a recycler and producer, we can secure the supply of safe, affordable, and sustainable packaging worldwide and at the same time promote awareness of the recyclable material," emphasizes ALPLA CEO Philipp Lehner. Apparently, the new plant will increase the annual production capacity of all ALPLA recycling companies and cooperations to around 238,000 tons for rPET (recycled PET) and 74,000 tons for rHDPE (recycled HDPE).

Increasing demand

The market for high-quality products made from recycled materials is growing not only in Europe, Asia, and North and South America but also in South Africa. There, the increasing demand is accompanied by the gradual expansion of nationwide collection systems. "Together with the Producer Responsibility Organisation PETCO, who identified KwaZulu Natal as an opportunity for enterprise development, and other key stakeholders, ALPLA has been supporting the development of the collection value chain, the sensitization of society, and the avoidance of landfills for years," explains Mike Resnicek, ALPLA Finance and Commercial Director Africa, Middle East and Turkey, and Director and Member of the Board of PETCO.

Local know-how

ALPLA has jointly decided to approach the investment with a local partner to realize the recycling plant. "Local know-how combined with a sound understanding of the cultural and economic landscape is key for such a large-scale project," Resnicek explains. PETCO CEO Cheri Scholtz says: "This investment in a further bottle-to-bottle plant in South Africa, and particularly with a local partner, is welcome news. We need additional offtake for the growing number of post-consumer bottles that we are unlocking nationally, and this also complements our transformation strategy."

ALPLA is represented at seven locations in South Africa, Mauritius and Angola. In mid-October 2022, the region's new manufacturing headquarter was inaugurated in Lanseria near Johannesburg. Prior to this, a second production plant for PET preforms was opened in Angola's capital Luanda. ALPLA is planning further investments in southern Africa in the coming years.

alpla.com/en

ALPLA is investing around 60 million Euro in the construction of its first own recycling plant in southern Africa. The company will build a modern plant in Ballito in the South African province of KwaZulu Natal by autumn 2024

Photo: ALPLA

BB Engineering:

INNOVATIONS IN AIR-TEXTURIZING, SPINNING AND RECYCLING

At ITMA – one of the world's largest international textile and garment technology exhibitions, that took place in June in Milan (Italy) – German company BB Engineering GmbH was an official sub-exhibitor of its parent company, Swiss Oerlikon Group, for the first time. In addition to man-made fiber spinning (VarioFil compact spinning line) and fiber-to-fiber recycling (VacuFil recycling technology), the company focused on introducing its new JeTex air-texturizing system, and left the fair with a pleasing volume of orders.

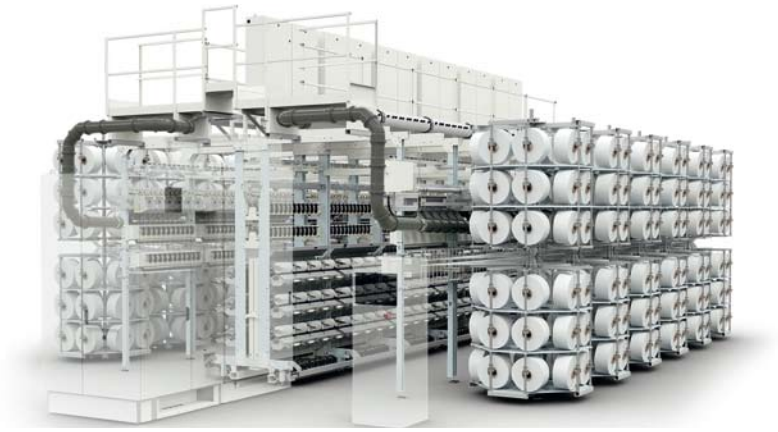


Photo: BB Engineering GmbH

With the new JeTex air-texturizing system, BBE is expanding its product portfolio to offer a finishing technology as well. It is a production line for high-quality air-texturized yarn (ATY). According to the company, it combines an innovative texturing system developed by BB Engineering as a key component with state-of-the-art components by Oerlikon Barmag to ensure fast production speed, the desired effects, and the quality of the product. At ITMA, JeTex air-texturizing was demonstrated in the 'Experience Center' of the Oerlikon stand. Regarding the proven and popular VarioFil compact spinning line for synthetic fibers, BB Engineering also brought some innovations to ITMA: Higher production capacities per spinning position and improved spin pack lifetime form a new machine generation with increased productivity. The VacuFil PET recycling system has been further developed and was presented as BB Engineering's solution for the waste-free production of filament yarns. "The patented liquid-state polycondensation (LSP) unit Visco+ for viscosity adjustment and control as key component was the main focus and attracted great interest," the supplier in the field of machinery and plant engineering for the synthetic fiber and film industry informed.

bbeng.de/en

Photo: NiccoElNino / stock.adobe.com

Interview with BIR President Susie Burrage:

"THE MARKET FOR RECYCLED MATERIALS HAS EXPERIENCED SIGNIFICANT DEVELOPMENT AND GROWTH"

At the latest convention of the Bureau of International Recycling (BIR) in Amsterdam, Susie Burrage was elected as the 23rd President of the global federation. She succeeds Tom Bird, who had completed his four-year term in office.

Susie Burrage has committed herself to recycling for many years. She is the fourth generation of her family in recycling and worked alongside her father before founding her own company, Recycled Products Ltd, in 2001. Since 2016, she is also President of the British Metals Recycling Association (BMRA). Furthermore, Susie Burrage serves as President of the European Metal Trade and Recycling Branch of EuRIC (European Recycling Industries' Confederation), UK Ambassador for the BIR, Ambassador for the Global Recycling Foundation, and Patron of the Bureau of Middle East Recycling. All roles are undertaken voluntarily.

On June 29 this year, she attended her official investiture at Windsor Castle as Officer of the British Empire (OBE); she was appointed in the King's inaugural New Year Honours in 2023 in recognition of her services to the recycling and environment sector.

As BIR's new president, the recycling expert has ambitious plans. In GLOBAL RECYCLING, she explained her key aims.

In your speech as elected BIR President, you mentioned several goals. Which one takes priority over the others?

Indeed, during my acceptance speech, I mentioned a number of goals that I have set for my presidency: utilizing the enthusiasm of young people via our Young Traders Group, encouraging the participation of women in BIR committees, growing membership in numbers and geographical outreach, enhancing member benefits, continuing to generate factual information and data to support advocacy and com-

munication efforts, and strengthening certain Divisions and Committees within BIR, specifically those related to paper, textiles, and plastics.

They are all important, but my main focus since my election as BIR President has been to work closely with the BIR Director General Arnaud Brunet and his team to define some immediate action points: with Communications Director Elisabeth Christ we are working on expanding our communications outputs, in particular regarding the extensive scope of our advocacy work led by our newly appointed Trade and Environment Director, Alev Somer. Another immediate priority is of course our upcoming World Recycling Conference in Abu Dhabi on October (22) 23-24.

For a long time, the role of recycling in the circular economy, CO_2 savings and material supply have been well-known and proven by studies. Nevertheless, it seems that not everyone is fully convinced of the benefits. Therefore, recycling does not have the status it deserves. In your opinion, how could this be changed?

There are several ways in which we can increase recognition and improve the perception of the recycling industry. Firstly, by continuing to work closely with Governments around the world through our World Council of National Associations. We must highlight successful recycling initiatives and projects through various media outlets. By sharing positive stories, we can inspire others and shine a light on the achievements and importance of the recycling industry. We can launch comprehensive campaigns to educate the general public about the importance and benefits of recycling. BIR has recently engaged the services of Unity, a high-profile PR company to assist with this. We can develop partnerships with schools and educational institutions and encourage them to integrate recycling education into their curriculums. By targeting the younger generation, we can instill a long-lasting appreciation for recycling and its industry.

Does this situation also have something to do with the market's activities in more challenging economic times?

In terms of international trade, the horizon is cloudier with the threat of recession hovering in Western countries and the energy crisis leading to higher logistical costs, combined with increasing trade barriers, including sanctions and protectionist policies.

What is your view on the development of the market for different types of recycled materials?

The market for recycled materials has experienced significant development and growth in recent years. Paper recycling is one of the longest-standing. The recycled paper and cardboard market has steadily grown due to increased demand from industries such as packaging, printing, and tissue manufacturing. The development of advanced paper recycling technologies has contributed to better quality recycled paper, making it more desirable for various applications.

The market for recycled plastics has seen significant progress, albeit with some challenges. With increased awareness of plastic pollution, there is a growing demand for recycled plastics in industries such as packaging, automotive, construction, and consumer goods. Technological advancements have improved the sorting and processing of different plastic types, allowing for higher-quality recycled materials. However, issues like limited infrastructure and lack of standardized plastic recycling systems have led to variations in market development across regions.

The market for recycled metals, such as aluminum, steel, and copper, is well established and has developed well due to factors like high scrap metal prices, energy savings in production, and environmental benefits. Recycling rates for metals are generally high, thanks to the well-established infrastructure for collection and processing. The automotive, construction, and manufacturing industries are major consumers of recycled metals, driving the demand for these materials.

The market for recycled electronics and e-waste has gained attention due to the increasing volume of electronic waste globally. Recovery of valuable metals like gold, silver, and copper from electronic waste is economically beneficial and environmentally responsible. The development of specialized e-waste recycling facilities and the implementation of regulations for proper disposal and recycling have helped drive the growth of this market.

The market for recycling textiles has experienced significant growth in recent years due to increased awareness about sustainability, environmental concerns and the circular economy. Despite the progress made in the textiles recycling market, challenges still exist, such as limited infra-

There are several ways in which we can increase recognition and improve the perception of the recycling industry.

structure, lack of consumer awareness, and the need for further technological advancements.

Overall, the market for different types of recycled materials has developed and diversified in response to the growing recognition of the environmental and economic benefits of recycling. The expansion of recycling infrastructure, advancements in recycling technologies and increased demand from various industries have all contributed to the positive development of these markets. However, continued efforts are needed to address challenges such as improving recycling rates, establishing consistent quality standards, and fostering sustainable market development practices.

To what extent do import and export restrictions affect companies in the recycling industry and the use of secondary raw materials?

BIR's mission has always been to promote free and fair trade of recyclables in a sustainable and competitive world economy, to encourage the environmentally sound management of resources, and the use of recycled materials worldwide. Its mission has become ever more important in the current geopolitical context with increasing pressure on international trade, and access to primary and secondary resources, together with net-zero ambitions and surging energy prices. The green and digital transition has increased the demand for critical and strategic raw materials to produce renewable energy and the technologies we use in our modern lives, as well as in defense and aerospace. This significant demand for critical raw materials has led to a growing number of government initiatives across the world to secure the supply of those materials with new bilateral trade agreements and more protectionist policies at national level.

BIR, as a world recycling association, is growing quite rapidly and now has almost 1,000 members from 70 countries worldwide. Which actions are planned to increase the number of members and to enlarge the "geographical footprint"?

One of the best ways to attract attention to our organization is to utilize various communications channels such as social media, email, newsletters and industry publications and reach out to existing and potential members. Of course, we must and will continue to hold our premier world recycling conferences. These gatherings serve as platforms to attract new members by showcasing BIR's influence, expertise and networking opportunities.

You also signaled your intention to strengthen some of BIR's Divisions and Committees, particularly those covering paper, textiles and plastics. Are these the sectors that will become increasingly important for the industry in the foreseeable future?

As we navigate the challenges of environmental sustainability, it is crucial to recognize the importance of all streams of recycling. Historically, BIR's four commodity divisions were equally strong, but for some time now, BIR has tended to be seen as predominately metal-centric so I wish to increase the voice of the other streams we represent. All streams reduce waste, save energy, reduce emissions, create jobs, enable economic growth and are essential ingredients in the circular economy.

Susie Burrage: "BIR's mission has always been to promote free and fair trade of recyclables in a sustainable and competitive world economy, to encourage the environmentally sound management of resources, and the use of recycled materials worldwide."

Photo: BIR

What benefits does BIR offer to its members?

A trading platform, a networking opportunity, advocacy, experience, knowledge – where else in the recycling world are you guaranteed the opportunity to rub shoulders with recycling industry greats and benefit from their words of wisdom.

Among your goals for the next few years is to encourage young people to get involved in the industry "by increasing the presence of young traders and their involvement in BIR structures and governance". How do you plan to achieve this?

Role models play a crucial role in shaping individuals' beliefs, attitudes and behaviors. They serve as sources of inspiration, guidance, and motivation for people, especially in their formative years. A role model is always inspirational, especially when it is someone you can identify with. By increasing the number of young traders in BIR structures and governance I hope to encourage many more to get involved once they see the opportunities and benefits of being involved. Unfortunately, there weren't any women for me to follow in the footsteps of, but some of the most precious and significant moments of my career are when a young female takes the time to tell me that I have inspired them.

How could the next generation – women and men – contribute to BIR's further development?

Despite the tsunami of legislative changes and challenges we are facing, I believe the recycling industry, despite having been in successful existence for many decades, is now coming of age in the eyes of the general public. I am a strong believer in collaboration and the more of us there are, the louder and stronger our voice will be.

By involving the young people already within BIR in decision-making, I hope to give them a sense of empowerment, autonomy, responsibility and ownership of BIR, their international recycling organization going forward.

Ms. Burrage, thank you very much for the interview!

Waste at Galapagos: HOW TO KEEP THE ISLANDS CLEAN

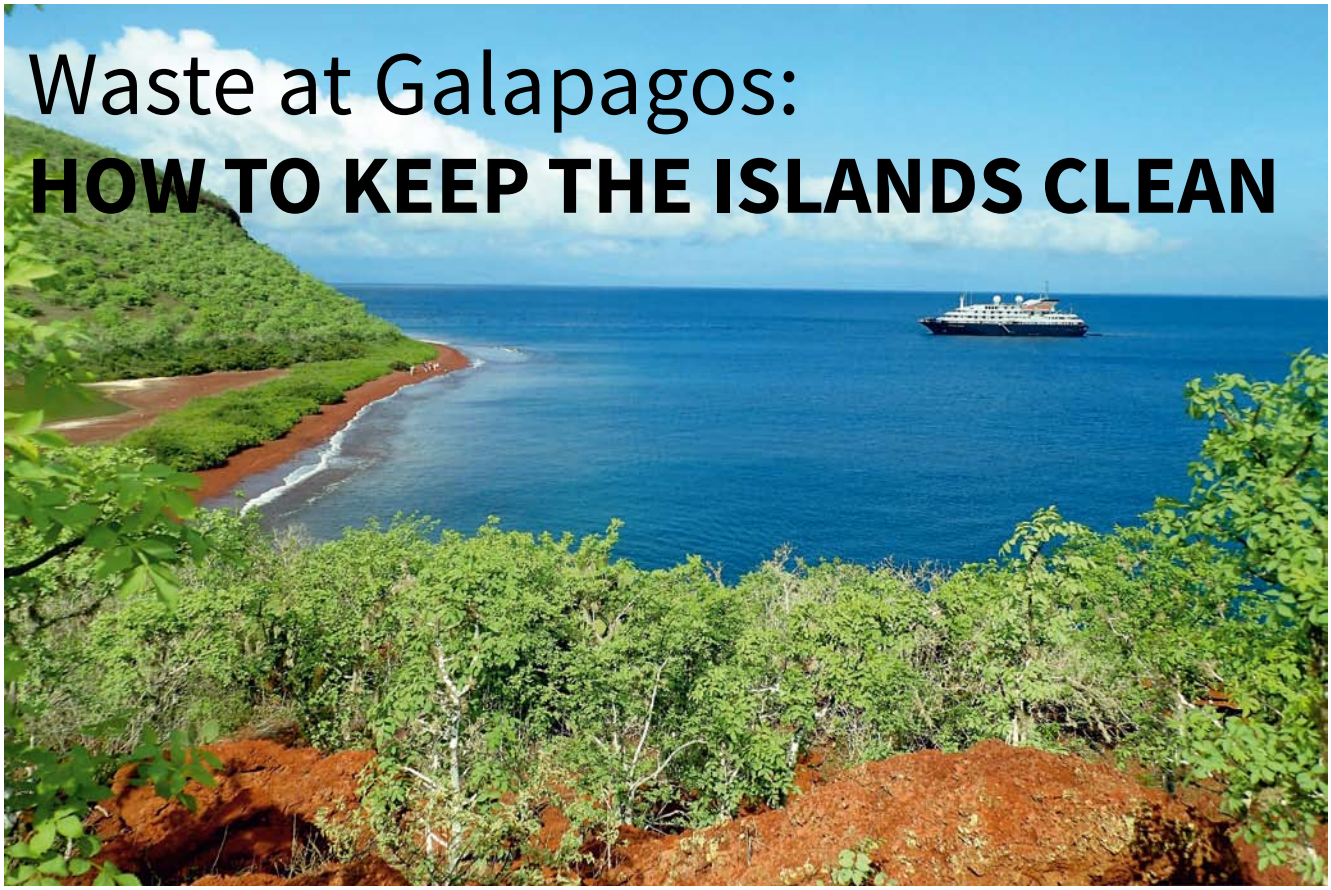


Photo: Gonzo1887 / pixabay.com

The Galapagos archipelago is composed of 127 islands, islets and rocks. In 1959, 97 percent of the total emerged surface was appointed National Park. In 2001 the islands were declared a UNESCO World Natural Heritage Site. But in 2018, the German Kreditanstalt für Wiederaufbau described the archipelago as a "paradise in need": Galapagos is confronted with a growing amount of waste.

According to a WWF paper on "Integrated Solid Waste Management in Island Regions", since 2006 on Santa Cruz Island, differentiated collection had "almost 100 percent coverage" with a recycling system in place. In fact, until 2009, no technological landfill existed, and the waste was spread at a special location. The first "real" landfill was installed in 2011 at the Santa Cruz Island after a land reclamation. At that time, San Christóbal and Santa Cruz produced about 10-13 tons of waste per day, respectively. That did not include the waste raised by the cruise ships – all in all, about three tons daily – that untreated ended at dumps. A video taken in 2010 merely shows an underdeveloped separation facility consisting of a roofed shelf with several small heaps of recyclables and a huge open-air pile of plastic bottles manually separated by colors without conveyor. "The recyclable waste is separated manually and treated to retrieve the greatest possible amount, while the organic waste is started at the stage of shredding and biostabilization", an MDPI-article in 2014 explained. The efficiency at that time was estimated at 10 m^3/day for recycled material and 1-2 m^3/day for treating organic waste.

Classified and categorized?

Galapagos Conservation Trust's Waste Management Report 2021 mentions that the archipelago was the first province in Ecuador to have a waste management system with "separation at source". It started in Santa Cruz in 2003, in San Christóbal in 2007 and in Isabela in 2011. WWF reported that between 2003 and 2006, with funding from the European Union, the municipality of Santa Cruz built a "recycling plant" and a "compost area" and purchased a waste compactor truck. Moreover, a system for separating and recycling packaging waste was implemented in Santa Cruz Island until 2010. Allegedly waste was then classified and categorized on material staying in the islands for reuse and materials selected for shipment to the continent. However,

students from the Colorado State University reported that in 2016 – although residents actively separating their waste into organic, recyclable, and non-organic color-coded containers – "both recyclables and non-organic waste is currently being dumped into a single unsealed landfill (which is on fire) since the only compacting machine they have is not functioning".

Cement bags and egg trays

However, in 2012, 125 tons/month of organic waste, 130 tons/month of non-recyclables and 75 tons/month of recyclables are said to be generated and treated in the Fabricio Valverde Recycling Center (PAFV) in Santa Cruz, built with funds from the European Union. The recyclables included cardboard (58 percent), glass (24 percent), plastic (9 percent), paper (6 percent) and cans, Tetra Pak, cement bags, egg trays, and batteries with percentages below one percent. A WWF paper on "Integrated Solid Waste Management in Island Regions" suggests that in 2012 about 50 percent of the overall waste generated on Santa Cruz Island was recycled.

0.85 kg per tourist daily

During the next years, the amount of waste rose. A paper on "Galapagos and the plastic problem" shows a rise from 18.8 tons of waste per day in 2010 to 28.6 tons of waste per day in 2019, "reflecting the growth in tourist numbers and the local population". While in the late 1960s, the islands received approximately 2,000 visitors per year, the number increased to over 160,000 tourists visiting each year in 2016 and about 300.000 in 2020. Additionally, the tourism model changed from strongly regulated boat tourism to weakly regulated land-based tourism resulting in increasing local waste productions and pressure on collection systems. The economic benefits of the tourism industry also led to a boom in resident population growth from 4,000 in 1970 to over 25,000 in 2016 and slightly over 33,000 in 2020, says Max Martin, director of environment technology firm Orca Tec, in a video lecture. A Veolia study in 2019 projected the daily waste production of a visitor at 0.85 kg and an inhabitant at 0.78 kg.

An unpublished document released at the University of San Francisco in Quito in 2020 balanced the waste streams of Santa Cruz and San Christóbal differentiated between organic, "rejected" and recyclable. Santa Cruz stood for 1,418,132; 2,119,076, and 1,703,406 kg, San Christóbal delivered 88,635; 86,629, and 36,220 kg. Baltra – the island with the commercially most used airport of the archipelago – contributed 130,588 kg.

Ensuring optimal management?

Today each of the three islands Santa Cruz, San Christóbal and Isabela possess a recycling center and a landfill. With the exception of Fabricio Valverde Recycling Center on Santa Cruz (which in 2016 was in the process of obtaining its license), all garbage dumps hold current Environmental Licenses and Management Plans approved by the Ecuadorian Environment Ministry and the Galapagos National Park Directorate. And the latter emphasized "thus ensuring optimal management of waste generated in the islands".

A look at the main waste streams relativizes the "optimal" management. Orca Tec chief Max Martin presented figures of 2019 showing the daily waste at Santa Cruz amounting to 17.90 tons – 91 percent municipal solid waste and nine percent bulky waste. Residual waste and part of recycling shortfall are adding to 55 percent going to landfill, as well as organics in the tune of 22 percent, that cannot be separated from microplastics properly and is dumped too. That leaves 1.12 tons of paper and cardboard, 950 kg glass, 480 kg plastic, 50 kg cans, 50 kg TetraPak and 60 kg others for recycling per year – 15 percent of all waste collected.

House-by-house collection

The public and private waste is sorted into three bins: green for organic waste, blue for recyclables, and black for non-recyclables. The collection in Santa Cruz is done house-by-house following an itinerary, while in San Christóbal it follows four different routes: solid household waste house-to-house, paperboard, street sweeping und dangerous waste from hospitals. The material is transported to municipality-driven waste management and recycling sites. Here, it is sorted, and the recyclables prepared for transport to the mainland. An insider is cited, that the haulage takes place whenever the volume of the waste in San Christóbal reaches around 20 tons. The transports from Santa Cruz to Guayaquil are handled every fortnight with full loads of containers.

> For sure, the cruise tour operators can do their part to avoid waste production and dumping waste into the ocean by their customers.

On a small water taxi

On paper, the recyclable material should be transported to the docks for transport to be sold in the mainland Ecuadorian cities of Guayaquil and Quito. But the Waste Management Report 2021 foreshadows that there are still "difficulties in transporting the waste from the islands to the mainland". A blog post from Colorado State University illustrates that not only the conveyance from the recycling facilities to the docks "creates substantial overhead". But in 2016, on Isabela Island, there was also no port on the island, so the container had to be carried out "on one small water taxi at a time to the cargo ships". Pictures exist from 2015 showing bales unloaded from vans and placed in barges. Another source indicates that in 2016 Puerto Ayora (Santa Cruz), Puerto Baquerizo Moreno (San Christóbal), Puerto Villamil (Isabela), and Puerto Velasco Ibarra (Floreana) respectively, were "the docks" from where the containers had to be picked up by the vessel – not the ports.

2,500 items per square meter

There is a second source of waste, deriving from the coastal area. In 1999, the coastal waves washed six tons of metal, 5.5 tons of plastic, four tons of synthetic rubber, 2.3 tons of wood, 1.2 tons of fiberglass, one ton of glass and some clothes, paper, cardboard and non-classified ashore. Today, especially plastics are the most present form of waste. From 2009 to 2014, fishermen, volunteers, residents, scientists, and park rangers removed 71 metric tons of plastic waste from the remote beaches, says an article on "Galápagos and the plastic problem". Between 2018 and 2021, more than 74,000 plastic bottles were collected, according to Galapagos National Park data. In 2021, a coastal cleanup gathered 97,667 plastic items, 12,057 fishing accessories, 1,262 metal items, 487 fabric objects, 380 wood items and about 5,000 pieces of glass. Additionally, more than 2,500 micro plastics per square meter were found on the most polluted beaches in Galapagos, and 69 percent of identifiable plastics found on Galapagos coastlines are single-use items, says the Galapagos Conservation Trust.

China-origin beach waste

High-resolution computer models acknowledged that the plastic pollution at the beach comes from floating plastic particles entering the ocean in Perú, Ecuador, Colombia, and Chile. They also indicated that it is highly improbable that PET released in Asia would reach the Galápagos Islands. Nevertheless, China is the second largest source of micro plastics. According to the article "Galapagos and the plastic problem", the analyzed labels of "China-origin products were legible, lacking biofouling, and containing recent expiration dates" and were caused probably by "the poor waste management systems of industrial fishing fleets". That is even more plausible, as the appearance of this sort of waste correlates with the beginning of the Chinese fleet fishing in the Galapagos region with "floating cities that remain at sea for two or three years while their crews rotate, and no one knows or keeps track of where their trash ends". The article identifies PET as predominant type of plastic and Peruvian beverage producer AjeCroup, Coca-Cola, and Tingy Holding Corporation, a major Taiwan-based food and beverage maker, as top three PET-manufacturers.

200 US-Dollar per ton

However, the municipalities of San Cristóbal and Santa Cruz implemented different systems of handling the collected and sorted material. San Cristóbal has about 120 tons of recyclables, transfers them to the dock, puts them into containers and manages the transport to the recycling companies. The carriage from island to mainland is free of charge for the municipality, as the Organic Law of the Special Regime of the Province of Galapagos necessitates this. On the other hand, the 70 containers of Santa Cruz cost 150,000 US-Dollar, while – depending on amount and market prices – the sale of the material recently ranged between 30,000 and 40,000 US-Dollar per year. So merely about 30 percent of the waste management was recovered. "This action prevents all that material from staying on the island" and must be seen as an investment, Mario Piu, former Environmental Director of Santa Cruz, is cited by the Earthjournalism Network. The receiving companies are obliged to transport inorganic marketable waste generated in the archipelago for free. The Galapagos Waste Management report 2021 puts the costs to manage each ton of waste produced in the archipelago at 200 US-Dollar – approximately 2.1 million US-Dollar per year. Around 12 percent of this waste is estimated to be plastics meaning that the local population and tourists may be generating up to 1,253 tons of plastics annually.

Of course, the governments of the islands tried to reduce costs. "The municipalities of the province, led by Santa Cruz, have driven strong campaigns to encourage recycling and to establishing a culture of waste separation", a status report prepared for the UNESCO Natural World Heritage Centre in 2016 underlined. "Large quantities of usable waste" could be recovered. But that was not enough. So, the municipal governments of San Cristóbal and Isabela signed an agreement with recycling companies on the mainland for "providing training and technical assistance to improve the processes of handling usable waste". The aim was to teach operators to "learn about quality issues, raw materials, the process of identifying contaminants and the correct way of collecting and shipping", the Ministry of the Environment gave account. And repeated the training on

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solid waste and "recycling issues" to "generate a long-term sustainable system allowing cooperation of Galapagos' municipalities and private companies".

Carbon footprint under 13 percent

Some private investment was done to tackle waste and save money. For example, the top-class travel agency Ecoventura installed two new machines – one that will compact plastic, cardboard, and paper for more efficient transportation, and the other to break down glass into a powder-like substance. The materials are then sent on a regular commercial passenger flight by aero plane to the mainland. This initiative – in partnership with an airline – was aimed to ensure that "no rubbish produced on any of our luxury expedition yachts will be sent to landfill in the Galapagos" and that each passenger's carbon footprint will be reduced by up to 13 percent. Likewise, the Tourist agency Silversea Cruises is in its own words "the first promoter that keeps the complete waste at the Galapagos islands away from the local landfill" by classifying and sorting all rubbish appearing on board of the cruise ship Silver Origin. Cardboard, plastic and cullet are aviated to the mainland and residual waste goes to Guayaquil. There it will be recycled, treated or burnt with used oil correspondently to official specifications.

A list of recipients

No official data can be found about the volume of recyclables that left the Galapagos Islands. But the Peruanian online magazine El Comerico has documented the transfers of recyclables to the mainland since 2012. The volumes differ between two tons from San Cristóbal in 2015 and 6,100 tons from Santa Cruz in 2018 – not to forget 35,000 tires in 2012. A list of the recipients of the material can be found in the before mentioned unpublished document from the University of Quito. It contains: Continental General Tires that will receive the shipment of tires. Plastic goes to Repapers Reciclaje del Ecuador with its 25 employees. The paperboard is dedicated to the Grupo Cartopel office in Guayaquil. Cridesa, the specialist for glass fabrication and vitrification, takes over residual glass. Scrap steel treatment is the task of Novacero, manufacturing nonmetallic mineral products, abrasive metal and steel products. Fibras nacionales, a company dedicated to purchasing all recyclable materials, is interested in paper and paperboard. Holcim produces building materials worldwide, but also takes care of used cement bags from Galapagos. And Tetra Pak, together with Tonicorp and the municipal government of Santa Cruz, signed an agreement to create initiatives that support the protection of the Galapagos Islands and promote their circular economy. According to Tetra Pak, a waste recovery initiative for a generation charge system makes Santa Cruz "the only city in Ecuador that collects close to 98 percent of the total waste".

A duty of international dimension

Galapagos' waste management is under construction. The Galapagos Waste Management Report 2021 makes clear that "there is still a need for campaigns for local communities and tourists, however, with pilot data suggesting that many people are not aware of existing schemes or the potential for new alternative products and recycling methods". This coheres with the fact that it is necessary for the infrastructure "to identify optimal routes for the waste's transportation" as the study from the University of Quito suggests. Surely, the cruise tour operators can do their part to avoid waste production and dumping waste into the ocean by their customers. Yet the greatest upcoming task is to stop the pollution of the oceans that results in littering the beaches. But that is a political duty of international dimensions.

JAPAN: PET BOTTLES PRODUCED WITH BIO-BASED MATERIALS

Finland-based company Neste has entered a cooperation with Suntory, ENEOS and Mitsubishi Corporation to enable the production of PET (Polyethylene Terephthalate) resin made with renewable "Neste RE" on a commercial scale. This material is Neste's feedstock for polymers production, made entirely from bio-based raw materials such as waste and residues (for example, used cooking oil) to replace fossil feedstock in the value chain. "Japanese beverage company Suntory will utilize the renewable PET resin to produce bottles for its products in 2024," Neste informed in August this year. A new partner for Neste in Japan, ENEOS would use bio-intermediates based on "Neste RE" to produce bio-PX (Bio-Paraxylene) at its Mizushima Refinery in Okayama, Japan. The bio-PX will be converted to PTA (Purified Terephthalic Acid) and subsequently to PET resin for Suntory to manufacture their PET bottles. According to the information, Mitsubishi Corporation will be coordinating the collaboration between the value chain partners.

neste.com

INTERNATIONAL NETWORK TO BRING TEXTILE RECYCLING PULP TO THE MARKET

Renewcell, a Swedish sustain-tech company that developed a patented process, which enables the recycling of cellulosic textile waste, has announced the launch of the CIRCULOSE Supplier Network (CSN).

The group currently consists of forty-seven yarn and textile producers helping drive the circular economy forward by enabling a steady supply of CIRCULOSE to the market. The launch would mark "a significant milestone in the advancement of the circular economy in the fashion industry," Renewcell and the group members are convinced.

Shredded denim and circulose pulp

Photo: Renewcell

According to Renewcell, it opened the first-ever industrial-scale chemical textile-to-textile recycling facility in November 2022 in Sundsvall (Sweden), aptly named "Renewcell 1". The company dispatched the first shipment of CIRCULOSE dissolving pulp produced in December of the same year. "With the recent RCS (Recycled Claim Standard) certification achieved at 'Renewcell 1', accredited CIRCULOSE pulp is now being produced on a larger scale," the Swedish firm gave account. "With an initial annual capacity of 60,000 metric tons, 'Renewcell 1' will be scaled up to produce 120,000 metric tons of pulp, equivalent to 600 million t-shirts."

CIRCULOSE is a raw material derived from recovering cellulose found in worn-out clothing and transformed into a dissolving pulp made from 100 percent recycled textiles. "The pulp serves as the foundation for various types of regenerated fibers, including viscose, lyocell, modal, acetate, and other man-made cellulosic fibers," Renewcell pointed out. "Currently viscose made with CIRCULOSE is available from suppliers including Tangshan Sanyou and Yibin Grace through our commercial partner Ekman."

The CIRCULOSE Supplier Network is comprised of yarn and textile producers streamlining CIRCULOSE production across the supply chain. These early adopters were revolutionizing the marketplace by becoming the first to access volumes of the "next generation" raw material. By joining the CSN, "members are committing to the continuous development of circular solutions and play a vital role in sustainable textiles and end products under the CIRCULOSE brand name", the Swedish pulp provider underlined.

circulo.se/en/

CIRCULOSE Supplier Network members span the globe and are operational in twelve countries. The full list is below:

- Austria: Linz Textiles
- Bangladesh: CYCLO® Recycled Fibers; Beximco Textiles; Shasha Denims
- China: Suzhou Shiyuan Textile Co., Ltd., (aka S&Y); Dezhou Huayuan Eco-Technology Co.,Ltd.; Jiangsu Pointer Textile Co.,Ltd.; Prosperity Textile (H.K.) Ltd.; Dongheng Textile Co., Ltd; Unitedtex Enterprise Ltd.; Hangzhou Jiayi Garment Co.,Ltd; Wujiang Dongfang Group; Polyace Textile and Yarn Co., Ltd.; Tat Fung Textile Co., Ltd. /Panther Denim; Texhong Textile Group; ColouriZD/Taylor Home & Fashions Ltd.; Crystal Group
- India: Arvind Ltd;. Trident Group; Pallavaa Group
- Indonesia: Sritex
- Italy: Beste SpA; Albini Group
- Mexico: Cone Denim
- Pakistan: Sapphire Textile Mills Ltd.; Artistic Milliners; Soorty; AGI Denim
- Portugal: Brito Knitting; RDD Textiles; Inovafil; Tearfil Textile Yarns; Tintex Textiles; Riopele; TMG Textiles; Impetus Group; ACATEL; Matias & Araujo
- Spain: Hallotex; Textil Santanderina
- Sri Lanka: MAS Holdings
- Turkey: Bossa Denim; Kipas Holding; Orta Anadolu; Karacasu Tekstil; Gulle Tekstil; Calik Denim

ECOMONDO 2023

The 26th edition of the international Italian trade fair on technologies for the circular economy, to be held from 7th to 10th November at Rimini Expo Center, has announced full capacity already in April.

According to the organizer Italian Exhibition Group (IEG), this year's Ecomondo is the first edition occupying the entire trade fairgrounds. Also new: the exhibition layout. Aligned with the motto "The Ecosystem of the Ecological Transition", it presents the "most innovative technologies for sustainable competitiveness" to the market in six themed macro-areas. The spectrum ranges from exploiting waste to make further resources to the regeneration of soil and agro-forestry and food ecosystems, from energy obtained from biomass to the use of waste as secondary raw materials. The scope also includes the entire integrated water cycle and environmental monitoring, protection of the seas and aquatic environments in their essential function for human sustenance and economic activities.

The water supply chain and SAL.VE

According to IEG, Waste as Resource, Sites & Soil Restoration, Circular & Regenerative Bio-economy, Bio-Energy & Agroecology, Water Cycle & Blue Economy, Environmental Monitoring & Control will be the themed exhibition areas at the event. Two sectors would be highlighted from among and alongside these: the specific 'Water' area and the new edition of SAL.VE. "In the former, visitors will find the entire water resource supply chain: from capture to restitution and reuse with a focus on digital transformation, which is now a key element in improving its management," the organizers informed. "In the biennial SAL.VE area, organized in partnership with ANFIA, leading manufacturers will be exhibiting vehicles for ecological waste collection and disposal services as well as urban sanitation. Test drives will be available outside."

Districts for "beacon" projects

Additionally, there will be space at the Expo Center for three industrial districts for which the Ministry for the Environment and Energy Security (MASE) has given the go-ahead with a contribution to 160 "beacon" projects for the circular economy. "Rimini will therefore feature the WEEE District with a specific focus on repowering technologies and new systems for recycling waste from electrical and electronic equipment, photovoltaic panels and wind turbine blades." The PAPER District would focus on systems for the paper and cardboard collection, logistics and recycling in cooperation with COMIECO. "Lastly, a themed itinerary will be dedicated to the production of plastics with a focus on recycling systems and marine litter."

Textile waste, eco-design and supply chain sustainability

The textile industry has been identified as a key value chain for which the European Union has foreseen actions to promote its sustainability, circularity, traceability and transparency. Key factors are eco-design requirements, producer responsibility schemes and labelling systems. "In Rimini, ample emphasis will be placed on the entire supply chain: from production to post-consumption," IEG announced. "The objective of all stakeholders is to provide answers to these challenges by providing information about ongoing projects and ultimate goals as well as promoting new business models in order to outline the state of the art of textile waste management in Italian municipalities." There would be a debate and exhibition area with all stakeholders: waste producers, managers, consortia and associations, research and development institutes, textile treatment and valorization plants, without forgetting the second-hand sector.

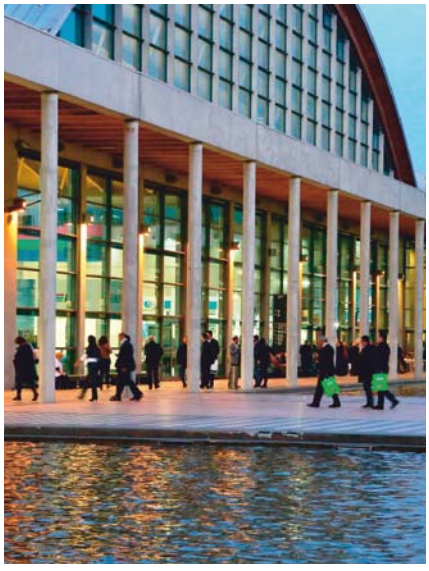


Photo: Italian Exhibition Group SpA

Bio cities

Ecomondo and K.EY have parted company on the trade show calendar, but the smart city, traditionally the falling point of renewable energies, can also be categorized under 'sustainability' and 'healthy'. "The Circular and Healthy Cities project does just that by regenerating the city, making it greener and more efficient in the way it manages water, food, wastewater and waste."

Start-ups

As reported, the Start-Up and Scale-Up Innovation area in the new East entrance will be back and further extended. "Companies and investors will have a new and larger platform for dialogue in order to cultivate the new generation of innovative businesses. More than 50 start-ups are expected in Rimini for the 2023 edition." IEG and ITA-Italian Trade Agency intend

to promote the initiative with ART-ER (Territorial Appeal Research, Emilia-Romagna's regional agency) and Confindustria as their main partners, in addition to collaboration with ANGI (National Association of Young Innovators) to promote all-round innovation.

From fishing and aquaculture to the regeneration of ports and coastlines and seawater desalination technologies: the blue economy will include traditional and emerging economic sectors linked to the development of Italian and Mediterranean marine resources, IEG underlined.

Conferences and events

Ecomondo will offer its community a full program of conventions and conferences organized under the aegis of the Technical-Scientific Committee, directed by Professor Fabio Fava from Bologna University, in collaboration with the event's main institutional and technical partners, together with the international board that includes experts from the European Commission, OECD, FAO, UfM, EEA, ISWA.

Top topics will be dealt with in trying to transmit even more knowledge transmission to the Ecomondo community: the priorities of the European Green Deal, the circular economy, the regeneration of polluted areas and ecosystems, the protection of soils and seas and the Mediterranean in particular.

Further push toward internationality

The organizers are convinced that the increased involvement in recent years of profiled operators from the Balkan area, non-EU Europe, North Africa (Egypt, Morocco, and Tunisia), Senegal, Ivory Coast, Angola, Ghana, Rwanda, the Middle East, as well as Canada, Latin America, the United States and China will continue for the next edition.

"The second edition of the Africa Green Growth Forum will be staged thanks to the contribution of prestigious international agencies, intergovernmental institutions, such as the Union for the Mediterranean and UNIDO, non-profit organizations, including Res4Africa, Business Council for Africa, which will present the technological framework and opportunities for growth and development in the African continent," IEG wrote.

en.ecomondo.com

Research Project EnEWA:

LOOKING FOR RECYCLABLE PAPER IN MIXED WASTE

The members of the German initiative – Universität Siegen, RWTH Aachen University, Leipa Group, Propakma, Tomra and Stadler – are developing a solution for recovering and recycling paper from the lightweight packaging, residual waste and commercial waste streams.

According to Statista, the global production of paper and cardboard totals more than 400 million metric tons each year. However, while the paper industry has made significant strides in intensifying the sustainability of its production by enhancing the recycled content of its products, there is much room for improvement. Despite separate waste collection being widespread, a smaller portion of paper produced than might be expected is recovered for recycling. As underlined by engineering firm Stadler, for example, in Germany, as much as 20 percent of the paper produced is not returned into the recycling value stream – and a part of this paper is discarded in mixed waste streams.

"Regulations mandating the minimum content of recycled material in new paper products will require a significant increase in recovered paper for recycling. Even if we were to recycle all the paper collected separately with the existing process, there would not be enough to meet these targets," Annika Ludes, Product Engineer at Stadler, referred to European targets. The research initiative EnEWA would look at a solution to fill the gap "by unlocking the untapped potential of obtaining recyclable paper from the lightweight packaging, residual waste and commercial waste streams". While the project analysis would be based on the paper from mixed waste streams as they are collected in Germany, the solution it is developing will be applicable, with some adaptations, to local situation in other countries. The project kicked off in December 2021 and is due to be completed in November 2024.

Paper fraction from non separates collection

The members of the EnEWA project have set clear objectives: increase recycling rates in paper production and reduce primary energy requirements and CO_2 emissions. "The goal is to achieve an overall recovered paper return rate of 90 percent – including both separate paper collection and special collection systems, which today have a 78 percent return rate, and the residual, commercial and lightweight packaging streams from which barely a small part of paper is currently recovered," a press release informed. "The project is also looking at what can be done to create the conditions for maximizing the amount of paper returned to the recycling loop." This would include discussions with German and EU regulatory authorities with recommendations for updating waste management guidelines to improve the waste streams feeding the sorting process; communication campaigns aimed at raising awareness among consumers about the correct separation of their household waste; and collaboration with producers for the design of packaging that is better for recycling.

Paper fine screenining in test scale

Industrial-scale trials with promising results

The task for Stadler in the project is to provide – in collaboration with Tomra Recycling – technical solutions to extract paper from the mixed streams and sort it into different paper qualities for recycling. In March, industrial-scale trials at Stadler's Test Center in Slovenia were completed. As reported, the sorting process begins with the income stream going through Stadler's ST2000 ballistic separator, followed by optical sorting with Tomra Recycling's AUTOSORT. The process was tested on waste collection samples from different areas of Germany, and in different conditions that may affect the sorting process, such as wet or dirty materials. "This is important because the waste

Photos: EnEWA/Stadler

collection processes vary from country to country, but also domestically at regional level, and even on a seasonal basis," Annika Ludes informed. "Also, waste from these streams is often dirty and may be wet. This means that the solution must have the flexibility to manage this variability."

The tests have generated vast amounts of data, and the analysis is still in the early stages. The RWTH Aachen University team is examining the results of manual and sensor-based analysis of the waste streams to get a good understanding of the ballistic separator's operation with these materials. It is analyzing separation of three main streams: pure paper, separation of paper out of the plastic waste stream, and separation of plastics out of paper. "In terms of the sorting process, the analysis so far has revealed that every paper fraction from the different waste streams has its own characteristics and that, due to its modularity and the range of possible settings, the Stadler STT2000 can be used effectively for sorting non-separated collected paper," the information said. Samplings made earlier in the project to analyze the material composition and paper content of the different waste streams have revealed that approximately 50 percent of the paper in the lightweight packaging stream could have been disposed of within the separate paper collection. "This finding highlighted the need to address the waste collection processes in order to ensure a more effective separation of the streams and, consequently, higher paper recovery rates."

Composition of the paper fraction – manual analyses

The project is also looking beyond the sorting process, according to Alena Spies, from RWTH Aachen. "Different dissolution and stock preparation options as well as a procedure for the hygienization of biological contamination and the separation of hazardous substances have been investigated. An additional focus is on rejects that arise during paper recycling processes. Last year, a complete recycling process has been conducted from paper and board from lightweight packaging waste till new cardboard including several sorting and processing steps. In addition, the project is continuously accompanied by an ecological and economical assessment and the transfer of knowledge of the results to the paper industry. With this project, we hope to establish the developed recycling process into the paper industry to achieve a material recycling of paper and board from lightweight packaging, residual and commercial waste."

Environmental benefits

The paper industry has already improved its carbon footprint through optimization of their plants and reducing the energy requirements in the reprocessing of recovered paper. Based on the provided information, by redirecting the paper from the residual, commercial and lightweight packaging streams into the recycling loop, the process developed by the EnEWA project has the potential, according to initial calculations, to save some 270,000 tons of CO_2 a year.

ants.rwth-aachen.de/cms/IAR/Forschung/Aktuelle-Forschungsprojekte/~topbp/EnEWA/?lidx=1
enewa-forschung.de
w-stadler.de/en/

A German Project:

LITHIUM FROM SPENT ELECTRIC CAR BATTERIES

Led by ACCUREC Recycling GmbH, an internationally active company in battery recycling, various partners – specialty chemicals company Evonik, Oeko-Institut and the IME Process Metallurgy and Recycling Institute at RWTH Aachen – are working on a research project named "EarLi" to recover high-purity lithium from recycled batteries from electric vehicles (EV).

EarLi stands for extraction and purification of lithium hydroxide monohydrate from spent lithium-ion EV batteries for reuse in producing battery cells. As reported, the total project volume is over five million Euro and is funded by the project partners and the Federal Ministry for Economic Affairs and Climate Action (BMWK), Evonik informed in June this year. The research project is scheduled to run for three years.

While metals, such as nickel and cobalt, can already be recovered from batteries in high yields, this is not yet possible for lithium because the process is technically more demanding. As underlined by Dr. Ralph Marquardt, chief innovation officer at Evonik, researchers worldwide were looking for economically viable methods of recovering this valuable raw material for batteries in high quality. The company "wants to play its part in finding a solution that drives forward e-mobility with the lowest possible environmental impact."

Photo: Evonik

Electrolysis for lithium separation

"To this end, an innovative process chain is to be set up on an industrial-type scale to convert the lithium from the black mass – a mixture of different active battery materials – into soluble compounds using a special thermochemical process and subsequently extract the lithium," the information said. "The lithium will then be separated in an electrochemical process using a highly selective ceramic membrane and isolated as battery-grade lithium hydroxide monohydrate. The innovative membrane process should enable cost- and energy-efficient isolation of high-purity lithium hydroxide and thus close the lithium loop in the battery market. Evonik has been working for some years on the development of selective ceramic ion conductors for lithium ions and their application as separation membranes in an electrochemical process."

- accurec.de
- corporate.evonik.com/en
- oeko.de/en/
- metallurgie.rwth-aachen.de

NEW METHOD FOR RECYCLING LITHIUM-ION BATTERIES

Researchers at Swedish Linnaeus University have developed a new way of retrieving cobalt from used lithium-ion batteries.

With a liquid solvent made of readily available substances – a simple derivate of urea and acetamide – over 97 percent of the cobalt can be recovered, the university informed. The researchers see good potential for large-scale application.

Due to the increased demand for lithium-ion batteries combined with the limited availability of the metals needed to produce said batteries, efficient methods for battery recycling are required. Cobalt is one of the main components of modern lithium-ion batteries widely used in electric vehicles and smartphones. Demand for cobalt is strong and expected to increase in coming years, the university is convinced. "Still, only a fraction of discarded batteries is today recycled."

According to Ian Nicholls, professor of chemistry at Linnaeus University, today's methods for recycling cobalt from batteries come with many drawbacks. "They require significant amounts of energy and create by-products that are dangerous for both humans and the environment. With more efficient and environmentally friendly methods, we can reuse a very significant portion of the cobalt that is already in use, instead of mining".

Greener battery recycling

As underlined, a new method for recycling cobalt developed by Ian Nicholls' research group could lead

Photo: Joakim Palmqvist/Linnaeus University

to a greener battery industry because two problems with current recycling are addressed – high-energy costs and dangerous waste.

This is what the cobalt looks like once it has been extracted from lithium-ion batteries

The cobalt is separated by a liquid solvent, which dissolves the lithium cobalt oxide. It "is a combination of two readily available substances: a simple derivate of urea, which is naturally occurring in urine, and acetamide, which can easily be retrieved from acetic acid", explained Subramanian Suriyanarayanan, one of the researchers.

Compared to widely used methods for recycling cobalt, the main benefit of the new solvent is that the process can take place at much lower temperatures. "In our case, the reaction is most efficient at 180 degrees Celsius. That makes our method much more energy efficient than today's commercial options, such as pyrometallurgy, which require extreme temperatures, often exceeding 1,400 degrees," Ian Nicholls was cited. As reported, the researchers have extracted more than 97 percent of the cobalt from pieces of lithium cobalt oxide that have spent two days in the heated solvent. "The raw cobalt has then been used to produce new batteries, which in turn have been recycled with maintained effect," the Linnaeus University gave account.

"New batteries have been constructed in collaboration with researchers at Indian Institute of Technology in Madras, India."

The researchers at Linnaeus University see the results as a step towards greener battery production.

lnu.se/en

Brazil:

LATASA USES STEINERT TECHNOLOGY FOR SORTING

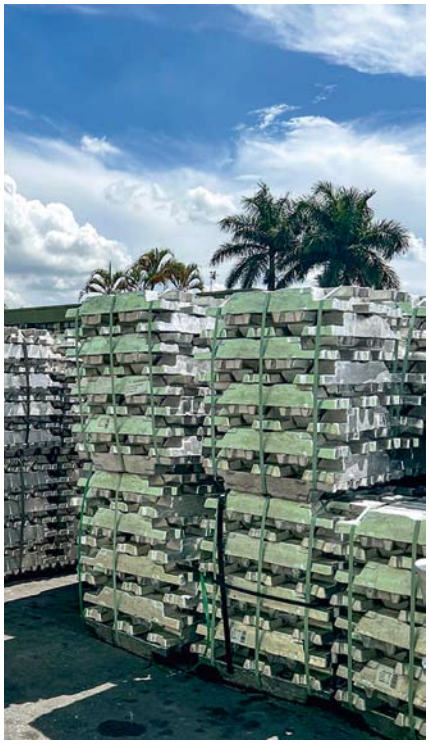
For the processing of all types of collected materials, and with the aim of achieving furnace-ready aluminum, Latasa's plant in Pindamonhangaba (São Paulo) employs separation technologies from Steinert.

With four smelting plants and a processing capacity of more than 300,000 tons of aluminum per year, Latasa Reciclagem, part of the ReciclaBR Group, stands out as the largest aluminum recycling company in the country, German-based company Steinert gave account. In addition, its diversified product portfolio serves various industries, such as automotive, steel, metallurgy, packaging, and consumer goods.

The company uses a process known as "Garimpeiro Urbano" (Urban Mining), present in 15 Brazilian states, which represent 96.07 percent of the country's aluminum can generation. This initiative involves 22 non-ferrous metal collection centers, working together with local suppliers of recyclable material, including cooperatives, municipalities, and small suppliers.

Latasa's final production follows the current Aluminum Scrap Classification Table, which was prepared by ABAL (Brazilian Aluminum Association) and follows recommendations from the USA-based Institute of Scrap Recycling (ISRI). In mid-2019, multinational aluminum manufacturing company Novelis approached the Brazilian recycler looking for a new type of scrap material to work with, Taint/Tabor. According to ISRI specifications, Taint/Tabor is described as clean mixed old alloy sheet aluminum. To generate the required high purities of the desired products, a recycling process able to separate different qualities is needed.

The aluminum leaves the Steinert KSS | XT LI for smelting



Final aluminum made from recycling material

"When we got to the stage that involves cleaning the scrap, we already knew about magnetic separators (of various types), screens, eddy currents and other methods. However, it was not just cleaning that was required, but separating the scrap by different densities or by type of chemical composition," Steinert cited Latasa's plant manager José Garcia. On the internet, they found Steinert, "where we discovered several types of equipment, and the one that interested us the most was the X-ray".

In August 2021, the first tests were carried out with Taint/Tabor scrap. As reported, the results met the expectations of the equipment that the companies needed. In March 2022, the Taint/Tabor processing line was inaugurated at Latasa Recycling Plant 1 with the implementation of the Steinert technology. Currently the Latasa plant in Pindamonhangaba operates:

- Steinert UME – Overbelt magnet for the separation of ferrous metals from aluminum scrap.
- Steinert EddyC – Eddy current separator to clean the non-ferrous metals from non-metallic residues.
- Steinert KSS | XT LI (X-ray transmission + 3D laser + inductive sensors) – Sorting System with a combination of sensors that separates impurities from aluminum and produces furnace-ready metal.

With input material received from different collection sources, the mechanical processing begins with two stages of shredding. Subsequently the material fractions are screened into different particle sizes. After this step, the material undergoes the separation processes, passing first the overbelt magnet for the separation of ferrous materials, and then onto the separa-

Photos: Steinert

tion of non-ferrous metals from non-metallic residues. The material produced by the eddy current separator is forwarded for selection and separation with the Steinert KSS. At this stage, the aluminum is already extremely pure, the technology provider emphasized. “Material that has paint is subjected to a process called decoating. Following this it goes to the oven, and the paint-free material is ready to be melted.”

A study of the company’s process and trials at the Steinert Latinoamericana test center in the metropolitan region of Belo Horizonte revealed that Steinert’s combined sensor sorting was found to be the best solution. “With the implementation of Steinert KSS | XT LI technology, Latasa has made a leap forward in innovation and efficiency in its process of separating and recovering aluminum and valuable materials,” the internationally active technology supplier pointed out.

steinertglobal.com

Advertorial:

ECOCLIP:

REDEFINING PRE-CONSUMPTION TEXTILE RECYCLING

Hidden within the production cycle of the textile industry lies pre-consumption waste – a significant byproduct generated during manufacturing. ECOCLIP, an innovative product by PICVISA, emerges as an effective and efficient solution to this challenge.

ECOCLIP automatically sorts fabric scraps, driving a sustainable transformation in the sector. With 100 percent surface analysis, the system identifies pure fibers and fiber blends across various colors. It can process 2.5 tons per hour with 95 percent accuracy and handle scrap as small as 25 millimeters. But the system does not stop at sorting. It also detects elements like buttons, zippers, seams, and metal pieces. That ensures the quality of pre-selected materials and heightens safety during the recycling process.

In a regulatory framework where the European Union champions Extended Producer Responsibility (EPR), brands will be mandated to increase the percentage of recycled textiles in their products by 2025. ECOCLIP becomes an indispensable tool in this context. Following the lead of recent Dutch legislation, it is anticipated that at least 25 percent of recycled textiles will be “fiber-to-fiber recycled”. ECOCLIP streamlines this process, enabling brands to meet these targets.

ECOCLIP is redefining pre-consumption textile recycling. By facilitating effective reuse and recycling of fabric scraps, this system is paving the way for a circular economy within the textile industry.

picvisa.com/en/

Photos: PICVISA

START-UP DEVELOPS SOFTWARE FOR DESIGN & OPTIMIZATION OF URBAN DRAINAGE SYSTEMS

Germany has a well-developed infrastructure with sewer networks and sewage treatment plants to collect rainwater and wastewater. The situation is different in developing countries, where this is often lacking. A start-up from the University Kaiserslautern-Landau wants to remedy this situation.

According to the university, the company offers its "ZIGGURAT" software for this purpose, "which can automatically plan and optimize drainage systems sustainably. The technology also takes into account the blue-green infrastructure, i.e. possible water storage and technical measures for infiltration and evaporation of rainwater."

As underlined, around half of the world population still lives without a sewerage system, and new urban areas are constantly being built without proper drainage. In its Sustainable Development Goals, the United Nations has set itself the goal of providing access to clean water and sanitation for all. "To achieve this, however, a corresponding infrastructure is needed."

But planning such sewer networks for wastewater, rainwater or combined sewage is complex and requires a lot of expertise. "Various parameters play a role, such as layout, the degree of de- or centralization, sewer diameters and gradient, laying depths, pumping and storage facilities," Timo Dilly from the founding team was quoted. His team in Kaiserslautern is currently developing software that can be used to automatically plan urban drainage systems in a sustainable manner. "It is based, among other things, on linking a large number of generally applicable technical rules of civil engineering planning and mathematical methods that can be used to generate sensible solution variants," Dilly explained. "We have developed our own algorithms for this. All this is based on current findings from our own research in urban drainage and hydro informatics." Climate change also plays a role in the planning of such drainage systems. "Dealing with rainwater has to be completely rethought when you consider increasing weather extremes. We need ways to store rainwater, but also natural elements such as sufficient green spaces." In this context, people also talk about blue-green infrastructure, which plays an increasingly important role in planning new urban drainage systems and is also planned for the software. In this respect, ZIGGURAT would also be suitable for local cities and municipalities that want to adapt their drainage systems in the future.

Dilly's colleagues Dr. Amin E. Bakhshipour, Professor Dr. Ulrich Dittmer and Ralf Habermehl from the Department of Urban Water Management at University Kaiserslautern-Landau are involved in the company too. They are supported by Marius Lauer, who contributes business management knowledge. In the future, they would like to make their software ZIGGURAT available on an online platform where interested parties can create an account for a fee. In addition to the software, the team from Kaiserslautern also provides their expertise and offers support in planning, for example.

On its way to independence, the company is supported by an "EXIST-Gründerstipendium" from the Federal Ministry of Economics and Climate Protection and the European Social Fund for "Business Start-ups from Science".

ziggurat.ai

ZIGGURAT founding team presents software for automatic sewer network planning; Sustainable Water Infrastructure Solutions (f.l.t.r.): Timo C. Dilly, Ralf Habermehl, Dr.-Ing. Amin E. Bakhshipour and Prof. Dr.-Ing. Ulrich Dittmer

Photo: RPTUView, Voss

Egypt:

MOBILE WATER TREATMENT UNITS ENSURE USE OF DESALINATED SEAWATER FOR COOLING

In water-scarce Egypt, major industrial players have been looking for ways to reduce their water consumption. Ezz Steel – with the annual capacity to produce seven million tons of steel, one of the leading steel producers in the Middle East and Africa – tasked Veolia Water Technologies Egypt with delivering mobile water solutions that allowed cooling water supply to switch from the Nile River to desalinated seawater.

Photo: Veolia Water Technologies

Ezz Steel rolling mills and Ezz flat steel plants are located in Al-Sokhna, an industrial area near the city of Suez in Egypt. The plants used to be supplied with freshwater from the Nile River before recently changing to desalinated seawater – source water with a relatively high level of chloride, which could affect the cooling process, Veolia Water Technologies informed in June. The company deployed seven brackish water reverse osmosis mobile water treatment units to treat the desalinated water, doing so in two phases: within two months, Veolia provided an initial 8,000 m^3/d (cubic meters/day) capacity, which was doubled during the second phase in April 2023 to reach 16,000 m^3/d.

"Thanks to Veolia's mobile water treatment units, Ezz Steel were able to secure 100 percent of their water production with lower chloride and total dissolved solids rates, allowing them to keep the water flowing into their cooling system," Veolia underlined. "In doing so, Ezz Steel have reduced their water and chemical consumption by approximately 75 percent."

veoliawatertechnologies.com/en

A Partnership to Optimize Scrap Treatment:

MUGHAL IRON & STEEL INDUSTRIES & PANIZZOLO RECYCLING SYSTEMS

The steel industry is a sector of fundamental importance to the global economy as it provides essential materials for construction, the automotive industry, energy, and many other international sectors. In this context, Mughal Iron & Steel Industries Limited (MISIL) has emerged as one of the leading players in the steel industry in Pakistan, with a history of excellence spanning over 50 years.

In its commitment to innovation and operational excellence, MISIL has recognized the importance of improving its scrap treatment processes and maximizing the recovery of secondary raw materials. To achieve these goals, MISIL searched for a strategic partnership with a company specialized in scrap treatment and the recovery of secondary raw materials.

In this pursuit, MISIL was impressed by Panizzolo Recycling Systems, a company with extensive experience in the scrap treatment and recovery of secondary raw materials industry. The choice of Panizzolo as a technology partner was driven by the company's solid and positive reputation in the field, high-quality technologies, and customer-oriented approach.
The partnership between MISIL and Panizzolo Recycling Systems has proven instrumental in addressing operational challenges and capitalizing on improvement opportunities in the steel industry. This collaboration has enabled MISIL to implement innovative solutions and advanced technologies provided by Panizzolo, resulting in a significant enhancement of scrap treatment processes from electric motors, increased recovery of secondary raw materials, and improved operational efficiency.

Mughal Iron & Steel Industries Limited (MISIL) encountered a significant obstacle when it came to enhancing its scrap treatment and preparation procedures. Given that MISIL acquires raw materials in the form of scrap from various global sources, enhancing the efficiency and efficacy of these operations became imperative. This optimization was necessary to guarantee the most effective management of resources and the efficient utilization of secondary raw materials.

Among the planned investments, MISIL focused on the treatment of scrap from electric motors, which can weigh up to 40 kilogram. It was of vital importance to introduce a dedicated grinding and separation plant to maximize metal recovery from these scraps and enhance the overall process yield.

The reasons that led MISIL to choose Panizzolo were multiple and focused on the business side and the valorization of secondary raw materials:

- Experience and expertise – Panizzolo Recycling Systems has a solid reputation in the scrap industry and boasts extensive experience in the efficient treatment and valorization of materials from various types of scrap. Their expertise and in-depth knowledge proved to be crucial in ensuring excellent management of treatment cycles and maximizing the recovery of metals such as copper, iron, aluminum, brass, and steel.

- High-efficiency solutions – Panizzolo Recycling Systems offers technologically advanced solutions designed to improve the efficiency and effectiveness of scrap treatment processes. Their grinding and separation plants were capable of achieving a high degree of purity in the waste materials, allowing MISIL to obtain high-quality secondary raw materials ready to be used in production processes.

- Complete and flexible treatment cycles – Panizzolo's solutions covers the entire treatment cycle, from grinding to material separation, en-

Photos: Panizzolo

suring a continuous and controlled flow. The flexibility of the solutions offered allowed MISIL to adapt the processes to the specific needs and characteristics of the scrap electric motors to be treated, thereby maximizing metal recovery and optimizing overall yield.

- Quality of secondary raw materials – The use of Panizzolo's solutions enabled MISIL to obtain excellent quality secondary raw materials, with a high content of precious metals and low levels of contaminants. Thus, MISIL improved the quality of its steel products and ensure compliance with customer specifications.

Production benefits achieved by the customer

The technology provided by Panizzolo Recycling Systems stands as an ideal solution to address the challenge identified by MISIL in the treatment of electric motors and maximize the opportunity to valorize metal raw materials. The combination of unique features and strengths of Panizzolo's solutions sets this technology apart from alternatives available in the market.

- **Hammer Mills**
  Firstly, the specially designed hammer mills for intense grinding play a key role in the proposed treatment cycle. The structural quality of the machinery, particularly in handling heavy scrap, ensures strength and durability over time, enabling it to handle intense workloads without compromising performance. This aspect is particularly relevant for MISIL, as the company requires reliable and robust machinery to process a large quantity of electric motors from different sources.
- **Treatment Cycle and Software**
  Another strength of Panizzolo's solution is the simplicity and speed of maintenance operations. The machinery is designed to facilitate maintenance operations, minimizing plant downtime and reducing the need for highly specialized personnel for these activities. As a result MISIL can maintain continuous and profitable production cycles in the long run without significant interruptions. Plant management is made simple through the management and control software developed by Panizzolo, installed in each treatment island. This software minimizes operator involvement in machinery configuration and operation, simplifying daily operations and reducing the need for specialized personnel. Through efficient plant management MISIL can maximize productivity and achieve a smoother and more effective treatment cycle management
- **Periodic Controls and Maintenance**
  In addition to ease of maintenance, Panizzolo's machinery offers high energy savings. Thanks to an optimal balance between energy consumption and hourly material processed, these systems ensure high production efficiency while minimizing energy waste. This aspect is crucial for MISIL as it allows for operational cost optimization and enhances the economic sustainability of the entire treatment process.
- **Output Quality**
  Lastly, Panizzolo's technology stands out for its ability to valorize all metals in electric motors, avoiding the production of sub-categories of metal blends that are difficult to reintroduce into the production cycle. This aspect is crucial for MISIL as it maximizes the recovery of secondary raw materials, ensuring the highest value extraction from the outgoing materials and reducing waste.

In conclusion, the technology provided by Panizzolo Recycling Systems addresses the challenge and leverages the opportunity identified by MISIL in the treatment of electric motors, offering a comprehensive and advantageous solution. The strengths, such as the structural quality of the machinery, energy savings, ease of management, and maximized metal recovery provide a competitive advantage for MISIL in the market. Choosing this high-level solution strengthens MISIL's position as a leading company in the steel industry and the valorization of secondary raw materials.

mughalsteel.com
panizzolo.com

DS SMITH TO BUILD NEW PAPER MACHINE IN ITALY

In June, Austria-based company Andritz reported that the international technology group received an order from DS Smith – a leading provider of sustainable fiber-based packaging worldwide, which is supported by recycling and papermaking operations – to supply a complete stock preparation line and a reject treatment system for the mill in Porcari (Italy). The equipment would be used on the new paper machine (due to start up in mid-2025) that is to produce new packaging papers from 100 percent recycled paper.

According to Andritz, the new stock preparation line will have a design capacity of 1,650 bdmt (bone dry metric ton) per day and process various types of raw material, such as OCC (old corrugated containers), mixed papers and board as well as new shavings of corrugated board. The system would include:

- A FibreFlow drum pulper with a pulping zone diameter of 4,500 millimeters (mm) and a total drum length of 50,000 mm – as underlined, the largest of this type in Europe – for "gentle pulping of the raw material mix and efficient removal of coarse contaminants".
- Nine PrimeScreen X screens with state-of-the-art rotor design "providing high screening efficiency at low energy consumption and superior stock quality".
- Two PrimeFilter D filters to handle "higher feed consistencies and higher-freeness pulp, even in the most demanding applications".

"The innovative reject treatment system will be able to handle 135 bdmt per day," the Austrian company pointed out. "It will comprise a robust ADuro C shredder as well as ReCo reject compactors to process the rejects from pulping and coarse screening in the most efficient way." The scope of supply would also contain basic and detailed engineering, installation and supervision, commissioning, and operator training.

Valmet provides the containerboard machine

About three months earlier, the global active developer and supplier of process technologies, automation and services, Valmet, announced that the Finland-based company will "supply a new containerboard machine with extensive packages of automation, services, and industrial internet applications to DS Smith Paper Italia S.r.l at their Porcari (Lucca) site in Italy".

Valmet's delivery will include a recycled liner board-making line from a broke collection to a reel and winder as well as process ventilation systems. "The wide automation package includes Valmet DNA automation system for process and machine controls, runnability and condition monitoring and Valmet IQ quality management system". Furthermore, the company would deliver a comprehensive Valmet Industrial Internet package including Valmet Performance Center services, advanced monitoring and predictive applications as well as training simulators; also included will be paper machine clothing, spare parts and consumables packages.

According to the information, the future 8,600 mm wide (wire) machine (BM 3) is expected to produce recycled liner grades with a basis weight range of 70–135 g/m^2 (grams/square meter) at a production speed of 1,500 m/min (meters/minute) and a mechanical design speed of 1,700m/min. The annual capacity is expected to reach approximately 450,000 tons.

andritz.com
valmet.com

From left to right: Alessandro Romagnolo, Deputy Project Manager Lion PM3, DS Smith; Esther Huala, Commercial Sales Manager, ANDRITZ; Giulio Giannini, General Counsel, DS Smith; Stefano Rovai, Engineering Project Manager, DS Smith; Mario Menapace, Sales Manager, ANDRITZ; Roy Dodenbier, Global Category Manager Capex Procurement, DS Smith; Peter Clewes, Vice President Fiber, ANDRITZ; Stefano Andreotti, Project Manager Lion PM3, DS Smith and Colin Beckett, Senior Category Manager, DS Smith

Photo: Andritz

Advertorial:

SIZE DOES NOT MATTER

The company HAMMEL Recyclingtechnik GmbH, situated in the middle of Germany, is a manufacturer of primary and secondary shredders. Since 1996 well-known HAMMEL shredders and processing plants are designed and produced and working worldwide in different applications.

When you look at the product range of the HAMMEL primary shredder, currently five models are available in either stationary electric versions or mobile with diesel engines. One of the models is the second biggest shredder, the HAMMEL VB 850 DK.

This model has been relaunched over the last few years and is subject to constant development. The newest version consists of the latest exhaust level STAGE 5 engine from the brand Cummins with 525 horsepower (hp). With this powerful engine, the shredder is capable of processing large-volume input materials such as waste wood (roots, pallets, logs, green waste), bulky goods and household waste and the shredding of aluminum profiles and bales, car bodies and light mixed scrap. Due to the multifunctional shafts, shredding the above-mentioned materials is equally possible and offers the customer total flexibility in usage. The HAMMEL VB 850 DK is self-driving via the crawler tracks and can be easily transported to various materials on the site.

The compact design and transport width of just 2.5 meters is a positive issue and offers extreme mobility advantages during road traffic transports. The long discharge belt with a discharge height of approx. 4,800 millimeters can be adjusted hydraulically, enabling high stockpiling of the output material. An optionally attached permanent over-belt magnet can sort out ferrous materials from the output material for optimal further processing in high-speed machines or screens. The design of the magnet installation will be improved to have an even better metal separation parallel to the discharge belt.

The new version of the HAMMEL VB 850 DK will be delivered soon to a customer in Germany. The machine will process wood waste, and the new magnet installation can be tested in an optimal way. Several demos will follow in the near future with different materials like industrial, household waste and aluminum profiles and blocks. Moreover, you will find this machine type at one of the upcoming exhibitions.

■ For more information visit the website 🌐 hammel.de.

Photo: HAMMEL

PAPEREX 2023

December 06 – 09, 2023, Delhi (India)

Paperex is a series of exhibitions and conferences that focuses on paper, pulp, and allied industries. The event features the latest technology, machinery, and raw materials for paper and board manufacturing, including paper mill machinery, automation, instrumentation, and various equipment for quality control, testing, and material handling. The exhibition attracts buyers from paper manufacturers, traders, printers, converters, packaging companies, and investors.

With 15 editions, Paperex has experienced steady growth, reflecting the industry's increasing capabilities and potential for new technologies and investments, the organizer points out. The event had gained international interest, with participants and visitors from countries worldwide. Paperex credits its growth to the support and patronage of the Indian and international paper industry and associations.

🌐 india.paperex-expo.com

HOW TO OBTAIN PURE COPPER BY RECYCLING OLD MOTORS AND ELECTRICAL WIRES?

The recycling of materials has become an increasingly central theme, as it is an effective way to reduce environmental impact and create new economic opportunities.

From this perspective, treating electrical wires and motors offers great economic potential for companies. Recycling electrical components, indeed, makes it possible to recover a material of great economic value: copper.

The potential of copper: A resource with huge economic value

Copper is known to be a strong and malleable metal that can be used in numerous processes. Thanks to these characteristics, copper is considered an extremely valuable material and in recent years, its value has continued to grow, leading to an increased interest in the processing of cables and electric motors for its extraction.

So why is copper recycling so much talked about? And why are companies interested in the machinery for its processing?

A great plus of copper recycling is its ability to be recycled countless times without losing its properties. In fact, by disposing of wires and electric motors, it is possible to regain pure copper, which can be used for new processes.

FOR REC's customized machinery for recycling electrical wires and motors

FOR REC designs and develops in-house turnkey plants for grinding and processing electrical wires and motors.

Predicting the market, FOR REC identified the growing demand for copper and decided to invest in research and development to realize increasingly sophisticated technologies for treating these materials.

The lines developed by FOR REC are designed to activate a grinding and separation process that guarantees high-quality standards of the output product, delivering up to 99.5 percent pure copper.

Specifically for the treatment of wires and electric motors, FOR REC has developed recycling lines equipped with:

- Double-shaft grinders for accurate volumetric reduction and roughing of the material, with partial control of the output size.
- Single-shaft grinders for processing materials with a high specific weight, able to process materials that generate high stress on mechanical organs;
- Granulators for grinding

The lines developed by FOR REC guarantee high production rates and a capacity ranging from 500 kilograms to 10 tons/hour, with an output product that is 99.5 percent pure.

Why choose FOR REC: professionalism and expertise to realize your tailor-made projects

Photos: FOR REC

FOR REC has specialized in designing and creating waste treatment machinery for many years. Thanks to the experience and know-how gained over the years, the company designs customized and turn-key machines ideal for treating numerous materials, including plastic, metal, rubber, WEEE, MSW, paper and aluminium.

The strength of this company lies in the customized management of each project. The process starts with analysing waste and continues with the customized design of the machinery – manufactured according to the technical specifications and needs expressed by the customer. Next, the installation starts, and then FOR REC provides assistance in all phases of plant maintenance and control.

■ Would you like to learn more about how FOR REC's machineries work?

Watch the latest webinar on wires and motors treatment to discover all the technical features of their lines:
forrec.eu/news-events/webinar/

M&J F320 E-drive:

WELL-KNOWN QUALITIES COMBINED WITH NEW BENEFITS

M&J Recycling was founded back in 1857. Several years later, the Danish company mainly focuses on solving the global challenge of growing waste volumes by providing technology that contributes to a more balanced and circular economy. That has been their goal since they started producing industrial waste shredders in 1988. This goal still drives M&J Recycling towards new breakthroughs every single day.

Therefore, it is hardly surprising that the company now presents a new electronic fine-shredder. The energy-efficient M&J F320 E-drive is designed to deliver RDF/SRF output (up to 28 tons per hour), has the same robustness and power as its hydraulic counterpart but is significantly cheaper to run and much quieter.

The task for M&J Recycling's development team was clear from the start when they set out to produce an electronic fine-shredder for heavy production of RDF/SRF. All the familiar qualities of the company's hydraulic fine-shredders were to be retained 1 to 1 in the new M&J F320 E-drive. That means the same capacity output, stability, and durable build quality customers have long since come to know M&J Recycling for.

Less energy, lower amperage

The M&J F320 E-drive uses around 20% less energy for production, which translates directly to the operating budget. Also, with the E-drive solution, you need a lower amperage on the main power supply due to the smaller electric motors used in the driveline (160 kW motor instead of 250 kW). "E-drive requires a minimum of service and wears out less than a hydraulic drive. There are fewer moving components in the drivetrain and you don't need to supervise and exchange hydraulic components. Together, this means that the customer can expect significantly higher uptime and significantly lower costs to keep the machine running," Jens Vestergaard Nielsen, Head of R&D explains.

Already in use

Additionally, the electronic fine-shredder has an automatic connection to the service center, saving response time and potentially enabling preventive maintenance. Furthermore, the E-drive makes significantly less noise than a hydraulic drive due to the lack of large pumps. Tests confirm that the noise level and noise power from E-driven units are measurably lower and therefore result in a marked improvement in the working environment for the employees.

The first M&J F320 E-drive has already been installed and is in use at a customer site. In preliminary tests, both power consumption and capacity fulfill the expectations.

mjrecycling.com

Photos: M&J Recycling

"NEXT GENERATION" LOADERS FOR DIFFERENT TASKS

Caterpillar has presented the next generation of Cat 926, 930 and 938 wheel loaders.

The machines offer a range of new technologies and features designed to boost productivity by simplifying machine operations. "Adding flexibility by design, the versatile Cat small wheel loaders offer industry-specific configurations to efficiently handle agriculture, waste, forestry, aggregate and snow removal applications," Caterpillar underlined. "Customized models can be equipped directly from the factory or through aftermarket upgrade kits installed by a Cat dealer."

As reported, the Cat exclusive adaptive engine RPM (revolutions per minute) feature would automatically adjust engine speed based on operator input to optimize productivity and minimize fuel burn. Systems were optimized and sized to run at standard lower engine RPM. The productive and efficient 1,200- to 1,500-RPM working range would make the loaders more fuel efficient, while larger pumps run at slower speeds for less wear and longer service life.

Furthermore, these new wheel loaders feature four customized powertrain operating modes:

- Utility mode: designed for hydromechanical tool use or pick-and-place work with implemented power and quick speed, utility vehicle mode delivers fine ground speed control with engine RPM throttle lock.
- Torque mode: saves up to five percent on fuel by "freewheeling" around corners and on downhills.
- Hystat mode: provides engine braking with aggressive deceleration, acceleration and no travel until the throttle is applied.
- Ice mode: for snow-clearing applications, ice mode offers soft directional shifts and extended coast-out for improved control.

As per the information provided by the manufacturer, the new Cat 926, 930 and 938 also score with improved safety and efficient operation due to the customizable in-cab display, which delivers an easy view of operating parameters and service savings.

cat.com

TURKISH PLASTICS RECYCLER PRODUCES WITH AUSTRIAN TECHNOLOGY

Turkish firm Tanrıkulu had ordered the recycling line from Austrian engineering firm Starlinger. The new post-consumer HDPE and PP recycling line is installed at the company's recycling facility in Başiskele (Kocaeli Province, Turkey).

Featuring Starlinger's special high-vacuum degassing unit, the recoSTAR dynamic 215 C-VAC has a production capacity of two tons of high-quality plastic pellets per hour and processes post-consumer HDPE and PP bottle flakes. According to the provider, the recoSTAR dynamic recycling lines have been designed with a focus on processing contaminated and highly humid post-consumer plastic waste. "The elaborate construction of the SMART feeder allows the recycling of materials with higher levels of humidity," Paul Niedl, Commercial Head of Starlinger recycling technology, was cited. Combined with the company's dynamic automation package, which regulates the ideal operating point, it would achieve a significant output increase. "The specially developed C-VAC degassing unit with its modern cascade setup takes care of volatile contaminants after the main extruder, effectively removing them by expanding the melt surface by 300 percent."

Tanrıkulu supplies the produced regranulate to the Turkish plastic product manufacturing industry. While recycled polypropylene is used mainly to produce automobile plastic parts, furniture, toys and other injection molding products, as well as for pallets, buckets or packaging films, recycled polyethylene is used for pipes, bottles, plastic bags, and similar products.

The company currently operates ten plastics recycling and manufacturing plants in various parts of Kocaeli Province, which borders the Istanbul metropolitan area. Tanrıkulu originally started out in 1989 in Istanbul, recycling paper, glass and metal waste. In 2006, it began to produce regranulate from plastic waste and diversified by adding a facility to produce PET sheets in 2014. Since then, Tanrıkulu has become one of the leading plastics recycling enterprises in Turkey and exports 50 percent of its PET sheet products to overseas markets. Its plastics recycling capacity doubled after opening the İzpack PET packaging production facility in 2018 and installing automatic plastic sorting systems in 2019.

Photo: Tanrıkulu

The C-VAC degassing module of Starlinger's recoSTAR dynamic recycling line increases the melt surface by 300 percent

tanrikulu.com.tr/en/
starlinger.com/en

Photo: Starlinger

Tanrıkulu processes washed PP and PE flakes. The produced regranulate is used for a variety of products

USING SOLAR POWER FOR PRODUCING ALTERNATIVE FUELS

Norwich-headquartered PSH Environmental Ltd has unveiled a project to transform waste into a renewable energy source – using only solar power.

The announcement follows a significant re-investment into a 12,000 square feet new building, 40 percent extension to the yard, new wash plant, solar system, and a UNTHA XR3000C mobil-e shredder. Capable of processing a range of difficult waste materials for alternative fuels, the electric-driven shredder runs entirely from solar energy generated by PSH Environmental, on site.

PSH Environmental's new UNTHA XR mobil-e shredder

Photo: Untha

As reported by shredding technology provider Untha UK, a 90-millimeter screen processes grade C wood down to a homogenous biomass product for a local energy plant. Furthermore, a 130-millimeter screen can be interchanged in as little as 15 minutes. By this means, PSH Environmental was able to reduce the density of other skip, bulky and C&I waste for RDF (Refuse Derived Fuel). "The flexible shredder can also handle other bespoke products – even those notoriously considered economically unshreddable or too difficult to handle."

The plant is now capable of throughputs of 40 tons of material per hour, which equates to 80,000 tons per annum.

untha.com/en

PRODUCING LOW COPPER SHRED FOR STEEL MILLS

According to Eriez, the manufacturer's Shred1 Ballistic Separator is propelling shredder yards to greater profitability with the power to capitalize on the surging demand for low-copper shred from steelmakers.

"With the integration of Shred1 into their operations, recyclers are gaining a distinct competitive advantage by producing a premium ferrous shred that not only meets escalating market requirements but can command a premium price per ton," the company described the machine's benefit.

Shred1 uses magnets and ballistics to segregate copper-bearing materials from shredded steel recovered by the scrap drum magnets. "This unique separator yields two distinct fractions: a premium low-copper ferrous product (in the range of 0.16-0.20% cu) and a traditional #2 shred," the provider underlined.

■ A White Paper gives more information: eriez.com/Documents/WhitePapers/ProducingLowCopperShredSteelMillsWhitePaper_WP-21.pdf

AIK TECHNIK – THE SPECIALIST FOR THE OPTIMIZATION OF WASTE INCINERATION PLANTS

When it comes to process optimization in the field of fly ash treatment, mercury and dioxin separation in flue gas purification or wastewater treatment of waste incineration plants and the development of plants, components and processes, AIK Technik AG from Sursee, Switzerland is regarded as a proven partner for authorities, special-purpose associations and various branches of industry in the private sector. The innovative company services 26 of 30 waste incineration plants in Switzerland and many more abroad.

As an experienced plant constructor and specialist in sustainable resource utilization, AIK Technik AG supports its customers in using innovative processes to close interrupted material cycles again and to achieve long-term and sustainable added value for the economy, energy and the environment with its plants. In doing so, AIK Technik preferably uses the following processes:

Recovery of recyclable materials after slag processing

The incineration process produces slag, which contains solid rock-like material as well as ferrous and non-ferrous metals. The slag is processed – iron scrap along with elemental aluminum, copper and brass are separated and collected. After recovery of these valuable materials, the remaining residual slag can be stably landfilled.

Removing mercury from wastewater

The process water to be treated from flue gas cleaning contains mercury, which is removed from the system in the first process stage. The process is based on two stages: prefiltration of the scrubber wastewater and mercury removal via selective ion exchange columns. The process removes approx. 98 percent of the mercury introduced into the wastewater incinerator, thus falling well below the limit values in the wastewater – an environmentally sound process that is widely used in various industries.

Heavy metal recovery/recycling with filter and fly ash washing (FLUWA by AIK®)

Acidic filter and fly ash washing (FLUWA by AIK®) form the core of AIK systems. Zinc, copper, cadmium, lead and other metals are efficiently removed from the filter and fly ash in the extraction process after mercury separation in the acidic wash effluent or liquid waste discharge. Currently, this FLUWA process treats more than 50 percent of the filter ash load generated throughout Switzerland. According to the motto “recovery before landfill”, the FLUWA process enables recycling of heavy metals and transforms the fly ash from hazardous waste to be compulsorily exported to residual material to be disposed of normally. The FLUREC process co-developed by AIK Technik in Sursee, Switzerland, is also available to efficiently recover heavy metals.

Heavy metal-free wastewater thanks to wastewater treatment (ABA)

The incineration of waste produces flue gases that must be cleaned. Wet flue gas cleaning, which has the best cleaning effect, produces wastewater that must be cleaned. Afterwards, the wastewater can be returned directly to the environment or sent to a public wastewater treatment plant. One of the goals of cleaning wastewater from waste incineration plants is to separate the heavy metals it contains and return them to the circular economy. This is done in the wastewater treatment plant of AIK Technik AG. The residual separation of the heavy metals is carried out by downstream selective ion exchangers. All requirements of the Swiss Water Protection Ordinance are met.

Phosphorus recovery with Leachphos© process

With the Leachphos© process, phosphorus can be recovered from municipal sewage sludge ash, according to the principle of closed-loop recycling. The phosphorus recovered in the recycling process is processed into fertilizer or phosphoric acid in a further stage. Both substances comply with the environmental requirements of the Fertilizer Act.

aiktechnik.ch

Photo: Mark Baumgartner, Brügg

POLLUTEC 2023

Pollutec – one of the leading European shows on environmental solutions for the industry, cities, and regions – returns to Eurexpo Lyon from 10 to 13 October 2023.

The show, which is celebrating its 45th anniversary this year, will call upon a wide range of players to feed discussion around topics anchored in current events and, in doing so, will support industries, cities, and regions in their transitions. As underlined by the organizer RX France, the 14 sectors are "richly represented", with content and discussion at the heart of the show's strategy and its positioning in Europe. There will also be numerous editorial spaces, such as:

- La tribune (plenary stage), with its four pillars: Resource, Adaptation, Engagement, and Employment.
- The international forum: meetings between industries, project sponsors, and/or European or international regions.
- The Agriculture and Climate space: cross-cutting discussions around soil quality, energy efficiency and management of water resources and sovereignty.
- The Bluetec Sea & Coastline space, organized around four main themes: biodiversity and the natural environment/decarbonization of maritime environments/coastline management/renewable energy

A holistic and international view of the issues

According to the organizers, from tackling pollution and nuisances to protecting the environment and combating climate change, Pollutec has been an unmissable event for the ecological and energy transitions. "Each edition highlights innovations and emerging topics and unites all those involved in the environment – from France and elsewhere – with a single goal: providing solutions to the environmental challenges facing every stakeholder." There will be eight visitor trails to Illustrate this approach: Innovation; Sea and Coastline; Managing Water Resources; Decarbonization; Adapting Towns & Cities and Regions to Climate Change; Management and Recovery of Bio Wastes; Circular Economy and Preservation of Resources; Health and the Environment.

Once again, this year's Pollutec will welcome several countries and international pavilions and delegations in Lyon. "Italy is to be Country of Honour; this distinction allows it to present to the international community the strength of its ecosystem in environmental solutions and coastline management," the exhibition organizers announced.

pollutec.com

Photo: Pollutec / RX

CIRCULARITY

November 20 – 21, 2023, Melbourne (Australia)

Circularity is an annual conference organized by the Australian Circular Economy Hub (ACE Hub). It aims to promote the circular economy in Australia and the Asia Pacific region. The conference spans two days and includes a multi-stream program with keynote sessions, industry panels, and workshops. It also features an exhibition, networking events, and the ACE Awards program.

The conference welcomes business and government leaders, circular economy practitioners, sustainability professionals, waste and environmental management experts, academics, and anyone interested in a circular future. The event provides a platform to share knowledge, network, and discuss the latest innovations and trends in the circular economy.

circularitylive.com.au

INTERNATIONAL ELECTRONICS RECYCLING CONGRESS IERC 2024

January 17 – 19, 2024, Salzburg (Austria)

IERC 2024 serves as a prominent gathering within the Circular Economy Electronics field. It brings together up to 500 international professionals from production, design, promotion, business development, material supply, recycling, logistics and authorities. With an expansive exhibition area featuring over 60 booths, attendees can engage with influential decision-makers in the industry and stay abreast of the latest developments in the global electronics recycling business. Furthermore, the organizers expect that this year's program will once again set new standards in sustainable waste management, circular economy and recycling as there will be a variety of interesting presentations, exhibitions and plant tours, as well as engaging conversations and discussions.

icm.ch

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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
Anass Saki, Tel.: +49 (0) 81 41 / 22 44 13, E-Mail: saki@msvgmbh.eu

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Enviro

We break conventions and boundaries to create improvement and do what no one else has done before us. Enviro is not just a part of an industry, we are setting the standard for the industries of the future. We dare to stand out, we dare to do the unexpected, and we are unapologetic about the benefits we create because we know they make a real difference.