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GLOBAL RECYCLING

*The Magazine for
Business Opportunities
& International Markets*



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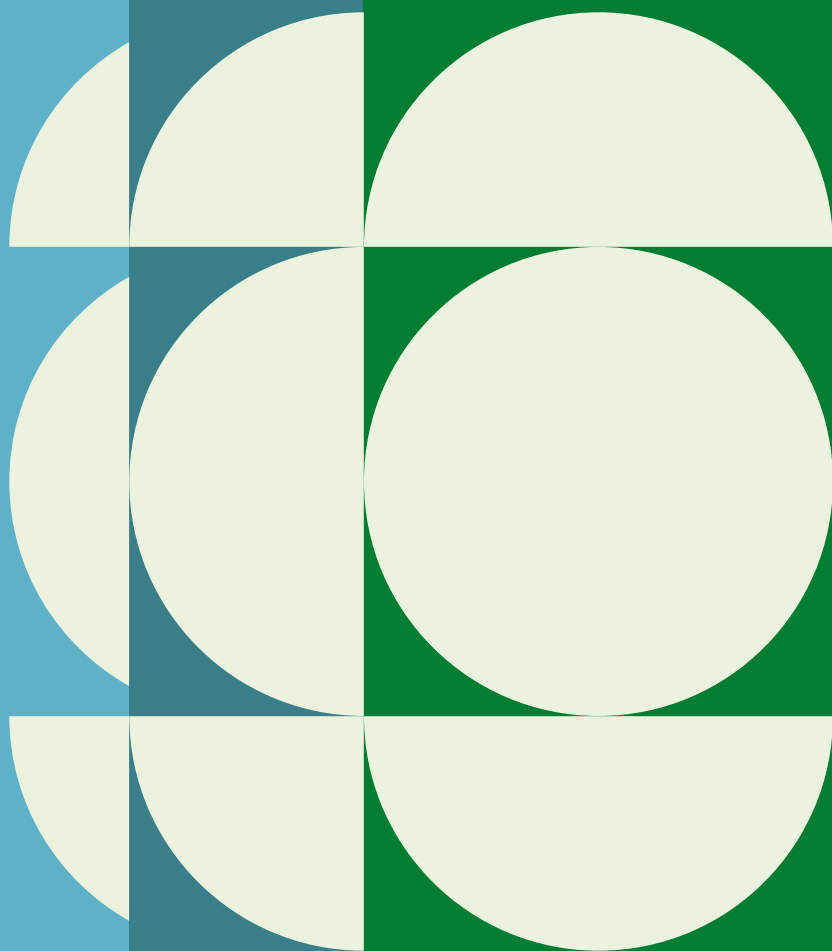
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Recycling: A Global Movement with a Promising Future



Brigitte Weber
Editor-in-Chief

Recycling is gaining ground – worldwide. How fast the recycling community is growing is demonstrated by the recent BIR World Recycling Convention & Exhibition, organized by the Bureau of International Recycling in Denmark. This event set a record with nearly 1,800 participants from more than 60 countries. Furthermore, a total of 162 companies and national federations were admitted as members of the international trade association.

At BIR's general assembly meeting, the Plastics Committee became division status like the Ferrous, Non-Ferrous, Paper and Textile branches. The plastics sector would attract "significant media attention due to the pressing issue of plastics pollution – a matter that is of global concern and currently under discussion in ongoing United Nations negotiations for a global treaty on plastics," Alicia Garcia-Franco from BIR was quoted. The World Recycling Association had been "very active in these discussions".

A major issue at the BIR International Trade Council session was the European Union's recently adopted Waste Shipment Regulation (WSR) and its potential to disrupt long-established international flows of recyclables captured under the EU's "waste" definition. As reported by BIR, simultaneously "there was general agreement on the need for open lines of communication and collaboration to ensure the smoothest possible implementation of the regulation". According to Martyna Robakowska from the European Commission, the key objectives of this regulation were to ensure that the environment was protected in relation to waste shipments and that the EU met its requirements under multilateral environmental agreements. After May 2027, exports to non-OECD countries would be allowed only if the receiving country had notified the EU Commission of its willingness to accept the material. That notification would need to be supported by documentation covering, for example, a list of the requested waste, the national waste management plan/strategy, the country's environmental protection legislation and a list of its authorized waste recovery facilities. Meanwhile, EU exporters would have to demonstrate that the waste was to be managed in an environmentally sound manner by ensuring independent audits were conducted on the facilities to which they were shipping.

In any case, more and more countries are on the way to dealing with the waste generated in the country. Australia has ambitious targets, inter alia, to increase recycling rates (page 20). That applies also to Saudi Arabia (page 3) and Singapore (page 25). Jamaica is on the move to energy-from-waste (page 28). And in the USA, a project regarding textile waste found a billion-dollar opportunity (page 6).

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

Yours

Brigitte Weber (weber@msvgmbh.eu)



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SAUDI ARABIA VENTURES INTO SUSTAINABLE WASTE MANAGEMENT

The Kingdom of Saudi Arabia's National Center for Waste Management (MWAN) aims to significantly reduce waste production, increase recycling rates, and divert 90 percent of its waste from landfills.

At the IFAT trade fair in Munich, the country informed about its strategies for the first time. As underlined by MWAN, it is clear that Saudi Arabia's ambitious transformation and stated objectives for the waste management sector will offer investors lucrative opportunities and returns. "By 2040, over 840 treatment and recovery facilities will be built to achieve the national objectives and targets for the waste sector. These will include waste-to-energy, recycling and recovery, composting in addition to construction and demolition recycling facilities and other key infrastructure," the information said. "This investment will help the kingdom achieve its recycling targets of 79 percent (up from the current five percent) and a landfill diversion target of 90 percent by 2040."

Increasing urbanization and waste generation

The National Center for Waste Management (MWAN) was established as a Regulator and a Strategic Master Plan was devised to unlock the market potential. "One of the objectives is to address ever-increasing waste generation volumes driven by urbanization and industrialization in and around major cities across the kingdom. The public perception of waste in Saudi Arabia is now shifting from being an economic and environmental burden to a resource that must be fully exploited," Sultan AlHarthi, Executive Director of Corporate Communications at the National Center for Waste Management (MWAN), was quoted.



Surrounded by prominent figures, Sultan AlHarthi presented Saudi Arabia's circular economy initiatives at the IFAT

As part of its planning efforts, MWAN has divided the country into 25 regional clusters, where diligent and detailed planning led to the creation of a large portfolio of investment opportunities within each cluster and across various waste streams. "Strategic planning guided by a national strategic vision allowed MWAN to tailor cluster solutions based on specific regional needs," explained Sultan AlHarthi.

Goal: Less waste, more recycling

By 2040, an average of 90 percent less waste should end up in landfills. A large portion of this waste will be recycled or recovered through conversion to energy using various advanced technologies to reach this target. "One of the key strategic targets set by MWAN is to reduce the overall waste generation per capita by three percent." Another key target is related to greenhouse gas emissions, aiming to reduce annual CO₂ equivalent emissions by 177 percent from a current

baseline of 47.8 Mtpa CO_{2e} (million tons per annum carbon dioxide equivalents). "Achieving these targets (among many others), Saudi Arabia aims to further enhance protection of its environment resources and the life quality of its residents".

Key progress

As reported, planning efforts have reached key milestones by completing the master plans of the five largest clusters in the kingdom, namely, Riyadh, Jeddah, Mecca, Dammam, and Medina, collectively generating over 60 percent of the waste at a national level.

In Riyadh, for instance, annual waste generation currently stands at 25.8 million tons, accounting for over a quarter of the nationwide volume of 107 million tons. "Current plans are in place to develop over 80 treatment/recovery facilities in the coming years. These will include waste-to-energy fa-

cilities (WTE), transfer stations, MRFs, RDF facilities, C&D recycling, composting and others. Many opportunities are already available for investors to take advantage of what the Saudi waste market has to offer,” explained Sultan AlHarthi. The same scenario would apply to the other four clusters. As such, investors are presented with a significant number of opportunities to build infrastructure and implement innovative recycling technologies.

About the National Center for Waste Management (MWAN)

Established in 2019, the National Center for Waste Management (MWAN) serves as the sole regulatory entity with a clear mandate to regulate and develop the waste management sector in the Kingdom of Saudi Arabia. MWAN’s mission exceeds that of a typical regulator where the center was granted by law the ownership of waste

and was mandated to promote and incentivize investment to ensure the financial sustainability of the waste sector and help the Kingdom adopt and implement circular economy principles. Leading with strategic initiatives under Vision 2030, MWAN’s efforts underscore Saudi Arabia’s commitment to diverting waste by 90 percent by 2040 and fostering a sustainable future.

🌐 mwan.gov.sa/en

AUSTRALASIAN WASTE & RECYCLING EXPO (AWRE)

The Australian trade event for the waste, recycling, and resource recovery sector is back for its 15th year, taking place at ICC in Sydney on July 24-25, 2024.

The exhibition, featuring the AWRE Summit, brings together policymakers, professionals, educators, and industry thought leaders to share ideas and solutions for a cleaner, more sustainable future, the organizers from Diversified Communications pointed out. “The event makes a welcome return as Australians grapple with the increasing complexities surrounding waste and recycling, compounded by the collapse of soft-plastic recycling firms like REDCycle. While the recycling rate in Australia is improving, the amount of waste we’re generating continues to increase as our population grows, according to the 2022 National Waste Report.”

As reported, this year’s expo will serve as a forum for leaders and professionals in the waste and recycling industry to convene, display and discover the latest innovations and collaborate on initiatives to reduce Australia’s waste production and move toward a more circular future. “With inspiring talks from leading experts in the sector, including Suzanne Toumbouro, CEO

of the Australian Council of Recycling, and Brett Lemin, Executive Director of Waste Contractors & Recyclers Association of NSW, the two-day live event helps form new connections and build strategies for a more sustainable and profitable economy.”

Also returning in 2024, the Innovations Pitch Fest would provide a showcase opportunity for “fledgling solutions” for the waste and recycling industry. “Directly after the pitch, judges will provide feedback criteria, including consumer need, innovation, point of difference, go-to-market strategy and product sustainability. The winner of the Innovations Pitch Fest will receive a fully subsidized stand at next year’s Australasian Waste and Recycling

Expo.” AWRE 2024 is supported by the Waste Contractors & Recyclers Association, Australian Council of Recycling, National Waste and Recycling Industry Council, Australian Organics Recycling Association, Australian Institute of Packaging, Australian Packaging Covenant Organization, National Retail Association, Good Environmental Choice Australia, Global GreenTag, Art of Diversion, Government News, Green Review, Inside State Government, Inside Waste, Laying Waste Media, Local Government Focus, and Waste Management Review. Major sponsors include the New South Wales Environment Protection Authority, Isuzu and FleetCard.

🌐 awre.com.au



Photo: falco / pixabay.com

LITHIUM-ION BATTERY RECYCLING GLOBAL BUSINESS REPORT 2024

Global Lithium-Ion Battery Recycling Market to reach 23.6 billion US-Dollar by 2030.

Market research store Research and Markets has added a report to its offering, which predicts that the global market for Lithium-Ion Battery Recycling is projected to reach 23.6 billion US-Dollar by 2030, growing at a CAGR (compound annual growth rate) of 18.8 percent from 2023 to 2030. Last year, this worldwide market was estimated at 5.9 billion US-Dollar.

“In the global economic landscape, competition within the lithium-ion battery recycling market is intensifying,” the information said. “Key competitors’ percentage market shares for 2023 highlight the competitive dynamics of this crucial sector. The indispensability of batteries in modern life brings battery recycling to the forefront of the recycling revolution. As batteries are ubiquitous and essential in the 21st century, there is



an urgent need to make them cleaner and greener.”

As underlined, lithium-ion batteries are particularly significant due to lithium’s central role in sustainability efforts. Recent market activities and world brands were pivotal in shaping the current landscape of lithium-ion battery recycling. According to Research and Markets, Lithium-Nickel Manganese Cobalt (Li-NMC) Battery Chemistry, one of the segments analyzed in the report, is projected to record 20 percent CAGR and reach

14.9 billion US-Dollar by the end of the analysis period. Growth in the Lithium-Iron Phosphate (LFP) Battery Chemistry segment is estimated at 17 percent CAGR for the next eight-year period.

Growth in USA and China

The Lithium-Ion Battery Recycling market in the USA was estimated at 1.2 billion US-Dollar in the year 2023. “China, the world’s second largest economy, is forecast to reach a projected market size of 7.6 billion US-Dollar by the year 2030 trailing a CAGR of 22.5 percent over the analysis period 2023 to 2030,” the market research store reported. “Among the other noteworthy geographic markets are Japan and Canada, each forecast to grow at 16 percent and 16.3 percent respectively over the 2023-2030 period. Within Europe, Germany is forecast to grow at approximately 18.3 percent CAGR.”

researchandmarkets.com/reports/5302807

Photo: Landratsamt Kitzingen studio zudem / apfalbild.de

ADVANCED RECYCLING TECHNOLOGY MARKET TO GROW

The “Advanced Recycling Technology Market Report: Trends, Forecast and Competitive Analysis to 2030” report has been added to ResearchAndMarkets.com’s offering.

According to the Irish market research store, the global advanced recycling technology market is expected to reach an estimated 2.05 billion US-Dollar by 2030 with a CAGR (compound annual growth rate) of 35.6 percent from 2024 to 2030. The future of this market sector looks promising with opportunities in the food and beverage packaging, non-food packaging, consumer electronics, infrastructure and construction, and automotive markets. As major drivers of the market development, the report identified increasing government regulations promoting recycling initiatives, rising demand for circular economy solutions and resource efficiency, and growing use of plastics in producing lightweight components. “Companies in the market compete on the basis of product quality offered”, the information said. “Major players in this market focus on expanding their manufacturing facilities, R&D investments, infrastructural development, and leverage integration opportunities across the value chain. With these strategies advanced recycling technology companies cater increasing demand, ensure competitive effectiveness, develop innovative products & technologies, reduce production costs, and expand their customer base.”

researchandmarkets.com/reports/5952513/advanced-recycling-technology-market-report

Sorting for Circularity USA:

PROJECT FINDINGS UNVEIL A BILLION DOLLAR OPPORTUNITY

The organization Fashion for Good has launched the “Sorting for Circularity USA” report, unveiling significant findings from the project, according to the authors. (Credit: Julia Cameron, Pexels/Fashion for Good)

A first of its kind in the US, the report delves into consumer disposal behavior, textile waste composition, and the potential for fiber-to-fiber recycling within the country. It provides crucial insights for making informed decisions for further investments, infrastructure development and the next steps towards circularity.

Understanding the U.S. textile waste landscape

The United States is a global leader in textile consumption and waste generation, positioning itself as one of the largest sources of secondary raw materials for post-consumer textile feedstock. Despite this, only 15 percent of the textile waste generated in the US is currently recovered, with 85 percent ending up in landfills or incinerators.

With the impending policies in the European Union and certain American states, alongside commitments from both public and private sectors to promote fiber-to-fiber recycling, there is a growing demand for infrastructure related to post-consumer textile collection, sorting, and recycling.

Addressing data gaps

In the pursuit of establishing a functional reverse supply chain and the necessary infrastructure, two critical areas lack data – consumer disposal behavior and material characteristics of post-consumer textiles. The Sorting

“The Sorting for Circularity USA project addresses a key challenge in the textile industry: transforming textile waste into a valuable resource. This project investigates the connection between consumer behavior, waste generation, and available recycling technologies. The goal is to establish a system where all textiles are utilized effectively, minimizing waste.” – Katrin Ley, Managing Director, Fashion for Good

for Circularity USA project addressed these gaps through a comprehensive national consumer survey and waste composition analysis.

The survey revealed that 60 percent of respondents divert textiles, while four percent discard them, driven primarily by factors such as condition and fit. On the other hand, the waste composition analysis unveiled that over 56 percent of post-consumer textiles are suitable

for fiber-to-fiber recycling, with cotton and polyester being the most prevalent fiber types, indicating a substantial potential for these textiles to be used as feedstock for mechanical and chemical recycling processes.

“This research provides defensible insight into two parts of the recovery value chain with little to no existing data: firstly, how consumers decide what to do with textiles they no longer want and secondly, the fiber composition of postconsumer textiles. With these new findings, we can enhance collection systems to capture more textiles, calculate the financial potential for textile recycling, and build supportive, data-driven policy. We are eager to continue building upon this research to advance further opportunities for textile circularity.” – Marisa Adler, RRS

Charting the path to a circular textiles future

The project revealed a 1.5 billion US-Dollar opportunity for fiber-to-fiber recycling by redirecting non-rewearable textiles from landfills and incinerators to recycling streams. The report outlines growth strategies for the US textile recycling industry, emphasizing enhanced financial value through efficiency improvements, increased commodity valuation, and policy mechanisms like extended producer responsibility schemes. Collaboration among stakeholders is crucial, including brands, government, retailers, consumers, collectors, sorters, recyclers, and financial institutions, to promote circularity,



invest in research and development, and advocate for supportive policies and incentives to drive technological innovation. This redirection of textiles towards recycling underscores the substantial economic potential of embracing circularity in the textile industry. There is an opportunity to build on these insights and assess the feasibility of different sorting business models and (semi-) automated sorting technologies to create a demo facility suitable for closed-loop textile recycling. Ultimately, evaluating the commercial and technical feasibility of a semi-automated sorting process and identifying investment opportunities to scale solutions nationwide.

🌐 reports.fashionforgood.com/wp-content/uploads/2024/05/2024-FFG-RRS-Sorting-for-Circularity-USA-Report.pdf

About Sorting for Circularity

Launched in January 2023 by Fashion for Good and RRS, the Sorting for Circularity USA Project is a pioneering initiative, the first of its kind in the United States, aimed at providing crucial insights for strategic decision-making to advance circularity in the fashion value chain.

The project brings together Fashion for Good brand partners Adidas, Inditex, Target, Levi Strauss & Co., external partners H&M Group, lululemon, Eastman, Nordstrom, and the New York State Center for Sustainable Materials Management (NYS CSMM), and key project implementation partners including the Secondary Materials and Recycled Textiles (SMART) Association, Goodwill Industries International, Helpsy, Goodwill of Colorado, Goodwill of the Finger Lakes, Goodwill of the San Francisco Bay, Goodwill Suncoast, and United Southern Waste.

The Sorting for Circularity framework, introduced by Fashion for Good together with Circle Economy in 2021, forms the basis for the project, utilizing Matoha's Near Infrared (NIR) technology to assess textile waste composition and identify the potential for fiber-to-fiber recycling.

🌐 fashionforgood.com/innovation-platform/focus-areas/

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GLOBAL INDUSTRIAL WASTEWATER TREATMENT MARKET PREDICTED TO GROW

The Business Research Company (TBRC), a market research and intelligence company with offices in India, the UK and the USA, has produced a report regarding the global industrial wastewater treatment market. As stated, the indus-

trial wastewater treatment market size is predicted to reach 38.88 billion US-Dollar in 2028 at a compound annual growth rate (CAGR) of 6.4 percent. "The growth in the industrial wastewater treatment market is due to rising industrialization. Asia-Pacific

region is expected to hold the largest industrial wastewater treatment market share."

thebusinessresearch-company.com/sample_request?id=10659&type=smp

THE RECYCLED CONCRETE AGGREGATES MARKET

According to India-headquartered company HTF Market Intelligence Consulting, the recycled concrete aggregates (RCA) market size is estimated to increase by 38.6 billion US-Dollar at a CAGR (compound annual growth rate) of 7.4 percent from 2024 to 2030. As underlined, the report aims to

provide market intelligence and strategic insights to help decision-makers take sound investment decisions and identify potential gaps and growth opportunities. Additionally, the report would identify and analyze the changing dynamics and emerging trends along with the key drivers, challenges,

opportunities and constraints. "The report includes historic market data from 2024 to 2030. The market value is pegged at 33.3 billion US-Dollar."

htfmarketintelligence.com/report/global-recycled-concrete-aggregates-rca-market-market

RE-STABILIZATION TECHNOLOGY FOR MECHANICAL RECYCLED PLASTICS

International active South Korean company Songwon Industrial Co., Ltd., highlighted at the National Plastics Exposition (NPE) 2024 in Orlando (Florida) its commitment as a leading provider of additives and services designed to help customers in the plastics industry optimize the sustainability of their products. In response to the growing demand for circular plastics, the manufacturer of

polymer stabilizers has developed "a pragmatic re-stabilization technology for materials with mechanical recycled post-consumer content (PCR)", a press release said.

The company has presented its "Songnox Binary Antioxidant Blends", developed to improve the process and thermal stability of PCR-based polyolefins. "These enable recyclers

to offer materials with improved melt flow, durable mechanical properties and enhanced cost-efficiency", Songwon described the benefits. "Similar solutions for other polymers with PCR content are also in the pipeline to further support the plastics industry's successful transition to a truly circular economy."

songwon.com

UNESCO CHAIR ON MATERIALS AND TECHNOLOGIES FOR THE ENERGY TRANSITION

Ca' Foscari University of Venice, in collaboration with Luleå University of Technology (Sweden), has announced the establishment of

the UNESCO Chair on Technologies and Materials for Green and Energy Applications (Aid4GEA), an initiative dedicated to science and technologies

for the energy transition. The Chair is Elisa Moretti, Professor of Inorganic Chemistry at Ca' Foscari, and the co-chair is Alberto Vomiero, Professor of

Science and Technology of Materials at Ca' Foscari and Luleå.

Aid4GEA is a strategic action for advancing international collaboration on sustainable technologies. It emphasizes the urgency of integrating

advanced materials for environmental solutions, promoting a circular economy and improving energy efficiency, especially in developing countries. The 15 partners already involved include academic institutions from several countries such as

Ethiopia, Morocco, Senegal, South Africa, Tunisia, Turkey, Pakistan and China. The project is supported by the most prestigious international advanced materials research societies, the Global Young Academy and three other UNESCO Chairs.

USA:

BRIGHTMARK TO INVEST IN NEW PLASTICS CIRCULARITY CENTER

Circular solutions company Brightmark LLC, headquartered in San Francisco, intends to develop a 2.5 million-square-foot circularity center in Thomaston (Georgia) with the capacity to repurpose over 400,000 tons

of plastic per year. According to Brightmark, the company's proprietary Plastics Renewal technology "takes discarded plastic content and converts it into the materials to create new circular plastic products" via pyrolysis.

The scope of investment will be nearly one billion US-Dollar, the information said. Construction is expected to start in 2025. The facility could go into operation in 2027.

brightmark.com

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- riedhammer.de
- lithium-ion-batterykilns.com



USA:

EASTMAN WILL BUILD A SECOND MOLECULAR RECYCLING FACILITY

In March, the American chemical company Eastman informed that it was selected by the Department of Energy (DOE) as one of 33 companies for award negotiations to support Eastman's second molecular recycling facility in the USA.

The DOE selection would lead the company, which operates its first molecular recycling facility in Kingsport (Tennessee), to announce intentions to build a second molecular recycling facility in the USA at its location in Longview (Texas). As reported, Eastman selected the Longview site "due to synergies with existing infrastructure and operations, favorable energy supply and footprint, and access to western and central U.S. feedstock pools. The location also provides enough space for onsite renewable energy. The investment includes operations that will prepare mixed plastic



The molecular recycling facility by night

waste for processing, Eastman's next-generation molecular recycling unit to depolymerize waste, and a polymer facility to create virgin-quality materials for packaging and textiles." The Longview molecular recycling facility would have the capacity to recycle approximately 110,000 metric tons of hard-to-recycle plastic waste.

About the technology

"Eastman's proven polyester renewal technology recycles hard-to-recycle plastic waste bound for landfill or incineration today", the press release said. The technology would allow this waste "to be broken down into its molecular building blocks and then reassembled to become virgin-quality material without compromising performance". By its own account, Eastman is enabling "the potentially infinite use of materials by keeping these valuable molecules in production, in a material-to-material high-yield loop". Furthermore, the company could transform waste plastic into virgin quality polyesters (suitable for contact with foodstuffs) "with lower greenhouse gas emissions than traditional methods". In addition to this newly announced facility in Texas, Eastman has recently completed its first mo-

Eastman collaborates with Debrand to recycle apparel waste

In April this year, Eastman formed a strategic collaboration with Debrand, a next-life logistics company specializing in finding sustainable solutions to apparel waste for some of the world's top apparel and footwear brands. Teaming up with Debrand for collecting, Eastman uses its molecular recycling technology to recycle 5,000 pounds of pre- and post-consumer apparel waste. The process would break down this type of waste to its molecular building blocks and use the certified recycled material to create Naia Renew fibers – circular fibers made from 60 percent sustainably sourced wood pulp and 40 percent recycled waste material via Global Recycled Standard-certified mass balance.

"Eastman and Debrand are showcasing the transformative potential of molecular recycling technology to address the textile waste crisis", the information said. By providing more circular solutions for this type of waste, this partnership would set a new standard for sustainable practices in the fashion industry.

Before the company collaborated with Eastman, Debrand had secured a strategic investment from Waste Management to deliver circular solutions across the U.S. and Canada. Eastman continues to cooperate with strategic brands and organizations. In February, the company teamed up with the outdoor apparel company Patagonia to recycle 8,000 pounds of its pre- and post-consumer clothing waste.

 eastman.com, debrand.ca

lecular recycling facility in Kingsport and plans to invest in another location in France.

Some days earlier, Eastman had informed that it is generating revenue from its molecular recycling facility in Kingsport. The company expected to ramp up production of the facility over the coming months “and enable growth across a wide range of markets”. Achieving this critical milestone

would enable the company’s pathway to deliver approximately 75 million US-Dollar of incremental EBITDA (earnings before interest, taxes, depreciation and amortization) in 2024 from this facility “as it builds momentum in its circular economy platform”.

Collaboration with customers

As a global specialty materials company, Eastman employs approximately

14,000 people around the world and serves customers in more than 100 countries. In 2023, the company had achieved a revenue of approximately 9.2 billion US-Dollar.

The company works with customers “to deliver innovative products and solutions while maintaining a commitment to safety and sustainability”.

[eastman.com/en](https://www.eastman.com/en)

POLISH-AMERICAN COLLABORATION IN ELECTRIC VEHICLE BATTERY RECYCLING

US-based Ascend Elements and Polish Elemental Strategic Metals have formed AE Elemental, a joint venture in Poland. The new firm is intended to own and operate an advanced Li-ion EV battery recycling facility in Zawiercie (Poland). Furthermore, the partners plan to build a plant in central Germany. As stated, the companies will jointly own (50/50) and operate a newly constructed electric vehicle (EV) battery recycling facility in Zawiercie, Poland. “The state-of-the-art facility will disassemble, discharge and shred EV batteries to produce black mass, which can be used to make new engineered EV battery materials, including cathode active material (CAM) and cathode precursor (pCAM),” the press release said. The facility would recycle up to 12,000 metric tons of batteries per year, or approximately 28,000 EV batteries annually. “Both JV partners agreed to jointly invest in large-scale lithium extraction from black mass. Lithium extraction capabilities processing up to 20,000 metric tons of black mass per year will begin construction in fall 2024 to be operational in 2026.” Additionally, the companies plan to build a new, state-of-the-art EV battery recycling facility in central Germany. As specified by the information, it will

be able to recycle up to 25,000 metric tons of batteries per year, or approximately 58,000 EVs annually.

About the partners

Elemental Strategic Metals is a member of Elemental Group and operates a large multi-metal extraction facility in Poland focused on recovering battery metals and platinum group metals. Currently, Elemental Group has subsidiaries in 35 countries on three continents (Europe, Asia and North America). Ascend Elements is a pro-

vider of sustainable, closed-loop battery material solutions. According to the company’s homepage, its patented Hydro-to-Cathode direct precursor synthesis process simplifies recycling and transforms old batteries into sustainable battery materials “that rival or surpass the performance of new”. The technique would leach out impurities, keeping the valuable metals in solution and eliminating multiple steps in the recycling flow.

ascendelements.com

elementalsm.pl/en/



From 2026 the joint venture company AE Elemental will operate the new electric vehicle (EV) battery recycling facility in Zawiercie, Poland

Photo: Ascend Elements

RECYCLED PET FOR COCA-COLA'S RPET BOTTLES IN INDONESIA

The rPET is produced by an Indonesian recycler on two recycling systems from internationally active manufacturer Starlinger.

In June 2023, Coca-Cola Indonesia – in partnership with Coca-Cola Europacific Partners Indonesia (CCEP Indonesia) – launched the first bottles made from 100 percent rPET (excluding bottle caps and labels) for its most popular soft drink brands. The recycled PET is supplied by one of Indonesia's recycling pioneers, Amandina Bumi Nusantara. The company operates a plastics recycling plant on the outskirts of Jakarta with two Starlinger recoSTAR PET HC iv+ bottle-to-bottle recycling systems and processes 3,000 tons of collected PET bottles every month. Two types of clear bottle-grade rPET pellets are produced – one for carbonated beverages and one for spring water. In addition, the company supplies hot-washed flakes in clear and light-blue colors.

Installing the two PET recycling systems was carried out by local technicians from Starlinger's Indonesian branch office in autumn 2022. The team in the branch office in Surabaya handles machine installations, service and maintenance works and spare part orders for the manufacturer's cus-



tomers in the South East Asian region and provides immediate support if needed.

Responsible sourcing

As reported by Starlinger, Amandina assists companies in achieving their sustainability targets by providing competitive recycled PET products produced from responsibly sourced input material. For the collection of post-consumer PET bottles, Amandina Bumi Nusantara collaborates with Mahija Parahita Nusantara Foundation, a non-profit organization founded by CCEP Indonesia and Dynapack Asia. As in many other Asian countries, over 90 percent of plastic waste collection activities in Indonesia are carried out by

waste pickers in the informal sector – called “recycling heroes” by Amandina and Mahija. The remaining percentage is managed through formalized systems such as waste banks and other organized collection efforts.

According to the information, CCEP Indonesia aims to make 100 percent of its packaging recyclable and to ensure that at least 50 percent of the plastic bottles are made of rPET by 2025. The company's targets for 2030 are to collect 100 percent of its plastic bottles to enter the recycling stream and to eliminate virgin plastic in its plastic bottles.

starlinger.com/en

cocacolaep.com/en-id/

Photo: Starlinger

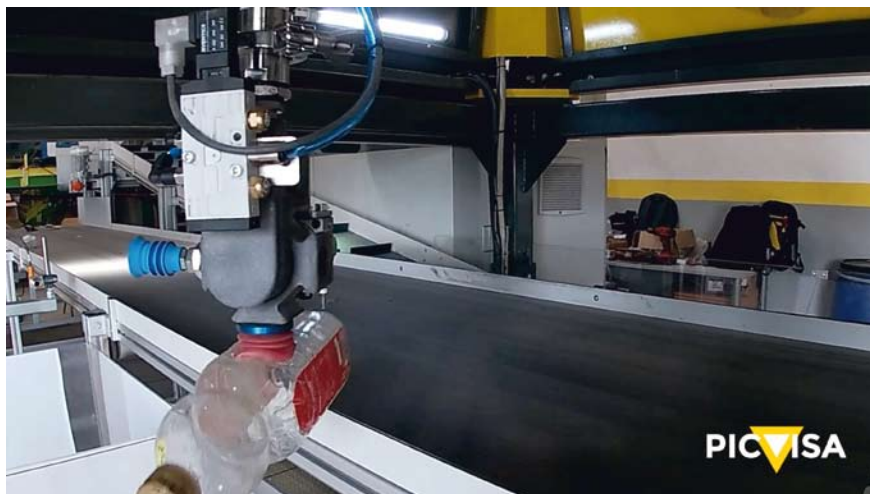
UAE PLASTIC RECYCLING MARKET TO GROW

As reported by Ireland-based company ResearchAndMarkets.com, the plastic recycling market in the United Arab Emirates (UAE) is positioned for significant growth in the coming years with an anticipated compound annual growth rate (CAGR) of 5.34 percent. According to recent market research, the market size stood at 0.84 million tons in 2020 and is predicted to expand to 1.44 million tons by 2030. “This growth trajectory is fueled by the UAE's increasing commercial activities, which have led to augmented plastic usage across various sectors, resulting in a substantial rise in plastic waste. The market analysis digs into plant capacities, production, operating efficiencies, and the demand and supply dynamics affecting the industry.”

■ For more information about this report visit researchandmarkets.com/r/94eb3f.

THE ROLE OF ROBOTICS IN ADVANCING INDUSTRIAL RECYCLING FOR A SUSTAINABLE FUTURE

An increasing number of companies across various industrial sectors are turning to automation to streamline production processes. This shift aims to leverage technological advancements for enhanced efficiency, boosted production, and improved product quality. Importantly, many industries are incorporating sustainability into their strategic goals, recognizing the need for greener practices for long-term viability. A key component of this shift is the integration of robotics in waste recycling.



Robotics, combined with artificial intelligence (AI) and computer vision, is revolutionizing waste management. These technologies enable rapid and accurate detection, capture, and sorting of waste materials. That precision enhances recycling processes and significantly reduces the ecological footprint of industrial activities. The new generation of robotics is designed to minimize the environmental impact of manufacturing, fostering a balance between economic growth, environmental care, and social welfare.

The impact of these advancements is noticeable in sectors such as food, fashion, chemicals, and energy. By in-

tegrating circular economy principles, these industries are becoming more sustainable, efficient, and resilient. The circular economy model transforms waste into valuable resources, reducing the residual environmental impact. That approach is crucial in addressing global biodiversity threats and mitigating pollution's adverse effects on human health and well-being.

One stark example of the need for circularity is the textile industry. According to Eurostat, the European Union exported 32.1 million tons of waste to third countries in 2022, slightly less than the previous year. The textile sec-

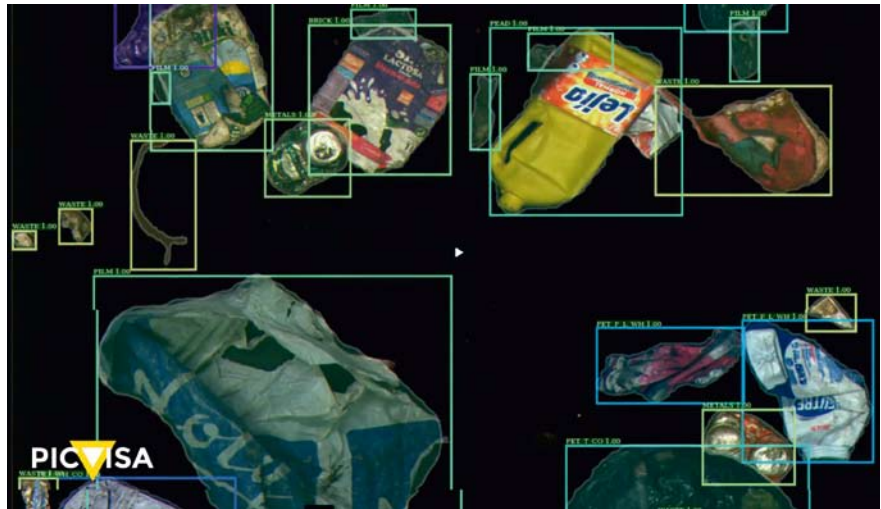
tor is a major environmental offender, trailing only food, housing, and transport in impact. Textile consumption pressures water and land use, with the EU discarding five million tons of textiles annually – an average of 11.3 kg per person. Shockingly, only one percent of the world's clothing material is recycled into new garments.

In Spain, approximately 900,000 tons of clothing are discarded each year, and 88 percent end up in landfills. The European Commission has recognized the urgency of this issue and launched the Circular Economy Action Plan, including the Strategy for Sustainable and Circular Textiles. This strategy aims to ensure that by 2030, all textile products in the EU market are durable, recyclable, and produced with respect for social and environmental rights. The strategy involves comprehensive measures to transform the entire life-cycle of textile products.

Robotics plays a pivotal role in transforming waste management across all sectors generating industrial waste, including electronics, metallurgy, glass, food, iron and steel, paper, and chemicals. Here is how robotics enhances waste management:



- Industries aiming to improve waste management can find effective solutions with companies like PICVISA.



By embracing automation, these industries can turn waste management challenges into opportunities, reducing environmental impact and promoting sustainability. Robotics offers a pathway to a more sustainable

and efficient future in waste management, demonstrating that innovative approaches can lead to a better waste management paradigm.

 picvisa.com

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AUSTRALIAN COMPANY ORDERED DESPRAY SYSTEMS

At IFAT in Munich, Dutch-based DeSpray Environmental signed a long-term multi-million contract with the Australian-based ARRG Waste for its aerosol recycling systems.

As reported by the provider, this is the first time in DeSpray's history that its aerosol recycling machines will be shipped to Australia and the Asia Pacific. "With this multimillion-dollar order, DeSpray Environmental has been found as a long-term partner to install the 100 percent aerosol recycling machines at several ARRG Waste locations." From its headquarters in Chinchilla (Queensland), the Australian company operates a range



Peter Monaghan (CEO) ARRG Waste, David Wrenn (Executive Manager) ARRG Waste, Eelco Osse and Mike MacKay, DeSpray Environmental owners (f.l.t.r.)

of waste management and recycling services. The cooperation with DeSpray would fit into their business model.

According to DeSpray Environmental, the arrival of the machines "should put a dent into the 250 million aerosol cans that are consumed in Australia every year and are not recycled properly". The company expects that other countries in the Asia Pacific will also follow the example of ARRG Waste in Australia and practice aerosol recycling.

despray.com

arrgwaste.com.au

Photo: DeSpray

Sweden:

PREEM TO RECONSTRUCT REFINERY FOR RENEWABLE FUEL

Swedish refiner Preem AB, a wholly owned subsidiary of Corral Petroleum Holdings AB (CPH), aims to become the largest producer of renewable aviation fuel in Northern Europe and a major producer of renewable fuels for road transport.

For this purpose, the company has entered into a loan agreement totaling approximately 240 million Euro (equivalent to around 2.8 billion Swedish Krona) with the Swedish Export Credit Corporation and Crédit Agricole Corporate & Investment Bank. "This loan falls under the National Debt Office's 'green credit guarantees' program," Preem informed on its homepage. It is the second credit guarantee to Preem under the government's credit guarantee program for green investments. According to the company, the loan

guarantee is intended to fund its investment at the Lysekil refinery for the production of renewable diesel (HVO100) and sustainable aviation fuel (SAF). "It is an investment in production that positions Preem to become the largest producer of renewable aviation fuel in Northern Europe and one of the largest producers of renewable fuels for road transportation."

The total cost of Preem's investment

stands at around 5.4 billion Swedish Krona, the refiner informed in May this year. The reconstruction of the facility, currently producing diesel, was announced to begin in 2024 and is scheduled for completion by 2027. The plant is expected to increase the company's renewable production capacity by 1.2 million cubic meters, compared to the total capacity of renewable fuels in 2023, which was approximately 530,000 cubic meters.



"The reconstruction is crucial for reducing fossil carbon dioxide emissions," Lina Stolpe, CFO of Preem, was quoted. "According to our projections, emissions in end-user sectors could decrease by up to three million tons annually."

preem.com/en/

Photo: falco / pixabay.com

Denmark:

CONSTRUCTION WASTE TO BE PROCESSED BY ROBOTIC SORTING PLANT

Danish recycling company RGS Nordic, which processes up to one-third of Denmark's construction waste annually, invests in an advanced robotic sorting plant set to be installed centrally in Copenhagen.



The firm wants to ensure better sorting and increased recycling. According to the information, this is done in collaboration with Finnish ZenRobotics and Terex Recycling Systems, who will supply a fully automated plant, which will be installed at one of RGS Nordic's waste processing facilities.

"We are investing in a state-of-the-art sorting plant aimed at construction waste which cannot be sorted out well enough at construction sites," RGS Nordic COO Rasmus Brødsgaard Buch was quoted. "Using robotic technology, we want to ensure that valuable waste resources end up higher in the waste hierarchy while

better supporting our customers with accurate waste data that helps them document their sustainability efforts within the area of waste. We believe that there is great untapped potential in utilizing technology in our sector, and that the robotic sorting facility will, therefore, be crucial in achieving increased circularity for the construction industry."

As underlined by ZenRobotics, a Terex brand, the facility's robots can work around the clock, make up to 9,200 picks per hour and handle objects weighing up to 40 kilos. "The fact that the plant is fully automated also

increases the safety of the employees who work with the waste streams, as they often do not come into direct contact with the waste. The quality and quantity of waste that is recycled is also improved by the AI-powered robots, which continuously improve in recognizing valuable waste resources and can be adapted to sorting tasks, in line with customer demand and market opportunities." The coming RGS Nordic robotic sorting plant is scheduled to be operational by the summer of 2024.

terex.com/zenrobotics

rgsnordic.com/en

Photo: ZenRobotics

EQUITY FUND INVESTS IN TANA OY

The CapMan Growth Equity III fund has made its first investment in Finnish environmental technology company Tana. The investment has been made together with CapMan Growth's long-term industrial advisor, Normet Group's principal owner, Aaro Cantell, and Elo Mutual Pension Insurance Company. Simultaneously, the company's executive management also invests significantly in the company. Tana's long-term owner Kari Kangas and his family will continue as the company's largest owners.

Tana Oy is offering smart equipment and solutions for processing solid waste. The product portfolio of the globally operating company includes shredders, screens, landfill compactors and remote monitoring systems. Tana products are exported to more than 50 countries through a distribution network including more than 30 authorized Tana dealers. As stated by the company, Tana Oy is growing strongly and has maintained an annual turnover growth rate of around 20 percent for several years. For the financial year that ended in March, the company's turnover is expected to exceed 65 million Euro, and the parties to the agreement have agreed to invest in the strong growth in the future as well.

tana.fi

FIRST AUTOMATED TEXTILE WASTE SORTING AND RECYCLING LINE IN FRANCE

France's first industrial plant for automated sorting and recycling of textile waste was established at the company Nouvelles Fibres Textiles, Amplepuis.

The plant, which was officially inaugurated on the last day of November last year, is the result of a partnership between textile recycling company Nouvelles Fibres Textiles, waste sorting specialist Pellenc ST and international technology group Andritz, headquartered in Austria. According to Andritz, this partnership "is a clear contribution to tackling the challenge of textile waste in the EU". The European Union's strategy for sustainable and circular textiles would aim to ensure that by 2030 textile products are made to a great extent of recycled fibers and incineration and landfilling of textiles are minimized.

Capable of automatically sorting garments by composition and color, the new line would meet the needs of both post-consumer and post-industrial waste markets, the engineering firm gave account. It would also remove hard parts such as buttons and zippers to prepare the material for further processing in a tearing machine. As reported, the automated textile



Inauguration of automated textile waste sorting and recycling plant at Nouvelles Fibres Textiles on November 30, 2023

sorting line at Nouvelles Fibres Textiles is dedicated to industrial-scale production, customer trials and projects, and the R&D activities of the partners. It would process textile waste to produce recycled fibers for the spinning, nonwovens, and composites industries. "The opening of the new line marks a milestone in our efforts to turn textile waste into resources. And we are already laying the foundations for a second material preparation plant with a capacity to process


25,000 tons of post-consumer textiles per year," Eric Boel, General Manager, Nouvelles Fibres Textiles, was quoted. Automated sorting was seen as the last missing link needed to develop a complete ecosystem in France, where the fashion industry, social and solidarity economy actors, waste management companies, and textile producers from different sectors are working together towards a textile circular economy.

 andritz.com

STEINERT EXTENDED RANGE OF SORTING EQUIPMENT

In May this year, the German-based sorting specialist Steinert informed that the company acquired the MSort sorting systems from Mogensen GmbH & Co. KG (based in Wedel near Hamburg), which has been part of the JOEST group since January. With this acquisition, the owner family Buchholz was pleased with the establishment of a new subsidiary – STEINERT MSort – that can offer additional sorting solutions and will expand the portfolio to include translucency and double-sided detection using color and near-infrared (NIR) starting July 1, 2024.

 steinertglobal.com

 mogensen-joestgroup.com/en/msort/

BLUEALP AND RES TO BUILD PLASTIC RECYCLING PLANT IN ITALY

Dutch company BlueAlp, a provider of recycling technology, has signed an agreement with Italian waste management firm Recupero Etico Sostenibile S.p.A (RES) to realize the first industrial-scale advanced recycling plant in Italy by mid-2026. “BlueAlp will supply a technology license and will engineer, procure and fabricate the unit in its workshop in Eindhoven, The Netherlands”, the information said. RES would own and operate the plant to process and convert 20,000 tons of mixed plastic waste per year. The industrial plant, based on BlueAlp’s patented pyrolysis technology, is the first in Italy in terms of size and production capacity. It will be set up in Pettoranello del Molise next to RES’ existing mechanical recycling facilities.

As underlined, it will process waste that cannot be recycled mechanically, such as polyolefin film fractions.



Maria Valerio (President RES), Antonio Valerio (CEO RES), Valentijn de Neve (CEO BlueAlp) and Albert Boogert (CFO BlueAlp), f.l.t.r.

Waste plastics will be transformed back to their original form as pyrolysis oil, which can be used to replace raw materials in the virgin plastics value chain and chemical and petrochemical industries. “This offers a response to the large demand for high quality re-

cycled content solutions, for example, the demand from FMCG players with ambitions to make plastic food packaging circular.”

bluealp.nl

recuperoeticosostenibile.it

Photo: BlueAlp

EXPANDED COOPERATION FOR THE RECYCLING OF SYNTHETIC TURF

The Danish synthetic turf recycler Re-Match has prolonged and expanded its cooperation with Geminor. The Norway-based resource management and trading company will now become a logistics partner for the supply of Re-Match’s new plants in both France and the Netherlands.

The Danish recycling company has since 2013 been a leading recycler of synthetic turf pitches in Europe. Last year, Re-Match opened its second factory in Tiel in the Netherlands, and more recently its third factory in Er-



stein outside of Strasbourg in France. Re-Match offers an environmentally sustainable recycling process and has recycled more than 160,000 tons of waste turfs during its 11 years in operation. As reported, the output from the recycling factories consists of dry and sieved materials that are 99 percent clean and ready to be reused in products within automotive and furniture – but also in new artificial turfs.

geminor.no

re-match.com

Photo: Re-Match/Geminor

AUSTRALIA: FOCUSED ON NETZERO



Austrade (Australian Trade and Investment Commission), the Australian Government's international trade promotion and investment attraction agency, invited investors to attend the country on its way to cutting domestic carbon emissions. Australia also has ambitious targets to increase waste recovery and recycling rates as part of this goal.

By 2030, Australia aims for a resource recovery rate of about 80 percent from all waste streams. That would equate to an extra 15 million tons of material every year, the agency referred to the country's National Waste Policy Action Plan 2022, an annexure to the 2019 National Waste Policy Action Plan ([dcccw.gov.au/sites/default/files/documents/national-waste-policy-action-plan-annexure-2022.pdf](https://www.dcccew.gov.au/sites/default/files/documents/national-waste-policy-action-plan-annexure-2022.pdf)) in an earlier version of its homepage.

According to the National Waste Report 2022, published in December of that year, during the financial year 2020-21 (1 July to 30 June) Australia generated an estimated 75.8 million tons (Mt) of waste. This amount included "25.2 Mt of building and demolition materials, 14.4 Mt of organics, 12.0 Mt of ash, 7.4 Mt of hazardous waste (mainly contaminated soil), 5.8 Mt of paper and cardboard, 5.7 Mt of metals and 2.6 Mt of plastics". That was meant to be equivalent to 2.95 tons (t) per person regarding the estimated population of nearly 26 million.

In 2020-21, 28.0 Mt of waste were disposed of, representing 37 percent of waste generated, the authors of the National Waste Report described the situation. At the same time,

Australia's resource recovery rate (including waste reuse, recycling and energy recovery) was 63 percent, while the recycling rate reached 60 percent. "The national trends in recovery and recycling rates are upwards."

In the period under review, approximately 45.4 Mt of materials were received or processed, up from 40.1 Mt in 2016-17, the information said. The four largest fractions of recycling, making up 84 percent of the total, were building and demolition materials (20.2 Mt), organics (6.8 Mt), ash (6.0 Mt), and metals (5.0 Mt). C&D (construction and demolition) represented the largest source stream (50 percent) followed by C&I (commercial and industrial) including ash (38 percent) and MSW (municipal solid waste) with a share of 13 percent. As stated in the National Waste Report 2022, Australia has regulated its exports of glass, plastics and tires and will regulate paper and cardboard from July 2024. "The rules generally aim to ensure that exports are ready for use as a product and do not require further processing or cause harm to environmental or human health overseas." Combined with import controls imposed by key Asian trading partners, the rules had "significantly affected the quantities of some waste-derived materials exported, as well as the processing undertaken prior to export". Despite these

changes, the total exports of waste and recovered materials have remained at about the same level (about 4.5 million tons per year) since the financial year 2011–12.

Infrastructure

Significant investment is occurring in Australian waste and resource recovery infrastructure, with outlays from the Commonwealth, states, territories and industry, the National Waste Report 2022 informed. As of 2022, a major area of development was linked to the Australian Government's regulation of the export of some materials not suitably processed for recycling. Glass, plastic and tires were already regulated – paper and cardboard were set to follow in July this year. "Large investments have been made to help develop local processing and boost the capacity of existing facilities to meet increased demand," the National Waste Report 2022 described the situation. The centerpiece of this support would be the Recycling Modernization Fund, through which the Australian Government is investing 250 million Australian Dollar (today more than 165 million US-Dollar) into new and upgraded recycling infrastructure. With contributions from the states and territories as well as the industry, the fund would see over one billion Australian Dollar of investment in recycling infrastructure. As reported, Recycling Modernization Fund projects announced by late 2022 were expected to sort, process, recycle and remanufacture over a million additional tons of waste glass, tires, plastic and paper per year by July 2024. Furthermore, the Australian Government's Food Waste for Healthy Soils Fund "supports the establishment of new, and upgrades to

existing, organics recycling infrastructure to increase the quantity and improve the quality of recycled organic products for use, especially on agricultural soils". That would correspond with a drive in many states and territories to increase food organics and garden organics collections from Australian households. As of September 2022, 16 projects had been awarded funding of 23.6 million Australian Dollar. In some areas, wastewater authorities were proposing the development of facilities that can handle both biosolids and FOGO (food organics and garden organics), "but this is in its infancy and is not widespread", the information said.

"The use of energy from waste (EfW) as a practical management option for large waste volumes in Australia is increasing." In 2022, two large-scale thermal EfW facilities were under construction in Western Australia (at East Rockingham and Kwinana), with operations expected to commence in 2023. Other large facilities in New South Wales and Victoria had received regulatory approvals. "One proposed facility (the Maryvale EfW facility being developed by Opal Australian Paper and partners) has also received significant financial support from the Australian and Victorian Governments," the document, dated 2022, informed. "These facilities generally incorporate municipal solid waste and rely on long-term contracts with local governments to deliver the large waste volumes needed. There are several much smaller EfW facilities across Australia, generally focused on selected industrial waste streams."

However, there was also a negative development. As stated, fires have affected some waste infrastructure, including ma-

Strong recycling commitment

The Australian Governments at all levels (country, state and territory) pursue the target to increase waste recovery and recycling rates, set out in the National Waste Policy and the National Waste Policy Action Plan, to "shift material use to a circular economy". According to Austrade in an earlier version of its homepage, the commitments include:

- "Progressively stopping the export of key waste streams – plastic, paper, glass, and tires – from 2021 to 2024. It means waste must be processed onshore by 2024.
- Increasing the resource recovery rate to 80 percent by 2030.
- Halving food waste sent to landfills by 2030.

National packaging targets for the industry:

- 100 percent of packaging to be reusable, recyclable or compostable by 2025.
- 70 percent of plastic packaging to be recycled or composted by 2025; and
- 50 percent of packaging to be used as recycled materials by 2025.
- Phasing out problematic and unnecessary single-use plastic packaging by 2025."

Furthermore, Australia is committed to creating onshore capacity and keeping value-added materials in the country's economy. "To meet these targets, local processing and recycling capacity must increase substantially – creating opportunities for investors." Additionally, the Australian Government would increase its "purchase of products with recycled content to generate demand for recycled materials".

terial recovery and e-waste recycling facilities. “Operations will cease until reconstruction is complete, which could be more than two years.”

New facilities: recent examples

In December last year, a new material recycling facility (MRF) – worth 40.5 million Australian Dollar – on the Sunshine Coast went into operation. As reported by the Queensland Government some months earlier, it “is the first new-build facility and largest new investment publicly-owned recycling infrastructure in South East Queensland in a decade. With industry-leading intelligent sorting technology, the Sunshine Coast MRF will be able to process 60,000 tons or more per year to recover glass bottles, plastic containers, cardboard, paper and steel and aluminum cans, supplying a range of quality products for re-use across several industries.”

With the saveBOARD recycling plant, Australia’s first food and beverage carton recycling facility was launched in Waragamba (near Sydney, New South Wales) in February last year. “saveBOARD is an industry-led collaboration between Tetra Pak and other carton manufacturers, Closed Loop, and Freightways. The boards produced at the facility can be used as a substitute for plasterboard and the saveBOARD technology provides a zero waste to landfill solution as any offcuts are reused and end-of-life boards can be remanufactured into new boards”, Tetra Pak informed on the website of the Swedish Australian Chamber of Commerce.

In 2023, a new construction waste recycling facility opened in Brisbane (Queensland). According to Rino Recycling, its fully automated recycling plant turns construction and demolition waste into recycled material for new infrastructure projects. As underlined, the site can process up to 475 tons an hour, the equivalent of 68 truckloads. With a recovery rate of 97 percent, the plant (investment scope: 95 million Australian Dollar) can recycle more than 1.5 million tons of waste annually and produce aggregates, sand, and road bases.

In December last year, the media portal Mirage.News reported that a new plastic recycling facility was unveiled by the Federal and Victorian Labor Governments. The plant is to process more than one billion PET plastic bottles every year – or over 150 bottles for every citizen in Victoria. Circular Plastics Australia’s Project Symphony in Altona North (a suburb of Melbourne) would process plastic bottles, including soft drink bottles, collected from household recycling bins and container deposit sites into new food and beverage packaging. According to Coca-Cola Europacific Partners, the new facility (worth 50 million Australian Dollar) is the biggest PET plastic bottle recycling plant in

Victoria, coinciding with the start of Victoria’s Container Deposit Scheme. The plant can produce 2.5 tons of recycled PET resin per hour. As emphasized, it is the second Circular Plastics Australia (PET) recycling facility now operational in Australia, with the first – a similar-sized plant in Albury (New South Wales) – commencing operations in March 2022. Circular Plastics Australia (PET) is a joint venture between Pact Group, Cleanaway Waste Management, Asahi Beverages, and Coca-Cola Europacific Partners (CCEP).

At the beginning of May 2024, Western Australia’s most advanced tire recycling facility opened, the Federal and Western Australian Labor Governments underlined in a press release. Tyrecycle’s new recycling plant in East Rockingham (40 kilometers south of Perth) would have the capacity to process 42,000 tons of tires every year. “The technology will double Western Australia’s production of crumbed rubber for use in recycled products like rubber chips, granules and powders – for reuse in things like roads and playgrounds.” The project was supported by a 5.2 million Dollar co-investment from the Australian and Western Australian Governments, with Tyrecycle contributing 9.6 million Dollar.

One of Australia’s biggest paper recycling facilities will be built in South East Queensland with plans to turn 220,000 tons of waste paper and cardboard from across Queensland and northern New South Wales into pulp annually for export. According to the Australian Department of Climate Change, Energy, the Environment and Water (DCCEEW), the national as well as Queensland governments have partnered with Australian company AusWaste Recycling to build a 137 million Australian Dollar waste paper recycling facility at Brendale. The Australian Recycled Pulp and Paper Project (ARPPP) is meant to process waste (about 220,000 tons), including used packaging, newspaper, coffee cups, milk cartons and office paper into value-added paper pulp for paper mills. Construction is expected to be completed in mid-2025.

Strong support

As reported by Austrade in an earlier version of its homepage, there are several incentives, grants and support in the country. Here are some examples:

- The government has committed to establishing a National Reconstruction Fund (15 billion Australian Dollar) to support co-investments in priority areas “including advanced manufacturing, value-add in resources and renewables and low emission technologies”.
- The National Product Stewardship Investment Fund (26 million Dollar) aims to increase the number of industry-led product stewardship schemes in Australia and the recycling rates of existing schemes.
- The Australian Government’s Recycling Modernization

International investment welcome

Austrade actively works to attract international investors and is a first point of contact for all investment inquiries. As part of the Foreign Affairs and Trade (DFAT) portfolio, Austrade is a statutory agency of the Australian Government.

Interested investors can assess their options with the Investor Guide (international.austrade.gov.au/en/do-business-with-australia/invest-in-australia/investor-guide). Or contact the agency: international.austrade.gov.au/en/contact-us

Fund has invested 250 million Australian Dollar to support investment in new infrastructure to sort, process and remanufacture materials. The 60 million Dollar plastics technology stream, announced in 2022, targets hard-to-recycle plastics. Co-funded grants of between one million and 20 million Dollar are available to support new or upgraded recycling infrastructure.

- The Clean Energy Finance Corporation (CEFC), Australia's green bank and invests in the recycling industry. It committed more than 328 million Australian Dollar to the sector from 2012 to 2023.
- The Australian Government funds Cooperative Research Center Projects (CRC-P) Grants for collaborative projects

to develop new technologies, products, and services. For example, the fund has supported research into a process to recycle wind turbine blades.

- Various regions of Australia offer different incentives. For example, the Victorian Government's circular economy policy, "Recycling Victoria: a new economy", includes an investment of over 380 million Australian Dollar. In South Australia, Green Industries SA offers a suite of grants to drive the shift to the circular economy, including market development grants and recycling infrastructure grants.
- Australia's National Plastics Plan outlines the approach to increase plastic recycling, find alternatives and reduce environmental impact.
- The Australian Government is developing a brand and labeling scheme, "ReMade in Australia", for verified Australian-made recycled content products.
- Australian state and territory environment ministers have agreed to put in place a mandatory packaging design scheme, which requires packaging to be designed so it can be recovered, reused, recycled and reprocessed. "The Australian Government supports innovation through a competitive research and development tax incentive."
- The Australian Tax Office's New Investment Engagement Service gives tailored guidance on tax issues to businesses planning significant new investments in Australia.

<https://international.austrade.gov.au/en/why-australia/go-green-with-australia>

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CURBSIDE COLLECTION IMPROVES ORGANIC WASTE COMPOSTING

Composting food and garden waste instead of sending it to landfills can significantly reduce methane emissions and help mitigate global warming. That is the result of a study from the University of Illinois Urbana-Champaign, which explored the effects of curbside compost collection programs in New South Wales, Australia.

“Governments around the world are interested in composting organic waste and reducing their methane emissions, and they are looking for ways to make waste collection more convenient for households. As municipal composting services were being rolled out in Australia, we wanted to measure how these policies affected household waste disposal behavior,” Becca Taylor was quoted; she is an assistant professor in the Department of Agricultural and Consumer Economics, part of the College of Agricultural, Consumer and Environmental Sciences (ACES) at Illinois.

Between 2009 and 2015, 24 local government councils in New South Wales (Australia’s most populous state) adopted curbside services to collect food and garden waste for recycling into compost. “Households received a red bin for general waste, a yellow bin for recycling, and a green bin for organic

waste”, the information said. “Information campaigns educated people on the types of waste allowed in the bins, and some councils provided small kitchen caddies to make waste sorting easier.”

Taylor and co-author Lihini de Silva from Monash Business School (Australia) analyzed household waste data from annual New South Wales government waste and resource recovery reports from 2008 to 2015. “We had access to data for all three curbside waste streams: landfill, recycling, and the newly added compost, so we could see spillover and linkages between them,” Taylor stated. “We found the programs were very successful in getting organic waste out of the landfill. On average households redirected 4.2 kilograms of waste to composting, which represents 25 percent of the waste that previously went to landfills.” In some areas, people could put food scraps and garden waste in the green bins, while other areas only allowed for garden waste. When the researchers compared the two types, they did not find large differences in quantities, which suggests most of the compost came from garden waste.

Based on the Australian data, Taylor and de Silva estimated that moving a

ton of organic waste from landfill to compost would result in six to 26 percent reductions in methane emissions. They noted these results could vary for other locations because calculations are based on the specific compost and landfill technologies that are used.

“We also wanted to see if composting affected other recycling or waste amounts. It could go either way – people could be reminded to recycle other waste as well, or the additional time and effort could result in less general recycling. Another concern was whether giving people an extra bin would increase the total amount of waste,” Taylor was cited. “However, we did not find significant effects on recycling rates, so it’s not crowding out other recycling, but also not encouraging it. We also found no effects on the total amount of waste.”

Methane traps heat in the atmosphere around 30 times more effectively than carbon dioxide. It remains in the atmosphere for a much shorter amount of time, so reductions in methane emissions have a more immediate impact on reducing global warming. Landfills are the third largest source of human-related methane emissions, after fossil fuels and livestock. Composting organic waste instead of sending it to landfills provides an important and low-cost way to reduce methane emissions, the researchers explained.

“These compost collection programs facilitate methane emission reductions without reducing the amount of waste. This underscores that recycling is important, but generating less waste in the first place would result in even greater emission reductions. Both measures are important elements of sustainable practices,” Taylor concluded.



Photo: Landratsamt Kitzingen studio zudem / abfallbild.de

Goal to Be a Flagship Facility in every Respect:

SINGAPORE'S NEW INTEGRATED WASTE MANAGEMENT FACILITY

The Integrated Waste Management Facility (IWMF) – in tandem with the Tuas Water Reclamation Plant (Tuas WRP) – will be part of Singapore's project to realize an innovative and sustainable solution to meet the country's long-term solid waste management and used water treatment needs.

The world's first integrated waste and water treatment facility to be conceptualized and planned from the ground up, Tuas Nexus, would be energy self-sufficient by harnessing synergies from Tuas WRP and IWMF, the National Environment Agency (NEA) and PUB, Singapore's National Water Agency, informed in a joint press release in September 2020. At that time, the first phase of construction of Tuas Nexus had begun, which is set to be completed in phases from 2025 onwards.

The new Integrated Waste Management Facility is seen as an integral part of NEA's long-term plan to meet Singapore's solid waste management needs. In 2022, about 7.39 million tons of solid waste were generated in the Republic of Singapore; 4.19 million tons were recycled. According to the country's statistics published in May 2023, waste generated by the non-domestic and domestic sectors increased from 5.12 million tons and 1.82 million tons in 2021 to 5.53 million tons and 1.86 million tons in 2022. The overall recycling rate was 57 percent.

In 2017, the country generated 21,107 tons of waste per day. At that time, 37 percent of this amount was incinerated at four waste-to-energy (WTE) plants and generated about three percent of Singapore's total electricity demand. Another 60 percent was

recycled, while the remaining three percent was landfilled.

With the new IWMF, the island country and city-state of Singapore aims to reach an overall recycling rate of 70 percent by 2030. Therefore, the facility will be equipped with state-of-the-art solid waste treatment technologies to improve energy and resource recovery from waste. It is Singapore's first integrated facility to treat incinerable waste, source-segregated food waste and dewatered sludge from Tuas WRP, as well as to sort household recyclables collected under the National Recycling Programme (NRP). As reported by NEA, when in full operation, the facility will process:

- 5,800 tons per day of incinerable waste;
- 250 tons per day of household recyclables collected under National Recycling Programme;
- 400 tons per day of source-segregated food waste; and
- 800 tons per day of dewatered sludge from Tuas WRP.

In 2020, NEA had informed that the IWMF would be developed in phases. The first phase was set to be completed progressively from 2024 to 2025, while the whole facility was tentatively planned to be completed by 2028.

Participating companies

In 2020, a Keppel-led consortium received a Letter of Acceptance from the National Environment Agency for an Engineering, Procurement and Construction (EPC) contract worth approximately 1.5 billion Singapore Dollar (1 Singapore Dollar = about 0.74 US-Dollar), for the development of a Waste-To-Energy (WTE) facility and a Materials Recovery Facility (MRF) for Singapore's new Tuas Nexus IWMF. It was expected that the plants would be completed in 2024. The consortium consisted of Keppel Seghers Engineering Singapore Pte Ltd, the environmental engineering arm of Keppel Infrastructure, China Harbour (Singapore) Engineering Company Pte Ltd and ST Engineering Marine Ltd, the



An artist's impression of Tuas Nexus, which shows the co-location of the Integrated Waste Management Facility (IWMF) (left) and the Tuas Water Reclamation Plant (Tuas WRP) (right)


Marine arm of Singapore Technologies Engineering Ltd. Furthermore, the consortium worked closely with NEA, as well as their consultants – a multi-disciplinary consultancy team led by Black & Veatch and AECOM, in association with Ramboll, for the design, construction and commissioning of this flagship project, Keppel Seghers informed in 2020.

The internationally active planning and consulting company WSP, togeth-

er with the consortium, had to manage the overall design of the new Integrated Waste Management Facility (IWMF). It “will provide design management, system integration management and interface coordination, performance requirement management and assistance in certification management. This will also include support for the preparation of the program for design and approval of design from the authorities for Procurement, FAT, construction, testing and commissioning,

TOP/CSC and handover.” In the same vein, WSP had also been awarded a contract with one of the joint venture partners, China Harbour (Singapore) Engineering.

It “will also provide design consultancy services in the areas of architecture, civil & structural, MEP building services to the consortium, as well as permitting services for the project.”

 nea.gov.sg

BIR'S POSITION PAPER ON CHEMICAL RECYCLING

Mechanical recycling must take priority and be incentivized.

Chemical recycling needs careful consideration and well-informed, market-based policies to ensure that it complements rather than competes with traditional recycling methods, the Bureau of International Recycling (BIR) stressed in its latest position paper published in April. According to the global recycling federation representing 37 national recycling associations and more than 950 individual companies, mechanical recycling must remain the preferred method on a large scale, whereas chemical recycling should be used only for hard-to-recycle end-of-life plastics. Describing chemical recycling as “a nascent technology”, BIR urges caution in its deployment and calls for the introduction of a harmonized definition of chemical recycling that excludes fuel production.


As pointed out in a press release, chemical recycling processes are extremely energy-intensive, and some that are currently available produce more greenhouse gas emissions than primary production using fossil fuels during the production process. “For these and other reasons, chemical

recycling should be used only for materials that mechanical recycling cannot efficiently or economically process,” the Bureau of International Recycling referred to the position paper. Moreover, chemical recycling should not be allowed to override the need for design for recycling, the organization underlined. Policies should focus on eliminating hard-to-recycle plastics and incentivizing the design of plastics for reuse or mechanical recycling, thus reducing the requirement for new resources. In the position paper would be added that chemical recyclers should refrain

from misusing mass balance accounting principles to fulfill recycled content objectives.

“A robust method for calculating the climate impacts of chemical recycling must be developed,” BIR Director General Arnaud Brunet was cited. “This should cover all emissions from the process, as well as overall energy usage and incineration of recovered hazardous waste. Furthermore, incentivizing the lower-carbon option of mechanical recycling would enable it to compete with lower-priced primary plastics and make the process more attractive for investment.”

Also responding to the publication of this latest position paper, BIR President Susie Burrage OBE underlined the importance of conveying the industry's key messages on issues relating to recycling. “I am delighted that BIR dedicates resources to such important topics. I'm also extremely appreciative of the excellent collaboration with our national associations on this. It is vital that we continue to join forces in this way for the benefit of our members.”

 bir.org/publications/position-papers



ELDAN RECYCLING IS ADDING ON HIGH TECH FOR EVEN BETTER RECYCLING SOLUTIONS

Since 1956, the Danish company has manufactured recycling equipment known for high performance, low production costs and products with high output purity. The systems and machines are developed based on ambient mechanical techniques for size reduction and separation and require no melting or chemical treatment.

The modular design enables the customers to expand or upgrade their plants as the market changes. By adding new machines with AI and Infrared Technology to their product portfolio, they offer even more sustainable recycling solutions.

Introducing Optical Sorting

In January 2024, Eldan announced a co-ownership with Picvsa Machine Vision Systems, a front-runner in optical separation technology. That is a big leap forward to integrate optical sorting technology into the Eldan processes.

It has resulted in the development of new lines of sorting equipment. The first machines, the Eldan MPS (Multi Purpose Sorter) and the Eldan SPS (Small Purpose Sorter), are launched during Q2 this year. The SPS was on display, live and running for demos, at IFAT in Munich in May. It was a huge success, and the machine was frequently turned on for live demos.

The two machines are tailored for efficient sorting in various applications, particularly in WEEE, NF and mixed metal scrap systems, but also for different Polymers. Advanced technology such as broadband infrared technology (NIR/MWIR), AI (shapes and appearance) enables innovative and sustainable sorting of color and material.

The timing could not be better

As a natural step, the name Eldan Sorting was established to build the brand for the sorting part of the company. Toni Reftman, CEO, Eldan Recycling,



Toni Reftman

is very happy about the co-ownership: "This is extremely exciting, and the timing couldn't be better. We are thrilled to

bring these new products to the market and others will follow during 2024."

In terms of what this co-ownership means for reaching new markets and segments, Toni continues: "We will be able to reach out to new customers, but also give existing customers more possibilities than before which in turn will benefit them and their customers." Eldan Recycling has broadened the horizon with these new combinations that offer the best of the best. That is a step to save the planet's scarce resources and make it last, at least a little bit, longer for generations to come.

 eldan-recycling.com

Photo: Eldan Recycling

Systematic Clean Air Technology



Wind Sifter



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for Sorting Cabins



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Jamaica: ON THE MOVE TO ENERGY-FROM-WASTE

“The management of all wastes poses serious environmental problems in Jamaica”, the local National Environment and Planning Agency gave account in 2021. Additionally, it is difficult to balance what is actually recycled.

The production of municipal solid waste alone reached 1,090,923 tons in 2021/22, not to forget 384,549 tons of industrial, commercial and institutional waste – altogether 1,475,473 tons, of which nearly 40 percent were organic and 15 percent “other” waste, but also material with recovery potential: 16.8 percent plastics, 9.0 percent cardboard, 6.6 percent papers, 6.7 percent textiles, 3.5 percent glass and 2.6 percent metals, the Development Bank of Jamaica gave account in June 2022. But the bank did not investigate the recovery qualities of particular waste, however, it defined the incineration potential of the waste compositions: 51.2 percent low and 41.1 percent high incinerable waste, 8.1 percent non-combustible and 0.6 percent undesirable waste. Later we will see why.

An uptick in illegal dumping

Most of the rubbish collected in Jamaica ends in landfilling. In 2021/22, the NSWMA – the National Solid Waste Management Authority – managed eight disposal sites. And had to admit that “correspondingly, there was an uptick in the incidence of illegal dumping across the island, with 388 reported dumpsites identified against 288 reported in 2020/2021.” Following NSWMA Executive Director Audley Gordon, the agency is trying “to increase drop off sites across the island that nobody should have a discarded laptop, tablet or cell phone and don’t know where to put it”. But it was and is not only the obviously rare space: As Thomson Reuters reported in 2020, the biggest landfill – Riverton – until 2014 operated without official permission,

was plagued by fires, lacked regulation and suffered ever since from inadequate funding. Additionally, the “improper disposal of solid waste [...] is strongly ingrained in Jamaica’s culture”, the NSWMA tried to apologize.

Risk of failing the goals

Already in 2016, the Public Defender’s Office’s report found out that “the NSWMA failed to fulfill its legal duty to safeguard public health of Jamaicans”. A Performance Audit Report, released in July 2022 by the Auditor General of Jamaica, still listed nine reasons why “Jamaica is at risk of not achieving its national goal to ‘manage all forms of waste effectively’ by the year 2030”. Among others, the paper underlined the absence of enabling regulations to firmly establish NSWMA as a regulatory authority and secondary the lack of any sanitary landfill in Jamaica; seven of the eight waste disposal sites were deemed inefficient and had outlived their life cycle. Furthermore, waste reduction initiatives were said to be insufficiently effective, the absence of sustainable waste reduction strategies was criticized, and several gaps in waste management resources were found: “Sustainable waste reduction strategies are yet to be implemented”. The report summarized that the management of solid waste in Jamaica – especially its collection – has been “a perennial public concern” in spite of approximately 32 billion Dollar allocated in the period between 2016 and 2021 – 17.5 billion Dollar and that more than half came from the collection of property tax.

Incineration, minimization and recycling

But what happens to the recovery potential Jamaica produces every year – the approximately 247,000 tons of plastics, 132,342 tons of cardboard, more than 98,000 tons of textiles, nearly 96,000 tons of papers, 51,750 tons of glass and more than 38,000 tons of metals, the Development Bank of Jamaica spoke of? The National Solid Waste Management Act – last amendment in 2017 – prescribes that the NSWMA may make regulations containing provisions in relation to “the incineration, minimization and recycling of solid waste”. The NSWMA itself is convinced that “we regulate Jamaica’s solid waste industry”. The agency is mandated per law to protect “effective management of solid waste. This is done through the collection of residential and commercial solid waste, enforcement of the NSWM Act and the management of eight disposal sites.” What about recycling?

166 tons sampled in seven years

Concerning plastics, the NSWMA was active in several “waste separation and recycling pilot projects”. In 2016, a six-month project focused on “solid waste reduction through waste separation – waste division and recycling”,

resulting in 140,000 pounds (lbs) of plastic “collected”. Another half-year project in 2021/22 collected 5,000 lbs of plastic bottles, a “Plastic Recycling Pilot Project” lasted 18 months and sampled 33,580 lbs of plastic, a long-time project – the “Northern Belt Plastic Separation Initiative” – realized a collection of nearly 188,000 lbs, and three other waste separation campaigns provided no information. All in all, 366,580 lbs or 166 tons were sampled in seven years.

Overwhelming response of the population

But between March 2014 and March 2017, 3.3 million pounds of plastics – or well over 100 million bottles in Jamaica were recovered from the environment, says the Jamaica Information Service. Part of the treatment was and still is handled by the Recycling Partners of Jamaica (RPJ), an extended producer’s organization and the designated national recycling entity, formed by public and private partnerships with the Wisynco Group and the Government of Jamaica. In 2022, the RPJ ran six depots, wanted greater capacity and wished at least one depot in every parish. The Jamaica Information Service cited the Chairman of RPJ, Dr. Damien King, who said that “the overwhelming response of the population to recycling indicates the need for greater capacity to properly manage the disposal and processing of recyclables”. The Jamaican online-magazine Gleaner spoke of a collection rate of about 12.3 million bottles a month and even a “flooding” of cages and depots with plastic bottles, so the organization could not export the material fast enough. In the majority, this has nothing to do “with the monetary incentive, which works out to about one Dollar per bottle”: The people putting their bottles in the cages do not get paid and do not redeem the deposits. According to Wisynco, during its last financial year, which ended in March 2023, the RPJ collected 6.6 million pounds of plastic bottles and exported 5.4 million pounds. “In its current fiscal year, RPJ is expected to make payments of more than 600 million Dollar to its more than 1,300 independent plastic collectors, 26 third party truckers and 155 employees.” To make it clear: 600 million Jamaican Dollar are 3,834,786 US-Dollar or 3,571,624 Euro.

Little glass recycling

There is only little glass recycling in Jamaica. A website called New Green Recycling explains that the island initially had “a thriving informal glass collection system” but it was discontinued when the cost of collection and transportation to the markets exceeded the value. During the pandemic new glass was even harder to source because of increased bottle shortages and delays in shipping and increased freight costs. Now only a few Jamaican recycling companies accept the material as a local market is missed, and it is too expensive to ship due to the weight. The Red

Stripe Corporation belongs to them, increased in September 2022 the bottle deposit for all of its returnable bottles and offers returns accepted “at wholesales across the island”.

Used paper well organized

Another important recycling material in Jamaica is paper. As the data portal [trendeconomy.com](https://www.trendeconomy.com) refers to, the country exported recovered (waste and scrap) paper or paperboard worth 669,000 US-Dollar in 2022. The last exports – updated in February of 2024 – amounted to 515,068 US-Dollar, says the United Nations comtrade database. The World Integrated Trade Solution, edited by the World Bank, offers exports that totaled 2,453 tons to the value of 177,000 US-Dollar in 2022. However, the treatment of used paper seems to be well organized: Jamaica Recycles not only offers the service of so-called Priority Baling, an indirect document destruction service by compressing paper onto large bales and then exporting it directly to paper mills worldwide, for bleaching and pulping. Jamaica Recycles is also part of the Cellmark Inc. Group of Companies that call themselves “one of the World’s foremost providers of supply chain services to the pulp and paper industry”. By the way: In 2010, the Jamaica Business Development Corporation reported trials of a local workshop to convert banana waste – especially the trunk of the plant – into stationary and other products. And in 2020, the Jamaican online-newspaper *The Gleaner* introduced a professor at the Northern Caribbean University experimenting with spinning sugar cane and banana tree pulp into stationery.

Recycling of industrial effluent

Another waste treatment is conducted by the privately owned Caribbean Scrap Metals and Recycling Company. The enterprise is committed to providing standard industrial recycled metal, both ferrous and non-ferrous, but specialized in copper, brass, radiators and stainless steel. CM Recycling, located in Kingston, defines itself as “Jamaica’s most premier and technologically advanced recycling company, showing state of the art recycling technology and world-class customer service”. The World Integrated Trade Solution confirmed ferrous waste and scrap of stainless-steel exports from Jamaica in 2018 of 62 tons and 43,480 US-Dollar. According to data of the Observatory of Economic Complexity (OEC), Jamaica sold 30,500 US-Dollar in metals in 2021 – the 6th most exported product in Jamaica. The five top exports are aluminum oxide, refined petroleum, hard liquor, aluminum ore and processed fruits and nuts. The percentage of recycled waste resulting from these materials is unknown. However, according to the Organization of the American States, recycling of industrial effluent has been practiced by several industries since

about the turn of the century, spearheaded by the bauxite/alumina companies operating in Jamaica. The “red mud” these companies produce is thickened, the liquid fraction collected, then channeled to sealed holding ponds, until it is said to be moved back to the plant.

E-waste collection planning á la Jamaica

The collection of electronic waste started late. In 2016, an enterprise team was named and commissioned “to manage the process of the Government’s waste-to-energy program”. Three years later, in February 2019, NSWMA Executive Director Audley Gordon told the local newspaper *The Gleaner* that “land has been identified to temporarily store e-waste”. But the property had to be retrofitted. And the overseas markets for the discarded electronic devices were still to be found. All the same, the public would soon “have to receive special instructions” on how to dispose of their e-waste. Until 2021-22, a Technical and Operations Committee continued to monitor the implementation of an e-waste project, and a truck was procured to transport the e-waste to the storage facility. In August 2022, NSWMA finally published that e-waste could now be dropped off at any of the four facilities. Inet Jamaica launched a website and began offering battery and electronic e-waste disposal, together with product and data destruction services to residents (collected by NSWMA). That happened three years later – or more precisely too late – as already in 2019, there was a need: “More than 30 expressions of interest to either bid on the waste-to-energy program or to collect solid waste, or both”, *The Gleaner* wrote.

Used tires – dispersed across the island

According to the latest NSWMA report, in Jamaica, it is estimated that more than two million used tires are generated per annum in Jamaica, and the disposal sites receive approximately 185,700 tires per year. During the reporting period 2021-2022, the NSWMA removed 11,743 tires from Riverton disposal facility and transported them to Carib Cement Co. Ltd. An agreement between NSWMA and Cool Energy Ltd. on end-of-life pneumatic tires leads to the extraction and production of pyrolysis oil. In phase I from 2021 to 2031, a national program provides the disposal of over two million tires located at the Riverton disposal site. The next phases between 2026 and 2031 will see development and implementation of an action plan “to facilitate the ongoing collection and disposal of end-of-life pneumatic tires at the other disposal sites across the island”.

An energy-from-waste sector

Already in October 2010, the Ministry of Energy and Mining published a draft paper on the National Energy-from-Waste

Policy. It underlined that a new policy was developed to ensure a vision: “Jamaica is the regional leader in providing affordable and clean energy from waste contributing to a sustainable future”. This vision was to guide the creation of an energy-from-waste sector to establish a market for waste, opening up opportunities for investment in both the energy and waste sectors while achieving both energy and waste management goals.

Meanwhile, the plans have become more realistic. After a Waste Characterization Study funded by the Inter-American Development Bank, Ricardo Munroe, Manager at the Development Bank of Jamaica, is sure that Jamaica is now one step closer to realizing its plans to privatize waste management services: “The aim is to move away from open dumps to a more environmentally friendly method of disposing of our solid waste. Waste from households and businesses could soon be converted into energy or stored in sanitary landfills.” The bank declares Jamaica as “a good prospect for the implementation of waste-to-energy technology, which is part of a proposed plan to privatize solid waste management services”.

To a sustainable future


A Transaction Certificate documents that a funding of 800,000 US-Dollar will support the Government of Jamaica in aiming at the preparation of closure plans and designs for the Riverton Disposal Site, the preparation of studies to support a viable business case for a public private partnership (PPP) for a reputable private investor, and the re-orientation of the NSWMA to support the preparation of a viable business case for improvement of solid waste management in Jamaica. Practically, Prime Minister Andrew Holness identified two waste-to-energy-sites in November 2022, even without divulging the locations. And in January 2023, he proclaimed: “We have done the environmental, economic and financial studies to come up with a strategy that is going to transform municipal waste management in Jamaica, to move it from the deplorable state that it is in to one in which we can all be proud. We will be creating this circular economy in waste because waste will become a feedstock for electricity generation. So, very soon, waste will have value and we will close the Retirement and Riverton City dumps.”

ISCC PLUS CERTIFICATION FOR GREENBACK'S OPERATIONS IN CUAUTLA


Greenback Recycling Technologies has received the International Sustainability and Carbon Certification ISCC (International Sustainability and Carbon Certification) PLUS for its recycling facility in Cuautla, Mexico, and its final product. This recognition is granted to companies voluntarily committed to global sustainability objectives. According to Greenback, the company's adherence to the rigorous ISCC PLUS criteria would signify “well-managed operations that meet legal and safety standards, while also demonstrating environmental and social responsibility in production”. The certified product, π -Oil, is acknowledged as a circular feedstock, “ensuring that waste is recycled within the economic system without being discarded”.

ISCC PLUS is a globally recognized voluntary sustainable certification scheme applicable to the bio economy and circular economy for food, feed, chemicals, plastics, packaging and waste. It is used as a tool to reduce greenhouse gas emissions and establish sustainable production with traceable supply chains from the origin to the final user using environmental, economic and social criteria. As underlined, ISCC PLUS brings transparency and trust to the plastics recycling value chain. “The audit-based certification works hand-in-hand with eco2Veritas, Greenback's proprietary intelligent tracking system.” It would support the ISCC PLUS annual auditing process by giving a real-time view with detailed and accurate data on the circular process at any point in time.

Greenback Recycling Technologies is a UK-based advanced recycling company founded in 2018. With a decentralized, small-scale plants operating on Enval microwave-induced recycling processes, the flexible, multilaminate plastics are recycled into π -Oil and aluminum.

 greenback.earth/en/

 iscc-system.org/certification/iscc-certification-schemes/iscc-plus/

 greenback.earth/en/3b_eco2veritas/

Textiles:

A “BUMPY” ROAD TOWARDS CIRCULARITY

At the latest Textiles Division meeting held during BIR's Convention in Copenhagen, experts delivered a progress report on the journey towards a circular value chain for textiles.

As reported by the Bureau of International Recycling (BIR), Cyndi Rhoades – founder of Worn Again Technologies and co-founder of World Circular Textiles Day – complained about the continuing predominance of a linear model for textiles based on virgin resources. Furthermore, she criticized that less than one percent is being recycled into new textiles. But she is convinced that “change is coming” and “technologies are on the way” to underpin the delivery of industrial-scale materials recycling. In that regard, the most important would be a move away from manual textile sorting to the development of automated sorting and pre-processing facilities (ATSP) capable of providing a low-cost, regional feedstock for fiber-to-fiber recycling. In the UK, the government had provided a grant of four million British Pound Sterling (around five million US-Dollar) for the development of an ATSP blueprint involving a consortium of 20 partners, she informed. The aim

was for this facility to be up and running by the end of 2025.

According to guest speaker Maud Hardy, Managing Director of the textile industry's eco-organization ReFashion in France, eco-modulated fees would play a major role in the 2023-2028 roadmap. Bonuses and penalties would be applied about durability, environmental certification and incorporation of recycled materials. As per Maud Hardy, the French government had also set the “huge” objectives of raising the collection rate in France from around 30 percent at present to 60 percent by 2028, and 80 percent recycling of non-reusable post-consumer textiles and footwear in 2027. Achieving these and other goals set out in the roadmap would require brands to invest some 1.2 billion Euro (around 1.3 billion US-Dollar).

Setback and progress

During a panel discussion moderated by Alan Wheeler of the UK's Textile Recycling Association, reference was made to the company Renewcell, which established an industrial-scale textile-to-textile recycling facility in Sweden but had since filed for

bankruptcy. According to BIR, Robert van de Kerkhoff, founder and CEO of PEPPER-i2/Impact & Inspire in Switzerland, said, “we know it's going to be a bumpy road. Yes, failures will happen. We need to step back and learn from them.” Asked about the necessary ingredients for achieving circularity success, he identified the need for full transparency and ensuring a level playing field given that the EU had taken the legislative lead; the regulation requires inter alia compulsory separate collections of textiles by 2025. He also quoted an Euratex figure that up to 250 industrial projects would be required across Europe covering different types of fiber-to-fiber recycling. According to BIR Textiles Division President Martin Bösch of TEXAID Textilverwertungs AG in Switzerland, current conditions for recyclers were “not so favorable” owing to low demand and falling prices. The short-term outlook remained “bumpy”, not least because of concerns over synchronizing the various components of a more circular industry. However the longer term offered the prospect of good progress on textiles circularity, he was quoted by BIR.

 bir.org

PLASTICS SUSTAINABILITY ESOLUTION

German publishing house Hanser has launched Plastics Sustainability eSolution, a knowledge database that bundles “relevant up-to-date information on the sustainability and recycling of plastics”. According to Hanser, the new platform is designed for user-friendliness and daily use. All content is readily searchable. “This quickly provides qualified answers and reliable results on the topic searched for. Users can mark and comment on the content individually via a note function and thus adapt it to their needs. Regular updates provide the latest information on the most important topics.” Plastics Sustainability eSolution can be tested free of charge for four weeks. After that, the subscription is available until September 6, 2024, at a discounted introductory price of 249 Euro (thereafter 499 Euro) per year.

 hanser-esolutions.de/plastics-sustainability

Wacker Neuson:

CREATING ADDED VALUE FOR THE CUSTOMERS

The Wacker Neuson Group, a global manufacturer of light and compact equipment for many industries, has expanded its digital strategy to develop new business models.

The management is convinced that technologies such as the Internet of Things (IoT) are being used in the group to offer customers in the construction and agricultural industries solutions that deliver real added value.


“We use digital technologies strategically to make our customers’ day-to-day work easier and more efficient,” Alexander Greschner, Chief Sales Officer of the Wacker Neuson Group, was quoted. “In order to be able to offer the best solution for our customers, we have positioned ourselves in such a way that we can develop and operate digital products based on our own IoT backend. We have built up the relevant expertise in-house. In addition, we work with partners who are estab-

lished on the market and can quickly develop suitable solutions together with us.”

As underlined, an important partner is Trackunit, who has been supporting the group for several years in offering EquipCare, the customer-focused fleet and data management platform. “The cooperation has now been extended for another five years. In this context, the Wacker Neuson Group is using Trackunit’s Kin technology for the first time to integrate non-powered equipment and attachments into the ecosystem via Bluetooth and gain a better overview of their usage.” OneStop Pro, also an important partner, helps the manufacturer develop additional solutions for its digital product portfolio, connecting with customers more directly and thus responding even more flexibly to market needs. “One of the first integrated products is the cloud-based EquipCare Pro software solution. It enables the

management, scheduling and evaluation of all machines, equipment and bulk items, regardless of manufacturer or brand. EquipCare Pro helps customers to significantly increase the productivity of their machinery.” These advancements would represent only a portion of the Wacker Neuson Group’s ongoing commitment to digital development.

The German-based group is a global producer of high-quality light and compact equipment. As reported, it is “the partner of choice across a broad spectrum of industries, serving in particular customers in the construction, gardening and landscaping, agricultural, municipal, recycling, rail transport and manufacturing sectors”. The product brands Wacker Neuson, Kramer and Weidemann belong to the Wacker Neuson Group.

 wackerneusongroup.com/en

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NEW RECYCLING TECHNOLOGIES FOR EUROPEAN ALUMINUM

The AIT Austrian Institute of Technology is coordinating the EU project RecAL (Recycling technologies for circular ALuminum), which focuses on sustainability, circular economy and resource efficiency in the aluminum industry.

Recently the initiative was officially launched in Vienna. The parties involved aim to develop innovative recycling technologies and a digital platform for a circular aluminum economy. The HORIZON EUROPE-funded project brings together 19 partner organizations from nine European countries and is coordinated by the LKR Leichtmetallkompetenzzentrum Ranshofen, a wholly-owned subsidiary of the AIT Austrian Institute of Technology. “The initiative aims to usher in a new era of sustainable production and reuse for aluminum by creating a digital cockpit, the RecAL Hub”; the

coordinator informed. “This enables the circular economy of aluminum recycles across the continent and connects suppliers, buyers and technology solution providers.” Recycling aluminum from existing end-of-life (EoL) and production waste has enormous potential and requires only five percent of the energy needed to produce primary material, AIT stated underlining the facts. Given its crucial role in global decarbonization, the RecAL project, in line with the European Green Deal, would aim to exploit the potential of this raw material in an environmentally friendly and efficient way.

However, one of the major challenges in recycling aluminum is that the metal is alloyed with a variety of other elements that are virtually impossible to separate again. “The current practice of mixing different EoL alloys

inevitably leads to down-cycling and a reduction in available feedstock”, AIT pointed out. “Europe has a rich potential for secondary aluminum, which is expected to account for 49 percent of total aluminum production by 2050. However, this potential source of resources requires a central hub.”

According to the information, the RecAL project takes a comprehensive approach to the sustainable use of this secondary resource and strategically addresses every step of the production and reuse cycle along the entire value chain:

- Higher impurity tolerance in alloy design without compromising properties.
- Exploiting the advantages of digitalization and robotics in sorting and dismantling.
- Creation of recyclate streams with significantly improved purities.
- Adapting production paradigms to unleash the full potential of secondary resources.
- Harmonizing communication between all sectors of the aluminum industry.

“With a strong focus on innovation, RecAL is driving forward a total of 14 major technological solutions for aluminum recycling up to technology readiness level 6 (TRL6). These are integrated into a digital, socio-technical ecosystem that acts as an aluminum hub for the circular economy”, AIT described the goal. “This dynamic platform promotes direct collaboration along the entire value chain and contributes significantly to industrial and technological symbiosis on a large scale by linking energy, resource and data cycles at regional and European level.”



VISCOSE FROM RECYCLED COTTON

Researchers at Lund University in Sweden have succeeded in making new viscose – from worn-out cotton sheets.

“Old textiles around the world end up at the rubbish tip and are often burned. In Sweden, they are generally burned to produce district heating. Extensive development work is being conducted to give old clothes and textiles a worthier end,” the Swedish university wrote. The planet would need recycled textiles, “as it takes a lot of energy, water and land to cultivate cotton and other plant sources for textiles”. But there are many challenges. “Cellulose chains, the main component in plant fibers, are complex and long. Cotton textiles are also intensively treated with dyes, protective agents and other chemicals. And then there is all the ingrained grime in the form of skin flakes and fats,” explained Edvin Bågenholm-Ruuth, doctoral student in chemical engineering at Lund University.

As reported by Lund University, he and his colleagues have now found a way to loosen up and convert the complex cotton fibers into viscose fibers. Viscose – sometimes referred to as artificial silk – is a common constituent of clothes such as blouses, skirts and dresses. The raw material is cellulose, in most cases wood.

A new technique, developed by Edvin Bågenholm-Ruuth and his colleagues, could soon be a commercial proposition that instead produces viscose from recycled textiles – and therefore saves on valuable forest resources, the university informed. “There are already viscose variants that are to some extent produced using old cotton fibers. However, a satisfactory product often requires a high percentage of ‘virgin’ fiber. Late last year, the researchers published a study

that shows the process (<https://link.springer.com/article/10.1007/s10570-023-05646-2>). In the coming years, there are plans for a pilot plant somewhere in Europe. The method has already been tested regarding the spinning of viscose threads, and the results were excellent.”

From the current perspective, it looks like the process will not be expensive. “It requires a quite simple salt – zinc chloride – which dissolves in water. Another advantage is that a smaller percentage of the toxic substance carbon disulfide is needed compared to standard processes. The result is good-quality viscose fiber, even though the process needs to be further optimized. “We have used white textiles, but if you use old, dyed clothes, you may need to add a stage that decolorizes the clothes. If this can be done while also avoiding traditional bleaching, it is preferable, as bleaching is a very resource-intensive process with a considerable environmental impact,” Edvin Bågenholm-Ruuth was cited.

The process

According to the information, the textiles are placed in a zinc chloride solution, and within one hour, everything is transformed into a gooey mass. Then water is added, leading to the precipitation of a fluffy white mass known as a “dissolving pulp”, which can be filtered off from the liquid. This pulp can then replace the wood pulp used in today’s viscose process. In the next stage, the pulp is treated with several chemicals, including carbon disulfide, to make it soluble in sodium hydroxide. The pulp is dissolved, spun, and then cut into viscose fibers.

Production

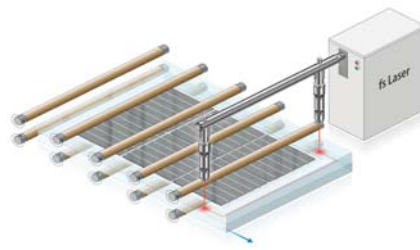
A company, ShareTex, has been formed to apply the technology and the hope is that this could happen on a commercial scale within five to seven years.

sharetex.com



PATH TO EASIER RECYCLING OF SOLAR MODULES

According to the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), the use of femtosecond lasers to form glass-to-glass welds for solar modules would make the panels easier to recycle. The researchers conducted a proof-of-concept study. The welds would eliminate the need for plastic polymer sheets laminated into solar modules but make recycling more difficult. "At the end of their useful lifespan, the modules made with the laser welds can be shattered", the information said. "The glass and metal wires running through the solar cells can be easily recycled and the silicon can be reused."



The use of a laser to weld the edges of glass together can help make solar panels easier to recycle at the end of their lifespan

"Most recyclers would confirm that the polymers are the main issue in

terms of inhibiting the process of recycling," David Young was quoted. The senior scientist and group manager for the High-Efficiency Crystalline Photovoltaics group in the Chemistry and Nanoscience department at NREL is the lead author of a new paper outlining the use of laser welds for solar modules. The paper, "Towards Polymer-Free, Femto-Second Laser-Welded Glass/Glass Solar Modules," appears in the IEEE Journal of Photovoltaics (<https://ieeexplore.ieee.org/document/10443029?source=authoralert>).

nrel.gov

Graphic by AI Hicks. Source: National Renewable Energy Laboratory

LITHUANIAN RESEARCHERS PROPOSE PYROLYSIS FOR WIND TURBINE BLADE RECYCLING

While wind energy is becoming one of the fastest-growing energy sources in the world, wind turbine blade waste emerges as a critical issue. Addressing this environmental concern, Lithuanian researchers have developed an innovative solution claiming that the benefits of pyrolysis can help reduce pollution.

In 2022, Dr Samy Yousef, a researcher at Kaunas University of Technology (KTU) Faculty of Mechanical Engineering and Design, and a team of researchers from the Lithuanian Energy Institute completed a series of experiments to find a way to recycle wind turbine blades. As reported by KTU, their experiments consisted of breaking down old composite materials, such as glass fiber-reinforced epoxy resin composites, in a pyrolysis process using a special catalyst. By doing so, they aimed to separate valuable components for reuse and recycle

old composite materials into useful energy.

Last year, in 2023, Dr Yousef and his team continued their experiments.



This time – on real wind turbine blade fragments, provided by the Danish company "European Energy A/S". The analysis of several wind turbine blades revealed that unsaturated polyester resins are predominant in the production of wind turbines in the Baltic region due to their cost-effectiveness compared to epoxy resins. Styrene, a main component of polyester resin, poses significant environmental and health risks. "When disposed of in landfills, it becomes highly toxic for humans and can cause lung cancer. In addition, styrene can pollute and poison groundwater and soil," the information provided by the university said.

To address this, the research team made of KTU and Lithuanian Energy Institute scientists successfully extracted styrene from blades in the form of styrene-rich oil using a pyrolysis reactor. "The main goal of the research

Photo: Hans Linde / pixabay.com

was to find a way to extract carbon fibers and resin from old wind turbine blades that are difficult to dispose of because they contain toxic substances and aren't biodegradable," Dr Yousef was cited. He added that during the experiments, the fibers, carbon and fiberglass were also recovered and purified through an oxidation process, offering a sustainable filler material to enhance the mechanical properties of composite materials.

Furthermore, the environmental impact of blade treatment using the pyrolysis process was calculated. "Conducting the life cycle assessment, Dr Yousef's team has discovered the significant environmental potential of blade waste pyrolysis compared to landfill disposal. In particular, regarding global warming, stratospheric ozone depletion, and fossil and mineral resource scarcity," KTU informed. Results revealed remarkable improve-

ments in various environmental indicators, with enhancements between 43 to 51 percent. However, the strategy would still raise certain environmental challenges due to post-treatment processes such as washing and oxidation. An article on this method proposed by the researchers was published in *Environmental Research* 2024, volume 245.

en.ktu.edu

SAND RECYCLING AS A SERVICE

According to Finnish company Resand Ltd, the earth is running out of sand. There is a recycling technology to stop wasting the needed material, which is able to clean the sand "so that it is better than new and good to be reused again and again. On location. As a service."

Resand, a specialist in the regeneration and recycling of foundry sand, is – by its own account – the first company to launch an electric sand reclaimer on the European market. "The reclaimer unit is a modular system that is quick and customer-friendly for the foundry to install and commission, with a delivery time of only 4-5 months," the company assured. CO₂ emissions from using new sand and associated transportation could be reduced by up to 70 percent. "When using renewable energy, the reclaimer's direct greenhouse gas emissions, i.e. Scope 1 emissions, remain low."

The system is specially designed for medium-sized foundries and has a production capacity of 1,000 kilograms of recovered sand per hour. "With an electrically heated drive, the sand reclaimer is very easy to connect to the foundry's mains, which means that clean sand is always available at the foundry", Resand underlined.

In April, the first SAAS (Sand As A Service) agreement for the new electric reclaimer was signed with a Finnish foundry. "With the agreement, sand regeneration will take place at the customer foundry's production facilities. After regeneration, the sand can be used again and again in foundry processes, effectively reducing the need for virgin sand."

The technique

On Resand's homepage, one can read that the modular sand reclaimer treats

the used sand in a thermo-mechanical regeneration process, which combines elements of high-temperature treatment, mechanical polishing of the sand grains, and dedusting of the cleaned sand. In this way, the used sand is cleaned of binder residues and other impurities. The result: The regenerated sand has reached a 95 percent level of mold strength compared to virgin sand, "making regenerated sand one of the few things in the world, where used is as good as new."

resand.eu/solution



The Resand unit is located directly at the foundry, cutting down any need for transporting sand between deposit, foundries, and landfill

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 company serves 26 out 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 and ferrous and non-ferrous metals. The slag is processed – iron scrap as well as 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, which is introduced into the wastewater incinerator, thus falling well below the limit values in the wastewater – an environmentally sound process 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 the 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 for efficiently recovering 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. Afterward, 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. That 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

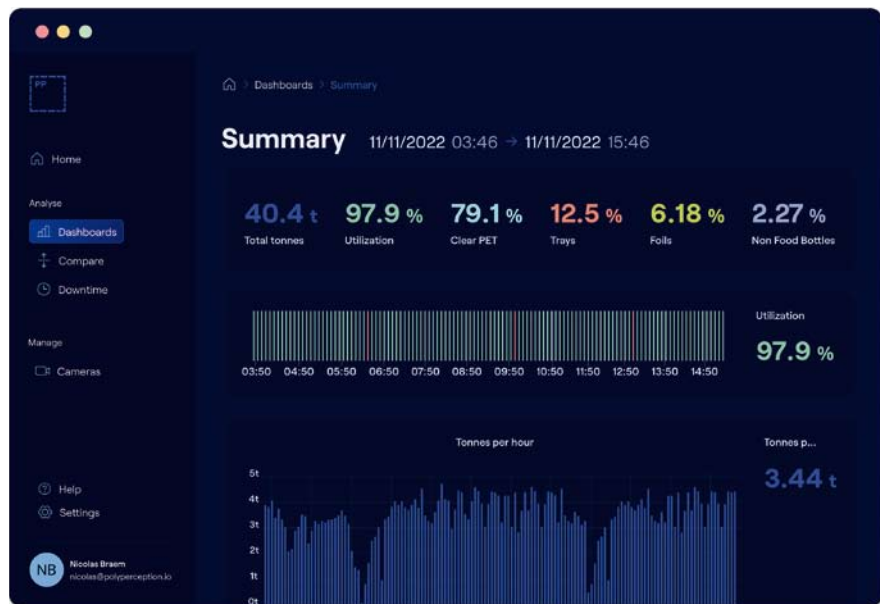
With the Leachphos® process, phosphorus can be recovered from municipal sewage sludge ash according to the principle of closed-loop recycling. The phosphorus recovered in the recycling process is processed into fertilizer or phosphoric acid in a further stage. Both substances comply with the environmental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



TOMRA ACQUIRED A STAKE IN POLYPERCEPTION

The internationally active supplier of collection and sorting technology, Tomra, has further invested in artificial intelligence by acquiring a 25 percent stake in PolyPerception, a Belgium-based start-up offering AI-based waste flow monitoring.

Tomra, one of the leading collection and sorting solutions providers, began collaborating with PolyPerception in December 2022. As reported, this investment in the company is another step in its “journey to transform resource recovery with the latest technology”. According to Dr. Volker Rehmann, Head of Tomra Recycling, by expanding the cooperation with PolyPerception, the company was able to combine its advanced material sorting systems and cloud-based monitoring solution with innovative material analysis. “This synergy enables us to enhance the optimization of the entire process and material flow, providing a significant advantage to our customers. Plus, it now allows us to harness PolyPerceptions’ data and AI expertise for continued enhancements to our machinery.” As underlined by the Norway-based partner, PolyPerception offers a waste analysis solution for PET recyclers and sorting plants. By measuring data at key points in the sorting process, the company helps sorting facility operators to continuously



PolyPerception Dashboard

assess the quality of sorted streams and the loss of good material in the residual stream to enable data-driven decisions. “It further functions as an automated compliance system, ensuring adherence to stringent regulations governing food-grade recycling and local legislation. With the regulatory landscape evolving towards greater stringency, PolyPerception anticipates growing demand in the market for its transformative technology.”

Nicolas Braem, co-founder and CEO of PolyPerception, was also very positive about the acquisition. “We are de-

lighted to strengthen our partnership with Tomra as a key strategic ally and distributor,” he was quoted. “Thanks to Tomra’s pole position in the market and extensive industry knowledge, we can accelerate the development of our technology and gain increased market visibility to speed up commercialization. Additionally, we’re enthusiastic about exploring additional collaborative opportunities to drive our mission of automating sorting processes even faster. It’s a win-win!”

tomra.com/en

polyperception.com

Photo: Tomra/PolyPerception

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Extending Equipment Life:

CASTOLIN EUTECTIC'S SOLUTIONS FOR WASTEWATER MANAGEMENT

Effective asset management is crucial for maintaining the longevity and reliability of wastewater treatment equipment. This article explores innovative solutions using Castolin Eutectic products (MeCaFix, MeCaWear, and MeCaCorr) to enhance the life cycle of critical components, offering sustainable solutions for asset integrity, reduced downtime, and improved operational efficiency.

Rapid Repairs

Wastewater treatment plants (WWTPs) face significant challenges in maintaining aging infrastructure while meeting stringent environmental regulations. Rapid repair and in-situ solutions are essential to prevent deterioration and costly equipment failure. Any disruption in WWTP operation can lead to untreated sewage discharge, posing risks to water quality and ecosystems. Fast repairs help minimize downtime, ensuring continuous treatment and preventing environmental harm.

Heavy loads on equipment, such as sludge pumps and mixers, along with hydraulic and vibrational stress, can lead to rapid deterioration. Utilizing fast-curing repair pastes like MeCaFix 100 enables operators to quickly

restore components to their original geometry, minimizing downtime and extending service life. MeCaFix 100, a unique blend of polyurea and polyurethane chemistry, cures ten times faster than traditional epoxy repairs. For leak repairs, MeCaWrap W4, a water-activated composite wrap, provides pressure resistance up to 27 bar (400 psi) and allows for a return to service in under ten minutes.

Managing Wear on Components

Clarifiers are integral to the wastewater treatment process and experience deterioration due to cyclic stress exerted by the scraper bridge wheels. The constant movement of the scraper's wheels, combined with a corrosive environment, initiates wear. Castolin Eutectic's MeCaWear ceramic polymers restore the tank rim with wear-resistant products designed for resilience against heavy cyclic stress and chemical exposure. MeCaWear 306, a two-component silicon carbide novolac polymer, forms a protective barrier against wear, corrosion, and chemical attack.

Repairing Cast Iron Components

In wastewater management, cast iron components endure significant wear

and tear. Pumps, valves, and pipework are exposed to abrasive materials carried within wastewater streams, gradually eroding surfaces. Rebuilding and reinforcing surfaces with durable ceramic-based coatings can extend the operational lifespan of pumps and valves by up to five years.

Concrete Tank Repair

Tanks require maintenance to address cracks and deficiencies in concrete structures, posing risks of environmental contamination. Products like MeCaFix 140, a Kevlar® reinforced polymer compound, offer robust solutions for non-structural defects. Installing a primary lining, such as MeCaCorr 706, onto the tank surface is a cost-effective preventive solution to mitigate further attack on the concrete structure.

By leveraging Castolin Eutectic's technologies, operators can enhance asset integrity, reduce maintenance costs, and contribute to sustainable wastewater management. Specialist wear-protection engineering can restore components to their prime condition, minimizing downtime and ensuring sustained operation.

 [castolin.com](https://www.castolin.com)



NEW CAT 973 TRACK LOADER

Caterpillar's new Cat 973 Track Loader replaces the 973K worldwide. The 275 horsepower (205 kilowatt) crawler loader has an operating weight of 65,901 pounds (29,892 kilograms). It joins the 953 (160 horsepower/119 kilowatt) and 963 (202 horsepower/151 kilowatt) in the Cat track loader line.

The new track loader is powered by a Cat C9.3B engine. Fuel consumption is reduced up to ten percent with the Auto Mode that will adapt the engine speed to the load, the provider pointed out. Eco Mode would use even lower speed for further reduction in fuel consumption in lighter duty applications. "Power Mode will keep engine speed high for a feel of readily available power at all times."

An optional Performance Series bucket boosts productivity up to 20 percent,



The Cat 973 Steel Mill package includes a specialized cab, insulated steel fuel tank, high temperature undercarriage and insulation throughout the machine

the manufacturer described one important advantage of the machine. "An optional Fusion Quick Coupler enables fast attachment changes. A variety of buckets, forks and other tools can be shared among track loaders, wheel

loaders and other Fusion-compatible machines. Buckets come from the factory with Advansys bucket tips/adapter/locking system. Advansys tips are built for maximum productivity and the lowest bucket lifecycle cost. A hammerless retention system means safe, fast removal and installation without special tools."

Purpose-built Low Ground Pressure (LGP), Waste Handling/Demolition and Ship Hold arrangements are factory-equipped with specialized undercarriage, guarding and other features designed to take on the intended tasks. "The 973 Steel Mill package includes a specialized cab, insulated steel fuel tank, high-temperature undercarriage and insulation throughout the machine, making it suitable for handling slag", Caterpillar informed.


 cat.com

Photo: Caterpillar

A ROBOT FOR DROSS REMOVAL AND MORE

At AISTech 2024 in May, the Iron & Steel Technology Conference and Exposition, Tebulo Robotics presented the new Dross Removal Robot.

According to the provider, it is a user-friendly system "with smart tools which may be integrated within any existing hot-dip galvanizing process, even when space is limited". Since these robot systems function almost entirely without human involvement, they would provide an improved operator working environment. "The new dross removal system consists of a combination of a front robot, a V-side robot, smart user-friendly control software and a patented tool



Tebulo Robotics Dross V side robot on track system

changer", the company, based in the Netherlands, informed. The robot may also be used for other types of work, such as cleaning the surrounding area, moving safety fences and/or taking zinc samples, the manufacturer pointed out. That functionality may be expanded upon demand. Furthermore, the Dross Removal Robot would be easily controllable via a user-friendly HMI interface. "This innovation not only improves the safety of industrial processes, but it also increases productivity while improving quality and sustainability", the company underlined.

 tebulorobotics.com

Photo: Tebulo Robotics

FORNNAX EXPANDS PRIMARY SHREDDER SERIES WITH SR 200 HD

Fornnax, a global pioneer in recycling machinery, is pleased to introduce the SR-200 HD Dual-Shaft Primary Shredder, a groundbreaking invention. The prestigious India Rubber Expo (IRE) at the Bombay Exhibition Centre in Mumbai took place on March 20, 2024. The SR-200 HD marks a significant leap in the recycling technology, demonstrating Fornnax's dedication to engineering excellence and sustainability.

On this occasion, the special presence of Mr. Ajay Shah, the President of Reliance Industries Limited, and Mr. Vishnu Bhimrajka, the chairman and chief convenor of India Rubber Expo 2024, along with a consortium of clients, inaugurated the SR-200 HD, marking a significant milestone in recycling technology. Led by Ravi Rath from Rathi Rubber India Pvt. Ltd., Mr. Chetan Joshi from Tyre Collection Australia, Mr. Rajan Subramanian from Vinora Industries, Mr. Paras Barasara from Valencia Rubber Tech LLP, Mr. Suresh from Unity EcoGreen, Mr. Bipin Kumar Agrawal from Earthman Rubber Industries Pvt. Ltd., Mr. Anil Rath from Oyster Industries Pvt. Ltd., Mr. Manish

Agrawal from Earthmet Resources Private Limited, the unveiling showcased the innovation and collaboration driving the industry forward.

Fornnax has always been aggressive about constant innovation and new product development. Based on growing customer demand for high-capacity pre-shredders, the SR-200 HD, the new HD model of the SR series that replaces the standard SR200 model, was developed. The Primary Shredder SR-200 HD is more powerful and has the highest input capacity model in the SR series of machines.

Ideal industrial applications

The SR-200 HD is primarily designed for tire shredding applications. It can also be utilized for other applications, including high-volume municipal solid waste, wood pallets, industrial and commercial waste, and many more. As a result of the stringent waste treatment policies in place, there is a growing global demand for competitive pre-shredders. The introduction of the SR-200 HD presents significant opportunities for industries in the

Middle East, Australia (due to full-tire export bans from Australia and steel export bans from the Middle East) and Europe, where an increasing need for advanced recycling solutions is evident.

Large-scale recyclers and cement plants that require high-capacity machinery are the prime targets. Fornnax has secured six pre-launch orders from India, Australia, the Middle East, and Europe, reflecting the trust built in the global market over the years. Industries are seeking machinery with enhanced output capabilities that comply with industry-leading standards to meet their recycling needs effectively.

Fornnax's objective is to become a leader in recycling technology

Fornnax is focusing more on designing and developing new products that suit specific input tire types that increase efficiency instead of providing standard models suitable for all tire types.

Fornnax is increasing its budget in R&D each year as the company focuses on new product development for customers' specific demands rather than continuing with the old standard products; in addition, CPCD-based, Fornnax is improving its standard models based on customers' feedback. In the recycling industry, Fornnax focuses on various applications to achieve a broad range customer base and vision to become the world's biggest shredder manufacturing company. For tire, municipal solid waste, metal and cable recycling applications, the company has 14 new shredder models under development till 2030 designed to meet the heavy demands of high-volume applications and users.



SR-200 HD launch at IRE 2024

Technical specifications and features

The new shredders come with various proven knives developed by Fornnax to accommodate customers' needs. With the robust cutting chamber design. The slow-speed shafts, which produce up to 2,000,00 Nm (Newton meter) of torque, allow the SR-200 HD to work with the most challenging materials. That, along with a quick shafts change system, enables the end user to switch from working in one application to another. Overall, the SR-200 HD is a high-capacity addition to the range and is already in high demand by customers worldwide.

There are different variants available for different market standards. SR200 with disc classifier will provide 60 to 150 mm output sizes to feed downstream equipment. The SR-200 HD



Fornnax SR-200 HD
Primary Shredder

with a Trommel screen provides output sizes of 60-80 mm, which is called TDF alternate fuel for the cement industry. And SR-200 HD without a screen produces output sizes up to 400 mm, called single pass rough shreds. Due to the design of 750 mm diameter knives and a larger shaft center, it has more discharge space to process bulky and high-thickness materials such as agricultural tires, truck tires and OTR tires.

Commercial benefits / economic advantages

The new HD model provides a low cost-per-ton with high reliability, ease of operation, and more flexibility for various types of tires, as well as a design optimized especially for sites with a 25-ton per-hour production requirement.

The SR-200 HD model provides higher capacity due to its high RPM and torque, resulting in less manpower, electricity, and wear costs. The new HD model is designed to focus on the TDF application (Tyre Derived Fuel). Cement plants usually utilize three to four lines to maximize production. The SR 200 HD is a single-line system that delivers a high output equivalent to three to four smaller lines.

 fornnax.com



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Poland:

TERRA ELECTRORECYCLING PLANT WENT INTO OPERATION

In April this year, Terra Electrorecycling, a subsidiary of the Elemental Group, opened one of the most modern e-waste processing plants in Poland.

According to the company's representatives, this will strengthen the firm's position in the region and expand the scope and scale of its operations. The new installation in Grodzisk Mazowiecki near Warsaw "will enable processing 100 refrigerators per hour, regardless of the type of refrigerant used in the device's construction", the company pointed out. "It is worth noting that older technology allows the processing of 60 Freon refrigerators or 30 pentane refrigerators within 60 minutes." Refrigeration appliances would undergo mechanical shredding,



Photo: Terra Recycling

while other e-waste will be dismantled manually. The target capacity of the new plant would be 70,000 tons of waste electrical and electronic equipment per year, of which refrigerators will account for 20,000 tons. The installation was built by the German company URT.

[terrarecycling.pl](https://www.terrarecycling.pl)

PLASTICS RECYCLING WORLD EXPO EUROPE

September, 11 – 12, 2024, Brussels (Belgium)

The Plastics Recycling World Expo brings together industry leaders, experts, and enthusiasts from the global plastics recycling industry, the organizers point out. The event is the occasion for two days of networking, knowledge sharing and experiencing innovations with the sole purpose of doing business. The Plastics Recycling World Expo will be co-located with the Compounding World Expo and Plastics Extrusion World Expo. The three expos will feature a wide array of leading compounding, recycling and extrusion equipment manufacturers plus suppliers of a huge variety of polymers,

additives and related services. "There will also be special zones focused on chemical recycling and polymer testing." According to the event's organizer AMI, by registering in advance, visitors will receive free admission to three shows featuring more than 200 suppliers, plus free entry to three focused conference theatres hosting technical presentations and business debates. "Attendees and exhibitors will also have the option to buy tickets for a networking party on the evening of 11 September."

eu.plasticsrecyclingworldexpo.com

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PLASTICS RECYCLING SHOW MIDDLE EAST & AFRICA 2024

September 10 – 12, 2024, Dubai (UAE)

PRSE ME&A is a three-day exhibition and conference exclusively focused on plastics recycling in the region. This event will offer delegates access to the latest advancements and information in the rapidly evolving plastics recycling industry. It will gather thought leaders, innovators,

and technology providers under one roof. PRS ME&A will feature an exhibition and a high-level conference. The exhibition will display the newest solutions and technologies on the market. Concurrently, the conference will host international experts who will discuss essential topics such as the

circular economy, regulations, challenges, opportunities, innovations, technologies, and trends. They will also share insights and experiences from the plastics sector to support a green future.

 prseventmea.com

ENVIRONTEC 2024

October 1 – 3, 2024, Budapest (Hungary)

HUNGEXPO Zrt., a prominent player in the Central-Eastern European exhibition market, is launching ENVIRONTEC, a new trade fair that aims to tackle the pressing issue of environmental sustainability through societal, economic, and industrial transformation, along with adaptive

practices. It will showcase innovative solutions and engage economic stakeholders committed to mitigation and resilience. Moreover, the event will offer insights into the latest trends in the sector, EU regulations like taxonomy, ESG, ESRS, and CSRD, as well as environmental technologies.

ENVIROTEC powered by ÖKOINDUSTRIA also intends to facilitate establishing new business connections for future collaborations through this regional business platform.

 environtec.hu/en

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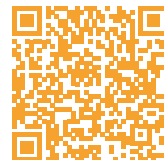


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