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Recycling: The Industry is Moving Forward

Brigitte Weber
Editor-in-Chief

On June 5th, the World Environment Day took place with more than 3,000 initiatives around the globe. Led by the United Nations Environment Programme (UNEP), and held annually since 1973, it has grown to be the largest global platform for environmental outreach; millions of people across the world in over 150 countries celebrate this event each year. According to UNEP, major corporations, non-governmental organizations, communities, governments and celebrities from across the world adopt the World Environment Day brand to champion environmental causes.

This year, the Republic of Korea hosted the Awareness Day with a focus on ending plastic pollution globally. The world produces more than 400 million tons of plastic annually, two-thirds of which are short-lived products that soon become waste, filling the ocean and, often, working their way into the human food chain, UNEP underlined. Globally, an estimated 11 million tons of plastic waste would leak into aquatic ecosystems each year, while microplastics would accumulate in the soil from sewage and landfills, due to the use of plastics in agricultural products. According to UNEP, the annual social and environmental cost of plastic pollution is estimated to be between 300 billion and 600 billion US-Dollar. “Ridding the planet of plastic pollution is an important contribution to achieving the Sustainable Development Goals, including those on climate action, sustainable production and consumption, protection of seas and oceans and repairing ecosystems and retaining biodiversity.”

In view of this situation, there is a huge need for solutions. An efficient waste management on the way to a circular economy would help to change for the better, as recycling is an important part of this transformation. In October, K 2025, the international trade fair for the plastic and rubber industry in Düsseldorf (Germany) will demonstrate what progress has been achieved on plastics recycling.

The international recycling sector is also continuously moving forward. At the BIR World Recycling Convention & Exhibition in Valencia (Spain), the organization’s President Susie Burrage OBE emphasized: “It is in our DNA to adapt, to lead and to innovate. And in the last two years, we have fully embraced that responsibility – not just to remain relevant, but to actively shape global sustainability through our work in recycling.” At this meeting, she also applauded the elevation of BIR’s Plastics Committee to Division status. She described this as a “milestone that rightly recognizes the growing importance of plastics recycling around the world”. You can find more information on the event on page 3.

The Nordic states are on their way to achieve the EU recycling targets. Iceland is reducing its landfill waste (page 24), while Denmark is looking for solutions, partnerships and projects (page 28). Furthermore, a new study published by the Nordic Council of Ministers recommends stronger waste prevention measures (page 27).

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

Yours
Brigitte Weber (weber@msvgmbh.eu)

Cover Photo: Messe Düsseldorf / tillmann

BIR World Recycling Convention & Exhibition:

ENSURING FREE TRADE DESPITE TARIFFS AND OTHER RESTRICTIONS

The world is changing – but the answer is NOT blowing in the wind.

More than 1,900 participants, drawn from well over 800 companies and more than 60 countries attended the recent convention of the Bureau of International Recycling (BIR) in Valencia, the world association gave account. "We are more visible and better connected than ever before, with a strengthened secretariat and a dynamic professional advocacy team," Susie Burrage OBE, President of the global federation of recycling industries, expressed her enthusiasm at the opening session. "BIR is now totally engaged in key international arenas – from the United Nations to the OECD and the European Union – ensuring our industry's voice is heard at the highest level." Moreover, she underlined that "we are an integral part of the manufacturing supply chain. We are essential. Without recycled materials, there is no sustainable future." The Managing Director of UK-based company Recycled Products Ltd also underlined that the recycling sector is able – by combining individual expertise as BIR members and through collaboration – to develop "practical solutions to address the pressing issues we face."

Uncertainties regarding trade

At the International Trade Council (ITC) meeting concerns about trade tariffs were put in place and planned by the US administration as well as a proposal from the European Commission to limit recycled metal exports to help domestic buyers were major issues.

Tariffs were explored in a keynote address by Professor Philippe Chalmin, of the Cyclope consultancy (FRA). Provided that the situation would be more or less stabilized, he predicted: "Next year tariffs will be between ten to 15 percent, which is huge by the way, and depends on the sector in which you are working."

Emmanuel Katrakis, Director of Public and Regulatory Affairs at Galloo (FRA/BEL), who chaired the meeting, welcomed an American perspective from Robin Wiener, President of ReMA (USA). According to the information provided by BIR, she reported uncertainty regarding tariffs also in the US. The manufacturing sector would not be supportive of the tariffs, "it wants a strong basis in the US but also wants market access," she was cited. However, there would be some legitimate issues with the global trading system. "To understand the rationales, there isn't just one set of tariffs being proposed. There is concern over China... There is the reshoring of jobs in the US and how we would do that. So, there are a lot of rationales being put forward." There were predictions that tariffs would be at ten percent as well as uncertainty about all parts of the economy.

The European Commission recently held a meeting regarding its Steel and Metals Action Plan, which was published in March. As per Emmanuel Katrakis, the biggest issue in Europe was energy prices, not recycled metals. Also "a few paragraphs" in the Steel and Metals Action Plan aimed at ensuring that scrap materials remain within Europe to maintain their availability. According to the information, he stressed that many meetings were ongoing in Brussels and that he could not divulge what was said, adding: "We are not scrap providers we are putting recycled materials on the market and based on objective figures, there was no problem of recycled metals availability that could justify export restrictions."

As reported by BIR, Murat Bayram, Managing Director, EMR (GBR) described the world situation as "like a poison in the DNA of an economy. Everyone was looking with a big question mark. It starts with the people, 'Will I still have my job or not?'; the automobile industry is looking for the people, but they are saying will I buy a new car or not?" And, referring to the

Photo: BIR

chairman's words on the European situation, he commented: "Additionally we have more and more foggy weather, especially with the discussion you mentioned. The discussion we have had I would say is a wake-up call on the one side and they are not stopping pushing for the regulation but also an eye opener that we are willing to fight." He also pointed out that "not every recycled steel or non-ferrous material has buyers in Europe at the moment." During the meeting, panelist Dhawal Shah of Metco Ventures (IND) had positive news to announce on India. The country had consistently been growing by 6.5 to 7.5 percent in GDP (growth domestic product), had become the fourth largest economy surpassing Japan, and has two big programs to make it more self-sufficient. "Over the last five to seven years we have come a long way. At the moment we have a deficit of about 80 billion Dollar, it used to hover at around 120-130 billion Dollar," he was quoted. In terms of materials, he reported that on the metals side, the infeed would be from imports, and import duties had been removed, except for aluminum which was at 2.5 percent. "You probably have 10-15 years until when we have enough with our recycling."

New Study on worldwide gains through recycling

The importance of having hard, data-driven facts when advocating on behalf of the industry was double-underlined at the latest meeting of BIR's International Environment Council (IEC), the global federation of recycling industries stated. The session "began with a potent example of how fact-based advocacy had been used by the recycling industry to counter the inaccurate arguments of vested interests seeking the introduction of export restrictions on Europe's recycled steel. The meeting concluded with a sneak preview of a heavily-researched and potentially game-changing study co-funded by BIR and KPMG, which will detail in hard numbers the massive and wide-ranging environmental gains achieved worldwide through recycling."

In this context, IEC Chairman Olivier François, President of EuRIC, described the upcoming BIR/KPMG publication as "absolutely key to showing the politicians that this connection between the circular economy and decarbonization must be done". The update on the "Environmental Benefits of Recycling" study was given by Stéphanie Grandjean Mateos and Mina Bishop, respectively Director and Senior Manager of Circular Economy at KPMG France's ESG Centre of Excellence. According to the information, the report – now in its final stages before release – would be significantly wider in scope than its predecessors released in 2008 and 2016. "The number of recycled materials addressed had been increased to 10 and key performance indicators had been extended so that coverage now encompassed: CO_2 emission savings; energy savings; water savings; raw material savings; and land use savings or ozone depletion." Furthermore, the information has been drawn from a very wide range of sources and based on actual market data/realities. As emphasized, the study showed a clear link between decarbonization and recycling/the circular economy.

"The numbers are very big – very big – and very interesting," BIR Director General Arnaud Brunet was quoted assuring the attending delegates. He is convinced that the high expectations surrounding this publication were justified.

bir.org

PLASTICS RECYCLERS EUROPE ESTABLISHED A NEW TASKFORCE

The organization has announced the establishment of a new Dissolution Taskforce, which reflects recent technological advancements in the industry. This initiative follows a collaboration with DROP-IN, the Dissolution Recycling of Plastics Initiative. The goal is "to shape policies that enhance the recognition of dissolution recycling and to ensure a level playing field among all recycling technologies".

Dissolution recycling refers to technologies that recover polymers from plastic waste through a solvent-based physical recycling process, aiming to maintain the integrity of polymer chains. The initiative is designed to promote the potential of this versatile technology while supporting a circular plastics economy, alongside mechanical and chemical recycling. Companies engaged in dissolution recycling are welcome to join Plastics Recyclers Europe (PRE) and its new Dissolution Taskforce to share their expertise and contribute to supporting a circular future for plastics.

plasticsrecyclers.eu

"One Earth Summit" 2025:

HONG KONG AND ITS ROLE AS AN INTERNATIONAL FINANCIAL CENTER

In March this year, the "One Earth Summit" was held in Hong Kong. The event attracted more than 300 participants from around the globe and was hosted by the Institute of Sustainability and Technology, co-organized by the One Earth Alliance, and the Giving to Amplify Earth Action (GAEA) initiative launched by the World Economic Forum.

The forum's theme was "Driving Systemic Change towards a Sustainable Future through Impact Investment and Technological Innovation". In his speech, Paul Chan Mo-po, Financial Secretary of the Government of the Hong Kong Special Administrative Region, underlined that as an international financial center and a leader in green finance, Hong Kong could help bridge the funding gap for green projects. Hong Kong's issuance of green bonds has ranked first in the Asian market for seven consecutive years, with a market share reaching approximately 45 percent last year. At the same time, Hong Kong is seeking innovative financing solutions, such as tokenized green bonds and infrastructure financing securitization, to attract new investors. Hong Kong is committed to achieving carbon neutrality before 2050, focusing on three major strategies: zero-carbon power generation, green buildings, and sustainable transportation, as well as waste reduction.

Furthermore, the region could help bridge the technology gap. "Hong Kong boasts a vibrant ecosystem of over 300 green tech start-ups based in our Science Park and Cyberport. Many of their innovative solutions, ranging from energy-efficient materials to carbon capture, EV infrastructure and others, are already capturing interest in overseas markets," Paul Chan was quoted on the homepage of the Government of the Hong Kong Special Administrative Region. Global measures to tackle climate change would create new business opportunities in burgeoning markets for green products and services. In this context, he announced the establishment of a GreenTech Hub, "which will accommodate 200 technology firms and serve as a nexus for public-private partnerships and international collaboration, with hopes that more private capital will drive green technology development and build a prosperous ecosystem". Additionally, artificial intelligence would have widespread applications in sustainable development, emphasizing the government's recognition of the significant potential of incorporating AI into the green ecosystem, designating it as a core industry.

Paul Chan Mo-po:
As an international financial center and a leader in green finance, Hong Kong can help bridge the funding gap for green projects

According to Paul Chan, Hong Kong can also help bridge the action gap. "Despite setbacks in climate initiatives elsewhere in the world, Hong Kong remains steadfast in its commitment to regional and international collaboration for concrete and credible climate action," he was cited on the Hong Kong Government's homepage. "We are dedicated to sharing best practices, technologies and resources with our partners. By taking part in global climate initiatives, and hosting fora like this one, we are determined to help shape the thought leadership necessary for advancing innovative solutions to our shared challenges."

Professor Poman Lo, Chair of One Earth Summit Board of Advisory and Founder of the Institute of Sustainability and Technology remarked in her welcoming speech, that Asia could play a "pivotal role in leading the global net zero transition. One Earth Summit is part of the major transformation underway to bring Hong Kong closer to our ambition of being an international hub for sustainable finance and green innovation." Additionally, Rob Van Riet, Senior Special Adviser to the Managing Board, World Economic Forum, and Amy Lo, Chairman of UBS Global Wealth Management Asia, Head and Chief Executive, UBS Hong Kong, also delivered speeches on the future of sustainable technology and finance before the official start of the forum.

oneearthsummit.org

Photo: Institute of Sustainability and Technology, Hong Kong

COOPERATION TO OFFER BROADER INSIGHTS FOR SUSTAINABLE INVESTING

Internationally active companies BlueOnion, headquartered in Hong Kong and Netherland-based Morningstar Sustainalytics, collaborate to expand sustainable investment and due diligence coverage.

"This collaboration addresses the growing challenges of greenwashing in sustainable investment products," the Chinese company underlined. With the surge in Environmental, Social and Corporate Governance (ESG) assets and heightened regulatory scrutiny – such as the recent circular issued by the Hong Kong Monetary Authority (HKMA) on the sale and distribution of sustainable investment products – the "synergistic interplay" between the data of the partners would "enhance the financial sector's efforts in meeting compliance requirements in a transparent and fuss-free manner".

According to the information, the BlueOnion Sustainable Finance Disclosure Regulation (SFDR) product and Morningstar Sustainalytics' data expand coverage to 300,000 mutual funds, Exchange Traded Funds (ETFs), and 93,000 bond funds, offering broader insights for sustainable investing. The platform would standardize sustainability product measurement, align with the EU SFDR, and empower organizations to analyze ESG performance, assess carbon emissions, avoid controversies, and address climate change. At the same time, it would meet regulatory and investor expectations with transparency and confidence.

"Proper due diligence is essential for banks to meet regulatory compliance and for asset managers to build portfolios aligned with global sustainability standards. This process depends on robust data, analytics, and clear visualization. BlueOnion's advanced analytics and visualization capabilities, together with our robust data, bridges a gap in the fixed-income asset class and the small to mid-cap coverage. As a turnkey solution, it helps our banking and fund clients save time and costs," Nick Cheung, Managing Director of Enterprise Products, Greater China, Morningstar, was cited.

As emphasized, the collaboration allows clients to integrate Morningstar Sustainalytics' data with BlueOnion's existing data and analytics solution on sustainability, "offering clients an intuitive solution to tackle challenges in regulatory compliance and sustainability-focused investment strategies". Furthermore, it would exemplify BlueOnion's and Morningstar Sustainalytics' commitment to supporting financial institutions in combating greenwashing, achieving compliance, and advancing the global ESG agenda. "Together, they enable clients to uncover actionable insights and drive meaningful progress in sustainable investing."

BlueOnion is an end-to-end sustainability analytics platform. Banks, asset managers, institutional investors, and companies would rely on the company to assess carbon emissions, analyze ESG performance, conduct climate scenario analysis, and build green portfolios. "The platform supports sustainability reporting, climate risk management, and compliance with anti-greenwashing regulations, enabling organizations to meet regulatory, investor, and customer expectations." blueonion.today

Morningstar Sustainalytics is a leading sustainability data, research, and risk rating service provider. It supports investors in developing responsible investment strategies. With over 30 years of expertise, the company helps financial institutions integrate sustainability risk assessments into their investment processes while ensuring compliance with evolving sustainability regulations. sustainalytics.com

Phosphorus:

THE MARKET IS DRIVEN BY RISING DEMAND

According to American company Transparency Market Research Inc., the elemental phosphorus (P4) and derivatives market is witnessing steady growth driven by rising demand in agriculture, chemicals, and pharmaceuticals. Innovations in sustainable phosphorus recovery and eco-friendly processing methods would shape the industry's future. As stated, the market was valued at 2.5 billion US-Dollar in 2023 and is projected to reach 4.6 billion US-Dollar by 2034, growing at a compound annual growth rate (CAGR) of 5.7 percent from 2024 to 2034.

Elemental phosphorus exists predominantly in white, red, yellow, and black allotropic forms, with white and red phosphorus being the most commercially significant, the American market research firm informed. It serves as a precursor for various phosphorus chemicals, including phosphoric acid, phosphorus pentoxide, and phosphorus sulfides. These derivatives are integral to multiple industries:

- Agriculture: Phosphorus-based fertilizers are essential for enhancing soil fertility and crop yields. The depletion of soil phosphorus due to intensive farming practices necessitates the continuous application of these fertilizers to meet global food demands.
- Flame Retardants: Phosphorus compounds are utilized in manufacturing flame retardants, which are critical for reducing the flammability of materials in construction, electronics, and textiles.
- Water Treatment: Phosphorus derivatives play a role in water treatment processes, aiding in the removal of impurities and ensuring water quality.
- Lithium-Ion Batteries: The rise of electric vehicles (EVs) and renewable energy storage solutions has increased the demand for lithium-iron phosphate ($LiFePO_4$) batteries, where phosphorus is a key component.

Phosphate fertilizers for agriculture

The global phosphate fertilizers market alone is valued much higher. As reported by Ireland-based market research store ResearchAndMarkets.com, the worldwide market for phosphate fertilizers was valued at 70.6 billion US-Dollar in 2024 and is projected to reach 91.1 billion US-Dollar by 2030, growing at a CAGR of 4.4 percent from 2024 to 2030.

Several emerging trends would shape the future of this market, which is driven by a growing focus on sustainability and the need to improve agricultural productivity. "One significant trend is the increasing interest in organic and eco-friendly fertilizers. With rising consumer demand for organic food and concerns about the environmental impact of traditional farming practices, farmers are exploring phosphate sources that are less harmful to the environment. This has led to the development of bio-based phosphate fertilizers and alternatives that rely on natural sources of phosphorus, such as animal waste and bone meal."

Photo: Fraunhofer IFF

Another trend is the growing emphasis on soil health management. Farmers and agronomists were becoming more aware of the need to maintain balanced soil fertility, not just through chemical inputs but also by managing organic matter, microbial activity, and soil structure. "This holistic approach to soil health, combined with the use of phosphate fertilizers, is helping farmers improve crop yields while promoting sustainable agricultural practices," ResearchAndMarkets.com stated. "Additionally, phosphate recycling is gaining traction as an important strategy for ensuring long-term phosphorus availability. Innovations in recovering phosphorus from wastewater and agricultural runoff are contributing to the circular economy in agriculture, reducing reliance on mined phosphate rock."

Moreover, the development of slow-release and controlled-release fertilizers is another important trend. These fertilizers release phosphorus gradually, ensuring that it is available to plants throughout the growing season and reducing the risk of runoff and leaching. "As environmental regulations become stricter and concerns about nutrient pollution increase, slow-release fertilizers are expected to gain more market share, especially in regions where agriculture is a major contributor to water pollution."

- transparencymarketresearch.com
- researchandmarkets.com

TURNING WEAPONS INTO OUTDOOR WORKOUTS

UK-based European Metal Recycling Ltd. (EMR) and the British charity organization Steel Warriors transform seized knives into community gyms. As reported by the internationally active metal recycler in March this year, the partners have removed nearly six tons of knives from London's streets. EMR and Steel Warriors would "transform these dangerous weapons into outdoor gym equipment for the people of the UK's capital". The knives were shredded at EMR's Willesden site and will be sent to a specialist foundry in Stourbridge to be crafted into gym equipment, the information said. "EMR provided its services free of charge, saving the charity significant costs and ensuring the project's success."

Steel Warriors was founded in 2017 by Ben Wintour and Pia Fontes. Inspired by the staggering amount of knife steel collected by the police each month, they envisioned turning a symbol of violence into one of strength and resilience, as one can read on the organization's homepage. Their goal was to empower young people with the confidence to walk the streets unarmed, promote physical and mental well-being through accessible fitness, and create pathways for personal growth and success. The charity has already established four gyms across London, plus one in Brixton Prison, and aims to expand further this year with EMR's support.

uk.emrgroup.com
steelwarriors.co.uk

GERMANY: A STAMP ON RECYCLED PAPER

Deutsche Post is issuing its first postage stamp produced on recycled paper. The German company and the British paper manufacturer Tullis Russell developed the postal stamp with the motif „Flower Letter" (Blumenbrief) jointly; the gummed version was produced from 12.8 metric tons of 100 percent recycled paper. 82.5 million stamps are issued in stamp sheets and gummed rolls. Every stamp costs 95 cents.

Photo: DHL Group

According to the information, a self-adhesive version of the stamp is also available, "although for technical reasons this currently continues to be printed on conventional paper".

group.dhl.com

BIO-BASED FERTILIZERS FROM WASTEWATER

On 30 March (International Zero Waste Day), the WalNUT project – a circular model for nutrient recovery from wastewater to produce sustainable bio-based fertilizers – joined the campaign by highlighting its commitment to sustainable agricultural practices.

As reported by the European initiative, which has received funding from the EU, current farming practices threaten soil health through nutrient imbalances, leading to problems like soil degradation and nutrient loss. To tackle these challenges would require "innovative, sustainable approaches to reduce waste and use resources more effectively, aligned with the International Zero Waste Day principles and goals. The WalNUT project focuses on turning wastewater into a valuable resource."

walnutproject.eu

NEW IN GERMANY: SHIP RECYCLING

According to EWD Benli Recycling GmbH & Co. KG in Emden, it is the first German firm to start dismantling ships, wind turbines and industrial plants in cooperation with Relog GmbH, a company that plans and implements dismantling projects. It received the approval documents from the Oldenburg Trade Supervisory Office in May this year.

ewd-benli-recycling.com
relog.green

BIO-CIRCULAR CARBON BLACK FOR COATINGS SYSTEMS

Orion S.A., a global specialty chemicals company, informed that it has launched ECOLAR 50 POWDER – a new bio-circular carbon black. The new product would deliver coloristic properties comparable to regular specialty carbon blacks, Orion underlined. "Based completely on bio-circular feedstock not in competition with the food chain, ECOLAR 50 POWDER contains 100 percent biogenic raw material per 14C analysis." A low to medium color furnace black, the products's coloristic properties would provide medium jetness in mass tone applications plus good tinting strength.

orioncarbons.com

COMSTOCK METALS AND RWE CLEAN ENERGY ENTER STRATEGIC SOLAR RECYCLING PARTNERSHIP

Comstock Metals LLC, a subsidiary of American company Comstock Inc., has entered into a Master Services Agreement (MSA) with RWE Clean Energy, the U.S. subsidiary of global energy company RWE. Under the terms of this new agreement, Comstock Metals will serve as a preferred, strategic partner for the recycling, disposal, and decommissioning services for RWE's solar installations.

As reported, these projects will include the recycling of solar panels and related equipment, logistics management, eco-friendly disposal practices, and the safe transportation of materials.

comstock-metals.com
americas.rwe.com

POST-CONSUMER RECYCLATES FOR AUTOMOTIVE APPLICATIONS

German-based companies TechnoCompound GmbH and RE Plano GmbH (a subsidiary of REMONDIS Recycling) have agreed to intensify their cooperation in using post-consumer recyclates (PCR) for automotive applications. Both companies collaborate against the backdrop of the numerous EU regulations currently being discussed and have already been passed regarding the sustainability of companies and products, including the End-of-Life Vehicles Directive. As reported, using recyclates from the lightweight packaging fraction of household waste sorting for use in technical products presents many challenges. Both companies have made significant developments and investments in this area in recent years. Dirk Breitbach, Managing Director of TechnoCompound, commented: "Building on our 35 years of experience in the use of recyclates in plastic compounds, the cooperation with RE Plano is an important step in the up-cycling of PCR from the lightweight packaging fraction for technical applications, such as vehicle interiors. This application has very high requirements in terms of emissions and odors, as well as the mechanical properties of our products."

At its latest sorting plant in Bochum/Germany, RE Plano uses an AI-supported sorting system that recognizes individual packaging and can be freely programmed for sorting criteria. That enables the company to achieve the highest purity levels in the fractions, which are suitable for later use in, for example, cosmetics packaging and vehicle interiors. Managing Director Ralf Mandelatz: "This will enable us to meet the volume requirements of the automotive market, and we are delighted to have TechnoCompound, an experienced market leader in technical applications, on our side." Dr Nabila Rabanizada, Head of Research & Development at REMONDIS Recycling, adds: "The suitability of our recyclates, including for high-quality, contact-sensitive applications, is also ensured by the further multi-stage processing of the sorting fractions at our plant in Lünen. This enables us to meet the specifications for the individual components."

Through compounding, additivation and further material processing, TechnoCompound uses these raw materials to produce plastic grades that pass the emission chamber tests, including odor and emissions, specified by vehicle manufacturers (OEMs). Regardless of the exact form of the future ELV directive, OEMs and Tier 1 and Tier 2 suppliers are pursuing their sustainability strategies, including the use of PCR. Dr Gerald Aengenheyster, Head of Development & Application Technology at TechnoCompound, comments: "We can offer material solutions where PCR and post-industrial recycled content (PIR) are balanced according to the application and specification." While the recovery of PCR from end-of-life vehicle recycling is still in its infancy, developments for using the PCR light packaging fraction are now well advanced and available for series application. TechnoCompound's PCR-based plastics are already being used in several automotive applications. Examples include an instrument panel carrier made from TechnoGreen PP LGF long glass fiber reinforced polypropylene grades, which are in production for two vehicles. By working together, TechnoCompound and REMONDIS Recycling are helping their automotive customers to meet legal requirements and further achieve their sustainability goals within the circular economy.

Photo: TechnoCompound GmbH

technocompound.com
remondis.de/en/home/

ADVANCED SORTING TECHNOLOGIES FOR THE NORDIC MARKETS

German-based Stadler Anlagenbau GmbH is a global leader in recycling and sorting plant solutions. With advanced technologies, specialized expertise, and tailored solutions, the company supports the Scandinavian countries' efforts to achieve their ambitious recycling and circular economy goals.

Nordic countries are globally recognized as leaders in sustainability, with some of the most advanced waste management and recycling systems. However, meeting ever-evolving environmental targets, improving efficiency, and tackling the challenges of cost, automation, and innovation require continuous technological advancements. Stadler, specialized in sorting systems and waste management solutions, brings its experience, technology, and understanding of the different Nordic markets to help customers stay ahead of these challenges. "The Nordic markets demand solutions that are not only technologically advanced but also aligned with their strong environmental ethos," Jürgen Berger, Head of International Sales at Stadler Anlagenbau GmbH, was cited. "With a strong track record in the region, we understand the specific needs of our customers and provide high-quality, future-proof solutions that help them maximize material recovery, improve operational performance, meet ambitious recycling targets, and deliver long-term value."

Nordic countries have set high environmental goals, requiring waste management solutions prioritizing resource efficiency, carbon neutrality, and circular economy principles. According to the German machine manufacturer, the company provides "state-of-the-art sorting plants that leverage advanced technologies, including Artificial Intelligence, the Internet of Things, and robotics to optimize material recovery and minimize waste, contributing to a circular economy".

Finland

An example is the Materials Recovery Facility (MRF) in Finland, developed in collaboration with Remeo Oy. This facility, located in the Greater Helsinki Region, incorporates AI technology, advanced processes, and a high level of automation to recover materials from both Commercial & Industrial (C&I) and Construction & Demolition (C&D) waste. With an annual capacity of up to 180,000 tons, it supports Helsinki's recycling needs and contributes to Finland's recycling rate of 70 percent. "This project underscores the role of automation and intelligent sorting technology in enhancing the circular economy," the mechanical engineering company emphasized.

Denmark

While Nordic countries share a common sustainability ethos, each market presents distinct challenges, different regulatory frameworks and cultural expectations.

In Denmark, Stadler partnered with Dansk Retursystem to create an automated high-capacity plant to process PET bottles and aluminum cans collected through the country's advanced deposit return system. "The high level of automation and flexibility of this plant ensures extremely efficient recycling of cans and bottles and is a shining example of a successful private-public collaboration for a circular economy," the provider underscored.

Norway

In Norway, which focuses on reducing plastic waste and encouraging advanced recycling techniques, Stadler's collaboration on the ROAF MSW sorting plant near Oslo has set a new standard for municipal waste management. "This fully automated facility sorts mixed household waste, recovering plastics and bio-waste using advanced optical sorting technology. With long-term goals of achieving a 70 percent recycling rate by 2030, the

facility has already improved recycling rates significantly."

In December 2024, Stadler was awarded a contract by IVAR IKS to design and install a new MSW sorting plant in Stavanger, further enhancing Norway's recycling capabilities. This upcoming facility, which will have a processing capacity of up to 40 tons of waste per hour, is projected to be completed by spring 2027.

Photos: Stadler

The German engineering firm's work with Veolia PET Norge AS in Fetsund is another example of its expertise in plastic recycling. "The high-performance sorting system for PET beverage bottles from take-back systems integrates screening and advanced sorting technologies, ensuring high purity and efficiency, meeting Norway's high standards for efficiency and sustainability."

Sweden

Stadler is also able to deliver solutions tailored to specific market needs. An example is located in Sweden, where textile recycling is gaining importance. The company delivered "the world's first fully automated textile sorting plant in Malmö, addressing a major gap in textile recycling. The facility uses near-infrared (NIR) technology to separate different textile fibers, enabling efficient recycling and supporting the transition to a circular economy in the fashion and textile industries."

After-sales support and customer focus

As underlined by Stadler, the company is committed to providing after-sales support, ensuring long-term reliability and operational efficiency for its customers. Its strong local presence in the Nordic markets would allow it to offer tailored maintenance services, rapid response times, and in-depth knowledge of regulatory requirements and market trends.

The company's dedication to customer service has earned praise from clients across the region, including Jan Ostendarp, Head of PET Technology at Veolia. "In our relationship with Stadler, we have always been impressed by the high quality and efficiency of its solutions, as well as the excellent collaboration before, during and even after installation," he was quoted.

w-stadler.com

NEW PLANT FOR THERMOCHEMICAL RECYCLING OF PLASTIC WASTE

In summer this year, German company PRUVIA GmbH intends to begin the construction work of "one of Europe's largest commercial plastic-to-oil plants" at the chemical park InfraServ Gendorf in Bavaria. The start of operation is planned for the fourth quarter of 2026. As reported, the process developed and patented by PRUVIA – an internationally operating clean-tech company in the field of plastics recycling – converts non-recyclable mixed plastic waste into non-fossil naphtha using a continuous pyrolysis process.

"This raw material recovered from waste can be used in the petrochemical industry to produce new plastics," the company underscored. The new plant would replace fossil raw materials and at the same time contribute to the sustainable defossilization of the chemical industry through the environmentally friendly circular economy of plastics. According to the information, the plant would be able to process annual 35,000 tons of mixed plastic waste. The Bavarian company is initially investing a mid-double-digit million Euro amount in Gendorf and will employ around 30 people once the plant is commissioned. The doubling of the annual capacity to 70,000 tons is planned for 2028.

pruvia.com

Advertorial:

Tire Recycling Business in Germany:

A BILLION-EURO INDUSTRY PAVING THE WAY TO CLIMATE NEUTRALITY

Germany stands at the forefront of global environmental innovation, with a strong commitment to sustainability and circular economy practices. As one of the world leaders in climate change mitigation, recycling, and waste management technologies, the country offers fertile ground for environmentally driven business ventures – particularly in the tire recycling sector.

In 2024 alone, Germany's tire recycling market generated an impressive revenue of approximately 335.68 million Euro, with forecasts projecting this figure to rise to nearly 419.88 million Euro by 2030. This growth reflects the broader expansion of the national tire market, which is expected to increase at a compound annual growth rate (CAGR) of 3.80 percent through 2032, ensuring a consistent supply of end-of-life tires as raw materials.

Germany also contributed 5.5 percent of the global tire recycling market revenue in 2024, further underscoring its strategic relevance. Adding to this positive momentum, the country introduced its National Circular Economy Strategy or Nationale Kreislaufwirtschaftsstrategie (NKWS) in 2024 – an ambitious policy framework focused on enhancing resource efficiency, reducing waste, and fostering long-term sustainable growth. Aligned with the European Union's broader goals, including the Critical Raw Materials Act and the Green Deal, this strategy reflects Germany's intent to lead by example. For entrepreneurs planning to enter the green economy, the tire recycling sector in Germany offers not only commercial viability but also the chance to contribute to the country's transition toward climate neutrality by 2045.

Essential Factors for a Successful Tire Recycling Plant in Germany

1. **Regulatory Compliance and Environmental Permits**
   To legally operate a tire recycling plant in Germany, companies must adhere to both national and EU-level environmental regulations. That includes compliance with the TA Luft (Technical Instructions on Air Quality Control) to manage emissions effectively. Operators must also obtain a waste management permit from the Kreislaufwirtschaftsgesetz (Circular Economy Act), which governs the handling, processing, and recovery of waste materials.

2. **Zoning, Land Use, and Local Approvals**
   Selecting a suitable site requires alignment with Germany's zoning laws under the Baugesetzbuch (Federal Building Code). The land must be designated for industrial or waste processing use. Before development, formal approval from the local municipal planning authority (Bauamt) is essential, particularly for construction and operational permits.

3. **Market Feasibility and Supply Chain Analysis**
   Conduct a detailed market analysis to ensure a sustainable supply of end-of-life tires and evaluate the demand for recycled products such as crumb rubber, tire-derived fuel (TDF), carbon black, steel wire, and tire-derived aggregate (TDA). Assess competition, transportation logistics, and proximity to tire collection centers, which are critical for reducing feedstock costs and maintaining operational efficiency.

4. **Strategic Business and Financial Planning**
   It is necessary to determine optimal plant capacity based on market needs – typically between 10 to 50 tons per day. Secure financial backing through a mix of private investors, loans, or government subsidies. Notably, programs offered by KfW Bank and other green funding initiatives can provide substantial financial support for projects aligned with circular economy goals.

Photo: Fornnax

Fornnax OTR Tire Recycling Plant

5. **Technology Selection and Regulatory Conformity**
   Choose a tire recycling technology that aligns with both environmental performance and economic efficiency. All machinery must carry EU conformity marks such as CE certification, ensuring they meet essential health, safety, and environmental protection standards. One of the leading equipment manufacturers, Fornnax, provides reliable and efficient tire recycling machinery designed to exceed EU regulatory requirements and support sustainable operations.

6. **Procurement of Specialized Equipment**
   Lastly, invest in high-quality, certified recycling equipment, such as primary and secondary shredders, granulators, and separation systems from reputable manufacturers. Ensure all equipment complies with German safety and quality standards (e.g., DIN norms) and is equipped with robust emission control systems. Top-notch quality equipment supplier Fornnax Technology offers a comprehensive solution for tire recycling needs, providing cutting-edge machinery and expertise to produce high-quality output products.

By partnering with Fornnax, recycling businesses can tap into decades of tire recycling expertise, backed by a strong global presence in countries like India, Australia, Serbia, Poland, Bulgaria, and the GCC, with a dominant market share of almost 90 percent in India. Fornnax provides customized multipurpose shredders and granulators, along with unparalleled sales and after-sales support. Fornnax's advanced three-stage tire recycling system enables the production of high-quality Tire shreds, Rubber mulch, Crumb rubber-modified bitumen, Steel, and Textiles.

In conclusion, establishing a successful tire recycling business in Germany requires careful consideration of regulatory compliance, market feasibility, and technological efficiency. With Germany's strong commitment to sustainability and circular economy practices, entrepreneurs and recyclers can capitalize on the growing demand for recycled tire products and contribute to Germany's ambitious goal of becoming climate-neutral by 2045.

■ Contact Fornnax Technology to maximize the potential of tire recycling business in Germany.

fornnax.com

THE NEW ZEALAND TIRE MARKET

According to AstuteAnalytica India Pvt. Ltd., New Zealand's tire market is set to grow. It was valued at 800.24 million US-Dollar in 2024 and is expected to reach 1,312.16 million US-Dollar by 2033, growing at a CAGR (compound annual growth rate) of 4.40 percent during the forecast period 2025–2033.

As reported, one of the drivers is the government and its mandated initiatives aimed at accelerating the adoption of a circular tire economy. Because of stringent environmental regulations and eco-conscious consumers, the country's tire market is undergoing a transformative shift toward sustainability. "In 2024, the government's Tirewise stewardship scheme, which mandates tire producers to fund recycling initiatives, has spurred innovation in material recovery," the market research and consulting firm gave account, emphasizing this aspect of the market. "For instance, 68 percent of end-of-life tires are now repurposed into asphalt or playground surfaces, up from 52 percent in 2022. Major brands like Bridgestone and Goodyear have introduced tires with 30–40 percent recycled rubber content, targeting urban consumers in Auckland and Wellington, where eco-awareness is highest."

These shifts were altering the supply chains of the tire market in the country. Local distributors would collaborate with Michelin to test silica-based compounds that reduce rolling resistance by 15 percent, enhancing fuel efficiency. "However, small retailers in rural regions face cost barriers, with sustainable tires priced 20 percent higher than conventional ones. To bridge this gap, startups like KiwiTires leverage crowdfunding to subsidize eco-friendly options for farmers. Consumer surveys reveal that 63 percent of buyers under 40 prioritize sustainability over brand loyalty, compelling manufacturers to recalibrate R&D budgets. This trend is redefining competition, as environmental compliance emerges as a key differentiator."

astuteanalytica.com

RECYCLED RESIN FOR BOPP FILMS

American PureCycle Technologies, Inc. has provided information about progress on using PureFive resin in industrial biaxially oriented polypropylene (BOPP) film trials. The latest trials were conducted by Brückner Maschinenbau GmbH, a leading supplier of production lines for manufacturing a wide range of stretched films, based in Germany. As reported, the positive trials were conducted with blends ranging from 15 to 50 percent PureFive resin from the company's commercial facility in Ironton, Ohio. "The film was successfully extruded at Brückner's German facility and performed similarly to virgin polypropylene (PP) on multiple

Photo: PureCycle

tests," PureCycle explained in April this year, while planning additional stretch tests. According to its CEO, Dustin Olson, no traditionally recycled material can consistently meet the high purity demands required to make film. "The early results are encouraging from the trials with Brückner, and it gives me confidence we can meet the stringent processing requirements." BOPP film has a wide range of end-use applications, including food packaging for snacks, candy and baked goods. It is also used for labeling and adhesive tape. This type of film is popular in these applications due to its features of transparency and moisture/chemical resistance. In June last year, PureCycle received a Letter of No Objection (LNO) from the United States Food & Drug Administration (FDA) confirming that the company's PureFive Ultra-Pure Recycled resin is suitable for use in food-contact applications.

purecycle.com

ORYX STAINLESS OPENED NEW FLAGSHIP FACILITY IN MALAYSIA

In May, the Oryx Stainless Group, a leading supplier of recycled stainless steel raw materials, officially opened its latest facility in Johor, Malaysia.

The site would reinforce the region's position as a strategic hub for sustainable industrial growth, the company headquartered in the Netherlands underlined. Around 200 guests attended the ceremony, including foreign ambassadors and senior government officials, including the Malaysian Investment Development Authority (MIDA).

According to the information, the facility will support the national target of carbon intensity reduction and help attract 300 billion Malaysian Ringgit (more than 62 billion Euro) in green investments. With each ton of recycled material saving up to 8.5 tons of CO_2, the plant's annual impact would approach one million tons in emissions reduction.

"Only in very few industries is the recycling rate as high as in stainless steel," Michael Pawlowski, Co-Founder and Chairman of the Supervisory Board of Oryx Stainless Group, was cited. "New stainless steel – with no loss in quality – can be produced from up to 90 percent of the materials processed on this site. The prerequisite is: Smart Recycling, as Oryx Stainless has practiced it since 1990."

In the first phase, the facility will process 150,000 tons of stainless steel annually. Oryx Stainless emphasized that local talent development stands central to the facility's mission. Malaysian employees have already completed advanced training in Thailand, learning to operate specialized equipment, including Malaysia's first special Sennebogen material handlers. "The workforce, drawn almost entirely from local communities, is set to double by mid-2026. Partnerships with Malaysian universities create pathways for engineering students into the growing green technology sector."

About Oryx Stainless

The business for trading and processing scrap metal as a raw material for stainless steel production specializes in creating blends of recycled raw materials for various stainless steels, addressing the need for over 150 different alloys. Their process involves analyzing, storing, and producing high-quality recycled materials to meet specific metallurgical compositions. "This ensures consistent quality and reduces the use of high carbon footprint primary raw materials like ferronickel, ferrochrome, and ferromolybdenum," the company informs. "Leveraging its smart logistics and a digitized production setup, Oryx also ensures that the entire blending process is as climate-neutral as possible."

oryx.com

APR AND RECYCLASS PUBLISHED SECOND PROGRESS REPORT

In April this year, the international active non-profit organizations USA-based The Association of Plastic Recyclers (APR) and Europe-based RecyClass published the second progress report of their collaboration. As emphasized, the report aims to accelerate the global harmonization of plastic recyclability.

"Key updates include streamlining the measurement of intrinsic viscosity variation for PET bottles and harmonizing the filter pack used in extrusion during HDPE and PP rigid packaging recyclability tests to facilitate future common assessments, RecyClass informed. Over the past year, APR and RecyClass have conducted extensive test campaigns. "The main areas of investigation included inks and laminating adhesives for PE films, additives that cause yellowing in recycled PET for PET bottles, and metalized labels." Following the results, the two associations actively participated in the respective Technical Committees to align the benchmarks of the APR Critical Guidance Test Protocols and RecyClass Recyclability Evaluation Protocols.

Moving forward, APR and RecyClass are set to conduct further test campaigns to enhance the Design for Recycling Guidelines for various packaging solutions. These efforts would help ensure better alignment and effectiveness of recyclability standards worldwide.

recyclass.eu, plasticsrecycling.org

AMCS OFFERS SOFTWARE UPDATE FOR PERFORMANCE SUSTAINABILITY

In April, Ireland-based software provider AMCS announced the launch of its "Spring Release 2025 update". As underlined, this release would enhance businesses' ability to achieve profitability and sustainability goals. According to Elaine Treacy, Global Product Director at AMCS, the introduction of the evolved account model, advanced material trading and digital payment options and the company's enhanced AI-driven solutions empower businesses to transcend traditional automation constraints. "This enables data-driven decision-making and provides insights that not only strengthen an organizations' bottom line but also amplify its positive environmental impact. Moreover, we're elevating residential services delivery with purpose-built automation, delivering better financial and sustainable outcomes for both public and private residential haulers, further ensuring our customers can achieve operational excellence while meeting their sustainability goals."

The key features are:

A) Circular economy advancements

- Launch of AMCS Pay in the EMEA and APAC regions: Expanding range of integrated payment methods and channels to make payment acceptance easier across all regions.
- Evolved Account Model: Facilitates circular economy automation of trading and reporting of transactions with material suppliers and subcontractors as well as across complex corporate structures.
- Optimized Weigh-to-Pay Metal Recycling: Streamlines processes with guided scale, supplier identification, and integrated immediate payments.
- Improved Recycling Operations: Enhanced weighing and tagging workflows for maximized efficiency.
- Smarter Order Fulfilment Logistics: Optimizes recycling impact through improved material trading automation and insights.

B) Data-driven sustainability

- New Sustainability Dashboards: Visualize key metrics such as emissions, resource use, and recycling outcomes in the AMCS Platform.
- Material Trading Dashboard: Provides insights on gross margin and other KPIs to drive financial and sustainability performance.
- AI and Machine Learning Enhancements: Improved route optimization, faster compliance reporting, video-based safety training and Scope 3 emissions estimation.
- Automated Regulatory Updates: Ensures full global compliance on chemical management, delivering increased transparency and safety.

C) Residential services optimization

- Smarter Routing and Service Optimization: New bulky waste route planning automation for optimized and efficient service delivery.
- Automated Seasonal Holiday Service Day Adjustments: Ensures year-round seamless service delivery.
- Enhanced Geographical Service Area and Service Management: Streamlines operations for both public and private residential haulers.
- Optimized Workforce Management: Tracks crew hours and costs to reduce payroll administration effort.

The "Spring release 2025" also includes improvements to AMCS Platform Finance automation, and enhanced IT security measures, the provider of solutions for Transport & Logistics, Resources & Recycling, and Safety (EHS) & Sustainability (ESG) emphasized.

■ More information about the AMCS Platform Spring 2025 update, including details about availability, can be found at amcsgroup.com/solutions/amcs-spring-release-2025/.

amcsgroup.com

ANDRITZ WITH A STRATEGIC ACQUISITION

Dutch company ATN Engineering B.V. now belongs to the international technology group Andritz. According to the Austria-based firm, by adding ATN's state-of-the-art degassing and de-oiling systems to its portfolio, this strategic acquisition would strengthen Andritz's position as "a global leader in recycling solutions". As reported, the Dutch firm is recognized as an innovator in the recycling sector with its drill head system, "which enables the safe and efficient removal of hazardous oil and gas from end-of-life refrigerators". The company also supplies feeding logistics and equipment for recycling industrial coolers, air conditioning equipment, and heat pumps. Furthermore, ATN provides engineering, manufacturing, installation, commissioning, and servicing of recycling equipment.

andritz.com

CDE WON CONTRACT FOR A PROJECT IN QATAR

Qatari company Advanced Technology Recycling (ATR) becomes the first company in the Gulf to invest in wet processing technology for C&D waste.

Photo: CDE

Northern Ireland-based company CDE, a leader in the design and engineering of wet processing solutions for the waste recycling and natural minerals processing sectors, has signed a deal with Advanced Technology Recycling (ATR).

"As the first company in the Gulf to invest in wet processing technology for construction and demolition (C&D) waste, ATR is setting a new standard for environmental responsibility in Qatar," the Irish provider emphasized the importance of this contract. The agreement, signed in December 2024, would see CDE supply "cutting-edge equipment enabling ATR to efficiently recover valuable resources from waste materials". As reported, Ali Al-Maadid, Executive Director of ATR, emphasized the company's mission to make recycling more accessible and reduce waste for future generations.

cdegroup.com

WASTE MANAGEMENT MARKET TO SURGE

Ireland-based ResearchAndMarkets.com has added the "Waste Management and Remediation Services Market Report 2025".

According to the information, this market is experiencing robust growth, driven by increasing waste generation and pressing environmental concerns. It is projected to grow from 762.9 billion US-Dollar in 2024 to 822.05 billion US-Dollar in 2025 at a compound annual growth rate (CAGR) of 7.8 percent. By 2029, the market is set to reach 1.07 trillion US-Dollar at a projected CAGR of seven percent. "This growth is spurred by circular economy initiatives, sustainability efforts, and advancements in technology," the market research store explained. "Major trends include the adoption of circular economy practices, development of green infrastructure, and enhanced e-waste management strategies."

Environmental regulations combined with the rise in urbanization and population growth have heightened the demand for effective waste management solutions. ResearchAndMarkets.com stated – referring to The World Bank – that annual waste generation is expected to hit 3.88 billion tons by 2050, "underscoring the urgency for efficient waste management and remediation services to mitigate environmental and health impacts. The expansion of mining activities further propels market growth, as these operations depend on effective waste management to ensure environmental compliance."

Photo: MSV, KI-generated

Western Europe leads the market, followed by the Asia-Pacific region. Other significant regions covered in the report would include Eastern Europe, North America, and Africa. The detailed market analysis would provide insights into the market size, regional shares, competitor strategies, and emerging opportunities, crucial for stakeholders aiming to thrive in this dynamic industry.

researchandmarkets.com

REFINITY WILL USE VTT'S TECHNOLOGY FOR ADVANCED RECYCLING OF MIXED PLASTIC WASTE

Recently, Innventure and Dow announced their plans to collaborate on the development and commercialization of new waste-to-value technologies through a company called Refinity. In January this year, USA-based Refinity, Innventure's newest company, announced the global licensing of rights from VTT Technical Research Centre of Finland for its proprietary fluidized bed advanced plastic waste conversion technology. The company intends to "use the licensed technology to commercialize the cost-effective conversion of mixed plastic wastes to chemical precursors, required in all petrochemical production, to replace fossil feedstock used for the precursors".

Refinity will work with VTT to optimize the technology for the conversion of different plastic waste feedstocks to sustainable chemicals that will replace fossil-derived chemicals, the information said. "The work will focus on increasing the yield of sustainable chemicals from plastic wastes that are not suitable for conventional thermochemical conversion or mechanical recycling and that are currently landfilled or incinerated. Refinity plans to scale up and deploy the technology in future commercial plastic waste-to-value conversion facilities."

As reported, VTT's technology transforms hard-to-recycle minimally sorted plastic waste directly into drop-in petrochemical raw materials, including olefins such as ethylene and propylene, and has been demonstrated at a pilot scale. Compared to conventional thermochemical processes, the innovative process concept would offer the conversion of mixed plastic waste into petrochemical precursors with higher yields and lower carbon dioxide emissions using easily scalable industrial process units. Refinity expects to integrate its manufacturing plants with existing petrochemical operations, unlocking the economics needed to support scalability to reshape the recycling landscape.

- refinity.com
- vttresearch.com

ELEMENTAL GROUP LAUNCHES CATALYST RECYCLING PLANT IN INDIA

Elemental Econrg India Private Limited – a new company formed by the merger of Elemental EMEA Global Trade Center DMCC and Econrg Systech Private Limited – will process used automotive catalytic converters in "the world's most rapidly growing new car market".

This branch of Elemental Asia began operations in India on February 3, 2025. The necessary plant equipment and specialized machinery for processing spent automotive catalysts (SAC) were imported from Poland. The company will primarily concentrate on the collection and processing of used catalytic converters, allowing Elemental to optimize its supply chain and effectively serve customers in the Indian market. Sales representatives will be responsible for building and maintaining customer relationships.

In 2025, Elemental Group's Indian company aims to process 130 tons of material at the new facility – and intends to increase the volume in subsequent years steadily. "The presence in India will strengthen the Group's market position and optimize the sourcing of raw materials from this promising market. As for post-production waste management, the company applies strict procedures for its disposal, in line with European environmental standards."

As stated by Elemental Asia, India's automotive industry ranks fourth in the world regarding production and value, as per 2022 statistics. "In 2023, the country, overtaking Japan, advanced to the position of the world's third-largest automotive market in terms of sales. The market scale is best illustrated by the numbers – according to CEIC Data, in 2022 there were more than 354 million motor vehicles registered in India, and annual production reached 5.5 million cars. In 2023, new car sales in the country reached 4.1 million units."

About Elemental Group and its companies

Elemental EMEA Global Trade Center DMCC is a key division of Elemental Asia, "supplying the largest volume of catalysts within the Asian group", the information says. "The company has representatives throughout the Middle East who are constantly developing a network of contractors and contacts. With its strategic location, large scale of operations, and team of experienced professionals, Elemental EMEA plays an important role in the group."

Econrg Systech Private Limited, on the other hand, is a well-established company operating in the Indian market. "Its long-standing presence has allowed it to gain trust and recognition, which facilitates expansion and outreach to large and smaller contractors who are distrustful of those outside India."

Elemental Asia is part of the Elemental Group. The company, which has been operating in the Asian market since 2019, specializes in the recycling of used automotive catalytic converters (SAC). The company currently has operations in Malaysia, Indonesia, Thailand, the United Emirates, as well as South Africa, and Australia, among others.

elementalasia.biz

USA:

CUPS AND CONTAINERS MADE WITH RECYCLED RESIN

The companies PureCycle Technologies, Inc. and Churchill Container have announced a new line of cups manufactured primarily with recycled PureFive resin. Churchill Container produces rigid plastic cups and buckets for clients in the sports, theater, and restaurant industries. As reported, the "Run It Back" line of cups and buckets contain up to 100 percent post-consumer recycled content. They are available to professional and collegiate sports teams looking to introduce sustainable souvenir items for their fans in 2025.

According to the information, PureCycle's PureZero program is designed to help sports teams, businesses, and educational institutions improve their recycling efforts through education and the implementation of best practices. In collaboration with the company's professional football partners, more than 700,000 pounds of waste material was recycled at the stadiums during the last two seasons.

Paper Market Analysis:

FOCUS ON PATHWAYS FOR CARBON NEUTRAL MANUFACTURING

With a report on "CO_2 Neutral Paper Market – A Global and Regional Analysis: Focus on Effective Pathways for Carbon Neutral Pulp and Paper Manufacturing", ResearchAndMarkets.com has expanded its offered spectrum. As consumer and corporate goals regarding sustainability grow more stringent, this market is poised for accelerated expansion, the market research store informed. "By 2025, major paper producers worldwide are prioritizing carbon neutrality via renewable energy usage, improved pulp processes, and offset programs (e.g., reforestation, carbon credits). Legislative and consumer-driven pressure to reduce plastic packaging intensifies demand for low-impact paper solutions, boosting the appeal of carbon-neutral labels. Over the coming decade, deeper adoption of next-generation technologies – like advanced recycling, digitally enabled supply chain monitoring, and biomass-based pulping – will improve carbon footprints across the entire paper life cycle, including raw material sourcing and end-of-life disposal." Simultaneously, brand owners would increasingly opt for carbon-neutral or low-carbon paper for packaging, tissue, newsprint, and specialty grades, as they align with net-zero commitments, the information said. However, cost premiums may persist in the short term. However, ongoing innovation and economies of scale would likely make CO_2-neutral paper more financially competitive because of the expanded accessibility to smaller manufacturers and new applications beyond traditional packaging and printing.

Key market dynamics

As reported by ResearchAndMarkets.com, a standout trend is the expansion of net-zero or low-carbon certification frameworks specific to pulp and paper. Organizations increasingly adopt recognized standards (e.g., CEPI, CITPA guidelines), enabling thorough carbon footprint calculations and communicating climate-friendly attributes to consumers. "This fosters transparency in the supply chain and drives more consistent comparative metrics for environmental claims."

The demand for eco-friendly packaging and paper is also a driver. As single-use plastics face bans or taxes, retailers and consumer goods companies would turn to paper-based alternatives. Achieving carbon neutrality in these paper products further amplifies their environmental advantage, resonating strongly with policy and consumer preferences, the authors of the analysis are convinced.

Despite momentum, incremental production and certification costs can limit the immediate uptake of CO_2-neutral paper. "Sourcing green energy, investing in carbon offsets, or implementing advanced recycling techniques raises overhead, leading some producers to maintain conventional methods – unless brand owners or end consumers are willing to pay a premium." However, advancements in low-carbon pulping technologies and biomass energy would represent a significant opportunity. "Mills switching to closed-loop processes, advanced enzymatic treatments, or black liquor gasification can drastically cut GHG footprints. These enhancements, paired with robust reforestation or offset projects, allow companies to brand themselves as carbon-neutral or net-negative, unlocking premium market segments and forging competitive differentiation in an increasingly sustainability-focused industry."

researchandmarkets.com

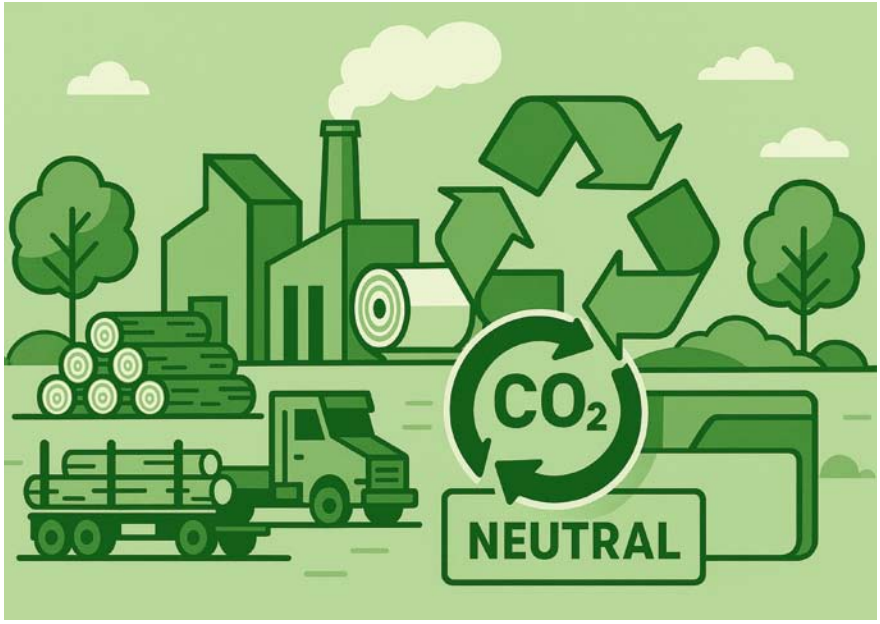
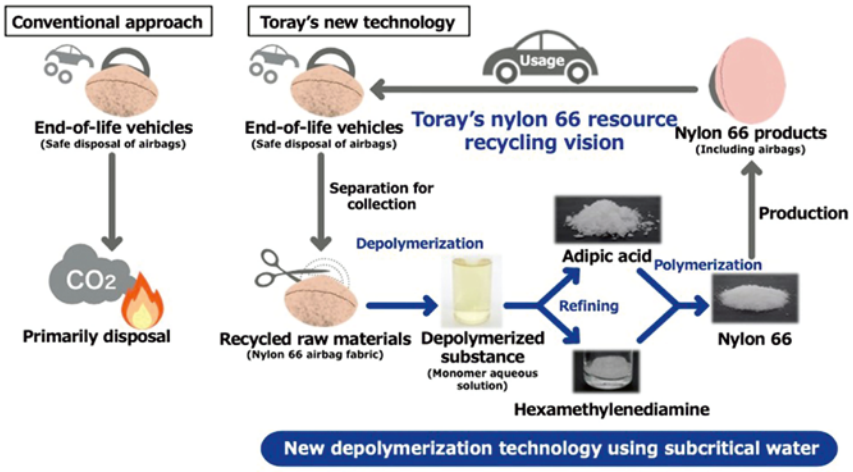


Photo: MSV (AI-generated)

TORAY ACHIEVED A BREAKTHROUGH IN RECYCLING NYLON 66

According to Japanese company Toray Industries, Inc., it has deployed a proprietary technology using subcritical water to depolymerize nylon 66 "uniformly and efficiently in just minutes, and recover it as a raw monomer material". Subcritical water is described as water "in a high-temperature, high-pressure state, just below the critical point of water (374°C, 22 megapascals). It differs from water at normal temperatures and pressures in several ways, such as by dissolving and hydrolyzing organic compounds".



Source: Toray

Toray reports that the demand for nylon 66 is estimated at 100,000 metric tons annually in Japan and 1.3 million tons worldwide. "Its high heat resistance and strength make it essential for automotive and industrial applications. These include automotive textiles such as airbags and tire cords, and plastic components such as radiator tanks, cylinder head covers, and oil pans. Tighter recycling regulations for automotive and other plastics in Japan have made it mandatory to collect used nylon 66-based airbags, making it a promising material for chemical recycling."

Chemical-recycled nylon 6 for which demonstration efforts are underway, entails recovering a monomer called caprolactam, the information said. "Contrastingly, the process for chemical-recycled nylon 66 requires recovering hexamethylenediamine and adipic acid monomers. Toray drew on its expertise in nylon 6 chemical-recycled technology to assess the depolymerization reaction of nylon 66 in subcritical water. It developed a proprietary technology to suppress side reactions, making it possible to efficiently recover high yields of those two monomers and regenerate nylon 66 through re-polymerization. Using Toray's technology to make nylon 66 should halve carbon dioxide emissions compared with production from petroleum-based sources."

The company is particularly focused on automotive materials, establishing technologies to separate other materials in such used equipment as airbags, and technologies to depolymerize nylon 66 and separate and refine monomers. Furthermore, Toray plans "to set up a framework to verify quality and evaluate customers through sample work. It will prepare for full-fledged mass production in around 2030 when stricter plastic recycling regulations are enacted."

The company intends to develop nylon recycling technologies for both nylon 6 and nylon 66. "It plans to broaden its chemical-recycled technologies beyond apparel and automotive materials to other industrial applications to help create a circular economy and contribute to carbon neutrality."

toray.com/global

NEW DISTRIBUTION PARTNER IN ITALY

Nordson Corp.'s Polymer Processing Systems (PPS) division – a global supplier of melt delivery and pelletizing solutions, as well as polymer and fluid coating die systems – has announced an expansion of its sales agent network in Europe "to boost global support for its BKG melt delivery and pelletizing customers". FIMIC Srl., a manufacturer of self-cleaning melt filtration systems for the plastics recycling and extrusion markets, has been appointed the exclusive agent for Nordson's BKG products in Italy. "This strategic partnership combines the expertise of two industry leaders, aiming to strengthen the Nordson BKG brand and provide enhanced solutions to the Italian plastics processing market", the press release said.

nordson.com/en/divisions/polymer-processing-systems

ECOREFIBRE PROJECT ENTERS FINAL PHASE

In April this year, partners in the EcoReFibre research project met at Dieffenbacher headquarters in Germany to review progress and plan the next steps toward developing processes for recycling end-of-life fiberboards and using recycled wood fibers to produce new fiberboards. The project was launched in May 2022 and is scheduled to end in May 2026.

During the meeting, the company presented the two key steps of its Fiber2Fiber preparation process. Project partners then saw demonstrations of the company's process for using steam to extract fibers from post-consumer fiberboard chips and its system for cleaning recycled fibers of impurities. At last year's EcoReFibre meeting, the company demonstrated its dry process for fiberboard recycling.

EcoReFibre partners inspecting freshly produced fibers from post-consumer fiberboard chips

Photo: Dieffenbacher

"With a throughput of more than 1,200 kg/h, our Fiber2Fiber process has exceeded the ambitious process target of 500 kg/h," Michael Rupp, who leads Dieffenbacher's Recycling Business Unit, was quoted. "This makes us optimistic that the EcoReFibre project will achieve its goals next year, giving an enormous boost to fiberboard recycling on an industrial scale."

Funded by the European Union, the EcoReFibre ("Ecological solutions for recovery of secondary materials from post-consumer fiberboards") research project includes 20 organizations from seven countries.

dieffenbacher.com/recycling/ecorefibre
ecorefibre.eu

Photo: MSV (AI-generated)

ICELAND IS REDUCING LANDFILL WASTE

As reported by Statistics Iceland in February this year, less than ten percent of waste went to landfill sites in 2022. More recent data is not yet available.

In that year, the Icelandic waste processing facilities received 1.581 million tons of waste, Statistics Iceland, the center for official statistics in the country, informed. Of this quantity, 1.420 million tons were recovered, while 147,000 tons were sent to landfill sites. This was 9.3 percent of the total amount processed.

The largest portion of material received was earthen material, gravel, and other material that could be allocated as filling material, which is considered reuse and therefore recovered material. “The proportion of material used for filling has been around 50 percent of the total weight in the preceding years, but was 60 percent of the total in 2022.” Other recycling was 19 percent, and other reuse was nine percent.

Iceland has made significant progress in reducing mixed urban waste sent to landfills since 2019, when almost all mixed urban waste was either landfilled or burned without energy recovery. This category consists of mixed waste from households, community disposal centers, and businesses that are not required to return their waste separately. In 2019, nearly 219,000 tons of waste were sent to landfills – 140,000 tons was mixed urban waste. By 2022, this sort of landfilling had decreased by more than half to about 68,000 tons, Statistics Iceland gave account. “However, in 2022, about 39 percent of mixed urban waste was sent abroad for energy production, which counts as material recovery.”

2023: A new law on waste

In January 2023, the new law on waste in Iceland took effect and came into force at the end of that year. According to the website https://urgangur.is/, it is one of those laws, which are often called “The circular law” (in Icelandic hringrásarlögin). The aim is to reduce the amount of waste

generated and promote the creation of a recycling society in the country.

The legal changes were:

- The same sorting system is used throughout the country. Households are to sort waste into at least seven categories: paper, plastic, bio-waste, textile, metals, glass, and hazardous waste.
- The same waste sorting symbols is used for bins and waste containers throughout the country to simplify classification and make it more efficient.
- The local authorities started collecting fees for waste management according to a usage-pricing model known as "Pay as you throw".
- Workplaces must also sort their waste into seven categories.
- Construction and demolition waste must be sorted into at least the following categories according to the new law: hazardous waste, wood, minerals, metal, glass, plastic and plaster.
- A recycling fee was applied to more packaging, ensuring that manufacturers and importers cover the costs of collecting and recycling packaging.

As described by the Icelandic Ministry of the Environment, Energy and Climate, the national Environment and Energy Agency is responsible for enforcing legislation on waste treatment. "Treatment of waste is aimed at minimizing its production and utilizing resources optimally through waste prevention measures, reusing whatever is possible, recycling of waste materials, utilization of waste for energy production, and finally, disposal where no other routes are possible." The Icelandic Recycling Fund would handle the administration and allocation of waste treatment fees. Regarding the nationwide system of recycling fees for all disposable drink containers, Recycling Ltd. handles the receipt of drink containers, payment of recycling fees for their return, and prepares their export and sale for recycling.

2024: A warning report regarding recycling targets

According to a report by the EFTA Surveillance Authority (ESA) in October 2024, Iceland, as well as Liechtenstein and Norway, would risk missing some of the 2025 targets for the preparation for re-use and recycling of municipal waste, and for the recycling of packaging waste. To support the green transition in the European Union, targets to increase the preparation for re-use and recycling are set under EU waste legislation that has been incorporated into the European Economic Area (EEA) Agreement. As stated, the ESA early warning report is to identify shortfalls and assist the EEA EFTA states in meeting their recycling targets. It is

Iceland, its memberships and participations

As underlined by the Icelandic government, the about 103,000-square-kilometer insular country is closely connected to other European countries in a historical, political, and cultural sense. "Although Iceland is not a member of the European Union (EU), its relation to the EU is mainly based on the EEA Agreement, which came into effect in 1994. The member states of the European Union (EU) are Iceland's most important economic partners, and the majority of Icelanders working and studying abroad do so in Europe. The Agreement on the European Economic Area (EEA Agreement) is therefore a vital part of Iceland's foreign policy," the information says.

Iceland is also a member of the European Free Trade Association (EFTA). This means that the EU member states, together with three of the EFTA states – Iceland, Liechtenstein, and Norway – make up the EEA Contracting Parties (the EEA states); Switzerland is also a member of EFTA, but is not party to the EEA Agreement. "However, in the EEA Agreement and the legal texts linked to it (e.g., Joint Committee Decisions), the term "EFTA states" refers to the three EEA EFTA states and is understood to exclude Switzerland," one can read on the association's homepage (🌐 https://www.efta.int/eea-relations-eu/eea-institutions-two-pillar-structure/eea-efta-states).

According to the Icelandic government, the EEA Agreement unites the EU member states and the three EFTA EEA states "into one single market governed by the same basic rules. These rules cover the so-called four freedoms: free movement of goods, capital, services, and persons, and competition rules." Furthermore, Iceland has implemented the Schengen Agreement since 25 March 2001, which ended internal border checkpoints and controls. Citizens of countries implementing the Schengen Agreement can cross the internal borders of the implementing countries at any point without checks.

🌐 government.is/topics/foreign-affairs/iceland-in-europe/

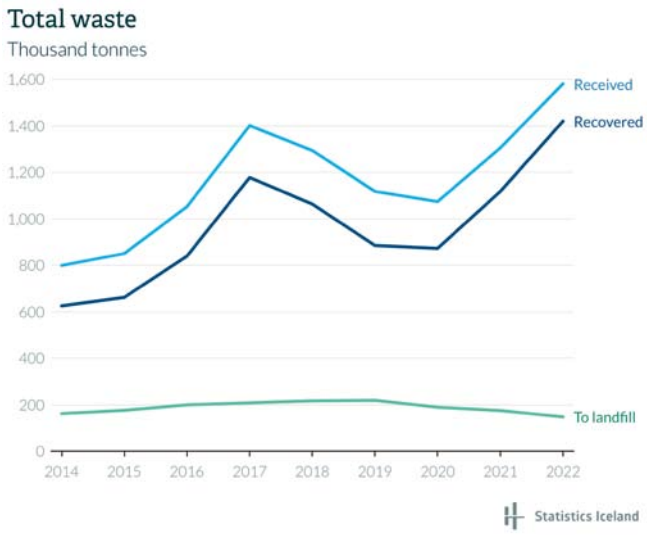
based on underlying assessments by the European Environment Agency, and follows the same approach and methodology as for the European Commission's assessment of the EU member states. According to the publication (https://www.eftasurv.int/cms/sites/default/files/documents/gopro/Early%20Warning%20Report.pdf), the EEA EFTA states generate significantly higher amounts of municipal waste per person compared to the EU average of 532 kilograms (kg) in 2021. Iceland generated the least amount of municipal waste per person with 659 kg in 2021 (Norway: 736 kg, Liechtenstein: 869 kg).

Iceland is "at risk of missing the municipal waste target, total packaging waste target, as well as the material-specific targets for ferrous metal packaging, glass packaging, and plastic packaging. Despite a decrease in its landfill rate of municipal waste between 2017 and 2021, the 2035 landfill target remains of concern," the surveillance authority wrote in a factsheet. In 2021, the Icelandic municipal waste recycling rate was 26 percent, while the EEA 2025 target was 55 percent. The situation is similar regarding packaging waste. The recycling rate was 49.8 percent; the 2025 target in the European Economic Area (all 27 EU countries plus Iceland, Liechtenstein and Norway) is 65 percent.

As main challenges and opportunities, ESA identified:

- Assess and precisely define the needs for bio-waste treatment facilities, to ensure sufficient capacities also for the future.
- Implement the planned ban on landfilling of bio-waste.
- Consider financial penalties for municipalities that fail to meet recycling targets.

The report also includes some positive aspects. "Iceland applies a labelling system common to the Nordic countries.



Harmonized pictograms facilitate the sorting of waste and incentivize recycling. Iceland took the lead in developing standardized pictograms for beverage packaging with deposits," the EFTA Surveillance Authority commended the country's initiative. Furthermore, the Icelandic Environment Agency had published a handbook on the implementation of waste management to help guide the municipalities. "The handbook is regularly updated to reflect legal developments and received feedback."

Investment opportunities

Foreign direct investments are welcome in the Nordic states. According to the website Invest in Iceland, which is part of Business Iceland (a public-private partnership established to improve the competitiveness of Icelandic companies in foreign markets and to stimulate economic growth through increased exports), the country offers a wide variety of business opportunities within different sectors and regions of Iceland. "A growing number of investors are acquiring stakes in Iceland's dynamic, high-tech enterprises or making strategic purchases in production and services related to their international activities. Investors have found an investor-friendly environment with high professional standards in all the support services that a business launch needs," one can read on the homepage (https://www.invest.is).

As underlined, sustainability is a crucial factor, and with 100 percent of electricity production and space heating from renewable hydro or geothermal resources, Iceland can score in the energy sector. "Incentives for green investments and emphasis on fully utilizing all energy and value streams, be it from geothermal power plants or the seafood industry, have generated exciting opportunities." Eco-industrial parks are developing based on geothermal resources. Combining multiple value streams from geothermal power plants would provide opportunities to create sustainable inputs to diverse processes. Some examples are

- Microalgae cultivation utilizing sustainably sourced electricity, geothermal energy, and CO_2.
- Waste-to-value food processing or cultivation based on geothermal heat.
- Liquid fuel production using electricity and CO_2.
- Algae-based cosmetic production.

Export sectors

Moreover, Business Iceland, which has several agreements with the Ministry of Culture and Business Affairs, will continue to support the international reach of the six key areas: Energy & Green Solutions, Innovation, Creative Industries, Tourism, Fisheries, and Food & Natural Products. For more information: https://www.islandsstofa.is/en.

Recommendation for the Nordic Countries:

STRONGER WASTE PREVENTION MEASURES

In a new report commissioned by the Nordic Council of Ministers' Nordic Working Group for Circular Economy, Sweco – one of Europe's leading architecture and engineering consultancies – recommends more measures.

The study, which aimed to identify realistic and effective measures to strengthen waste prevention and the promotion of reuse in the Nordic region, suggests that the governments of Sweden, Denmark, Norway, Finland and Iceland, as well as the Faroe Islands, Greenland and Åland should implement more systematic waste prevention strategies to achieve regional and national sustainability goals. "The report outlines practical measures to strengthen the circular economy in the Nordics, with a particular focus on waste prevention and reuse," Sweco (🌐 swecogroup.com) informed.

As stated, the Vision 2030 is to turn the Nordic region into the most sustainable and integrated region in the world. The Nordic countries would have programs and plans in place that include improved waste management as one element of realizing that vision. In addition to the Nordic ambitions, several recent EU regulations are focusing on minimizing waste in several segments of product value chains. Given global climate and biodiversity challenges, the Nordic Council of Ministers had engaged an internationally active architecture and engineering consultancy to provide expert recommendations on accelerating waste prevention across the region. "The project, which centers on municipal waste, was conducted by a team of Sweco experts from Finland, Sweden, Denmark, and Norway."

According to the study titled "Waste Prevention in the Nordics", the team evaluated and analyzed prevention and reuse measures with a focus on their impact (reducing the quantity of waste, reducing the adverse impacts of waste and/or harmful substance content) and feasibility (ease of implementation and monitoring as well as applicability to the Nordic region). "Within municipal waste, the waste fractions of textiles, consumer electronics, and plastic packaging were specific focus areas."

Source: The Nordic Council of Ministers

In the Nordic countries, there is no systematic approach to implementing waste prevention and reuse policy, the expert team gave account. "An in-depth case study on economic steering instruments was conducted for the textiles value chain. It looked into the potential of implementing value-added tax (VAT) reductions for repair services and secondhand products, fees for fast fashion, and research and development (R&D) funding for developing new circular business models."

Transitioning to a circular economy

The study would emphasize that transitioning to a circular economy requires a fundamental shift from recycling-focused policies to a holistic approach that addresses the entire product lifecycle. "Sufficiently stringent economic instruments are critical for overcoming the market and cultural barriers that sustain linear economies. However, economic measures alone are rarely impactful enough when implemented in isolation. Instead, policymakers must adopt a comprehensive 'toolbox' approach, combining multiple measures rather than relying on any single solution to drive significant change," the executive summary informed.

"The study concludes that achieving the Nordic Vision 2030 of becoming the world's most sustainable and integrated region necessitates a well-designed policy mix. This includes aligning extended producer responsibility (EPR) with economic and regulatory measures, supported by informational guidance, to create a favorable environment for a circular economy." Additionally, targeting the early stages of the product lifecycle would be crucial for addressing waste prevention effectively.

■ More information about the study: 🌐 https://pub.norden.org/temanord2025-502/temanord2025-502.pdf

DENMARK IS LOOKING FOR SOLUTIONS, PARTNERSHIPS, AND PROJECTS

"Denmark is committed to the EU targets to increase recycling of municipal waste to 55 percent in 2025, 60 percent in 2030, and 65 percent in 2035", says an Action Plan for Circular Economy edited by the Ministry of Environment of Denmark in 2021.

That seems questionable since the Circularity Gap Report on Denmark revealed a very high material consumption in 2023 – 24.5 tons of virgin materials per person per year, compared to the European average of 17.8 tons per capita. The European Environment Agency computed a waste generation of 814 kg in 2020, compared to the European average of 517 kg per capita. So, how will Denmark reach its self-defined targets?

Danish waste is delivered by four sources, which are nearly equally distributed: building and construction, households, power stations, sewage treatment plants, and incineration plants, as well as Industry and – by eight percent – trade, offices, and institutions. Landfill sites, incineration plants, and Kommunekemi, the main plant for hazardous waste disposal, are all owned or controlled by public authorities.

In one waste system

In 2022, the Danish waste totaled 12.2 million tons and was composed of 3.2 million tons of household waste and 9.0 million tons of industry waste, the latter mostly comprised nearly 4.0 million tons of construction waste. Figures for 2015 showed that mixed construction waste made up 28 percent, mixed municipal waste 13 percent, waste suited for incineration 12 percent, and biodegradable waste ten percent. Recyclable materials were metals (eight percent), paper and cardboard (six percent), wood (four percent), electronics and batteries (one percent) as well as plastic and tires (one percent). Hazardous waste amounting to 88,000 tons was produced by oil refineries and the manufacture of chemicals and pharmaceuticals. Unlike other countries, Denmark has chosen to handle household and industrial waste, including packaging and hazardous waste, in one waste system.

More exports than imports

The official Danish Affaldsstatistik gave account, that in 2022 recycling and recovering of Danish waste added to 9.017 million tons or 74 percent of all waste. 2.742 million tons or 22 percent were incinerated, while 430,817 tons equaling four percent ended at landfills. The Circularity Report on Denmark, edited in August 2023, spoke of around 46 percent 'technically' recycled, 22 percent incinerated, two percent landfilled and the remaining 30 percent of waste treated in wastewater treatment plants or spread on land. According to the World Bank, Denmark in total exported waste and scrap, stainless steel with a value of 86.494 million US-Dollar. Altogether Denmark exports 1.9 to 2.4 million tons of waste and thus much more recyclable waste than imports of 0.6 to 1 million tons, says the Circularity Report.

A path dependency effect

It must be taken into account, that there is a difference between the treatment of total waste and household waste – with impacts on the recycling rate. While waste in general is incinerated by 25 percent, household waste is burned by 46 percent. Although these high rates are "a hallmark feature of the Danish waste system", incineration "is on the verge of becoming unfashionable", surmises an article of the Symsites Project. Because incineration is "neither a suitable strategy for circular economy nor aligned with the EU waste hierarchy". It might create a path dependency effect: "Municipally-owned waste

Photo: MSV (AI-generated)

incineration plants have excess capacity and domestic recycling infrastructure is limited", says the article. With bad consequences: According to the local online magazine Copenhagen Post in 2020, Denmark has 23 state-of-the-art incinerators that not only burn domestic waste but also need waste from outside: In 2016, Denmark imported about 364,000 tons of waste to incinerate, resulting in about 36 million tons of CO_2 emissions.

New agreement needed

Meanwhile, the wind begins to change. "It's time to stop importing plastic waste from abroad to fill empty incinerators and burn it to the detriment of the climate", climate Minister Dan Jørgensen was cited by the Copenhagen Post in 2020. "For 15 years we failed to solve the waste incineration dilemma", he underlined. A new agreement is needed to increase recycling and reduce burning. So if – for example – the waste incineration plant at the ambitious Bornholm waste project might be decommissioned and waste incineration, as well as landfilling, would be completely phased out, another path of waste disposal must be found, online newspaper Politico cited Claus Bøgeskov Mogensen, the technical director of the Maabjerg energy center in Holstebro. He is sure that the closure of incinerators will lead to a completely new lifestyle and needs alternative design products. He called the situation a "devilish dilemma."

In search

Denmark is looking for solutions, partnerships, and projects.

- In 2022, the Innovation Fund Denmark, for example, granted 106.5 million Danish Kroner (14.27 million Euro) to a mission-driven project of 92 partners to ensure a domestic circular economy for plastics and textiles.
- In 2022, Vitol entered into a strategic partnership with Danish company WPU, which recycles waste plastic into plastic oils. The combined capacity of these plants will be 160,000 metric tons of waste plastic a year.
- In 2023, the Norwegian Pyrolysis company Quantafuel planned a first-of-its-kind plastic sorting facility for 60,000 tons of plastic in Denmark.
- In 2024, German environmental service provider PreZero built a new sorting plant for lightweight packaging in cooperation with the Danish company Solum in Holbæk.
- In 2024 ReSource Denmark – a joint venture between the Norwegian chemical recycler Quantafuel (now owned by UK-based Viridor) and the financial investor Eurazeo – opened Nordic's largest plastic sorting facility.
- In December 2024 impact investment firm Summa Equity combining with NG Group announced an 800 million Euro acquisition of Fortum Recycling & Waste to establish the Nordic leader in the circular economy by combining the strengths of both entities.

Infrastructural Fund

According to PitchBook – a platform for private market information –, there is a Danish Waste Management Fund located in Copenhagen and investing in Denmark. The infrastructural fund will pursue minority investments, with checks starting at 25 million US-Dollar for companies and valued at US-Dollar 100 million or more. The fund seeks impact investments relating to waste sectors.

UK INCINERATION BOOM COULD RESHAPE EUROPE'S WASTE FLOWS

Kjetil Vikingstad – Founder and Head of R&D at Norway-based Geminor – examines in this article the broader implications of the United Kingdom's rapidly growing Energy-from-Waste (EfW) capacity: The UK is on the brink of a significant shift. Over the next two years, between four to five million tons of new EfW capacity will come online – alongside rising landfill taxes that could release up to seven million tons of waste. Whether the UK becomes a net importer or exporter depends on available feedstock. Market dynamics, seasonal shifts, and waste composition will decide the balance – bringing both opportunity and risk across Europe's waste flows.

At Geminor, we've worked in this flow for years. I've seen how the UK's excess waste has supported plants across the Nordics, the Netherlands, and Germany. However, with a sharp increase in treatment capacity, more waste will be handled domestically. Depending on seasonal and market dynamics, there may be periods when imports are needed to maintain operational efficiency in UK facilities.

This evolution could be felt beyond UK borders. Operators in Northern Europe that previously depended on British Refuse Derived Fuel (RDF) may begin looking toward Southern and Eastern Europe, where up to 100 million tons of waste are still landfilled annually. Yet accessing these markets is not straightforward. Infrastructure constraints, transport costs, regulatory variation, and compliance challenges all add layers of complexity that must be navigated.

Meanwhile, the UK still landfills around seven million tons of waste yearly. However, a key question

Kjetil Vikingstad

Photo: Geminor

remains: How much of that landfilled waste is suitable and economically viable for energy recovery? EfW plants are designed for low-calorific household and commercial waste streams. If the quality being landfilled today is suited for modern EfW plants, it could be treated domestically or exported, depending on the volumes available. Understanding this is essential for aligning capacity, infrastructure, and long-term waste strategies.

In the UK, as in other parts of Europe, the push for circularity is accelerating with the rollout of new EfW capacity – reshaping residual waste and complicating operations. As source separation, mechanical sorting, and advanced recycling technologies improve, more high-value materials are removed upstream, typically leaving a less consistent, lower-calorific waste stream for incineration. At Geminor, we're observing increased interest in Carbon Capture technologies, particularly for biogenic waste streams with negative emissions potential. However, these technologies' effectiveness and economic viability partly depend on stable feedstock and predictable biogenic carbon content, which may become increasingly variable as sorting advances. This variability could directly impact plant efficiency and complicate long-term planning for carbon capture infrastructure.

These operational shifts highlight the growing need for policy alignment. The UK is exploring its own carbon tax or emissions trading scheme. Still, if this diverges from the EU ETS, it could disrupt cross-border investments in energy recovery infrastructure, Carbon Capture Storage (CCS) deployment, and broader circular economy systems. Introducing CCS may also lead to significantly higher gate fees for waste deliveries due to higher capital and operating costs – posing financial challenges for municipal and inter-mu-

Geminor was the UK's Largest RDF Exporter in 2024

The latest RDF Activity Report from Footprint Services for December 2024 had confirmed that Geminor was the UK's largest exporter of Refuse-Derived Fuel (RDF) last year.

In 2024, Geminor UK managed a total of 645,947 tons of waste, including 90,000 tons from Ireland. "With 364,581 tons exported to European markets, the remaining 191,366 tons were allocated to domestic offtakers, highlighting the strategic balance between exports and local waste-to-energy solutions," the internationally active company gave account. This flexibility would allow Geminor to adapt to evolving market conditions, ensuring consistent waste management solutions for its partners.

nicipal companies already operating under budget constraints. For many, the viability of adopting CCS may depend on developing carbon dioxide removal (CDR) frameworks, where negative emissions – particularly from biogenic sources – can generate tradable carbon credits. If recognized in future regulatory systems, these credits could play a key role in offsetting costs and supporting scalable decarbonisation in the sector.

Recognizing these shifting dynamics underscores the necessity of harmonized practices across borders. As national waste systems evolve independently, the demand grows for shared standards: consistent waste documentation, cohesive TFS legislation, a clear application of the polluter-pays principle, and aligned carbon accounting. Without this, Europe risks fragmentation just when coordinated action is most critical.

Ultimately, EfW will continue to play an essential role in Europe's circular economy, particularly for non-recyclable waste. However, successfully managing the UK's transition will require more than capacity alone. It demands joined-up thinking across markets, technologies, and policies to build a more resilient and integrated European waste system.

geminor.no

THE MARKET FOR PLASTIC PALLETS IN THE UNITED ARAB EMIRATES

According to new research published by India-based Astute Analytica, the United Arab Emirates (UAE) plastic pallets market was valued at 103.09 million US-Dollar in 2024 and is expected to reach 174.47 million US-Dollar by 2033, growing at a compound annual growth rate (CAGR) of 6.25 percent during the forecast period 2025–2033.

As stated by the market research and advisory firm, the UAE plastic pallets market stands at the "cusp of a transformative era, driven by a confluence of factors that underscore its pivotal role in the nation's economic landscape. This trajectory is not merely a statistical anomaly but a testament to the sector's resilience and adaptability in the face of evolving market demands." The predicted market expansion would highlight the sector's potential for sustained growth. "This surge is underpinned by the UAE's strategic positioning as a global logistics hub, coupled with its burgeoning manufacturing sector." The UAE's commitment to sustainability is reshaping the landscape of plastic pallets manufacturing, "heralding a new era of eco-conscious production and consumption", Astute Analytica said. "This paradigm shift in the UAE's plastic pallets market is not merely a response to global environmental concerns but a strategic imperative aligned with the nation's vision for a sustainable future. The government's proactive stance in phasing out single-use plastics and promoting eco-friendly alternatives has created a ripple effect across industries, with the plastic pallets sector emerging as a frontrunner in adopting sustainable practices. This transition is further bolstered by the UAE's ambitious goal of achieving net-zero carbon emissions by 2050, a commitment that has galvanized industries to reimagine their operational frameworks." In response to these initiatives, plastic pallet manufacturers in the UAE plastic pallets market would increasingly incorporate recycled materials into their production processes, with some companies reporting up to 70 percent recycled content in their products.

Photo: MSV (AI-generated)

"This shift towards circular economy principles is not only reducing the environmental footprint of the industry but also opening up new avenues for innovation and competitive differentiation. The adoption of advanced recycling technologies has enabled manufacturers to produce high-quality pallets from post-consumer plastic waste, effectively closing the loop on plastic consumption." Furthermore, the industry would be witnessing a surge in demand for biodegradable and compostable plastic pallets, with market research indicating a 25 percent year-on-year increase in sales of these eco-friendly alternatives.

astuteanalytica.com/inquire-before-purchase/uae-plastic-pallets-market

Photo: Messe Düsseldorf

PLASTICS AND CIRCULARITY – CAUGHT BETWEEN NECESSITY AND POTENTIAL

K 2025 from 8 to 15 October in Düsseldorf (Germany) – according to the organizers "the world's No. 1 trade fair for the plastics and rubber industry" – has set itself the goal of addressing the central issues of our times. One of its three "Hot Topics" reads "Shaping the Circular Economy". For the exhibition team, this was reason enough to shed some light on the current state of affairs in terms of circularity ahead of this international event.

The world is experiencing a raw material crisis: more than 100 billion tons of raw materials are consumed annually but over 90 percent of the raw materials used are not recycled. An alarming ratio flagged up by the European Investment Bank (EIB). Rising CO_2 costs, volatile raw material prices, and geopolitical insecurities put additional pressure on companies to manage resources more carefully.

Circularity is considered the decisive lever for achieving a sustainable future. An analysis by management consultancy Material Economics shows that Europe could save 450 million tons of CO_2 equivalents through closed material cycles by 2030 – this corresponds to eight percent of the current emissions. In the long term, the Ellen MacArthur Foundation forecasts that up to 45 percent of emissions could be avoided by a closed-loop circular economy.

This transformation also holds enormous economic potential: according to estimates by consulting group EY, the use of secondary raw materials reduces energy consumption by 20 to 90 percent, saves large amounts of water, and could save European firms up to 465 billion Euro in material costs per year. The International Labour Organisation (ILO)

also expects seven to eight million new jobs to be created worldwide by the transition to a circular economy by 2030. More and more use cases show that circularity makes not only ecological but also economic sense. For instance, the German Cabka Group annually produces pallets and crates from some 150,000 tons of recycled plastics by their accounts – proving thereby how waste can be turned into valuable products.

Plastics industry: A key sector with catching up to do

The plastics industry plays a pivotal role in this transformation. In 2023, 413.8 million tons of plastics were produced worldwide, according to Plastics Europe, but the share of recycled materials continues to be low: only 8.7 percent of plastics were recycled – most of them by mechanical recycling – whereas the lion's share was incinerated or landfilled. This is happening even though recyclates hold enormous potential. Their production requires markedly less energy than producing new products from fossil raw materials, thereby substantially reducing CO_2 emissions. On top of this, their use increases supply security – a factor of rising importance in times of geopolitical crises.

However, recycling is technically demanding – and often more expensive than producing new plastics. After all, post-consumer plastics have to be sorted, cleaned, and prepared with great effort. In addition, the legal requirements are strict, high-quality recyclates are scarce and many processes are energy-intensive – all resulting in higher production costs compared to new plastics. "But nobody wants to pay higher costs," stresses Ulrich Reifenhäuser, Chairman of the K Advisory Board. "Plastics are so successful because they are so much better than other materials. But the transition to the circular economy costs money. This cost issue will not be overcome without regulatory requirements." However, the responses to the question of how the transition to a functioning circular economy will work vary by country.

Europe looks to regulation

While other nations focus on voluntary commitments and market-oriented solutions, Europe regulates by law. Strategies such as the "Circular Economy Action Plan" (CEAP) and regulations such as the Packaging and Packaging Waste Regulation (PPWR) and the Single-Use Packaging Directive (SUPD) drive the transition to circularity using recycling rate, mandatory recyclate content, and Extended Producer Responsibility (EPR). The PPWR shows how this works: since 2025 single-use PET bottles have to contain a minimum of 25 percent recycled plastic and this percentage will go up 30 percent by 2030. For manufacturers such as Coca-Cola or Nestlé, this means rebuilding their supply chains, sourcing high-quality recyclates, and adapting production – otherwise, they run the risk of a sales ban. The SUPD is also having an impact: in Lithuania the return rate of PET bottles shot up from 34 percent to 92 percent after introducing a deposit system – all within just two years". Companies face major challenges in the process: the limited availability of high-quality recyclates, the technical complexity of changing over to a recycling-friendly design – and the short deadlines set for complying with these often-complex requirements.

Chemical ingredients are also increasingly moving into the focus of the EU. The handling of PFAS is especially disputed since a ban could make recycling considerably more difficult – because plenty of waste plastics would then be classified as contaminated and eliminated from the circular economy. Wolfgang Große Entrup, Director General of the Association of the Chemical Industry e. V. (VCI), therefore warns against a blanket ban: "With each individual substance banned in the EU the risk grows that more of our industry players move to less regulated regions. This, however, does not solve the original problem."

Asia: Between advances and structural deficits

Accounting for 53 percent of global plastics production Asia is the main player and source of plastic waste. While some countries pursue ambitious recycling strategies, others lack the basic infrastructure.

China's circularity offensive: centrally controlled, consistently implemented

For a long time, China was the biggest importer of plastic waste, and now the country is recharging its course. By adopting its "National Sword Policy", the country has stopped the imports of unsorted plastic waste and is now driving the expansion of its recycling structures. The 14th five-year plan focuses on modern collection and sorting systems and promotes both mechanical and chemical recycling. By 2035, the industry aims to be largely decarbonised and have transitioned to closed material cycles. This strategy is accompanied by the "Circular Economy Promotion Law", which obliges companies to take back and safely dispose of specific products and the establishment of the state-owned "China Resources Recycling Group" to centrally control the transformation.

Japan and South Korea: Driving technology systematically

Japan and South Korea are among the pioneers in the circular economy – not least due to clear political objectives and early-adopted legislation. In Japan, the "Container and Packaging Recycling Act" has already obliged companies

since the 1990s to participate in return and recycling systems. This is supported by the "Plastic Resource Circulation Act" adopted in 2022, which promotes recyclate use and prescribes detailed recycling plans for plastic products.

South Korea pursues a systemic, technology-driven approach via its new "Act for Promotion of Transition to a Circular Economy Society" (APTCES): binding recycling rates, clear requirements for sustainable product design as well as targeted regulation for hard-to-recycle products. In addition, companies wanting to place new recycling technologies on the market are temporarily exempted from restrictions.

Unlike Europe, these two countries are banking on clear responsibilities, hands-on implementation, and targeted innovation funding rather than detailed regulation. This approach is supported by high social acceptance and responsibility assumed across the board when it comes to waste separation and saving resources, for example.

From India to Indonesia: Why the circular economy is faltering

In India, the "Plastic Waste Management Rules" (PWMR) oblige companies to take back plastic waste. Despite this important step insufficient infrastructure and the varying regional applications of the rules remain a major challenge for a nation-wide implementation. Similar problems exist in Vietnam, where an EPR law was introduced in 2022. It holds manufacturers and importers accountable for seeing to the recyclability of their products.

In Thailand, the "Plastic Waste Management Roadmap 2030" pursues the aim of recycling or energetically using 100 percent of plastic waste by 2027. There are local initiatives in Indonesia but there is no comprehensive national strategy. One objective is to reduce drastically the plastic waste that ends up in the sea by 2040. Despite the progress made in these countries the regional fragmentation of waste management and the lack of infrastructure continue to pose a major challenge. Raising people's awareness and stronger industry involvement will make or break the success of these measures.

Photos: Messe Düsseldorf / tillmann

North America: A patchwork of strategies

In North America, circularity strategies are heavily fragmented. The USA is pursuing an approach comprising state initiatives and private business measures. 33 US states have established EPR programs, which oblige manufacturers of single-use packaging to participate financially in waste management. By 2032, 100 percent of packaging will be recyclable or compostable, and 65 percent of one-way packaging be recycled. Other states, however, lag behind. There is also another reason why plastic recycling in the USA only has a low uptake compared to the rest of the world, despite modern recycling technologies: "There is neither a national nor a state-wide recycling program that would cover at

Shaping the Circular Economy at K 2025

According to the organizers, at K 2025 enterprises from the different sectors of the industry – raw material production, machine building, and processing – will flag up the major advances made so far as well as coherent future solutions for the circular economy under the guiding theme "Shaping the Circular Economy". The numerous K Specials would also pick up this topic. The VDMA (German Machinery and Equipment Manufacturers' Association) will host an extensive Forum on the outdoor premises in 2025, named "The Power of Plastics". With 12 of its member companies, it will demonstrate live on the premises between Halls 10 and 16 just how important technology is for implementing circularity in the plastics industry. In the official Special Plastics Shape the Future in Hall 6, organized by Plastics Europe Germany, the discussion forum on Thursday, 9 October, will come under the motto: "Circular Thursday: Transition – Resilience of the industry – which technologies will make the circular economy work?"

K 2025 will be open daily from 10.00 am to 6.30 pm from Wednesday, 8 October, to Wednesday 15 October. Tickets are available online. k-online.com

least a complete federal state. Instead, individual cities and municipalities decide whether, how, and which waste they collect and sort," explains the German federal economic promotion agency, Germany Trade & Invest (GTAI).

Canada pursues a more comprehensive approach to promoting the circular economy. The government has introduced the "Federal Plastics Registry", a national registry for plastics to collect data about the production, use, and disposal of plastics. It is designed to increase transparency and make for more effective plastic management. The "Action Plan on Zero Plastic Waste" aims to reduce plastic waste and establish a circular economy for plastics. It includes measures for reducing single-use plastics and promoting reuse and recycling. Beyond this, a gradual approach is pursued to reduce plastic waste by banning single-use plastic products and introducing EPR.

South America has a long way to go

In South America, the circular economy is still in its infancy – some 90 percent of waste ends up at landfills, and recycling is only of secondary importance. Chile, Colombia, and Brazil have national return and circularity schemes such as Chile's "Ley REP", Colombia's "Basura Cero" initiative, or voluntary industry solutions in Brazil. Uruguay relies on consistent waste management with its Integrated Waste Management Act (Ley 19.829) and promotes packaging recycling. Despite various advances and initiatives, however, infrastructure remains insufficient in many South American regions and success will depend on further state investment, international cooperation, and stronger awareness raising among the population.

Summary & Outlook

The circular economy is both an obligation and an opportunity alike for the plastics industry. Europe pursues a strictly regulatory approach; Asia combines state regulations with technology offensives, while in the Americas the spectrum ranges from ambitious requirements to a patchwork of isolated measures or confidence in the invisible hand of the market.

However, every circular economy model has its pitfalls: regulation creates clear rules but can lead to excessive bureaucracy and lack of investment – a risk that becomes increasingly perceivable in Europe. "To avoid a slowing down of the transformation we urgently need measures to make investment in the production of circularity-ready plastics more attractive, reduce red tape caused by excessively long approval procedures to name but one, and return to a level-playing field with our international competitors," warns Virginia Janssens, Managing Director of Plastics Europe.

Market-based approaches promote innovations but do not guarantee nationwide implementation. Centrally controlled strategies produce fast progress but can become inefficient. One thing is clear: without higher recycling rates and more recyclates, circular economy remains a patchwork. Learning from each other can combine strengths and compensate for weaknesses.

THE NEXT-GENERATION SOLAR CELL WILL BE FULLY RECYCLABLE

According to Swedish Linköping University, researchers of the university have developed a method to recycle all parts of a solar cell repeatedly without environmentally hazardous solvents. “The recycled solar cell has the same efficiency as the original one,” the press release said. “The solar cell is made of perovskite and the main solvent is water.”

Electricity use is expected to increase drastically in the coming years with the development of AI and the transition to electrified transport, among other things, the university stated. For the change to not drive climate change, different sustainable energy sources would need to work together. Solar energy has long been considered to have great potential and solar panels based on silicon have been on the market for over 30 years. However first-generation silicon solar panels are at the end of their life cycle, which has created an unexpected problem. “There is currently no efficient technology to deal with the waste of silicon panels. That’s why old solar panels end up in the landfill. Huge mountains of electronic waste that you can’t do anything with,” Xun Xiao, a postdoc at the Department of Physics, Chemistry and Biology (IFM) at Linköping University (LiU), was cited. Feng Gao, professor of optoelectronics at the same department, assisted: “We need to take recycling into consideration when developing emerging solar cell technologies. If we don’t know how to recycle them, maybe we shouldn’t put them on the market at all.”

Promising technology for recycling

One of the most promising technologies for next-generation solar cells involves perovskite (editor’s note: a calcium titanium oxide mineral composed of calcium titanate, with the chemical formula CaTiO3). According to the information, they are not only relatively inexpensive and easy to manufacture but also lightweight, flexible, and transparent. Thanks to these properties, perovskite solar cells could be placed on many different surfaces, even on windows. Also, they could convert up to 25 percent of the solar energy into electricity, which can be comparable to today’s silicon solar cells. “There are many companies that want to get perovskite solar cells on the market right now, but we’d like to avoid another landfill. In this project, we’ve developed a method where all parts can be reused in a new perovskite solar cell without compromising performance in the new one,” Niansheng Xu, postdoc at LiU, was quoted.

However, given that perovskite solar cells currently have a shorter life span than silicon solar cells it is important that perovskite solar cell recycling is efficient and environmentally friendly, the university underlined. “Perovskite solar cells also contain a small amount of lead that is necessary for high efficiency, but this also places great demands on a functioning recycling process.” In addition, there were also legal requirements in large parts of the world for producers to collect and recycle end-of-life solar cells sustainably.

As reported, there are already methods for dismantling perovskite solar cells. “This mostly involves using a substance called dimethylformamide, a common ingredient in paint solvents. It is toxic, environmentally hazardous, and potentially carcinogenic.” The Linköping researchers have instead developed a technology where water can be used as a solvent in dismantling the degraded perovskites. “And more importantly, high-quality perovskites can be recycled from the water solution.” According to Xun Xiao, the researchers at Linköping University can recycle everything – covering glasses, electrodes, perovskite layers, and the charge transport layer. The next step for the researchers is to develop the method for larger-scale use in an industrial process. In the long term, they believe that perovskite solar cells can play an important role in providing energy when surrounding infrastructure and supply chains are in place.

■ The study – published in Nature (https://www.nature.com/articles/s41586-024-08408-7) – was funded by the Knut and Alice Wallenberg Foundation, the Wallenberg Initiative Materials Science for Sustainability, The Swedish Energy Agency, and through the Swedish Government’s strategic area in advanced functional materials, AFM, at Linköping University. Researchers Xun Xiao, Niansheng Xu, and Feng Gao have applied for patents on the technology described above.

liu.se

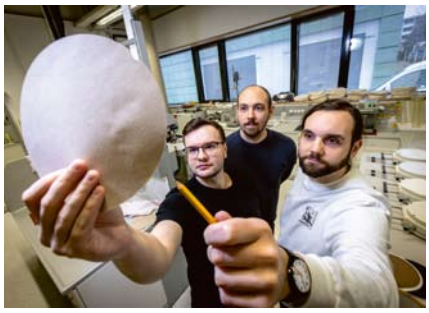
Photo: Thor Balkhed / Linköping University

RESEARCHERS AT TU GRAZ TURN TEXTILE WASTE INTO PAPER

The idea is not new, but was now rediscovered: Researchers at the Austrian Technical University of Graz have found a way to recover the cellulose fibers from used clothing and utilize them to produce cardboard and other packaging materials.

As reported by the university, in Austria alone around 220,000 tons of textile waste is produced every year, of which almost 80 percent is incinerated. As a result, valuable raw materials are lost. A team led by Thomas Harter from the Institute of Bioproducts and Paper Technology has come up with a solution to this problem. The researchers have developed a process to recover the fibers from cotton-based used textiles and use them to produce paper for packaging materials.

According to Thomas Harter, technically converting textile fibers into paper is a downgrade. "However, it has a major advantage from an environmental point of view. The paper cycle is highly closed, with recycling rates of over 90 percent in the packaging sector. If we bring valuable textile fibers into this cycle, they remain usable for a long time." Recycled textiles could be an important source of raw materials



Alexander Weissensteiner, Alexander Wagner and Thomas Harter (f.l.) with a paper sample consisting of 30 percent recycled cotton fibers

for the production of packaging paper and help to reduce the amount of paper imports currently used for this purpose.

Very similar to normal papermaking suspension

To make paper from old items, clothing is cut into small shreds and soaked in an aqueous solution. This mixture of water and shreds is milled to separate the interwoven cotton fibers without knotting or clumping. As part of his master's thesis, Alexander Wagner determined the most suitable beating machine, the necessary processing time, and the optimum ratio of water to textiles to extract the maximum amount of usable fibers from the textile waste. "At the end of our tests, we obtained a suspension that is very similar to a normal papermaking suspension and that we can process into paper using established methods," Thomas Harter was quoted.

Significantly more tensile strength than conventional recycled paper

As described by TU Graz, the paper with textile content hardly differs from ordinary recycled paper; it is slightly brownish with occasional colored speckles, which come from colored clothing. However, these splashes of color were irrelevant for carton boards and other packaging materials. Tensile tests have shown that the addition of textiles increases the strength of recycled paper. "Even with a textile-based proportion of 30 percent, the paper is significantly stronger, while the processability remains the same," Alexander Weissensteiner informed, who is also working on optimizing the recycling process as a master's student. This would be due to the length of the fibers. "The fiber lengths of recycled waste paper are quite short. At 1.7 millimeters, our recycled textile fibers are significantly longer."

The researchers' next goal is to reduce the energy consumption of the beating process. In addition to additives such as light acids and alkalis, they also test enzymatic pre-treatments to support fiber disintegration in the beating unit. "We also want to take the next scaling step and implement the process on industrial devices," Thomas Harter stated.

tugraz.at

Paper made from Cotton

Cotton paper, also known as rag paper or rag stock paper is made using cotton linters (fine fibers that stick to the cottonseeds after processing) or cotton from used cloth (rags) as the primary material, the online dictionary Wikipedia informs. "Prior to the mid-19th century, cotton paper was the main form of paper produced, with pulp paper replacing cotton paper as the main paper material during the 19th century." Cotton paper is more durable, "and consequently important documents are often printed on cotton paper."

Today, cotton paper is still produced and available. According to China-based manufacturer of pulp and paper making machinery CNBM, the spectrum ranges from writing and printing paper to currency and security paper.

Photo: Lunghammer / TU Graz

SCRAP DEALER WITH NEW 830 G MATERIAL HANDLER

With the new generation of the 830 G, SENNEBOGEN is expanding its portfolio with a powerful material handler that impresses above all with its comfort, ergonomics, and user-friendliness. TSR Czech Republic s.r.o., a leading scrap dealer headquartered in Prague, had the opportunity to test the machine extensively at its site in Pilsen.

The SENNEBOGEN 830 G has proven itself in scrap yard operations thanks to its robust design and high performance

Versatile use in scrap yards

TSR Czech Republic s.r.o. has been operating as a scrap metal dealer since 1991 and employs over 400 people. The company specializes in metal processing and trading, relying on state-of-the-art technologies and machinery.

The SENNEBOGEN 830 G is used at TSR in the scrap metal warehouse, which is specially designed for processing metals. The machine's main tasks include feeding the scrap shear and scrap press, as well as loading trucks and rail cars. The entire work process takes place outdoors, which means that the excavator has to operate in a wide range of weather conditions. Thanks to its robust design and polyp grab, the 830 G can handle both light and heavy loads with ease. The highly dynamic operation requires frequent position changes and precise control of the machine. With the SENNEBOGEN 830 G, TSR has taken an important step toward the future and is relying on modern technology that makes everyday work noticeably easier.

Miloslav Schlossbauer: "Fuel consumption and availability of spare parts were decisive purchasing criteria for us."

Maxcab: Comfort redefined

One highlight of the 830 G is the advanced Maxcab cab, which is even more ergonomic and user-friendly. The spacious cab gives the driver an optimal view of the work area, thanks to the large glass surfaces and elevated position.

The intuitive controls, combined with an ergonomically designed workstation, minimize operator fatigue even during long working days of eight to 12 hours. In addition, the comfortable seat, automatic climate control, and clearly arranged controls contribute to productivity.

Control via a central touch display

One of the major innovations of the 830 G is the SENcon control system, which is operated via a 10" touch display and enables precise and simple operation. The well-thought-out arrangement of functions and the intuitive interface reduce training times and make the machine quickly accessible even for new drivers.

The ability to monitor fuel consumption in real time ensures additional efficiency. This is a particularly important advantage in energy-intensive operations such as scrap yards. "The low fuel consumption and good availability of spare parts convinced us – that's why we decided to purchase the machine," emphasizes Miloslav Schlossbauer, Managing Director of TSR.

Refueling from the ground

In addition to comfort and efficiency, the 830 G also impressed with its durability and easy maintenance. Compared to previous models or other

Photos: SENNEBOGEN / Lisa-Maria Heigl

machines on the market, the excavator scores highly with its well thought-out design, which allows refueling from the ground and quick access to maintenance points. The comprehensive service is another advantage that was particularly emphasized by TSR.

The decision to go with the SENNEBOGEN 830 G was supported by close cooperation with the sales and service partner Merimex.

merimex.cz
sennebogen.com

The SENNEBOGEN 830 G loads the scrap press precisely and reliably

SUCCESSFUL TESTING OF A HYDROGEN-POWERED MELTING FURNACE

In May, the aluminum recycling and rolling group Speira informed about an advancement in its sustainability journey: As part of the EU-funded HyInHeat project, it has successfully converted a melting furnace with a capacity of 1.5 tons to hydrogen operation. Initial tests with various scrap types show promising results with no impact on melt quality, the information said.

Tests of the retrofitted 1.5-ton capacity furnace using various types of aluminum scrap demonstrated that the quality of the melted metal remains consistently high: “Our early trials have been very encouraging,” Galyna Laptyeva, Senior Scientist and Project Lead at Speira was quoted. “We’ve proven that hydrogen is fundamentally suitable as a fuel for our melting furnaces. This is a major step towards reducing the carbon intensity of our production.”

To further increase efficiency, Speira has equipped the test furnace with even more advanced technology. Instead of using normal air, hydrogen is now burned with pure oxygen – a process known as “oxyfuel.” According to Galyna Laptyeva, Oxygen is a by-product of hydrogen production. “By using it for combustion, our calculations show we can save approximately 30 percent of fuel. This makes the process not only more environmentally friendly but also more economical.”

Speira has successfully converted a laboratory-scale melting furnace to hydrogen operation and is now testing an oxyfuel process for even higher efficiency

Another advantage of hydrogen combustion is that, ideally, no harmful nitrogen oxides (NOx) are produced, Speira pointed out. “In practice, however, small leaks and impurities can cause minimal amounts of these pollutants. Researchers will closely examine how to reduce these emissions to a minimum in upcoming tests.”

About HyInHeat

Launched in 2023, the HyInHeat project brings together 30 partners from 12 European countries to explore hydrogen’s potential for decarbonizing heat-intensive processes in the aluminum and steel industries. Together, they bring expertise in various fields related to industrial heating, including combustion, furnaces, sensors, safety, and sustainability. The initiative aims to develop efficient hydrogen combustion systems that address nearly the entire process chain of these energy-intensive industries. The project will run until the end of 2026 and is being coordinated by the Department for Industrial Furnaces and Heat Engineering (IOB) at RWTH Aachen University.

speira.com
hyinheat.eu
iob.rwth-aachen.de/en/department/

Photo: Speira

TANA FROM WASTE TO VALUE®

Tana Oy is a Finnish environmental technology company with a bold mission: to turn waste into value. Founded in 1971, Tana has grown into a globally recognized provider of mobile equipment and intelligent solutions for solid waste management. With exports to over 50 countries and a strong global presence, the TANA machines are known for their durability, versatility, and data-driven performance.

Launched in spring of 2025, the TANA Hammerhead waste shredder and the TANA Raven disc screen are the latest additions to Tana's machine portfolio, showcasing the company's unique design philosophy.

The TANA Hammerhead is a powerful high-capacity mobile shredder designed to respond to the increasing volume demands of the circular economy value chain. Built on proven TANA Shark technology, available in both electric and diesel versions, it's engineered for performance, reliability, and sustainability.

The TANA Raven is a smart, modular disc screen designed for high-capacity waste screening. With patented anti-wrapping discs, adjustable particle sizing, and digital platform integration, it offers unmatched versatility and efficiency. Ideal for MSW, C&D, and wood waste, the TANA Raven is built for adaptability, durability, and seamless integration into modern recycling operations.

At the heart of Tana's success is its commitment to innovation, sustainability, and customer-centric service. The company's vision outlines a future where advanced technology and tailored lifecycle services help customers maximize recycling, recovery, and operational efficiency. Whether it's through the TanaConnect® digital platform, the Tana Second Life rebuild program, or a global network of over 30 distributors, Tana ensures that its customers are equipped for long-term success.

Tana Rental brings flexibility and peace of mind to customers

In line with its strategy to offer more flexible and comprehensive solutions, Tana operates Tana Rental, a service designed to meet the evolving needs of the Finnish market. As a part of Tana Oy, Tana Rental provides operational flexibility for companies dealing with varying waste streams and volumes. By allowing businesses to scale capacity up or down without the long-term commitment of ownership, Tana Rental offers a smarter, more agile alternative.

According to Anu Söderena, the Nordics & Baltics Manager at Tana, the core of the rental service is built around customer needs. "Customer-centricity is at the heart of everything we do," she explains. "We want to make machine usage as easy and risk-free as possible. With Tana Rental, customers receive not just the machine, but also maintenance, spare parts, and expert support, all for a fixed fee."

One of the key advantages of Tana Rental is its suitability for a wide range of customer profiles. The rental service is particularly beneficial for companies with seasonal or project-based operations, or for those looking to test TANA machines before making a long-term commitment. "We see a lot of interest from recycling facilities, waste management companies, and contractors," Söderena notes. "Rental is also a great solution when there's a sudden need to scale up capacity quickly."

The response from the market has remained overwhelmingly positive throughout the years. Customers appreciate the simplicity, reliability, and responsiveness of the rental service. "Many are surprised by how effortless rental is and how well the service adapts to their specific needs," says Söderena. "It's rewarding to see how much value we can bring to their operations."

■ Anu Söderena, Nordics & Baltics Manager, anu.söderena@tana.fi
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Photo: Tana Oy

CLOUD-BASED SOLUTIONS FOR WASTE COLLECTION

Innovation4Waste, the new Partitalia brand that develops IoT (Internet of Things) waste-tracking solutions, has presented its cloud-based technologies at Waste Expo 2025 in Las Vegas, the leading trade show in North America focused on solid waste, recycling, and sustainability.

At this event, the Italian company presented its "Smart Waste Management" IoT ecosystem. According to the information, it includes a comprehensive portfolio of 'connected' solutions to meet the needs of different scenarios. Among the new products being showcased was Asset Track-ID, the IoT solution for tracking roll-off containers, "which monitors container location in real-time, communicating bi-directionally with the cloud and remotely managing devices. Easily integrable with third-party applications, the asset tracker allows for quick location of lost or misplaced containers, helping to avoid costly replacements. The continuous monitoring system also enables prompt action in case of anomalies, supporting a more effective waste management approach," the provider highlighted the advantages.

Photos: Innovation4Waste

Innovation4Waste's offering also includes IoT solutions for radio-frequency identification (RFID) data collection in curbside waste pickup, which ensure traceability of the delivery and automatic and reliable data collection. These encompass "high-power vehicle-mounted RFID readers that are stand-alone, ultra-durable, and capable of operating in extreme environments – automatically identifying authorized containers". The Discovery Mobile, the evolution of the first wearable RFID reader for waste collection, was also presented.

innovation4waste.com

GERMAN ALUMINUM ALLOY SORTING PROJECT

Tomra Recycling and Gerhard Lang Recycling collaborate in KANAL, a pioneering aluminum alloy sorting project.

As reported by Tomra Recycling Sorting, Gerhard Lang Recycling GmbH was one of the first companies globally to implement the manufacturer's AUTOSORT PULSE system for the precision sorting of aluminum alloy stamping scrap generated from automotive production in early 2024. The German metal recycling company has installed the unit at its metals sorting plant in southwestern Germany as part of the research project KANAL funded by the German Federal Ministry for Economic Affairs and Climate Action with 3.9 million Euro.

The project title KANAL stands for "Kreislaufsystem für funktionales Aluminium-Neuschrottrecycling aus der Automobilproduktion mittels LIPS," which translates to "Circular System for Functional Aluminum Scrap Recycling from Automotive Production Using LIBS." Tomra, Gerhard Lang Recycling GmbH, Pforzheim University of Applied Sciences, and engineers from Jeanvré have teamed up for the project to prove that aluminum production scrap can be effectively sorted and transformed into high-quality secondary aluminum. The consortium uses Tomra's dynamic laser-induced plasma spectroscopy (Dynamic LIBS) technology. Gerhard Lang Recycling GmbH is a research and field validation partner in this pioneering project.

Sorting of 5xxx and 6xxx aluminum wrought alloys

The plant's infeed material consists of stamping scrap – the excess metal material that is removed during the metal stamping process – generated during the production of car parts and panels. While highly efficient, the stamping process inevitably generates significant amounts of scrap, with an estimated 30-50 percent of the material being discarded. "The aluminum scrap comprises a mixture of 5xxx (high-magnesium) and 6xxx (low-magnesium) aluminum wrought alloys that are employed in different components within automotive production," the information said.

Upon arrival at Gerhard Lang Recycling GmbH's metals sorting plant in Gaggenau, the material is shredded before undergoing a multi-stage magnetic separation process to remove the ferrous metals. In the next step, the non-ferrous material is fed into the AUTOSORT PULSE. As underlined, before the installation of this machine, the recycler's team sold the mixed material to aluminum manufacturers immediately after the shredding process for there was no efficient solution on the market to separate the high- and low-magnesium aluminum alloys. With the system now in place, these alloys are sorted into different products, allowing the company "to produce exceptionally high purity 5xxx and 6xxx aluminum scrap".

Advanced dynamic laser detection

Due to the separation process, based on the precise analysis of the elemental composition of each material and highly advanced dynamic laser detection, AUTOSORT PULSE can distinguish between alloys, Tomra gave account. Additionally, object singulation would allow the machine to "accurately identify and separate even overlapping and adjacent materials, maximizing yield and efficiency in the sorting process. Its 3D object-scanning feature recognizes the shape, height, and position of the object and identifies the ideal shooting point for the Dynamic LIBS laser." This laser would offer two focus modes: multi-point, where the laser shoots in a line across the sample, and single-point where the laser drills down into a specific spot. The latter, developed by Tomra, had demonstrated superior performance in tests. Furthermore, the sorting unit has the ability "to minimize contamination and subsequently enhance the value and marketability of the recycled materials".

Tomra's AUTOSORT PULSE now allows Gerhard Lang Recycling GmbH to produce high purity 5xxx and 6xxx aluminum scrap

Photo: Tomra

- tomra.com
- lang-recycling.de
- jeanvre.de
- hs-pforzheim.de

WIRE SCREENS FOR DEMANDING APPLICATIONS

Compass Wire Cloth, a North American manufacturer of separation, sifting, and screening solutions, highlights its Piano Wire Screens – also known as Harp Wire Screens – as a "high-performance solution for operators seeking efficiency, durability, and precision in demanding screening applications". Engineered with long wires, these screens would eliminate cross wires to achieve "the highest open area of any screen on the market, delivering throughput up to five times greater than traditional long-slot woven screens". As reported, the screens are available with plastic or metal profile bars, giving users the flexibility to match material and application requirements. Plastic bars provide greater flexibility and improved vibration, helping keep the screen surface clean and reducing blinding, the company described the

Photo: Compass Wire Cloth

benefits. Metal profile bars offer added structural rigidity where required. "These profiles are moveable to allow for quick adjustment to support rails, enabling fine-tuning for better alignment and optimal performance." Built for both side-tensioned or end-tensioned screen setups, these screens would come equipped with common hook types, and custom hook shapes were available to accommodate virtually any screening machine. "Compass Wire Cloth offers these screens made of high-quality, high-tensile, or stainless-steel wire, ensuring a long service life even in tough conditions. High-tensile wire is ideal for screening dry materials, while stainless steel excels in high-moisture environments." Opening sizes range from one to 19 millimeters, giving operators the precision to match screen selection to specific materials, the provider assured. These screens are suitable for fine screening of sand, gravel, compost, topsoil, coal, and recycled materials. "They are also an excellent choice for handling challenging materials that are prone to clogging, blinding, and overrunning," Compass Wire Cloth underlined. "Their design excels at removing roots and other elongated debris, offering a cleaner separation and reducing material contamination."

compasswire.com

PAPER CHAIN SOUTHEAST ASIA EXPO + WEPACK SOUTHEAST ASIA 2025

July 29 – 31, 2025, Jakarta (Indonesia)

To further strengthen the upstream and downstream synergistic effects of the paper-making and packaging industrial chains, two major organizers specializing in paper-making and packaging exhibitions – China National Chemical Information Center and RX will co-host the Paper Chain Southeast Asia Expo + WEPACK Southeast Asia 2025 in Jakarta, Indonesia. As reported, the exhibition will feature over 300 participating enterprises and present a high-quality supply system for the Southeast Asian papermaking and packaging industrial chain. "Its organizers will deeply explore industry resources from multiple countries such as Indonesia, Vietnam, Malaysia, and Thailand, extensively invite trade visitors from related application industries to attend for consultation, help exhibitors effectively expand more intended customers, and promote in-depth cooperation and mutual benefits between Chinese and Southeast Asian paper-making and eco-friendly packaging industries." WEPACK Southeast Asia 2025, having reached strategic cooperation with Paper Chain Indonesia, will be co-located and held in conjunction with the latter at the Indonesian JIEXPO Exhibition Center. "Officially renamed 'Paper Chain Southeast Asia Expo + WEPACK Southeast Asia 2025', both shows will jointly create a large-scale, all-around paper technology, packaging processing, and packaging application whole industrial chain specialized exhibition gala in the Southeast Asian region."

wepack-southeastasia.com/en-gb/about.html

ECO EXPO ASIA 2025

October 28 – 31, 2025, Hong Kong (China)

Eco Expo Asia 2025, a leading global trade platform for the environmental protection industry, will take place at AsiaWorld-Expo, Hong Kong. The organizers are sure that the event will bring together leading exhibitors and thousands of buyers from across the world, providing an opportunity for businesses, governments, and advocates to collaborate on innovative solutions for a sustainable future. "This year's event promises to build on its legacy of success by introducing cutting-edge green technologies and facilitating impactful business connections." Eco Expo Asia marks its 20th edition this year. Under the theme "Green Innovations for Carbon Neutrality", the trade fair will focus on key areas such as green building technologies, waste management, renewable energy, green finance, green and smart mobility. The event will also promote startups and support research institutes to display R&D achievements. "Eco Asia Conference" and other concurrent seminars are dedicated to various environmental issues and "hot topics", along with a series of product

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demonstrations. Furthermore, the "Click2Match" online platform, running from 21 October to 7 November 2025, "will extend the show's reach by enabling virtual business meetings and partnerships, ensuring broader participation and fostering meaningful global connections."

hktdc.com/event/ecoexpoasia/en

ECOMONDO 2025

November 4 – 7, 2025, Rimini (Italy)

From 4 to 7 November, Ecomondo, the Italian Exhibition Group (IEG) event of reference in Europe and the Mediterranean basin for the green, blue and circular economy, will be back at Rimini Expo Center. Combining business growth with environmental and social protection through the adoption of ethical and inclusive development models is a requirement for which Ecomondo can act as a go-between by promoting dialogue between industries, institutions and the world of research. The 28th edition of Ecomondo, the most ambitious ever, will strengthen its international vocation and consolidate its role as a global circular economy and ecological transition platform and hub.

ecomondo.com

BHARAT RECYCLING SHOW 2025

November, 13 – 15, 2025, Mumbai (India)

India's biggest trade show for commodity recycling, organized by Media Fusion and Crain Communications, will serve as a platform for technology providers and recyclers in various sectors including metals, e-scrap, battery, ELV, tires, paper and construction, to display their innovations and forge partnerships to enhance efficiency in the sector. According to the organizers, the event's strategic co-location with Plastics Recycling Show India, which witnessed success in its first edition, would enable synergy amongst all commodities. Furthermore, "the three-day conference will have top experts, start-ups, passionate entrepreneurs, stalwarts and more engage in discussions on recycling".

bharatrecyclingshow.com

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