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& International Markets*



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Recycling: With Secondary Materials to New Visions



Brigitte Weber
Editor-in-Chief

In September this year, the international annual German motor show – IAA Mobility 2021 – took place in Munich. Circular economy and sustainability formed a significant pillar of this event.

For example, the concept vehicle “BMW i Vision Circular”, which the BMW Group presented as a future solution for the year 2040, attracted a great deal of attention. The special feature of this concept car is that it has been designed according to circular economy principles and using secondary materials to cut CO₂ emissions. “The process for supplying secondary materials is far less harmful to the environment and carbon-intensive compared to the extraction and manufacture of primary material,” the car manufacturer explained. “This can bring about a major improvement in a vehicle’s carbon footprint, especially on the supply chain side.” At present, vehicles from the BMW Group were manufactured using nearly 30 percent recycled and reused material on average. The company’s ‘secondary first’ approach aims at gradually increasing this figure to 50 percent.

Future tires will also contain secondary materials. During IAA Mobility, tire manufacturers Continental and Michelin highlighted plans to make their tires as sustainable as possible and use recycled plastic in tire production. Furthermore, when batteries have spent their useful life, companies, research institutes and vehicle-makers are developing and optimizing efficient ways for recycling high-voltage batteries.

The transition towards a circular economy is already happening around the globe since more and more countries recognize the benefits of such a sustainable practice. In September, the Finnish Innovation Fund Sitra and the Government of Canada hosted the World Circular Economy Forum 2021, which was organized in collaboration with 15 international and Canadian partners. The Forum’s theme was “Game changers! Seizing the circular opportunity”. It focused on the actions needed in the next five years to raise circular ambition globally, bring in new allies and introduce new voices into the conversation.

Regarding circularity, African countries offer plenty of opportunities for business activities, as there are “Five Big Bets” for the circular economy in Africa (page 5). In Brazil, waste-to-energy technology is on a massive transition into the future (page 28). A patented manufacturing process using tungsten powder made from scraps or chips enables additive manufacturing of complex components (page 12). And for conveyor systems, cleated belts can be an effective solution (page 44).

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

Yours

Brigitte Weber (weber@msvgmbh.eu)



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SCOTIABANK ISSUES SUSTAINABILITY BOND

In August this year, Canadian Scotiabank announced the closing of its inaugural one billion US-Dollar three-year Sustainability Bond offering.

As reported, the bank is committed “to making a positive impact and creating better communities for every future”. Net proceeds from the Sustainability Bond offering would be used to fund the financing or refinancing – in whole or in part – of eligible green and/or social assets, which refer to new or existing assets, businesses or projects that meet the eligibility criteria of Scotiabank’s Sustainable Bond Framework (www.scotiabank.com/content/dam/scotiabank/canada/en/documents/about/investors-shareholders/funding-programs/SCOTIABANK-SUSTAINABLE-BOND-FRAMEWORK-2021.pdf). These criteria include inter alia the category “Pollution Prevention and Control”. Examples of Eligible Green Assets are “loans related to activities that contribute to soil remediation, waste prevention and collection, waste reduction and waste recycling such as:

- Development, operation and upgrade of recycling (metals, plastic and paper) plants
- Facilities, systems and equipment that are used to divert waste from landfills.”

Another category is “Sustainable Water and Wastewater Management”.

According to Scotiabank, this is the largest Sustainability Bond issued by a Canadian Financial or Corporate to date. A portion of the proceeds of this bond would help advance women-owned and women-led businesses through the bank’s women initiative – a signature program that breaks down economic barriers for women through unbiased access to capital, specialized education and holistic advisory services and mentorship.

The bank launched its Sustainable Bond Framework in July 2021. “The framework has received a Second-



Party Opinion from Sustainalytics, a global leader in ESG and Corporate Governance research and ratings, and is in line with the Green Bond Principles 2021, Social Bond Principles 2021, and the Sustainability Bond Guidelines 2021, as administered by the International Capital Market Association,” the information said.

Earlier this year, the bank had launched its inaugural Net Zero Research Fund as part of its commitment to pursuing net-zero targets and pathways. It was designed with the objectives of the Paris Agreement in mind to stimulate research, dialogue and understanding of the shift to a net-zero emission global economy. From the beginning of June until the beginning of July this year, the one million Dollar fund accepted applications from think tanks and academic institutions. These are supporting key sectors in their efforts to decarbonize the economy.

Source: Scotiabank

RECYCLED PET: STRONG DEMAND

According to the newest market report offered by Research And Markets, the global recycled polyethylene terephthalate (rPET) market size is expected to reach 14.40 billion US-Dollar by 2028, growing at a CAGR (compound annual growth rate) of 6.7 percent.

Recycled PET is a synthetic compound prepared from used PET products, which finds application in different end-use industries. The resins are produced from post-consumer PET bottle flakes and are one of the most stable

forms of recycled PET. “Clear was the largest type of rPET in 2020, and the product is expected to continue dominating the global market owing to the high demand in the production of bottles and sheets,” Research And Markets stated. Clear recycled PET would be widely used in multiple applications, such as in producing resins and fibers.

According to the report, particularly the growing beverage industry in many countries (such as China, India, Japan, South Korea, Vietnam, and

the Philippines) and the increasing demand for rPET in non-food sectors were projected to drive the global market over the forecast period. The shift in preference toward establishing manufacturing units in the Asia Pacific region – especially in China, India, Vietnam, Indonesia, and Thailand – would also propel the product demand. In terms of revenue, Asia Pacific dominated the global market and is projected to expand further at a steady CAGR over the forecast period.

www.researchandmarkets.com

MONDELÉZ INTERNATIONAL LAUNCHES GREEN BOND OFFERING

Mondelēz International, Inc. has announced the pricing of the group’s first green bond.

The green bond issuance by the company’s wholly-owned subsidiary – Mondelez International Holdings Netherlands B.V. – totaled 2.0 billion Euro and consisted of 650 million Euro of 0.250 percent notes due September 2029, 650 million Euro of 0.625 percent notes due September 2032 and 700 million Euro of 1.250 percent notes due September 2041. “The notes are fully guaranteed by Mondelēz International, Inc.,” the American multinational confectionery, food, holding and beverage and snack food company assured.

Mondelēz International intends to allocate the net proceeds from the offering to eligible projects; the project categories were in alignment with the United Nations Sustainable Development Goals. Within these categories, focus areas that are aligned to its priorities include:

- **Sourcing Sustainable Ingredients:** Mondelēz International is focused on the resilient supply of key raw



materials. As one of the world’s largest chocolate manufacturers, the company’s signature sustainable sourcing program, Cocoa Life, invests in innovation, collaboration and on-the-ground support for nearly 200,000 farmers to address the root issues cocoa farming communities face.

- **Reducing Waste in Packaging:** Mondelēz International aims to find new, smarter plastic packaging solutions that use less virgin material and advance harmonized approaches to recycling systems and infrastructure. Funds will go toward efforts to create a more circular economy where packaging, including flexible film, is reused or recycled.

- **Tackling Climate Change:** Last year, Mondelēz International joined the Science Based Targets Initiative (SBTI) and set the reduction targets for greenhouse gas emissions consistent with helping keep global warming well below 2°C. These goals extend to reducing the environmental impact of growing the commodities essential to the business.

Institutional Shareholder Services ESG (ISS ESG), a leading global provider of environmental, social, and corporate governance research and ratings, has published a Second Party Opinion on Mondelēz International’s green bond framework. It reviewed Mondelēz International’s green bond framework and found that the planned use of proceeds is consistent with the company’s sustainability strategy and material ESG topics. Mondelēz International will publish annual updates on the allocation of the proceeds until the proceeds have been fully allocated to projects meeting the eligibility criteria.

These updates will be reported publicly at www.mondelezinternational.com.

Photo: Andi Karig

WASTE MANAGEMENT MARKET ANTICIPATED TO GROW FURTHER

According to Allied Market Research, the global waste management market size, which accounted for 2,080.0 billion Dollar in 2019, is expected to reach 2,339.8 billion Dollar by 2027. That equates to an annual growth rate (CAGR) of 5.5 percent from 2020 to 2027. The report analyzes the global waste management market based on type, service, and region, the market research and business-consulting wing of Allied Analytics LLP gave account. “The types of waste covered in this report are municipal waste and industrial waste. The services taken into consideration in the report are collection and disposable services. The collection service segment is further divided into collection & transportation, storage & handling, and sorting. The disposable services segment is sub-classified into landfills, recycling, composting & anaerobic digestion, and others.”

www.alliedmarketresearch.com/request-sample/423

Circular Economy – FIVE BIG BETS ON A BILLION DOLLAR OPPORTUNITY FOR AFRICA

When in April this year, the World Economic Forum and the African Circular Economy Alliance had published the report on “Five Big Bets for the Circular Economy in Africa”, Al-Hamndou Dorsouma from African Development Bank, called this a “billion-dollar opportunity”.



Although Covid-19 had a negative impact on economies around the world, the crisis would present “a unique opportunity for many to rebuild green and potentially bounce back stronger than ever”, the Acting Director Climate Change & Green Growth of the multilateral development finance institution wrote on the World Economic Forum’s homepage. This chance was clear for the African continent when considering the circular economy. According to this report (www3.weforum.org/docs/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf), which also

offers positive examples for African initiatives, increased circularity in several sectors would support the economy, jobs and the environment on the continent in the long term.



Therefore, Al-Hamndou Dorsouma’s first big bet refers to the waste conversion industry: In his view, circular methods could help prevent hunger while boosting the economy and protecting the environment. “For

instance, training farmers in methods such as recovering wastewater for irrigation can help shift production to more climate-smart models,” he stated in line with the WEF report. “Additionally, converting food waste to organic fertilizer can strengthen green manufacturing and increase circularity in food systems.” Rethinking agriculture could be key for the continent as the sector employs 60 percent of the Sub-Saharan workforce and comprises nearly a quarter of the continent’s gross domestic product (GDP).

In his next bet, the author addresses the plastic waste recycling industry. “Recycling has emerged as a solution to the growing demand for goods with plastic packaging, but it must be scaled to both mitigate the environmental effects and have significant impact,” he wrote. “To grapple with these trends, new circular-inspired incentives are needed.” That might come for consumers in the form of bottle deposit systems. Especially businesses could face corresponding legal provisions and tax incentives to boost investments in recycling facilities. “Such investments could present a significant opportunity: the global economy faces losses of up to 120 billion Dollar annually connected to plastic’s reduced value after first use”.

Al-Hamndou Dorsouma’s big bet number three applies to the mass timber industry. Due to the expected growth of African cities, greenhouse gas emissions in Africa are projected to increase by more than 2.5 times by 2050, driven by large transformations in urbanization, industrialization and electrification. “Abating these emissions is possible through the promotion of low-carbon infrastructure,” he is convinced. “Planet-centric designs using mass timber can reduce waste, conserve forests and manage emissions in African cities that are currently growing at twice the global average”.

An important issue is also e-waste management, which is nowadays a challenge for many African countries. “Attracting more investment for recycling e-waste will support green job creation and increased value capture”, underlined the Acting Director Climate Change & Green Growth of the African Development Bank in his next bet. “One key opportunity lies in developing the e-waste recycling industry and substantial collection facilities. That will require goods produced with longevity in mind, designed for recycling or repair. It will also include legislation that limits foreign e-waste. Such shifts could create new jobs and move many waste-pickers from the informal to the formal economy.”

Last but not least, a new textiles economy – based on circular economy principles – would lead to better outcomes, he pointed out. “One immediate opportunity for this sector includes converting fashion and textiles waste into garments for commercial export markets. But changes can also come

to agriculture, using regenerative practices for the growing of crops such as cotton that renew the soil, and practices that lean away from ‘fast fashion’ to new business models based on ‘upcycling’ existing garments. These moves also could tackle waste on a range of levels as less than one percent of material used for garments is recycled (leading to a 100 billion Dollar annual loss).” Additionally, the fashion sector currently would use 342 million gallons of oil each year to produce plastic-based fibers.

“Foreign direct investment is key to Africa’s sustainable recovery”

According to Sosten Gwengwe, Minister of Trade in the Government of Malawi, and Ratnakar Adhikari, Executive Director of Enhanced Integrated Framework (EIF), diverse sectors in Africa have the potential to attract new investments and

Examples of recycling initiatives

As described in the WEF report, to alleviate plastic packaging pollution, the following approaches could help create new economic opportunities:

- Increase recycling and innovation in PET collection methods as a way of creating loops
- Incentivize investments in PET recycling facilities through regional harmonization of legislation and the introduction of tax incentives
- Explore longer-term opportunities in design innovation and reuse of other types of plastic packaging

PET and plastic recycling initiatives have already created numerous job opportunities for marginalized groups, including young people and women, the publication “5 Big Bets for the Circular Economy in Africa” gave account. In Ghana, a newly established waste and plastics recycling plant would create green jobs for 2,300 people – 800 directly and 1,500 indirectly. In South Africa, according to Plastics SA, the plastic waste industry provided stable employment for around 7,800 people in 2018. In Nairobi County, Kenya, Unilever’s Zero Waste project created 70 green jobs for young Kenyans and opportunities for 1,700 collectors. The establishment of these end-to-end recycling facilities has also been a promoter of industrialization through technology and skills transfer, the information said. Previously, PET bottles were sent to other countries for recycling and then shipped back.

contribute to economic recovery after the pandemic. In light of the global economic downturn following Covid-19, foreign direct investments (FDI) have declined, they stated on the WEF homepage. The World Investment Report had informed that global FDI collapsed in 2020, falling by 35 percent. “This decline was concentrated in developed countries, where FDI flows fell by 58 percent. The decline in developing countries was relatively measured at -8 percent, thanks to robust flows to Asia. The distribution was uneven across regions, with Africa witnessing a reduction of 16 percent.”

However, the continuing and uncertain effects of the pandemic had clouded the outlook for FDI in Africa, they said. Greenfield announcements had fallen by 62 percent to 29 billion Dollar in 2020 from 77 billion Dollar in 2019, and international project finance for large infrastructure proj-

ects had declined by 74 percent to 32 billion Dollar. “These developments are concerning, as these types of investment are crucial for productive capacity and infrastructure development, which will be vital for a sustainable recovery,” Sosten Gwengwe and Ratnakar Adhikari wrote.

According to the African Economic Outlook, the economic growth of the continent shrank by 2.1 percent in 2020. It is expected to resume at a moderate pace of 3.4 percent in 2021. “This will be underpinned by a rebound in FDI and commodity prices, which has already seen an uptick, coupled with a resumption of tourism and a rollback of pandemic-induced restrictions and widespread rollout of Covid-19 vaccinations.”

FDI flows to Africa had evolved over the past decades as new sources of investment have opened up and emerging sectors have expanded. “A closer look at the opportunities this evolution presents should be a priority for African governments and investors looking to invest on the continent.”

They see an opportunity in financing sustainable development. Investment into the African continent over the coming years should ideally focus on the key sectors and opportunities that will define the continent’s growth in the short and long term, both authors are convinced. A few of these are:

- Renewable energy capacity in Africa could reach 310 GW (gigawatt) by 2030, which would put the continent at the forefront of renewable energy generation globally. There is significant scope for Africa to build a climate-resilient and low carbon continent with attractive investment opportunities on renewable energy.
- E-commerce and logistics: With the expected bolstering of economic activity on the continent through the implementation of the African Continental Free Trade Area (AfCFTA), progress in mobile and internet penetration is likely to stand at 50 percent in 2025, and growing consumer spending is expected to reach 2.1 trillion Dollar in 2025. Despite this, companies have largely failed to tap into Sub-Saharan Africa’s e-commerce potential, owing to infrastructure and logistical challenges, which represent an excellent opportunity for foreign investment.
- Sustainable tourism: In 2019, the tourism industry accounted for about seven percent of Africa’s GDP and contributed 169 billion Dollar to its economy. The International Monetary Fund predicted that real GDP among African countries dependent on tourism would shrink by 12 percent in 2020. However, here again, opportunities lie. A growing middle class and the launch of the AfCFTA could increase travel within and into the continent.
- Circular economy: The sharing, reusing, repairing, recycling and regenerating of materials to generate economic value and promote environmental sustainability offers

Circular Economy Case Studies from Africa

The UK registered charity Footprints Africa has collected examples of initiatives from across Africa and published a report (<https://cdn.website-editor.net/1d19b3c8e4ec4cea997a5b973b37c28c/files/uploaded/Footprints%2520Africa%2520-%2520Circular%2520Economy%2520Case%2520Studies%2520Report.pdf>). The intention is to create an open-source database of best practices that can inspire local initiatives, “as well as inform the global dialogue, which is largely focused on the European and American context”. In this report, the team of Footprints Africa highlights “23 examples amongst a list of 70”. The project was conducted in collaboration with the African Circular Economy Network (ACEN), with support from Shifting Paradigms and GRID-Arendal, a partner of UNEP.



By the end of this year, the objective is to collect 500 cases with a strong regional representation. The information can be found in a collection on an interactive map, which shows initiatives how circularity is already being practiced across Africa:

- www.acen.africa/case-studies
- www.footprintsafrica.co

Source: Footprints Africa

tremendous potential for FDI in Africa. Of the five thematic areas identified by the African Circular Economy Alliance and the World Economic Forum, i.e. food systems, packaging, the built environment, electronics, and fashion and textiles, circular food systems alone can help create a trillion-dollar industry by 2030 while generating millions of inclusive green jobs.

The Covid-19 pandemic has created a unique opportunity to reframe investor engagement with the African continent,

they emphasized. While improving the business climate for attracting FDI is important, building the capacity of investment promotion agencies on FDI promotion and facilitation would go a long way in helping the continent build back better, more so for the 33 least developed countries (LDCs) within the continent. To this end, the Enhanced Integrated Framework and the World Association for Investment Promotion Agencies have established a targeted program aimed at actively assisting investment promotion agencies from the LDCs (15 of which are in Africa).

OUTLOOK FOR THE RECYCLING OF FLEXIBLE POLYOLEFIN FILMS IN EUROPE

A recently published study from AMI Consulting – a provider of information, market intelligence and events for the global plastics industry – aims to quantify the market for flexible polyolefin recycling in Europe.

According to the consulting firm, the report analyses the industry’s operating environment and the particular challenges involved in the collection, sorting and recycling of flexible films. It is based on “AMI’s comprehensive and detailed in-house data on virgin polymer demand, polymer end-use applications, and recycling capacities” – and was combined with a research program including conversations with industry participants.

“The quantitative analysis includes a focus on volumes of post-use flexible polyolefin films generated as waste by end-use sector and, considering collection rates, levels of contamination and international trade in post-use plastics, an assessment of the volumes of post-use films available to EU+3 recyclers as inputs into the recycling extrusion process,” the company underlined. “The latter data point is of particular importance given it marks the new calculation point for the EU’s



recycling targets. Data is provided for the years 2019, 2020 and 2021, with forecasts for 2025 and 2030.” The report would also identify the top six countries regarding recycling capacity for flexible polyolefin films in Europe. “This is complemented by a detailed analysis of existing and emerging end-use applications for the outputs of the recycling process, providing data for 2020, 2025, and 2030.” Furthermore, the analysis was accompanied by an assessment of the industry’s changing operating environment and the associated implications for the industry’s future development.

“In a market where demand for recyclates has traditionally been determined by fluctuations in virgin polymer prices, market forces alone are not sufficient to create a viable operating environment for recyclers,” AMI stated.

The legislation had become increasingly important as the key instrument to incentivize recyclate use beyond the sectors where consumer pressure and brand owner commitments have initiated change. Measures of key relevance can be found in the EU Strategy for Plastics in the Circular Economy.

“With deadlines for meeting EU recycling targets approaching the recycling industry needs a clear commitment to investments into Europe’s collection and recycling infrastructure for flexible films,” the consulting firm is convinced. “There is significant potential to increase the volume of post-use films made available for recycling, and to produce higher quality recyclates suitable for a broader range of end-use applications.”

www.ami.international/cons/produkt.asp?catalog=Consulting&product=M286

NEW WEBSITE FOCUSED ON BATTERY RECYCLING

Canada Silver Cobalt Works Inc. has launched a new website (www.re-2ox.com) for the battery recycling initiative utilizing the company's proprietary hydrometallurgical process.

According to the Canadian firm, the Re-2Ox process has already been successfully used in developing a cobalt sulfate compound for end-use in lithium-ion batteries. Now, the company is seeking to deploy this process in the recycling of spent lithium-ion batteries and other recyclables that contain metals of value.

As reported, potentially 90 percent of recyclable battery material will be available for processing with no accessible global recycling capacity availability. However, the Re-2Ox process is amenable to the feedstock of used battery material, which is now widely obtainable, Canada Silver Cobalt emphasized. "We strongly considered this initiative a few years ago, but initial research turned up a lack of feedstock at that time, but this has now changed," CEO Frank J. Basa, P.Eng., commented. "With feedstock currently available and coupled with the Re-2Ox process, the path is clear for the company to develop what can be a robust and ever-increasing poten-



tial income stream by providing future tolling services for the treatment of used batteries."

The percentage of a Li-ion battery's weight that comes from valuable cathode material is 30 to 40 percent with the value of the lithium-ion battery market projected to be upwards of 70 billion US-Dollar next year, Canada Silver Cobalt referred to the International Energy Agency, US Department of Energy. If current trends for handling these spent batteries would not change, "the majority will end up in landfills despite the fact that Li-ion batteries can be recycled. These batteries contain valuable metals and other materials that can be recovered,

processed and re-used; however, little recycling goes on today. The opportunity is right in front of us as the world stands at the inception of a mega-trend or global shift away from carbon-producing transport to electrified transport. To date, the media focus has been on the front-end savings without addressing the back end, which has to be recognized if green goals are to be fully realized." The company sees this as a major opportunity that will grow for decades as these now-established mega-trends continue to accelerate, not just in North America but also around the world.

www.canadasilvercobaltworks.com

Photo: Canada Silver Cobalt Works / re-2ox



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THE MARKET FOR COMMERCIAL AIRCRAFT DISASSEMBLY, DISMANTLING AND RECYCLING

Market research and consulting company Visiongain predicts strong growth for this sector.

According to the analysis of Visiongain Research Inc., the global commercial aircraft disassembly, dismantling and recycling market is expected to reach 8,138.78 million US-Dollar in 2026 from its previous value of 6,742.76 million US-Dollar in 2021. Visiongain further anticipates that this worldwide market will reach 10,009.49 million US-Dollar in 2031.

“No one paid any attention to the decommissioned commercial aircraft stored on the outskirts of distant airfields for decades,” the firm stated in a press release. “Engines, turbine components, avionics, and landing gear may all be used as spare parts, and fuselage sections include recyclable metals like titanium, copper and aluminum.”

Taking an entire airplane apart, sorting all of the components by kind, and

reprocessing them is a skill in and of itself. Engines and landing gear, for example, must be carefully removed before being harvested for spare components, the firm described the process. The same applies to all impurities, such as extinguishing chemicals, kerosene, and oils.

Recycling businesses were hired to handle the scrap, shredding the parts and segregating the different materials. “It is feasible to recover a number of metals and complicated alloys in this way, which industrial businesses can then employ to create new goods. Temperature-resistant super alloys comprising titanium and nickel, which may be reused by the aerospace industry, can be extracted from aircraft scrap. Incineration is used for any substance that cannot be recycled.” Every change in the way planes are built presents new hurdles for recyclers, Visiongain informed. The fuselages of airplanes destined for scrap were previously composed of aluminum, which is easily recyclable.

“However, aircraft makers are increasingly relying on lightweight fiber-reinforced composites, particularly carbon fiber reinforced polymers (CFRPs), to save weight. These CFRPs will likewise have to be dismantled and treated on a massive scale at some point.”

New life for carbon fiber reinforced polymers

Carbon fiber reinforced polymers can also be recycled in most cases. However, so far, this has proven to be more challenging and costly than incineration, Visiongain gave account. Epoxy resin, in which the fibers are embedded, is a common polymer used in airplane construction. Reclaiming the fibers would entail separating the epoxy resin from the fibers in the absence of oxygen, which necessitates the use of specialized equipment. The recycling of pricey carbon fiber reinforced thermoplastics was a less technological barrier.

Material traceability and sorting

As reported, material traceability and sorting is a long-term solution. “This procedure is utilized to improve the facility’s recycling rates and reduce trash. Material traceability and sorting is a time-consuming process that necessitates the employment of trained personnel to separate the usable aircraft components.” When recycling businesses have to document every stage of the supply chain in addition to collecting and gathering data, it may be inconvenient. “This issue may lead to poor supply chain management for aviation components and parts.”

■ A sample of the report can be downloaded here: www.visiongain.com/report/aircraft-disassembly-market-2021/#download_sampe_div



Photo: SCHROTT24

E-WASTE: GOOD PRACTICES IN TACKLING FIRES

More and more electrical and electronic products in everyday life contain batteries, making life more convenient and pleasant. However, those same batteries, when damaged, also increasingly cause fires.

WEEE Forum and collaborate associations – EuRIC (European Recycling

Industries' Confederation), EUCOBAT (European association of national battery collection schemes), EERA (European Electronics Recyclers Association), MWE (Municipal Waste Europe) and the WEEELABEX Organisation – have joined forces to counter the occurrence of fires caused by lithium batteries and e-waste containing lithium

batteries. A new report compiles good practices addressed to all actors in the value chain, covering all phases of a product's lifecycle.

■ It can be downloaded here: <https://weee-forum.org/wp-content/uploads/2021/07/Tackling-fires-caused-by-batteries-in-e-waste.pdf>

EBRD INVESTS IN TURKISH WASTE-TO-ENERGY FIRM

The European Bank for Reconstruction and Development (EBRD) is investing in a minority stake in the Turkish waste-to-energy business Biotrend Çevre ve Enerji Yatırımları AS.

As reported, Biotrend's main activities are integrated solid-waste management and renewable energy generation under municipal concessions of

up to 20 years. The company operates 18 waste-to-energy plants in the following Turkish cities: Izmir, Bursa, Balıkesir, Hatay, Usak, Sivas, Aydın, Canakkale and Malatya, with a total installed capacity of 72.6 megawatt (MW). Since April this year, the company is listed on Borsa Istanbul.

As a shareholder in one of Turkey's leading private waste management

companies, EBRD intends to promote private-sector participation in municipal waste management. It was working with the Ministry of Environment and Urbanisation and Turkish municipalities to upgrade the legal framework for public-private partnerships focused on municipal services.

www.ebrd.com

UNTHA SUPPLIED SHREDDERS FOR PLANT IN RUSSIA

Two Untha XR waste shredders are now in operation in Russia, following a collaboration between the Austrian-headquartered engineering firm and Kaluzhskiy Zavod Kommunalnih Mashin (KZKM). The duo of machines is set to shred one million tons of municipal solid waste per year for the Russian State. The MSW – which is

collected from dozens of neighboring towns and cities – is reduced to a fraction size of 200 millimeters for onward treatment and recycling.

As a municipal machinery specialist, KZKM has historically concentrated primarily on the manufacture, supply and maintenance of heavy industrial

equipment for Russia's road infrastructure, Untha gave account. "However, the company's growing reputation has led to wider expansion, which resulted in the firm being the main technology provider for a new recycling plant in Kaluga region – part of the country's nationwide waste collection program, Ecology."

NEW ROBOTIC SORTING SYSTEM FOR FRENCH RECYCLER

Through its subsidiary Etiaor the Norwegian-based company Vow ASA will supply a robotic sorting system powered by artificial intelligence (AI) to French recycler Paprec.

The system was ordered by the French-based company and Bianna Recycling, the engineering, procurement, and construction contractor for

Paprec's recycling plant La Courneuve in the North of France. The AI-powered robot will be sorting demolition material, mainly wood and concrete, Vow ASA informed. The unit, named Ascodero Intelligent Robotic Sorting System (AIRSS), would detect and sort 1,000 units per hour in a stream of 1,400 kilograms/hour of various materials.

As stated, the market for waste sorting

of construction and demolition material in France is large. In 2020, a total of 42 million tons of building waste was collected. With more than 16 million tons collected and 280 sites, "Paprec plays an essential role in total waste management throughout France and Switzerland".

www.vowasa.com

Tungsten:

MULTI-STAGE PREPARATION PROCESS ALLOWS UPCYCLING OF RESIDUAL MATERIALS

Cast aluminum, tool manufacturing and radiation shielding: Newly patented manufacturing process of a tungsten alloy (WNiFe/WNiCu) enables additive manufacturing of complex components.

Tungsten alloys (WNiFe/WNiCu) are used because of their corrosion resistance against molten metal and high thermal conductivity for the chill-mold casting processing of aluminum. But also in tool manufacture and for shielding from alpha and gamma radiation, the heavy metal with its density comparable to gold is indispensable. However, at around 3,400 °C, tungsten has the highest melting point of all chemical elements. Therefore, and due to its Mohs

hardness (editor's note: a scale created in 1822 by German geologist and mineralogist Friedrich Mohs) of 7.5, it is difficult to work with tungsten. As a result, components with more complex shapes, such as curves or conical bores, often have to be switched to hot-work tool steel, which is easier to form. To enable the use of tungsten for those more demanding geometries and thus increase the efficiency and longevity of the components, Bayerische Metallwerke GmbH has developed a new manufacturing process for the



To enable the use of tungsten for more demanding geometries, Bayerische Metallwerke GmbH developed a new manufacturing process for a tungsten alloy and patented it in early 2021



Nabil Gdoura

tungsten alloys WNiFe and WNiCu and patented it in early 2021. Bayerische Metallwerke GmbH belongs to the Traunstein-based Gesellschaft für Wolfram Industrie mbH. The earlier mentioned process is characterized by the multi-phase mixed crystal alloy that is obtained in a powder form suitable as a starting material for 3D printing and coating processes. Moreover, this powder can be made from scraps or chips, allowing former waste products to be recycled and even upcycled.

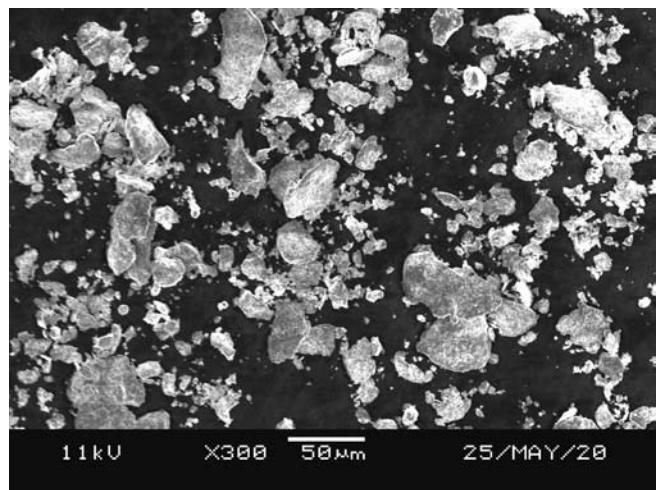
“Due to its resistance to corrosion and erosion from molten metals as well as its excellent thermal conductivity, tungsten is the material of choice in the field of cast aluminum,” says Nabil Gdoura, research and development engineer at Bayerische Metallwerke GmbH. “The very high density of 19.25 g/cm³ in its pure form also makes it a good alternative to the harmful lead, which is still used for radiation shield-

Originally founded in 1911 in Berlin as Wolfram Drahtfabrik GmbH for the manufacturing and processing of tungsten and molybdenum by the grandfather of the current managing partner Marion Freifrau von Cetto, the company changed its name to the Gesellschaft für Wolfram Industrie mbH in 1928. The company’s headquarters were moved to Traunstein in 1943, where additional production buildings were constructed in the 1950s. After the death of the shareholder Helga Freifrau von Cetto, her daughter Marion Freifrau von Cetto took over management of the company as the owner in 1974. In 1991, the Gesellschaft für Wolfram Industrie mbH acquired the competitor Bayerische Metallwerke GmbH in Dachau that had been active in the market since 1926, and thus expanded its product range. Both companies produce exclusively in Germany. There are currently 57 employees at the Dachau location and 63 in Traunstein. In August 2018, the company opened another location in Winterthur, Switzerland, with Wolfram Industrie GmbH.

ing in medicine, for example.” In the case of casting molds, also known as chill-molds, used in aluminum processing, the aim is often to have long but at the same time very thin and sometimes conically shaped cooling channels of less than one millimeter in diameter to ensure the most uniform and rapid heat dissipation possible. Otherwise, the material quality of the end product can be adversely affected by the formation of cracks. It is impossible to form from the hard and heavy metal, whose extremely high melting point is between 3,387 and 3,422 °C, such precise and sometimes curved shapes using conventional machining or forming processing techniques. Therefore, for these complex components for the purposes mentioned, it has so far been necessary to switch to hot-work steel, which can be brought into almost any desired shape with the help of 3D printing techniques. In contrast, the newly developed manufacturing process by Bayerische Metallwerke enables the difficult-to-machine but durable tungsten prepared for 3D printing. Moreover, the process also allows residues of other processing methods to be recycled as components of the tungsten alloy powder, thus reducing waste and manufacturing costs.

New tungsten alloy in powder form suitable for 3D printing

After completing the two-year development phase, Bayerische Metallwerke applied for a patent for their new manufacturing process for a tungsten alloy product and its further use at the beginning of 2020, which was granted in January of this year. “The special feature of our tungsten-nickel-iron alloy is that we obtain it in the form of a pre-



The new manufacturing process is characterized by the fact that the single-phase tungsten-nickel-iron alloy is obtained in powder form, which is suitable as a starting material for 3D printing and coating processes



Dr.-Ing. Hany Gobran

alloyed powder,” explains Dr.-Ing. Hany Gobran, research and development manager at Bayerische Metallwerke and inventor of manufacturing technology. “This is suitable as a starting product for 3D printing and coating processes.” In the absence of an alternative, only a mixed powder has so far been used to make tungsten usable for components with complex geometries. However, the main disadvantage of such mixtures results from the different melting points of tungsten (around 3,400 °C). But also due to the melting point of nickel and iron since both change their physical state at around 1,500 °C. As a result, a large part of the two added substances evaporates uncontrollably during the melting process in the further processing process. That is because the boiling points of nickel and iron are already around 2,700 °C and 3,000 °C, respectively. Thanks to the pre-alloying during the process developed by Gobran, all three elements are combined as a multiphase material in

each powder particle. Thus, their composition and distribution in the end product can be precisely controlled, and no loss of the binder metals has to be accepted.

According to the common standardized variants, the new alloy can be produced with 80 to 98.5 percent (weight) tungsten, 0.1 to 15 percent (weight) nickel and 0.1 to 10 percent (weight) iron and/or copper. That achieves a density of the end product of 17 to 18.8 g/cm³, which is desirable for applications in the aluminum industry, tool manufacture and alpha and gamma radiation shielding. “The higher the proportion of tungsten in the end product, the more resistant it is to molten aluminum and the better its thermal conductivity,” explains Gobran. “If, on the other hand, good ductility and mechanical machinability play a greater role, the proportion of tungsten in the alloy can also be reduced accordingly. The composition can therefore always



It is impossible to form from the hard and heavy metal, whose extremely high melting point is between 3,387 and 3,422 °C, such precise and sometimes curved shapes using conventional machining or forming processing techniques

Tungsten and Recycling

According to the study regarding the global tungsten flow in 2016, conducted by the International Tungsten Industry Association (ITIA), the “total input for production of intermediates was 108,500 tons (metric tons tungsten content) from which 37,500 tons were scrap (new and old scrap), which results in a recycling input rate of 35 percent”. A total of 98,000 tons of tungsten were consumed in end-use products – and based on the estimate for old scrap generated (29,000 tons), an end-of-life recycling rate of 30 percent could be calculated. “Thus, tungsten belongs to the group of metals with a recycling input rate above 25 percent (i.e. 35 percent),” the IAIA stated in a 2018 published newsletter.

www.itia.info/assets/files/newsletters/ITIA_Newsletter_2018_05.pdf

be adapted to the specific application and the respective complexity of the shape.” During the comminution process as part of the manufacturing process, the flow behavior and the grain size of the powder between 10 and 200 µm can also be determined. In this way, the alloy is individually prepared for the desired type of further processing – such as plasma coating processes or additive manufacturing.

A new manufacturing process enables materials to be upcycled

If, for example, the hot-worked steel previously used for thin and conical cooling channels in cast aluminum chill-molds is replaced by the tungsten alloy developed by Gobran, the application benefits not only from the heavy

metal's resistance to corrosion and erosion. Compared to steel, tungsten also has the advantage of much higher thermal conductivity so that the wear on the chill-molds can be massively reduced. Due to its higher density, the alloy product is also an alternative to poisonous lead. That is used not only for radiation shielding but also as a stabilizer, for example in the tool industry. "Another special feature

of our alloy is that we can make the powder from scraps or chips," adds Gdoura. "This is a big step forward from both an economic and environmental perspective, as it allows us to recycle and upcycle waste products from conventional processes."

www.wolfram-industrie.de

ON-DEMAND RECYCLING SERVICES FOR HARD-TO-RECYCLE MATERIALS

Rubicon, a software platform that provides smart waste and recycling solutions to businesses and governments worldwide, has launched the new service "RubiconMarketplace" powered by specialty recycling solutions company g2 Revolution. In this way, independent businesses and residential customers were enabled to divert hard-to-recycle items such as aerosol cans, plastic bags,

light bulbs, personal protective equipment (PPE), and batteries away from landfills and into recycling streams, a press release said. The new marketplace is managed in partnership with g2 Revolution. The USA-based recycling company develops sustainable "Second Life" solutions that help reduce waste through reuse, recycling, or recovery of usable ingredients to make or substitute for new products.

"Every pound of material that is recycled is a pound that does not go to incineration, deep well injection, or to a landfill," Rubicon emphasized. "In turn, this process of diversion protects the environment, saves money, and helps businesses meet environmental compliance requirements."

www.rubicon.com

www.g2rev.com

forrec.eu



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THE NEW END-OF-WASTE TREATMENT CYCLE IN ROSTER LTD

Roster Ltd has been operating throughout Europe in the field of demolition for over thirty years. Additionally, the company deals with the recycling of scrap resulting from their demolition work. Keeping this in mind, Rosen Terziev, owner and founder of the Bulgarian company, decided to close the recovery cycle internally, making the most of the metals and choosing Panizzolo technologies for an End-of-Waste treatment.

Roster Ltd: an ambitious and structured industrial reality

Roster Ltd was founded in 1990 and specialized in the mechanical demolition of buildings, disassembly of plants, equipment, industrial machinery as well as ferrous metal processing and recycling. Nowadays, the company focuses on the demolition of public and private structures, both industrial and structural. "In this sector, the choice of the machinery with which to operate is fundamental. For this reason, we choose from the products of world-class manufacturers with proven effectiveness and productivity. High-performance machinery and good technical availability allow us to work quickly and efficiently," explains Rosen Terziev, representative and director of the company. The company operates throughout Europe with import and export channels for recycled materials to the Netherlands, Hungary, Romania and Turkey. "Therefore, we are constantly looking for new partners and new markets," Terziev underlines.

The company has a young and ambitious staff, with technicians and operators focused on the company's growth. "I have a highly professional team, who, in carrying out their business, assure customers honesty,

cooperation and personal dedication. Currently, more than 200 people work in the company, operating in the dismantling and recycling departments divided into three offices within the national territory," explains Rosen Terziev. Roster Ltd is, in fact, present in Smolyan with the administration and an operational area of eight thousand square meters in Plovdiv. Moreover, they own the second branch of three thousand square meters, while in Kameno they operate within the third site of 37 thousand square meters. "Not to mention the various construction sites throughout Europe, with a staff of engineers committed to following every single phase. Our offices act as a logistics center for vehicles and the storage and treatment of rubble and scrap. In the next period, we plan to expand a new area of 54 thousand square meters."

Panizzolo and Roster: successful partnership

In Kameno City, located near Burgas and its commercial port on the Black

Sea, the new Panizzolo recycling plant was put into operation. The task of the plant is to treat scrap, mixed metals and armored cables obtained from various demolitions. "The project was born within a special meeting where I discussed the desire to treat this waste internally to increase production capacity and reduce company costs. Anton Alabashev, one of my most trusted collaborators, has undertaken detailed research and market analysis. With the presentation of the most interesting companies, the name of Panizzolo Recycling Systems stood out, and, together with a second colleague Hristo Zeynelov, we started the first contacts."

For the success of this project, the establishment of a relationship based on human value, the spirit of enterprise, professionalism and technical competence proved to be fundamental. "For us, the price has never been the main factor. We have always sought contact with people, and this is what made us choose Panizzolo Recycling Systems. We saw staff with a great desire to



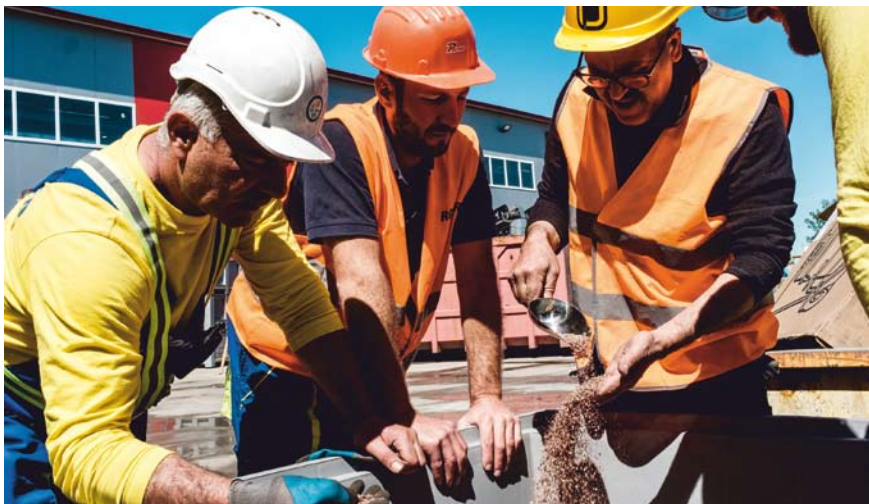
Photos: Panizzolo

work and to build a truly complete plant for the recycling of mixed materials.”

The Panizzolo treatment cycle: from waste to secondary raw material

The installed system guarantees Roster Ltd a flexible and End of Waste treatment. Scrap is subjected to different phases: a volumetric reduction thanks to the shredding PZ 2H 1500 R (2x132kW), a grinding using the Flex 1000 hammer mill (250 kW - up to 11 ton / h) and then continuing with appropriate systems for separating the output material. An independent treatment line is part of the Panizzolo refining plant. The purpose is to enhance fractions leaving the previous plant, enhancing the granular metal such as copper, brass, aluminum and steel.

“Coming from our demolition activity, waste occurs mainly in a mixture of iron and electrical material. We needed a system that could cope with



this heavy refusal, and the Panizzolo technicians were able to professionally guide us to the correct setting,” Terziev explains.

Rosen Terziev: “Panizzolo, an example of quality and professionalism”

Complying with the quality policy of Panizzolo, the introduction to the plant’s system went hand in hand with a theoretical and operational train-

ing cycle. That allowed the operators of Roster Ltd to become familiar with new technologies. “During our cooperation, I was pleasantly surprised not only by the acceptability of the pricing policy and the quality of your products but also by the high culture of communication and the professionalism of the staff,” Rosen concludes.

- 🌐 www.roster.bg
- 🌐 www.panizzolo.it

GERMAN PLANT BUILDER SHIPPED TANK FACILITY TO LATIN AMERICA

In Mexico, German H&S Anlagentechnik has handed over a large turnkey tank facility for storing PU (polyurethane) raw materials to the Ikea supplier Ikano Industry.

As one of the world’s largest manufacturers of flexible PU slabstock foam, Ikano Industry produces mattresses for Ikea’s American market at the expanded site. “The new storage capacity, which was created using a modular design, allows to purchase raw materials cost-effectively in larger quantities and provides a certain independence of raw material price fluctuations,” H&S stated. The H&S plant engineering firm also offers recycling reactors for PU residues. It has developed “an innovative technology and reactor installations for the chemical conversion of flexible and rigid polyurethane foam residues into polyol,” the homepage says. The technologies would enable the production of high-quality recovered polyols on a suitable production scale.



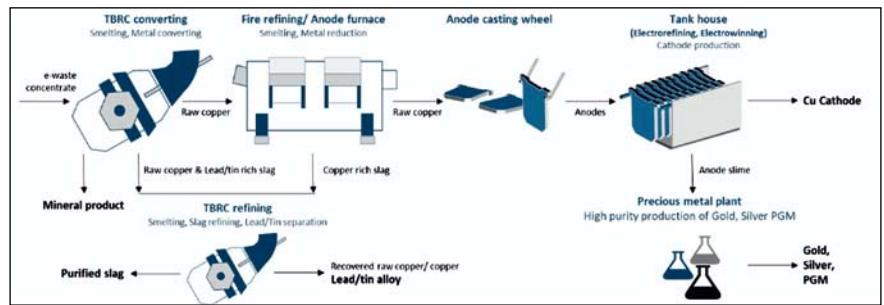
🌐 www.hs-anlagentechnik.de/en

Photo: H&S Anlagentechnik

SMS GROUP REALIZED AN E-SCRAP RECYCLING PLANT FOR PRECIOUS METALS IN RUSSIA

Following a multi-month commissioning phase, SMS group has handed over a greenfield recycling plant for waste electrical and electronic equipment (WEEE) to Aurus in Mtsensk, Russia, a company of Ecopolis Corporation.

According to the German-based plant supplier to the metallurgical industry for steel, aluminum, copper and metals, “the facility is the first of its kind in the world”. Using a combination of pyro- and hydrometallurgical processes, it would recover high-purity copper, nickel, gold, silver and platinum at very high rates. The facility “is designed for an annual recycling capacity of 6,000 tons of WEEE and 10,000 tons of copper scrap”. Ecopolis Corporation is the only operator of WEEE recycling plants in Russia. SMS group is convinced that it represents an important milestone both in terms of recycling technology and for the global recycling industry. In 2017, the engineering firm had received the order for the development of this plant. The supply



Process flows of the BlueMetals e-scrap recycling plant supplied by SMS group to Aurus

scope included the top blown rotary converter (TBRC), an anode refining furnace, the casting wheel, the refining electrolyzer, the precious metals plant and a dedusting system. In addition to the supply of all core components, long-term service agreements were concluded to optimize the plant availability.

As stated by SMS group, today, more than 45 million tons of electronic scrap have accumulated worldwide. The recycling market in this field was grow-

ing continuously. “As part of a global innovation initiative, SMS has expanded its group activities to provide holistic solutions for the recycling of non-ferrous metals.”

Under its “BlueMetals” banner, SMS designs and manufactures recycling facilities for processing between 1,000 and 120,000 tons of waste electrical and electronic equipment of different qualities per year.

www.sms-group.com

Graphic: SMS group

SUTCO OFFERS TECHNOLOGY FOR BIOLOGICAL WASTE TREATMENT

Since July this year, German company Biodegma is a brand of Sutco RecyclingTechnik GmbH. By taking this move, the developer and manufacturer of sorting and treatment plants has expanded its portfolio with additional technology in the field of biological waste treatment.

After years of successful cooperation between the two companies and the realization of various large projects for mechanical-biological waste treatment, mainly in Poland, the



plant manufacturer has taken over the assets of the Ludwigsburg-based Biodegma company. Biodegma specializes in the design and construction of aerobic waste treatment plants. All employees will be integrated into the organization of Sutco RecyclingTechnik. They will remain at the original Biodegma location in Ludwigsburg and conduct their business from there in the usual manner.

www.sutco.de/en
www.biodegma.de

Photo: Sutco

FROM CARS TO CANS ...

One of Britain's leading car salvage, dismantling and recycling companies, SYNETIQ, recovers enough aluminum to create 346 million drinks cans per year.

On average, the company extracts more than 5,200 tons of aluminum during the vehicle recycling process each year. This amount is sufficient to make 346 million drinks cans, a press release informed. Then the light metal is redistributed back into the supply chain as part of its integrated, circular recycling model.

As reported, this is part of SYNETIQ's initiative called "Our Road to Tomorrow", of which the key aim is to be the most trusted and sustainable business in its sector. The initiative included



a study into the true carbon dioxide (CO₂) footprint of the firm's operations and the CO₂ savings that can be achieved by using green parts in automotive repairs while highlighting the environmental benefits of integrated salvage and recycling.

Aluminum is commonly used throughout modern vehicles, including body

panels, wiring, wheels, engine and transmission, and must be carefully separated during the recycling process, the company explained. SYNETIQ would process more than 70,000 vehicles each year, using the waste hierarchy of reduce, reuse, remanufacture and recycle to maximize the sustainability of operations. Vehicles that are not safe for repair, and do not contain reusable parts, are separated down into raw materials for recycling.

According to the information, over the last two years, the business has helped clients avoid 5.5 million kilograms of CO₂ through the supply of green parts alone – the equivalent CO₂ of powering 662 homes for one year.

www.synetiq.co.uk

Photo: SYNETIQ



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Norway:

ROBOT SORTING WILL INCREASE THE RECYCLING RATE OF MUNICIPAL WASTE

Norway-based Geminor and Norwegian waste company “Renovasjon i Grenland” (RIG) have agreed to handle up to 35,000 tons of residual waste for five years.

The waste will be sorted into several recyclable fractions in one of Scandinavia’s newest robot sorting plants. As reported by Geminor, the resource management company will handle and treat approximately 7,000 tons of municipal waste per year for the inter-municipal waste company Renovasjon i Grenland in Norway. The contract will last until autumn 2023, with an option for another three years. The waste is transported to Geminor’s partner in the project, Bjorstaddalen Næring AS, outside the city of Skien. Here, the residual waste will be separated into several recyclable fractions.

According to the head of project and Account & Development Manager at Geminor, Leif Neverdahl, the use of a robot sorting plant offers several advantages. “The robot sorting creates



Leif Neverdahl
at Geminor



Sindre Hauen at
Bjorstaddalen Næring AS

completely pure and cleaner fractions that improve the final treatment of materials – whether the waste goes to material recycling or energy recovery. Our goal is to increase the recycling rate and simultaneously improve the quality of the fractions that are used in the production of new products. Thus, robot sorting is a sustainable option in our waste treatment.”

The robot plant performs 6,000 picks per hour and can be “trained” to sort all of the important fractions for recycling. “The sensor technology is unique and can identify both shape, color, and material. In case of new market opportunities – or even regulations – the system can be taught to recognize new fractions. We want to be in front when it comes to robot sorting and are constantly looking for better solutions in our waste management,” Sindre Hauen, CEO of Bjorstaddalen Næring AS, informed.

🌐 www.geminor.no/en
 🌐 www.bjorstaddalen.no

Photo: Geminor

Photo: Kilian Munch

ANDRITZ AND CIRC PARTNER REGARDING TEXTILE RECYCLING

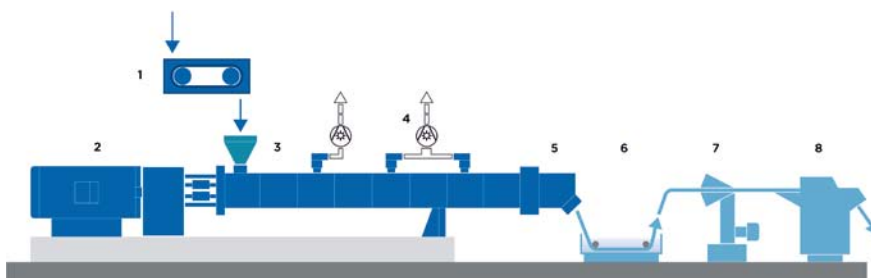
International technology group Andritz has signed a cooperation agreement with USA-based CIRC LLC. The goal is to bundle each party’s expertise in textile recycling and upscale CIRC’s recycling technology for commercial use, the Austrian plant manufacturer gave account. The agreement has come about after many months of successful CIRC processing trials in various Andritz research and development facilities. CIRC – a recycling technology innovator – has developed and patented a textile recycling technology to separate and recover various valuable raw materials contained in most fabrics and used in textile production. This “cutting-edge process” would mainly focus on the handling of mixed polymer streams, specifically any blend of polyester and cotton.

As part of the agreement, the Austrian company will engineer, design, manufacture and start up the process equipment for the first demonstration plant and other commercial textile recycling facilities.

🌐 www.circ.earth, www.andritz.com

BOTTLE-TO-BOTTLE RECYCLING NOW MORE EFFICIENT

PET flakes can now be processed without pre-drying into pellets using Coperion’s ZSK twin-screw extruders, the worldwide active German-based producer of machines and material handling systems underlined.



Typical set-up of a recycling system for economically processing PET flakes into PET pellets that can be used in turn to manufacture bottles

Polyethylene terephthalate (PET) plays an ever more important role in recycling, due to the large volume of packaging materials in use today. Before this material can be reprocessed, it must first be shredded to flakes and then cleaned. “Ordinary technologies require pre-drying, crystallization or agglomeration of the PET flakes following washing,” Coperion emphasized. “However, using the specialized technology from Coperion, the shredded PET can be fed directly into the ZSK twin screw extruder and compounded.”

The process

The shredded flakes are fed into the ZSK extruder using high-accuracy SWB

(Smart Weigh Belt) feeders or gravimetric feeders from Coperion K-Tron. In addition, other regrind materials, new materials, or mixtures can be added. Melting, intensive devolatilization, and complete homogenization take place in the ZSK process section before the melt is transferred via a gear pump and filter with an automatic screen pack changer to a strand or underwater pelletizer for pellet production. Pellets are then condensed in an SSP (Solid State Polycondensation) reactor. According to the provider, the

efficient plastification within the ZSK extruder would ensure that Coperion systems for this bottle-to-bottle recycling process achieve throughput rates between two and eight tons per hour.

The pellets’ quality meets the requirements of virgin material, Coperion assures. They had received approval from the United States Food and Drug Administration (FDA) for food-contact uses.

www.coperion.com/en

Graphic: Coperion

THE GLOBAL MARKET FOR NON-HAZARDOUS MEDICAL WASTE MANAGEMENT

Fact.MR, a provider of data-driven market intelligence, has recently launched a report on Medical Waste Management Market. The market is expected to surpass 22 billion US-Dollar by the end of 2021-2031, which means a – projected – CAGR (compound annual growth rate) of more than three percent, the company informed. “Increasing hospitalization rates is compounding the volume of medical waste generated, thus nudging demand.”



Historically, demand had accelerated at a CAGR of approximately four percent, closing in at over 16 billion US-Dollar in 2020. “The onset of Covid-19 further heightened expansion prospects,” the information said. “As countries continue battling the pandemic even today, hospitals and other healthcare settings are prioritizing on maintaining hygiene standards to prevent infection spread.”

www.factmr.com

Photo: O. Kürth

WET PROCESSING PROVIDER CDE REALIZED ITS FIRST SOLUTION IN BELGIUM

Ireland-based company CDE has commissioned its first solution in Belgium for family-owned business De Bree Solutions as it upgrades its 20-year-old equipment range.

Founded in the 1970s, the Belgian company is a sewage and waste collection service provider. Having expanded its focus over the past five decades, De Bree Solutions is active in industrial cleaning, green processing, soil cleaning, soil remediation, waste management, water purification and sewer renovation throughout Belgium, Netherlands and France. At the turn of the millennium – as a result of evolving environmental legislation – De Bree Solutions invested heavily in the latest recycling technologies of the day. Therefore, the company established soil remediation and water purification facilities in Maldegem and opened three new sites in Ostend, Eke and Schoondijke where raw materials are recovered from contaminated and inert waste streams.

Once again, the company has invested in the latest waste processing technologies, entering a period of business



growth and sustained demand for its product range.

CDE solution

The solution proposed by CDE included its AggMax, EvoWash and CFCU systems to process highly variable feed material including organic waste, contaminated soils containing metals, cyanide and oil; construction, demoli-

tion and excavation (CD&E) waste; and road sweepings.

CDE’s AggMax technology “is engineered to operate in the toughest of conditions to maximize product yield from the most abrasive of feedstocks,” the Irish business expert underlined. “Its versatile design incorporates five processes on a single and compact portable chassis, including pre-screening, scrubbing/attrition, sizing, contaminants removal and stockpiling.” The heavy-duty AggMax could process challenging CD&E waste material containing large quantities of organic and other inert physical contaminants into high-value materials suitable for a variety of applications in the construction industry.

As reported, fine material is processed by CDE’s signature EvoWash technology. A compact, modular sand washing system, the EvoWash screens and separates the smaller sand and gravel fractions through an integrated high-frequency dewatering screen, sump and hydrocyclones. “Incorporating CDE’s patented Infinity Screen tech-



nology, the EvoWash offers optimal dewatering results which enables materials processors to produce a range of high-quality sands that are market-ready straight from the belt.”

Furthermore, the CFCU technology would allow the effective separation of two materials of different relative densities. “With a variable cut (separation) point, it offers greater control over sand classification providing complete flexibility for the production of various end products and the removal of lightweight contaminants

from the fine material fraction”, the information said.

400 tons per day

Since the seamless integration with the existing plant setup, CDE’s solution has almost doubled processing capacity at the Maldegem site. According to Yves Dupont, Managing Director at De Bree Solutions, the target is 400 tons of sand and stone per day in one production. “Thanks to CDE, we now have that capacity there which will help us keep up with growing demand.”

Both the sand and aggregate fractions would pass through the newly commissioned equipment, which has increased capacity and improved output quality. Washed sand processed by the CDE solution is being used for over 90 percent of concrete produced by De Bree Solutions for underground works. The aggregate output is used for various applications, including concrete products, drainage and other construction-related applications.

🌐 www.cdeglobal.com

🌐 www.debree.be

RECOVERY OF PAPER FIBERS FROM WASTE

USA-based paper products manufacturer Georgia-Pacific (GP) has opened a processing unit to recover fiber from particularly contaminated streams that would otherwise be landfilled.

In Toledo (Oregon, USA), the first quarter of this year started with Georgia-Pacific’s material recovery facility (MRF), which has applied the Juno technology to recycle highly contaminated mixed materials. It is planned that the unit will process 300 tons per day (or about 100,000 tons per year) when it has reached its full capacity. The recovered fiber, along with fiber from OCC (old corrugated containers), will be used to produce linerboard for boxes.

Juno, a company belonging to the American pulp and paper corporation Georgia-Pacific, “provides communities and organizations with a solution to help achieve recycling goals and reduce overall air emissions,” the information on the enterprise’s homepage says. Globally, over two billion tons of waste were generated each year; that number would grow to approximately 3.5 billion tons by the year 2050, it

refers to estimates of the World Bank. “Juno wants to help.”

As described on the homepage, the – patented – Juno Technology “takes commercial waste and uses a proprietary process to sterilize waste, turn the food into biogas, and recover paper, plastics, and metals”. For this purpose, the waste is sanitized in a specialized, heated chamber. Then the process separates the valuable materials – mostly paper fibers, plastics and metals – suitable for recycling. The organic material is converted into biogas that can be used in a variety of applications. GP anticipates that, on average, about 30 percent of processed waste will be usable fiber for papermaking.

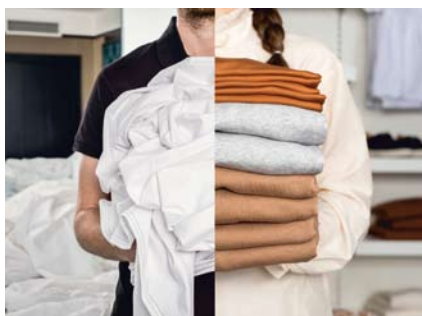
According to Juno, it can recycle up to 90 percent of what is diverted to the company from landfills and incinerators from commercial sources. The firm is convinced that it has the “potential to provide millions of tons of recycled paper, plastics, and metals back to the global economy for reuse as raw materials”. Furthermore, there are emissions reductions: “Our goal is to divert 10 million tons of garbage from landfills and incinerators and offset 10 million tons of carbon dioxide equivalents in under 10 years.” It is planned to commercialize GP’s and Juno’s waste solution in cities around the globe.

🌐 www.juno.gppackaging.com



SÖDRA INTENDS TO SCALE UP PRODUCTION OF ONCEMORE PULP

As reported by Södra in June this year, a new investment in its pulp mill at Mörrum will achieve a tenfold increase in the OnceMore production capacity while also expanding the proportion of recycled textile in the pulp.



According to Södra, Sweden's largest forest owners association and an international forest industry group, the corporation can realize with OnceMore "the world's first process for industrial-scale recycling of textile waste of blended fibers". Due to the positive reaction to the solution and the growing market demand, it has decided to invest in new machinery at its pulp mill at Mörrum (Sweden). The new investment would increase the production capacity of OnceMore pulp to 6,000 tons, the Swedish producer underlined. The proportion of recycled textiles in the pulp would also go up. The machines will be commissioned in the first half of 2022. The investment is the second step towards processing 25,000 tons of textile waste and offering OnceMore pulp based on Södra's

forest raw material and 50 percent recycled fabrics. This target has been set for 2025. OnceMore makes it possible "to convert large volumes of used cotton textiles and cotton-polyester blends into new clothing and textiles," Södra points out on its homepage. "The RCS (Recycled Claim Standard) certified pulp is also attracting interest from the market. Södra has held several meetings with interested brands and recently signed a long-term collaborative agreement with the global textile giant Lenzing."

The cooperation involves transferring knowledge between the two com-

panies, which have been proactively driving the circular economy issue for years, the corresponding press release said. A joint process development had followed by a capacity expansion for pulp from post-consumer waste. The jointly developed pulp would subsequently also be used as a raw material for the production of Lenzing's TENCEL™ x REFIBRA™ branded specialty fibers.

OnceMore had received a highly positive reception, Södra emphasized. The company would deliver regular supplies of this pulp to several textile manufacturers around the world. "This new investment and our partnership with Lenzing will help us create world-class textile recycling and grow the business. OnceMore has the potential to transform the textile industry," Johannes Bogren, Vice President, Södra Cell Bioproducts, was quoted in a press release.

www.sodra.com/en
www.lenzing.com

Photo: OnceMore

RENEWCELL ORDERED SHREDDERS FOR ITS TEXTILE RECYCLING PLANT IN SWEDEN

Austrian-based international technology group Andritz has received an order from Renewcell to supply textile recycling equipment to its greenfield recycling plant in Sundsvall, Sweden. Core elements of the new recycling system will be the company's ADuro shredders, which will reduce used textiles in one step to small pieces. "With unique capabilities, the ADuro shredders cut the incoming material uniformly and cleanly while enabling a very high throughput," Andritz gave account. "In the subsequent

separation stages, contaminants like buttons and zippers will be removed from the shredded textiles." Renewcell would use this pre-treated material to produce a pure, natural dissolving pulp made from 100 percent recycled textiles.

In addition, the scope of supply would include additional key pieces of equipment. With the equipment from Andritz, up to 60,000 tons of used textiles per year could be handled in the new recycling plant. The start-up is

scheduled for the first half of 2022. Renewcell, headquartered in Stockholm, Sweden, was founded in 2012 and is specialized in the recycling of textiles. Its recycling technology dissolves used cotton and other cellulose fibers and transforms them into new raw material, the so-called Circulose pulp, which is further used to make biodegradable virgin quality viscose or lyocell textile fibers for the fashion industry.

www.andritz.com

MONITORING SENSORS REDUCE COLLECTION TIME AND COSTS

Ekocharita, a Slovakian textile waste collection company, has revealed the results of a waste monitoring project using sensors from waste management solution provider Sensoneo.

As of January 2021, Ekocharita began installing Sensoneo smart sensors to monitor the fill levels of their containers in real-time. By the end of June this year, they had monitored 600 containers. Thanks to data gained from the sensors, Ekocharita was able to improve the management of their operations significantly as they:

- decreased the time required for the collection of one ton of textile waste by 30 percent,
- reduced the waste collection cost by 20 percent,
- and made the logistics process smoother and better organized.

Textile waste is a stream that is still awaiting legislation for separate collection. According to European law, it should come into practice in 2025. Until then, the system is supported by private companies that manage the collection of discarded clothes and ensure its reuse, recycling, and charity donation.



ers are usually distributed in busy urban areas. The availability of textile waste containers nearby encourages citizens to sort the clothes properly.

However, the filling cycles of containers for textile waste are not predictable. That makes collecting this waste difficult for operations and logistics and puts high financial and time demands on managers. Real-time online monitoring of fill levels can significantly improve operations and reduce costs, Sensoneo and Ekocharita underlined.

Ekocharita operates within 16,000 square kilometers and manages 1,300 containers for clothes, shoes, toys and home textiles located mainly in the western part of Slovakia. The contain-

- www.sensoneo.com
- www.ekocharita.sk

Photos: Sensoneo

CANADA PLASTICS PACT WELCOMES NEW PARTNERS

In August this year, the Canada Plastics Pact (CPP) welcomed 12 new partners including leading consumer goods organizations, industry associations, governments, converters and recycling stewardship organizations from across Canada. The organization, tackling plastic waste and pollution as a multi-stakeholder, industry-led, cross-value chain collaboration platform, now has over 65 partners. The CPP brings together partners “who are united behind a vision of creating a circular economy in Canada in which plastic waste is kept in the economy and out of the environment”. Their goal is to create this for plastics packaging by 2025 in Canada. Since the CPP launched earlier this year, partners have started working on several initiatives for progression towards the 2025 targets. In July, the organization announced it would lead the consultation and implementation of the “Consumer Goods Forum’s Golden Design Rules for Plastic Packaging Design” within Canada, which would provide a framework “that will result in less plastics overall and better plastics to the recycling system”. In addition, the CPP is currently working to develop a roadmap to achieve the 2025 targets along with a longer-term vision that will be released this fall.

Poland:

JELENIA PLAST USES MORE PLASTIC REGRANULATE

German-Polish producer Jelenia Plast and Polish plastic recycler ML Polyolefins have contracted the supply of polypropylene recyclate in the next step of their cooperation.

The contract was signed by Jens Kröger on behalf of Jelenia Plast and Tomasz Mikulski, president of ML Sp. z o.o. As reported, the companies did not provide the exact value of the contract due to trade secrets but indicated that the contract value would amount to a “few million Euros per year”.

ML Polyolefins is a leader in producing polypropylene from recycled materials in Central and Eastern Europe, manufacturing about 1,200 tons of granulates per month. The company intends to strengthen its leading position in the region and join the group of the largest manufacturers of black polypropylene in Europe. Its investment plans include the construction of new storage yards, a new factory, the purchase and installation of a new regranulation line, further improvement of the machinery park and an increase in production potential. Jelenia Plast was founded in 1992 by Mathias and



Photo: ML Polyolefins

Intensified the co-operation regarding recyclate supply: (from the left) Monika Łągońska (Head of the Purchasing Department of Jelenia Plast), Jacek Mędrak (Member of the Management Board of Jelenia Plast), Jens Kröger (President of the Management Board of Jelenia Plast), Tomasz Mikulski (President of the Management Board of ML Polyolefins), Krzysztof Nowosielski (Commercial Director ML Polyolefins)

Jens Kröger. Today the company employs more than 700 people and produces household and garden items by injection molding and rotation. The company sees itself as the market

leader in this product segment, which started in 2003.

🌐 www.jeleniaplast.com/en
 🌐 www.mlpolyolefins.com/en

SABIC TO LAUNCH CIRCULAR POLYCARBONATE

SABIC, a global leader in the chemical industry, has announced the launch of its certified circular polycarbonate (PC) resin and blends.

As reported by the company, this material made from the upcycling of post-consumer mixed plastic is a first in the industry. An internal SABIC LCA study had shown that the certified circular polycarbonate would offer a potential carbon footprint reduction of up to 23 percent in comparison to its

incumbent. Part of the multinational company’s TRUCIRCLE portfolio of circular solutions, the certified circular polycarbonate is produced through the advanced recycling of post-consumer mixed plastic that could otherwise be destined for incineration or landfill. Through pyrolysis, difficult-to-recycle used plastic is broken down into pyrolysis oil. “This is then used as a feedstock to create certified circular building blocks for high-performance plastics with the same properties

as the virgin material – in this case, polycarbonate,” the chemical manufacturer said.

Polycarbonate – more specifically LEXAN resin – forms part of SABIC’s ETP portfolio including PC blends such as CYCOLOY and XENOY resins. “Customers across industries – such as E&E, Automotive, Healthcare, B&C and Consumer Goods – may use the certified circular polycarbonate under identical process conditions to those

used for its incumbent.” The polycarbonate is certified by an independent third party under the International Sustainability and Carbon Certification (ISCC PLUS) scheme using a standardized mass balance approach. That

provides a method of asserting the recycled material content along with predefined and transparent rules. In addition, the widely recognized ISCC PLUS accreditation provides traceability along SABIC’s physical-linked

supply chain, from the feedstock to the final product, requiring a chain of custody based on the mass balance system.

www.sabic.com/en

Water Recycling with Microalgae:

BUSINESS CASE FOR BIOFUEL FROM WASTEWATER POND

Environmental health experts at Australian Flinders University are advancing research into a sustainable wastewater recycling program by developing a cost-effective way to harvest microalgal biomass for use in biofuels and other applications.

According to the research of Flinders University, the high-rate algal pond (HRAP) model, recycling wastewater at two regional South Australian locations at Kingston-on-Murray and Peterborough, uses algae and bacteria to treat the wastewater. Research led by Flinders University Professor Howard Fallowfield and Dr. Paul Young has presented details of a new system using slaked lime and magnesium concentration to pool the microalgae-rich biosolids produced in the HRAP at Kingston-on-Murray in SA’s Riverland. Chemical reaction modeling was used to optimize the processing, and the cost of chemicals was evaluated. “This auto-flocculation process was success-



Professor Howard Fallowfield

ful in harvesting the biosolids while significantly reducing the turbidity, nutrients and E. coli contamination left in the wastewater,” lead author Dr. Young was quoted.

As reported, these sustainable, low-energy systems are cost-effective to run. Moreover, the capital cost of construction is about 40 percent of the previous system for effluent-only

schemes and marginally higher for blackwater schemes. “While a conventional system requires 66 days to treat the wastewater, HRAPs can perform a similar level of treatment in 5-10 days,” the information said. As emphasized by Professor Fallowfield after an earlier Flinders University study, which compared the trial site at Kingston-on-Murray with a conventional system, its ability to remove pathogens is equal to, or better than, existing wastewater systems. According to Professor Fallowfield, the study for the first time shows the HRAP wastewater treatment system could also be used to efficiently harvest microalgae grown in a low-cost environment – without the need for further investment in expensive infrastructure. “The integration of treatment and biosolid recovery offers new configurations for the operation of HRAP-based wastewater treatment systems,” he is convinced.

www.flinders.edu.au

Photo: Flinders University

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Waste-to-Energy Technology in Brazil: **ON A MASSIVE TRANSITION INTO THE FUTURE**

Twenty years ago, an academic paper registered “Barriers to Implementation of Waste-to-Energy Technologies in Brazil”. The list included lack of funds, spoke of an absence of consistent national policy and legislation, argued with the deficiency of detailed data collection and assessment, criticized higher direct investment costs and mentioned the public belief that WtE is worse than composting. What has changed in this sector ever since?

A snapshot of Brazil's installed energy production capacity in 2015 shows that of 140 GW nearly 92 GW depended on hydropower, "characterized by large reservoirs distributed over a complex geography comprising various river basins".

The percentage of Waste-to-Energy has not even been amounted to, and the appropriate plants were too inflexible to be dispatched when other reservoirs were at a low level or not available. The WtE technology did not play any role. A research paper published at the Waste-to-Resources Symposium 2017 sought for reasons and attested "a significant lack of technical knowledge about processes and technologies in the majority of city administrations". The consequence: "Most cities are not capable of elaborating waste characterizations nor waste management plans or at least evaluate the potentials for waste treatment facilities other than landfilling". A report in March 2018, launched by the World Bank Group, found other factors: "Waste-to-energy projects face some political opposition, especially from those who fear that these facilities will cause waste-pickers to lose their livelihood. Waste incineration and energy recovery is deemed too expensive for Brazil's market." But the paper also prognosticated: "Increased energy prices, end-of-life sanitary landfills, and lack of room for new sanitary landfills could make incineration economically feasible in the future."

A handful of biogas plants

According to a presentation at the Waste-to-Resources Symposium 2019 in Hannover, the most common WtE technologies in Latin America and Caribbean countries – technically and economically proved to be feasible – are biogas production from landfills, anaerobic digestion for agro-industrial wastes, industrial refuse-derived fuel and "some successful cases of pyrolysis". Actually, for Brazil, two landfills in São Paulo are reported to generate gas for producing electricity. In 2017, the Caieiras Landfill had installed 29,5 MWe and the Bandeirantes Landfill 20,0 MWe; the Salvador Landfill at Bahia with 19 MWe capacity was concluded in 2011. Sergio Guerreiro Ribeiro, President of WtERT Brasil, underlined then most sanitary landfills in Brazil burned the biogas in flares – by incineration without energy generation. Newly, the park of waste recovery technologies in Brasil is expanded by three mechanical treatment plants turning municipal waste into alternative fuels with a capacity of 750.000 tons per year. And it will be enlarged by another incineration plant of 300.000 tons and several composting plants with 90.000 tons capacity planned.

Co-processing technique since 1992

Votorantim Cimentos – in its own words "one of the largest global companies in the building materials sector" – is

running a plant in Rio Branco do Sul, the first cement plant deploying the co-processing technique of industrial waste since 1992. As the Integrated Report 2015 of Votorantim indicates, the company created a business unit called Area for Alternative Fuels and Raw Materials (AFR) in 2015, "with the objective of seeking new options for fuels and raw materials, enabling and accelerating, for example, the use of alternative fuels in cement production". In 2014, almost about 90 percent of its facilities were authorized to receive wastes for processing.

Thermal substitution rate: 15 percent

One year later, Brazil plunged into a political-economical crisis leading to a productivity reduction in the cement industry and an excess capacity of nearly 50 percent. In 2019, the cement industry consisted of about 100 plants – two-third of them are integrated units and one-third cement grindings –, of which currently only 60 percent are licensed to co-process waste-derived fuels, raw materials and tires. With 1.5 million tons of fuel derived from waste and biomass, the total thermal substitution rate of this material in the cement industry merely reaches 15 percent. And even if the cement sector roadmap foresees a thermal substitution rate of 35 percent, including 10 percent of alternative fuels and 50 percent including 20 percent for 2050 respectively, the effect of co-processing by the cement sector must not be overestimated.

The potential of incineration

A study published by the Brazilian Ministry of Regional Development titled PLANSAB – Energetic report analyzed the potential of municipal solid waste for the cement market. Depending on the engagement of municipalities for the availability of material, the best scenario identifies the procession of 10.5 million tons of waste. However, the most realistic scenario defines 3.3 million tons of waste per year for generating 1.1 million tons of alternative fuel. To process these 10.5 million tons to realize the production of four million tons of alternative fuels, it would need investments into mechanical-biological treatment plants of about 1.2 billion Euro and additionally 17.5 million Euro per cement kiln unit for the substitution of fossil fuels, a group of researchers demonstrated at the Waste-to-Resources Symposium 2019. Another study written at the State University of Campinas counts on a combination of waste treatment by recycling, incineration and bio-digestion, resulting in a biological treatment option to produce about 221.7 GWh per month, while the incineration treatment option could reach about 2902.6 GWh per month. A publication from researchers at the Federal University at ABC favors a combination involving incineration and anaerobic digestion. That represented the highest theoretical potential of electricity generation

at about eight TWh per year in the state of São Paulo and – considering the scale of commercial plants – a viable potential of 84 percent of this amount representing 6.7 TWh per year.

First projects planned

In the summer of 2018, the state of Paraná claimed to install the CS Bioenergia plant in combining organic waste and sewage sludge treatment, located near the city of Curitiba. The project – costs: 16 million US-Dollar – aims to reuse 300 tons of sludge and 1,000 m³ of organic waste daily as input to a bio-digestion technology producing biogas for the generation of 2.8 MW every day. The plant will be created by Sanepar, the sewage treatment State Sanitation Company of Paraná, and the private Cattalini Bio Energia group. “Our plant breaks a landfill paradigm regarding treatment of organic waste in Brazil,” Sérgio Vidoto, director of Cattalini Bio Energia, was cited in April 2019. In an interview, Mounir Chaowiche – Sanepar’s president – prospected at least eight anaerobic sewage treatment stations for the collection of biogas, funded by the German KfW Bank.

In January 2019, the media reported the operation of an energy-from-waste pilot plant in Rio de Janeiro. Able to extract 100 to 150 m³ of biogas per processed ton, with 50 to 60 percent methane concentration, the technology produces fertilizer and natural gas from waste. The facility – developed by the Federal University of Minas Gerais in partnership with the companies Methanum Tecnologia Ambiental and the Municipal Company of Urban Cleaning – was funded by the Brazilian Development Bank. Its processing capability is expected at 30 tons per day. In 2020, energy producer Valoriza Energia highlighted the URE Valoriza Santos (also called URE Baixada Santista by Abren) as “the first MSW thermovaluation plant that will go into operation in the country”. Located in the municipality of Santos, it is planned to generate 50 MWh of electricity and a thermovaluation of 2,000 tons/day of waste from the Baixada Santista. This generated energy can serve a city of 250,000 inhabitants. But still, in 2021, Valoriza Energia saw the plant “among the projects in implementation”.

And in April 2021, Ciclus Ambiental, the waste concessionaire for Rio de Janeiro, “intended to install waste-to-energy plants”, the first in Caju, a district in the north of Rio. For this 30 MW generation unit, an investment of 105 million US-Dollar was estimated.

The Barueri project

However, the “first WTE project” with the first “mass burn WtE contract” in Brazil was planned for the city of Barueri, in the vicinity of São Paulo. The plant was owned by Foxx

Haztec, the largest waste management company in Brazil, and – according to WtERT – was planned to be financed by Caixa Economica, a government-owned bank, with 69 million US-Dollar and the International Finance Corporation with 16 million US-Dollar. The total costs were estimated at 111 million US-Dollar. The plant’s processing capacity totaled 825 tons per day or 300,000 tons per year; the installed capacity of 20 MW had to provide an annual net power of 117 GWh, the exported power was forecasted at 14,72 MWt. In September 2016, the construction “is ready to start except for a few details in the finance/equity partnerships involved”, WtERT referred. The start of construction was terminated in April 2017. In June 2018 – meanwhile, China Jinjiang Environment had taken control of Foxx URE-BA Ambiental Ltda – a press release declared the Barueri WTE project as “proposed”. According to Ms. Wang Yuanluo, Non-Executive, Non-Independent Chairman of Jinjiang Environment, her company wants to make Barueri a landmark project in Brazil and Latin America to “kickstart the development of the local WTE industry” and aiming to “pave the way for the Group’s success in Brazil and Latin America”. Operation start of the plant was scheduled by February 2020.

The reality

Figures published by waste-to-energy association Abren, BNamericas and WtERT Germany indicate that the calculated annual capacity of urban solid waste-to-energy plants in Brazil’s metropolises amounting to 18.9 TWh is far from being realized. In March 2021, only 183 MW of five projects were “under development”: The Barueri plant had merely been granted an installation license, URE Mauá and the Rio de Janeiro plant achieved preliminary licenses, URE Valoriza Santos or Baixada Santista respectively is in the state of “implementation”, and apparently the Diadema plant with Outotec gasification exists only on paper. Some of them have obtained the environmental license, says Yuri Schmitke, president of waste-to-energy association ABREN.

The “first WTE project” with the first “mass burn WtE contract” in Brazil was planned for the city of Barueri, in the vicinity of São Paulo.

Further treatment urgently asked

According to Yuri Schmitke, the country has the potential to install 250 waste-to-energy power plants with 20 MW installed capacity, able to respond to at least 6.4 percent of Brazil's energy demands, with CAPEX investments of 160 billion Brazilian Real (32 billion US-Dollar). Together with the potential of biogas plants, this would be enough to deliver nearly eight percent of the country's energy demand. Additionally, the landfills in metropolitan cities such as São Paulo and Rio de Janeiro "will face exhaustion in less than three years, requiring urgent measures by local authorities to find new alternatives for their municipal solid waste". That will strengthen the need for more facilities. If the total waste diverted from landfills nationally would be considered, further thermal treatment is urgently asked.

A positive agenda

It is not primarily the investment sum that hampers licensing, construction and commercial operation of such facilities in Brazil. It might have been partly the public opposition in 2019. Then thousands of Brazilian waste pickers marched together under the slogan "Não a incineração" (Say no to incineration). And it might have been partly the group "Brasil Contra a Incineração do Lixo" (Brazil against waste incineration) publishing its "Manifest against the Destruction of Urban Solid Waste and for ZeroWaste". But it was surely, although only partly, the result of a decennial lasting change inaugurated by Brazilian National Solid Waste Policy, that a "positive agenda" and a "new systematic approach for waste management" were created. That led to generally greater efficiency in public contracting and it contributed to guaranteeing the legal security of contracts for operations signed, as Brazil expert Christiane Dias Pereira recently balanced at the Waste-to-Resources (Online) Congress. Above all, it was the promotion of what Yuri Schmitke called a missing "sectorial articulation". The formation of ABREN in 2019 as a voice for the waste-to-energy treatment was the consequence. That helped to convince the government of the feasibility and benefits of this sort of waste management. Meanwhile, Abren is a unit

of the Global Waste to Energy Research and Technology Council (WtERT), associated with the International Solid Waste Association (ISWA) as well as Germany's Waste Management Federation (BDE) and has a technical cooperation agreement with the Portuguese WTE association Avaler. The political circumstances in Brazil are improving. In July 2020, Brazil's New Sanitation Legal Framework was approved. Among others, it designed a new class of contracts on sanitation services, including waste treatment: sealed with the public authorities, delivering fairer conditions, and running in the long term. The public consultation for the first National Waste Management Plan has been concluded in early 2021, containing inter alia targets for energy recovery from MSW through Anaerobic Digestion and thermal treatment. And in the second semester of this year, the first waste to energy auction is planned – seen as "a major breakthrough into the definitive WTE market opening in the country", Yuri Schmitke and A. Belchior Tisi, president of WtERT-Brazil, are quoted.

Energy recovery: the leading project type

"These regulation changes affect investments in WTE field in Brazil mostly with regard to the securitization of up-front investments via the direct charge for the service in the water/waste consumer's bill", the presidents of Abren and WtERT are convinced. Of course, fitting technological, financial and/or ecological parameters like waste quality development, the height of environmental taxes, focussed funding, public opinion and several others are needed "to pave the way for a massive transition" into a successful future for the Brazilian WtE market. However, a fact file from AcuComm – provider of business opportunities and market intelligence – already in 2019 certified incineration with energy recovery as "the leading project type" of waste treatment in Brazil, accounting for about three billion US-Dollar. Second is biofuel recovery, accounting for 2.6 billion US-Dollar. For comparison: The value of recycling is estimated at 32 million US-Dollar, waste processing at 36 million US-Dollar. AcuComm expected overall waste investments of 3,963 million US-Dollar to become operational over the next few years.



Brazil:

NEW SORTING FACILITY STARTS IN 2022

German-based plant engineering firm Stadler has signed an agreement with Orizon Valorização de Resíduos for the construction of the largest mechanical sorting plant in Brazil.

Upon completion, the facility is expected to process 500,000 tons of solid waste per year in the country where the potential for recycling is growing. According to Stadler, the contractually agreed plant construction represents a technological breakthrough in the operations of the Jaboatão dos Guararapes Ecopark in Pernambuco (northeast Brazil), which would allow greater reuse of recyclable waste. In 2020, the plant received 1.5 million tons, equivalent to the waste generated by 3.7 million Brazilians. “The agreement also sets an example of the management and use of technology for the sector,” Alexandre Citvaras,

director of Business Development at Orizon Valorização de Resíduos, is cited. As stated by the engineering firm, the plant in Pernambuco will be the largest mechanical sorting plant ever built in the Brazilian market. The German company has designed and implemented the entire project with two overarching objectives: to modernize and strengthen Orizon’s plant for the sorting process and select the recoverable products with the highest value to serve increasingly demanding domestic and international markets.

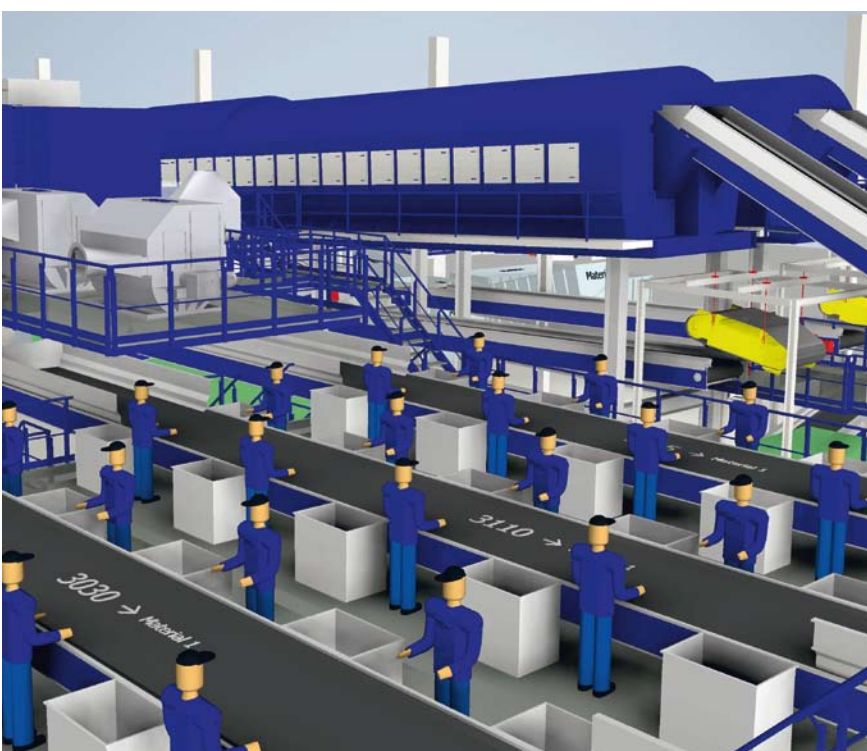
“The biggest challenge had been to design a sorting process with proven technology that increases the efficiency of the waste treatment at the Jaboatão dos Guararapes Ecopark,” Alexandre Citvaras gave account according to the information. “With this machinery, we will achieve a sorting efficiency ranging from 75 percent to

85 percent of the economically viable recyclable material. It is a breakthrough in our operations, which have gained in productivity and will play a key environmental role by returning materials to the production chain, helping to move us towards a true circular economy.” Contract partner Stadler has been chosen because Orizon Valorização de Resíduos believes that the plant manufacturer realizes “machinery with the quality and robustness required to process the type of solid waste that the ecopark receives, and which, at the same time, keeps the quality control with manual sorting”. It is intended that at the new sorting plant, 150 people will be employed to “carry out this work in the project, which will start its operation in 2022. This is why we needed a project that combines the two models,” the Orizon manager depicted the requirements.

A very ambitious project for the Brazilian market

Henrique Filgueiras, Stadler’s sales representative in Brazil, explained that the said agreement is “extremely important”. It would strengthen further the plant manufacturer’s relationship with a customer “that we have known and worked with for more than seven years – a company that has a lot of potential here in Brazil. In addition, it is a plant with a high capacity for processing MSW – the highest in Latin America – and a project on this scale strengthens our reputation as specialists in this type of plant in Brazil. The agreement gives us the opportunity to do a good job in another project and gain even more experience in Brazil.”

As reported, this plant has been designed to process a large volume of material with the initial separation of



the coarse and heavy fraction through mechanical sorting and the final separation of the fines by hand. In addition, the plant layout already envisages the possibility of extending the line to increase its capacity, as well as increasing the automation of its processes.

Orizon Valorização de Resíduos operates five ecoparks in Brazil. Its waste management and processing facilities receive approximately 4.6 million tons of waste per year, serving approximately 20 million people and more than 500 business customers. Because of the new plant's efficiency and prominence, the project will be rerun in the future in the rest of the company's facilities throughout the country.

Specific peculiarities of the market

The Brazilian market has specific characteristics; a detailed analysis of the

individual cases is necessary before presenting a solution to the customers. According to André Galuppo, supervisor at Stadler for Latin American projects, "Stadler always seeks to



André Galuppo

develop products, methodologies and ideas that are specific to the Brazilian reality. We do not 'copy and paste' projects from Europe. The objective is to develop projects, studies and work focused on Brazilian waste and business models. This technical and intellectual development will be used in Brazil and for Brazil, benefiting the entire market."

"We have been investing in Stadler do Brasil Ltda. for more than eight years to provide local support that can be relied on," Stadler's Director of Latin American Operations, Sergio Manchado Atienza, was quoted. The goal was to help develop the market in a country "as important as Brazil, and with many resources necessary for the evolution of the circular economy. We are very proud of the work and development of our Brazilian subsidiary."

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www.panizzolo.it



INDIA: TATA STEEL COMMISSIONS ITS FIRST STEEL RECYCLING PLANT

Indian multinational steel-making company Tata Steel has commissioned its new Steel Recycling Plant with a capacity of a half-million tons per annum (0.5 MnTPA) at Rohtak, Haryana. It has been set up in collaboration with M/s Aarti Green Tech Ltd., as a “Build, Own, Operate” (BOO) partner.

According to the steel maker, it is the first facility in India, equipped with modern and mechanized machines such as shredder, baler, and material handler, to name but a few. The scrap would be procured from various market segments, for example, end-of-life vehicles, obsolete households, construction & demolition and industrial, through an App FerroHaat. The scrap would then be processed through mechanized equipment, and the high-quality processed scrap would be supplied for downstream steel making. “Steel produced through the recycled route entails lower carbon emissions, resource consumption and energy utilization,” Tata Steel stated.

Simultaneously, the company has also launched two new brands – Tata FerroBaled and Tata FerroShred for the baled and shredded ferrous scrap



Photo: Tata Steel

produced in its new facility. “These products are high quality processed scrap, and they promise to provide the much-needed raw material fillip to Indian steel industry by making available quality processed ferrous scrap and reducing the dependency on imports.” Both new brands would promise high cleanliness, low contamination, high bulk density, lower tramp elements and no radioactivity. The products would be accompanied with test certificates – another first for the scrap industry – along with value propositions like higher yield, better productivity, lower conversion costs, less transportation and handling costs,

and overall better quality. “Steel can be recycled again and again without losing its properties,” Yogesh Bedi, Chief Steel Recycling Business, Tata Steel, was cited. “From that perspective, steel scrap is a valuable resource and an important future raw material for steel making. Recycling scrap ensures the closure of the circular economy loop. The brand names will give a distinct identity to the processed scrap and ensure a standardized quality product for the customer and simultaneously raise the bar of the scrap Industry.”

www.tatasteel.com

ALPLA EXPANDS PORTFOLIO IN SOUTH AFRICA

Austrian-based ALPLA Group, a global manufacturer of plastic packaging and a recycling specialist, has acquired the manufacturer Veri-green Packaging based in Durban. Veri-green Packaging has a workforce of 25 employees at its site in Durban. The company specializes in bottles and canisters for lubricants such as engine oils. With the acquisition, the

Austrian company is increasing its involvement in this region. It offers ALPLA an inroad into a market segment in which it has not been present in southern Africa. Furthermore, it would generate synergies for the firm’s existing customers, a press release said. In 2017, the Austrian company acquired Boxmore Packaging. According to the information, Boxmore

Packaging is the African market leader in manufacturing PET bottles, PET preforms and caps. A modern production facility and a regional head office were currently under construction in Lanseria near Johannesburg. There is another production facility near Cape Town.

www.alpla.com



GREENLAND – WASTE MANAGEMENT ON THIN ICE

Per Ravn Hermansen, former Greenland’s Ministry of Domestic Affairs, Nature and Environment, has “only a rough idea about the amount of municipal waste generated in Greenland”. But that is just the tip of the iceberg.

In 2007, the Danish-Greenlandic Environmental Cooperation proclaimed that “we now have a new waste incineration plant, which means that we no longer have to landfill flammable waste, but can burn it and get heat from garbage”. In the new waste incineration plant in Sisimiut, construction waste was mixed with household waste into a homogeneous mass to burn evenly. More than that, in Nuuk a twelve-year-old incineration plant and a three-year-old facility in Qaqortoq were running. Similar plants were provided for Aasiaat, Maniitsoq and Ilulissat. “Within a few years, there will be incineration plants in all

the larger towns.” (At that time, Greenland was part of the Kingdom of Denmark, and Denmark was one of the leading countries in incineration.)

However, Gunvor Marie Kirkelund, Environmental Engineer at the Technical University of Denmark, suggests that the incineration plants did not have any fly ash treatment so that the material was shipped to end the disposal at hazardous sites in other countries. The bottom ash was disposed of at uncontrolled disposal sites without further valorization. And despite incineration, “the waste was piling up

at a lot of places”, causing emissions, uncontrollable fires or waste spread out by the wind. Maintenance or repairs of the incinerators meant waiting for service personal from abroad and importing spare parts from outside Greenland and contributed to long down periods. In 2018, Naalakkersuisut, the government of Greenland, even recognized that many of the small-scale incinerators were substandard, resulting in a 30 percent deficit in incineration capacity.

We burn as much as possible

The situation at the turn of the century is best characterized by Jens Romerdahl, a senior technical, environmental and housing consultant: “We burn as much as possible for the benefit of heat production in Greenland instead of sailing it over the Atlantic.” Romerdahl pointed to the fact that the transport of recyclables to Europe included a 4,000 km journey by ship and further transport by road – a proposition mostly economically not feasible. Furthermore, 81 percent of Greenland’s area is covered by ice, roads connecting towns and settlements and road networks are very limited.

According to the “Analysis of Nordic regulatory framework” of 2018, transport is predominantly possible by sea and air. “Due to its isolation, waste treatment options in Greenland are more limited than in other Nordic states, and little waste is recycled.” At that time, the municipalities delivered “dangerous waste” like cars and chemicals to Mokana, a removal company in Aalborg. Fly ash and slag were not sailed to Denmark but might be used for road construction and will probably be landfilled, argued Jens Romerdahl.

Mostly organic or combustible

First data on the amount of waste can be found in a study conducted by Rasmus Eisted and Thomas H. Christensen in 2011. The paper says that about 30,000 to 35,000 tons of waste, including bottom ashes, were landfilled annually. Approximately 20,000 tons of waste were annually incinerated, emitting about 14,000 tons of flue gases and producing about 6,000 tons of landfilled bottom ash as well as about 200 tons of fly ash. And nearly 730 tons of hazardous waste were exported per year. The declaration of the waste types is interesting: Household waste was primarily organic (43 percent) and – excluding recyclable fractions – “combustible” (30 percent). The remaining materials comprised mainly paper, glass and plastic; steel and aluminum appeared in negligible percentages. Nevertheless, in 2015, almost only 25 percent of household waste in Greenland was delivered to so-called recycling stations – the rest ended up in ordinary household waste. That means that commercial and household waste were not separated, and “hazardous waste” like e-waste, batteries, oil and cables went into incineration.

Heat production centralized on two plants

Meanwhile, a new period in Greenland’s waste history has started. In June 2019, a new national waste management plan for 2020-2031 has been developed that declares the EU waste hierarchy, circular economy, best available technology, the polluter pays system and responsibility for the waste sector as “fundamental principles”. And completed in 2021 and/or 2022, two new waste-to-energy plants are expected to be operating in Nuuk and Sisimiut, Greenland’s biggest towns. Each plant with an investment of 200 million Danish Crown or about 26.9 million Euro will have a capacity of 60 tons daily to treat local waste or from the rest of the island. The concept is new, as the production of district heat is centralized on two plants, replacing about 20 incinerators all over the country. Some additional transfer stations will be established in towns and settlements to store waste until it is transported to be incinerated. However, the practice is not yet perfect. The plan puts 20 further incineration plants out of operation. The untreated scheduled waste, including glass and metal, will be stored at local disposal sites – in the worst case with the before-mentioned consequences of uncontrolled dumps.

New initiatives started

In the last decade, new waste strategies with new initiatives focusing on sorting and recycling started. As electronic and hazardous waste is shipped to Denmark, the waste reception facilities in the largest towns try to dismantle the electronic waste and handle storage of hazardous waste for shipping. According to a brochure analyzing Greenland’s regulatory frameworks in 2019, some cities want to collect large metal waste for shipping. A municipality installed a collection system for glass packaging that is crushed and used in asphalt. In all municipalities, bulky waste is sorted for direct reuse. Qeqatta ran a pilot project for the composting of food waste. In three local municipalities, schemes or pilot schemes are in place for recycling or reuse of glass, metal, wood, paper and card, food waste and items for direct reuse. And, says the study, “in all the cities and most of the settlements, reception facilities have been established for electronic waste, fridges and freezers and hazardous waste”.

Another construction site of Greenland’s environmental policy is its commercial and industrial waste sector. Little is to be found in the figures, but the “Analysis on Nordic framework” study indicates commercial and industrial waste generation and management in 2015. The graphic shows incineration of about 19,000 tons, landfilling of 8,000 tons and an estimated amount of 1,000 tons of hazardous waste. A look at the fishing and mining industry offers a clearer image.

Fishing waste: dumped, landfilled and burned

Greenland's economy relies on fishing. Traditionally fishing residues were dumped into the ocean. In 2006, Greenland generated about 14,000 tons of waste, where only about 20 percent was utilized, says a study published by the Technical University of Denmark on biogas and bio-oil from fishing waste in Uummannaq. Between 2010 and 2012, it must have been more than 2,000-3,000 tons of fish processing waste landfilled every year, argues a team releasing a study on bio-economy in Nordic countries. Nordregio, a regional research center, illustrates that Sisimiut's district heating by incineration in 2016 was partly powered by residues and oil from the fish industry. However, in the 1990s, Greenland became aware, that the processing of halibut residues could deliver "an extensive processing capacity".

An analysis of Biodegradable Waste as a Resource for Innovation, edited by the Environmental Agency of Iceland in 2016, showed biodegradable fishing industry waste figures. Cod, Greenland halibut, lumpfish, snow crab and shrimp summed up to 104,000 tons of fish, utilized between 15 and 75 percent and resulting in "rather high" and "roughly estimated" 52,025 tons of "unused biodegradable waste". On the strength of the island's greatest fishing company Royal Greenland, its fleet landed 61,660 tons of especially prawns, halibut and cod in 2020 in Greenland and processed them at the 37 treating facilities of Royal Greenland and others at the west coast. According to the company, "in 2020, at the factories in Greenland, we utilize an average of 67 percent of the total volume of fish and shellfish." That means that last year 20,438 tons of fish waste were produced.

To increase the utilization rate

The company has set further goals. In 2022, it wants to use 80 percent of Royal Greenland's potential fish and shellfish resources at all factories and on all trawlers. Initiatives foresee the development of new methods for better utilization of resources. Among others, the production of cod liver oil started. It is approved for both human nutrition and for use in animal feed. The modern Royal Greenland vessel m/Tr Sisimiut shows improvement as it will be able to utilize the fish by 100 percent, "as the vessel is equipped with an on-board fishmeal and fish oil factory to process cod and other whitefish", the company announces. And more than that, the enterprise takes part in WASEABI, which in its own words is "an EU-funded project that aims to develop and test new concepts, which will ensure that side-streams from aquaculture, fisheries and aquatic processing industries can be exploited for the production of new products and ingredients". The ambition of Royal Greenland is "to continuously endeavor to increase the utilization rate to the maximum level" and through this reduce waste.

Undeveloped deposits of rare earth metals

The second source of Greenland's industrial waste is its mining industry. Since 1850, the island's dwellers have seen digging, for instance, for cryolite, lead and zinc, gold and olivine. Following Statistics Greenland 2013, there are vast resources of rubies, iron ore, platinum, uranium, rare earth elements and coal. But first of all, Greenland possesses "the world's biggest undeveloped deposits of rare earth metals", as the U.S. Geological Survey called it. Two Australian companies – Tanbreez seeking funding from the USA, the other backed by China – are standing on the list of candidates for exploring the mine. In July 2018, Greenland Minerals Limited (GML) – its biggest stakeholder is the Chinese rare-earths processing company Shenghe Resources Holding – published a "Social Impact Assessment" paper. The comprehensive brochure explained the handling of domestic and industrial waste. It ran: "All solid waste will be pressed into bales and shipped to Qaqortoq for incineration. If an incinerator was to be constructed in Narsaq, this facility would be used instead." Accumulators, batteries, electronic devices or glass are stipulated to be stored in temporary containers and periodically handed over to the Qaqortoq waste handling facility for further disposal "according to regulations and after mutual agreement". Hazardous waste material like hydrocarbons or explosives "is shipped to Denmark and handled in compliance with a comprehensive EU initiated legal framework".

No prototype for adequate treatment

In summary, "all solid waste" without separate collection and recycling will be incinerated. Recyclables such as batteries, electronic devices or glass can be handled after the current "agreement". Real hazardous waste is shipped to Denmark, according to the old motto "out of sight, out of

Greenland has the chance to install a sustainable mining industry and to use the money to restore the national waste management system.

mind”. Besides that, the circumstances of the planned incineration are not precise, as Per Ravn Hermansen in another context had criticized: “In Greenland we have a one-door policy, allowing mining companies to obtain all necessary permissions from the same public authority. This means that they submit their applications, covering all aspects of their operations, including waste to the Bureau of Minerals and Petroleum.” And the plans of GML include dismantling and exporting uranium and – doing so – producing residual nuclear material. It seems that the Kvanefjeld mine exploitation will not be a prototype for adequate treatment of Greenland’s mineral waste.

A ticking time bomb

Another problem in Greenland still exists in means of waste resulting from the Cold War between the USA and Russia. In 1959, the U.S. Army built “Camp Century” beneath the surface of the northwestern Greenland Ice Sheet. In 1967, this military base was abandoned, leaving gasoline, PCBs “in not trivial quantity” and nuclear coolant water behind. Scientists examined the military documents and computed that there are approximately 9,200 tons of physical waste, 20,000 liters of chemical waste associated with base fuel and about 24 million liters of biological waste, mostly sewage. What makes this waste a ticking time bomb is the ice sheet surface. Although the waste is covered by estimated 36 meters of ice, there is a net ablation plausible to be melted down within the next 75 years. According to an article in the *Geophysical Research Letters* published in 2016, this would “guarantee the eventual remobilization of physical, chemical, biological, and radiological wastes abandoned at the site”. Besides that, there are four other abandoned and not yet remediated ice sheet bases in the vicinity of Thule Air Base, the still operational military airport in the south of Greenland. Not to mention Bluie East Two (known locally as Ikateq), a disused American airfield containing an estimated 100,000 rusting oil barrels. Denmark and U.S. forces quarreled for years about their responsibilities, and Greenlandic authorities lacked participation in past agreements. “In January 2018, Danish and Greenlandic authorities signed an agreement to promote the clean-up of American military installations. The deal earmarks 180 million kroner (24 million Euro) over six years for the clean-up”, a Special

“Rare-earth minerals are key to the further development of green technology.”

Rapporteur of the United Nations Human Rights Council gave account.

Marine debris mostly local

The list of waste types related to Greenland is not complete without marine debris landed at the island’s shores. The Arctic Ocean is a “dead end for floating plastics in the North Atlantic branch”, as the Spanish environmental researcher Andrés Cózar called it. That means that plastic waste from the USA and Europe has been accumulating here in recent decades. Locally produced residual material should be excluded, as the pollution of the sea by solid waste, sewage, different types of garbage and oily bilge water is generally prohibited by the International Convention for the Prevention of Pollution from Ships (MARPOL). However, the Polar Code’s improved rules for polar shipping covers smaller vessels such as fishing boats only since 2017. Until then, almost 150 fishing vessel incidents in polar waters were reported. Rod Downie, Polar Programme Manager at World Wildlife Fund, enumerates: “When fishing vessels sink, hundreds of kilometers of fishing lines and hooks, nets, fuels, heavy oils and other debris can be released into the ocean.” Therefore, a team of scientific researchers from the Netherlands and Denmark – collecting 300 kg of Greenlandic waste during a beach clean-up done south of Sisimiut – gathered fishing nets, shotgun shells and outboard engine oil containers. But the self-proclaimed “plastic soup detectives” were astonished about something else: “Almost all litter was of local origin and consisted of everyday products used in local communities and settlements.” The team of the Arctic Marine Litter Project then formulated several recommendations for local and national policymakers in Greenland to tackle the issue of marine litter in West Greenland. Jakob Strand of Aarhus University, who took part in the project, draws his conclusion. He identifies Greenland’s open dumps as the main source of plastic litter, where the material is mostly stored until it is incinerated. The online newspaper *ArcticToday* cited him in March 2021: “If local councils were more aware of the problem, it would help to reduce the amount of litter entering the water.”

EU and Greenland (dis)agreed

In June 2012, the European Union and Greenland’s government signed a letter of intent, in which “environmental issues related to mining and social impacts of mining” were seen as “possible areas for dialogue”. And in a “Programming Document for the sustainable development of Greenland 2014-2020” edited 2014, they agreed that Greenland “intends to deal with its waste by a network of incinerators situated in the various communities”. Furthermore, they tallied with the low population density and missing roads between towns, which complicate the waste management,

the missing of data on waste management and the fact, that “most modern waste processing facilities in Greenland would be considered outdated in most of the industrialized world”. But there were also discrepancies concerning the range of the EIA Directive, solutions involving local incinerators, dumps by expeditions, US military and historical mining and the pumping of untreated sewage into the sea. A paper on “The Greenland Gold Rush” suggests that, at that time, only 15 percent of all companies operating in Greenland were from Denmark, Germany, Czech Republic or the United Kingdom and that 60 percent of investments came from companies from Australia and Canada.

Entry to ERMA

The scenery has changed since 25 June 2021 as the Ministry of Mineral Resources of Greenland was accepted as a member of the European Raw Materials Alliance (ERMA). The alliance, driven by the European Commission on the search for critical raw materials, coalesced with the ministry. That expects “opportunities for investing in Greenland’s mineral potential” and to cooperate with ERMA’s members from the entire value chain because different mining and exploration companies in Greenland are already members of ERMA. Naaja H. Nathanielsen, Minister for Housing, Infrastructure, Minerals and Gender Equality, stated that “EU’s focus on the green transition – as well as environmentally and socially responsible extraction of minerals - harmonizes with Greenland’s objectives”. The ERMA entry of Greenland happened shortly after regional elections in April 2021, won by the pro-independence Inuit Ataqatigiit (IA), who wants to enter an ecological and anti-mining course. According to the will

of the party, the Kvanefjeld project – or at least the project to dig up the rare earth metals and uranium – will never be realized. The social-democratic Siumut party has been in power most of the time since 1979 and focuses on exploiting mineral resources.

For independence, livelihood and fighting climate change

A study in 2018 showed that two-thirds of the population would fancy independence from Denmark, although Greenland’s economy depends largely on an annual 600 million US-Dollar subsidy from Denmark. So, the revenue of domestic mining is welcomed, as much as traditional works like fishing, hunting and farming can no longer guarantee the hitherto livelihood forcing unemployment and lack of opportunities. Additionally, the local government needs funding for a better infrastructure by investing, for example, in schools, social services and instructions on environmental issues. Tanbreez or GML – the revenues of the mines are badly wanted, even if the people fear pollution and the missing of new jobs for natives, as they are no experts for developing, extracting and processing the material. Within fresh earnings, Greenland has the chance to install a sustainable mining industry and to use the money to restore the national waste management system. Further additional investments will soon be needed. In this sense, Anna Fotyga, a member of the European parliament, was quoted with the words: “Rare-earth minerals are key to the further development of green technology and the fight against climate change, and Europe must cut its dependence on China for these minerals.”

Systematic Clean Air Technology



Wind Sifter



Ventilation & Venting for Sorting Cabins



Separator Lock



Jet Filter Technology



ENVIRO SUPPLEMENTS DOCUMENTATION FOR CONSULTATION CONCERNING A NEW PLANT IN UDDEVALLA

Scandinavian Enviro Systems intends to supplement the consultation documentation that has been submitted to the county administrative board in Västra Götaland ahead of a future permit application regarding the construction of a new recycling plant for end-of-life vehicle tires. When preparing the application, another alternative location for the recycling plant was identified, which is why an additional site within the industrial district in question in Uddevalla will be the subject of future consultation.

Earlier this year, Enviro announced that it intended to submit a proposal for consultation documentation to the county administrative board in Västra Götaland ahead of a future permit

application for establishing a new recycling plant for end-of-life vehicle tires. The consultation pertained to the establishment of a new plant on an identified industrial site in the Lillesjö district of Uddevalla Municipality. The company is now supplementing the



consultation to encompass an additional alternative location within the industrial district in question. A total of two industrial sites will thus be the subject of future consultation.

The documentation that has now been produced for consultation will be followed by a formal application for permission to establish the plant. Probably the permit application will be submitted in autumn 2021. As Enviro previously announced, a final decision on constructing the plant is also dependent on several other factors, such as securing access to end-of-life tires and agreements covering deliveries of recovered materials.

www.envirosystems.se

Photo: GR-Archive

FROM WASTE TO BIOPRODUCTS THROUGH BIOREFINERY

URBIOFIN project aims to demonstrate the techno-economic and environmental viability of an integrated biorefinery for the transformation of the organic fraction of municipal solid waste (OFMSW) into new marketable bioproducts, chemical building blocks, biopolymers and additives. The project is coming close to its final

course of implementation, following a five-year journey. The results are already leading to the achievement of the objectives. Laboratory scale tests, as well as several pilot and demo scale trials, have been performed.

From organic waste, to biofuels, bioplastics and biofertilisers

URBIOFIN will demonstrate innovative processes in bioethanol production from the OFMSW and its use as a chemical building block. The bioethanol produced from the OFMSW will be employed as a feedstock for the production of “second generation” bioethylene for gas ripening application. Furthermore, the project will demonstrate innovative processes in Volatile Fatty Acids production from anaerobic digestion of OFMSW and its elongation into Medium Chain Fatty Acids to produce short-chain and medium-chain PHA biopolymers.

Regarding the biogas upgrading by microalgae photobioreactor for the production of pure biomethane, the upgraded biomethane will be further treated. The aim is to remove volatile methyl siloxanes.

The project will also demonstrate innovative processes in the production of bio-fertilizers from microalgae and OFMSW. Microalgae grown on OFMSW-based digestate will showcase the potential to produce an aminoacid-rich intermediate product. The validation trials of the preliminary produced materials are in progress. Meanwhile, in the following months, the intermediate materials produced in the pilot plants will be used to formulate and produce different bio-based products. Their potential will be validated for the selected end-user purposes complying with EU legislation.

www.urbiofin.eu

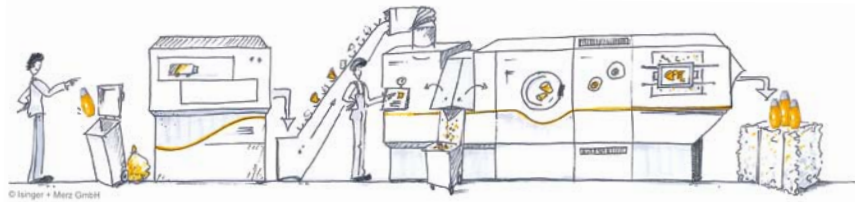
Source: URBIOFIN



“THE MACHINE” – VDMA PLASTICS RECYCLING THEME WORLD AT IFAT 2022

Technical solutions for plastics recycling are the key to completing the circular economy. VDMA uses the world’s leading trade fair IFAT to present the solutions of its members to an international crowd in Munich. With “The Machine” and an associated multifunctional exhibition stand, VDMA Waste Treatment and Recycling Technology will design a plastics recycling theme world for IFAT 2022 that will focus on technical solutions for recycling plastics.

The idea for “The Machine” was developed with the Wiesbaden-based trade fair construction company Isinger + Merz and is intended to illustrate the individual process steps involved in plastic recycling from packaging waste, thereby creating a basic under-



Source: VDMA

standing of processes and at the same time offering an overview of the “system as whole”. In short, to break down the black box of plastics recycling. Visitors to the VDMA exhibition stand at IFAT should be able to follow the path of a used shampoo bottle from its disposal (collection) through the individual process steps. “The Machine” focuses on the interdependencies of the processes. It is neither a cinema nor a museum; VDMA’s aim is rather to make the processes in the “black box” understandable. Visitors should

gain knowledge through experience and understand through comprehension. To this end, the visitor is actively involved and becomes part of the process. They should lift the “lid of the black box” themselves and look inside “The Machine”, move the control stick or stand at the control panel.

The VDMA is actively involving its members and other partners in the planning and implementation.

www.vdma.org

GOAL: FIRST PRINTED CIRCUIT BOARD RECYCLING FACILITY IN AUSTRALIA

Two funded research projects, led by Flinders University and its commercial partner, focus on mounting waste from computers and electronic devices.

The almost 1.6 million Dollar collaboration with Singapore-based company Clean Earth Technologies – backed by two major Australian Research Council Linkage Project grants awarded by the Australian Government – would help to establish a pilot printed circuit board recycling plant in Adelaide, a press release said. In this way, the production of world-leading polysulfide polymers, which assist environmental recovery, is to be ramped up. As announced, the first grant will expand the production of novel polymer technologies for oil spill remediation and slow-release fertilizers developed

by the Chalker Laboratory at Flinders University in South Australia. After small-scale trials, the polysulfide polymers are set to be manufactured in ton-scale production in Adelaide for customers in Australia and overseas. A research team led by organic chemist Associate Professor Justin Chalker invented polysulfide polymers.

The second project will involve the recovery of gold, silver and palladium from e-waste and feature new recycling methods for the plastic and fiberglass in this sort of waste. “Along with taking these key products into further testing and commercial production, the e-waste Linkage Project is an important step towards developing the first printed circuit board recycling facility in Australia,” Associate Professor Justin Chalker is quoted. “Our

Flinders team will facilitate the commission and operation of the recycling facility.”

The invention of several new rubber-like polysulfide materials – themselves made from waste or recycled materials – has attracted Clean Earth Technologies as a partner. Patents for the oil spill remediation and slow-release fertilizer polymers have been assigned to Singapore-based CET. According to company CEO Kevin Fell, these new products have vast applications. The next stage of these projects would involve further trials and development of the polymer to improve its effectiveness in oil spill remediation after a possible disaster.

www.flinders.edu.au

www.cleanearth.tech

METAL WASTE CAN BE TRANSFORMED IN AEROGELS

Scientists of the National University of Singapore (NUS) have developed a technique to upcycle metal waste into multi-purpose aerogels (porous ultralight materials).

Metals are used in cookware, tools, electric appliances, electric wires, computer chips and jewelry, to name but a few applications. With the growing demand for metal products, it is crucial to promote sustainable and environmentally friendly methods of recycling metal waste to help reduce the environmental impact of using metals in the economy, thought the NUS engineers – and went to work. The result: A method that could be applied “to all types of metal waste in powder form, such as metal chips and electronic waste”, the university assured.

The conventional approaches for recycling metal waste are energy-intensive. Furthermore, some of these methods also generate environmentally harmful by-products, such as ammonia and methane during aluminum recycling.

“Our approach is cheaper, does not produce any hazardous waste, consumes less energy and is more environmentally friendly than conventional recycling methods for metal waste. The metal-based aerogels created using our unique fabrication technique have high thermal and mechanical stability. Hence, they are promising candidates for heat and sound insulation in harsh environments with high temperature or high mechanical impact,” research team leader Associate Professor Duong Hai-Minh from the NUS Department of Mechanical Engineering was quoted. The researchers already achieved success in developing aerogels using different types of waste such as plastics, textiles, paper, pineapple leaves and other types of food and agricultural waste.

Simple, low-cost fabrication process

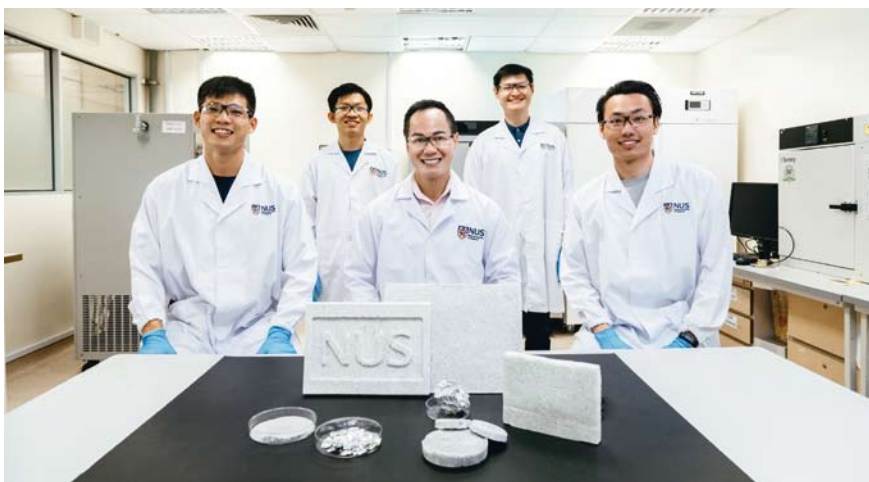
According to NUS, the metal-based aerogels are created in a simple fabrication process: Metal waste is first ground into powder and mixed with chemical crosslinkers. Then, the mix-

ture is heated in the oven, frozen and then freeze-dried to create the aerogel. “The process may vary slightly depending on the metal waste involved. On average, it takes about one to three days to transform powdered metal waste into aerogels, compared to three to seven days using conventional methods of producing aerogels.” Using this NUS technique, a piece of metal-based aerogel that is one square meter in size and one centimeter thick would cost less than 10.50 Singapore Dollar (converted 7.90 US-Dollar) to produce, half the price of commercially available silica aerogel.

New applications for metal-based aerogels

In the opinion of the NUS researchers, the developed metal-based aerogels could be used as lightweight construction materials. “Our aluminum aerogel is 30 times lighter and insulates heat 21 times better than conventional concrete. When optical fibers are added during the mixing stage, we can create translucent aluminum aerogels, which, as building materials, can improve natural lighting, reduce energy consumption for lighting and illuminate dark or windowless areas. Translucent concrete can also be used to construct sidewalks and speed bumps that light up at night to improve safety for pedestrians and road traffic,” Associate Professor Duong informed. As underlined, the translucent aluminum aerogel created by the NUS team is six times lighter, six times better in thermal insulation and 120 times cheaper compared to commercial translucent concrete (LiTraCon).

When coated with a chemical called methyltriethoxysilane (MTEOS), aluminum aerogels could repel water and become a self-cleaning construction material that allows dirt or debris to be easily washed away in contact with



The NUS team led by Associate Professor Duong Hai-Minh (seated, center): Goh Chong Jin (seated, left), Ong Ren Hong (seated, right), Nguyen Thai Thien Phuc (back, left) and Goh Xue Yang (back, right)

water. The aerogels are also suitable as fire-retardant boards, thermal insulation materials in buildings and piping systems, for absorption of airborne contaminants for indoor environments and oil-spill cleaning. The team is also

looking at using aerogels for biomedical applications. The NUS scientists have already published their work and are discussing the commercialization of the technology for fabricating metal-based aerogels. In the next

phase of their research, the NUS team is also looking at developing aerogels for applications that require high-temperature tolerance.

www.nus.edu.sg

India:

COLLECTING AND RECYCLING OF RIVER WASTE

In August this year, Finnish firm Riverrecycle Oy has announced that its collection unit for river debris and plastic waste on the Mithi river in Mumbai is operational after the testing phase.

“The solution supports the local waste management by converting plastic waste into raw materials for plastic and other products, with direct benefits to all participants throughout the value chain,” the company informed. The project had started in October 2020 with funding from Huhtamaki, a global provider of packaging solutions for consumers, as part of their larger initiative to promote global sustainability initiatives with local impact. In cooperation with United Nation’s Global Pulse, VTT Technical Research Centre of Finland and Earth5R, an India-based environmental entity, the company’s operation would reduce the input of plastic into the Indian Ocean, the press release said.

To recover the plastic floating along the Mithi river, the business, supported by the above-mentioned partners and local administration MMRDA, has installed a device that concentrates and guides floating plastic into an automated collector, lifting it out of the river. The device, which is designed by the firm, would be able to capture up to 50 tons of waste daily. “The system includes a sorting station and will be including waste segregation facilities, available to the local community.” Part

of the recycled waste revenues would be used to sustain the process.

In June, the Finnish company had announced that it had signed a collaboration agreement with ICTSI Foundation to install a financially sustainable solution to discarded plastic along Pasig River in Manila, Philippines. The agreement would include funding of approximately 1.0 million US-Dollar for Riverrecycle regarding the implementation of the project.

According to the information, the Pasig River cleaning project will see the “collection of plastic floating along the river, with the goal of converting the

plastics into oil”. The river collection system is also expected to lessen the amount of water hyacinth in the river. “The project will be accompanied by an awareness campaign to empower local communities to adopt alternative waste management behaviors and avoid future plastic pollution,” Riverrecycle gave account. It expects to combine economic viability with high environmental impact. The firm is currently active in India, Indonesia, Bangladesh, the Philippines and Vietnam. It intends to install 500 cleaning and recycling points in the coming years.

www.riverrecycle.com





Mike Schroeder,
Product Specialist at
WCCO Belting, Inc.

NAVIGATING THE INS AND OUTS OF CLEATED BELTING

■ Author: Mike Schroeder, WCCO Belting

You are undoubtedly looking for ways to improve your bottom line within your recycling process. Making the operation more effective by speeding up material movement is one way to achieve that goal. A cleated product solution can provide significant value if its role is evaluated carefully during the product development or refurbishment process.

Multiple applications operate with standard belt patterns, such as chevron and crescent, to improve upward movement. Although these patterns are workable options, the lack of pattern height loses the fight against the power of gravity. As a result, conveyor equipment is restricted to low inclines. To reach the drop-zone at such a low incline, conveyor systems must be designed at far-reaching lengths. Alternatively, operating with a cleated belt allows you to convey more materials and at higher angles. Here's why a cleat can create a high-value impact on your business:

What are the benefits of conveying with cleats?

Each type of equipment has an optimal solution for its conveying operation, and using cleats is one way to help yield the highest possible return. One benefit is through increased capacity. Conveyors running with a cleated belt can often convey material 25 percent faster and achieve steeper angles when compared to standard pattern options like chevron and crescent. Using a cleated belt, you could also lessen the roll-back that you experience with a low-profile pattern belt. Cleats hold the material and help maintain

forward momentum. In addition, a higher cleat profile and steeper incline provide value by allowing you to reduce the length requirements of the belt and the size of the conveyor system in its entirety. A cleated belt presents the opportunity to shrink the footprint of the equipment and create higher efficiencies in your operation.

What are the different cleat options available?

Industry standards vary, and numerous cleat options are available from a wide range of belting suppliers. What will ultimately give you the highest capacity depends on your application and system requirements. For example, a taller cleat height would be used in applications moving larger materials and at steeper angles to reduce spillage. Cleat shape, angle and design are all relevant to the surcharge angle of the materials you are conveying. With several options and combinations on the market, it is critical to have an open dialogue with your belting provider to learn what will maximize belt life and help lower your total cost of ownership.

How to determine what cleat is right for your operation?

How the belt is manufactured and how the cleats are adhered to the belt, the cleat design, cleat pattern, and numerous other factors all make an impact – positively or negatively – on how your belt performs when conveying recycled materials. Your application and equipment design needs to be taken into consideration when discovering your optimum cleated belt solution. You should source a cleated product that will provide you with the greatest return, and as such, it is difficult to give a straightforward answer to the question of what cleat is right for your operation. What we can do is help educate you on cleated belt fundamentals. That will prepare you and your team to have a discussion with your belting distributor or manufacturer.



Conveyors running with a cleated belt can often convey material 25 percent faster and achieve steeper angles when compared to standard pattern options

What to consider before buying a cleated belt?

It is important to understand belt fundamentals because the belt you choose impacts your operation’s overall performance, as well as your or your customers’ experience. Here are some tips to make sure you are getting the best belt for the job:

1. Establish your performance requirements (and do not make the mistake of relying on your old spec sheet): If you want to increase belt life and lower your total cost of ownership, your belt provider should help you determine the belt construction specifications based on your performance requirements. The cleats will be irrelevant if you do not start with a proper base. Identifying the optimal combination of fabric, rubber, construction, cleats, and lacing can benefit your system. The best approach to developing an ideal product solution is to open a dialogue with your provider to discuss the conveying requirements of your system as a whole. The right belt construction can provide energy savings, increase roller and bearing life and decrease maintenance costs.
2. Determine your cleat profile (size and shape): The recycled materials being conveyed will determine the cleat height, cleat shape and cleat angle. Matching the profile to what materials you are moving and at what angles your system conveys will provide you with the most superior solution. For example, cleat height can be adjusted to reduce roll-back. Nevertheless, there are numerous cleat options available from a wide range of belting suppliers. There are also belt manufacturers, like WCCO Belting, that can engineer a custom cleat profile to support your individual effort to reach peak operational performance.
3. Determine your cleat design: What cleat design will work best for you is largely based on the arrangement of your conveyor system. If there is a trough and how much and what kind of edge guards the equipment is designed with, which determines the amount of cleat recess required. Roller diameter will also impact cleat angles and the design. Another consideration is the return roller assembly. Without a smooth return, rollers could cause excess wear and lead to premature cleat failure. And unquestionably, the details of the material being conveyed need to be examined. For example, if you are conveying wet materials and require liquid drainage, the pattern could be structured accordingly to eliminate any interference.
4. Determine the ideal cleat frequency: There is a science behind how frequently cleats should be positioned on a belt to give you the best output for your equipment. Your supplier should help you find the sweet spot between the type of product being conveyed, the speed the conveyor is moving, and how often to repeat the cleat pattern. For example, if moving smaller recycled materials in particle-form, the more cleats or buckets, the better, but many factors go into this determination. Make sure you under-

stand why the frequency recommended to you is the best option for your operation.

5. Understand how the cleats are adhered to the belt:

How cleats are adhered to the belt construction can substantially impact belt life. A belt fabricator modifies premade belting using secondary processes and tools to add cleats. Those tools are, for example, glue chemicals and metal bolts. Did you know that cleats can be bonded through a single-step vulcanization process? WCCO Belting, a belt manufacturer, uses an innovative proprietary process, combining the raw (uncured) belt carcass and rubber cleat extrusions through extreme heat and pressure to vulcanize the belt. The result is one belt that holds equivalent properties throughout and the strongest cleat adherence achievable.

Do not let the same old belt construction (that you may have been ordering for years without question) slow down your progress. Ask your belting provider to present a cleated belt solution based on your performance requirements. If they cannot answer the considerations above, it may be time to consider a new supplier. With the proven increase in efficiency and the positive impact a cleated belt can have on your recycling operation, now is as good of a time as any to see what kind of high-value impact the right belt could have on your business.

About Mike Schroeder

Mike Schroeder is a Product Specialist at WCCO Belting, Inc., a family-owned manufacturer of agricultural and industrial rubber belting and conveyor products in Wahpeton, ND. In his role, Mike serves as the most vital link between customers and WCCO's internal teams. Through on-site visits and open discussions, he identifies customers' operational requirements. Moreover, he helps WCCO deliver innovative, high-impact product solutions. Mike currently has one patent and other patent-pending rubber products.

About WCCO Belting

WCCO Belting is a family-owned, nationally recognized custom rubber product manufacturer that delivers belts across the globe for the agriculture, light industrial, construction, sand and gravel, packaging and recycling industries. The company uses a proprietary vulcanization process to build every product to order. This method and WCCO Belting's superior rubber compounds and fabrics are more effective in lowering the total cost of ownership of the customer's equipment. For more information, visit www.wccobelt.com and follow WCCO Belting on LinkedIn.

NEW PLANETARY DRIVE SERIES FOR RECYCLING MACHINES

Italian drive specialist Bonfiglioli has launched the new R3 planetary gearbox series, designed specifically for recycling machines such as shredders and others.

According to the internationally active company, which operates worldwide in 80 countries with 20 branches, 13 production facilities and a wide distribution network, the R3 series is compact and powerful. "Their planetary gear train makes them the ideal choice for all severe duty applications where shock loads and impacts are the rule rather than the exception. Adverse conditions, which often prevail in the recycling process, are easily absorbed by the gearbox," the designer, manu-



Italian drive specialist Bonfiglioli presents the new R3 planetary gearbox series

facturer and distributor of a complete range of gearmotors, drive systems, planetary gearboxes and inverters

assures. Fast speed changes were no problem for the compact yet extremely powerful R3 gearboxes. As underlined, the product configuration is highly flexible due to several options for mounting, gear layout, output shaft and motor interface. According to the torque need and customer machine layout, the R3 series can be equipped with one, two or four hydraulic motor adapters. An electric motor adapter is also available upon request.

The planetary drives are available in four sizes with a torque range from 129,000 up to 370,000 Nm (Newton meter) and gear ratios from 56 to 117.

www.bonfiglioli.com

CONVERTING PULPER WASTE INTO FUEL BRINGS PROFIT

Turkish company KMK Paper becomes self-sufficient by converting its pulper waste from paper production into a fuel that provides energy for its own operations.

KMK Paper, a leading corrugated paper manufacturer in Turkey, recycles the shredded residual materials as Refuse Derived Fuel (RDF) to generate the energy required for paper and board production. In this process, energy generated by burning is used to produce water vapor, which, in turn, is required for the production of high-quality corrugated board. This process, from production to reuse of pulper waste, is self-contained and efficient.

For its production facilities, the company relies on three single-shaft WLK



Shredded pulper waste

25 Super Jumbo shredders from German manufacturer Weima Anlagenbau GmbH. One has already been in place for five years at the Kütahya location and two more followed in Kahramanmaraş. Every day, more than 100 tons of pulper braids and loose rejects from production are recycled. The resulting refuse-derived fuel is reused as an energy source for the company's production.

Second production line

Kahramanmaraş Paper Industry Incorp. was founded in 1988 in Kahramanmaraş in southeastern Turkey. Initially, it was dedicated to producing corrugated cardboard, with a capacity of 40,000 tons per year. At the beginning of 2012, a second production line was put into operation in the province of Kütahya. Today, the company produces 150,000 tons of paper and board products annually. In addition, the portfolio has steadily expanded to include products such as paper cores, textile board, printing board and gypsum board. The furniture industry has also been supplied regularly for some time.

 www.weima.com

Photo: Weima



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MORE SORTING OPTIONS IN SCRAP AND ALUMINUM RECYCLING

In situations, for example, where recovered, recycled aluminum is being used to produce new products, manufacturers need their secondary raw materials to display consistently high levels of purity.

According to the German machine producer Steinert, this is possible by employing sophisticated sorting technology, for example, the new STEINERT XSS T EVO 5.0 machines (XSS T = x-ray sorting system with transmission). Dry density sorting using x-ray transmission is a proven method utilized by hundreds of metal recycling firms worldwide. The sorting machine is used to separate free heavy metals, aluminum compounds, free magnesium as well as wrought and cast aluminum parts. Now, the company's development work would ensure specific benefits for the sorting process.

Thanks to the new software Multilayer Data Evaluation (MDE), "the sorting

machine is able to use even more distinguishing criteria for detection thanks to high-resolution object recognition and by undertaking classification in parallel," the manufacturer explained. "Complex sorting tasks, such as magnesium detection are solved easily. Automatic x-ray monitoring and calibration (AXM) of the x-ray sensors help achieve consistently high detection and sorting quality." The hardware has also been improved, as Steinert emphasized. The high-resolution valve pitch of 6.25 millimeters (mm) would enable even more efficient sorting of fine material down to 5 mm. "The x-ray scan area is cleaned automatically in the new generation of machines. This vastly reduces the amount of manual cleaning needed and maintains a consistently high level of detection quality." The 4-year warranty for the x-ray source and sensors would provide operational reliability and keep operating costs low. Other features include continuing software and hardware updates.

How does detection with x-ray transmission work?

The extent of absorption of x-rays depends on the material density and on the thickness or the radiated path of an object. The larger the atomic mass and the thicker a material part, the more radiation will be absorbed. The absorption in the material to be sorted is measured at two different energy levels to compensate for the influence of the object thickness.

The "dual-energy procedure" uses software to determine the material-specific absorption and thus the procedure conclude the density of the material. Moreover, the radiation passing through the objects enables both the conclusion of an average density for an object and the identification of inclusions in rocks or clumps of material.

The main advantage of X-ray transmission is that its transmissive detection makes the system insensitive to surface soiling and enables the detection of inclusions. That is the case in mining, for example, with pyrite accumulations in chunks of ore or in recycling with heavy metal inclusions in pieces of aluminum. Moreover, it is possible to mask materials of low density. Thus, it is possible to significantly increase the throughput in applications and remove impurities from a closed supply flow (e.g. metals from waste wood).

The sorting process in detail

A vibration conveyor is used to carry the sortable material on an acceleration belt, which breaks the supply flow down in the supply direction, thus achieving material separation. The feed material is transported through



New software: Multilayer Data Evaluation provides even more distinguishing criteria. The automatic x-ray monitoring and calibration of the x-ray sensors help achieve consistently high levels of detection and sorting quality

Downloadable e-book for guidance on sorting options

A so-called solution guide can be downloaded as an e-book to provide an initial overview of the opportunities provided for sorting aluminum scrap and other materials. Although aluminum scrap comes from different sources like profiles and plates, incineration bottom ash, shredder systems or Dense Media Separation (DMS), the rough stages of the sorting process are similar: recovering non-ferrous metals and upgrading the recovered metals, in other words, producing pure metal types. The e-book provides insight into both the heart of the systems – the STEINERT XSS T EVO 5.0 – as well as the upstream magnet technology and downstream fluorescence technology; of benefit to operators of aluminum shredders, secondary smelters or processors of waste incinerator ash. The downstream fluorescence technology produces pure heavy metal fractions such as copper, brass and zinc.



www.steinertglobal.com/metal-recycling/aluminium-recycling/#c32158

proportion not absorbed by the material. The variation between initial and measured radiation can be used to reveal differences in density between or within individual objects, Steinert assured. Each object was classified according to application-related criteria. Should the decision to sort be positive, the relevant object is deflected from the discharge parabola using a short, targeted blast of compressed air, transported by a separating splitter and thus separated from the remainder of the material flow.

Semi-mobile sorting machine

A semi-mobile variant is installed in a 40' container. A further 40' container contains the operating room with the controller. "The focus of the semi-mobile STEINERT XSS T EVO 5.0 is on mineral processing, although it can also be used in other sectors," the manufacturer informed.

www.steinertglobal.com

the scanner area in a position on the conveyor belt. Thereby the x-ray source is positioned below the con-

veyor belt and radiates a narrow area of it. Detectors in the beam above the conveyor belt measure the radiation's

CHANGING TOOLS AT THE PUSH OF A BUTTON

The Likufix quick-change system from Liebherr is now available for large, medium and small wheel loaders. The fully automatic system is an in-house development by Liebherr and well established in the company's hydraulic excavators. The system has also proven itself in the medium-sized series of wheel loaders in recent years.

"A solution that truly comes into its own in operations involving multiple working tools," the manufacturer emphasized. The Likufix quick coupler system would allow the operator "to safely and conveniently change mechanical and hydraulic working tools at the push of a button from the cab". As reported, Likufix is now available

for additional wheel loader models: This applies to the two compact loaders L 506 and L 508, the two stereo loaders L 507 and L 509, as well as to the XPower large wheel loaders up to

the L 580. As before, it is still available for the medium-sized Liebherr wheel loaders L 526, L 538 and L 546.

www.liebherr.com



Photo: Liebherr

A NEW “FLAGSHIP” IN THE FINESHRED FAMILY

Metso Outotec Waste Recycling has launched a new shredder “created from scratch”.

“M&J F320” is the name of the company’s complement to its new FineShredder series targeting the production of alternative fuels like Refuse-derived fuel (RDF) or Solid Recovered Fuel (SRF). According to the manufacturer, the machine is equipped with an extra-long rotor and can deliver 23 tons per hour (90 percent below 50 millimeters). “It is built to perform with an absolute minimum of downtime,” Metso Outotec Waste Recycling underlined. At the same time, the M&J F320 had several obvious advantages compared to the industry benchmark:

- One of the most competitive OPEX in the industry (up to 35 percent lower)
- Low total installed power kW (up to 20 percent less Kilowatt)
- Low operational energy costs kW/h (approx. 20 percent less)

As reported, the low operating costs are due to an innovative design: “The M&J F320 has a unique cutting system

that requires minimal daily maintenance. Once the rotor knives and static knives have been set in the initial set-up, or after a change of knife holders, it does not require routine adjustment like other competitors.” The shredder would also generate a limited amount of heat. Thus, the operating company could avoid frustrating downtime due to, for example, molten plastic.

According to the provider, the modular design of the shredder ensures fast

servicing. The service team has quick and easy access to everything and can thus replace all wear parts quickly to avoid lengthy maintenance. “There is easy access to the shaft from both sides for servicing and cleaning – and the knife blocks have been designed for easy replacement, should the need arise.”

www.recycling.metso.com/campaigns/waste-recycling/sharp_as_a_shark/

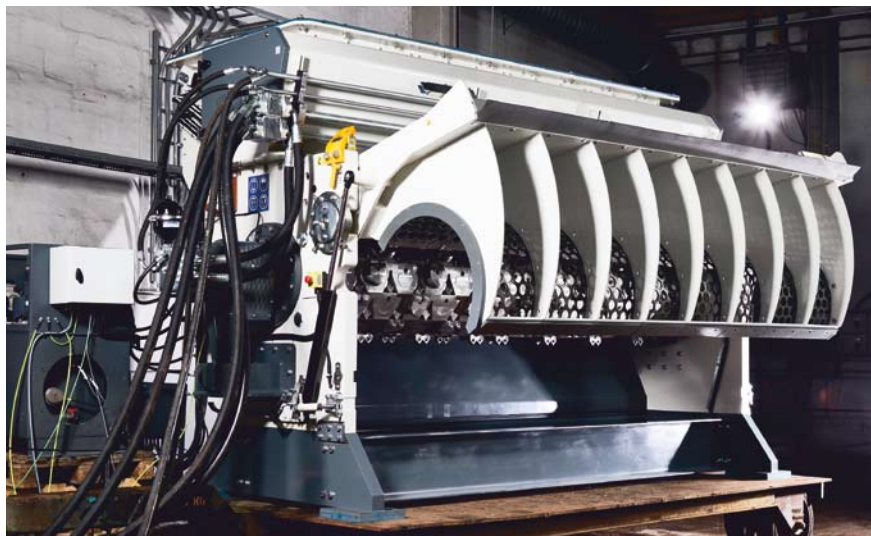


Photo: Metso

MATERIAL HANDLERS WITH IMPROVED CYCLES TIMES

Caterpillar brings two new material handlers onto the market. According to the manufacturer, the Cat MH3022 and MH3024 are built for reliable and efficient operation in waste and scrap metal applications. The design of the machines would provide superior performance, low operating costs and improved comfort. “Their advanced electrohydraulic system optimizes the balance of power and efficiency, improving cycle times to handle more material in the same amount of time, improving profit

potential,” Caterpillar underlined the pros. Both material handlers are powered by the Cat C4.4 engine, operating on up to B20 biodiesel. “Meeting EU Stage V and U.S. EPA Tier 4 Final emissions standards, the engine’s maintenance-free after-treatment system lowers operating costs and maximizes machine uptime. The choice between Power and Eco power modes fine-tunes power requirements to the task at hand, offering up to 10 percent lower fuel usage than previous models without sacrificing

machine performance.” A 12 percent wider, stabilized footprint increases the Cat MH3022’s operating stability for improved performance when lifting at extended reach, the provider highlights one more feature. Furthermore, the MH3024 would offer up to seven percent greater swing torque to move more material faster. “Heavy lift mode for both models boosts lifting capacities to more efficiently handle heavy loads. Allowing the boom to freely travel up and down without using pump flow, the standard Smart-

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Boom allows the operator to focus on grapple control and have a smoother cycle.” Additionally, a range of attachments and new reach options were available for varied applications to increase operating flexibility, Caterpil-

lar informed. For more versatility, both material handlers could be equipped ex-factory with a 15-kW generator for magnet operation.

www.cat.com



Photo: Cat

WASMA

March 22 – 24, 2022, Moscow (Russia)

The international exhibition and business program, Wasma, is held annually in Moscow. “Every year Russian and foreign manufacturers and suppliers showcase a wide range of equipment and technologies for collection, storage, transportation, sorting, recycling and disposal of waste;

wastewater treatment, as well as specialized vehicles,” the organizer said. For specialists responsible for procurement of equipment and technologies, visiting Wasma was a convenient way to solve business tasks in a short time.

www.wasma.ru/en-GB

CHINAPLAS 2022

April 25 – 28, 2022, Shanghai (PR China)

Chinaplas, the 35th International Exhibition on Plastics & Rubber Industries, is one of the world’s leading trade shows for plastics and rubber industries. According to the organizer, Adsale Exhibition Services Ltd., this event is expected to host more than 4,000 global exhibitors, covering 360,000 square meters of exhibition area. The trade show would provide an online and offline technology ex-

change and sourcing platform, “where a well mixture of Chinese and overseas exhibits are displayed under one roof, for international buyers to look for advanced and innovative materials, machines and solutions, to facilitate business network expansion, digitalization and collaborative opportunities exploration”.

www.ChinaplasOnline.com

Postponed:

CHENGDU INTERNATIONAL ENVIRONMENTAL PROTECTION EXPO

November 18 – 20, 2021, Chengdu (China)

Chengdu International Environmental Protection Expo (CDEPE) will take place from Thursday 18th to Saturday 20th November 2021 in the Chengdu Century City New International Convention and Exhibition Centre.

Because of the latest developments in the epidemic situation in continental

China, and according to the requirements of the Department of Epidemic Prevention in Sichuan, CDEPE 2021, the largest environmental protection show in western China, initially scheduled for 2nd to 4th September, has been postponed. The expo is co-organized by Sichuan Environmental Protection Industry Association (SCEPI) and Europe China Environ-

mental Exhibitions, an Italian Exhibition Group (IEG) company. CDEPE was rescheduled, after an in-depth discussion and consultation with all the parties concerned, to safeguard the health and interests of all the participants and ensure the event's success.

 www.cdepe.com/eng

EKOTECH

February 23 – 24, 2022, Kielce (Poland)

Ekotech is one of Poland's most meaningful events of communal services expos, the organizer Targi Kielce said. Every year, the Kielce exhibition and congress center hosts the event. Exhibitors from the environ-

ment protection and waste management business sector come together. "The event also enjoys unflagging popularity among visitors. Not only do industry entrepreneurs visit the trade show – there are also public adminis-

tration employees and representatives of scientific milieus." The event offers conferences targeted at industry specialists and local government officials.

 www.targikielce.pl/en/ekotech

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