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# GLOBAL RECYCLING

*The Magazine for  
Business Opportunities  
& International Markets*



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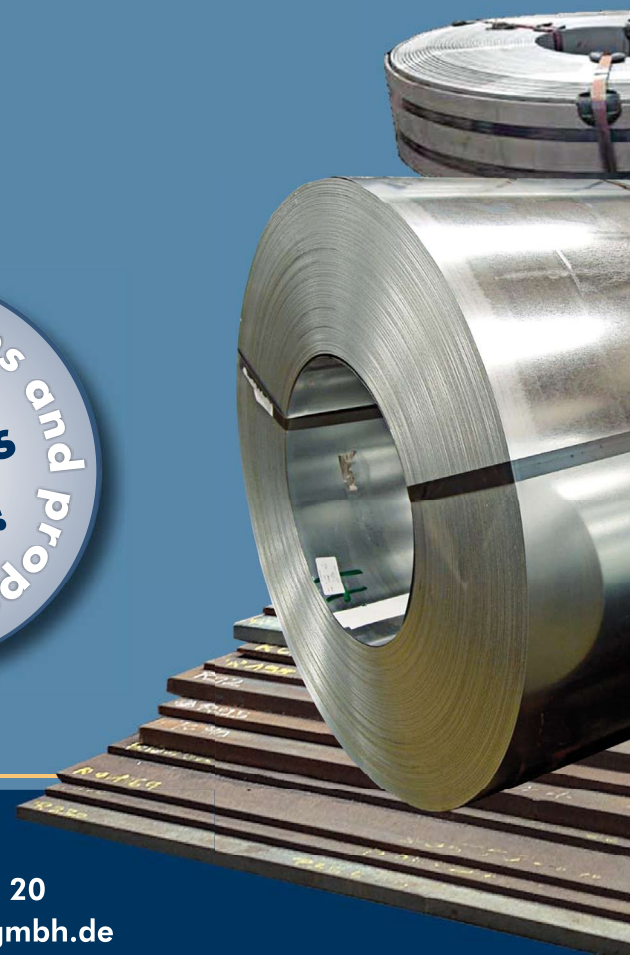
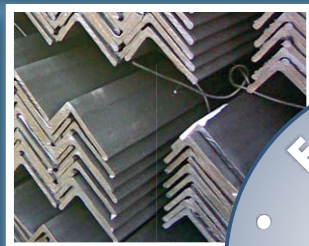
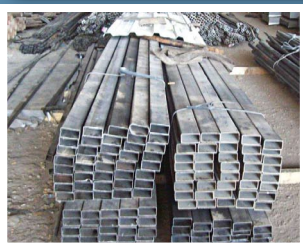
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## A Bright Future for Recycling!

On March 18 this year, thousands of people in different countries across the world were celebrating the first Global Recycling Day. This initiative from the Bureau for International Recycling (BIR) called on the world to think "resource" not "waste" when it comes to recycling – and took the opportunity to encourage people to think of recycling in a new way.



There were activities in cities all around the world, some ahead of the Day itself: In London the Global Recycling Day team presented the scale of what is possible, by using large bundles of recycled materials at a central location. The French Federation of Recycling Enterprises held a press conference in Paris and similar events took place in Washington DC (USA) and São Paulo (Brazil). In Johannesburg (South Africa) the Global Recycling Day's Manifesto was launched along with a public clean-up campaign. At the head office of the Australian Packaging Covenant Organization in Sydney, academics and industry experts gathered to recognize the Day and discussed cross sector collaborations. Actions took place also in Delhi (India), Dubai (United Arab Emirates), Brussels (Belgium), Vienna (Austria) and Ulaanbaator (Mongolia), to name but a few. The Day was also supported by companies and associations, including the United Nations Industrial Development Organization (UNIDO), which promotes a circular economy to improve the environmental performance, resource efficiency, and productivity of existing and new industries. Furthermore, the Day marked the 70th anniversary of non-profit organization BIR, which represents over 760 member companies from the private sector and 36 national associations in more than 70 countries.

This initiative will certainly strengthen the position of recycling in the resource management of industries. However, recently some materials flows were disrupted since China had put a ban on the import of recyclables, which contain too many impurities. The ban applies to 24 categories of solid waste, including certain types of plastics, paper and textiles. Nearly all waste exporting states had relied on China's demand for materials, and now the impact seems to have dramatic consequences, as waste is ending up on waste dumps and burnt in incineration plants. But the ban has catalyzed the markets as well: the situation is described from page 28 onwards. Furthermore, the Chinese General Administration of Customs (GAC) has launched a campaign called "Blue Sky 2018" in March, which will continue up until the end of the year. Aim is to prevent waste from other countries being illegally smuggled into the People's Republic of China. As reported by media, the GAC verified 50,000 tons of smuggled waste in 69 cases by February 27.

In more and more countries throughout the world the legislative pendulum swings to circular economy. One prime example is Singapore, which is heading for zero waste (page 20). On the African continent, Ghana has launched a National Total Sanitation campaign and is working on a National Plastic Policy (page 26). And sometimes a country has to struggle to achieve the recycling rates set by environmental legislation and EU directives; this applies to Bulgaria (page 23), where the recycling market is active.

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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# Singapore Offers Many Opportunities

Companies wanting to invest in the Republic of Singapore face favorable conditions.

As reported by the online edition of Singapore-based newspaper "The Straits Time", the city-state's economy performed in 2017 much better than expected. Therefore, the Ministry of Trade and Industry (MTI) upgraded its 2017 full-year gross domestic product (GDP) forecast to three or 3.5 percent. This is up from an earlier estimate of two to three percent. According to FocusEconomics, a provider of economic analysis and forecasts for 127 countries, economists estimate that Singapore's growth should remain healthy in 2018. "Robust export growth on the back of solid trade dynamics, together with pro-business government measures, should fuel a rebound in fixed investment," the information said in December 2017. "Fixed investment will also benefit from increased public spending on infrastructure." FocusEconomics panelists expect the economy to grow 2.7 percent in 2018 and 2.6 percent in 2019.

## Industry: urban solutions and sustainability

According to the Singapore Economic Development Board (EDB), a governmental agency under the Ministry of Trade and Industry, the city-state is "home to some of the biggest companies who are innovating, testing and collaborating to develop and commercialize sustainable solutions". Five key pillars – infrastructure, built environment, clean energy, water and environment, urban mobility – are

promoted by EDB, which is responsible for strategies that enhance Singapore's position as a center for business, innovation and talent. Together, these industries form the urban solutions and sustainability sector. With a growing emphasis on water and the environment worldwide, the country considers itself as well positioned. "Singapore is recognized as a 'Global Hydrohub' with about 180 water companies," EDB emphasized. These firms represent the entire value chain of the water industry. "Singapore is also nurturing the environmental industry which includes environmental consultancy, waste management and pollution control."

One of the pro-business measures is PPP (public-private partnerships). Partnerships between the government and companies have played a key role in Singapore's sustainability and urban solutions agenda, EDB underlined in December last year. "To foster such partnerships, Singapore has positioned itself as a 'Living Laboratory', by availing its national urban infrastructure to companies both local and foreign, to develop, test and commercialize innovative solutions. This allows the government to harness the best technologies and solutions introduced by the companies." Companies as well benefit from using the country as a reference market to develop and sharpen their solutions before scaling up to markets in Asia and the rest of the world, the agency gave account. "This has been the approach that has



enabled Singapore to build up key strengths in its water management solutions, amongst other areas. This has led to the Public Utilities Board (PUB) in Singapore jointly piloting over 150 projects with leading water players such as Suez Environnement, Anaergia and Meidensha, over the past eight years." PUB's invitations to tender are published on the GeBIZ website at [www.gebiz.gov.sg](http://www.gebiz.gov.sg).

The Singapore Economic Development Board undertakes investment promotion and industry development in the manufacturing and internationally marketable services sectors. The government agency also works with companies by providing information, connection to partners and access to government incentives for their investments, as well as their transformation and growth initiatives. "We also work closely with other Singapore government agencies to constantly improve our pro-business environment, and ensure that our industries are supported by a globally competitive workforce through talent development," EDB emphasizes.

[www.edb.gov.sg](http://www.edb.gov.sg)


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## Food Waste Management Market: Food Processing Waste to Grow

According to a report published by Future Market Insights (FMI), food processing waste – by waste generation type – is anticipated to retain its dominance by securing 35 billion US-Dollar by the end of the forecast period in 2027. This reflects a compound annual growth rate (CAGR) of 6.8 percent.

The recent report on global food waste management market developed by Future Market Insights reveals that the retail waste segment of the market is estimated to expand at comparatively lower compound annual growth rate (CAGR), related to other waste type segments during the assessment period (2017-2027), the research company emphasized. "The report also highlights the factors influencing growth of the market. Wherein, factors such as waste produced by agricultural processes, dairy food processing waste, poultry and meat processing waste as well as increasing seafood processing wastes are included. The amount of waste generated by these industries is beyond imagination. These factors compelled players in the waste food management industry to improve waste food procedures."

### Dynamics of the Market

As reported, food processing waste is anticipated to dominate, riding on high single-digit CAGR throughout the assessment period. In terms of volume, the consumption of the food processing waste segment is likely to reach 182 million tons by the end of the assessment period, with 5.1 percent growth rate, FMI predicts. The consumption waste segment is projected to reach 30 billion US-Dollar by the end of the assessment period. "Further, this segment will reach 139 million tons by the end of 2027 and it is estimated to increase at 4.4 percent CAGR throughout the assessment period."

According to Future Market Insights, in terms of revenues, both the consumption waste and food processing waste segment is likely to dominate the global food waste management market throughout the forecast period. "By the end of 2017, the consumption segment is likely to procure over one-third share of the market whereas the food processing waste segment will hold nearly two-fifth market share",



the company wrote in December last year. "Moreover, by the end of 2027, the consumption waste segment is likely to lose 90 basis points and food processing waste segment will grow by 210 basis points. The food production waste segment is anticipated to witness low CAGR and will procure only nine percent market share, in terms of value."

### Regulations Governing Management of Food Waste

Generation of food waste is mainly observed in developed economies, FMI gave account. The majority of the food waste is generated through supply chain including producers, processors, distributors, transportation and logistics channels as well as retailers. As reported, governments of several countries are implementing stringent rules governing the effective management and disposal of food waste.

Some examples:

- Food Production Wastes: Regulatory bodies such as Food and Ag-

riculture Organization (FAO) and Ministry of Agriculture, Forestry and Fisheries are regulating food waste management at the agricultural level in order to minimize food wastage at source.

- Distribution and Supply Chain Wastes: The National Solid Waste Policy in Brazil focusses on increasing the sustainability of solid waste management and decreasing the total volume of waste produced at the national level. The sectors covered in the policy include health-care, construction, transportation, forestry, mining, industrial, domestic and public.
- Retail Wastes: The Waste Management Legislation in Europe has made it mandatory for food manufacturers, service providers and the retail sector to deal with food waste recycling and disposal in an environment-friendly manner.

➔ [www.futuremarketinsights.com/reports/food-waste-management-market](http://www.futuremarketinsights.com/reports/food-waste-management-market)



# Bulgaria Is Progressing in Waste Management

As reported by Serbian-based online platform Balkan Green Energy News in November last year, Bulgaria's environment ministry intends to build two waste treatment plants in the Sandanski municipality.

According to the information, the project (worth a total of 4.75 million Euro) involves the construction of a composting plant (capacity: 2,623 tons per year) and an installation for preliminary treatment of waste (10,430 tons per year). The construction work is expected to be completed in 2020. The EU operational program will help financing this project.

Some weeks earlier the online platform reported that in the Bulgarian capital of Sofia a combined heat and electric power plant is to be built, which would use processed waste from a waste management facility in the capital city. It is planned that the new unit, which is part of the integrated Sofia municipal waste project, will partly replace heat generation from existing natural gas-powered facilities. The financing is – inter alia – provided by a loan of the European Investment Bank and an EU grant.

## Steady economic growth

According to the European Commission, Bulgaria's economy is set to continue its steady growth, driven mainly by private and public consumption and a recovery in investment. Real GDP (Gross Domestic Product) growth

in 2017 was expected to reach 3.9 percent following a good performance of the economy in the first half of the year and an upward revision to 2016's real GDP growth rate by 0.5 pps, the Commission stated in autumn last year. In 2018 GDP growth is expected to reach 3.8 percent (year-on-year).

## Investing in Bulgaria

"Bulgaria's strategic geographic location serves as a bridge between the EU and the rapidly growing markets of Russia, Turkey, the Middle East and CIS countries, placing the country in the center of transit between these regions," the country's InvestBulgaria Agency stated to underline the busi-

ness opportunities. "Furthermore, five pan-European corridors pass through Bulgaria's territory, including corridor № VII (the Danube River, connecting Bulgarian ports with the North Sea entirely by water) and TRACECA (TRANsport Corridor Europe – CAucasus – ASia, connecting the country to Central Asia)." The agenda of the government to emphasize on the modernization of infrastructure in the upcoming years would be set to reduce significantly the required time for transportation of cargo, "placing the country in a pole position for attracting new investors interested in expanding their businesses in these geographies".

InvestBulgaria Agency is a governmental institution providing information, contacts and project management support to potential investors. Its services include provision of macroeconomic data, company and industry profiles, legal advice, information on Foreign Direct Investment (FDI) incentives and EU funds, on site and facility locations as well as on industrial and free zones, investment project support and administrative and legal support.

➞ [www.investbg.government.bg/en](http://www.investbg.government.bg/en)



Photo: Wikimedia

## Agrifiber Products Market Set to Rise

According to third-platform research firm Persistence Market Research, the global agrifiber products market is expected to reach a valuation of more than two billion US-Dollar by 2025 from a value of about 984 million US-Dollar in 2017.

The publication titled "Agrifiber Products Market: Global Industry Analysis (2012-2016) and Forecast (2017-2025)" includes aspects such as trends, developments, opportunities, drivers and challenges across important regions like North America, Latin America, Europe, Asia Pacific (APAC) and Middle East and Africa (MEA).

By product type, the wall panel and boards segment is expected to grow at a high compound annual growth rate (CAGR) of 7.5 percent during the forecast period. As reported, it is the largest segment by value, dominating the global market during the forecast period. By application, the residential sector has shown high inclination towards the use of these products – in 2017, the value stood at around 850 million US-Dollar; the segment is estimated to reach a significant valuation by the end of 2025. By raw material source, the wheat and rice straw segment is expected to surpass all other material sources with a high growth rate as well as a high market share.

➞ [www.persistencemarketresearch.com/market-research/agrifiber-products-market/toc](http://www.persistencemarketresearch.com/market-research/agrifiber-products-market/toc)



# Big Business Opportunities for Recycling of Nutrients Possible

When the inputs of fertilizers to soil exceed the off-take of nutrient, the resulting surplus represents a potential risk to the environment. Not a decade ago, the surplus of nitrogen in agricultural land in the EU 27 amounted to 49 - 80 kg per hectare, whereas the surplus of phosphorus reached 1.8 - 8 kg per hectare. Meanwhile, these surpluses could be reduced, but there is still the waste of nutrients. If better fertilizer handling and proportioning will not help, the reuse and recycling of organic nutrients might and could reduce the input of mineral fertilizers.

In the EU27, nitrogen accounts for almost 70 percent of the volume of all applied fertilizers. Its input to cropland for the EU27 is derived to 51 percent from mineral fertilizers and 34 percent of manure, according to the Rural Investment Support for Europe Foundation. Regarding the phosphorus input to agricultural soils, mineral fertilizers account for 43 percent and manure contributes 53 percent. The total input of nitrogen that flows into the EU agricultural system annually reaches 16.7 Mt (million tons) per annum, of which 6.5 Mt are emitted to air, 7.3 Mt emitted to groundwater and surface water and only 2.4 Mt or 14 percent consumed by humans. The input of phosphorus amounts to 2.392 Mt per annum, of which – after crop production, animal production, food processing and non-food production – 655,000 tons or 30 percent reach human consumption.

## Three sources

Substrate flows in the EU are fed by three sources: animal manure, wastewater and sewage sludge and food chain waste, mostly slaughterhouse waste. The per annum 1,400 Mt of livestock manure by pigs, cattle and poultry is

less than 10 percent processed. Separated, anaerobically treated or mixed with additives the material yields 0.55 Mt nitrogen and 0.14 Mt phosphorus. But manure already provides 43 percent of nitrogen (7.1 Mt) and 53 percent of phosphorus (1.5 Mt) to EU-27 agriculture. And it represents 70 percent of all recovered nitrogen and phosphorus. Their efficiency and recovery could be increased by improved handling, storage and more concentration of the material.

According to the figures, annually 10 Mt of dry sludge are produced in the EU-27, containing about 3.3 Mt nitrogen and 0.3 Mt phosphorus. The sludge is by 42 percent applied to agricultural land with big regional variations, by 27 percent landfilled, by 14 percent incinerated and by 16 percent treated in other ways like composting. So recovery amounts and rates should be reinforced as well as knowledge and material specification. For the third source – food waste – less information is available, as the definitions of waste differ among the EU Member states. The 88 Mt of biodegradable respectively organic waste in total, diverted into 11.3 Mt of compost for gardening and 56 Mt digestate used by 80 percent in agriculture, contain 0.55



Mt nitrogen and 0.11 Mt phosphorus. Additionally, slaughterhouse waste and wastewater amount to 25 Mt per year, containing 0.28 Mt phosphorus and mostly being incinerated.

### To compensate mineral fertilizers

Combined, the three selected waste streams show an estimated nitrogen stream of more than 10 to 13 Mt, of which 7.8 percent is recycled, and a total phosphorus stream of 2.5 Mt, of which 1.9 percent is recycled (i.e. recovered/collected and reused). This means recycling rates between 60 and 80 percent for nitrogen and 75 percent for phosphorus. Not being recovered from these major waste streams were 2 to 5 Mt nitrogen and 0.6 Mt phosphorus. As the Fertilizers Europe Annual Overview 2015 wrote, "these quantities represent 18 to 46 percent of the mineral nitrogen and 43 percent of the mineral-based phosphorus currently applied to crops in the European Union". In other words: A large percentage rate of mineral fertilizers for crop production could be compensated by extra organic nutrients.

The processing of manure to valuable end-products can be entered by anaerobic digestion. The following physical separation step disaggregates the ongoing mass of 80 to 90 percent liquid phase from 10 to 20 percent solid phase. The liquid fraction may be treated via Ammonia stripping or liming to  $(\text{NH}_4)_2\text{SO}_4$ -solution or via biological treatment to K-rich effluent. Evaporation and/or filtration leads to mineral concentrates or chargeable water; alternatively, Struvite and Calciumphosphate can be precipitated. The solid fraction may be pyrolyzed to generate phosphorus-containing ashes, dried and pelletized to organic fertilizers, treated by liming to recover organic Calcium-Fertilizer or bio-thermally dried to manure compost. Processing enables cost-effective transportation of nutrients to areas where they are needed. So nutrient recycling could be a model for saving resources and – dependend to market and price conditions – for saving money.

The opportunities for nutrient recovery and reuse in the European agriculture could – amongst others – be improved by three measures, Allan Buckwell, Elisabet Nadeu and former EU Commissioner for Environment Janez Potočnik

argued in a presentation at Brussels in Juli 2016. The parallel tasks to be involved contain an increasing amount of recovered nutrients, an increase of fertilizer equivalent value of recovered nutrient and the creation of recovered products that are safe, easy to store, and cost-effective in handling and use by farmers. On the other hand, it must be assured that contaminations are avoided: The European Food Safety Authority warned in 2012 of increased risk through cadmium, heavy metals, pathogens and organic contaminants such as pharmaceuticals that can be incorporated in organic fertilizers like sewage sludge and compost, and, added to animal feed, be incorporated in manure.

### Recovery and recycling as strategies

The EU Commission became aware of the issue and took initiatives, particularly as phosphate rock was added to the list of 20 critical raw materials in 2015. Amongst others, the politicians launched two European Sustainable phosphorus Conferences in 2013 and 2015. Contributed 5.8 million Euro to the three years project on "Recovery and recycling of nutrients turning wastewater into added-value products for a circular economy in agriculture" titled water-2REturn. And put forward a legislative proposal on fertilizing products in March 2016, modernizing the conformity assessment and market surveillance in line with the 'new legislative framework' for product legislation, covering a wider range of fertilizing products (even including those manufactured from secondary raw materials), and setting limits for the presence of heavy metals and contaminants in fertilizing products. The European Parliament meanwhile adopted the proposal in late October 2017.

Nutrient stewardship got key to the United Nations Sustainable Development Goals number 2: Zero Hunger, number 14: Life Below Water and number 12: Responsible Consumption and Production. The Baltic Region States (HELCOM) committed to improved nutrient management, including enhanced phosphorus recycling. A "phosphorus Challenge" was taken up by the European Sustainable Phosphorus Platform, formed in March 2013 through a declaration, signed by over 150 organizations after the first European Sustainable Phosphorus Conference, where 45 stakeholders discussed regulatory issues surrounding



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the use of recycled phosphates in agriculture. The European Innovation Partnership on Agriculture and Sustainability (EIP-AGRI) addressed the issue “How to improve the agronomic use of recycled nutrients (N and P) from livestock manure and other organic sources?” Fertilizer’s Europe organized a conference in June 2016 on “Opportunities in the EU nutrient legislation: What to look out for”. The Rural Investment Support for Europe Foundation (RISE) published a comprehensive, 96 pages containing review on “Nutrient Recovery and Reuse in European agriculture”. And for instance, Denmark announced a new waste recycling strategy in 2013, including phosphorus recycling from manure, sewage biosolids and food wastes.

### Finland – model country in nutrient recycling

Finland took the issue even more seriously and committed already in 2010 to become a model country in nutrient recycling. According to figures out of 2015, the country produced 20 Mt of manure annually containing 17.5 million kilograms phosphorus, as the manure produced in Finnish animal farms would be sufficient to cover plant phosphorus needs at a national level. In April 2016 – at the Helsinki “Forum for Action” on “Recycle nutrients for clear waters” – the Finnish Minister of Agriculture and the Environment, Kimmo Tiilikainen, launched a 12 million Euros national Key Project Program 2016-2018 for innovation in nutrient recycling technologies. And he presented targeted goals aiming for increased nutrient recycling and energy self-sufficiency in agriculture: The target is to process 50 percent of farm manure and community wastewater sludge in sensitive areas by 2025.

Newer statistics published by the Natural Resources Institute Finland in October 2017 indicate that waste and side streams generated annually in Finland contain 26,000 tons of phosphorus and 95,000 tons of nitrogen. Even though the amount of phosphorus suitable for recycling is higher than the demand of plants for fertilizers, a total of 11,000

tons of artificial phosphorus-containing fertilizers was still used in Finland in 2015.

### A fertilizer value of around 20 billion Euro

An elder estimation says that nitrogen pollution of air, water and soil costs the EU between 70 and 320 billion Euro per year. And the European Nitrogen Assessment calculates that the loss of excess nitrogen from agriculture into the environment has a fertilizer value of around 20 billion Euro per year. This shows the significance and necessity of adequate handling and recycling or reuse of nutrients. “Recycling phosphorus and nitrogen is important to promote water protection, food security and circular economy. However, currently, nutrients are not being recycled efficiently enough to reach the set goals”, says Sanna Marttinen, CEO of the Finnish Partnership for Research on Natural Resources and the Environment. Currently, 5 percent of all manure is processed in Finland, while the actual need is at least 20 percent. The situation is fairly similar in Belgium and the Netherlands, for example. Solving these problems within the EU would create new business opportunities for competitive clean technologies for domestic markets and exports.

Following Sanna Marttinen, “incentives for creating concepts for products and services over the entire nutrient cycle should be made. A functioning market for recycled nutrients would effectively balance supply and demand. The soon-to-be-reformed EU fertilizer legislation will offer opportunities, but is not a sufficient measure on its own.” Eeva Hellström, director of Finnish Innovation Fund Sitra, puts the focus on another aspect. In her opinion “water and nutrient cycles have not been regarded as being as important as they should be in developing a bio-economy. At the same time, the effect of local solutions on global challenges needs to be better understood. When developing business we have to understand water and nutrient cycles, and there are big business opportunities here.”

## New Catalysts for Fuel Cells

Catalysts for anion exchange membrane fuel cells do not have to be expensive. Scientists from the University of Surrey (located in the South East of England) – in cooperation with colleagues from Queen Mary University of London – have produced non-metal electro-catalysts for anion exchange membrane fuel cells by using a cheap clay material called Halloysite as the template, urea as the nitrogen source and furfural (an organic chemical that can be produced from oats, wheat bran or sawdust) as the carbon source. This was then processed into a fine black powder and used as nitrogen-doped carbon electro-catalyst.



According to the information, that could pave the way for production of low-cost, environmentally friendly energy generation. As reported, the “catalyst helped to achieve a power density performance of 703 watts per square centimeter squared (mW cm<sup>-2</sup>) from the fuel cells”.

Fuel cells are currently used as a low carbon energy technology for electricity generation in transportation and stationary applications, but the use of precious-metal-based catalysts, especially platinum, makes the technology expensive and less sustainable. According to the scientists, their work demonstrates that low cost catalysts can give high performances in fuel cells, although more work needs to be done.



## Singapore: Researchers Turn Fashion Waste into Multifunctional Material

A research team from the National University of Singapore (NUS) Faculty of Engineering has developed a method to convert cotton-based fabric waste, such as unwanted clothing, into highly compressible and ultralight cotton aerogels.

According to the university, aerogels are among the lightest materials in the world and are highly porous with strong absorption capacity and low thermal conductivity. These properties make aerogels highly suitable for applications in areas including oil-spill cleaning, personal care products such as diapers as well as for heat and sound insulation. "While aerogels were first created in the 1930s, this advanced material has not been widely adopted by industries due to its high production cost. Leading aerogel scientists around the world are therefore actively looking at ways to improve the manufacturing and consumption of different types of aerogels. Contributing to this global effort, the NUS team has successfully pioneered the development of aerogels using cotton fibers harvested from textile waste." These products can be fabricated within eight hours – this is about 20 times faster than current commercial

fabrication processes. Led by Associate Professor Hai Minh Duong and Professor Nhan Phan-Thien from the Department of Mechanical Engineering at NUS Faculty of Engineering, the research team discovered that the novel cotton aerogels can be easily compressed and that they can also very quickly recover up to 97 percent of their original size when placed in water. Hemorrhage is the excessive and rapid loss of blood. Those control devices are used to exert internal pressure to stop bleeding and promote blood clotting. The NUS researchers developed highly compressible hybrid cotton aerogel pellets, which are more effective than cellulose-based sponges for treatment of deep hemorrhagic wounds. These pellets are simple and cost-effective to produce and can be easily integrated into a clinical syringe to be used as a hemorrhage control device. The cotton aerogel pellets are also biocompatible; hence

they can be safely administered for treatment. "Each cotton aerogel pellet can expand to 16 times its size in 4.5 seconds – larger and more than three times faster than existing cellulose-based sponges – while retaining their structural integrity", NUS informed.

The NUS team, in collaboration with DSO National Laboratories, developed also a light-weight thermal jacket to maintain the temperature of ice slurry at 0.1 to 1.0 degree Celsius for more than four hours. The thermal jacket, which weighs about 200 grams, consists of a cotton aerogel layer embedded within commonly used fabrics to provide heat insulation. The NUS team has filed a patent for the novel cotton aerogels and is now exploring opportunities to work with companies to commercialize the technology.

➡ <https://news.nus.edu.sg/press-releases/compressible-cotton-aerogels>

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## EPS-SURE: European Project to Recycle Fish Boxes

The project, which was started in 2017, counts a budget of 1.5 million Euro and has obtained a grant of the European Commission through the European LIFE+ Program.

As reported by Coexpan, an Italian company specialized in the manufacturing of rigid plastic sheets and thermoformed products for the food industry, the "LIFE EPS-SURE 2017-2020" Project is destined to the design of a new collection, pretreatment and recycling system of Expanded Polystyrene (EPS) wastes to produce new high added value Polystyrene (PS) products suitable for food contact. The project is coordinated by Ciclo-



plast, an association that integrates all the companies of the plastic sector

in Spain in which Anape, Coexpan, El Corte Inglés and Total Petrochemicals Iberica take part. Coexpan's contribution to the EPS-SURE Project will be "a key element to verify the functionality of the new obtained grades according to the usual quality standards in the sector, analyzing its thermoformability, its preservation capability of the different types of food and its safe use as a suitable material for direct food contact," the company said.

Photo: hirophoto / fotolia.com

## Hong Kong: Government Considers Plastic Bottles Deposit Scheme

According to "South China Morning Post", a deposit scheme is considered to boost the incentive for Hong Kong citizens to recycle plastic bottles.

if a "producer pays" scheme is needed to transfer the recycling costs to the manufacturer, similar to legislation tackling dumped glass bottles.

lack of sorting facilities in Hong Kong means nearly all waste plastic and paper is shipped across the border for further processing," it said.

As reported, the government is also considering "actively collecting waste plastic bottles" from the community, "instead of relying on contractors who have long been reluctant to handle such waste due to its high processing costs". Furthermore, an 18 month study is also underway to see

The main reason for this development is the tightening of waste imports by the Chinese mainland, which took effect on the first of January. According to the newspaper, this would greatly limit the scope of waste Hong Kong can ship away and hence force tons of unwanted recyclables into landfills. "A

To ensure compliance with the mainland's stricter import regulations, the government had revised its recycling strategy in December last year to focus on three types of paper (cardboard, newspaper and office paper) and two types of plastic (rinsed bottles for drinks and personal care products).

## A Multi Million Grant for New Facility in California

US-based company Revolution Plastics LLC awarded a grant of three million US-Dollar from the California Department of Resources Recycling and Recovery (CalRecycle) through its Recycled Fiber, Plastic and Glass Grant Program.

Revolution Plastics (founded in 2016 by Delta Plastics, a company located in the Mississippi River Delta), provides free pickup of agricultural plas-

tics – mostly low-density polyethylene (LDPE) film or irrigation tubing – to more than 400 dairies, growers, almond hullers and other agriculture-related processors in California and is the largest agricultural plastic collection operation in the state. Currently, the company's collected plastic is shipped from its consolidation yards in Central California to Delta Plastics' facility in Arkansas, where it is washed and converted to resin and used in

manufacturing processes to produce can liners, irrigation tubing, agricultural cover films, plastic lumber and other construction as well as agricultural films. Since its inception, Revolution Plastics is responsible for the collection of over 30 million pounds of used plastic in California. The grant will help Revolution Plastics establish a recycling and manufacturing plant in Central California, which is expected to start production in 2018.

## East Africa: Smuggling of Secondhand Clothes Increases

As reported by African media, there is an illegal trade with used clothes and leather products, since member states of the East African Community (EAC) had raised levies on second-hand textiles to protect the clothing industry

of Tanzania, Burundi, Kenya Uganda, Kenya and Rwanda. These countries decided in 2016 to restrict the import of such products. According to the report, analysts "have warned that if the illegal trade continues, economies of

EAC partner states will suffer and the region's policies to promote domestic products will collapse".

Furthermore, the illegal trade would cause tax fraud to smuggling.





Sullivan Scrap processes approximately 70,000 tons of materials each year, with 25 percent being non-ferrous metals

# Exploring the Changes in Scrap Metal Sorting

Photos: Rigaku Analytical Devices

According to a 2017 report from the Institute of Scrap Recycling Industries (ISRI), the United States recycles 150 million metric tons of scrap materials annually. This volume includes 85 million tons of iron and steel, 5.5 million tons of aluminum, 1.8 million tons of copper, two million tons of stainless steel, 1.2 million tons of lead and 420,000 tons of zinc each year.

Author: Jen Lynch – Marketing Director, Rigaku Analytical Devices

The recycled materials that the scrap metal industry sort and processes into raw material feedstock are crucial for industrial manufacturing around the world. For example, the proportion of recycled copper, found in electric wires and pipes used by the home building industry surpasses 50 percent according to Thought Co., The Benefits of Metal Recycling.

The nature of scrap metal sorting is changing. As any recycler will report, traditional scrap metal sorting techniques are becoming outdated. New techniques are required by the industry to efficiently process the huge volume of scrap that is received from both commercial and domestic sources. These changes have brought with them new challenges, which has fueled the demand for more effective tools that have the capabilities to increase the accuracy and speed of scrap metal identification. The increase of speed is vital to the profitability of businesses in this industry due to the fluctuation of metals prices.

## Sullivan Scrap and its service challenges

Founded in 1953, and based in Holyoke (Massachusetts, USA), Sullivan Scrap partners with a broad range of customers requiring the recycling of scrap metal – including some of the region's largest manufacturers – down to local individuals in and around New England. The company has created a reputation in the industry for providing customers with the fairest pricing for their scrap, in addition to offering over 50 years of expertise in effective and convenient solutions for handling and disposing of scrap metal materials.

Customers include both large-scale manufacturers, for example, someone in construction or demolition, and small-scale 'do-it-yourselfers' looking to remove scrap metal from a garage, shed, or basement or old farm equipment. The removal and disposal of metal products and materials require expertise that will ensure that all unwanted metal

products and materials are handled and disposed of safely and with minimal impact on the environment.

Customers of Sullivan Scrap require both speed and accuracy in the identification of an increasingly complex range of metals. Using 'older' generation metal identification instruments has become limiting to the scrap industry. Organizations in the scrap arena require a rapid throughput of metals to maximize potential profits. In many cases, existing analytical devices are cumbersome and not ideally suited to the typical scrap yard environment, making them potentially unreliable. Failure to rapidly identify all alloying elements can mean a missed opportunity for both speed and profit gain.

### Meeting requirements head-on

Sullivan Scrap processes approximately 70,000 tons of materials each year, with 25 percent being non-ferrous metals like aluminum, copper and brass. In order to stay competitive, they use different handheld technologies to identify their incoming material in order to process it as efficiently as possible. Handheld analyzers are now the instrument of choice for the purpose of meeting the rigorous demands of modern scrap recycling. They can provide accurate alloy grade identification on-site for fast separation. The company has been using handheld x-ray fluorescence (XRF) technology for many years, typically for the analysis of nickel alloys, brasses, and other metals made up of heavier elements. However they found a gap in this technique when it came to processing lighter alloys, such as aluminum.

The company discovered laser-induced breakdown spectroscopy (LIBS) technology two years ago. This new generation handheld device has proven to be extremely effective in light elemental analysis – especially for aluminum – as well as having the capability of sorting heavier metals. Sullivan Scrap uses a LIBS device from Rigaku Analytical Devices called the KT-100 Series metal analyzer. The LIBS handheld device offers increased speed in obtaining analytical results, therefore allowing their facility to sort more alloys. In doing so, the scrap recycler is able to sort specific alloys out so they are not making a mixed package. This



A key feature of the KT-100 is its ease of use for the everyday user

enhancement has allowed the firm to upgrade the materials that it is able to prepare and thus increase profitability on every pound. In addition to the analytical performance of LIBS technology, utilizing a laser-based technology reduces the need for regulatory licensing and registration that previous generation analyzers were susceptible to.

Sullivan Scrap found that a key feature of the KT-100 was its ease of use for the everyday user. The user is able to select what information is available on the results' screen and is able to determine what is displayed, whether it is the spectra, the chemistry breakdown, or even just the alloy match name. The other stand-out features of the device are the hard, raised buttons on the keyboard. Other handheld analyzers are moving towards a touch screen operation only, which could become problematic for users who are wearing work gloves. Unlike other handheld devices used by the scrap recycler, the KT-100 has a docking station cradle that will charge the analyzer plus a spare battery at the same time. The cradle facility removes the need to take the battery out of the analyzer at the end of each shift, offering the advantage of being constantly ready to use on demand.

The environment at a scrap metal sorting facility is not ideal for analytical technology instruments. Therefore, any tool used to sort metal needs to be able to withstand the toughest use to ensure any unplanned downtime for the scrap yard and the associated repair costs avoided. The KT-100 Series LIBS analyzer has proved to be durable for use in tough environments, as it has passed rigorous U.S. Military 810-G certification for temperature, mechanical and drops testing, making it ideal for use in scrap yards.

### Conclusions

Handheld LIBS technology has been in use at Sullivan Scrap for two years and has proved to make the sorting process quick and efficient, while the results from the device are reliable and consistent. The device is capable of the precise identification technology required to ensure the accurate resale value of both light and base metals allowing the opportunity for profit gain. With the use of LIBS technology, Sullivan Scrap has been able to meet the demands of modern scrap metal sorting.

➔ [www.rigaku.com/en/techniques/libs](http://www.rigaku.com/en/techniques/libs)



Photo: Marc Weigert



## Dell Turns E-Waste into New Treasures

In January this year, the USA-based multinational computer technology company Dell and actress, entrepreneur and activist Nikki Reed were announcing a new limited-edition jewelry collection made in the USA and sourced from gold recovered from Dell's recycling programs.

According to the information, the collection includes 14- and 18-carat gold rings, earrings and cufflinks. It was showcased at this year's 2018 Consumer Electronics Show (CES2018) in Las Vegas to highlight the widespread impact that e-waste, or disposable electronic equipment, has on the environment. Dell hopes to bring greater visibility to the value within technology and encourage people to recycle responsibly.

In addition, Dell announced a pilot to use recycled gold from used electronics in new computer motherboards, "which will ship in the award-winning Latitude 5285 2-in-1s starting this spring," a press release said. "The pilot follows a successful feasibility study on server motherboards. The closed-loop gold process could support the creation of millions of new motherboards in the next year. It expands Dell's closed loop program from plastics to precious metals."

In the USA the recycling rates of e-waste are low, only 12.5 percent. As reported, it is estimated that every year Americans throw away gold and silver worth about 60 million US-Dol-



lar through unwanted phones alone. The new jewelry collection and Dell pilot would demonstrate the potential for these precious materials to be recycled into goods.

### Dell's closed-loop gold process

The manufacturer offers take back and recycling services and "mines" its own recycling stream for raw materials. Computers and other electronics which work are being refurbished and resold or donated. In the case of gold, Dell's partner, Wistron, responsibly extracts the gold from motherboards electro-chemically and then melts the gold into bars for easy transport, the company gives account. Then the gold is shipped to suppliers in Taiwan who use it to create a "gold salt bath".

Components for new motherboards are then dipped in this bath to coat them.

### Advantages of recycled gold

In working with TruCost, a company which makes estimates about the hidden costs of unsustainable use of natural resources by companies, Dell found "that the closed-loop process can cause 99 percent less environmental damage and avoid 1.6 million US-Dollar in natural capital costs per kilogram processed" (3.68 million US-Dollar for the pilot project alone) when compared to gold mining. "The same study showed closed-loop process can avoid 41 times the social impacts of gold mining," the manufacturer underlined.

Photo: Schreinschot, Dell Video, <https://youtu.be/WuGE5oNOIA>

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## EU to Support Northvolt's European Battery Project

The European Investment Bank (EIB) has approved a loan request from Swedish company Northvolt AB for the construction and operation of a first-of-a-kind demonstration plant in Västerås, Sweden, for the manufacturing of Lithium-Ion batteries.

The loan of up to 52.5 million Euro is set to be supported by the European Commission through InnovFin under the "Energy Demo Projects" (EDP) Facility. When the negotiations will be concluded and after signature, Northvolt is expected to begin construction of its demonstration line in the coming months.

According to the information, this facility is being built in order to show the commercial viability of the concept and to qualify and industrialize products together with the company's customers. It would also comprise a research facility. "The produced batteries are targeted for use in transport, stationary storage and industrial and consumer applications," EIB gave account.

As reported, the launch of the demonstration plant is a key step towards the establishment of Northvolt's large-scale Li-ion battery factory in Skellefteå in the north of Sweden, eventually targeting a production of 32 GWh



Draft of Northvolt's future large-scale factory

worth of battery capacity annually. It will serve as the main production site, which includes active material preparation, cell assembly, recycling and auxiliaries. The company plans to start construction during this year. Northvolt was founded in 2016 with the

mission to build the world's greenest battery, with a minimal carbon footprint and the highest ambitions for recycling in order to enable the European transition to renewable energy.

➔ [www.northvolt.com](http://www.northvolt.com)

## Chinese Company Finalist in the Award for Circular Economy Multinationals

Chinese Company GEM Co. Ltd. was awarded runner-up in the Award for Circular Economy Multinationals at the World Economic Forum in Davos (Switzerland), Chinese news agency Xinhua reported in January this year.

In 2016, the company processed three million tons of waste, recycled 37 kinds of resources, and recovered 58 kinds of products. "At present, GEM has completed five major industrial chains. The recycling of waste batteries and power battery industry chain, cobalt and nickel tungsten resource recycling and carbide industry chain, the recycling of electronic waste industry chain, comprehensive utilization of scrap automobile industry chain, waste residue, waste mud, waste water recycling industrial chain. There are sixteen industrial parks in the China's ten provinces and cities to drive the business," the World Economic Forum gave account. The company was founded in December 2001

in Shenzhen and went public in January 2010. "GEM is China's first listed company exploiting urban mines, resource recycling and Waste Electrical and Electronic Equipment Directive (WEEE) recycling industry," the information says. The company has more than 5,000 full-time employees.

According to Xinhua, GEM has applied for 1,200 core patents in the field of waste recycling and material recovery, including 52 Patent Cooperation Treaty (PCT) and foreign patents; more than 20 core patents were authorized in Europe, the USA and Japan. As reported, the company cooperated with the University of Oxford and the Oxford University Innovation

Limited with regard to pyrolysis oil from waste tires. It has made investments in Europe and also intends to build a "China-African Circular Economy Industrial Park" in South Africa.

The Circulares – an initiative of the World Economic Forum and the Forum of Young Global Leaders, run in collaboration with Accenture Strategy – is the world's premier circular economy award program. The award offers recognition to individuals and organizations across the globe that are making notable contributions to the circular economy in the private sector, public sector and society. The annual awards are hosted at the World Economic Forum's Annual Meeting in Davos.



## Dubai to Build the World's Largest WtE-Plant

Dubai will have the largest plant in the Middle East to convert waste-to-energy, the official portal of the UAE (United Arab Emirates) Government had announced some time ago.

Dubai Municipality has selected Swiss company Hitachi Zosen Inova in a joint venture with Belgium's largest construction company BESIX Group to build the world's largest energy-from-waste facility, a press release, dated on 29th of January this year, informed. The two companies would collaborate on delivering the engineering, procurement and construction of the turnkey plant, and a minimum of 30 years' operation and ownership of the resource recovery facility.

As reported, the facility will be located at the waste landfill site in Al Warsan and will be built at a cost of nearly 681 million US-Dollar (2.5 billion AED). It "will treat 5,000 tons of non-recyclable municipal solid waste from the Dubai area per day, making a total of 1,825,000 tons a year that will be converted into renewable energy," the Swiss company announced.

"The 171 MW of electricity generated will be fed into the local grid as base-load energy and will power around 120,000 homes. In addition there will be metals recovered and construction materials produced from the bottom ash."

The plant is part of Dubai's Sustainability Strategy. According to Hitachi Zosen Inova, Dubai is making great strides in the field of sustainability in line with the Dubai Strategic Plan 2021, the UAE National Agenda 2021, and the Dubai Integrated Energy Strategy 2030. "These strategic plans aim to protect the environment and ensure sustainable development through various projects and initiatives for the conservation of natural resources, rationalized consumption and the inclusion of alternative and renewable energy resources in Dubai's energy mix." In accordance



Photo: Hitachi Zosen Inova

with the objectives envisaged in these plans, Dubai Municipality was keen to strengthen efforts to achieve the targets for minimizing the volume of municipal waste disposed of in landfill, and for developing alternative energy sources through the implementation of projects for the sustainable management of waste, energy and the environment. The Dubai Resource Recovery Facility would mark a big step toward achieving these goals.

➔ [www.hz-inova.com](http://www.hz-inova.com)

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*Figure: Tailor-made recycling solution for  
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## Plastic Bottles Made from Recycled Plastic

**Evian, Danone's mineral water brand, intends to make all its plastic bottles from 100 percent recycled plastic by 2025, compared to 25 percent at present, in order to tackle the issue of waste.**

As reported by news agency Reuters, Evian is teaming up with Loop Industries, which has developed a new technology of depolymerization to transform all types of Polyethylene Terephthalate (PET) plastic waste into the high-quality plastic Evian requires, to redesign its packaging. Further, "Evian will invest a 'significant' albeit undisclosed sum of money to reach its goal."

According to Canada-based Loop Industries, Inc., the strategic initiative with Evian is part of a long-term Danone global partnership. The company's technology "decouples PET/polyester plastic from fossil fuels by depolymerizing all forms of waste PET/polyester into its base building blocks (monomers)," the Canadian firm gave account. "The resulting



monomers are then repolymerized into virgin-quality polyester plastic, enabling a true circular economy." The technology would allow for low value and no value waste such as carpets and clothing to be up-cycled into high value consumer goods packaging such as water bottles. As reported, the patented technology specifically targets PET/polyester plastic allowing

for the removal for all waste impurities, such as colors, dyes, labels and non-PET/polyester plastic waste.

"Our disruptive technology is helping partner brands reach and exceed their stated sustainability goals," Daniel Solomita, founder and CEO of Loop Industries, Inc., explained. "Iconic brands such as Evian recognize the benefits of our technology in accelerating the transition to the circular economy envisioned by The Ellen MacArthur Foundation and other thought leaders in industry, government and academia. We are now focusing on global commercialization of our technology through manufacturing partnerships to supply Loop branded PET/polyester resin."

➔ [www.loopindustries.com/en](http://www.loopindustries.com/en)

Photo: O. Kurth

## The Coca-Cola Company Announced New Global Vision

**The Coca-Cola Company has announced that it is fundamentally reshaping its approach to packaging, with a global goal to help collect and recycle the equivalent of 100 percent of its packaging by 2030.**

"This goal is the centerpiece of the company's new packaging vision for a World Without Waste, which the Coca-Cola system intends to back with a multi-year investment that includes ongoing work to make packaging 100 percent recyclable," a press release

in January informed. The American company and its bottling partners are pursuing several key goals. By 2030, for every bottle or can the Coca-Cola system sells globally, "we aim to help take one back so it has more than one life. The company is investing its marketing dollars and skills behind this 100 percent collection goal to help people understand what, how and where to recycle. We will support collection of packaging across the industry, including bottles and cans from other companies. The Coca-Cola system will work with local communities, industry partners, our customers, and consumers to help address issues like packaging litter and marine debris."

To achieve its collection goal, the company "is continuing to work toward making all of its packaging 100 percent recyclable globally. The company is building better bottles, whether through more recycled

content, by developing plant-based resins, or by reducing the amount of plastic in each container. By 2030, the Coca-Cola system also aims to make bottles with an average of 50 percent recycled content. The goal is to set a new global standard for beverage packaging. Currently, the majority of the Company's packaging is recyclable."

The beverage producer "will work to achieve these goals with the help of several global partners: the Ellen MacArthur Foundation's New Plastics Economy initiative, The Ocean Conservancy/Trash Free Seas Alliance and World Wildlife Fund (The Cascading Materials Vision and Bioplastic Feedstock Alliance)." It intends also to launch efforts with new partners at the regional and local level and plans to work with its key customers to help motivate consumers to recycle more packaging.



Photo: pixabay



## Aim: A New Plastic Recycling Concept “Made in Finland”

VTT Technical Research Centre of Finland and the City of Nokia aim to develop a new type of plastic recycling concept in the ECO3 business park for the bio and circular economy in Nokia. The partners are confident, that this would enable the creation of new business based on the industrial development of plastic recycling and recycled plastic.

According to the information, developing new concepts for the use of recycled plastic will provide tangible support for Nokia’s urban strategy. “In the best case scenario, this will offer a way of raising the efficiency of plastic recycling and increase opportunities for Nokia citizens to become pioneers in material recycling.”

As announced, the study “will result in a plant concept created by VTT, allowing the planning of business operations on an industrial scale. The contents of the plant concept are affected by issues such as the volumes and quality of plastic material

streams, the availability of potential new technology, the development needs of companies operating in the area, interest shown by international and domestic companies, and the suitability of transport connections for materials transport. The goal is to convert recycled plastic into a material equivalent to virgin plastic.” VTT’s study also includes an analysis of the key technological implementation alternatives, an initial estimate of the investment and operating costs of recycled plastic production, and an analysis of prospective investors and companies, the Finnish research center said. The concept is provided by

the Ministry of Economic Affairs and Employment.

A new kind of industrial scale, multi-sector bio and circular economy business zone is becoming a reality in the ECO3 business park, VTT emphasized. Its area is located in the Kolmenkulma Eco-Industrial Park in Nokia. As reported, this competence center is also a demonstration and piloting environment, developed by the City of Nokia and Verte Oy, the City of Nokia’s development company, in cooperation with companies and universities.

➔ [www.eco3.fi](http://www.eco3.fi)

## A Multi-Functional Plant for Manufacturing Alternative Polyols in Dubai

Using in-house plants and their own waste production materials, companies can manufacture their own high-quality alternative polyols\*) – in doing so, they cut costs.

German company Rampf Eco Solutions has worked with its collaboration partner Keil Anlagenbau to design a multi-functional plant for manufacturing polyols based on polyethylene terephthalate (PET), phthalic anhydride (PSA), and polyurethane (PU)/polyisocyanurates (PIR). It was delivered to a leading supplier of insulation technology in Dubai, erected on site, and put into operation. The facility now offers the option of manufacturing high-quality polyols from the customer’s own PU/PIR waste materials, the information says. Ester polyols based on PET or PSA could also be produced in the same plant.

As reported, the two companies are able to offer a complete solution for the international markets by combining their core areas of expertise:

- “Rampf boasts comprehensive know-how in developing chemical solutions for manufacturing alternative polyols from PU and PET waste materials.
- Keil Anlagenbau has extensive knowledge in developing and con-

structing tank farms and recycling, supply, dispensing, and process engineering plants.”

### Expertise in the field of alternative polyols

According to Matthias Rampf, Managing Director of Rampf Eco Solutions, the company’s research teams have been developing high-quality alternative polyols for over 20 years. In two of the largest multi-functional plants in Europe at the corporate headquarters in Pirmasens, Germany, tailored ether and ester polyols were manufactured from industrial and post-consumer PU waste materials (from flexible to rigid foams) as well as PET/PSA.

As reported, the company has also developed a chemical process that

makes it possible to use PET/PSA, other polyesters such as polylactide (PLA), polycarbonate (PC), and polyhydroxy butyric acid (PHB), and renewable or bio-based raw materials such as vegetable oils as sources of raw materials for manufacturing alternative polyols.

➔ [www.rampf-gruppe.de/en/products-and-solutions/eco-solutions/](http://www.rampf-gruppe.de/en/products-and-solutions/eco-solutions/)



\*) A polyol is an organic compound containing multiple hydroxyl groups. According to Wikipedia, a molecule with more than two hydroxyl groups is a polyol. Low molecular weight polyols are widely used in polymer chemistry, where they function as crosslinking agents.

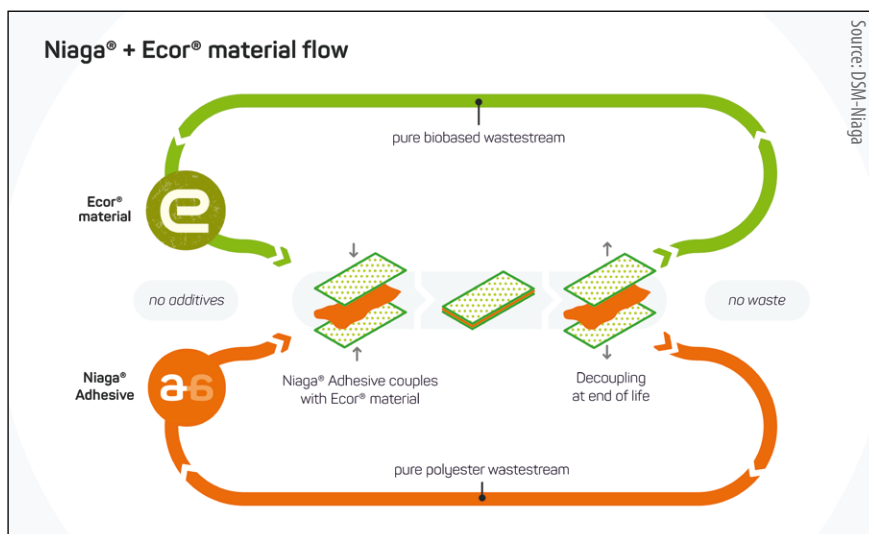


## DSM-Niaga Announces Research Collaboration with Ecor

DSM-Niaga has announced that it will start a research collaboration with Ecor, which will focus on developing fully recyclable and healthier alternatives for particleboard, MDF and other panel materials.

Ecor offers technology for circular materials and has an R&D facility in Venlo, the Netherlands. As reported, the two companies have explored a collaboration by combining each other's technologies. The technology of Ecor can make materials from natural fibers, with water, pressure and heat alone. DSM-Niaga manufactures products by using a reversible adhesive, which enables easy decoupling of different material layers, for full recovery and high value recycling. The combined technologies have been tested in diverse product applications. According to the information, the preliminary results have led to further investigations of applications and will lead to new fully recyclable products.

The Ecor technology is a waste-to-product manufacturing process and results – according to the information – in materials, which enable the circular economy principles of starting with waste resources and enablement



of recycling at the end of a product's life cycle. Ecor material is made of recycled cellulose fibers locally sourced from urban, farm and process waste materials, is completely free of toxins and VOCs and C2C certified.

DSM-Niaga is a joint venture, established in 2014, between the start-up Niaga and Royal DSM, a Dutch-based

global science-oriented company active in health, nutrition and materials. The company's aim is to make products fully recyclable in an easy and affordable way, without compromising on quality or price. Carpet was the first product Niaga redesigned.

➔ [www.ecorbenelux.com](http://www.ecorbenelux.com)  
 ➔ [www.dsm-niaga.com](http://www.dsm-niaga.com)

## Looking for Deinkable UV Ink

**As most cross-linked inks create problems in the recycling process, new ideas are in demand. Therefore, the International Association of the Deinking Industry (INGEDE) and ink manufacturer hubergroup intend to start a research project.**

According to INGEDE, other than traditional offset and gravure inks, most cross-linked inks are difficult to remove from the paper fibers in the deinking process. This applies to liquid toner as in HP's Indigo ink, polymerized natural fatty acids in mineral-oil free inks or some dispersion varnishes form large particles, which for different reasons can lead to visible residues in the recycled paper – such as current UV-curable inks.

With especially low-energy curing UV inks (LE-UV, LED-UV) gaining more and more market share, the problems caused by a former niche product reach new dimensions. INGEDE and hubergroup have jointly identified the necessity for further development and enhancement of UV inks and the UV printing process. This is the reason why they announced that they intend to design a research project in order to identify influencing factors and possibilities for a sustained improvement of UV printing in terms of deinkability in the processing of paper for recycling or even to achieve full recyclability. The challenge is to achieve all this without compromising the printability, INGEDE informed.

The hubergroup is an international holding group comprising of 40 companies, spread across the globe. It has been a privately held company for 250 years, does research and development work, and is considered to be a market leader in offset and packaging inks. INGEDE is an association of leading European paper manufacturers. It aims at promoting utilization of recovered graphic paper (newsprint, magazines and office paper) and improving the conditions for an extended use of recovered paper for the production of new graphic paper, hygiene paper, and white top liner as well as folding boxboard.

➔ [www.ingede.com](http://www.ingede.com)



# Consortium Intends to Build Europe's First Waste-to-Chemistry Plant

The companies Air Liquide, AkzoNobel Specialty Chemicals, Enkern and the Port of Rotterdam intend to realize a waste-to-chemistry facility as a "sustainable alternative solution for non-recyclable wastes".

According to the information, it will be the first of its kind in Europe, converting waste plastics and other mixed wastes into new raw materials. In February this year, the consortium of companies has signed a project development agreement. The initial investments, which cover detailed engineering, the setup of a dedicated joint venture and completing the permitting process, will be worth nine million Euro, AkzoNobel gave account. The consortium would aim to take the Final Investment Decision for the estimated 200 million Euro project later in 2018. Dutch Rabobank will be the lead advisor for the financing process.

"Realization of the project is supported by the Dutch Ministry of Economic Affairs & Climate policy, which has agreed to develop mechanisms and regulation that will help bring this new technology to full scale to support the low-carbon transition of the Dutch economy", the information says. "The waste-to-chemistry project is also supported by the City of Rotterdam, the Province of Zuid-Holland and InnovationQuarter, the regional development agency."

It is planned, that the facility will convert up to 360,000 tons of waste into



220,000 tons (270 million liters) of "green" methanol. "As an equivalent, this represents the total annual waste of more than 700,000 households and represents CO<sub>2</sub> emission savings of about 300,000 tons". If realized, the location of the facility will be within the Botlek area of the Port of Rotterdam using the proprietary technology of Canada-based company Enkern.

The plant will be designed to convert non-recyclable mixed waste, including plastics, into syngas and then into clean methanol for use in the chemical industry and for the transportation sector. Today, methanol is generally

produced from natural gas or coal, the consortium informed.

The plant will have two production lines or twice the input capacity of Enkern's commercial-scale plant in Edmonton, Canada. It will benefit from the state-of-the-art infrastructure available within the Port of Rotterdam, as well as synergies with Air Liquide (large industries) for supplying the required oxygen, and together with AkzoNobel, the raw material hydrogen. AkzoNobel also acts as a customer for the methanol.

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# Singapore: Heading for Zero Waste

In October last year, several trade associations and chambers (TACs) signed a Memorandum of Understanding (MOU) to contribute to a more sustainable living environment and further Singapore's goal of becoming a zero-waste nation.

Photo: japhoto / fotolia.com

The signing of the agreement took place at the presence of Singapore's Senior Minister of State for Environment and Water Resources, Amy Khor, at the opening of the WasteMET Asia Symposium – according to the organizers, Asia's only solid waste management platform. As reported by media, the agreement aims to identify industry challenges and develop joint projects and solutions to promote the business prospects of the associations' sectors as well as best practices in waste management and recycling across industries.

Associations involved are

- Waste Management and Recycling Association of Singapore (WMRAS)
- Singapore Water Association (SWA)
- Singapore Food Manufacturers' Association (SFMA)
- Landscape Industry Association of Singapore (LIAS)
- Association of Property and Facilities Managers (APFM)
- Singapore infocomm Technology Federation (SiTF)
- Singapore Industrial Automation Association (SIAA)
- Container Depot and Logistics Association Singapore (CDAS)

Nearly two months later, Singapore's Minister for the Environment and Water Resources, Masagos Zulkifli, launched the "Environmental Services Industry Transformation Map

(ES ITM)", unveiling the strategies and initiatives to ensure a "vibrant, sustainable and professional" industry that will provide services and solutions to "help achieve our Zero Waste vision" and a clean Singapore.

At the time, more than 78,000 professionals and 1,700 companies were working in the cleaning and waste management sectors. According to the information, the demand for environmental services continues to rise, but increasing manpower to meet the service demand would not be sustainable. Therefore, "transforming the industry is thus necessary to improve productivity, promote growth and create better jobs for these sectors".

The ES ITM is one of four Industry Transformation Maps (ITMs) under Singapore's Built Environment cluster, which includes the construction, real estate and security sectors, a press release said. The National Environment Agency (NEA) – in collaboration with Government agencies, industry, unions and other stakeholders – has developed 33 initiatives across 12 strategies to transform the environmental services industry. These strategies and initiatives are aiming at innovation and wider technology adoption, upskilling the workforce to take on better jobs, improving productivity through better procurement practices and capturing value overseas. "With the implementation



of these strategies and initiatives, by 2025, about 30,000 individuals in the environmental services industry can benefit from higher value-added jobs through upskilling and technology adoption by companies," the Ministry is convinced.

Singapore is also working towards the vision of being a Zero Waste nation, where waste is re-defined and innovative technologies would be deployed in waste reduction, separation, recycling and treatment to enable the country to close the waste loop. "The ES ITM will provide many opportunities for technology collaboration and adaptation across the cleaning and waste management sectors," the Ministry gave account. "Jobs will be enhanced as the future of delivering services via system-level infrastructure – such as pneumatic waste conveyance systems and autonomous machines – calls for new skillsets. Service buyers will also need to play their part by adopting outcome-based contracting which enables wider technology adoption to improve productivity in the cleaning sector. The shift in industry procurement practices will support more manpower-efficient work processes." As part of the launch event in December last year, NEA signed Letters of Intent (LOI) with seven partners. The initiative "INnovating and CURating Better Automation and Technologies for Environmental Services (INCUBATE)" embodies – according to the information – the partnership between the technology providers and service providers, premises owners and the Government, to collectively innovate and curate better technologies, solutions and innovations for the environmental services industry.

A "Skills Framework for Environmental Services" is also launched. It covers five career tracks – cleaning opera-

tions, waste collection, material recovery, treatment and disposal, and environment, health and safety – involving 24 key job roles. As reported, it is a reference document for individuals who wish to upgrade their skills and prepare themselves for better jobs in this industry, for employers and for education and training institutions to design programs to address the sector needs.

"The transformation efforts of the ES ITM will ensure that the industry remains competitive and attractive," the Ministry emphasized. "Businesses, including service providers, technology providers and service buyers, can look forward to opportunities for technology collaboration and adaptation, and optimize allocation of resources through the use of innovative solutions and data analytics." To encourage greater use of technology and automation, funding schemes that facilitate the development and deployment of innovative and smart technologies are available, the Ministry informed. The Government would also introduce various funding schemes that are open to researchers and industry players.

Furthermore, the Ministry announced that the National Environment Agency continues to work with key association partners, such as the Waste Management & Recycling Association of Singapore (WMRAS) and the Environmental Management Association of Singapore (EMAS), to encourage industry-level collaboration and support the transformation of the environmental services sector. At the same time, it will work with organizations "to enhance enterprise capabilities and drive the adoption of internationally-benchmarked standards, to help more companies capture overseas market opportunities".

## Waste Management and Recycling

In line with the economic growth – gross domestic product (GDP) in 2016: 297.0 billion US-Dollar, real GDP growth: 2.0 percent – and increase in population to about 5.6 million inhabitants, the amount of solid waste generated in Singapore is piling up. In 2016, the quantity of waste was 7.81 million tons, up by 140,700 tons from 7.67 million tons in 2015. The overall recycling rate remained at 61 percent. The volume of waste recycled in 2016 increased by 119,300 tons to 4.76 million tons. According to Singapore National Environment Agency, the rise of recycling volume was largely due to an uptick in amount of construction debris recycled.

Some sectors are showing very high recycling rates. In 2016, 1.59 million tons of construction waste was generated, 1.58 million tons went for recycling and 9,700 tons were disposed of (recycling rate 99 percent). In the same year, recycling rates of nearly 100 percent applied also to ferrous metal (waste generated 1.35 million tons, recycled 1.35 million tons, disposed 6,000 tons) and non-ferrous metals (waste generated 97,200 tons, recycled 95,900 tons, disposed 1,300 tons). The recycling rate of used slag was 98 percent (waste generated 251,100 tons, recycled 247,000 tons, disposed 4,100 tons). The amount of domestic waste generated dropped from 2.13 million tons in 2015 to 2.09 million tons in 2016; but the quantity of



waste, which went for recycling, increased from 403,500 tons in 2015 to 435,600 tons in 2016. The domestic waste recycling rate was 21 percent, up from 19 percent in 2015.

### Singapore's solid waste management

Singapore possesses one of the cleanest urban environments in Asia, but there is room for improvement. The country's growing population and booming economy have contributed to a about sevenfold increase in the amount of solid waste disposed of from 1,260 tons a day in 1970 to 8,559 tons a day in 2016, the National Environment Agency stated. Solid waste management in Singapore begins at homes and businesses. Prior to the collection, recyclable materials are sorted and retrieved for processing. Then the remaining waste is to be collected and sent to waste-to-energy plants. These facilities reduce the volume of the waste by about 90 percent and produce steam that runs turbine-generators to generate electricity. Currently, Singapore's solid waste disposal infrastructure consists of four waste-to-energy (WTE) plants: Tuas, Senoko (divested to the private sector in 2009), Tuas South and Keppel Seghers Tuas Waste-To-Energy Plant (KSTP), which was developed under a Design, Build, Own and Operate (DBOO) model and commissioned in 2009 to replace Singapore's first WTE plant at Ulu Pandan.

Ash from the waste-to-energy plants and non-incinerable solid waste is brought to the Tuas Marine Transfer Station (TMTS), where solid waste is unloaded directly from vehicles into long barges. Specially designed tugboats then push the covered barges on a three-hour long journey to offshore Semakau Landfill, located 30 kilometers away from the transfer station, where they are disposed of. The site is currently Singapore's only landfill facility; covering an area of 350 hectares, the authorities expect that it will meet the country's disposal needs up to 2035 and beyond. In 2016, the landfill received an average of 2,189 tons of waste every day.

### New project

The National Environment Agency (NEA) intends to build an Integrated Waste Management Facility (IWMF) to help Singapore meet its future needs and achieve long-term environmental sustainability. According to the information, its construction will take place in phases with its first treatment facility coming on stream in 2022. As a state-

of-the-art flagship facility, it will be equipped with innovative technical solutions that can maximize both energy and resource recovery from solid waste, the information says. As the future integrated waste management facility and the Tuas Water Reclamation Plant (TWRP) will be co-located at the same Tuas View Basin site, various synergies are expected to benefit NEA and PUB (Public Utilities Board), which governs the water resources in the Singaporean city-state. After begin of operation, the IWMF will be able to process – on a daily basis – 5,800 tons of incinerable waste, 250 tons of household recyclables, 400 tons of source-segregated food waste and 800 tons of dewatered sludge from TWRP.

### Water and waste water treatment

In this area, the Singaporean Public Utilities Board (PUB) triples as a utility and research development center and export platform for water technology. When it comes to water, Singapore wants to become independent. That is the reason why PUB has developed new water projects such as NEWater (recycled water) and the Deep Tunnel Sewerage System (DTSS) as well as more desalination and rainfall storage. Converted into US-Dollar, around 10 billion US-Dollar, including water recycling and waste recycling from the site Tuas, flows into the tunnel for wastewater (DTSS), which is 40 kilometers long. According to the information of Germany Trade & Invest, the planning phase is going to last until the middle of 2019. The construction phase is said to end 2025.

The tunnel for wastewater, which is being built since 2017, should run in the underground. The already existing waste water system is planned to be bind on the tunnel through appropriate connections (length: around 60 kilometers). The second centerpiece of the project is the Tuas Water Reclamation Plant (TWRP) with an integrated production facility for recycled water, which can be used as drinkable water or as water for the industry. The facility will house the world's largest membrane bioreactor with a flow path of 800,000 cubic meters per day.

In order to reduce the dependence on rainwater, the construction of the fifth facility is planned for the desalination of sea water. The facility should have a flow path of 120 million liter per day. Furthermore, the facility is going to be built on the island Jurong next to a power plant in order to use synergies.



Photo: pixabay





# Bulgaria: “All Beginnings Are Hard”

In Bulgaria, recycling of municipal waste including composting remains relatively low with 25 percent compared to the European average of 44 percent.

In 2014 the recycling rate actually decreased in comparison to 2013 by 3 percent. Composting remains at a very low level of two percent. And the country still has one of the highest landfilling rates of municipal waste in the EU: It reached 74 percent in 2014 compared to the EU average of 28 percent, according to the latest EU Environmental Implementation Review Country Report. Not without reason an EU-wide assessment of waste management by the Member States recently placed the country at the bottom of the list, merely trumping Greece.

## Ambitions ended unfulfilled

Since the country's accession to the EU in 2007, Bulgaria has tried to catch up with EU directives. A National Waste Management Program 2009-2013 was published, the Waste Framework Directive was transposed into national law by the Waste Management Act in 2012, and a National Waste Management Plan 2014-2020 has been approved. But according to a report written on behalf of the EU Commission, their implementation was hampered by “administrative and institutional drawbacks”. Or – as a comprehensive study edited by the German Federal Environmental Agency (Umweltbundesamt) points out – the national efforts came “predominantly in the form of programmatic work and the creation of necessary legal bases, rather than in actual regionally implemented successes”. Besides that

the EU requirements and targets proved to be too ambitious for the implementation abilities or for several local possibilities of realization and ended unfulfilled or were neglected.

Bulgaria also started the installation of regional waste management systems. In 2013 already 144 systems for municipal waste disposal were built – 30 of them regional. They were organized as waste removal chains often ending in landfills. Some areas were served by 124 active, non-compliant landfills that missed the official targets in 2009. 87 sites were closed and re-cultivated, but until the end of 2015 still 104 active landfills were unsanitary and only 13 regional landfill site were rebuilt. Until record day, the EU Commission had expected the closure of at least 191 old dumping sites and the construction of 56 new modern or updated regional landfills. This permanent breach against the Landfill Directive led to an infringement procedure in July 2015, financial sanctions and a stop of EU funding.

## The recycling market: active ...

According to the EU Commission report, the recycling market in 2013 was very active. Two mechanical-biological treatment plants had been constructed in Varna (140,000 tons/year) and Plovdiv (125,000 t/y) under PPP (public private partnership); a mechanical-biological treatment

and a compost plant at Han Bogrov near Sofia was under tender procedure. 2015 the building of a waste treatment facility in Sofia for 410,000 t/y was finished and put into operation, recycling 57 percent of the amount and producing 180,000 t/y RDF (refuse derived fuel). At the end of 2013 the Ministry of Environmental Protection and Water had registered 26 take back organizations, including package waste (4), end-of-life vehicles (2), used electronic appliances (5), used batteries and accumulators (7), waste oil (3) and scrap tires (5). Unfortunately, their efficiency was hampered by missing public consciousness, little incentives for waste material separation, and the lack of integrated waste treatment chains.

### ... and successful

Nevertheless, the Bulgarian Executive Environment Agency (EEA) reported for 2013 an overall recycling rate of 63 percent, including rates of 88 percent for paper, 69 percent for metal, 61 percent for glass, 58 percent for wood and 41 percent for plastics. The consumption rates were different showing a total of 23 percent, resulting from 85 percent of wood, 60 percent for glass, 29 percent for metal, nine percent for plastics and none for paper. According to the EEA, "the national recycling targets for materials for all types of packaging have been achieved: glass, plastic, paper / cardboard, metal and wood". A certain waste incineration does not exist, but some co-incineration takes place. Less than 50,000 tons of municipal waste are co-treated in power stations and cement works. Nationwide five cement plants resort to the utilization of waste fractions of high thermal value coming from packaging, scrap tires, waste wood and refuse-derived fuel from treatment plants in Sofia.

### The Environment Operational programs

Several investments have been made into the Bulgarian waste management sector, especially in form of EU funding. In 2007, the European Commission approved the Operational Program "Environment" for the period 2007-2013. The total budget of the program was around 1.8 billion Euro. By 2013, the program planned to have realized 65 new or rehabilitated waste water treatment plants serving an additional 1.8 million people, and 22 integrated waste management systems serving an additional 3.5 million people. The EU wanted to back the "improvement and development of waste treatment infrastructure (ERDF)" by 311 million Euro. But as Bulgaria could not follow the re-

quirements, in spite of several reminders, the funds were partly frozen.

Meanwhile, the next Operational Program "Environment" for 2014-2020 was launched with a total EU contribution of 1.5 billion Euro, aiming amongst others at 285,000 tons less waste going to landfills. The program for "waste management systems" was EU funded by a total of 288 million Euro, while Bulgaria planned the building of a plant for combined waste-to-energy production in Sofia (254 million Lewa; today 129 million Euro), of composting plants for separate green and biodegradable municipal waste and plants for the primary treatment of municipal waste (131 and 98 million Lewa respectively, today 66 and 50 million Euro), of secondary treatment centers (44 million Lewa; today 22 million Euro) and of an anaerobic plant for the collection of biodegradable waste. But in the same year the European Commission took Bulgaria to Court over illegal landfills, because more than four years after the final deadline for closure Bulgaria still had 113 non-compliant landfills in operation and sued litigation before Bulgarian courts regarding the construction of 23 new compliant landfills. The result: The country will not get any EU funds for the building of landfills, but must finance it completely from the state budget.

### International operating companies withdrew

Following the interpretation of consulting firm Germany Trade and Invest, the Operational Program "Innovations and Competitiveness" 2014-2020 issued funds for the building of plants for separation and recycling of plastic, paper and cardboard as well as glass. More than that, it intends the extension of public-private partnerships (PPP) between communities and waste treatment organizations. This seems to turn out problematically. Experts agree that the Bulgarian waste market is difficult, as waste disposal and consulting enterprises criticize tenders and procurement processes and complain about poor payment habits of the municipal contracting authorities. Secondly, plants and services for waste treatment fall under concession law which makes the installation of public-private partnerships more complicated. And the third point is that PPP were merely entered for services in a small or middle scale, but turned up to be uninteresting for major projects.

It is not astounding, that – referring to a comprehensive study edited by the Federal Environmental Agency (Umweltbundesamt) – the presence of international operating waste disposal companies in own Bulgarian subsidiaries or joint ventures have significantly decreased compared to former years. Their part has been taken by private providers or again municipal businesses. Big companies like RWE Umwelt, Scheele International or Saubermacher have withdrawn completely and alienated their shares. So meanwhile the Bulgarian waste management market increasingly belongs to domestic enterprises without foreign capital shares. That complies with the current declaration of ViaExpo consultant Ginka Dimitrova, that there are 55 regional waste management associations, 45 regional systems for waste management and 8 transfer stations built.

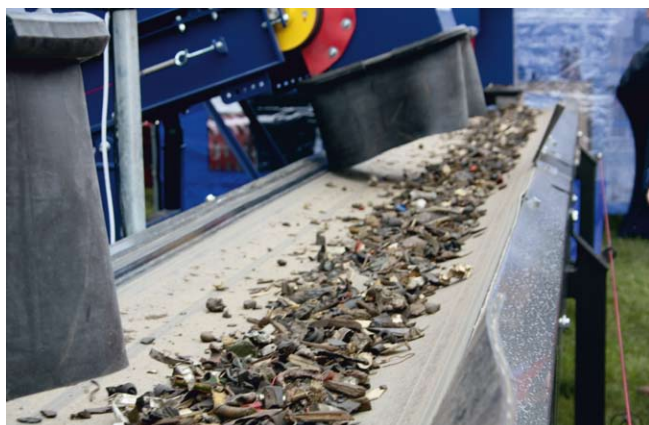


Photo: O. Kürth



## Further potential exists

That does not mean that there is a standstill at all. As business intelligence provider AcuComm reported in February 2017, there were eight waste projects running in Bulgaria of a total value of 275 million Euro, focusing on mechanical-biological treatment and incineration with energy recovery. Their capacity alone stands for 59 percent of the country's estimated annual waste generation. Three projects concentrate on power generation, representing 38 percent of the total. 70 percent of the projects by value and 60 percent by tonnage capacity are said to be already operational. There is even more potential. One year ago, the European Implementation Review on Bulgaria certified low waste recycling rates, but prospected that the full implementation of the existing waste legislation could create more than 14,000 jobs in Bulgaria and increase the annual turnover of the waste sector by over 1.5 billion Euro. Moving toward the targets of the EU waste legislation and policies could create additional 16,500 jobs and increase the annual turnover of the waste sector by additional 1.7 billion Euro.

Germany would like to foster such efforts. Signing a convention on joint environment projects at a meeting with the Bulgarian ministry of environment, Ivelina Vassileva, Germany's state secretary Rita Schwarzelühr-Sutter declared in 2016: "We want to encourage enterprises to invest in environmental- and climate-friendly technologies. To absorb the technical and economic risks connected with the application of new technologies, we will support brave companies financially."

## New Heavy Duty Scales

The British scales manufacturer, Marsden Weighing Machine Group Limited, has launched a new range of heavy duty platform scales, suited to weighing heavily-laden pallets, roll cages and dolavs.

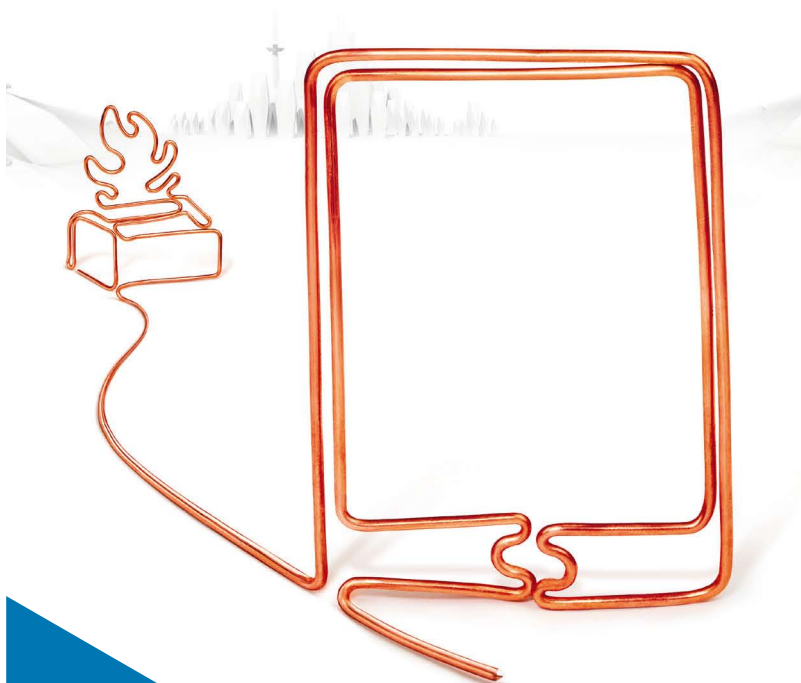
The scales in the new '5T' range have a capacity of five tons and are reinforced for extra strength in order to withstand the increased load, the provider informed. Previously,

Marsden's highest capacity off-the-shelf platform scales were only available up to 3,000 kilograms (kg). Platform scales with a higher capacity were only built on demand.

"With the 5,000 kg capacity scales now available off-the-shelf, customers can order before one pm and receive their scale next day," the company assures. According to Marsden, the scale of type P-JIK-5T is built for recording and printing weight data, with an RS-232 port fitted to connect the scale to a PC. The model P-DI-620P-5T-APP has an inbuilt printer, perfect for SOLAS weighing and it is Trade Approved. The type P-I-400-5T is designed for simple check weighing, with an easy to use indicator and a big, bright LED display, the provider informs.

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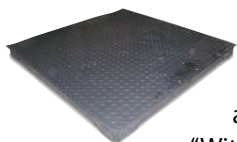


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# Plastic Recycling on the Rise in Ghana



The Dow Chemical Company officially launched a coalition – named the Ghana Recycling Initiative by Private Enterprises (GRIPE) – in an event held in Accra, Republic of Ghana.

The aim is to improve plastic waste management in the country in collaboration with Coca-Cola, Fan Milk, Guinness, PZ Cussons, Unilever, and Voltic under the auspices of the Association of Ghana Industry (AGI). The coalition is to support government efforts to integrate sustainable waste management solutions, advocate improved waste management practices, contribute to increased collection and recycling rates countrywide, and provide employment opportunities through scalable recycling solutions, the chemical company informed in December last year.

According to Dow, the plastics advocacy project for Ghana began after the government proposed a ban on plastics following a flooding and fire disaster in 2015, which was blamed on poor waste management, particularly of plastic items. The team of the chemical company “led other private sector stakeholders through the Association of Ghana Industries (AGI) in engaging regulators to provide science-based understanding and alternative resolution options”, which was followed by the creation of this private sector recycling coalition (GRIPE). Earlier in 2017, Dow’s project to Improve Plastic Waste Value Chain in Ghana was granted 200,000 US-Dollar from the company’s Impact Fund and now includes a three-year financial commitment to GRIPE, as well as a collaboration with two local NGOs (Environment 360 and Asase Foundation) for additional impact.

Ghana’s Minister for Sanitation and Water Resources, Kofi Adda, welcomed the initiative. “We recently launched a National Total Sanitation campaign to tackle sanitation in our major cities. We recognize that the government cannot address the issue of sanitation and plastic waste alone, hence the efforts by industry to rise up to the challenge and help make a difference, this time around, is laudable

and worthy of every support they may require to succeed,” he was cited.

## Forum on Sustainable Plastic Waste Management

In January this year, Professor Kwabena Frimpong-Boateng, the Minister of Environment, Science, Technology, and Innovation (MESTI), has advised Ghanaians to minimize their use of plastic products and substitute them with degradable materials. The minister, who was addressing participants at a stakeholders’ forum on sustainable plastic waste management, organized by the GIZ (German Corporation for International Cooperation GmbH) in collaboration with MESTI in Accra, said the amount of plastic waste being generated globally on daily basis was reaching alarming proportions.

However, in his view, an immediate ban on the production and use of plastic in the country was not the solution; he advocated a gradual system of effective preparation and sustainable management through useful recycling of waste materials into productive goods. The country could take advantages of the availability of raw materials to generate income, create jobs and turn plastic waste into creative and beneficial products for use, he was quoted by the Ghana News Agency.

As reported, the forum presented a platform for discussions on current trends, emerging issues and best practices from across the world, and gave participants the opportunity to make inputs into the draft of the country’s National Plastic Policy, currently being developed by MESTI, to make it more coherent and implementable. The Ministry’s strategy in managing plastic will hinge on “reducing use,



re-use, refuse single-use recycle, and replacement, such as replacement of plastic shopping bags by cotton materials or paper”.

### New Waste Treatment Plants

According to media reports, Ghana’s waste management sector is characterized by poor waste collection systems and indiscriminate disposal of refuse. The volume of waste generated by about 29 million Ghanaian inhabitants on a daily basis is estimated at 14,000 tons. In 2015, the country was ranked by the World Health Organization as the 7th dirtiest country in the world, Ghanaweb reported.

Currently, the government is addressing Ghana’s water and sanitation challenges. Each of the country’s regions will get two waste treatment plants, Joseph Kofi Adda, Ghana’s Minister for Sanitation and Water Resources, was quoted in July last year. At a stakeholder forum to devise a three-year strategic plan for the execution of the Ministry’s mandate in tackling the country’s water and sanitation difficulties, he also informed, that the government intends to make Accra the cleanest city in Africa. Ghana’s first-ever Minister for Sanitation and Water Resources wants to ‘double or triple’ the budget for water and sanitation in his country to launch a total sanitation campaign.

### Water: Ambitious Goals

According to Dutch-based international think-and-do-tank IRC, ambitious tasks await Joseph Kofi Adda, who attended last year’s World Water Week, the world’s biggest conference on water and development held annually in Sweden’s capital Stockholm. The organizations IRC and Safe Water Network work together to achieve Ghana’s ambitious targets over the coming years.

As reported by non-profit-organization IRC, Ghana’s plan is to improve the sanitation situation drastically by 2020:

“Around 25,300 boreholes will be constructed together with 300 small water systems. One million toilets will be built and Accra should be Africa’s cleanest city in four years’ time. The targets contribute to the larger goal of sustainable water and basic sanitation for all in Ghana by 2025 – a goal that surpasses the global Sustainable Development Goals, which aim to provide everyone with water and sanitation by 2030.” The information provided by IRC also says, that about 60 percent of Ghana’s population has access to basic drinking water. Around 14 percent of the inhabitants have basic sanitation and less than 19 percent have access to water and soap. Waterborne diseases or diseases related to poor sanitation, such as cholera, would continue to affect the population. Diarrhea would kill more than ten thousand children under five every year, IRC referred to information provided by UNICEF.

As reported, user tariffs are paying for around 75 percent of Ghana’s water and sanitation facilities and donors contribute 19 percent. But it is estimated that the donations will decline in the wake of Ghana’s promotion to a lower middle-income status. But the Ghanaian government has secured a two-billion-dollar Chinese loan that will help to build the infrastructure needed for sanitation facilities so that Accra will be the cleanest city in Africa one day.

### Investment Opportunities in Ghana

The Ghana Investment Promotion Center (☎ [www.gipcghana.com](http://www.gipcghana.com)) co-ordinates and monitors all investment activities and assists domestic and foreign investors.

The Public Procurement Authority (☎ [www.ppa-ghana.org](http://www.ppa-ghana.org)) has the task of ensuring that public procurement is carried out in a fair, transparent, and non-discriminatory manner.

## SCS Global Services Accredited for Biomass Program Certification

**US-based SCS Global Services has become the third certification body to be accredited by Accreditation Services International (ASI) for certification services with regard to Sustainable Biomass Program (SBP).**

SBP is a certification system designed for woody biomass, mostly in the form of wood pellets and wood chips, used in industrial, large-scale energy production. Its vision is an economically, environmentally and socially sustainable woody biomass supply chain that contributes to a low carbon economy. According to the information, ASI, the appointed accreditation body for the SBP certification system, has undertaken a thorough assessment of the processes and procedures in place at SCS and is satisfied that the accreditation requirements for the SBP

certification system have been met. Further details and the accreditation certificate can be found at ☎ [www.accreditation-services.com/archives/certification\\_bodies/scs-global-services-4](http://www.accreditation-services.com/archives/certification_bodies/scs-global-services-4). ASI is an assurance partner for leading voluntary sustainability standards as well as initiatives around the world, and operates a quality management system based on ISO/IEC 17011:2004 requirements for accreditation bodies. The ASI accreditation process starts with a desk review of supporting documentation from the certification body and is followed

by an on-site head office assessment. The last stage is a witness assessment of a certification body audit.

“Certification Bodies must become accredited by ASI if they wish to provide SBP certification services to their clients and prospective clients from the first of January 2018,” a press release informed. “The requirement applies to all certification bodies, including those that are currently SBP-approved.”

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# China's Import Ban: A Drama for the Recycling Branch?

Several times China has complained about the quality of imported waste. However, the lately implemented ban seems to be a surprise to the waste exporting businesses.

**S**urendra Patawari Borad, Chairman of plastics committee at the Bureau of International Recycling (BIR), once said about Europe and the U.S.: "If China gets a cold, we get a fever, and if China gets a fever, we get pneumonia." Only recently the recycling branch coughs. Since the first of January 2018, the Chinese Government applies new import rules banning the import of 24 grades of 0.5 percent contaminated solid waste of most scrap, for the moment mainly mixed papers and post-consumer plastic, and one percent for non-ferrous scrap. That was a shock for most of the affected exporting nations. But the reactions of their branches differ.

## USA: The world's largest waste importer to China

For the U.S. industry, the Chinese import ban came hard, but not fast. As the U.S.- China Economic and Security Review Commission carved out, U.S. waste and scrap exports to China peaked at 11.6 billion US-Dollar in 2011 before declining to 5.2 billion US-Dollar by 2016 – "largely due to Chinese concerns over waste and scrap contamination and a Chinese inspection crackdown". But of course, the

ban – and already its announcement – had and will have a negative economic impact on the recycling industries in the United States as the world's largest exporter of waste and scrap and largest waste and scrap importer to China. According to figures of the National Waste & Recycling Association (NWRA), in 2016 approximately 41 percent of paper recovered in the North Americas was exported with about a quarter of recyclable paper and in 2015 more than 20 percent of post-consumer bottles and 33 percent of non-bottle rigid plastics.

The cut did not come surprisingly. However, "the industry was not prepared for it," said Surendra Patawari Borad, member of Brussels-based Bureau of International Recycling. The NWRA as much as the Institute of Scrap Recycling Industries (ISRI) and the Solid Waste Association of North America's (SWANA) were "disappointed the Chinese government did not modify its waste import restrictions in response to the serious concerns raised by North American, European and Asian governmental authorities and associations". And sentenced the restrictions as "extraordinary" and "already adversely impacting recycling pro-



grams throughout North America". More than that, they counteracted what SWANA called "substantial changes to their operations" of many American and Canadian companies and local governments in late 2017 and 2018. These changes, SWANA reported in September 2017, saw many material recovery facilities looking to upgrade their sorting systems to improve the quality of their bales along with better educating their residents.

### Stockpiled or landfilled

That was not the only way the North American recycling branch took action. Some of the exports were diverted. Vermont based Casella Waste Systems for example provides about 25 percent of its fiber typically going to China since recently to India, Indonesia, Thailand and Korea and new domestic buyers. And a spokesperson of the Suez Group Recycling conceded the export of materials directly to China in April 2017 and the securing of alternative off-take markets in Europe and Asia. Several amounts of former exports were stockpiled temporarily. In Nova Scotia, the Halifax Regional Municipality is temporary allowed to send low-density plastics to a private landfill. The Rogue Disposal & Recycling's facility in Oregon was forced to put recyclables like mixed paper, cardboard and plastics into interim storage at their employee parking lot. And David Biderman, SWANA Executive Director and CEO, noted "recyclables are going to landfills in Oregon, to waste-to-energy facilities in Massachusetts, and being stored in warehouses and parking lots in the U.S. and Canada." Still in December 2017, Ranjit Baxi, president of the Bureau of

International Recycling, appealed: "If it doesn't go to China for two to three months, you'll have one million tons of paper stacked somewhere in the American economy." But the branch looks forward too. Casella Waste Systems has invested in some more polishing separators, added labor force to capture contaminants by hand and asked customers to improve waste quality. The Oregon Refuse and Recycling Association argued: "Markets in China and elsewhere remain for higher grade recyclables and recycled commodities. The ban presents both an opportunity and a necessity to review curbside recycling programs and improve their quality." Patty Moore, executive director of the Plastic Recycling Corporation of California, considered that the long-term need is to increase domestic processing in the United States. And likewise, The Recycling Partnership, a national recycling nonprofit, is sure that China's National Sword policy poses a problem, "but it is also an opportunity. An opportunity to diversify market options. To refocus on quality. To support jobs in U.S. recycling. To grow U.S. manufacturing. What can you do? Keep calm, stay informed and focus on clean material."

### UK: Securing alternative offtake markets

In 2016, the United Kingdom exported 55 percent of recovered plastics and 74 percent of exported paper to China. So the import ban means not only a future "lot of uncertainty", like Adam Read, external affairs director at waste management company Suez, judged. It is "an impending crisis", caused as well by lacking of a clear UK recycling and waste strategy, a shortage of domestic capacity to recycle



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- 09.00 Paper Division
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- 13.45 Stainless Steel & Special Alloys Committee
- 15.00 E-Scrap Committee
- 16.15 Tyres & Rubber Committee
- 19.30 70th Anniversary Celebration

▼ **TUESDAY, 29 MAY 2018**

- 09.00 Ferrous Division
- 10.30 Shredder Committee
- 11.45 World Council of Recycling Associations
- 14.00 Annual General Assembly
- 15.00 Keynote Session
- 16.15 International Trade Council

▼ **WEDNESDAY, 30 MAY 2018**

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- 10.15 Textiles Division
- 11.30 International Environment Council

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and an uncertainty caused by Brexit, Adam Read was quoted by Greenpeace's online-journal Unearthed. Following the papers, the import ban had consequences: The Guardian referred to some industry experts who already saw "a buildup of rubbish at recycling plants around the UK". And The Telegraph related to statements of officials warning that "hundreds of thousands of tons of toxic plastic could be burnt in Britain rather than recycled" due to the import ban. The industry reacted in their own way: Official data for the third quarter of 2017 showed increases in exports of plastics to Turkey, Taiwan, Vietnam and Malaysia and increases in exports of paper to Turkey, Taiwan and Vietnam. And a spokesman of SUEZ Recycling and Recovery UK acknowledged that the company completed exports to China already in April 2017 and secured alternative off-take markets in Europe and Asia.

Of course, the Chinese import ban will have a serious domestic impact on the UK recycling supply chain, the Resource Association stated. But its Chief Executive, Ray Georgeson, remained realistic: "We must now use this moment to seize the opportunity it should present to re-balance the UK recycling economy and return to the unfinished tasks of developing our own markets and sustainable end uses for our secondary materials." The balance of responsibility for plastic products placed on the market must also shift towards producers, through design for recyclability and minimum recycled content, he believed. Therefore, he proposed a regulatory approach including mandatory design guidelines and mandatory recycled content for various plastic products, trading standards to ban certain single-use plastic products and investment in manufacturing technology to support the use of recycle as a primary input. This would have been necessary anyhow: The Resource Association estimates the annual cost of contamination to UK re-processors associated with the

management of poor and inconsistent quality recycle by its re-processor members of 51 million Pound Sterling (57 million Euro).

### The politics sprang into action

The official policy was criticized. Recycling Association's Chief Executive Simon Ellin grumbled: "It is very disappointing that Michael Gove is not aware of the fundamental impacts that China's ban will bring to the UK's recycling and waste industry." Environment State Secretary Michael Gove had admitted on the first of November: „I don't know what impact it will have [...] and to be honest, I haven't given it sufficient thought."

The criticism was fruitful. On the 18th of December 2017 Michael Gove announced a "four-point plan for tackling plastic waste" including cutting the total amount of plastic in circulation, reducing the number of different plastics in use, improve the rate of recycling and making recycling easier. Furthermore, a call for evidence around deposit reward and return schemes for plastic bottles and other drinks containers was launched. And he told the BBC that in the short term the UK would look to other East Asian nations to recycle British waste. But in the longer term the nation must "stop offshoring our dirt". The Environment Agency issued fresh guidance to exporters, stating that any waste which does not meet China's new criteria will be stopped, in the same way as banned waste going to any other country.

### A desire to tackle the challenges

On the 11th of January 2018, Prime Minister Theresa May committed the UK to eliminating avoidable plastic waste by 2042 – with the reservation: "Avoidable means what

## U.S. Scrap Exports Remained Mostly Strong in 2017

New analysis from the Institute of Scrap Recycling Industries (ISRI) shows that a total of U.S. scrap exports advanced in 2017 in both value and volume terms. Data from the Census Bureau indicate an 8.6 percent increase in Dollar terms; estimated 31 percent of waste exports went to China. "The recycling industry proved to be very resilient as it has shown to be so many times in the past," judged ISRI Chief Economist Joe Pickard.

In fact, American ferrous scrap exports – excluding stainless steel and alloy steel scrap – reached their best annual performance since 2014, triggered among others by an improved demand of 60 percent by China. Likewise, U.S. exports of aluminum scrap to China increased by 32 percent in comparison to October until December 2016. But while whole shipments to mainland China increased by nearly four percent in 2017, U.S. copper and copper alloy scrap exports to China in the 4th quarter of 2017 decreased by ten percent compared to the same time in 2016. Regarding recovered paper and fiber, the export to China decreased from 19.8 million metric tons in 2016 to 18.3 million metric tons in 2017, whereas the Dollar value of these exports grew 1.4 percent.

On contrary, U.S. plastic scrap exports suffered the most from the Chinese import restrictions: Plastic scrap export sales to mainland China and Hong Kong dropped 32 percent and 38 percent, respectively, in dollar terms and 14 percent in metric tons – the lowest level since 2008. And the drop-off in Chinese import demand for plastic scrap was unusually late in 2017 – even before the regulations came into effect.

"China's ban and change in regulations will continue to redirect global scrap flows," Pickard stated. The open question will be: how?



## Australia Impacted by China's Ban

The Chinese import ban on many recyclable materials has reached Australia. As reported by Australian Broadcasting Corporation (ABC) at the end of January, "waste management in Victoria has been plunged into uncertainty with many local councils unsure of where or how to dispose of their recyclable materials, after a major recycling company pulled back on some of its contracts." It had told several waste disposal companies it would cease accepting recyclable materials in early February, citing the commercial difficulties caused by China's ban on the importation of certain types of waste. According to the information, in Australia China's ban affects an annual average of 619,000 tons of materials, worth about 423 million US-Dollar.

is technically, environmentally and economically practicable." The long-awaited 25 Year Environment Plan schedules among others comprehensive measures for production, consumption and recycling. On the very same day and as part of the Environment Plan, Waste Resources & Action Programme (WRAP) in partnership with the Ellen MacArthur Foundation announced a new and unique UK collaborative initiative to "help turn the tide on the UK's growing issue of plastic waste". The ambitious gathering wants to involve collaborative action and commitment by businesses, industry, governments, local authorities, NGOs, media and society at large, to re-define what is possible and create a plastic system that works – according to WRAP "a circular economy where plastic is valued and never becomes waste".

"When it comes to the recycling, resources and waste elements of this plan, we've been talking about driving improvements for many years," Simon Ellin commented. "It's good that there now appears to be an understanding of the challenges and a desire to tackle them." This corresponded to Ray Georgeson's call to the Government "to stimulate secondary markets in the UK for plastic waste and increase producer responsibility for plastic products placed on the UK market". Or – as he explained at another place – to re-balance the UK recycling economy and develop domestic markets and sustainable end uses for secondary materials of improved quality.

## Malaysia: Imports multiplied

Already in 2017, shipments of waste to South Asia have tremendously grown. According to ISRI figures for 2016 to 2017, Malaysia nearly quadrupled its imports of mixed or other plastic solely from USA within a year. BIR estimates that the country increased its entire plastic scrap imports from 288,000 tons in 2016 to 450,000 - 500,000 tons in 2017. Plastic scrap imports to Thailand expanded by 117 percent, to Indonesia by 65 percent and to Vietnam by 62 percent. Mixed waste imports to Malaysia and to Thailand even rose by 292 and 150 percent respectively. Other data indicate the increase of PET imports of 63 percent and of PVC imports by more than 400 percent to Malaysia. PE waste shipped to Thailand ascended between 2016 and 2017 by 876 percent. And even India showed increasing imports by 50 percent for PE, a larger growth in volume than that of any other country.

Data from IHS Markit indicate that the previous import capacities of other countries for processing U.S. waste exports were single-digit: India as the second-largest acceptor shared 7.9 percent, South Korea 4.4 percent, Indonesia 2.1 percent, and Taiwan 1.3 percent. Hence, the Financial Post presumed: "Countries including India, Thailand, Vietnam, Taiwan and South Korea could import more mixed paper, but they probably couldn't make up for what's being lost from China." Or as one of ISRI's senior directors,



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## China to Boost Recycling Industry

**By 2020, the People's Republic of China intends to increase the output value of the resource recycling industry to three trillion Yuan (434.8 billion US-Dollar), a jump of 67 percent from the 2015 level.**

According to Chinese State News Agency Xinhua, 14 Chinese agencies released a plan in May last year, saying that the resource productivity ratio should rise by 15 percent from the 2015 level, and the recycling utilization ratio of major waste should reach 54.6 percent by 2020. "Through the efforts, China hopes to foster a green, low carbon development model to encourage green lifestyles and green consumption among the public," Xinhua reported. "In the country's 13th Five-Year Plan for the 2016-2020 period, the government has made green development one of its major priorities."

By the end of the year 2017, the Ministry of Environmental Protection (MEP) and other government agencies carried out a joint campaign targeting irregularities in the recovery of waste materials, including electronics, tires, plastics and clothes. As reported by Xinhua in August last year, the aim was to shut down substandard firms and encourage legitimate recycling companies "to accelerate business expansion by mergers and acquisitions". According to the information, the combined revenue of the ten major recycled resources, including waste steel and paper, amounted to more than 590 billion Yuan (about 90 million US-Dollar) in 2016.

Adina Renee Adler, expressed it: "China's demand was greater than the next ten markets combined. Not one country can make up that volume."

### Do not turn Malaysia into a landfill

But it is not only the quantity, that raises questions. The quality of imported waste in South Asia is as well disputable. In July 2017, the Harakah Daily published that at Malaysian seaport Port Klang 800 abandoned containers carrying contaminated waste were stockpiled, imported mostly from United Kingdom, the United States, Germany and Japan; clearing cost: five million Euro. The Penang Consumer group found this procedure endemic at other Malaysian ports and advised that such imports should be banned to prevent Malaysia becoming a dumping ground for other countries' waste. In November 2017, The Daily Sun interviewed Malaysia's Urban Wellbeing, Housing and Local Government Minister Tan Sri Noh Omar. He spoke of detained containers transporting prohibited solid wastes, reported that several importing companies had failed to comply with the regulations regarding plastic wastes, and mentioned that the responsible department had been instructed to review on the issuance of approved permits to 149 plastic waste importing companies – delivering waste from countries including China, Hong Kong and Singapore. The minister verbally: "Do not turn Malaysia into a

landfill and do not manipulate the rules for quick profits. This act will not be forgiven."

This trend is verified by Pablo Leon from his point of view. In early January 2018, the manager for Spanish recovered plastics broker Fosimpe was cited with the words: "For now, we are mostly focusing on Southeast Asia for our exports [...] We are changing our whole strategy."

### "Europe is now at crossroads"

Facing these circumstances, the waste exporting nations have to decide their future behavior. According to Zero Waste Europe, "Europe is now at crossroads with two main solutions ahead. The first one is to continue with business as usual, producing increasing amounts of low quality plastics and finding new markets where we can get rid of them while we consider whatever happens abroad as 'recycling'. This will work until these countries follow China's path and decide to stop being the world's landfill. The second option is to tackle plastic waste at source, with ambitious plastic prevention and reuse targets and increase capacity for recycling in Europe. Although it requires courage and significant systemic change of our consumption and production patterns, this is, by far, the best and only long-term solution and, even better, it is good for the people, good for the planet and good for the economy."

## Deere & Company Acquired German Wirtgen Group

In December last year, US-based Deere Company has completed its acquisition of German-based Wirtgen Group, a privately-held manufacturer of road construction equipment.

According to Deere & Company, the Wirtgen Group will enhance the size, scale and stature of its construction equipment business and will help

to continue its global growth. As reported, the acquisition aligns with Deere's long-term strategy to expand in both agriculture and construction – the company's two global growth businesses. The Wirtgen Group is an internationally operating group of companies in the construction machinery sector, incorporating the traditional product brands: Wirtgen,

Vögele, Hamm, Kleemann and Benninghoven. As a technological leader, it offers its customers mobile machine solutions for road construction and road rehabilitation, plants for mining and processing minerals or recycling material and for the production of asphalt.

➔ [www.wirtgen-group.com](http://www.wirtgen-group.com)





Photos: Tiger Depack by Cesaro Mac. Import srl

# Separating Organic Waste

**Tiger Depack by Cesaro Mac. Import: Designed to remove all types of packaging.**

At IFAT (Hall 4/Booth 327/426) the company will present its complete product line. Product manager Adrea Piccioni answered questions from GLOBAL RECYCLING.

*According to Cesaro Mac. Import, 2018 will be the “year of the Tiger”, when your company announced, that it will present a new Tiger Depack product range at IFAT. Which new features do these models offer?*

IFAT, the leading European event dedicated to the waste industry, is bringing radical changes to Cesaro Mac. Import this year. As a matter of fact, the Tiger HS 640 has become a separate brand to the Tiger Depack with a complete product line and many other fields of use. Up until last year, Tiger was a single, highly performative piece of machinery, used mainly for depackaging and optimizing the organic waste cycle at biogas production installations. Over the last ten years the market's needs have expanded and evolved, and Cesaro Mac. Import has decided to change its approach by creating a new brand: Tiger Depack (from “depackaging”, which is the main use of this machinery).

A new range of products has been designed for this new product line which now offers three machines with very different features:

- The Tiger HS 10, which up until 2017 was called the HS 640: It is the machine from which it all began and which now counts over 80 models all over the world;

- The Tiger HS 20, designed to face higher treatment capacity and sizes: just slightly bigger than the Tiger HS 10;
- The Tiger HS 5, whose main feature is its small size for limited production volumes;
- The Tiger HS 20 PPS (Paper Pulp Solution), designed over the last year and which will be showcased first at IFAT then in Italy at MIAC (International Fair dedicated to the Paper Industry): This model is a modified HS 20, designed specifically for use in paper factories.

The objective for the next few years is to create more products in the Tiger Depack line, because the fields of environmental treatment are continuously evolving with needs which are becoming more and more specific and require dedicated machinery.

*Tiger Depack machines are designed to remove “all types of packaging from the organic fraction of waste”. In which sectors do these machines provide the biggest benefits?*

At present, the fields of application of Tiger Depack machinery are divided into three sectors.

- The main sector, from which the Tiger experience stems, is depackaging. This is the need to separate packaging and its content in clearly-defined re-usable moulds, such as, for example, the packaging of expired food. In this case, the advantage for the client is to obtain two

moulds which are both usable: organic and packaging – both can be inserted in recovery cycles and therefore do not produce waste.

- The second field is the recovery of products during the disposal process. Tiger Depack is useful in organic waste treatment machinery (FORSU) which recycles a great deal of plastic (mainly plastic bags). Thanks to Tiger Depack, this machinery manages to recycle a great deal of the organic waste and to clean the plastic which otherwise would be disposed of at a higher cost for the company. From the experience garnered from using the machinery, we have discovered that, from a weight of 27 percent of plastic sent for disposal using the Tiger Depack, only seven percent is actually disposed of. In addition, the organic material obtained can be reinserted in the biogas and compost production cycle.
- The third field is production. The smallest model is used in these applications, as it is inserted in production chains which are already operational. As a matter of fact, industrial production generates waste for quality control: for example, crooked labels on packaging and sample testing on batches of products. By inserting Tiger Depack into the production process, it is possible to split the product, recuperating the processing waste and make it possible to avoid the production of waste at the source. The machine is already active at establishments that produce pet food, companies that make ice-creams or companies that manufacture detergents. Still within the "Production" sector, we have created the Tiger Depack PPS, used to treat paper mill pulper, which is not a product but paper-processing waste. Once again in this case, the insertion of the Tiger Depack has allowed to significantly reduce the waste sent to disposal and to recover 20 percent of the paper pulp to be reinserted in the production cycle.

**Which kinds of waste (wet, dry) can be separated and how many tons per hour can be treated?**

Tiger Depack is the perfect machine for the processing of both organic waste and expired packaged foodstuffs or



Andrea Piccioni, product manager

to simply clean the oversized screened materials. But not only that. Thanks to the same basics and without any technological change, Tiger HS640 is able to treat also non-food products, as detergents and hygiene products. Tiger Depack depackagers treat from five to 40 tph. The type of matrix and the destination process determine different hourly capacities. Tiger Depack depackagers offer a wide selection of treatment with only two setups to manage, the management software manages to regulate power and avoid downtime thanks to a logic that tends to the set parameters and the load tolerated by the machine.

It is in fact possible to find unexpected changes in the material during processing, changes that may depend on the heterogeneity of the same as the presence of batches involuntarily added to the loading. The software developed in ten years of experience manages to calm the divergences obtaining a constant trend over time, a fundamental requirement for high performance processes and management.

**Is it possible to integrate the Tiger Depack machines into yet existing lines or systems?**

Tiger Depack technology is patented and stands out among the main competing technologies because it has been studied even to be inserted in production installations which have already been set up. This technology was conceived because there was no high-performance system on the market in this field capable of responding to specific needs with a single piece of machinery.

Tiger Depack features technology which is capable of obtaining two outlet moulds with two high-quality flows which can both be used. Another element that makes the Tiger Depack line stand out is how compact it is: the medium model takes up only 20 square meters, that is to say 7 x 2.5 meters. This is an extremely limited amount of space which makes it possible to easily insert it in existing production lines without the need to create designated structures. Every version is all-in-one, and it is simple and intuitive to use.

The electrical power supply makes it possible to use the machinery both indoors and outdoors. The machinery



## Advertorial:

is user-friendly, because it has an intuitive system which operates both manually and automatically. And, thanks to the technological applications of its software, it is possible to manage the main parameters of the machinery precisely and continuously, such as loading speed and the quantity of liquids added to the process. An efficient and precise integrated system of sensors allows the Tiger systems to self-regulate, optimizing consumption and reducing motor strain. A large touch-screen panel helps to monitor both the consumption and strain of each motor in real time, but also the percentage of liquids added to the process. When the machinery is inserted in treatment machines of which the Tiger is just one step of a complicated process, the machine interacts with the external management systems with great ease.

An efficient post-sales and customer service system guarantees Tiger Depack clients are followed all around the world with remote diagnostics systems and services activities designed around the type of material being treated. The Tiger Depack brand represents Cesaro Mac's Import experience and reliability in the field of waste and systems.

***The company Cesaro Mac. Import will present itself and the Tiger Depack product range under a new logo at IFAT. What does the symbol represent?***

A "swipe" towards the future of the Tiger Depack Brand. The new Tiger Depack brand is the result of a scrupulous

study of the product's characteristics and of the company. The main goal we set ourselves is to convey efficiently and immediately the key concepts of the Tiger Depack brand. A fundamental point represented by our brand, and in all its interpretations, is the concept of "strength and technology" that expresses both elements intrinsic to the products as well as characteristic features of the brand. Graphically we can consider this to be a restyling of the brand. This development became necessary as the brand matured, owing to the extension of the product lines and the international scope of the company.

We started with a symbol that embodies the concept of strength, albeit in its simplicity: a tiger's claw. This symbol represents – in both its shape and in its meaning – a set of different elements that in their immediate meaning manage to portray the concepts that the brand wishes to convey. From this symbol we created a graphic iconic image that aims at representing several abstract concepts: The graphic element consists of four irregular signs, in parallel and of different lengths. The four signs slant from left to right. This image represents the scratch mark left by a swipe made by a tiger's paw. The graphic element represents the effect of the "swipe" and not the swipe itself. It is a way to emphasize the importance of the result. The choice of a scratch has another meaning in the type of work that Tiger Depack machines carry out, as they rip up packaging.

➔ [www.tigerdepack.com](http://www.tigerdepack.com)



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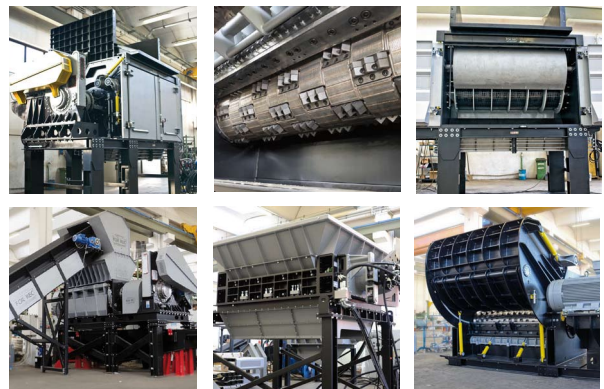
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“Primary recycling fits completely into the industrial recycling system by delivering the recycled waste to the facility using recyclable values and returning it to the industry. The great experience, knowledge and development of new environmental technologies enabled us to gain a great interest in the global market for the application of MBO-Te new technology that achieves circular economy. This is the technological innovation of recycling in the sustainable management of municipal waste. With our achievements, we have introduced European experts who support the European Commission’s new communications with the goals of European policy for the circular economy and who want to significantly improve the existing waste management model in European countries, supporting projects that give the best results in the recycling process.

It is particularly noted, that waste management objects and facilities should be in line with the requirements of the best available techniques and technologies which should be applied in the design, construction and maintenance of recycling facilities. We have been working on the development of a new technology for more than 15 years for which we have received hundreds of recognitions and

awards from all over the world. The European Commission supports those technologies that give the best recycling degree, such as the MBO-Te industrial recycling technology developed by Tehnix.

## Technological advantages of construction of the recycling center for mixed and pre-sorted municipal waste management

Recycling facilities that are installed in recycling centers perform the complete recycling process. Complete municipal waste is sorted according to usable values and market needs. MO = mechanical treatment from which we obtain eight types of selected, baled raw materials – plastic, cardboard, paper, PET, MET, textile, glass and metal. All raw materials are completely clean, baled and sold on the global market for the production of new products in the industry. BO = biological treatment of organic waste and green waste. The process of bioreactor composting allows the cycle of production of eco compost in a period of only two months. Composting is carried out under fully controlled technological conditions without any negative impact on the environment and without water, soil and air pollution. Eco compost enriched with minerals and phosphate is



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2. PRODUCTION LINE FOR SHREDDING AND BALING OF RDF FUEL
3. PLANT FOR BIO-REACTOR COMPOSTING AND PRODUCTION AND PACKING OF ECO-COMPOST
4. RECYCLING OF a) CARDBOARD b) PLASTIC c) MATTRESS d) FURNITURE e) HOUSEHOLD APPLIANCES
5. SOLAR POWER PLANT WITH INSTALLATION ON THE ROOF OF SORTING AND COMPOSTING PLANT



## Advertisement:

used for agricultural purposes. TO = thermal treatment. The rest of the combustible waste, which cannot be recycled due to the size of the material and the structure, also dries and shreds, and automatically bales into the bale without human presence. The average energy value of dried RDF fuel in bales is four MW per ton. The total percentage of waste recycling at MBO-Te facility Tehnix is up to 100 percent. By such procedures we achieve the goals of sustainable development and circular economy and receive almost hundreds of acknowledgments from Europe and the worldwide confirmation of the benefits of our technological achievements in recycling. And constructed recycling facilities are working permanently.



cess, especially those structures that are underrated in the labor market. Tehnix plants are very well adapted to local conditions. They are conceived to leak into small and medium-sized environments. They can be simply installed in old halls, thus improving the abandoned buildings. Basically, they are industrial plants with low energy consumption, which guarantees efficient sorting by employing local workers. The impact on the environment is extremely small and the working area in the manual sorting hall is ventilated and air-conditioned.

In large areas, industrial Tehnix sorting plants can be installed in two or more locations, thus reducing traffic within the site and guaranteeing the implementation of the proximity

principle in the overall waste management system. Mechanical-biological recycling of pre-sorted or mixed municipal waste is a technological breakthrough developed by Tehnix. This technology is a major step forward in the economy of municipal waste management due to its technological flexibility, as it enables those technological innovations that achieve great impact and low costs in the recycling of the delivered municipal waste."

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www.tehnix.hr



Source: Tehnix

## Technical Novelties “Made in Austria”

“Green Boost your business” is the motto at IFAT, under which the Austrian-based company Komptech is presenting its communication technology “Connect!”, along with all-new and updated machines for shredding, screening and turning.

Komptech’s key message at this year’s IFAT is “even more customer benefit”. The Austrian technology provider is intent on continuing to help its customers doing sustained good business and on making its own contribution to an even more effective environmental technology. The company’s lineup at this event is extensive, from the VDMA (German Machinery and Plant Manufacturing Association) Practice Days “Biomass” and (for the first time) “Minerals” to a booth full of new and interesting things. “This large fair footprint also represents the start of a new market offensive”, the company emphasizes. “Komptech reserved additional outdoor space just in time, where it will present a new machine.”

### Communication that connects

Since January 2018 Komptech’s “Connect!” monitoring and communication technology has greatly enhanced the availability and efficiency of its machines, the company underlines. Based on a further development of its condition monitoring system, “Connect!” is designed specifically for Komptech machines and the conditions they are used in. “With continuous monitoring machines can always be maintained based on their condition. Contingency costs can be reduced to a minimum, and partial real-time sensor data analysis provides for a reliable and fast-reacting information system.”

### Staying with the program

According to Komptech, the provider has always placed a priority on



The monitoring and communication system “Connect!” further enhances the availability and efficiency of Komptech machines

continuous development of its technology to meet customer needs. The new Topturn X5000 expands its line-up of triangular windrow turners. This “five meter machine” comes in two power versions. Its one-piece plough blades simplify switching from work to transport position. The drum wear parts can swing through 180 degrees, giving longer use and thereby lower operating costs. As reported, the completely redesigned Axtor 4510 shredder weighs now only 19 tons (with all options) and is thus much easier to transport. Its two-axle configuration also gives it great manoeuvrability. The intake and shredder rotor have been repositioned for a more compact yet just as capable machine. Komptech has also updated its screening machine park. Based on the Nemus 2700, the brand-new Nemus 3000 is a drum screener “that sets new standards in maintenance and service-friendliness”, the provider is convinced. Longer discharge belts and the ability to use screen drums from competitor machines are further

benefits of this piece of equipment. The efficient shredding of a very wide range of materials like household and commercial waste, green cuttings and waste wood with just a single machine was the goal behind the development of the new Terminators Type V.V stands for versatility; one example is the optional retrofit of a post-shredding unit under the drum, adding greatly to the range of grain sizes. V is exactly what many operators need, Komptech says.

The same goes for the new Metalflex non-ferrous metal separator, which sorts non-ferrous metals out of all kinds of waste streams. “Three different mobility configurations make it very flexible”, the company stresses. “And not only does it remove valuable non-ferrous metals for recycling, it can also take an FE separator to do even more. The applications range from pre-shredded wood and bulky waste to shredded green cuttings.”

➔ [www.komptech.de](http://www.komptech.de)

## New Company

In February this year, the new Dutch company Bofar B.V. was established by the Dutch provider of recycling machines and solutions, Machinefabriek M. Bronneberg BV (MBH), and Faron van Lieshout, an expert who has been with the company for

over five years. According to Bofar, the company will specialize in tailor-made 3D-design of parts, components and complete installations as well as made-to-order installations that fall outside the regular scope of available recycling and separation

machinery. It also holds the rights to sell and produce HIS installations that separate gold and platinum group metals from shredded waste and scrap.

➔ [www.bofar.nl](http://www.bofar.nl)



## Cost-Effective Steel Production with Low-Grade Scrap

The delegation from Japanese steel institute visited SHARC furnace plant at Hellenic Halyvourgia.

In December 2017 a delegation from the Iron and Steel Institute of Japan visited the SHARC electric arc furnace plant (Shaft Arc – electric arc furnace with scrap preheating in the shaft) at Hellenic Halyvourgia (HLV) in Volos, Greece, one of the country's largest electric steel producers for long products.

The delegation comprised 19 representatives of eight Japanese electric steel producers and was organized with the aim of exchanging ideas and information on the cost-effective production of steel, with special emphasis on steel production with low-grade scrap in the SHARC electric arc furnace. According to the information provided by SMS Group (a group of companies active in plant construction and mechanical engineering for the steel and nonferrous metals industry), the furnace at HLV is a 54-MW direct-current electric arc furnace with a tapping weight of 100 tons. "It features two symmetrically arranged preheating shafts for drying and preheating the scrap," it is emphasized. Especially the furnace's two-shaft design, which doubles the available volume, would allow the use of inexpensive, low-density scrap. "The shafts with the built-in post-combustion systems make the furnace not only highly productive and efficient but also easy on the environment. With a potential charge of up to 65 percent of hot briquetted iron (HBI) in the shafts, the SHARC can also be used for the



Photo: SMS Group

Delegation from the Iron and Steel Institute of Japan in front of the SHARC electric arc furnace at the Hellenic Halyvourgia plant in Greece

production of high-quality long and flat products," the information says.

The delegation observed several heats using the SHARC process with low-density scrap of 0.25 tons per cubic meter. Due to its scrap preheating technology, this type of furnace can be charged with the least expensive scrap available in Greece, currently at a purchase price of about 15 US-Dollar per ton. "The price advantage varies depending on where in the world the scrap is purchased," SMS Group underlined. "In Turkey, for example, the same scrap grade costs around 30 US-Dollar, in certain regions of China up to 50 US-Dollar per ton."

Over the past ten years, in Greece, the market volume for long products has decreased from 2.2 million tons to 350,000 tons annually. Nevertheless, Hellenic Halyvourgia has been able to maintain its profitability thanks to liquid steel production in the SHARC furnace. As reported, with less than 280 kilowatt hours and an electrode consumption rate of 0.57 kilograms per ton of liquid steel, "the SHARC process is a very cost-effective steelmaking route". Not only that, due to the symmetrical design of the furnace, the coal rate for foaming slag would be only nine kilograms per ton.

➔ [www.sms-group.com](http://www.sms-group.com)

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## Eddy Current Separator with Eccentric Rotor: Type SFME-29

The Spanish provider of separating equipment, Felemamg, introduced its first eccentric rotor separator in 2009, improving significantly the quality of this type of separators, which have existed in the market so far.

In the model SFME-29 an eccentric magnetic rotor of 271 millimeters diameter and an envelope diameter of 395 millimeters are implemented.

Thanks to this level of eccentricity, the protective fiber envelope of the magnetic rotor does not need maintenance and the maintenance of the conveyor belt drops hugely. Furthermore, the adjustable position and the number of poles of the magnetic rotor, depending on the granulometry and the material to be treated itself, make the separator come out perfectly adjusted from the factory to give a maximum separation performance.

As part of the integral separator design and focused to provide the highest degree of safety during operation of the separator, the machine is supplied with a cowling high-rise, preventing that possible pieces can roll



Photo: Felemamg

or finish coming out of the machine. In the same way, these separators have a front cowling.

During these years, the separator has received very positive feedback from users since it improves the performance in a remarkable way with respect to the classic concentric separator by reducing its maintenance

and increasing their good separation yields. The SFME-29 separators can be supplied in a basic way, only with its electric cabinet, or with different optional elements as vibrating feeder (recommended for a high performance separation), hoppers output products or cowling upper.

➔ [www.felemamg.com](http://www.felemamg.com)

## The Atritor Turbo Separator De-packaging System

Atritor will be returning to IFAT 2018 after their successes of previous years, exhibiting their Turbo Separator de-packaging system with new models which have been introduced to their range to facilitate industry demands for more throughput in less time while maintaining clean separation.

The Turbo Separator has been the AD industry workhorse for recovering packaged food content for waste-to-energy applications for over a decade. Its design, durability and strength are combined to give a one-step process in order to remove valuable organic food waste from its packaging with up to 99 percent ef-

iciency for biomethane production. Avoiding shredding or damage to the packaging any more than necessary means that plastics are kept out of the tanks clean and plastics clear of fraction. The efficiency of the separation means that secondary processing is not required, reducing energy consumption. The Turbo Separator

can operate as a stand-alone wet or dry system; water or other liquid can be added during or after the separation process as required. As landfill regulations tighten, the system is also increasingly used by waste management companies and manufacturers to separate and recover the gypsum and paper elements of wallboard. The Atritor Turbo Separator model range gives a choice of throughput performance to suit different sizes of application from three to 20 tons per hour of mixed packaged food waste. With site locations across the world including Europe, North America, Australia and Africa the system realizes adaptability, ease of operation and with a unique design for low and easy maintenance and quickly interchangeable screens and paddles.

➔ [www.turboseparator.co.uk](http://www.turboseparator.co.uk)

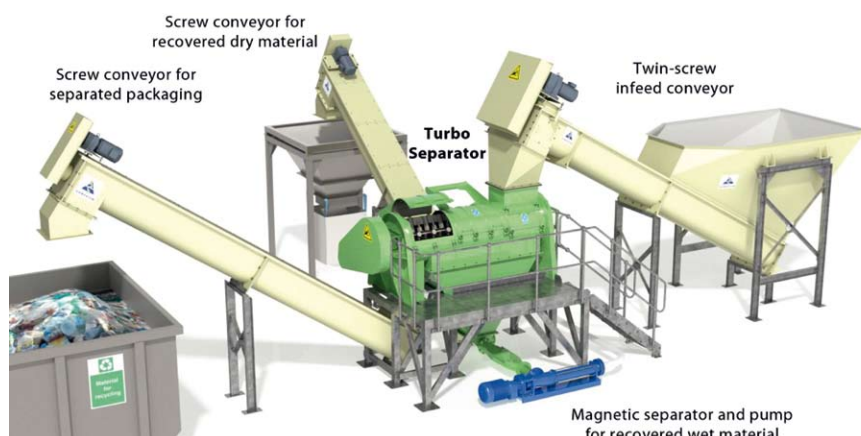


Photo: Atritor Limited



## France Selects Forrec to Process Refrigerators

**The year 2017 was one of outstanding achievements and consolidation: Two major French companies decided that Forrec's refrigerator processing technology and experience were exactly what they needed to complete their own plants, which will, in terms of intake capacity (120 refrigerators/hour), be the world's largest.**

A key aspect of these lines and the process they perform is the final handling of the extracted gas. The first plant, scheduled to come online by May 2018, uses an innovative, sophisticated on-site gas thermo-destruction system; the second plant, which will be operational by the end of summer 2018, applies the tried and tested cryogenic (nitrogen) system currently used in several Forrec plants around the world.

The internal design studio with a staff of nine engineers allowed a careful analysis of the whole part concerning emissions into the atmosphere (a fundamental element for compliance with the regulations in force in Europe) and the construction of two lines that exactly respond to customer requests, both in terms of reliability and performance. Forrec continues to lead the WEEE (Waste Electrical and Electronic Equipment) sector, espe-



Photo: Forrec srl

cially the refrigeration segment. It also provides air conditioning, water heater and boiler waste disposal via a unique process that only Forrec plants provide. Such cutting-edge solutions stem from continuous technological

upgrading and a flexibility that ensures close customer support during project development and implementation.

➔ [www.forrec.eu](http://www.forrec.eu)

## New Drum Screen with Retrofitting Possibilities

**With the drum screen Basic 518, German-based company Doppstadt places a basic solution for small and medium municipal environmental services and recycling plants on the market.**

For enterprises looking for an efficient basic solution for the screening of medium quantities of light materials, the Doppstadt product range now includes a machine solution with retrofitting possibilities where required. According to the provider, the compact drum screen separates everything that finds its way through the 4 m<sup>3</sup> feed hopper: bio, domestic and green waste, old growth, sand, gravel and earths.

The machine separates the incoming material into two fractions and discharges it over the exchangeable rear conveyor belt (applicable on the left or right side) or the front conveyor belt. "The CAT diesel engine is fully compliant with E3A/Tier 4i exhaust emission standards, machine operation is really



Photo: Doppstadt

The new drum screen Basic 518 adapts to changing requirements

easy, and only a minimum amount of maintenance is required," the company emphasized. "Thanks to its smart, compact design the Basic 518 conve-

niently fits into a standard shipping container and can be transported on a flatbed truck."

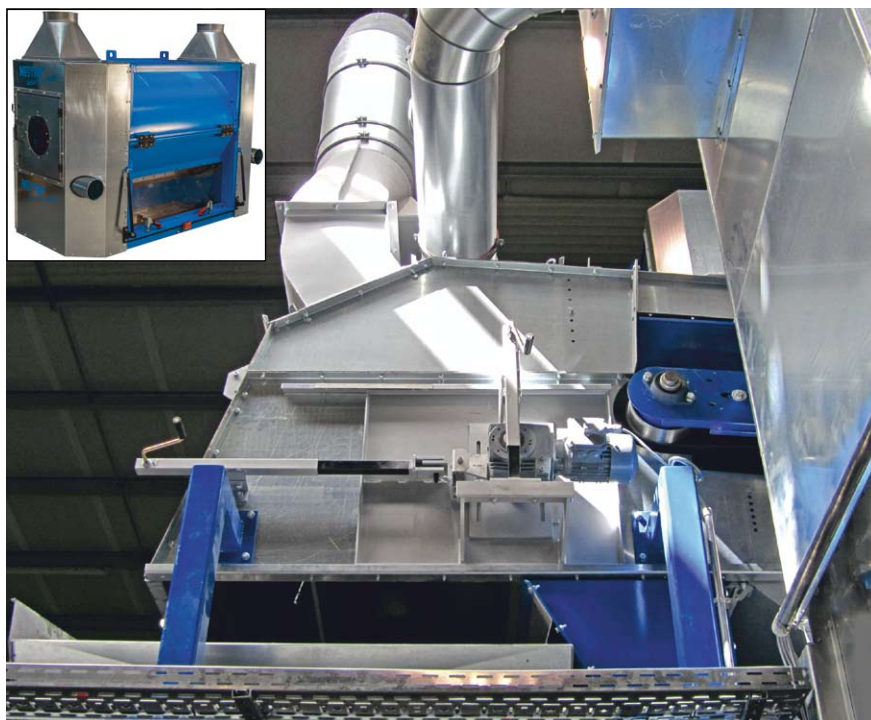
➔ [www.doppstadt.de](http://www.doppstadt.de)

## Nestro Introduces Important Components for the Recycling Industry

On the IFAT Nestro Lufttechnik GmbH presents itself in hall B5 on booth 153.

Due to the worldwide growing consumption of raw materials and the increase of waste at the same time emphasizes the enormous importance recycling continues to have. On the other hand, overcapacities in this sector is leading to cut-throat competition, which can only be won with significantly better technical and economic solutions. Nestro assists recycling companies to tackle these new challenges ensuring optimum operating output, energy efficiency and clean air. The company meets the growing demands concerning energy efficiency and noise reduction with a competent, comprehensive consultation offer and suitable technology. Significant energy savings can be earned using state-of-the-art equipment, for example ventilating fans perfectly laid out for the single application case, high efficient motors (IE3, IE4) and frequency converters for fans. Also sound emissions can be drastically reduced by optimum product and system design as well as by different insulating measures. On the exhibition stand some of these components are shown to the visitor in a small demonstration system.

At IFAT components for wind sifting, separation and filtration in the recycling industry are operated live featuring a compact system design. With a conveyor belt typical waste material is supplied to a three fraction wind sifter. The wind sifter creates three fractions with different weights (sturgeon materials / PET bottles / foil and



Photos: NESTRO Lufttechnik GmbH

paper). The product design prevents light weight material from being drawn into the heavy weight and target fraction. Besides, the sifter works in air circulation and up to of surplus air are fed to the dust removal. The downstream separator 10/7 discharges the remaining waste material with an air volume of 6,000 m<sup>3</sup>/h. The emptying process of the separator is supported by purge air to guarantee an optimum throughput with concurrent cleaning of the separator chambers. The robust Nestro separators, also suitable for long-fiber materials, can be installed in a space saving manner thanks to the compact design. Also the maintenance is easy due to big

inspection doors. In this small demonstration system the remaining dust is exhausted by a deduster type 250 JET. Real filter systems used in the recycling industry are using modular intermediate JET filters with air volumes from 10,000 up to 200,000 m<sup>3</sup>/h.

These systems are clean air systems, the ventilating fan is connected at the outlet side to the filter. This guarantees the highest energy efficiency and absolute dust leak-tightness. The regeneration is automatically managed by air pressure impulses ("JET") allowing continuous operation 24/7.

➔ [www.nestro.com](http://www.nestro.com)

## Metso Reported Growth in Global Market Share

Photo: Metso

Lindemann EtaCut II is the new energy efficient generation of heavy duty scrap shears



Finland-based Metso Corporation experienced substantial growth in orders for its metal recycling solutions during 2017. As reported, the orders further expand Metso's installed base globally, including major orders for China and Europe. The customers range from large, multinational scrapyards and leading players in the steel industry, to local, family-run metal waste scrap processors. According to the information, the deliveries cover the whole metal recycling product portfolio, including shears, balers and shredders. "A large part of the orders were scrap shears, ranging from the small and mid-sized N-series shears, to the heavy-duty EtaCut scrap shears, which are designed especially for scrapyards, steelworks and foundries," the company reported.

➔ [www.metso.com](http://www.metso.com)



## SUM 2018

May, 21 – 23, 2018, Bergamo (Italy)

"SUM 2018 – 4th Symposium on Urban Mining and Circular Economy" will take place in Bergamo's upper city from 21 to 23 May 2018. The specialist conference will focus on the concept of Urban Mining and Circular Economy and the need to look beyond

separate collection and the current logic of consumer's responsibility, resulting in an increased recovery of resources, better quality of the same, improved environmental protection, involvement of producer responsibility and lower costs for society. The

symposium will include oral sessions, a poster session, startup sessions, workshop sessions and a technical tour at a real scale plant dealing with post-consumer plastic packaging.

➔ [www.urbanmining.it](http://www.urbanmining.it)

## European Demolition and Decontamination Annual Convention 2018

June, 7 – 9, 2018, Vienna (Austria)

This year, the European Demolition Association (EDA) organizes its Annual Convention 2018 in June 7 – 9 in Vienna (Austria). At this multilingual conference the most important and relevant topics will be approached

by highly professional experts, the organizers underlined. As in previous years, the event would have an important technical part, with a full day conference about new developments, case stories and round table

discussions. These activities would provide an opportunity to meet professionals involved in the demolition industry.

➔ [www.europeandemolition.org](http://www.europeandemolition.org)

## VENICE 2018

October, 15 – 18, 2018, Venice (Italy)

The aim of the Venice 2018 Symposium, which takes place from 15 to 18 October 2018, is to focus on the advances made in the application of technologies for energy recovery from biomass and waste and to encourage discussions in these fields. The previ-

ous edition of this event, held in 2016, was attended by nearly 550 scientists and operators from approximately 57 different countries. The seventh edition of this symposium will feature three days of scientific presentations, one day of guided technical tours at

biochemical and thermochemical plants, six parallel oral sessions, poster sessions, workshops, startup sessions and an exhibition by companies working in the field.

➔ [www.venicesymposium.it](http://www.venicesymposium.it)

## Eco Expo Asia

October, 25 – 28, 2018, Hong Kong

The current edition of Eco Expo Asia – International Trade Fair on Environmental Protection will be held from 25 – 28 October 2018 at AsiaWorld Expo, Hong Kong. Last year, this event experienced another year of positive growth in terms of visitor numbers. According to the organizers of the 12th edition of Eco Expo Asia, held from 26 – 29 October 2017, eight of the top ten countries with the highest visitor figures were located in Asia. The Expo was jointly organized by Messe Frankfurt (HK) Ltd and the Hong Kong Trade Development Council (HKTDC) and co-organized

by the Environment Bureau of the Government of Hong Kong Special Administrative Region. "The four-day fair welcomed 335 exhibitors from 18 countries and regions, including 16 overseas and local pavilions and group participations," the final report said. "The 2017 edition saw a record number of 14,029 visitors from more than 100 countries and regions, a four percent increase from last year. There was also a noteworthy 30 percent increase in overseas visitors at the fair, which emphasizes the strong international status that Hong Kong enjoys as well as Eco Expo Asia's position as a

global platform for the environmental protection industry."

➔ [www.ecoexpoasia.com](http://www.ecoexpoasia.com)



# RECYCLING-TECHNIK Dortmund 2018 – live and up close

November, 7 – 8, 2018, Dortmund (Germany)

Experts from diverse industrial fields will meet once again at Recycling-Technik Dortmund, the expert trade show for recycling technologies. As a business and innovation platform the trade show combines a world-class exhibition with an attractive show program and countless networking opportunities.

## Scoring with quality and applicable knowledge

Exhibitors present machinery and technical components for recycling and disposal of waste: from balers and shredding machines, sorting systems and crushers through sieving and separating machines to conveyor systems. In total the show is expecting more than 500 exhibitors.

"2017 was our first time exhibiting at Recycling-Technik Dortmund, and it was absolutely the right decision,"

states Manfred Eßmann, Sales Manager for Lindner Recyclingtech. "The trade visitors came with specific enquiries; from the approximately 50 high-quality contacts we made, we're expecting some good orders."

At Recycling-Technik Dortmund recycling organisations, recycling depots and disposal companies, as well as enterprises with in-house recycling facilities will find the machines and solution they are looking for. "Recycling-Technik Dortmund has really evolved and become a must-attend event for our industry," says Tim Strattmann, Technical Specialist for Mechanical Engineering in the Engineering and Maintenance Department at Aurubis AG.

In addition, high-caliber lectures in the Innovation Centers, which are organized by renowned partners such as vero e.V., Fraunhofer IML, IAB Wei-

mar gGmbH and WFZruhr, offers audiences new and relevant information from science and practice.

## Important business and innovation platform

The show features an international co-operation exchange with the "Match-making Recycling Technology", an opportunity created by Enterprise Europe Network, Zenit GmbH and WFZruhr to establish concrete and targeted contacts and to open discussions with potential cooperation partners from Germany and abroad.

In addition, the 8th Urban Mining Congress "Design for Urban Mining" will take place in parallel to the Recycling-Technik Dortmund. This offers the opportunity to combine theory and practical knowledge.

➔ [www.recycling-technik.com](http://www.recycling-technik.com)

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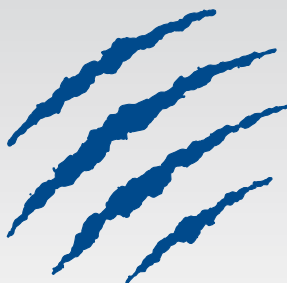
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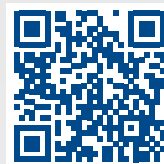
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