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GLOBAL RECYCLING

*The Magazine for
Business Opportunities
& International Markets*



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Recycling Creates Business Chances

In view of the multifarious business opportunities provided in the recycling sector, it is hardly surprising that there are many matchmaking platforms on each continent to connect businesses.



One example is the European Recycling Conference, which took place this September in Berlin. This event was organized by EuRIC – the European Recycling Industries' Confederation – in partnership with three specialist associations in Germany: BDSV (Bundesvereinigung Deutscher Stahlrecycling- und Entsorgungsunternehmen e.V.), the Association of German Steel Recycling Companies; VDM (Verband Deutscher Metallhändler e. V.), the German Federation of Metal Traders and bvse (Bundesverband Sekundärrohstoffe und Entsorgung e.V.), the German Federal Association for Secondary Raw Materials and Waste Disposal. The second edition of the European Recycling Conference offered national and international networking opportunities for the participants – traders, recyclers, consumers and machinery suppliers from across Europe.

Another occasion to find partners and investment possibilities is the TEF Entrepreneurship Forum in the Nigerian city Lagos. On October 25 this year, entrepreneurs, global investors, representatives from the African public and private sectors as well as development organizations will meet to exchange ideas and forge networks by bringing together the different actors.

In light of many waste management practices in African countries – backlogs in waste collection coverage, disposal to open dumps or unsanitary landfills, often recycling of waste not undertaken to a sufficient extent – there are tremendous opportunities in waste as a secondary resource. According to a recent report, published this year by the United Nations Environment Programme (UNEP), the value of the potentially recoverable resources, that are not currently being collected and are essentially lost to the economy, is estimated at 7.6 billion US-Dollar per year. That is a considerable amount of money. The situation with regard to the African continent is described from page three onwards. In this issue of GLOBAL RECYCLING you can take a closer look at the recycling activities of three African countries as well: While in the Republic of Cameroon recycling is becoming increasingly important (page 19), the Republic of Kenya takes first reliable steps to change its waste management (page 22). Against the background of economic growth, the Republic of Côte d'Ivoire offers great opportunities for investment, particularly since the waste management sector still needs help (page 25).

As secondary materials are part of the global economy, the circular economy is definitely a business chance for all market actors. According to the recent visions of this concept, it can be implemented by encompassing all aspects of resource efficiency from production to consumption. However, to realize a development to a circular way of economy, all actors along the value chain have to be integrated, the German Fraunhofer Institute for Material Flow and Logistics is convinced. In the opinion of the experts, adapted logistic concepts to coordinate both material and information flow are inevitable – besides approaches to product design for recycling and new business models. Their proposal, how logistical trends could support the transformation towards a circular economy, is described from page six onwards.

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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Tremendous Business Opportunities in Africa

There are many reasons to invest in the countries of the African continent.

According to the report "Africa Waste Management Outlook", published this year by the United Nations Environment Programme (UNEP), the waste management practices on the continent are far from ideal: Backlogs in waste collection coverage and disposal to open dumps or unsanitary landfills are widespread. But these practices generate also a huge potential of opportunities in waste as a secondary resource.

Experts believe that in the African urban areas the generation of municipal solid waste amounts to 125 million tons per year (of which four percent is currently being recovered), the authors of UNEP's report informed. This volume alone should have a total resource value of 8.0 billion US-Dollar. The estimation "is based on only a limited set of waste streams, and only on the direct value of the resources at a specific point in the value chain, and therefore understates the true value of all waste streams across the continent," the reader can learn. "The value of the potentially recoverable resources, that are not currently being collected and are essentially lost to the economy, is estimated at 7.6 billion US-Dollar per year. Moving waste up the waste management hierarchy is essential if this potential for Africa is to be realized."

The increased economic strength in new economic regions like African countries and the accompanying

growth in consumption "puts further pressure on raw materials and underscores the limits of our linear economic model – 'take, make, dispose,'" the African Business Magazine wrote in October last year. "But there are promising developments underway, too, as innovators around the world pave the way for a 'circular' economy to emerge at all levels, giving rise to new business models and economic opportunities."

As reported by the publication, some companies are considering their products' life cycles, including recycling, as early as the design phase. "Certain cities are organizing industrial parks where the waste of one company becomes the input of another one. National governments have started banning plastic bags and experimenting with repair tax incentives. Consumers can rent blue jeans instead of buying them. And urban farms are sprouting out of plastic bottles in Cameroon."

"The circular economy tackles problems at their roots by reducing our dependence on finite products," the team of African Business Magazine is convinced. "It shifts our economies towards a more virtuous circle, designing out waste at all levels while restoring our manufactured, human, social, natural and financial capital." Through this type of management it addresses complex problems and it should not be seen as a simple, standardized solution. It would be a "col-

laborative effort in which everyone has a role to play".

The conversation about Africa is shifting to one about opportunities, prospects, ventures and creativity, an article informed on the occasion of the "World Economic Forum on Africa" in 2016. This was not news to companies that have paid close attention to the continent and invested there, Tarek Sultan Al Essa (Chief Executive Officer and Vice-Chairman, Board of Agility, Kuwait) gave account. The fast-growing youth population and the urbanization were expected to drive over 50 percent of Africans to cities by 2050, and Africa's formalizing economy were all well known. "These trends and other developments have driven a half-century or more of growth in Africa, and will continue to do so," the author predicted – and named six reasons to invest in the continent. For example, Africa could lead in sustainable development by developing flexible fuel grids that generate power with a mix of abundant wind, solar, hydro and bioenergy, alongside conventional fuels such as oil and gas. Business leaders are hungry for vibrant new markets, he stated. "There are too few places where entrepreneurs and businesses with ideas and an appetite for risk can bring value and find long-term growth if they are persistent, creative and determined", Tarek Sultan Al Essa wrote. "But there's something else they know: Africa is still such a place."



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Wind of Change in Africa

The African Union – the organization represents all sovereign states on the continent – has the vision that African countries will be recycling at least 50 percent of the urban waste they generate by 2023 and grow urban waste recycling industries.

With an area of about 30,000,000 square kilometers and a growing population of more than 1.2 billion, Africa is the world's second largest continent. And with an estimated GDP (gross domestic product) of 5.5 trillion US-Dollar – corresponding nearly 4,600 US-Dollar per capita – in 2015, the continent is an economic area with rising importance. However, Africa has to face development challenges, as the urban population is increasing at a rate of 3.5 percent per annum. One aspect is the waste management, which is driven not only by population growth but also by changing consumption habits, production patterns and global waste trade.

"Recycling only four percent of the waste it generates, Africa has become a dumping ground for waste, particularly hazardous waste, often from developed countries," the South Africa based Council for Scientific and Industrial Research (CSIR) stated when it announced the "first waste management outlook for Africa"; this report was released by the United Nations Environment Programme (UNEP) and CSIR.

To address the challenge regarding waste management, there are policies and strategies for Africa. The African Union published the "Agenda 2063: The Africa We Want" in 2013 and a popular version in 2015. It is a strategic socio-economic transformation framework for the continent and emphasizes sustainable development. "The Agenda 2063 Implementation Plan (2014–2023) outlines specific goals to be achieved during the first ten years, including reference to the expected transformation of waste management," the authors of the "Africa Waste Management Outlook" inform. One target is a recycling rate of 50 percent regarding urban waste by 2023.

The "Libreville Declaration on Health and Environment in Africa" was signed in 2008 in Libreville (Gabon)



as a commitment to protect human health from environmental degradation. According to the information, it reaffirms African countries' commitment to the implementation of the Bamako Convention on the "Ban of the Import into Africa and the Control of Transboundary Movement of Hazardous Wastes within Africa (1991)" and the Bali Declaration on "Waste Management for Human Health and Livelihood (2008)".

In 2011, the East African Community Development Strategy outlined broad strategic goals for the region for the period from 2011/12 to 2015/16. "The strategy recognizes a lack of effective legislation, inadequate funds and services for municipal waste management, and the low priority given to solid waste management, as major challenges facing member countries," the reader can learn. Although the strategy does not have a recommended strategic intervention on waste management in general, a development objective includes the harmonization of policy interventions on the management of plastics and plastic waste and the establishment of an electronic waste (e-waste) management framework.

The Regional Indicative Strategic Development Plan of the Southern Africa Development Community (SADC) is a framework aimed at guiding the

integration agenda over the period 2005–2020. The objective of the Plan is to deepen integration in the region so as to accelerate poverty eradication and the attainment of other economic and non-economic development goals. SADC recognizes major causes of poor waste management in Southern Africa.

In 2012, the Economic Community of West African States (ECOWAS) developed a draft e-waste regional strategy. Its main objectives were to strengthen existing institutional frameworks for collaboration in controlling the importation of used electrical and electronic equipment (EEE) and to encourage cooperation between different government agencies and the three tiers of government in ECOWAS States, African countries and regional organizations. The Community of West African States also developed a draft regional strategy on chemicals management and hazardous waste in 2015 and a draft strategy on plastic waste management in 2016, the authors of the UNEP report gave account.

➔ https://au.int/sites/default/files/pages/3657-file-agenda2063_popular_version_en.pdf

➔ www.csir.co.za/first-waste-management-africa

➔ www.wedocs.unep.org/handle/20.500.11822/25515

Connecting Business and Investment Possibilities

There are several business platforms operating on the African continent, which help investors.

One of them is “Invest Africa”, a result of the coming together of two organizations under this name in 2018: the “Business Council for Africa” (BCA) and “Invest Africa”. According to the organization’s homepage, the BCA was established in 1956 as the “West Africa Committee” (WAC); it became the “West Africa Business Association” (WABA) in 2000 before growing to cover the whole of Sub-Saharan Africa as the BCA in 2009. “Invest Africa” was founded in 2013 by the South African investor Rob Hersov to provide a specialized network to support private and institutional investors, funds and “High-Net-Worth” individuals to engage with opportunities in Africa.

With a combined membership of more than 400 individuals and companies, ranging from global organizations and multi-nationals to individual investors and entrepreneurs, the organization focuses on connecting the

private sector with real business opportunities. It enjoys strong connections through the “European Business Council for Africa” (EBCAM) which has over 4,000 members active in Africa, the information says.

“We aim to connect business in Africa by leveraging this extensive network and its influence, helping members to identify synergies that add value both individually and globally, in a way that is both profitable and responsible,” the organization emphasized on its homepage ➡ www.investafrica.com.

Invest in Africa

“Invest in Africa” (IIA) is a not-for-profit organization with the vision to create thriving African economies. Working in partnership with both private and public sector companies, IIA identifies and tackles the challenges of doing business in Africa, delivering cost-efficient solutions.

“We believe the challenges of doing business in Africa cannot be solved by one company or one sector alone,” the organization informs. “But by pooling resources and sharing knowledge, IIA leverages existing and new opportunities to drive long-term growth across African economies.”

“Invest in Africa” is focused on job creation and improving the business environment for both investors and local SMEs. Its priority is to increase the linkages between large international and domestic companies and smaller local business and increase access to skills, markets and finance.

- The “African Partner Pool” (APP) is IIA’s online marketplace that allows SMEs to promote the products and services they can deliver and the standards they can deliver to. “This makes it easier for big companies to find the right local suppliers to work with,” IIA underlines.
- The “Business Linkage Programme” (BLP) is the organization’s business skills training program part-funded by the African Development Bank.

“Invest in Africa” was launched in 2012 and has since partnered with private and public companies across sectors, including Ernst & Young, Eco-bank, Equity Bank, Ghana Investment Promotion Centre and Association of Ghana Industries, to name but a few. The organization has offices in the UK, Ghana and Kenya.

➡ www.investinafrica.com



TEF Entrepreneurship Forum

The gathering of African entrepreneurs will take place on October 25, 2018, in Lagos (Nigeria). As reported by the Cameroon News Agency, the event will unite over 5,000 entrepreneurs, global investors, leaders from the African public and private sectors and developmental organizations at the Federal Palace Hotel, Lagos. The “TEF Entrepreneurship Forum”, which is organized by the Tony Elumelu Foundation (TEF), would be an opportunity to generate ideas, forge networks and bring policymakers and the private sector together, in a spirit of robust debate and interaction.

The Forum will also feature the launch of the “TEFConnect”, a digital platform for African entrepreneurs, dedicated to connecting African entrepreneurs and the entrepreneurship ecosystem.



Logistics as Key Enabler for a Circular Economy

Future challenges in logistics and supply chain management: A whitepaper, published by Fraunhofer Institute for Material Flow and Logistics, introduces logistical trends supporting the transformation towards a Circular Economy.

The principle of the Circular Economy is to keep raw materials as long as possible within the economic cycle generally free from waste and emission. To do so, end-of-life products and materials must be kept at the highest possible level of value creation according to their original use. To realize such a circular way of economy adapted logistic concepts to coordinate both material and information flow are inevitable – besides approaches to product design for recycling and new business models.

According to the German Fraunhofer Institute for Material Flow and Logistics (Fraunhofer IML), developments of digitization, Industry 4.0 and Internet of Things offer solutions that have not yet been applied to a large extent. “However, possible disadvantages of Circular Economy like rebound effects and increased demand for resources by deploying digital technologies must be taken into consideration,”

the specialists say. “Due to its strong integration into the processes of production, use and waste management logistics, in particular, has to contribute to a sustainable economy.”

Logistics in the Circular Economy

In the Circular Economy, logistics has to fulfill more than classic take-back and disposal logistics of today's waste management services, the authors of the whitepaper – Verena Fennemann, Christian Hohaus und Jan-Philip Kopka – emphasized. Information and communication technologies would allow the integration of all actors along the value chain and enable new business models.

“Up until now, logistical value creation networks have been characterized by a linear flow of materials, culminat-

ing in the disposal of goods associated with considerable material and resource losses. This practice creates high amounts of materials and value losses across an entire economic system." Within this system, logistics were divided into two parts: The "classic" logistics functions support procurement, production logistics and distribution of new parts and products whereas waste disposal logistics focusses on processes at a product's end of life. The utilization phase between the production of consumer and industrial products and the processes of waste management constitutes a kind of intermediate stage that causes a change of ownership and disrupted information flows within the products life. End-of-life products together with their inherent information, components and raw materials are less effectively recycled as it would be possible within in an effective Circular Economy. In addition, supply chains mainly focus on the production and distribution of non-durable goods and only rarely aim at closing loops in order to repair products. However, one of the most significant challenges in the transformation towards the Circular Economy is the integration of the recyclers as suppliers of high-quality secondary products, components and raw materials on the one hand and the manufacturers buying these materials and offering repair services on the other hand. "In this respect, logistics is one, if not the most important factor of success," the authors are convinced.

Three Scenarios

"Current efforts towards a Circular Economy are mostly politically driven and still early stage," the authors state. "No certain forecast is possible as to how legislative conditions will change over the coming years and how markets will react to it." For this reason, the authors propose scenarios and describe the implications of legislative circumstances on market participants and logistics. The first scenario imagines a more conservative follow-up of current efforts and therefore proposes an only less ambitious transition towards a Circular Economy. The second scenario describes a much more politically driven transformation: In

analogy to the German turnaround in energy policy following the Fukushima accident in 2011, the scenario anticipates a legislative framework that is more ambitious in driving enterprises towards a Circular Economy.

Furthermore, there is a third scenario, which is dedicated to a full circular transformation. In this scenario, the European legislation aims at a consequent and global transformation towards a Circular Economy. Resource consumption is sanctioned (e.g. by resource taxes) and additional regulative policies are installed (e.g. consumption taxes) to prevent rebound effects. A set of appropriate circularity indicators to quantitatively and qualitatively assessing resource consumption and resulting environmental impacts are applied. Within EU member states mandatory aims are set, and sanctions are imposed for countries and actors not achieving the aims. Market actors will react adaptive at first, but quickly embrace the new regulations and develop innovations according to the changed market environment.

According to Fraunhofer IML, this third scenario illustrates a substantial shift in the principles of industrial production towards an increase of the importance of repairing and maintenance at the cost of selling new products. "As a result, the overall smaller amount of waste is recycled to higher quality secondary raw materials," the authors predict. "Export volumes of finished goods decrease as well as the import volumes of raw materials and semi-finished products." The increase in mandatory obligations would pose a significant challenge for manufacturing companies and their business models. Decreasing sales volumes for new products (in some cases compensated through the selling high-value products) would lead to shifts within the market. "Rising demands for repair work and spare parts (driven by manufacturers, retail and third parties) requires new approaches through existing or new market participants. Requirements for long time spare part supply change drastically (e. g. in terms of backward compatibility of components and parts)."

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In the future, manufacturing companies will cooperate more closely with increasingly specialized disassembly and recycling industries or integrate these parts of the value chain. Augmented reality (AR) and virtual reality (VR) applications support repair and disassembly processes. Incorporating secondary raw materials into their products becomes more attractive for manufacturers while high data transparency becomes consensus. The recycling industry will face a market shakeout. "In total, quantities of waste generated and circulated will decrease while the quality of the materials within the stream increases. Recycling companies tend to specialize and integrate more closely with the supply chains of manufacturing industries. They extend their business to new areas in order to better compete with manufacturers (e.g. in the field of refurbishing used parts)." Waste disposal logistics would move towards managing and disposing of residual and hazardous waste.

The logistics industry will change as well, the authors prognose. "Traditional" applications in parcel and bulk goods logistics decrease in market share – especially in the fields of waste disposal logistics and resource distribution logistics. Specialized solutions for small quantities (e.g. used products and spare parts) have good market perspectives. The overall resource consumption of logistics systems and businesses has to be reduced considerably. "Supply chain networks provide a decentralized, comprehensive information infrastructure allowing companies interacting with one another to align their decisions with overarching goals of circular supply chains as well as to

their own strategy and societal demands." Standardized and quality controlled secondary raw materials can be obtained from various sources and are integrated with the procurement strategies of supply chains. The data infrastructure helps to comprehend the origin and quality of materials through the supply chains in an accessible manner. Principles of the Industry 4.0 are applied on company scale and support autonomous planning of logistics tasks by aligning underlying systems with the requirements of new and efficient spare part strategies and on demand-production of components. Companies within the Circular Economy rely more strongly on AR and VR technologies to support workers during the disassembly of products and part harvesting from devices. Products are identifiable by smart labels and autonomously find their routes within logistics networks.

The scenarios describe contrasting ideas of a Circular Economy, the authors conclude, and state that no actual prognosis can be made how and how quickly the development of a Circular Economy will take place in the EU. "On the one hand, a continuation of the existing path beyond the status quo is likely. On the other hand, a disruptive transformation towards a Circular Economy is unlikely to happen over-night. A variety of transitional scenarios can be anticipated, in which existing approaches will be refined, and new ideas will come to fruition," the experts from Fraunhofer IML predict.

The white paper can be downloaded at ➡ <http://publica.fraunhofer.de/dokumente/N-502288.html>

Finding Partners

There will be international matchmaking at the "Recycling-Technik" (recycling technology) exhibition, taking place in Dortmund on November 7 and 8, 2018.

Promoting international co-operation, strengthening of the domestic recycling industry as well as the strengthening of industry and research – these are the goals that the Zenit GmbH is pursuing by WFZruhr and the Enterprise Europe Network. The terminology "Matchmaking" originates from the video games industry and describes the process of bringing together the various players in the game. That is exactly the aim of this initiative for companies in the recycling sector. With the Enterprise Europe Network, a strong partner has been gained; this initiative from the European Commission is with representations in more than 60 countries the worldwide largest network of information offices and advisory services for small and medium-sized enterprises (SME). For the recycling and environmental economic numerous international contacts and partners are listed. For a lot of SME, it is not really that easy to establish international contacts. That is where "matchmaking" recycling research is there to help. Companies can gain from this opportunity by following the below mentioned seven steps:

1. Reserve November 8th, 2018 in your calendar for a visit to the exhibition in Dortmund.
2. Express your technology and/or product range and demand as well as your ideas for research projects.
3. Register online briefly describing your company as well as your co-operation requests.
4. Have a look at the list of exhibitors and select the ones you would like to talk to. Please note that exhibitors and profiles will be added until the end of October.
5. Have a look at the meeting schedule Zenit will prepare for you prior to the exhibition.
6. On November 8th, 2018 just go to the exhibit booth from WFZruhr (hall 7, stand X 08) and prenumbered tables will await you for your talks with your potential partners.
7. Contact us at the exhibitions with your questions, suggestions and wishes.

For online registration and list of exhibitors go to ➡ <https://recycling2018.b2match.io/>

Global Waste Recycling Market Outlook 2018

The analysis, conducted by global research and consulting firm Frost & Sullivan, revealed that IoT (Internet of Things), 3D printing, predictive analytics, and China's ban on imported waste are to alter the state of the market worth 300.71 billion US-Dollar.

According to its Global Waste Recycling Market Outlook 2018, last year close to 48.2 million tons of e-waste was generated, of which only 20 to 25 percent was documented to be collected and recycled. The remaining waste was either landfilled or disposed of unsafely or illegally in lesser developed countries. "This scenario is likely to persist in the absence of stringent regulations, closed-loop supply chains, and greater producer responsibility," Frost & Sullivan emphasized. "China made a market-altering decision when it announced a ban on the import of 24 categories of recyclables and solid waste by the end of 2017." This would force the world's biggest waste exporters to build new recycling infrastructure in their own facilities or look to other Southeast Asian countries for waste management.

The analysis forecasts waste volumes, revenues, services, and examines the latest trends that are influencing the market, the information says. "It also highlights the recycling opportunities generated by different waste streams and the impact China's waste ban will have on the import of foreign waste. It covers the segments of municipal solid waste (MSW), industrial non-hazardous waste, waste electrical and electronics, construction and demolition waste and plastic waste."

markets that were initially exporting waste to China. "The ban is likely to drive investment opportunities for countries like Australia, Japan, Germany, the UK and the US," Frost & Sullivan estimates.

The outlook also features trends that have been changing the way waste management is happening around the world, the research and consulting firm announced. "For instance, e-waste management is gaining significant momentum in the recent years." Frost & Sullivan predicts that the market is set to grow by 6.2 percent in 2018 from the previous year.

Changes due to technologies

"The waste recycling market, like its end-user industries, is experiencing disruptive changes due to the advent of advanced digital technologies. For example, smart waste bins with IoT capabilities will play a significant role in changing the way waste is collected and sorted," Deepthi Kumar Sugumar, research analyst Energy & Environment, is cited. "Similarly the rise of 3D printing technologies has made it much easier to recycle plastic waste. Many industries are turning plastics into high-quality filaments to replace spares, lowering the need for re-manufacturing."

Although technology has improved waste management considerably, market participants using these technologies will be challenged to convince industries employing conventional methods to switch to modern systems. They need to be made aware of the role novel recycling systems can play in enabling a circular economy.

Meanwhile, the use of cutting-edge technologies is giving rise to innovative business models such as commercial waste collection zones. These models allow haulers to invest in infrastructure improvement and introduce inventive methods for MSW collection. By optimizing waste collection routes, combining real-time data, and employing data-related technologies such as predictive analytics, it will be possible to eliminate the unplanned dispatch of vehicles to collect waste. "Another important technology that could have far-reaching consequences for the waste management market is augmented reality (AR)," Sugumar assumes. "AR can help any manufacturer make informed decisions to prevent waste in the first place. Though AR is still evolving, it will change the way waste reduction and management is conducted in the future."

➔ ww2.frost.com

Market size

The outlook study predicts that the global market revenue is likely to increase from 265.61 billion US-Dollar in 2017 to 282.1 billion US-Dollar in 2018. "This does not include the revenue from plastic recycling industry, which itself poses a tremendous business opportunity, and the market size is estimated at 37.6 billion US-Dollar in 2018, a significant growth of 7.1 percent from 2017." As reported, the study also discusses the effect of the waste import ban imposed by China. As a result, the waste management industry is set to undergo substantial change, opening possibilities in



The Market for Energy from Waste Remains Dynamic

Even last year the number of garbage incinerators has been further increased. Since the beginning of 2015 more than 200 new facilities with a treatment capacity of more than 50 million tons per year have gone into operation.

Around 70 percent of those capacities accounted for new building projects in China. Another ten percent accounted for projects in the remaining Asiatic region. Mainly within the context of new building projects in the United Kingdom and modernization as well as expansion projects in the rest of Europe only around 20 percent of those capacities have been installed in Europe.

The majority banks on grate-firing

At the end of 2017, almost 2,450 garbage incinerators with a yearly treatment capacity of more than 330 million tons were in operation. The majority of those facilities banks on grate-firing; only around 20 percent of the global stock of facilities is working with fluidized-bed combustion. Alternative treatments are still playing a minor part. According to the ecoprog GmbH, the yearly enlargement shall remain dynamic: Until 2026 it is ex-

pected that around 60 facilities with an incineration capacity of around 17 million tons per year are going to be built.

Asia remains dominant

Simultaneously, the unequal regional distribution is further enhanced: Since 2010 the expansion of buildings has been stabilized at a high level. In 2015 and 2016 around 12 million tons per year of treatment capacity was built each, and the expansion of buildings should settle down at around 10 million tons per year of treatment capacity in the years ahead. Since 2012 the yearly increase of thermal treatment capacities reached around two million tons per year in Europe. The expansion has almost been halved compared with the boom year between 2008 and 2010. For years the amount of incineration plants decreases due to low energy prices in North America; a few new building projects have to face the shutdown of old facilities.

the planned projects, but the project planning increased in South and East Europe as well. In France projects for the incineration of substitute fuels increase. Poland prepares more WtE-projects for the assistance by the EU. However, in the existing markets, such as Germany and Switzerland, high acceptance prices and high utilization rates of the facilities ensure increasing numbers of modernization. A major project in Mexico has animated the South American waste market. Just like in Asia there are numerous metropolitan areas with an increasing number of amounts of waste and scarcity of space as well as the wish for stronger self-sufficiency in the energy sector. In Europe, the European waste policy is still the most important market factor for the establishment of WtE-capacities. Altogether, the ecoprog GmbH estimated an expansion of over 600 new incineration plants with a capacity of more than 170 million tons per year in the next 10 years.

Acquired by Chinese Companies

The competition's globalization stagnates briefly within the WtE-sector in the past year. The restriction regarding the acquisition of companies abroad, determined by the Chinese Government at the beginning of 2017, is one of the main reasons for the stagnation. Due to the fear of too high capital outflows from the country this decision has been made. Previously, especially facility operators had been acquired by Chinese companies, such as EEW in Germany, Novago in Poland and Urbaser in Spain.

The study, "Waste to Energy", from which the data has been extracted, is updated every year and is considered as the most extensive market inquiry and data collection regarding the topic of waste processing worldwide. More information concerning the current 10th edition 2017/2018 can be downloaded under www.ecoprog.de/publications/energy-management/waste-to-energy.htm

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WASTEANDBIO



Picture credits: picture on the left: WtE plant Bielefeld, Germany, with kind permission of Baumgarten Boiler Systems GmbH; picture in the top right corner: WtE plant Krakow, Poland, with kind permission of Cossan Lantjes GmbH; picture in the bottom right corner: © panthermedia.net/picturebaer.

Waste to Energy 2017/2018

Technologies, plants, projects, players and backgrounds of the global thermal waste treatment business

10th edition, 2017

Probably Asia will dominate the Waste-to-Energy-Market in the years to come as well. An end of the Chinese construction boom is not yet expected since the targets of the past five-year-plan have not been accomplished so far. For the time until 2020, the goals of the current five-year-plan have already been increased. Simultaneously, a diversification of the Asian market took place: In recent month plans for waste burning facilities have been specified in aspiring states such as India, Thailand, Indonesia or the Philippines. Presumably, new capacities are going to be built in Japan and Taiwan as a replacement for old facilities. In Japan, this development is accompanied by a trend away from numerous small plants to a reduced number of big facilities.

Market recovery in Europe and South America

There are signs for a market recovery in Europe as well. The British waste market still implements numerous of

Global Trends of Biomass and Waste-to-Energy Sector

The proportion of renewable energy generated by wind, solar, biomass and waste-to-energy, geo-thermal, marine and small hydro rose from 11 percent in 2016 to 12.1 percent in 2017, says a new comprehensive study by Frankfurt School/UNEP Centre/BNEF on "Global Trends in Renewable Energy Investment 2018". The upwards trend does not correspond to the development of the bio-mass and waste-to-energy sector.

Globally, overall investment showed great increases of three-digit rate in solar and wind financing, while the biomass and waste-to-energy sector recorded gains at five billion US-Dollar and a loss of 14 percent compared to 2016. The same with asset finance and small distributed capacity investment: In contrast to solar and wind, biomass and waste-to-energy reached three billion US-Dollar and a loss of 52 percent. Concerning public market investment, solar and wind sector registered 2.5 and 2.4 billion US-Dollar respectively, the biomass and waste-to-energy merely 700,000 million US-Dollar.

In the asset finance sector of utility-scale renewable energy, biomass and waste, geothermal, small hydro and

marine together just made up three percent in 2017. According to Frankfurt School of Finance & Management gGmbH, biomass and waste-to-energy projects halved the amount of finance from 2016 to 2017. The 36 projects then raised three billion Dollar and thus the lowest figure on record for the sector since 2004. The decline is probably caused by the United Kingdom's end of the Renewable Obligation support program, and the Contract-for-Difference auctions that replaced it brought out other main points.

Venture capital and private equity (VC/PE) investment in renewable energy in total fell by exactly a third in 2017 and a sixth of its 2008 peak. As a result, biomass and waste, as well as

geothermal and marine, went down to nearly zero. On contrary, as overall Research and Development investment rose across almost all sectors, biomass and waste too gained ten percent to 918 million US-Dollar. And the quota of acquisitions rose by 90 percent to 4.9 billion US-Dollar: through the refinancing of two waste-to-energy plants in Dublin and in Amsterdam raising 525 million US-Dollar and 352 million US-Dollar respectively, and the Marguerite Fund's acquisition for 111 million US-Dollar in a Portuguese biomass portfolio.

The full report on Global Trends in Renewable Energy Investment 2018 can be downloaded under ➔ <http://fs-unep-centre.org/sites/default/files/publications/gtr2018v2.pdf>

Georgia: Tbilisi Green City Action Plan

The government of Tbilisi, capital and largest city of Georgia, has approved the "Tbilisi Green City Action Plan".

With this approval, the city will benefit from the European Bank for Reconstruction and Development (EBRD) and its program. The Green City Action Plan includes measures to improve areas such as water and wastewater services, solid waste management and energy, to name but a few. As reported, it was developed by the City of Tbilisi with the support of the EBRD and financial support provided by the Czech Republic. Furthermore, EBRD informed about the Tbilisi Solid Waste Project. The Government of Georgia

has applied for loan financing from the Bank for a project to finance the improvement of the solid waste collection and management system in the City of Tbilisi. The proposed project, which has a total estimated cost of 15 million Euro, would require the procurement of waste collection vehicles, upgrading of the existing waste transfer station and the rehabilitation of the landfill leachate system. Tendering for the contracts is expected to begin in the fourth quarter this year. "Contracts to be financed with the

proceeds of a loan from the Bank will be subject to the Bank's Procurement Policies and Rules Rev. November 2017 (➔ www.ebrd.com/work-with-us/procurement/policies-and-rules.html) and will be open to firms from any country," EBRD informed. Interested suppliers, contractors and consultants should contact Tbiliservice Group Ltd, Mr. Lasha Kajaia, Email: L.kajaia@tbsg.ge.

➔ www.tbilisi.gov.ge/page/green-city?lang=en, www.ebrd.com



RecyclingPortal
The portal for waste, waste disposal, recycling, life-cycle management and markets

www.recyclingportal.eu

Mongolia Considers Tax Reductions on Recycling Plants

As reported by Chinese news agency Xinhua, Mongolia considers reducing the tax on waste recycling plants by 50 percent. In this way the country wants to fight against climate change, pollution and environmental degradation,

Mongolian Environment and Tourism Minister Namsrai Tserenbat was cited.

According to the information, to tackle environmental issues caused by a build-up of garbage, the waste

management as well as the recycling systems have to be improved.

Furthermore, the Mongolian government decided to ban single-use plastic bags as from March 1, 2019.

Exide Industries Erects New Battery Recycling Plant in India

Exide Industries Ltd, India's largest manufacturer of lead-acid storage batteries and power storage solutions provider, invests in building a battery recycling plant in Haldia (West Bengal) and expands its existing facility to manufacture Nickel-Cadmium batteries.

As reported by Indian media in August this year, the greenfield battery recycling

plant will be equipped with European technology. According to Exide and the media, the plant in Haldia will have a monthly capacity of 15,000 metric tons, making it the country's largest lead recycling facility. With this project, the Indian company will boost its recycling capacity: It already operates two lead recycling plants near Pune and Bengaluru, which have a combined monthly capacity of 11,500

metric tons of recycled lead. The expansion project in Haldia is to produce high-end Nickel-Cadmium batteries in technical collaboration with Furukawa of Japan. "These batteries have applications in bullet trains, metro rail and other critical installations. This plant will also produce lead-acid batteries," the information says. Work on the projects is expected to continue 12 to 18 months.

Joined Forces for the Australian Waste Equipment Market

Superior Pak, Australia's largest manufacturer and servicer of mobile waste equipment, has announced a joint venture with German Faun Group.

The Australian company works with vehicle suppliers such as Iveco, Dennis Eagle, Mercedes-Benz, Scania, Isuzu Trucks, Hino, Fuso, Volvo and DAF.

The head office is located in Brisbane, with its manufacturing center based in Bundaberg (Queensland). The current management team remains unchanged; the new shareholding arrangement took effect at the beginning of September. Faun is part of the international operating Kirchhoff Group, which belongs to Europe's

leading manufacturers of waste handling equipment and road sweepers. With a history dating back to its foundation in 1845, the company produced its first "dustcart" especially for collecting rubbish in 1897. Production of refuse collection vehicles and sweepers commenced in 1908 with the name Faun established in 1916.

Firm Raised Money to Install Recycling Machines in China

As reported by media, the Chinese online smart recycling platform Xiaohuanggou has raised money (converted in about 164 million US-Dollar) from Beijing-headquartered asset management firm Zhongzhi Enterprise Group. The company, established in 2017, belongs to Paithink Group, an

investment company, and intends to place one million recycling stations across the People's Republic of China in the next three years. According to the information, it places smart garbage recycling machines close to residential areas, hotels and business centers. With Xiaohuanggou's

app and WeChat mini-program, users could locate the nearby recycling stations with machines for different types of waste. The machine would automatically weight the garbage and pay users by cash. Afterward, the waste is sent to specialized recycling organizations.

Patented Aerosol Recycling Technology also in Australia and New Zealand

The Netherlands-based company Despray B.V. has announced that it has officially appointed the Australian JDM Aust Pty Ltd as its exclusive sales and service representative for Despray patented Aerosol recycling technology in Australia and New Zealand.

According to Despray, the company's technology allows safe recycling of

aerosol cans in a non-explosive atmosphere. The closed system captures the gas and compresses it back into a liquid fuel, which can be used for waste-to-energy applications. Furthermore, the cans – which do not need to be sorted by size – are crushed in a totally sealed oxygen-free environment in a batch system. The available systems operate automatically, incorporate

safety interfaces and require very little operator training or expertise, the provider emphasizes. JDM Aust Pty introduced the Despray technology into the market of Australia and New Zealand at the Australasian Waste & Recycling Expo (AWRE), which took place end of August in Sydney.

➔ www.despray.com

Waste Management in Accordance with Environmental Protection

The production of machinery, the conversion of solid waste into secondary raw materials as well as the transformation of organic waste into ecological fertilizers, and production of RDF fuel from waste residues are part of the main tasks Croatian-based company Tehnix performs. In order to obtain an overview of the company's technology in the service of preserving the environment the president of the company Đuro Horvat answered the following questions from GLOBAL RECYCLING.

Tehnix exists more than 25 years, and the company's main focus is on the production of environmental protection machinery and equipment. In what way do your machines contribute to the protection of the environment?

The company Tehnix has explored and developed the best technologies that allow complete recycling of pre-sorted and/or mixed municipal waste according to use values. A large theoretical and practical knowledge in the development of new machinery and equipment that create the technological manufacturing unit allows a selection of waste into three utility segments for the reuse in the industry. Using factory recycling, we get eight types of clean raw materials that could be sold and returned to the industry. The raw materials obtained from industrial recycling are clean, fast-operated, baled and cheap. In the company, we have developed new machines and equipment that make the core value of the industrial recycling capability that can be implemented everywhere. By applying new technologies, the world can continue industrial development without a negative impact on the environment.

In which sectors do your machines and equipment enable major benefits in achieving the goals of circular economy?

Our machines enable major benefits in the sector of sustainable municipal waste management. The value of the MBO-Te technology is the permanent sustainable management of mixed municipal waste in standard waste processing plants, creating ecological, economic, energy and social resources. With the MBO-Te technology, we can significantly improve, simplify and reduce waste management, and thus do not pollute space in the city or underground drinking water, reduce harmful emissions, and contribute to stopping climate changes. In conclusion our machines, equipment and technologies significantly contribute to the environmental protection sector, the production of eco compost in bio-agriculture for the production of healthy food, and finally the use of combustible waste residues RDF as a major energy resource in cement production or hot-water heating and in the future of electricity generation.

Tehnix builds "modern standard factories for the treatment of mixed municipal waste". Do you provide the customers with a complete and fully functional system?

To be exact, we give clients everything they need to build a factory of the highest quality with the highest degree of recycling. Modern standard industrial waste recycling plants provide three segments of mixed municipal waste treatment that recycle waste 100 percent and return it to the industry as quality raw material for the production of

new products. A reuse center is placed within the factory. MO = an industrial mechanical treatment in factory plant enables extraction of eight types of raw materials – plastic, cardboard, paper, PET, MET, glass, textile and metal. BO = a biological aerob treatment of organic waste enables the production of eco compost within two months. Biofertilizer contains phosphate which is very important for the production of healthy food. Te = with thermal treatment the combustible waste residues are dried, shredded and baled as RDF fuel ideal for cement production. We manufacture equipment for the usage of RDF fuel in cement plants.

How does the treatment of mixed municipal waste look like in your factories?

This is a technological innovation, a patented technological unit where collected mixed municipal waste is recycled – sorted by use values and returned to the industry as a quality clean raw material: plastic, cardboard, paper, PET, MET, textile, glass and metal from which new products of contemporary design are produced. The high-quality raw materials are baled and packed for sale on the market or in the raw stock. At the beginning of the recycling process, organic waste is discharged from the delivered waste. It is screened, cleaned, dedusted and dried. In this way, recycled waste can be easily sorted by type. To organic waste prepared green waste is added and collected waste wood from the recycling yards and others. We produce eco compost in controlled conditions over a period of two months, enrich it with minerals to obtain a high-quality organic fertilizer with phosphate. All the rest of the various packaging waste and waste, that cannot be recycled and has energy value, is shredded, magnetically purified, baled as RDF fuel and is not disposed at the landfill.

According to Tehnix, the "MBO-Te" is "an innovative technology in waste management". Which features does the technology offer?

The technology offers simpler disposal in one container, bin or sack, faster and cheaper collection, fewer downtime, higher recyclable rates, and lower dumping rate on landfills. As part of our standard plant, all ecological protection is carried out without a negative impact on environment. The whole plant is prefabricated, mobile and can completely be recycled from ecological site. Our industrial recycling plants are ideal for tourism, cities or states. Furthermore, small space is needed; it is suitable to be built near existing landfills due to their recovery. The longevity of our factories is at least 50 years and the entire investment is payable within five years. It is a technological breakthrough for citizens to pay less, the state is spending less money, there are no missed investments, it is easier to control by state institutions as well as European Union

experts. Sustainable development can be achieved faster and cheaper. So far we have built nearly 48 different capacity plants, and received great interest from all over the world. The standard projects are already prepared, and we can give the user a complete offer within the same day. It is extremely important to create a high quality conceptual technological and construction project of permanent functionality. By applying the MO-BO-Te we get more raw materials, more energy, more jobs, satisfied citizens, clean environment and a richer society.

The company's mission is to help its customers to "achieve better results in Municipal Solid Waste Management". How does Tehnix pursue this goal?

From day to day we have more and more users of our technology. We have developed standard waste recycling projects, and we produce complete standard equipment of various capacities. Moreover, we help our customers in defining the bidding documentation, detailing the technology and costs. Tenders are being conducted quickly because everything is clearly defined. In this way, we protect the investor and the technology. Until now the money has been invested in buildings and landfills. The entire technological process is technologically connected and it is IT- and business-controlled. We run projects with a "turnkey" system. We provide a month training to the contractor for achieving the maximum functionality. Moreover, we train the plant operators, maintain the system, provide expert consulting for location and capacity selection.

Our projects are funded by commercial banks, the World Bank and the EU. By applying our technology, waste is becoming an economic resource through which we achieve the goals of the circular economy all over the world. They will produce raw materials and send them to European countries for the manufacturing of new products. New tourism trends and large migration seek new approaches and technologies in collecting and recycling of mixed municipal waste. The Tehnix MBO-Te technology is the technology of the future. This is a global circular economy.

Your company offers facilities for industrial composting for the controlled production of eco compost. How does the daily run look like in those facilities?

We have developed the ideal eco-compost production equipment. Yes, we are designing eco-composting plants of various capacities, mainly near sorting plants or recycling plants for mixed municipal waste, because waste contains organic waste that needs to be separated by a special plant and supplied and formed to windrows for the production of eco-compost. It is very important to mechanically prepare organic and green waste. We have developed the ideal bioreactor composting technology, which means producing high-quality compost within a two-month period. Daily work in these eco composting plants has been technologically defined for all operations, ranging from preparation to the packing of compost for the market. High-quality compost always has a market for healthy food production. Daily work in composting plants is dynamic with good working conditions and without any intense smell. Furthermore, for

our invention of bioreactor composting plants, we received a grant of 1.5 million Euros.

Which aspects have to be considered most when building a facility for the controlled production of eco compost?

The size of a composting space and a capacity of the plant are the aspects that have to be considered most. Industrial composting must take place under controlled conditions. This means that the entire technological process of producing eco-compost is supervised. The most important part is to determine the spatial capacity of windrow composting. The dimensions of the covered hall are determined by the number of users and the environment. The composting hall must be provided with water, electricity, compost equipment and a rainwater pool. The height of the hall is aligned with the object of recycling and sorting of municipal waste.

Composting falls into the technological recycling process, which means the separation of organic and biodegradable material which turns into quality fertilizer. It is important to determine the optimum space capacity for bioreactor composting. The roof of a hall can be made of concrete, panels or metal sheets covered with a coat. It is most economical to build a composting hall just next to the sorting plant. The building itself must satisfy the conditions that there is no rain, bora, snow nor leaking of liquids in the space around the composting nor in underground waters. The building itself must be enclosed by a wall of three meters in height to avoid the overcooling by bora and the rinsing of the furrows in rainy conditions. The composting hall substrate should be impermeable reinforced-concrete, the door should enable the material to be fed and transport of compost. The project must meet spatial and ecological conditions. The daily amount of biodegradable waste is approximately 0.2 kg/capita. The amount of green biodegradable waste, leaves, branches, grass, waste wood from recycling yards, old furniture is 0.3 kg/capita.

Apart from providing customers with machinery, equipment and facilities, you offer your own range of utility vehicles called "EKOMUNAL". What are the main features of your utility vehicles?

We manufacture, service and maintain special utility vehicles EKOMUAL with various capacities of 5, 7.5, 10, 14, 16, 18, 20, 22 m³. Our utility vehicles and upgrades have long-lasting functionality, are cost-effective due to low cost and low fuel consumption, and are ecological because they do not pollute the environment. Upgrade EKOMUNAL is a Croatian product. Today's communal companies have to take care of citizens, of smaller environmental protection costs. We use Mercedes chassis on which we install a high-quality upgrade for waste collection. In Tehnix, we want to make a vital contribution to the sustainability of the planet, we want to improve the existing model for separating waste in a home, apartment or factory. It was till now insufficient to use all the economic potentials that municipal waste has. The new MBO-Te technology enables complete industrial recycling of collected mixed municipal waste, achieving the goals of sustainable development and circular economy.



Đuro Horvat: “The Company Tehnix Developed an Innovative Technology for Municipal Waste Recycling which Achieves Circular Economy”

“Recycling is good, circular economy even better.”

Recycling is one of the five technological phases for a circular economy that is not efficient enough. This is a transitional phase of waste treatment at MBO-Te industrial recycling of mixed municipal waste. Tehnix has developed a new technology for sustainable management of mixed municipal waste. Our MBO-Te technology enables a circular economy. It facilitates industrial waste recycling and sorting of raw materials by use of values. Furthermore, it allows 100 percent recycling without landfilling. We have developed a variety of waste recycling plants of various capacities of 5, 10, 15, 20, 30, 40 or 80 t/h of mixed municipal waste, from which we obtain ten useful raw materials for the industry. This is a technological breakthrough developed in Tehnix, with which the treatment of collected waste is faster, cheap and more complete. By building standard factories, we achieve a circular economy. The European Union fully supports and finances the system of MBO-Te technology that creates new values, does not need landfills nor pollutes the environment.

Achieving circular economy of mixed municipal waste in five technological steps:

1. Personal waste disposal ~ organization of collection ~ economy of transport,
2. Construction of standard eco factories for industrial recycling of collected waste,
3. Reception of solid municipal waste, recycling and baling eight types of clean raw materials,
4. Composting of organic waste and green waste, production of eco compost,
5. The rest of the combustible waste is shredded and baled for the production of RDF fuel for cement plants.

The Tehnix company has developed a modern technology for the circular economy. Great experience, constant research, development and the construction of facilities enable excellent results by transforming municipal waste into a national resource by employing people, creating high-quality raw materials, producing eco compost and RDF energy. For our technological discoveries, we have received the highest worldwide acknowledgments. Our technological discoveries enable water, soil and air protection. By applying our technology, millions of new jobs can be created worldwide and contribute to stopping the climate change. We would like to help to stop the economic migration of young people who could work on recycling plants in their countries. We will significantly abolish waste-related corruption processes, develop the national recycling industry, protect the planet Earth from floods and droughts and other possible natural disasters. All new industrial products have to be designed for recycling. All products have to be recycled and not land-filled after use. Ecology should become a science that will deal with the protection of the planet Earth. We are ready to convey our technological experiences, solutions and patents to other people worldwide dealing with waste and ready to build recycling factories together. The Tehnix company is the global leading eco-industry. We have developed and produce over 300 products and technologies that are sold on the world market. We cooperate with scientists, experts, institutes in the Republic of Croatia, the EU and the world.

- a) Now we have millions of polluted hectares of soil, streams, rivers, lakes, and the seas have become landfills.
- b) We have to use the best technology in industrial municipal mixed waste recycling.
- c) MBO-Te is a technology of the future which achieves circular economy and sustainable development of the planet Earth.

Make the world ecologically sustainable because nature is our common home.

Let Tehnix be your partner in implementation of the best MBO-Te technology! Looking forward to cooperate together!

Letter No. 107/20-08-2018
Donji Kraljevec, 20.08.2018

For «TEHNIX» d.o.o.:
CEO - Đuro HORVAT



Tehnix – Your partner in environmental protection



The Company Tehnix Is the Customer's Partner in Environmental Protection – Let's Go Further Together!

Tehnix is the leading eco-industry in the world. The company's business goal is to develop and produce the best technology for achieving sustainable development and circular economy. We have developed and produced more than 300 devices and equipment for environmental protection, for which we have received hundreds of world awards. We have developed the best MBO-Te waste recycling technology. By applying our technology, municipal waste becomes an economic resource. Through industrial recycling of mixed communal waste, we get eight types of raw materials, produce eco compost and RDF fuel.

Together with our customers, we want to develop industrial recycling of municipal waste in their city, municipality or country. This will contribute to stopping climate changes of the planet Earth. The MBO-Te is the technology of the future for achieving circular economy and sustainable development.

Inventor – CEO of the company Tehnix – Đuro Horvat



➔ www.tehnix.com, e-mail: tehnix@tehnix.com, +38540650100, Braće Radića 35, 40320 Donji Kraljevec, Croatia



**Tehnix® MBO-Te = INNOVATIVE TECHNOLOGY
IN MUNICIPAL WASTE MANAGEMENT**



MBO-Te

**MODERN FACILITY FOR
INDUSTRIAL RECYCLING OF
MUNICIPAL SOLID WASTE
CAPACITY OF FACTORIES**

**5t/h 10t/h 15t/h
20t/h 40t/h 80t/h**



**THE RIGHT SOLUTION
CIRCULAR ECONOMY
CITIZENS - NATURE - INDUSTRY**

1. PLANT FOR INDUSTRIAL RECYCLING OF MUNICIPAL SOLID WASTE
2. PLANT FOR BIO-REACTOR COMPOSTING AND PRODUCTION OF ECO-COMPOST
3. PRODUCTION LINE FOR SHREDDING AND BALING OF RDF FUEL
4. RECYCLING CENTER FOR REUSE OF DISPOSED PRODUCTS
5. SOLAR POWER PLANT INSTALLED ON THE ROOF WITH POWER OF 1MW

A German-Hungarian Strategic Partnership for Plastic Recycling

German APK AG and Hungarian MOL Group have signed a strategic cooperation agreement in August this year.

As a first step, the Hungarian partner will support the completion of APK's plant located in Merseburg, which will serve as a pilot for the German company's solvent-based process called Newcycling. As reported, this technique enables the recovery of high-quality materials from complex multi-layer packaging. The recycling technology can be applied to a broad variety of mixed plastic types and process them into high-quality recyclates.

MOL Group, an integrated international oil and gas company headquartered in Budapest, is taking steps to grow its petrochemicals business and enter knowledge-intensive industries together with strategic partners. "We see a growing demand from our customers for recycled plastics, and at the same time we are also fully committed to the idea of circular economy and sustainability," Ferenc Horvath, MOL Group's Executive Vice President for Downstream, is quoted. The company would aim to become a leader in recycling in Central and Eastern Europe. "MOL, as an established polymer player in CEE (Central and Eastern Europe), together with an innovative



partner as APK will work on further developing the Newcycling technology and bringing it to our core region where the need and the potential for plastic waste recycling is significant."

The 2030 strategy of MOL Group includes the expansion of the company's petrochemicals value chain. It intends to invest around 4.5 billion US-Dollar until the end of the next decade into growth projects. In this context, the company plans to build up its recycling capabilities, "as plastic recycling is the most cost-efficient and environmentally friendly option for a responsible management of plastic waste". Plastic packaging is one of the key strategic segments defined in MOL's

2030 Enter Tomorrow Strategy and a sector where both partners recognize a growing demand for recycled materials, the group underlined.

According to the information, the Hungarian group is active in over 30 countries with a dynamic international workforce of 26,000 employees. It operates four refineries and two petrochemicals plants under integrated supply chain management in Hungary, Slovakia and Croatia, and owns a network of nearly 2,000 service stations across nine countries in Central and South Eastern Europe. MOL Group is a supplier of polymer products such as polypropylene, low-density and high-density polyethylene.

ELKOPLAST Between nature and human



Wide range of products for waste collection and handling

- roll-off containers
- skip containers
- above ground containers for selective collection
- semi-underground containers
- underground containers
- hot-dip galvanized containers

Other products



Liquid management products

- mobile diesel and AdBlue fuel tanks
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Winter maintenance

- fiberglass grit bins
- polyethylene grit bins

ELKOPLAST in 3 numbers

25

25 years on international markets

150

150 employees

22mil.

above 22 millions € turnover

ELKOPLAST CZ, s.r.o.

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760 01 Zlín
Czech republic

phone: +420 575 571 000

e-mail: elkoplast@elkoplast.cz

www.elkoplast.eu

New Recycling Plant for Contaminated Steel Scrap

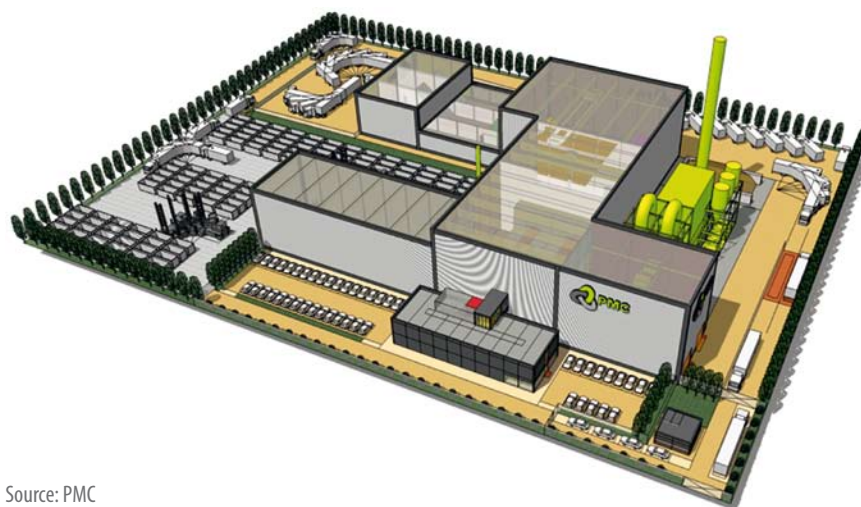
Dutch Purified Metal Company (PMC) starts the construction of the plant in Delfzijl, The Netherlands.

In July this year, Purified Metal Company has completed the financing for the construction of a large-scale state-of-the-art processing plant that is to recycle contaminated steel scrap (for example asbestos and other toxic materials). According to Berlin-based EIT RawMaterials (initiated and funded by the European Institute of Innovation and Technology), which has supported the established SME as a start-up, PMC is the “first company in the world with an environmentally friendly and economically feasible method to recycle contaminated steel scrap into high-quality raw materials for the steel industry”.

After realizing the first factory in the Netherlands, Purified Metal Company aims to roll out the innovative and patented process for the recycling of contaminated steel scrap in the rest of Europe and the world. The company expects that the factory will be operational by July 2020 at the latest.

Circular solution

The solution for recycling contaminated steel was developed together with UK-based waste-to-product company



Source: PMC

Renewi plc, which will exclusively collect and transport contaminated steel directly to PMC's new recycling facility in the Netherlands. “As asbestos was frequently used in the construction of buildings, plants, ships and housing between 1960 and 1993, the lifespan of many of these structures will soon be coming to an end, resulting in a relatively large amount of asbestos-contaminated steel scrap,” Renewi informed in May this year. “As asbestos is harmful for health, its remediation is usually an extremely labor-intensive and expensive process with any hazardous materials needing to be disposed of in a safe and controlled way.”

As reported, PMC's facility will combine “innovative processes with existing techniques originating from other industries”. During the process, the fibrous parts of the asbestos would be destroyed, ensuring that it is no longer hazardous. “In addition, other hazardous substances contaminat-

ing the steel, such as chromium-6 and mercury, are captured or neutralized”.

“The process prepares steel for reuse in the form of Purified Metal Blocks (PMBs) which are raw materials typically used in the manufacturing industry that can be made to certain specifications, dependent on the requirements of the end user,” PMC assured. “The production of PMBs is safer, more affordable and more efficient than current remediation techniques.”

The collaboration between Renewi and Purified Metal Company “will have benefits for both customers and the environment through the recovery of valuable raw materials from complex waste streams and the reduction of carbon emissions,” the two companies emphasized.

- ➔ www.purifiedmetal.com/en
- ➔ www.renewi.com/en
- ➔ www.eitrawmaterials.eu



About Purified Metal Company

PMC was founded by a group of shareholders who have combined expertise and form the basis of the innovation in the field of recycling of contaminated steel scrap. By PMC's own account, they were able of transforming the innovation into a process in which hazardous raw materials can be converted into usable raw materials complying with the end of waste criteria of the European Community. According to the company, existing knowledge and expertise is enhanced through the collaboration with highly qualified partners in a consortium.

Cameroon: More Waste Creates More Recycling



The Republic of Cameroon faces the same challenges like many other developing countries. Waste management and recycling are not at the forefront of the Central African country, but they are becoming increasingly important.

Economic growth as well as changing consumption and production patterns have resulted in rapid increases in generation and use of plastics in the Republic of Cameroon. According to scientists and the media, the annual consumption of plastic materials has increased tremendously, although exact figures are not available. The same applies to the plastic waste generation in the country.

In Douala, with more than three million inhabitants the largest city of the country and its economic capital, plastic consumption has expanded much more than in other Cameroonian regions in consequence of rapid urbanization and economic development. "Due to the increase in generation, waste plastics are becoming a major stream in solid waste," Maria Atongajua from the International Institute of Tropical Agriculture, Cameroon, stated 2016 in an abstract in the context of the International Conference & Expo on Green Energy, Recycling & Environmental Microbiology in Atlanta (USA). "After food waste and paper waste, plastic waste is the third major constituent at municipal and industrial waste in Cameroon. Even the rural communities in Cameroon with low economic growth have started producing more plastic waste due to increased use of plastic packaging, plastic shopping bags, PET bottles and other goods/appliances using plastic as the major component." Owing to lack of integrated solid waste management most of the plastic waste is neither collected properly nor disposed of in an appropriate manner to avoid its negative impacts on the environment and public health, she gave

account. The plastic waste would be often the most visible component in waste dumps and open landfills in Cameroon. In her opinion, recycling can provide an opportunity to generate energy and resources.

According to a research article on "Municipal solid waste generation, composition and management in the Douala municipality" by Innocent Ndoh Mbue, Bitondo D (both from the University of Douala) and Balgah Roland Azibo (University of Bamenda), the amount of plastic waste disposed of was estimated at 441,817 tons in 2013, which would represent 15.4 percent of Douala's waste stream.

Plastic recycling

With regard to plastic recycling, there are some private initiatives in the Republic of Cameroon. One example is "Coeur d'Afrique", the association of retired Cameroonian professional footballer Roger Milla. As reported by the publication "Business in Cameroon", it intends to open this year in Douala another recycled plastic waste-based pavement production plant. The first plant was established in Yaoundé, the country's capital. It employed at the time 20 people permanently (and contributed to the creation of more than 300 indirect jobs in waste collection chain). The processed plastic waste was used to produce ecologic pavements.

Another example is Namé Recycling, a Belgian-Cameroonian company, which started up a PET plastic recycling

operation based in Limbé, in the South West of Cameroon. In June 2017, "Business in Cameroon" gave account, that the company extended its services to the city of Yaoundé, where plastic and packaging waste, generated by households and companies, is to be collected – and recycled into reusable products.

Nearly one year later, in April 2018, it has been released that Namé Recycling will recycle all the plastic waste, which the brewing company Société anonyme des brasseries du Cameroun (SABC) produces in the country. SABC also informed that this year its objective is to recycle 30 million plastic bottles (three times the volume recycled in 2017). "The second phase is about domestic wastes. Objective: recover 80 percent of the bottles produced", the group was cited.

E-waste

According to a study from the University of Maroua, published in 2014, the awareness of e-waste in the country is low despite increasing dependence on modern technologies that generate e-waste. The author, Cornelius Tsamo, conducted a survey of 33 EEE (electrical or electronic equipment) repair workshops and the responsible bodies regarding waste management in the town of Maroua, located in the Far North Region of Cameroon.

The analysis revealed that 1,628 different e-waste items were found with an average flux rate of one to four items per week. Only six percent of items brought to the workshops could be repaired. More than 90 percent of the equipment would enter the e-waste stream, he stated. "The majority of the waste is stored in the workshops, and parts recycled when necessary. 87.9 percent of those manipulating these e-waste items do so without any protection, as 12 percent of them are aware of the toxicity of these wastes. The local councils have no e-waste management plan as no legislation exists to that effect. There is complete lack of awareness on this type of waste to the public as well as the main actors that should be responsible for their management stemming from poor policy and regulatory systems," Cornelius Tsamo wrote in 2014.

In this field, the situation changes too. MTN Cameroon – part of the MTN Group (Mobile Télécommunications Network) – and Sweden-based technology and services provider Ericsson have been working together in 2017 under the Product Take Back program (E-waste take back) to minimize the potential environmental impact associated with the disposal of decommissioned electrical equipment. It has been reported in December 2017 that Ericsson has gathered 53 tons of waste in Cameroon and sent this amount to its recycling partner in South Africa.

The E-waste initiative was introduced to MTN Cameroon as part of Ericsson's modernization project with MTN. The project involved expanding both the core and RAN (Radio Access Network) for MTN Cameroon. On the radio side, it included 3G (a third-generation [3G] wireless standard) expansion on 80 sites and LTE (Long Term Evolution, a mobile communications standard) expansion on 52 sites.

Throughout the program, four 40-foot containers have been loaded with equipment at MTN Cameroon's warehouse facilities in Yaoundé and then transported by sea to the Ericsson-approved recycling partner in Durban, South Africa. There, the equipment was sorted and dismantled for the final recycling step. According to Ericsson Cameroon, the recycling rate is 98 percent of all materials.

Cameroon's waste management

The global initiative for sustainable development marked by the Rio Summit in 1992 and the aims of Agenda 21 led to a regulatory framework of waste management in the Republic of Cameroon. Veronica Ebot Manga (University of Buea), Osric Tening Forton (African Development Bank) and Adam D. Read (University of Northampton) stated in an article, published in 2008. As reported, a Ministry of Environment and Forestry (today: Ministry of Environment, Nature Protection and Sustainable Development www.minep.gov.cm, responsible for guidance on waste legislation) was established and a National Environmental Management Plan developed in 1992. But over time the relevant ministerial departments have been transformed (separated or merged) into different ministries "which have devolved powers related to waste management".

However, this is not the only reason, why much of the country's municipal solid waste management practices have remained unaffected. Waste management is still regarded as an activity which is centered upon collect and dump somewhere else, the authors described the situation. "This reality is in stark contrast with current legislation and regulations that are framed within the formal policy goal of environmental sustainability."

While the policy framework would set out strategies to protect environmental resources and promote materials conservation through safe disposal and materials recovery respectively, "poor waste collection and indiscriminate as well as improper disposal dominate local Municipal Council practices," the authors found. "Failures in the implementation of adequate policies at the local level have been attributed to factors such as lack of funding, low staffing levels, political interference, implementation of inappropriate technologies and relative cost." One reason was the number of actors. According to the information, several ministerial departments have mandates to implement solid waste management regulations; the highest body responsible for municipal solid waste management is the Inter-Ministerial Commission for Municipal Waste Management in Cameroon. This range of responsible bodies would lead to inefficiencies, as "the current regulatory system relies on a top-down approach to decision making wherein the ministerial departments are able to exercise control over local councils which have limited autonomy. This results in decisions that reflect political inclinations rather than scientific reality."

The amount of domestic waste, generated by about 23.5 million Cameroonians (estimation in 2016), can only be estimated: Experts speak of 5.5 million tons a year – or 16,000 tons a day (five to eight percent of this quantity is assumed

Tenders Cameroon

- ➔ www.tendersinfo.com/global-cameroon-tenders.php
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to be plastic waste). The country's major waste management contractor is the Cameroon Hygiene and Sanitation Company (Hysacam). The private firm was founded in 1969, is based in Douala and Yaoundé and handled in 2017 waste management services in 17 cities throughout the country for 15 million Cameroonians; Hysacam collected over 1.5 million tons of waste a year or 4,000 tons a day. According to the information supplied, the company operates right across the waste management chain, from collection to processing, employs 4,000 people and has a fleet of several hundred trucks.

Actions to protect the environment

At the Paris Climate Change Summit in 2015, Cameroon's President Paul Biya reaffirmed the country's engagement to reduce greenhouse emissions by 32 percent by 2035. In August this year the online publication "Cameroon Report" informed, that the Ministry of Environment, Nature Protection and Sustainable Development sanctions some 395 companies for violating environmental laws. The list includes companies illegally importing hazardous waste into the country as well as businesses using and distributing non-biodegradable plastics, to name but a few categories.

With regard to plastics, the "government has embarked on several sensitization campaigns to protect the environment, especially from dangers caused by the use and disposal of plastic waste which constitutes ten percent of the six million tons of plastic waste disposed of nationwide every year," the "Cameroon Report" wrote. "During the com-

memoration of this year's edition of the World Environment Day, the Minister of Environment, Nature Protection and Sustainable Development, Hele Pierre reiterated government's resolve to end the use of non-biodegradable plastics. He also said people circulating and encouraging the use of such plastics will be hunted down, noting that inspections are being carried out while customs officers are also preventing the importation of such plastics."

Business opportunities

According to the forecast of the International Monetary Fund (IMF), Cameroon's Gross Domestic Product (GDP) should grow 4.0 percent in 2018. This was confirmed by an assessment from the global credit insurer Coface (Compagnie Française d'Assurance pour le Commerce Extérieur) the "African Business Magazine" reported in April this year and stated that the company was "counting on infrastructure, energy and the food business to stimulate Cameroon's growth in 2018".

Furthermore, there is a program for economic emergence by 2035. The Presidency of the Republic of Cameroon informs on its website that the President of the Republic, Paul Biya, has transformed the country into a work site for economic emergencies. In the face of the challenges, all Cameroonians are invited to develop Cameroon. "Economic Emergence also requires opening up to partners and foreign investors willing to support our development," the information said.

In this regard, major structuring projects being executed throughout the country would be "key levers". One major sector is the agricultural and environmental pole; its aims include environmental protection and ecosystems preservation.

- ➔ www.prc.cm
- ➔ www.prc.cm/en/invest-in-cameroon

Avery Dennison Joins the Plasticity Partner Program

USA-based Avery Dennison Corporation – a global company specializing in the design and manufacture of a wide variety of labeling and functional materials – has joined the Plasticity Partner Program. It has entered into a three-year agreement with Ocean Recovery Alliance, founders of Plasticity Forum.

Over the three-year period Avery Dennison and Plasticity aim to collaborate across the industry to discover, connect and facilitate solutions to create innovative prevention programs for plastic pollution, the information said. "Avery Dennison has eight ambitious sustainability goals that we have committed to meet by 2025, and we know that to achieve them we need to work collaboratively within our industry and beyond. Partnering with Plasticity enables us to work across our value chain to find systemic so-

lutions to convert plastic waste into valuable second-life resources, which is a key priority for us," Roland Simon, vice president of global procurement and corporate sustainability at Avery Dennison, was cited.

Avery Dennison Corporation's products, which are used in nearly every major industry, include pressure-sensitive materials for labels and graphic applications; tapes and other bonding solutions for industrial, medical and retail applications; tags, labels

and embellishments for apparel; and radio-frequency identification (RFID) solutions serving retail apparel and other markets. According to the company's own information, it has approximately 30,000 employees in more than 50 countries. Reported sales in 2017 were 6.6 billion US-Dollar.

- ➔ <http://label.averydennison.com/eu/en/home/products/sustainable-solutions.html>
- ➔ <https://www.plasticity.global>



Kenya: Much Has to Be Done

The country takes first reliable steps to change its waste management.

In 2010, a team of researchers published a paper on the possibilities of solid waste management in Kenya's capital Nairobi. The description of the situation at the time included that only half of the estimated 3,000 tons of waste generated every day were collected, criticized missing means of safe disposal in sanitary landfills or state-of-the-art incinerators, deplored that only 400 to 600 tons reach the Dandora dumpsite every day, and showed that the over 2,000 people recovering 250 to 300 tons of recyclable or reusable material are only responsible for eight to ten percent of the daily waste stream. Four years later, a visitor described the solid waste management situation in Kenya's capital as follows: "There is something terribly wrong in Nairobi City: As you drive along the road you will see heaps of garbage."

Figures mostly estimated

The amount of waste in Nairobi and Mombasa can at best be estimated, the amount in the country stays unknown, and current figures must be searched with a magnifying glass. A scientific investigation of Nairobi's solid waste management situation in 2010 reported 2,122 tons of domestic waste and 999 tons of non-domestic waste produced per day, containing 51 percent of organics, 18 percent of paper, 16 percent of plastic, and two percent of metals and glass each. The reuse and recycling levels ranged at about one percent for organics, eight percent for paper waste, five percent of plastic waste, 100 percent

of reusable metal scrap and an unknown part of glass recycled. In all 27 percent of total generated waste was properly disposed of at designated Dandora landfill, while 69 percent were improperly disposed of or handled. And even the latest solid waste management report published by the Ministry of Environment and Natural Resources can only estimate the total amount of domestic solid waste generated to 4,950 tons per day in 2011 and 5,600 tons per day in 2015.

For 2020, the aforementioned researcher's paper estimated 2,000 tons per day of organic fraction rotting, scavenged or illegally treated and 600 tons of officially dumped organics. Recyclables in 2020 were valued at 1,400 tons burnt or illegally treated, about 200 tons officially dumped and 150 tons recovered. Remaining residual waste is officially dumped, burnt or illegally treated. An "Integrated Solid Waste Management Plan" – a collaboration of Kenyan government with the United Nations Environment Program – was designed to raise the collection rate to 64.6 percent by 2020 and to 100 percent by 2030, while the waste reduction rate should increase to 7.5 percent by 2020 and to ten percent by 2030.

Not only budgetary deficiencies

However, these figures will become reality in the future: In 2012, the need for developing solid waste management was urgent. The national legislation appeared comprehen-

sive, but the practices and efforts at the local level were not. According to the United Nations Human Settlements Programme, the by-laws exhibited many limitations, their enforcement was either lacking or weak, the organizational capacities emerged as inadequate, and the service structures suffered from chronically underfunding, with too few vehicles, poor equipment, and inadequate maintenance. And there were “hardly any containment systems for waste before transportation and the disposal sites of these towns are unsecured, unmanned and in some cases non-existent”. UN-Habitat coordinator Andre Dzikus was quoted with the words: “Due to budgetary deficiencies, town authorities find it difficult to address solid waste management in a sustainable manner. In addition, insufficient public awareness and enforcement of legislation is also a hindrance.” Nevertheless, the expenses are rising since 2014, as the budget allocation for solid waste management in growing Nairobi increased from 103 million to 1.5 billion Kenyan Shillings (872,000 respectively 1.2 million Euro) in 2017.

A pilot project titled “Clean, healthy, wealthy Nairobi” was launched in October 2014, designed to change the current point collection system of several companies to one successful collection system organized by a single franchise. In April 2015, Nairobi’s waste management companies were linked against a corresponding bill, and members of the Waste and Environment Management Association of Kenya began lobbying for a stop. They argued that the bill would push them out of business and would not allow competition. Governor Evans Kidero countered: “Contracting prequalified companies and private waste collectors has proved ineffective since some of these firms don’t dispose garbage at Dandora dump site as required.” The bill was adopted, one of 37 competing companies won the contract, and more than 2,000 people became unemployed.

Private sector involvement

That affair brought into consciousness that the failing institutional accountability of the previous collection system

had led to a significant amount of private sector involvement, to a large extent handled by the informal sector. It was reported that – as early as the turn of the century – private businesses or individuals collected paper, cans, glass and plastic bottles for recycling in major cities like Nairobi and Mombasa, though not in smaller towns. The same situation as in 2013: A large percentage of solid waste was managed by the private sector and non-governmental organizations due to public-private partnerships. EcoPost for example, founded by eco-preneur Lorna Rutto, is a social enterprise created to find alternative plastic waste management solutions to Kenya.

The company collects plastic waste and manufactures commercially viable, highly durable, and environmentally friendly fencing posts, that are used widely across Kenya. The project created over 300 jobs and saved the environment from over one million kilograms of plastic waste.

Foreign interests

Several recyclable materials even captivated the interest of foreign companies. In 2013, computer producer Dell created an e-waste recycling program together with the E-Waste Solutions Alliance for Africa. The regional e-waste handling facility – first-of-its-kind – was named East Africa Compliant Recycling. Its 40 collection points were run by independent local entrepreneurs that buy e-waste from collectors. The idea was to create a controlled processing infrastructure offering an alternative to the unregulated recycling operations across the region. In 2014, Hewlett-Packard extended its work in Kenya – after a local e-waste management project since 2010 – and wanted to develop a blueprint for a modern recycling facility. The HP experts teamed up with – among others – the East African Compliant Recycling and the German Deutsche Investitions- und Entwicklungsgesellschaft and created a system for separating and dismantling e-waste including domestic devices. According to The Guardian, the result was East Africa’s first large-scale recycling facility in Nairobi and Kenya’s first-ever registered collection network for e-waste.

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There is much interest in the recycling of plastic packaging waste in Kenya too. The estimated amount of plastic packaging put on the market makes up approximately 270,000 tons per year. The recycled volume – based on questionnaire responses of recyclers – adds up to around 38,000 tons per year, corresponding to an overall recycling rate for plastic packaging waste by 15 percent. A recently published study enumerates 51 recyclers of plastic packaging waste in Kenya, mostly based in Nairobi.

Cooperations with Japan and Denmark

Not just recently, the Kenyan government cooperates with other nations. Since several years, the Japan International Cooperation Agency (JICA) has supported improvements of environmental management capacity in Nakuru, started supporting on capacity development of solid waste management in Nairobi, and will continue supporting its implementation. 1,251 billion Kenyan Shilling (10.26 billion Euro) were invested in the PPP-Project of Medical Waste and Hazardous Waste Appropriate Processing Plant in Nairobi, and as mentioned above, the agency initiated “Clean, healthy, wealthy Nairobi”. In late 2016, the Danish Environmental Protection Agency held several meetings in Kenya for stakeholders at national and regional levels as well as private sector companies and organizations. The Danish Minister for Environment and Food, Esben Lunde Larsen, signed a cooperation agreement for the environment area with Kenya to ensure cleaner production, better waste separation and reduced water consumption by Danish products. And in August 2017, Kenya joined a number of other African countries that regulate the use of plastic bags through legislation aimed at waste prevention.

Investment capital needed

Much has to be done, according to the latest report of the Ministry of Environment and Natural Resources: Waste sorting, a market for organic waste and a market for certain inorganic waste fractions like styrofoam and low-grade plastics are still lacking. Investment capital has to be acquired: The total investment costs – to be met by international grants and investment loans, national grants and investment loans – for 15 recycling points and 16 composting plants and the necessary technical infrastructure and trucks are estimated at approximately 35 million US-Dollar (30 million Euro). The expected costs for capacity development are approximately 3.8 million US-Dollar (3.2 million Euro), and the costs for project management are estimated at two million US-Dollar (1.7 million Euro) for the next 15 years. Last but not least incentives for private sector players wishing to engage have to be created; a transparent guiding framework for private sector participation and thus providing predictability for its players will be provided.

The business development agency Germany Trade and Invest but warned in 2016: “Private investors may help to find appropriate solutions, but don’t come into effect because of the self-interest of influential groups. Well-meant development aid projects of the international donor community are accepted with pleasure but don’t lead to a change in thinking. They, on the contrary, would help to cover mismanagement and defer necessary rethinking, critics give account.” Maybe this has changed, and Kenya is on its way to change its industrial production into a waste-reduced model.

Trading Platform for Recovered Paper with Integrated Logistics Solution

Digital commerce is finding its way into recovered paper trading: The B2B-trading-platform merQbiz, launched in 2017 by German international operating engineering company Voith and US-based Boston Consulting Group Digital Ventures, has expanded its range.

Since January, merQbiz and the American logistics provider C. H. Robinson cooperate. As a result, the platform includes integrated logistics solutions, Voith informed. “MerQbiz now also offers the automation and improvement of previously manually performed logistics processes on an user-friendly digital platform. Absolute transparency in the market now applies not only to the pricing of recovered paper but also to the shipping costs – competitive pricing is carried out in real time and customers receive prompt transport offers that match with their trading order. C. H. Robinson’s capacities allow for access to previously unmatched freight capacities.”

According to the information, merQbiz connects buyers and sellers of recovered paper in a digital marketplace – currently in the USA only. The platform would enable traders and buyers from pulp and paper mills to directly network with one another and access information about the supply and demand of recovered paper. In addition, users could securely conduct their sales and purchasing transactions on the trading platform. “Similar to the well-known online marketplaces, merQbiz evaluates the merchants, the buyers and the quality of the goods,” the German-based company explained. This would ensure a high level of security for all goods, logistics and payment flows as well as a high degree of transparency and professional handling.

In the medium term, the trading platform’s offers will also be available to customers outside the United States, Voith announced.

➔ www.merqbiz.com



Ivory Coast: Waste Management Is still a “Problem Child”

Ivory Coast has put an end to the past violence and political turbulence. According to the World Bank, the African country shows a GDP rate of eight percent last year and offers great opportunities for investment. But its waste management sector still needs help.

In 2006, the waste management of the Ivory Coast attained sad famousness. A mixture of over 500 tons of fuel, caustic soda, and hydrogen sulfide of toxic waste was dumped at 18 sites around Abidjan, the economic capital of the country. The international commodities trader Trafigura had tried to save charges in Europe, sent a vessel to several countries which rejected the hazardous substances, and finally disposed of the load for allegedly 17,000 US-Dollar near Abidjan. The UN published that 15 people died, 69 people were hospitalized, and over 108,000 others sought medical treatment during the following days. Trafigura, later on, paid over 200 million Euro support complete remediation as well as compensation payments. According to The Guardian, lawyers speculated that some

money might end up being stolen thanks to the Ivory Coast regime's corruption. Clean-up and treatment work continued at some of the sites affected by the dumping until as late as 2015 and 2016. In November 2015, the Ivorian Government announced that it had completed the decontamination of all of the dumpsites.

Waste infrastructure: missed

At that time, figures regarding amount and treatment of Ivorian waste could not be found. Merely EWIT, the European Union funded E-Waste Implementation Toolkit, found out that the population of Abidjan in 2015 consisted of 5,550,000 residents – a quarter of the Ivory Coast popula-

tion – and produced slightly more than one million tons per year and 1,500 tons of E-waste per year. Although it is estimated that 80 percent of the national industrial activity at the Ivory Coast are concentrated within the District of Abidjan, there were no collection station, no dismantling facilities and no material recovery facilities installed. Data on repair and refurbish facilities were missed. 176 landfills and dumps had been closed; 151 dumps and one landfill were active.

Funding urgently needed

As the Global Partnership on Waste Management gave account already in 2012, the Ivory Coast urgently needed funding for the installation of waste management facilities in the country. Projects for landfills, incinerators and autoclaves to treat both hazardous and non-hazardous waste streams lacked sufficient financial support. The list of wishes for better management of industrial waste included more access to technologies for waste segregation, the construction of incinerators, a waste exchange and some storage facilities for hazardous waste. In spite of existing policy plans, this had not yet been realized due to a lack of funds, resulting in dumping as the most common practice. The same with the management of hazardous waste: The realization of finalized plans were hampered by deficient funds leading to lack of equipment, limitation of enforcement and disposal of contaminated waste alongside municipal solid waste or outside of landfills. Furthermore, the management of MSW needed funding for the procurement of waste collection equipment, the construction of landfills and the installation of recycling centers, not to mention education programs for training the public.

Failures

Some projects attempted to change the status quo. In 2014 Ivory Coast Prime Minister Daniel Kablan Duncan launched a plastic bag collection, processing and recycling project. It was estimated at 26,000 Euro and found appropriate to create 10,000 jobs long-term. But as small bags are used widely in Africa to package water, the water sellers' union protested against the ban potentially putting thousands of water sellers out of work. The NGO Afrik Environnement planned to create a plastic waste recycling center in the town of Abidjan in 2010 that "has not seen the light of day". The intent of building a composting factory on the outskirts of the Akouédo landfill was supposed to begin in 2014 but seems to have been postponed because of several open decisions on available land and the position of the collection points. The capture and exploitation of biogas at the Akouédo landfill in Abidjan – anticipated costs: 18 million Euro – was "mobilized for funding" in 2015.

Another project to burn gases from the Akouédo tip that should have started in 2011 and end in 2018, was not put into service because of financial and authorization difficulties. In 2015, two additional technical landfill centers for household waste were "under construction": the Kossihouen center – which should theoretically open at the end of 2015 and had its cornerstone ceremony in Spring 2018 – and the Atiékoï center – planned since 2003 and

without completion date in 2015. At least some composting programs were promoted.

A called-off deal

A breakthrough seemed to be attained in 2014 when U.S.-based environmental services firm Wise Solutions CDI decided to invest 226 million US-Dollar to acquire equipment and build an infrastructure in Abidjan's waste management. In addition, provisions were made for the construction of up to three recycling and digester plants to process 6,000 tons daily and up to 2.5 million tons annually. The deployment of activities should occur in summer 2015, and the waste sorting and recycling units were planned to be operational in 2016. At that time Ivory Coast was pushing for heavy investments to upgrade infrastructure. The concession was funded for 15 years. However, the deal was called off. In December 2017, Wise Solutions declared an arbitration claim against the Republic of Ivory Coast to the International Center for Settlement of Investment Dispute. The licenses were taken over by other foreign companies.

Insufficiencies persisting

All in all, effective private investment in the public waste management branch can hardly be found – except in refuse collection for which the municipals are responsible. The collection concessions are awarded to private enterprises to transport the waste from source to landfill. A country report presented in late 2017 detected that neither government, municipalities nor private or private-public corporations were able or willing to procure money. Because of a sharp increase in the aggregate quantity of industrial waste and a steady increase of general consumption foreseen, the report is dunning urgent attention and innovative solutions, "as both policy-makers, technical actors and citizens are clearly outpaced by the intensity of environmental and health issues associated with wrong behaviors, poor practices and ineffective actions". Insufficient technical capabilities in the public stream and a recovery rate of 20 to 40 percent merged with "a strong reliance on industrialists' goodwill to create value through re-use, recycling or treatment". And the management of residential waste was characterized by tardiness in finding appropriate solutions, an overall lacking education of the population on proper waste disposal and the failing of an operational recycling facility. A scientific article even spoke of a "crisis of management of household waste in Abidjan", declared failures of service providers and ranked "the informal private pre-collectors ... to be more effective and appreciated by the households in their actions". The situation did not change generally, when Abidjan's city cleaning system was supplemented by 256 new vessels in April 2018.

Chances for implementation

That does not mean that there are no chances for the implementation of recycling projects – especially under foreign help. The Electronic Waste Project of the Ivorian charity Enter Mesad – set up 2014 by European mobile gi-

ant Orange – was started to run the country's first mobile phone recycling collection center. Suppliers were paid for delivering the mobile tech waste, that was sorted, repackaged and sent to France for recycling. Another example is the e-waste disposal campaign launched in 2015 by communication technology firm Ericsson and communication services enterprise MTN Ivory Coast. Supported by the Ministry of the Environment, it aimed to drive the awareness and collection of electronic waste, to open a public collection station and finally to transport the collected e-waste to a recycling partner to South Africa. And a new branch of waste treatment at Ivory Coast might be really successful. The country is the world's top cocoa producer with around two million metric tons of cocoa annually and 26 million metric tons of pods left or burned. So, a biomass power station has lately been planned for 60 to 70-megawatt capacity. Although Ivory Coast is rich in the reliable power supply and delivers power to its neighbor states, the rising domestic consumption makes additional capacities necessary. The U.S. Agency for Trade and Development wants to substitute the feasibility studies for the plant.

Outlook: optimistic

It seemed that in 2017 the government took off the gloves to activate waste management. The Agence Nationale de gestion des déchets (short: Anaged) was founded as a

subdivision of the Ministry of Environment to serve a comprehensive waste collection and infrastructure program. Anaged's general manager Sarrahn Ouattara prefigured, that the government would adopt the solution of recycling problems, seek private partners from abroad and call for bids in 2018 and 2019. But to this day nothing mentionable happened. Currently, there is no additional privately financed waste treatment project in sight. According to consulting agency Germany Trade & Invest, innovations in Ivory Coast's waste disposal sector might result from internationally acting producers of consumer goods in the country, or smaller local recycling companies specialized on waste disposal complying with international standards. Optionally an incentive could result from the National Development Plan 2016-2020, valued at 60 billion US-Dollars and funded by 40 percent from the public and 60 percent from the private sector. This is why – as the online-magazine Africanews titled – "Ivory Coast seeks top investment destination status for West Africa". Ivory Coast is considered as "one of the best bets in Africa" with a diverse sector for investment. And this should radiate in the waste sector too. Not for nothing does the Center for Investment Promotion of Ivory Coast offer the following investment projects as "very profitable": construction materials, plastic recycling units for the production of packaging, paper and cardboard recycling units, paper production units based on cellulosic waste, and units for recycling of cullet, hollow glass and molded glass.

Indorama Ventures Expands PET Recycling Capabilities

Indorama Ventures Public Company Limited, a global chemical producer headquartered in Thailand, has announced that it has entered into an agreement to acquire Sorepla Industrie S.A., a plastics recycling facility in France.

According to the information, Sorepla Industrie is one of the largest recyclers in Europe. The facility consists of three production lines: Recycled Polyethylene Terephthalate (rPET), Recycled High-Density Polyethylene (rHDPE) and food-grade Pellets, with a combined capacity of 52,000 tons per year. "Regardless of the fluctuations in the quality of post-consumer feedstock, Sorepla can offer consistently high quality recycled PET material that meets customers' specific needs in packaging and fibers," the new owner is convinced.

This acquisition would be strategically in line with Indorama Ventures' objectives of long-term sustainability, the Thai company said. The addition of Sorepla would further solidify its position "as one of the leaders in recycling in Europe and opens up new opportunities to serve increasing demand for food-grade rPET". While the

company has a recycling presence in France through its subsidiary, Wellman France Recyclage in Verdun, "the acquisition of Sorepla gives the company additional capabilities to deliver food-grade rPET to serve increasing

demand among major brand owners for more sustainable packaging solutions". Due to Sorepla's proximity, synergies of management and supply chain are expected to benefit the businesses.



rPET resin is widely used for food and beverage packaging as well as fiber applications in Europe. The demand for food-grade rPET in Western Europe is expected to grow at a compound annual growth rate (CAGR) of seven percent from 2018-2021; currently, it is outstripping supply. "A growing emphasis on sustainability and circular economy objectives among packaging and consumer product manufacturers is expected to be amongst the key factors driving market growth," the Thai chemical producer. "Recycled PET is well-known to be hygienic and is approved for food-contact applications in most countries around the world."

Seychelles:

The Islands Aim High Regarding their Waste

Blue lagoons, palm trees and offshore companies: They determined the image of the Seychelles. A few years ago, another central item came into focus: The rising level of prosperity created rising amounts of waste that flooded the local landfill. The archipelago in the Indian Ocean comprising 115 islands had – and has yet – to find solutions.

In January 2007, the Seychelles Government and the European Union signed an agreement for a total of 4,680,000 Euros, provided for activities aimed at increasing the country's capacity for waste disposal. Principal secretary for Foreign Affairs, Seychelles' ambassador Claude Morel then commented: "Along the way, while our economy grew and more jobs were created, the government has ensured that its environment was taken care of. Today, the reputation of our environment status internationally speaks for itself."

Relating to recycling ten years later it could be said: "Not yet!" According to the Seychelles News Agency in August 2017, the 93,000 inhabitants of the archipelago generate about 48,000 tons of waste per year of which 90 percent end up in landfills. Students of ETH Zurich and UniSey even investigated that in 2014 alone more than 75,000 tons of waste was generated on Mahé, the biggest Seychelles island, and dumped in the Providence landfill. They found out, that the waste had almost doubled in the past decade, is still on the rise and will – by business as usual and without intervention – need seven to ten additional landfills by 2040.

Lack of Cohesive Management

The official waste management policy follows international treaties like Basel and Stockholm Convention, adopted an Environment Protection Act in 1995 and the 2003–2010 Solid Waste Master Plan for the Seychelles, approved the 2012–2020 Seychelles Sustainable Development Strategy and the 2014–2018 Solid Waste Management Policy and passed the 2016–2020 Strategic Plan of the Landscape & Waste Management Agency (LWMA). Therefore, the legal and policy framework ultimately allows and prevents waste infrastructure implementations. But as the comprehensive case study of the ETH Zurich in 2016 criticized among others, in practice the contracts between the governmental institutions sometimes overlap, often fail to define the specific tasks and lack to ensure that all objectives are fulfilled. Another paper of ETH Zurich in 2017 gives account of various cases where implementations were severely delayed or even forgotten mostly because they did not lay specific, tangible actions with liable people responsible for management or enforcement. There is a lot of financial support for Seychelles' waste treatment. The Consolidated Fund provides 11,314,000 Euro, the Waste Manage-

ment Trust Fund finances partly the levy system for PET bottles and aluminum cans, the Environment Trust Fund has an annual budget of approximately 340,000 Euro, the Providence II landfill was paid for by the European Development Fund, the landfills Amitié on Praslin and L'Union on La Digue were grant-aided by the Praslin Development fund until 2010, more than 1.1 million Euro is generated annually from waste collection, and there are some more financial, legal, and technical solutions to improve waste management in the Seychelles.

Mostly transferred to controlled landfills

But still the archipelago's municipal waste is collected primarily from communal bin sites, compacted in specialized trucks and transferred to controlled landfills. All of the Seychelles landfills are owned by the government, except that Amitié and L'Union have been taken over by LWMA in 2012 and Providence, the landfill on Mahé island, operated by the government-contracted company STAR since 1996. Most of the major waste fractions are landfilled: Incentives or mechanisms to find alternatives are missed. STAR, for instance, is paid a flat fee per month instead, without the need or even motivation to separate more waste or divert it from landfilling. So, the company only cares for PET bottles, aluminum cans and large scrap metal.

Urgent need to become involved

The recycling businesses in the Seychelles had to fight against high costs of transportation, high overheads, limited public sorting corporation, limited operating space, lacking basic resources, lack of infrastructure, lack of sensitization of local communities, canceled government subsidies and a poor marketing of finished products. In a comprehensive status report of the local non-governmental organization Sustainability for Seychelles and others, Elke Talma and Michele Martin already in 2013 noticed "an urgent need for civil society organizations and the private sector to become more actively involved in helping Seychelles reduce the amount of waste going to landfill". Their survey with 22 representatives of waste management organizations revealed that three-quarter of the interviewed companies were operating actively; 41 percent of them made a profit – mainly waste exporters and the redeem centers, the latter subsidized by the government. Most organizations were engaged in PET bottles, glass, scrap metal and waste oil, followed by metal cans, electronic waste and batteries. In total, Talma and Martin estimated 300 smaller operators that were engaged in the commercial recycling, processing and exporting sector. But the ETH Zurich study balanced: "The small economies of scale prevent waste businesses from generating revenues to overcome operation and investment costs."

Initiatives are on the way

Despite many obstacles, progress was made. In 2014, Surya Enterprises exported 2,000 tons of scrap metal along with 60 to 100 tons of used car batteries annually. In summer 2015, the youth-led not-for-profit organization SIDS Youth Aims Hub inaugurated a Seychelles free

from plastic bags campaign. In 2017 Donald Ernesta ran the local DE-Recycling company: Depending on informal collections, it is crushing huge volumes of aluminum cans and exports them by cargo containers. Seychelles Breweries were involved in the recycling of glass by refunding returned bottles and turning the glass waste – 125 tons of bottles per year – into building material. In absence of an implemented national plan for e-waste, S4S in September 2017 partnered with telecommunication and phones companies to drive the e-waste collection on its own. In October 2017, the redeem centers of Harini company collected and shredded three million PET bottles and aluminum cans and exported them to China. At the first of July 2017, the Cabinet of Ministers of Seychelles reacted to a major solid waste management problem and brought two regulations regarding the ban of plastic bags, plastic utensils and polystyrene boxes in force. In March 2018 a governmental plan was published of investing 500,000 US-Dollar in an industrial crusher for organic waste entering the landfill at Providence to sort, crush and compost the material to be used in landscaping and others.

To strengthen recycling programs

Meanwhile, the Seychelles government seems to have realized the importance and relevance of adequate waste treatment. In its budget for the fiscal year 2017, the Minister of Finance, Trade and Economic Planning offered to "focus on the implementation of an integrated waste management strategy aim at diverting waste from the landfill through recycling". He also wanted "to strengthen its recycling programs for PET, beverage cans, scrap metal, old car batteries, tires and used oil and work on an initiative to recycle glass bottles". And he promised to allocate 107 million Euro in 2017 to the LWMA, responsible for the management of waste and overall landscape development and management of Seychelles, "to allow them to discharge their function". The next budget for the fiscal year 2018 referred to cleaning and landscaping, waste collection for municipal and commercial waste and landfill management on La Digue, connected with an 740,000 Euro increase "to cater for these services" and the expectation of "a number of contractors to participate actively in the tender process". Hence, it might come true, what Elke Talma and Michele Martin predicted in 2013: "With the right Government support, there is definitely a future in waste management."

Furthermore, the political progress offers possibilities for domestic as well as for foreign provider. Consequently, the Seychelles Investment Board subsumes solid waste management, recycling and design and packaging (with emphasis on environmental sustainability) under "local investment areas". And the financial resource needs for water, sanitation and waste management to implement the Seychelles Sustainable Development Strategy 2012-2020 Strategy are estimated at 179.5 million US-Dollar. And the Strategy paper clarified: "Whilst infrastructure investments in utilities can be prohibitively costly, integrated approaches such as using waste-to-energy technologies are likely to become more common."

New York City's Struggle Against Waste

In April this year, the New York City Department of Sanitation (DSNY) released its “2017 NYC Residential, School, and NYCHA Waste Characterization Study” – according to the information, the latest look at what New Yorkers put in their trash, recycling, and organic bins.

The major finding of the study, conducted over spring, summer and fall in 2017: New Yorkers “are producing less waste at home than ever before”. More than two-thirds (68 percent) of the citizens’ waste belongs in a curbside organic or recycling bin. Organics – including food scraps, food-soiled paper, and yard waste – are the largest and still growing category of waste. The city’s inhabitants are best at recycling cardboard and most often forget to recycle aluminum. However, cartons and aseptic boxes, including milk and juice cartons, are the most commonly misplaced recyclable items. Another result of the study: After New York State had “implemented an electronic waste disposal ban”, the amount of e-waste has declined by 60 percent.

“The study is first and foremost a reflection of what we buy and choose to get rid of,” New York’s Sanitation Commissioner Kathryn Garcia was quoted. “More specifically, this study tells us that our efforts to reduce, reuse and recycle our waste are working. The average New York City household throws away less and recycles more today than five years ago.” The Department conducted similar studies in 2005 and 2013.

As reported, the current study delivered data on each segment of the waste, as “some 800 samples were hand sorted by the study team into 70 main sort-categories and an additional 172 sub-categories to get a detailed understanding of the variety of plastic and paper products in the waste stream”. Furthermore, the analysis provided context behind the observed changes. “For example, in 2005 the average New Yorker recycled more than 100 pounds of newspaper. In 2017, this total was less than 20 pounds – reflecting the changing way we receive news,” the Department stated. “Also, as product manufacturers have modified their packaging, the study shows marked changes in certain types of recyclables including



more rigid plastic containers and less glass containers.”

Goal: Zero waste to landfill by 2030

The more than eight million residents of New York City generate over six million tons of waste every year. As reported, every week the average New Yorker throws away 15 pounds (6.8 kilograms) of waste and another nine pounds (four kilograms) in commercial establishments. There are no local landfills – the Fresh Kills landfill on Staten Island was closed in 2001. At that, New York “came to rely on a system of private transfer stations throughout the city. With an average truck able to carry about ten tons of waste, that 13,000 tons of daily trash that had once been sent to Fresh Kills became close to half a million truck trips to these private transfer stations,” the homepage “Getting to Zero” gave account. “From there, loads were combined in tractor-trailers that could carry twenty tons each and then trucked hundreds of miles to landfills as far away as Kentucky and South Carolina”. This meant increased pollution in areas where transfer stations clustered.

The goal to eliminate waste sent to landfills by the year 2030 was articulated in the Mayor de Blasio’s “OneNYC: The Plan for a Strong and Just City”. According to the New York

City Department of Sanitation, it has made great progress in achieving this aim. As reported, the organics collection program has grown to be the largest in the nation. As of June 2017, more than 1.6 million residents city-wide were enrolled in organics collection service, up from about 717,000 at the end of 2016. “We are on track to serve all New Yorkers by the end of 2018 with either curbside service or convenient neighborhood drop-off sites,” Kathryn Garcia wrote in the 2017 progress report regarding the strategic plan of 2016.

The city’s solid waste management plan is the blueprint for a “long-term, sustainable, and equitable” approach to managing the residential waste, the reader can learn in the 2017 progress report. The plan includes the conversion of four marine transfer stations, the opening of four land-based rail transfer stations, the final closure of Fresh Kills landfill, and a commitment to limiting the impact of waste management infrastructure on neighborhoods.

C40 Cities Climate Leadership Group, Inc., a network of the world’s megacities committed to addressing climate change, underlined the “combination of waste reduction, reuse and recycling programs, and wastewater treatment plants with anaerobic digestion that harness food scraps to create energy”. New York City would “render landfills a thing of the past”. In doing so, 2.56 million metric tons of CO₂ would be reduced by 2050, the non-profit organization, created and led by cities, is convinced. Apart from that, there are further benefits with regard to environmental, social, economic and health aspects. According to C40, eliminating the transportation of waste to landfills will save the city more than 310 million US-Dollar a year and decrease air pollution, to name but two.

- ➔ www1.nyc.gov/assets/dsny/
- ➔ www.c40.org/

Hindalco to Acquire Aleris

India-based Hindalco's wholly owned subsidiary Novelis Inc. – one of the world's leaders in aluminum rolling and recycling – intends to purchase Aleris Corporation, a global aluminium rolled products provider headquartered in the USA, for 2.58 billion US-Dollar in a debt finance deal.

According to Kumar Mangalam Birla, Chairman of Hindalco, the Novelis acquisition more than a decade ago made Hindalco a global multinational. The acquisition of Aleris would be the next phase of its growth strategy. "This will solidify our position as the world's no.1 aluminum value-added products player," he was quoted. "Post this acquisition, we are well placed to serve our customers across geographies in automotive, and now the high-end aerospace segments."

Hindalco Industries Limited is the metals flagship company of the Aditya Birla Group, a multinational conglomerate based in Mumbai, India. Since its six billion US-Dollar acquisition of Novelis in August 2007, Novelis has further invested two billion US-Dollar in the business over the last decade. The focus has been on building an early mover position in the automotive markets, creating differentiation through its sustainable operating model of recycling and deepening its commitment to future growth mar-

kets in South America and Asia. At a market segment level, the acquisition of Aleris will enrich the portfolio with the fast-growing automotive segment and entry into the high-end technology-driven aerospace segment, Hindalco informed. Moreover, access to the continuous-cast capabilities would enhance Hindalco's competitive position in the Building and Construction (B&C) segment. "From a footprint perspective, Aleris has a wide base of manufacturing locations. This not only deepens the combined entity's presence in developed markets like the US and Europe, but it also positions Novelis well in the emerging markets of Asia." Aleris had invested approximately 900 million US-Dollar in the last few years in the automotive and aerospace businesses. "The ramp-up of these capacities in the near-term will significantly bolster Novelis' growth across regions and market segments. As a result, Novelis will have a further diversified business portfolio across regions, segments and customers." As reported by

Novelis Inc., the company will acquire Aleris' 13 manufacturing facilities across North America, Asia and Europe. Aleris' new automotive finishing lines in Lewisport (Kentucky, USA) along with the auto capacity in Duffel (Belgium) would allow Novelis to further diversify its global footprint and customer base. "In addition, Aleris' Zhenjiang facility is strategically located near Novelis' existing Changzhou plant, adding value through logistical efficiencies, closed-loop recycling, and providing greater opportunity for customer collaboration."

The acquisition is subject to customary closing conditions and regulatory approvals. It is expected to close in nine to 15 months. Until the closing, the companies will continue to operate as separate entities. Following the closing, the two companies will integrate Aleris into Novelis, which will remain headquartered in Atlanta.

➡ www.hindalco.com

➡ www.novelis.com, www.aleris.com

USA: Tetra Tech Reports Record Revenue

US-based global provider of consulting and engineering services Tetra Tech, Inc. has announced results for the third quarter ended on July 1, 2018.

For the period from April to June, Tetra Tech achieved revenue of 765 million US-Dollar, up 12 percent year-over-year. For ongoing¹⁾ operations, revenue totaled 761 million US-Dollar, and the revenue – net of subcontractor costs²⁾ (net revenue) – was 569 million US-Dollar. As reported, operating income for the third quarter was 55 million US-Dollar and on an ongoing basis totaled 60 million US-Dollar, up 26 percent year-over-year.

Nine-Month Results

Revenue for the nine-month period was 2.2 billion US-Dollar and net revenue was 1.6 billion US-Dollar, both up ten percent compared to the same period in fiscal 2017. Operating income for the nine-month period was 147 million US-Dollar.

Tetra Tech provides technical solutions to its clients and supports global commercial and government clients focused on water, environment (including waste management), infrastructure, resource management, energy, and international development. According to the company, Tetra Tech cooperates with more than 17,000 associates worldwide.

➡ www.tetrattech.com

1) Measures presented for ongoing operations are non-GAAP (GAAP: generally accepted accounting principles in the United States) financial measures.

2) Tetra Tech's revenue includes a significant amount of subcontractor costs and, therefore, the Company believes revenue, net of subcontractor costs, which is a non-GAAP financial measure, provides a valuable perspective on its business results.



Lead Recycling: Substantial Investment Is Needed

Lead has one of the highest recycling rates in the world and is also the most recycled of commonly used metals. According to the International Lead Association, the recycling rate in Europe and the USA reached 99 percent. But not so in Africa, Asia and Latin America: The Blacksmith Institute ranked the unsound recycling of lead-acid in these regions as the world's worst polluting industry in 2012. What has to be done?

On a global scale, around 85 percent of all lead is used for the manufacturing of batteries. In Africa, these batteries are used in the mobile sector, but also for power supply and solar power storage. So every year 1.23 million tons of used lead-acid batteries and 800,000 tons of lead are waiting here for recycling, according to a study published by the Lead Recycling Africa Project. As the paper describes, in a first step a large number of small workshops buy used batteries in order to replace the sulfuric acid and to recondition or repair the object by exchanging damaged electrodes. Further on, local scrap dealers will sell the batteries to traders. As these buyers demand dry products, the scrap dealers often pour the acid – in combination with dissolved and dispersed lead – away or even out into the environment.

85 percent could potentially be recycled

In most small or industrial secondary lead smelters the lead-acid batteries cases are manually cracked and the scrap stored. During the process of informal recycling, acid and lead dust are leaking, and the stored scrap is afterwards exposed to rainfall and wind. Losses are suffered by heating and smelting the lead by an open fire. However, small informal lead-smelting is declining, as it can only process the elementary lead but not the lead-oxide from the battery, the Lead Recycling Africa Project gives

account. Industrial secondary smelters apply furnaces fired by charcoal or oil, resulting in molten lead with some contaminants and lead-containing dust. The battery cases, mostly made out of plastic, are washed – only once in an open water bath that cannot fully remove lead-oxide contaminants – shredded and sold. As a consequence, the plastics for later use are cross-contaminated. The final lead bars leaving the industrial smelters do not meet the standardized level of purity and end usually in European or Asian lead refineries.

According to the International Lead Association, it is estimated that worldwide at least 85 percent of lead consumed could potentially be recycled. "However, in practice, the amount that is recovered is lower." UNEP (UN Environment) and International Resource Panel acknowledge that lead together with ruthenium and niobium is the only metal with a recycled content higher than 50 percent. Its end-of-life recycling rate ranges from 52 to 95 percent – on condition of easily recoverable applications, large amounts and high present value.

Tremendous losses

But the life-cycle of lead is characterized by tremendous losses. In 2011, Perry Gottesfeld und Christopher R. Cherry investigated life cycle loss rates of solar photovoltaic en-

ergy systems from mining, battery production, and recycling. They estimated the loss of 33 percent in China and 22 percent in India and figured worldwide losses to the environment adding up to 2.4 million tons or one-third of the global lead production. So they underlined that “investments in environmental controls in lead smelting, battery manufacturing, and recycling industries along with improvements in battery take-back policies should complement deployment of solar PV systems to mitigate negative impacts of lead pollution”. Furthermore, they pleaded for simultaneous investment in environmental controls and product stewardship that could at best reduce losses by 47 percent in China and 44 percent in India.

Beijing researchers Jing Liang and Jian-su Mao published a paper in 2014 showing that for every kilogram of lead consumed 0.48 kg lead is lost into the environment. The emissions in 2010 were estimated to be “mainly from use (39.20 percent) and waste management and recycling (33.13 percent)”. And a recently published, comprehensive study on “soil contamination from lead battery manufacturing and recycling” comes to the conclusion, that “many lead battery recycling plants around the world have been recognized as sources of airborne lead emissions that have resulted in lead contamination of soil and dust” – not to mention their impact on surface and groundwater sources. Especially in Africa, the sampling of 118 recycling facilities detected arithmetic mean lead concentrations of 2,600 milligram/kilogram on the outside of plants and 57,700 milligram/kilogram on the inside of plants. All samples taken outside exceeded the residential soil hazard levels determined by the U.S. Environmental Protection Agency, 42 percent of the samples taken inside exceeded the specified values, and nearly all of the samples collected inside (93 percent) transcended the Agency’s criteria for industrial sites.

Measures against airborne lead level

Admittedly, this study regards mostly to very small lead (although licensed) battery recycling facilities in Cameroon, Ghana, Kenya, Mozambique, Nigeria, Tanzania, and Tunisia. Their annual processing capacity has merely a fraction of regulated plants in China and range below the capacities needed to run an economically feasible plant. But even in these facilities, little modifications are possible, Dr. Faridah Hussein Were, a University of Nairobi lecturer, reported 2015 by the example of a large-scale battery recycling plant in Kenya the conditions before and results after his research. The huge open-air stockpile of end-of-life batteries had significantly been reduced and taken to a bunker. The closing of the rotary furnace after charging reduced the airborne lead level from 195 $\mu\text{g}/\text{m}^3$ to 105 $\mu\text{g}/\text{m}^3$. The upgrading of the open vessel containing lead fumes diminished it from 176 $\mu\text{g}/\text{m}^3$ to 98 $\mu\text{g}/\text{m}^3$. And by alloying of lead into billions, the partially closing lessened the emission from 168 $\mu\text{g}/\text{m}^3$ to a level of 123 $\mu\text{g}/\text{m}^3$. If no measures are taken, the lack of furnace emission controls in a small scale plant can result in fumes during the lead reduction, while dismantling, reconditioning and dismantling residues will increase the airborne lead level and pollute the composite soil.

Lack of adequate infrastructure

Consequently, Dr. Faridah Hussein Were recommended a “comprehensive regulatory framework for lead-acid battery recycling operations”. At that time, the NGO Occupational Knowledge International couldn’t inspire great hope that this would happen locally or even worldwide. According to the organization, “China, India and some other countries already have general laws requiring lead battery manufacturers to take back used batteries for recycling. However, these are largely ineffective because they do not provide financial incentives and do not impose penalties for noncompliance.” With the exception of the United States, where lead battery recycling facilities got subjects to the strictest national emission standards of any country. But in 2014, the United States Environment Protection Agency still stated: “Metals industrial processing is one of the largest sources of lead emissions.”

Meanwhile, things might have changed. The Status Report on Recycling Rates of Metals, released by UNEP and the International Resource Panel in 2011, was able to declare: “Most of the nonferrous metals are widely enough used and often sufficiently valuable, that their recycling and reuse is reasonably high. This is especially true for lead, which is mostly used in large vehicles, and industrial batteries that are returned and subsequently recycled in commercially and industrially linked recycling.” That may be correct for several developed countries but does not apply to all facilities worldwide. Not without reason the United Nations Environment Assembly (UNEA) 2016 adopted a resolution noting “the lack of adequate infrastructure needed to recycle the rapidly growing number of waste lead-acid batteries” and “the need to further reduce releases, emissions and exposures”. And in December 2017, UNEP additionally decided to call for accelerated action and strengthened partnerships in “eliminating exposure to lead paint and promoting environmentally sound management of used lead-acid batteries”.

Investment to make improvement

The Lead Recycling Africa Project gets more precise in formulating effective measures against unsound lead-acid battery recycling in Central Africa and beyond. The list of request demands – amongst others – the development of collection and take-back schemes based on the principle of extended producer responsibility, stringent standards and requirements implemented by governments as well as by regulatory bodies, assurances of the lead-consuming industries to source from facilities and supply chains with best available recycling and processing technologies, not to forget a transfer of know-how and technologies to developing countries and emerging economies. The “Soil Contamination”-Study postulates: “Few countries in Africa have industry-specific regulations governing the operations and emissions from lead battery recycling. There is an immediate need to establish such regulation to prevent ongoing emissions and the resulting soil contamination.” And Dr. Faridah Hussein Were reduces the necessities to the brief denominator: “Substantial investment is needed to make improvement in the (recycling) industry.”

E-Waste: Collection and Shredding Alone Are Insufficient

Why is e-waste recyclate quality still being overlooked, and what is the answer to best practice?

The recycling of e-waste is dominating the waste industry's headlines at present, not least because updated legislation is continually coming into force. But there is more to e-waste (or WEEE) recycling progress than recovery rates alone. Marcus Brew, managing director of WEEE shredding specialist UNTHA UK, urges the industry to pay more attention to recyclate quality too.

E-waste is not a newly-regulated market. In Europe, for example, legislation has existed since the early 2000s to drive recovery progress, encourage producers to play their part, and to clamp down on illegal trade. Directive amendments have since stepped things up even further, primarily because the mounting "throwaway mindset" that modern society seems to exhibit, is adding extra pressure to an already challenging area of the waste arena.

In fact, because e-waste is one of the fastest growing waste streams in the world, it will probably be decades before the law begins to stand still. It has to adapt to reflect the growing variety of electrical equipment now available in the market for instance, which probably explains the need to recognize Open Scope rules. But the legislation will undoubtedly also become tighter over time if countries continually fail to reach the recovery targets set. The UK is just one of many culprits.

Given the movability of this legislative landscape, it is perhaps understandable why recovery rates dominate



Marcus Brew

industry headlines. But there is more to understand e-scrap management than collection compliance alone.

It is important to consider what happens to recovered e-waste too.

It is crucial to ensure the ethical and professional handling of this inherently hazardous material stream by a specialist operator, for example. Globally, the illegal export of e-waste has been reported as a significant industry problem over the years, and the reason for this is probably two-fold. Firstly, many people simply do not know how to deal with this complex waste stream. So, in the face of targets they cannot meet, they ship the materials overseas so that they are someone else's problem. Other people readily acknowledge the level of high-value precious metals that are locked away within e-waste, which leads to the second reason for illegal trade – people want to access, salvage and sell the gold, silver and palladium.

However, these catalysts for unscrupulous e-waste handling can have catastrophic consequences. If e-scrap is not managed by a competent, licensed facility, there is a risk that many of the inherently hazardous substances within e-waste could end up in the general waste stream. If water courses became contaminated, for example, this would put surrounding communities at significant risk. There

have also been reports of children in developing countries manually handling these waste streams, which exposes them to these harmful contaminants.

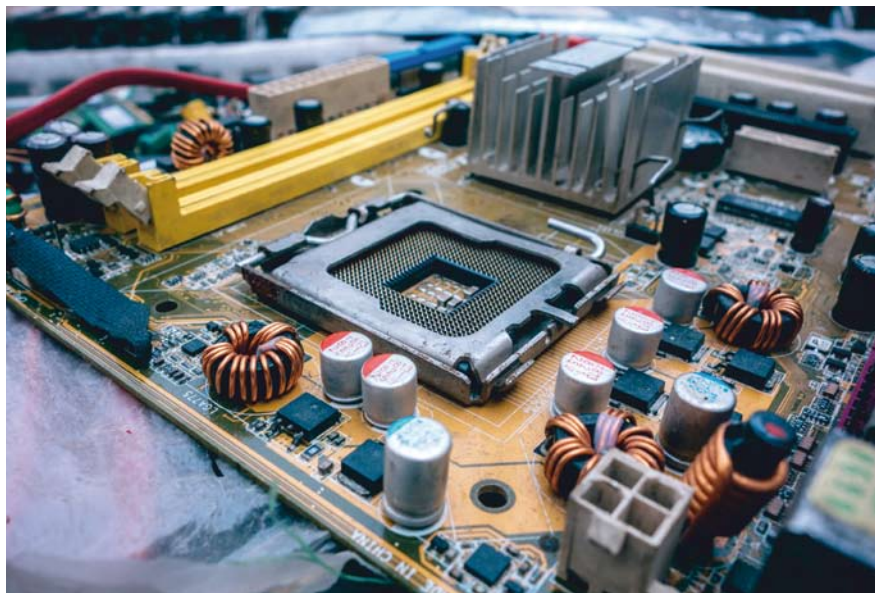
Best practice

Assuming e-waste passes through a compliant supply chain, it is then important to think about the best-practice methodologies that should be executed to ensure the maximum environmental gain. In many cases, seemingly outdated e-waste can be refurbished for re-use, providing it is stored correctly prior to being handled – being left outdoors in a cage and exposed to the elements will only lead to quality deterioration. The equipment may be unwanted but still in perfect working order or suitable for resale following a safety inspection and repair.

Beyond that, maximum recyclate recovery rates should be the priority. An effective material liberation strategy should, therefore, be devised, so that the valuable commodities such as gold and copper can be extracted, segregated and re-inserted into the supply chain.

The manual breakdown of equipment, by trained professionals, is often the preferred methodology. This approach is admittedly labour- and time-intensive, however, the high-





value nature of the materials inside means that this is usually a worthwhile exercise.

When it is not commercially viable to manually strip back the e-waste or gain access to all the component parts, a shredding operation can be designed to release these valuable recyclates. Some e-waste operators have traditionally opted for a hammer-mill machine, which works by smashing aggregate material into smaller pieces using repeated impact blows. However, such equipment is typically high speed, which can create a significant

amount of dust. Not only is this dust useless and costly, but it can also pose a fire or operator wellbeing risk. Hammer mills also cannot usually achieve the particle refinement required for downstream separation technologies to effectively do their recycling job.

A four-shaft shredder with a screen, on the other hand, will systematically break the e-waste down to ensure the production of a homogeneous fraction. Ideally, the technology should be high torque and slow speed, for reduced dust, low wear, increased up-time and added efficiency.

For an extremely sophisticated turn-key solution, the operator should also consider the integration of an over-band magnet to help extract ferrous metals, an eddy current separator (ECS) to separate out any non-ferrous metals, and an optical sorter to finally clean anything that the ECS has not already refined.

More comprehensive e-waste handling systems naturally represent more of an upfront investment. However, if driven by commercial factors, it is important to think about the likely payback and not just about the upfront price tag of the system. The revenue yield will soon cover the initial capital outlay. After that, everything is largely profit.

Then there is the “green” agenda to consider. E-waste is a staggeringly worrying problem on a global scale, and if its creation cannot be reduced at source, greater effort needs to be exerted to better manage it. E-waste can no longer be disregarded as someone else’s problem. The more that valuable “waste” materials locked within this “scrap” can be salvaged and re-inserted into new manufacturing processes, the greater the world’s resource security in an era of often dwindling raw materials.

New Ash and Metal Recycling Plant in Denmark

In March this year, Danish company Meldgaard has opened its newest facility for the recycling of incineration ash and heavy metal processing in Kolding, Denmark.

According to the information, the plant is the “newest of its kind in the world” and consolidates the company, which is processing more than 1.2 million tons of waste-to-energy ash per year from operations in Europe and the USA, as an international leader in waste-to-energy ash recycling within the circular economy. As reported, the Kolding plant provides “state of the art cutting edge solutions to handle ever-growing international requirements”.

Municipal and industrial waste includes a large array of metals like steel, iron and expensive metals such as copper, brass, silver, gold and aluminum, to name but a few. The plant



Photo: Meldgaard

realizes a complete ash recycling circle for all materials, Meldgaard assured. All metals would be sorted and sent to the smelters for recycling. The resulting ash aggregate “is then sold for use in construction and road projects where it can replace virgin mate-

rials such as sand and sub-base. This leads to cost reduction in the construction projects as well as reduces the burden on extraction of natural raw materials.”

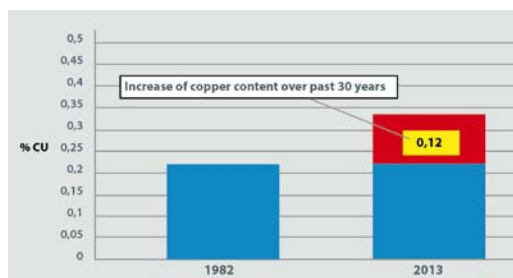
➔ www.meldgaard.com

Analyzing Shredded Scrap with Sicon's EcoScan Online

Shredded scrap is widely common input material in the steel making process. Generally, shredded scrap is of a homogenous quality in terms of physical characteristics as well as chemical composition.

Steel plants can optimize loading intervals and reduce tap-to-tap times by using shredded scrap which results in a better production performance while reducing specific energy consumption. Additionally, advantages include decreased consumption of "consumables" such as electrodes, refractory material and calcium oxide. Basically, using shredded scrap in steel production is highly beneficial; nevertheless, many steel plants are still not fully exploiting these advantages. Why is that?

In reality, shredded scrap has acquired a somewhat poor reputation. One example is the continuous increase of copper content in shredded scrap over the past 30 years:



Shredded scrap copper content increase (Sicon 2014)

In theory, a shredder liberates material by means of size-reduction and densifies the material stream for further downstream separation of non-ferrous metals by means of magnetic separation. In reality, however, this principle only works partially, as demonstrated in the following graphics:



Shredded scrap with visible copper contamination

What are the reasons behind these visible copper contamination missed by magnetic separators?

Most of the current shredding plants in operation today are literally based solely on separation technology from the past century. Certainly the non-ferrous metal content has been significantly increased in a shredder's feedstock as a result to rise in discarded electronic devices. Admittedly, with constant separation efficiency the copper content in shredded scrap will increase inevitably. Without changes to existing shredding processes there will be no end to this trend. With copper being only one of numerous non-ferrous metals contained within the shredder feedstock, the total contamination level of shredded scrap with non-ferrous metals is significantly higher. As a result, shredded scrap is used in steel production with highest caution, but especially in long steel production the copper content is often a limiting factor in the production process.

To complicate things further, shredded scrap quality is often determined by chance. Only a few shredder operators know the analytical composition of their produced shredded scrap. Moreover, the same applies to the purchasing steel plants, which often use shredded scrap in their worst-case-scenarios in order to avoid producing a shortfall batch. Ironically, in times of technological revolution and inflationary digitalization, the processes in place for steel making seem rather outdated.

Introducing the EcoScan Online, Sicon brings a compact and cost-efficient online-based analyzer to the market which can easily be integrated and retro-fit to existing operations. Production-relevant data is being analyzed and evaluated in real-time, including chemical composition and density. Based on collected data, the end user is able to pull average values for current day or month production; specific data for each batch can

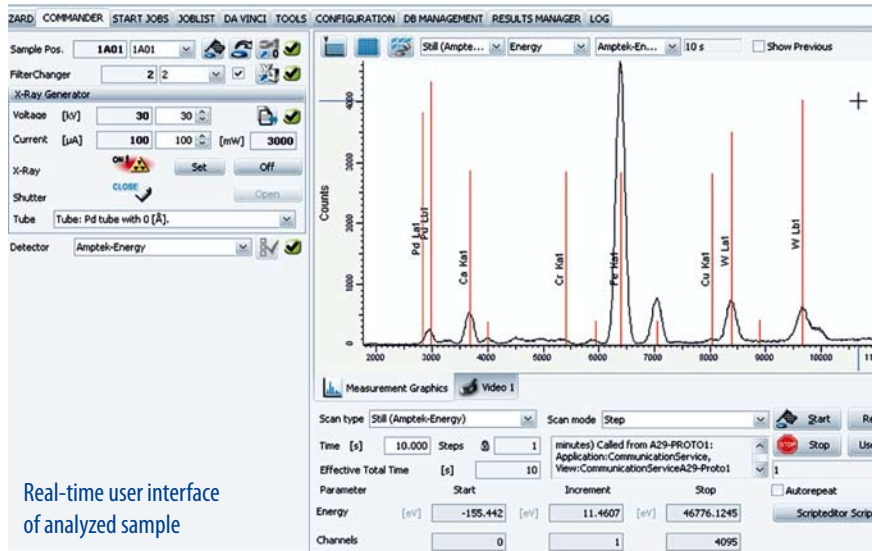
be pulled easily from the collected data stream. With increased data-collection, long-term trends can be determined based on feedstock and production material.



Sicon EcoScan Online

Based on fluorescent -technology, the EcoScan Online is built with the latest generation of XRF multi-element sorter technology, which has been previously field-tested and proven in numerous handheld analyzing units. Designed and built as an online unit, the EcoScan Online delivers quantitative data in real-time and highest accuracy.

The EcoScan Online unit is completely integrated into the shredder process and transmits data to a control display at the evaluation unit. Deviations from pre-set parameters set off an alarm. With the alarm in place, the shredder discharge conveyor automatically changes its position and piles the produced shredded scrap onto another compartment. The shredder operator and shredder loader are included in the "communication chain" as well. With increasing deviations of copper content, a warning signal lights up in the operator cabin indicating that infeed material has to be selected accordingly. The measure to balance out high copper content by changing feed material into the shredder is common practice, however, innovative is that now you have reliable parameter-based indicators instead of relying solely on a "feeling". The complete production transparency of quality-control encourages



minimization of copper content in the shredded scrap. In monetary terms, the graphic above demonstrates the lost value (non-realized market profits from copper sales) from shredded scrap due to contained copper (in annual production capacities in tons).

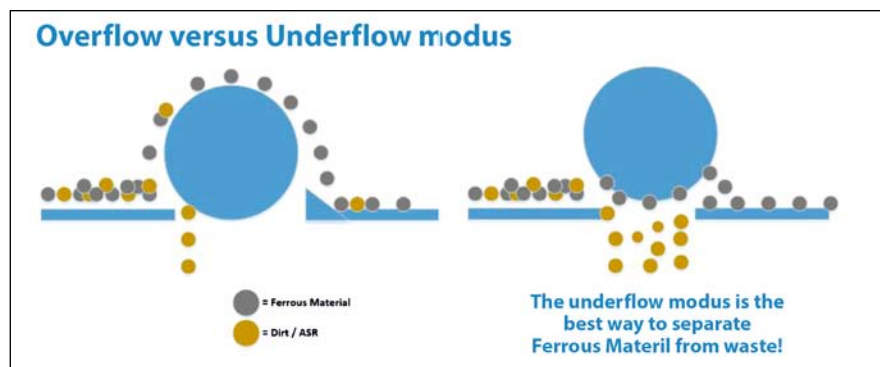
The reduction of copper content also has economical value. The goal of each shredder operator, as demanded by the market, should be a shredded scrap with a copper content below 0.2 percent. Unrealistic? Today's shredder operations have the following core flaws:

- 1) Use of electromagnets in overflow mode
- 2) Manual sorting of ferrous material flow

Both are outdated practices that, when optimized, allow the shredder operation to access additional

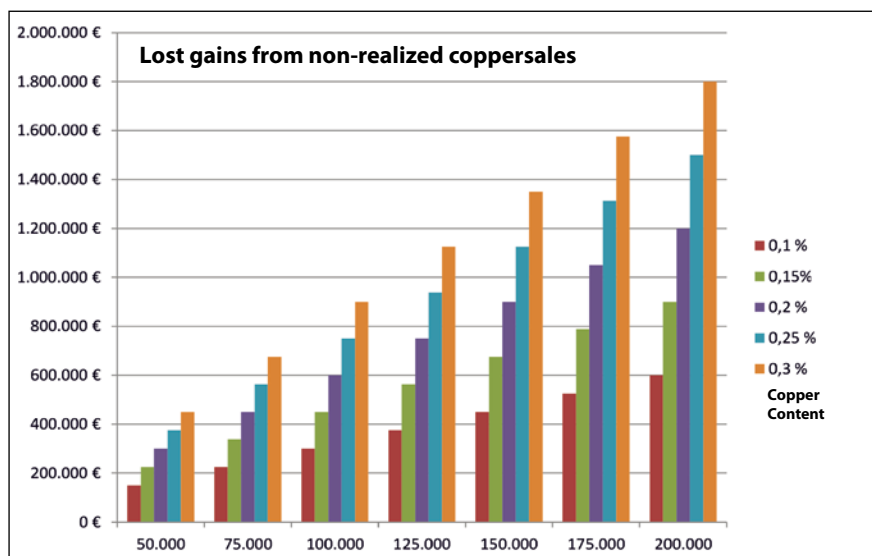
value. Following optimizations can be made:

- 1) Use of permanent magnets in underflow mode for a significantly better cleaning result of shredded scrap.



Comparison of magnetic separation in underflow and overflow mode

- 2) Integration of a PrimeScrap; the PrimeScrap is a combination of ballistic and eccentric magnet separator in one machine. The PrimeScrap



Lost gains from non-realized copper sales in annual production (metric tons)

allows splitting the shredded material flow into a copper-free fraction (about 70-80 percent of material flow) and produces a concentrated copper-rich material fraction (20-30 percent of the material flow). The handpicking station is now only processing 20-30 percent of the original material flow and is able to generate a much better and cleaner fraction.

- 3) Exchanging handpicking stations with sensor-based metal separators

Optimizations within the ferrous downstream can be made to any shredder operation. Outstanding shredded scrap quality is not a privilege of new shredding plants.

The collected data from the EcoScan Online can further be used to establish a custom-tailored preventative maintenance plan or can be used for additional optimization of the shred-

der control automatization. In times of industry 4.0 such gadgets will become established industry standard sooner or later.

No doubt, shredder operations will remain one of the most important aggregates within the scrap treatment. With new technology available to the industry to improve shredded scrap quality, shredded scrap becomes of increased interest to the steel producers improving shredder operators' positions in the market. A transparent and improved quality is beneficial to both, shredded scrap producers and its consumers.

➔ www.sicon.eu

Source: Sicon GmbH

Photos/Graphic: Sicon GmbH

Aluminium briquettes achieve up to seven per cent more yield than loose chips

Aluminium Cycle: Machining, Briquetting, Melting

High quality briquetting systems increase efficiency and yield.

Aluminum's recycling cycle begins and ends in melting plants. In between, this light metal is machined in many different industrial operations of diverse branches and ideally is then pressed into a compact briquette using a briquetting system from German provider RUF. But where exactly are chips produced and why does briquetting usually make economic sense?

Aluminum chips are produced throughout the entire product creation process: during the surface treatment of cast bolts and rolling ingots, during profile, plate and sheet production as well as the machining of components. Depending on whether they are produced by milling, turning, grinding or sawing: The chips, which are often wet, vary in form and properties such as wool-like, spiral, rough and fine. What they all have in common is: They will be remelted, whether in a remelter or a refiner. This phase describes both: the end and the new beginning of the eternal Aluminum-Recycling-Cycle.

Within this cycle, four branches, above all, are concerned with the importance of handling aluminum chips: rolling mills, stamping/pressing plants, machining companies and melting works.

But what are the key considerations in detail? Loose chips have a large volume at low weight; so they display low bulk weight, typically lying between 140 to 250 kilograms/cubic meter (kg/m^3). This effects significant costs for storage as well as transport, both internally and externally.

In order to react against this, the chips must be pressed. This is where the applied technology is of high importance. RUF's machines can compress to a level of 2,200 to 2,400 kg/m^3 (and in individual cases, these figures may be exceeded) when required. As a comparison: The density of solid aluminum lies, on average, at 2,700 kg/m^3 .



RUF Maschinenbau delivers tailor-made briquetting solutions for all areas of application – rolling mills, extruders, machining companies as well as remelters resp. refiners

Briquetting in rolling mills

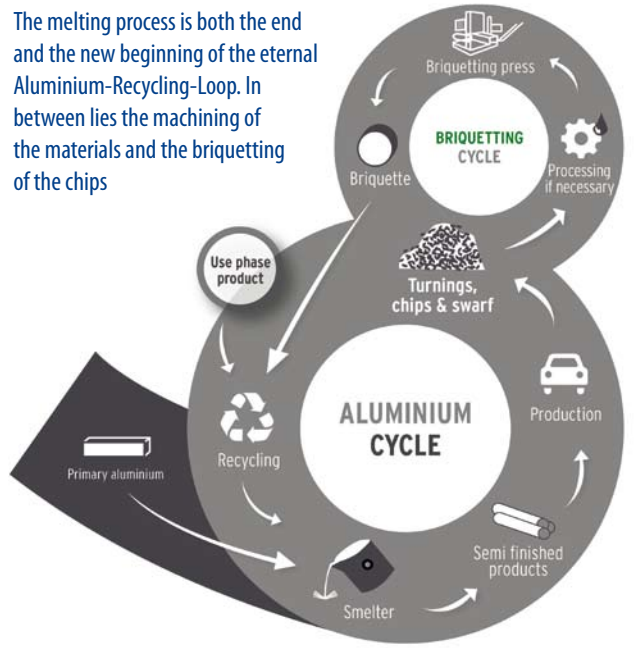
Chips are created in rolling mills through the milling off of the casting surface. So-called edge trimming shavings are also created during the machining of sheets, coils or foils. Briquetting applies for either form. When the company has an affiliated melting works, the pressed aluminum will be conveyed directly there (highest added value). Otherwise, they will be stored and sold on the scrap market. On account of the high density, when compared to loose chips, storage and transport costs are reduced by the use of briquettes. Furthermore, briquettes achieve higher sales revenue because they are better suited to the melting process.

Briquetting in pressing plants

Pressing plants are producing chips primarily through reprofiling and sawing of casted round bolts as well as finished extruded sections. As very few of these types of companies are affiliated with melting works, storage and transport costs are extra significant. Another factor above all in achieving higher sales revenues is that stamping/pressing plants dispose of single origin chips with a clearly defined composition. This means they can be used as alloying additions during the melting process, which is very much in demand in the melting plants as it means they have to purchase less, very expensive, alloying elements and aggregates.

Briquetting in machining companies

Machining companies are to be found in many branches like e.g. in the automobile industry, aerospace and mechanical engineering. Handling chips is daily business for these companies, and it has the association of a "waste product" of machining. The advantages of briquetting regarding storage and transport costs also exist here, just like the optimization of sales revenues, because of the volume reduction of the chips after briquetting by a factor of between six and twenty. Furthermore, there is another important factor in this area of application: the recovery of cooling lubricants, emulsions or oil. RUF's systems are equipped with an integrated catchment device for fluids. This ensures that the storage area remains clean, which is very much in alignment with orderly production process-



es and environmental protection in practice. It is possible to reduce personnel costs and increase work safety levels when the machine works automatically, and only the conveyance of chips or briquettes requires service personnel.

Briquetting with remelters and refiners

Remelters and refiners are smelters, which are differentiated by e.g. the products they manufacture. Remelters mostly produce wrought alloys as wire, bolts and rolling ingots. Refiners produce casting alloys in the form of ingots. Both utilize chips, amongst others. The difference between using loose chips or briquetted aluminum for remelting is, in both cases, significant. Because under the effect of flames, the light material burns-off very quickly instead of melting. And as the linkage between surface area and density is particularly big with chips, a lot of material is lost through this burn-off. Moreover, the large exposed aluminum surface area of the chips implies a high tendency to oxide formation. This leads to further losses in the melting furnace in the form of dross. A further problem factor in the melting of aluminum: When the liquid metal comes into direct contact with other liquids such as cooling lubricants, an almost explosive reaction takes place. Therefore, the factor of residual moisture is important.

Adapted briquetting technology from RUF

Whether rolling mill, pressing plant, machining company or smelters: What is decisive is always using a needs-based, high-quality briquetting system. RUF has an appropriately large range of systems with customized automation and further accessories. Moreover, the numerous users of RUF systems confirm the high level of robustness, reduced maintenance costs as well as reliable service. This means return of invest is achieved often within one or two years.

As a leading innovator, the Bavarian company invests regularly in the optimization of its systems and cooperates with research institutions and universities. Furthermore, RUF works intensively together with their customers. RUF offers companies the opportunity to test the briquetting of their own chips in in-house test systems and/or they rent them briquetting machines. This is a basis for RUF engineers to optimize system solutions for individual cases, and it is a way of introducing new areas of application.

➔ www.brikettieren.de

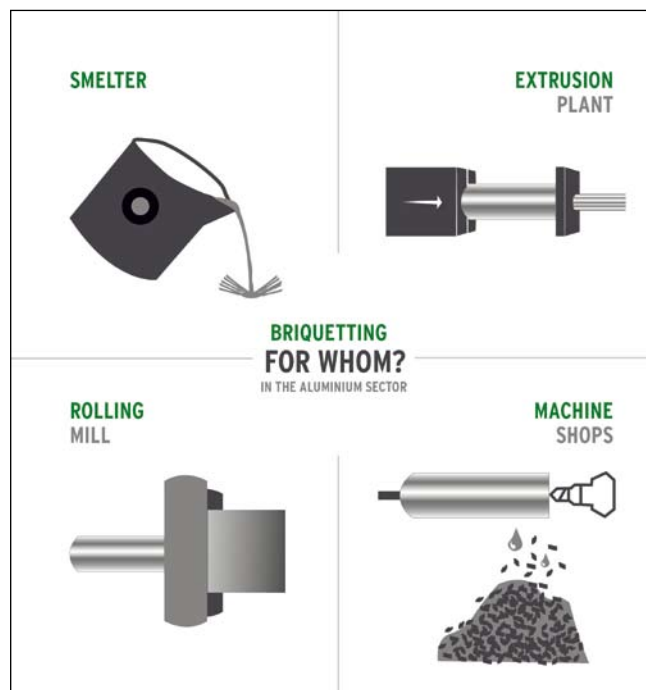
Loose chips often have a moisture content of 20 percent and more. If they are not briquetted, the chips must go through a centrifuge and further drying systems in order to remove the residual moisture. In contrast, briquetting is significantly more economically effective, especially when high-quality systems are used. An appropriately high pressing power reduces the moisture content down to between three and five percent. If the briquettes are subsequently stored in a dry place, this reduces to values fewer than two percent. And the briquettes can be safely and efficiently melted.

Smelters' requirements

Because of burn-off and oxidation, loose chips cannot be used in some melting furnaces – or only after very cost-intensive treatment. The melting process of loose chips in a rotary drum furnace requires the addition of salt. The inherent problem here is: The leftover salt slag has to be disposed of or undergo re-treatment, which is very expensive. Hearth type melting furnaces can also be equipped with so-called Vortex-installations, which can be operated with electromagnetic or mechanical pumps. This leads to the chips being stirred into the molten mass. This functions pretty well, but it requires a lot of effort. And apart from the purchase costs, the installation needs space and regular maintenance, and there are also extra personnel and operating costs involved, particularly due to the high wear factor.

Two to seven percent more yield from the melting process

Independent of which furnace technology is implemented, the melting process functions at its best with highly compressed briquettes. What is decisive is the density of the briquettes, which lies between 2,200 and 2,400 kg/



Four application branches in particular benefit from numerous benefits when aluminium chips are briquetted: melting works, stamping/pressing plants, rolling mills and machining companies

m³. The density of liquid aluminum is, on average, around 2.350 kg/m³, depending on the alloy. Therefore, the briquettes hardly float at all, which means burn-off and oxide formation are reduced to the minimum. This is the reason why refiners generally report a yield at least two percent higher. Some have confirmed five to seven percent more metal yield.

Authors:

Christian Hamers, freelance technical consultant at RUF and Andreas Jessberger, Head of Sales, Ruf Maschinenbau GmbH & Co. KG

Metso Enters the Indian Market

Finland-based technology provider Metso has signed a non-exclusive agency agreement with Seepra Recycling Group for the India market area.

The agreement covers the whole of India with responsibility for the sales of Metso's waste recycling equipment – fine-, mobile- and pre-shredders. According to the Finnish company, strengthening the partner network allows it to establish new relationships and provide more of its solutions and services to the customers. "We increase our coverage and get important market insights through best-in-class agencies and distributors," Lars Laursen, Metso's general sales manager for waste recycling in the Asia Pacific region, is cited.

As reported, the Indian Seepra Recycling Group has a strong knowledge of Metso's waste recycling equipment and business as well as the local markets. All after sales activities will continue to be governed by Metso. Its local service network for minerals processing customers will complement the waste recycling services. According to Metso, its global waste recycling community has close to 30 official distributors and agencies.

"Developing the distribution community is one of the strategic focus areas within the waste recycling business, and Metso is constantly looking for new, best-in-class partners," the machinery and plant manufacturer underlined.

➔ www.metso.com

➔ www.indiamart.com/seepra-recycling-group

Finnish-Danish Partnership Regarding Waste Container Sensors

Finnish company Enevo partners with Rubaek & Co to sell Enevo's sensors and solutions in Denmark.

"Rubaek works with over 8,000 customers in the Danish market and offers a tailor-made waste management solution from installation to consulting for their customers," the company underlined. Rubaek, which belongs to the San Sac Group, will carry Enevo's smart waste container sensors and proprietary analytics and software as part of their portfolio. Enevo was founded in 2010 and works with their customers to transform the financial, environmental and social impact of waste. "By collecting and analyzing data from refuse containers across the world, Enevo is able to help create efficiencies in and provide insights around waste collection and recycling," the information on the homepage says.

SmartWASTE project

Enevo has implemented the "SmartWASTE" project (duration until May 2019), which has received funding from the European Union's Horizon 2020 research and innovation program. As reported, it is addressing some significant EU-wide challenges within the waste industry by transforming waste collection into a demand-based model. The objective of the project is to scale-up and "expand the service into new European regions by piloting the solution with potential customers in large-scale projects".

"The key problem in waste collection today is the use of static routes and schedules: Truck drivers are driving 'blindly' from bin to bin and collecting containers that can be either half empty or overfilled. This adds up to a large amount of unnecessary costs, such as operational time, fuel consumption and greenhouse gas emissions," the Finnish company gave account. "Globally, over 400 million waste containers are being served by millions of trucks every day, and 50 percent of the value in the market is in the logistics." Enevo would aim to capitalize on this business opportunity and become the number one supply chain platform for waste and recycling operations worldwide.

➔ www.enevo.com



Photo: Andi Karg

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Paper Pulp Solution – Made by Tiger Depack

With “Tiger Depack HS 20 PPS – Paper Pulp Solution” the Italian company Cesaro Mac Import introduces a new machine, created to optimize the paper mill pulp cycle, into the market – Ecomondo 6-9 November, Pad A1 Stand 135 (Italy, Rimini) and MIAC 10-12 October, Booth 25B (Italy, Lucca).

Paper for Recycling is a vital raw material for the production of new paper. In Europe and across the world, usage rates are very high thanks to millions of tons made available through a separate waste collection. During the production process of new paper, the secondary raw material is dissolved in water to separate paper pulp and unwanted components (for instance inks and plastic), which up until now were subsequently managed as waste with extremely steep disposal cost and significant economic losses of raw materials still aggregated to the rejects. The presence of cellulose percentages in more or less significant quantities has often made its disposal at a landfill or incinerator complicated: Reducing its volume using presses has decreased its weight but it has not remedied the problem of the presence of organic material, which – aside from other things – is a source of profit for the paper mill.

To solve this problem, Cesaro Mac Import – the owner of the Tiger Depack brand – has developed the “Tiger Depack HS 20 PPS – Paper Pulp Solution”. This machine exploits a patented system of centrifugal separation that manages to reduce the quantity of waste material and recover all the paper paste still in the pulp. The Tiger Depack technology is devised to separate packaging from the contents in order to obtain matrices that can be re-used in the primary manufacturing cycles as part of a rising focus on the part of fabrication cycles and industries on integrating secondary matrices within them and resulting in less and less waste and refuse.



Photos: Cesaro Mac Import

As emphasized by the provider, Tiger Depack is a flexible machine which uses a patented centrifugal separation system which enables a seamless usage in multiple fields:

- in industrial plants to optimize production waste,
- in the management of organic waste from separate waste collection to separate plastic materials from organic waste
- and in the management of waste from production cycles such as pulp in order to reduce the quantity of the latter and recover raw materials from it.

“The Tiger Depack PPS system was designed and adapted for the production of paper with truly outstanding results,” Cesaro Mac Import underlines. The machine is particularly well suited for use in medium-sized paper mills that mainly use recycled paper in their manufacture cycles, and therefore with high amount of “waste pulp” to handle. The characteristics of this waste (plastic and organic materials) may vary depending on the type of paper manufactured and on the quality as well as on the type of secondary material at the input. Cesaro Mac Import will assess this waste in order to adapt the hourly production rate of the “Tiger Depack HS 20 PPS” and the quality of the matrices at the output.

material, consisting of water and paper pulp, the Italian company points out. In addition, the “Tiger Depack HS 20 PPS” would reduce the weight of the material to be sent to the landfill to just 30 percent at the input.

Furthermore, the machine is designed to be integrated into existing systems, that applies to existing safety systems as well. “It is an all-in-one machinery and thanks to its compact size (just 21 square meters of occupied floor space) it does not require specific preparations before being installed, as all it needs is a water and an electrical connection to be up and running,” the provider assures. According to Cesaro Mac Import, Tiger Depack “can be included in both indoor and outdoor settings, and the machine is designed to operate both in a manual and in an automatic cycle with 24-hour productivity. The machine can be powered using automatic traveling crane systems or using wheeled loaders, and it is equipped with the most sophisticated safety and control systems, including remotely.”

Cesaro Mac Import – the Italian manufacturer and exporter of Tiger Depack across the world – follows all after-sales activities, guaranteeing support and an efficient system of scheduled servicing worldwide.



The machine is able to recover up to 70 percent in weight of re-usable ma-

➔ www.tigerdepack.com/en/company/hs20-pps-en.html

Waste & Recycling Expo Canada

October, 24 – 25, 2018, Toronto (Canada)

According to the organizers, the Canadian Waste & Recycling Expo and the Municipal Equipment Expo will attract more than 3,000 attendees and nearly 300 exhibiting companies. The two-day event will take place at the Enercare Centre in downtown Toronto. As

announced, the 9th Annual Canadian Waste to Resource Conference will be held also in Toronto (Beanfield Centre) – beginning on Tuesday, October 23th, 2018 with the opening gala reception. More than 275 special guests, speakers and participants are expected to

join in. Plenary sessions take place on Wednesday, October 24th, and Thursday, October 25th, 2018.

➔ <https://waste-recycling-expo-canada.us.messefrankfurt.com/canada/en.html>

Pollutec 2018

November, 27 – 30, 2018, Lyon (France)

40 years have passed by since the first Pollutec took place. In the course of years, the trade show has established its name, and as always, the focus will be on equipment, technologies and services for the environment and energy. Pollutec's event manager answered questions from GLOBAL RECYCLING to explain what else the trade show has in store for its visitors.

Which exhibition areas will cover which topics during the Pollutec 2018?

Pollutec 2018 covers 14 exhibition areas: Water resource management; network management; collection, cleaning and cleansing; waste treatment; recycling, reuse and materials; sites and soils; instrumentation, metrology and analysis; air, odor and noise management; risk prevention and management; energy production and storage; energy efficiency of products and processes; urban planning and mobility; biodiversity and natural environments; and support, training, research on various pavilions and institutional booths. New this year, a special operation is dedicated to plastic management. The idea is to display the actions of different actors (public, private, or civil society) regarding the future of plastics, the question of packaging, the restrained uses that have to be developed, and the circular practices in the industry.

According to the program, the fair offers several presentations which will focus on topics such as sustainability or waste recycling. Which one of them would you like to point out especially?

As far as presentations and talks are concerned, visitors already have a large choice between key topics in the fields of biogas, energy, waste, water, air quality, risk management any many more. This year, the emphasis will be put on the circular economy in its real meaning, i.e. a set of practices designed to preserve natural resources and use them more efficiently while avoiding waste. Presenting goods and services with a low environmental and energy impact along with solutions for reuse or recycling and new materials recovered from waste, Pollutec has been contributing to the goal of a circular economy for many years. This year, we go even further: We organize the first international meeting dedicated to the circular economy in cities and regions.

Furthermore, we organize the first international summit for cities and regions committed to the circular economy together with Grand Lyon metropolis. Lastly, I would also like to point out that an official lecture on the theme: "Towards a circular economy of Plastics" is proposed by Ademe. This event will unveil the last actions carried out to meet this industrial challenge, thus encouraging plastics companies to use virgin materials rather than recycled ones.

Since 2002 the trade show announces a so-called "Country of the Year". This year the decision was made in favor of Burkina Faso. For which reasons did you decide for this country?

Burkina Faso has experienced high levels of growth over the last two years

(+5.9 percent in 2016 and +6.4 percent in 2017). Its cities are growing fast, including Bobo Dioulasso (+11 percent a year) and the capital Ouagadougou (+7.2 percent a year), and have to deal with the resulting problems: pollution, transport and healthcare. In this context, over 1.7 million people have recently benefited from the Urban Water Sector Project conducted with the World Bank. This year the Ministry of Environment, Green Economy and Climate Change of Burkina Faso is involved to bring together public and private players to meet international environment key players by the end of November in Lyon. They are now organized in five focus group: Water management, waste management, energy, sustainable cities and sustainable agriculture.

Which reasons would you name to justify the country's importance for the recycling sector?

The economy is heavily reliant on agriculture – it is Africa's leading exporter of cotton, for example. Therefore, they are looking to develop new activities to valorize the by-products of cotton, but shea as well. Regarding cities, they have to deal with growing waste collection and treatment needs. The metropole of Lyon worked with the capital Ouagadougou and other french bodies to improve the waste management. Now the Ouagadougou city focuses to improve sorting waste and face new challenges like the recycling of PV panels, which are common goods in Burkina-Faso.

➔ www.pollutec.com

European Food & Beverage Plastic Packaging Summit

February, 27 – 28, 2019, Rotterdam (The Netherlands)

This year, the focus will be on the industry's increasing challenge for innovation toward a sustainable future, the organizers announced. The summit will deliver a look at the best strategies for sustainable packaging including recycling and packaging performance, with a stronger focus on the brands and retailers, who will share

their thoughts and information on consumer experience and demands for the next generation of packaging.

Furthermore, the conference will also explore the European Commission's Circular Economy Package and its impact on the dynamics of the entire supply chain. "This includes the latest

developments from the Waste Framework and Packaging directive, as well as the Single-Use Plastics Directive, and the new challenges presented by these," the information says.

➔ www.wplgroup.com/aci/event/sustainable-packaging-conference-europe/

International Automobile Recycling Congress 2019

March, 20 – 22, 2019, Vienna (Austria)

The 19th International Automobile Recycling Congress (IARC 2019), organized by Switzerland-based ICM AG, will be held from March 20 – 22, 2019 in Vienna, Austria.

According to the organizers, more than 250 delegates from industry, authorities and academia will discuss and present news and challenges of

the manufacturing and end-of-life vehicle (ELV) business. "The Congress will bring together the various links in the ELV recycling chain such as car manufacturers, metal and plastic scrap traders, recycler, shredder operators and policy-makers from all over the world," ICM underlined. An exhibition area is integrated into the conference facilities, where vendors

can meet their clients. The conference will also offer workshops and plant tours. Furthermore, cocktail receptions and a networking dinner create an atmosphere to get in touch with business partners, colleagues and competitors, the organizer assured.

➔ www.icm.ch/iarc-2019

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