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GLOBAL RECYCLING

*The Magazine for
Business Opportunities
& International Markets*



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Brigitte Weber
Editor-in-Chief

Recycling: Future Prospects Are still Good

Unfortunately, since the coronavirus has spread over the world, the global epidemic damages the economy. The economic fallout could include recessions in the USA, Europe and Japan as well as the slowest growth in the People's Republic of China, the financial, software, data, and media company Bloomberg L.P. said, referring to four scenarios developed by Bloomberg Economics. Low inventories and disrupted supply chains would restrict production capacity. The International Monetary Fund and the World Bank Group have announced billions of US-Dollar in immediate support to assist countries in coping with the health and economic impacts of the pandemic; governments around the world are reacting as well.

Some of the financing should also be preventive, Martien van Nieuwkoop from World Bank underlined in an article regarding healthy food systems for a safer world. In this way, one could tackle some of the root causes of emerging infectious diseases: the uncontrolled risk of pathogen transmission from animals to humans. "Simply put, animal health, people's health and planetary health are interconnected and food systems provide an array of drivers for the emergence of diseases."

Recycling is a partial solution to this problem. The sector not only prevents waste and provides (secondary) raw materials for production, but also saves emissions and helps to limit climate change. Simultaneously, through separate waste collection and appropriate treatment, pollutants from household waste can be extracted, so that harmful substances do not get into products. Especially in the European Union environment protection and recycling is a big issue. Therefore, also the Bureau of International Recycling (BIR), the global federation of recycling industries, welcomes the EU's support for recyclers as laid out in their new Circular Economy Action Plan. It "will deliver clean material loops, increase recycling capacity and get secondary raw materials to market, BIR members should be encouraged of a healthy future up to and beyond 2050 on a climate-neutral continent," the world recycling association is convinced. The possibility of financial support through EU funds to build up high quality and high volume recycling value chains in the EU is also very welcome.

To help achieve the Sustainable Development Goals – and also to boost the Circular Economy – new funds are established, which aim to facilitate investments. The situation is described from page 3 to 11. Additional topics are India's sewage treatment policy (page 28), Russia's plans to intensify recycling (page 36) and a national framework in the USA (page 39), to name but a few.

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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INVESTMENTS IN THE ENVIRONMENT

Sustainable investing is becoming increasingly important around the world, as shown by a few examples.

At this year's World Economic Forum in Davos, a coalition of private and public sector organizations (including United Nations entities, non-governmental organizations and a private equity firm) have announced the launch of SDG500 – a new investment platform to help achieve the Sustainable Development Goals (SDGs).

According to the information published at the annual meeting in Davos, the goal is to mobilize 500 million US-Dollar toward achieving the SDGs in emerging markets across individual funds. The platform would offer exposure to six different underlying funds, which are or will be managed by Bamboo Capital Partners. "The funds will use debt and equity to invest at Seed, Series A and Series B stages in hundreds of businesses in emerging and frontier markets," a press release said. "SDG500 aims to address the 'missing middle' financing gap that affects entrepreneurs in these markets, where growth is constrained by a lack of access to follow-on financing." The


financing gap to achieve the SDGs in developing countries is estimated to be 2.5 trillion US-Dollar per year.

The target of the funds of SDG500 will be businesses in the agriculture, finance, energy, education and health-care sectors across Africa, Asia, Latin America and the Caribbean and Pacific regions. "There will also be a gender-lens focus and some of the funds will specifically invest in businesses that empower and provide jobs for women." The blended finance structure of SDG500's underlying funds is designed to catalyze and de-risk further funding from institutional investors to make a significant contribution to achieving the SDGs by 2030. As reported, initial sponsors of the catalytic layers of the funds of SDG500 include the European Union, the African, Caribbean and Pacific Group of States, the Governments of Luxembourg, Togo and Tunisia, CARE and the Alliance for a Green Revolution in Africa.

The underlying six funds are:

- the ABC Fund (an impact investment vehicle targeting smallholder farmers and small and medium agribusinesses in developing countries);

- BUILD (a fixed-income fund aimed at early-stage enterprises in the Least Developed Countries);
- the CARE SheTrades Fund (a gender-lens fund which will use debt and equity to invest in businesses in Asia);
- BLOC SmartAfrica and BLOC Latin America (venture capital funds targeting technology enterprises in Africa, Latin America and the Caribbean respectively); and
- HEAL (a venture capital fund investing in health-tech businesses in emerging and frontier markets).

 www.bamboocp.com

There will also be a gender-lens focus and some of the funds will specifically invest in businesses that empower and provide jobs for women."

INVESTORS WANT TO PLACE FUNDS SUSTAINABLY

According to Schrodgers, a global asset manager with 565.5 billion US-Dollar in assets under management, this year ESG (environment, social, governance) themes have been in the spotlight of the World Economic Forum in Davos, with the program covering topics such as ‘How to save the planet’. According to investment writer Emma Stevenson, the reason such concerns were on the Davos agenda becomes clear in the sight of WEF’s assessment of the top global risks for 2020 (extreme weather, climate action failure, natural disasters, biodiversity loss, human-made environmental disasters). “Environmental risks now take up the whole top five global risks in terms of likelihood. This demonstrates how issues such as climate change have become increasingly pressing in recent years,” she stated. WEF’s list of risks would chime in with Schrodgers’ findings that environmental factors are becoming increasingly important to investors.

The Schrodgers Global Investor Study 2019, for example, found that 24 percent of respondents felt climate change is having, or will have, a significant impact on their investments, with a further 39 percent expecting it to have some impact. In this study, conducted in April 2019, Schrodgers commissioned an independent online survey of more than 25,000 people who invest from 32 locations around the globe. In this research, “people” were defined as those who will be investing at least 10,000 Euro (or the equivalent) in the next 12 months and who have made changes to their investments within the last 10 years.


Some results of the study regarding sustainability:

- 57 percent will always consider sustainability factors when selecting an investment product, rising to 66 percent of people in Asia.

- 61 percent of people believe all investment funds should consider sustainability factors, not just those specifically designed as “sustainable investment funds”.
- Almost two-thirds of people (60 percent) believe their individual investment choices can make a difference in building a more sustainable world.
- 61 percent of generation X (38-50 years old) will always consider sustainability factors when selecting an investment product, compared to 59 percent of millennials (18-37 years old). Similarly, generation X were the most likely to feel that their investments could have a direct impact in contributing to a more sustainable world (64 percent) followed by mil-

lennials (60 percent) and then baby boomers (57 percent).

- Whilst all the UN sustainability development goals were important to people, protecting the planet from degradation was seen as the most critical, and 87 percent of people believe that climate change would impact their investments.
- Despite the interest in sustainable investments, people still ranked financial priorities above it in importance when considering their investments – with avoiding losing money the most important, followed by meeting return expectations.


 www.schrodgers.com/en/insights/global-investor-study/2019-findings/sustainability/

BLACKROCK JOINS CLIMATE ACTION 100+

In January this year, the US-headquartered multinational investment management corporation BlackRock has become the latest signatory to Climate Action 100+, a global investor engagement initiative “to ensure the world’s largest corporate greenhouse gas emitters take necessary action on climate change”.

With the addition of BlackRock – which is classified as the world’s largest asset manager with more than 6.8 trillion US-Dollar in assets under management – Climate Action 100+ continues to grow in size and influence, the initiative gave account. “BlackRock joins more than 370 global investors already participating in the initiative.” The addition of funds it manages would bring total assets under management represented by investors participating in Climate Action 100+ to more than 41 trillion US-Dollar.

“BlackRock is one of the largest and most influential asset managers in the world and will bring even more heft to investor engagement through Climate Action 100+,” Emily Chew, current Climate Action 100+ Steering Committee Chair and Global Head of ESG Research and Integration at Manulife Investment Management, is quoted.

 www.climateaction100.org

FIRST INVESTMENTS TARGETED IN ASIA BY EARLY 2020

In December last year, New York-based investment management firm Circulate Capital has announced the first close of the 106 million US-Dollar “Circulate Capital Ocean Fund (CCOF)”, which was launched in Singapore.

As reported, the company is dedicated to incubating and financing enterprises and infrastructure that prevent ocean plastic in South and Southeast Asia. “The fund is dedicated to address Asia’s plastic crisis and is also one of the ten largest ASEAN-based Venture Capital Funds in the market,” Circulate Capital emphasized. CCOF’s founding investors include PepsiCo, Procter & Gamble, Dow, Danone, Unilever, The Coca-Cola Company and Chevron Phillips Chemical Company LLC. With 60 percent of ocean plastic originating from the region, Asia is the biggest

source of plastic leakage into global oceans, a press release said. “To address the financing gap between available private capital and the resources needed by Asia’s waste industry systems, CCOF will provide both debt and equity financing to waste management, recycling and circular economy start-ups and SMEs in South and Southeast Asia, focused on preventing plastic pollution and advancing the circular economy.” By its own account, Circulate Capital has identified more than 200 potential investment opportunities across a range of industries in the region, with its first investments targeted by early 2020.

Circulate Capital’s investment model seeks to mobilize institutional investors by blending concessionary funds with investment capital, the



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firm assured. Its objective would be to demonstrate that investments in turning waste into value can ultimately provide attractive financial returns.

www.circulatecapital.com

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THE GLOBAL ENVIRONMENT FACILITY

It was almost 30 years ago that a special fund to preserve the environment was founded. The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit. Through its strategic investments, the GEF works with partners to tackle the planet's biggest environmental issues.

The GEF is a partnership of 18 agencies – including United Nations agencies, multilateral development banks, national entities and international NGOs – working with 183 countries to address the world's most challenging environmental issues, the website www.unenvironment.org informs. “The GEF has a large network of civil society organizations, works closely with the private sector around the world, and receives continuous inputs from an independent evaluation office and a world-class scientific panel.”

Additionally, it is also a financial mechanism for five major international

environmental conventions:

- the Minamata Convention on Mercury,
- the Stockholm Convention on Persistent Organic Pollutants (POPs),
- the United Nations Convention on Biological Diversity (UNCBD),
- the United Nations Convention to Combat Desertification (UNCCD) and
- the United Nations Framework Convention on Climate Change (UNFCCC).

According to the United Nations Environment Programme, GEF is also an innovator and catalyst that supports multi-stakeholder alliances to preserve threatened ecosystems on land and in the oceans, build greener cities, boost food security and promote clean energy for a more prosperous, climate-resilient world – leveraging 5.2 US-Dollar in additional financing for every 1 US-Dollar invested. The GEF funds are available to developing countries and countries with economies in transition to meet the objectives of the interna-

tional environmental conventions and agreements.

Furthermore, the Global Environment Facility is a member of the Platform for Accelerating the Circular Economy (<https://pacecircular.org>). PACE is a public-private collaboration platform and project accelerator for the circular economy. It currently focuses on four thematic areas with high ecological footprints: Plastics, Electronics & Capital Equipment, Food & Agriculture, and Textiles & Fashion. The platform hosts projects that generate learning used by leaders for further decision making and investments. At the start of 2020, the PACE community consisted of 75 public, private and civic executive leaders and over 200 members championing 18 tangible projects across the globe. The community is supported by the PACE Hub, a team hosted by the World Resources Institute in The Hague.

www.thegef.org

BLACKROCK GLOBAL FUND CIRCULAR ECONOMY

Assets under management in dedicated environmental, social and governance (ESG) funds have tripled in the past decade to a little under one trillion US-Dollar, the investment management corporation BlackRock stated in its “Davos brief”, referring to estimates of the International Monetary Fund (IMF). “Yet we see a far bigger structural shift afoot – akin to the multi-decade impact of the post-war ‘baby boom’.” Therefore, BlackRock would make “an increased commitment to integrate sustainability across its technology platform, risk management and investment strategies”. According to the information, it is – inter alia – building sustainable portfolios,

improving access to sustainable investing, particularly for indexes, and intensifying engagement between investors, companies and regulators.

In October last year started a new BlackRock Global Fund (BGF) Circular Economy with 20 million US-Dollar of seed capital. End of January, it was worth several millions more and spread over 43 companies, including Adidas, Mondi, Nestle, Tomra, Veolia Environnement – to name but a few. The BGF Circular Economy aims to provide a return on the financial means deployed by the investors through a combination of capital growth and income on the fund's assets. As reported,

the fund invests globally at least 80 percent of its total assets in the equity securities (i.e. shares) of companies that benefit from, or contribute to, the advancement of the circular economy. The fund would aim to invest in line with the principles of the Circular Economy as determined by the Investment Adviser (IA), BlackRock assured. It would not invest in companies that are classified in the following sectors: coal and consumables; oil and gas exploration and production; and integrated oil and gas.

www.blackrock.com/ch/individual/en/products/310165/blackrock-circular-economy-fund

CAPITAL TO REDUCE PLASTIC POLLUTION

In April last year, the American multinational investment bank Morgan Stanley informed, that a new report from the Morgan Stanley Institute for Sustainable Investing would highlight the groundswell of interest in the nascent field of integrating the changing plastics economy into investment decisions. “Both institutional and individual investors are beginning to recognize that they can help bring innovations to market by connecting capital with companies, products and solutions across the plastics value chain”, the financial services company wrote. Investors were signaling greater awareness and interest in plastic pollution management as an investment consideration, Audrey Choi, the firm’s Chief Sustainability Officer and CEO of the Morgan Stanley Institute for Sustainable Investing, stated. “From private foundations to multinational companies, institutions are exploring approaches to mitigate the impact of plastic waste.”

As reported, Morgan Stanley addresses the issue through the “Plastic Waste



Photo: Hans Braxmeier / Pixabay


Resolution”, a firmwide effort to help leverage capital and other resources to reduce plastic pollution. “This multifaceted, decade-long commitment will include a variety of investment vehicles, such as a bond issued with the World Bank aimed at reducing plastic waste in the oceans and six new low-minimum portfolio strategies for retail investors who want to advance the

U.N.’s goals on ocean conservation,” the interested reader could learn.

According to Morgan Stanley, the broader category of impact investing is an increasingly mature field, offering a range of impact targets and investment options. “Green bonds and sustainability bonds are fertile areas of opportunity for investors interested in plastic-pollution mitigation,” the bank gave account. “Among both bond issuers and investors, demand for climate-friendly bonds continues to rise and, as the sector continues to evolve, we anticipate the emergence of more specific investment solutions that address plastic pollution.” On the municipal-bond front, there are opportunities for bonds linked to infrastructure development, recycling facilities or other projects that contribute to the reuse or repurposing of plastic – or to the reduction of plastic pollution from the environment. “As interest in the issue proliferates, technological innovations could also emerge – potentially in the form of new processes and facilities that make the reuse of plastic more efficient.”

LLOYDS BANKING GROUP INTENDS TO SUPPORT GREEN ECONOMY IN THE UK

In January this year, Lloyds Banking Group has announced its new ambition to accelerate working with customers, government and the market to help reduce the carbon emissions in the UK that are financed by more than 50 percent by 2030. According to the British financial services group, this is the estimated equivalent of removing the emissions produced by almost a quarter of UK homes. In 2020, Lloyds Banking Group intends to announce products and services to support and invest in greener finance for the UK. “We want to help our customers make the lifestyle changes required in their homes, vehicles and investments by creating green products and services that make it easier for them to invest in tackling climate change,” a press release said. “We will also support businesses by financing their investments in the green economy as well as helping to improve the energy efficiency of commercial buildings.”

 www.lloydsbankinggroup.com

 www.morganstanley.com

DRIVING FINANCE IN EMERGING MARKETS

At Bloomberg's Global Business Forum in September last year, a new partnership was announced between the Climate Finance Leadership Initiative (CFLI) and the Association of European Development Finance Institutions (EDFI). The goal is to advance the public-private collaboration vital to closing the climate finance gap in emerging markets. "EDFI and the CFLI will engage their members with the aim of building project pipelines, managing risks, and broadening opportunities for private-sector financing and investment in emerging and frontier markets," the business, financial information and news company Bloomberg gave account. The members of the Climate Finance Leadership Initiative include seven of the largest institutions in the world from across the investment chain, including project developers, banks, insurers, asset managers and asset owners, representing trillions of US-Dollar in financial flows. The Association of European Development Finance Institutions represents 15 bilateral development finance institutions from across Europe that jointly manage a portfolio of more than 50 billion US-Dollar of impact-oriented investments in emerging and frontier markets.

According to the information, this partnership is a response to the solutions outlined in the report "Financing the Low-Carbon Future", released from the CFLI, which offers a private-sector perspective on the actions needed to accelerate climate finance. As part of the partnership, the CFLI and EDFI would work with their members on efforts to:

- "Originate, structure and co-finance low-carbon opportunities on a deal-by-deal basis or through pooled investment vehicles;
- Explore the development of structured finance and portfolio invest-



- ment solutions to meet the needs of institutional investors and increase the availability of efficient financing for developers;
- Identify and deploy incremental risk mitigation tools, such as first loss cover available from concessional capital providers; and
 - Support policy engagement efforts on enabling environments to attract private sector capital and use joint projects wherever possible to help highlight sound policy standards."

Underpinning this partnership is a new set of CFLI-developed Investment Readiness Guidelines (Appendix

1 in the mentioned report), which will be used by the CFLI and EDFI to foster dialogue and engage outside stakeholders, such as governments and concessional capital providers, on targeted issues that advance sound policy standards. Using the Investment Readiness Guidelines, the CFLI also plans to convene policy leaders across geographies with representatives from major financial institutions to drive public sector engagement on the solutions outlined in the CFLI report. These meetings will be held throughout 2020; the purpose is to facilitate the scaling of low-carbon investment opportunities to meet the goals of the Paris Agreement. Additionally, through 2025, CFLI financial institutions collectively were prepared to facilitate the deployment of more than 20 billion US-Dollar in emerging market climate financing and investment to help realize the opportunity in the low-carbon transition, Bloomberg informed.

www.bloomberg.com/CFLI
www.data.bloomberglp.com/company/sites/55/2019/09/Financing-the-Low-Carbon-Future_CFLI-Full-Report_September-2019.pdf

Photo: edar / Pixabay

EUROPEAN CIRCULAR BIOECONOMY FUND

In December last year, the European Commission and the European Investment Bank (EIB) have announced the completion of the public procurement process for the selection of an investment advisor to set up and manage the European Circular Bioeconomy Fund (ECBF). The selected investment advisor is ECBF Management GmbH, and Hauck & Aufhäuser Fund Services S.A. will act as the Alternative Investment Fund Manager, the information said.

The new fund will provide access to finance – in the form of equity, debt or quasi-equity – for innovative circular bio-economy companies and projects of various sizes in the European Union. ECBF Management raises funds from public and private investors with a target fund volume of 250 million Euro and aimed for a first close in the first quarter of 2020.

www.ecbf.vc

AUSTRALIAN RECYCLING INVESTMENT FUND

In December last year, the Clean Energy Finance Corporation (CEFC) has welcomed the creation of the 100 million Australian Dollar fund. It “will encourage increased investment in clean energy technologies which support waste recycling, leading to lower landfill related emissions,” the press release said. Its creation “is reflected in the Australian Government Clean Energy Finance Corporation Investment Mandate Direction 2019”. The mandate would direct the CEFC to make available up to 100 Million Dollars to support recycling or recycled content projects using clean energy technologies, with a particular focus on waste plastics, paper, glass and tires. The “new fund will align with the circular economy principles established in the National Waste Policy. It will also support the agreement of the Council of

Australian Governments to ban the export of waste plastic, paper, glass and tires while building Australia’s capacity to generate high value recycled commodities and associated demand.”

The Australian Recycling Investment Fund will draw on existing CEFC finance. Projects seeking this type of financing are required to concentrate on renewable energy, energy efficiency and low emissions technologies and to contribute to emissions reduction.

Furthermore, such projects have to be commercial, “reflecting the CEFC’s requirement to deliver a positive return for taxpayers across the portfolio”. In addition to investments through the Australian Recycling Investment Fund, the CEFC would continue to invest in large-scale energy-from-waste projects.

www.cefc.com.au/where-we-invest/about-our-finance/investment-programs/australian-recycling-investment-fund/



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European Union:

FINANCING THE GREEN TRANSITION

In December last year, the European Commission proposed a Green Deal.

The European Union is committed to becoming the first climate-neutral bloc in the world by 2050. This requires significant investment from both the EU and the national public sector as well as the private sector to finance the Green Deal. According to the European Commission, the European Green Deal Investment Plan would mobilize public investment and help to unlock private funds through EU financial instruments, notably InvestEU, which would lead to at least one trillion Euro (1,000,000,000,000,000 Euro) of investments.

While all Member States, regions and sectors would need to contribute to the transition, the scale of the challenge were not the same. Some regions will be particularly affected and will undergo a profound economic and social transformation, the commission stated. The Just Transition Mechanism will provide tailored financial and practical support to help workers and generate the necessary investments in those areas.

The European Green Deal Investment Plan

The European Green Deal Investment Plan is to create an enabling framework to facilitate and stimulate the public and private investments needed for the transition to a climate-neutral, green, competitive and inclusive economy. Complementing other initiatives announced under the Green Deal, the Plan is based on three dimensions:

- **Financing:** mobilizing at least one trillion Euro of sustainable investments over the next decade. A greater share of spending on climate and environmental action from the



Photo: Alain Audet / Pixabay

EU budget than ever before will crowd in private funding, with a key role to be played by the European Investment Bank.

- **Enabling:** providing incentives to unlock and redirect public and private investment. The EU will provide tools for investors by putting sustainable capital at the heart of the financial system and will facilitate sustainable investment by public authorities, by encouraging green budgeting and procurement, and by designing ways to facilitate procedures to approve State Aid for just transition regions.
- **Practical support:** the Commission will provide support to public authorities and project promoters in planning, designing and executing sustainable projects.

The Just Transition Mechanism

The Just Transition Mechanism (JTM) is a key tool to ensure that the transition towards a climate-neutral economy happens fairly, leaving no one behind. While all regions will require funding and the European Green Deal Investment Plan caters for

that, the Mechanism provides targeted support to help mobilize at least 100 billion Euro (100,000,000,000 Euro) over the period 2021-2027 in the most affected regions, to alleviate the socio-economic impact of the transition. The Mechanism is intended to create the necessary investment to help workers and communities which rely on the fossil fuel value chain. It will come in addition to the substantial contribution of the EU's budget through all instruments directly relevant to the transition, the Commission informed.

As reported, the Just Transition Mechanism will consist of three main sources of financing:

- 1) A Just Transition Fund, which will receive 7.5 billion Euro of fresh EU funds, coming on top of the Commission's proposal for the next long-term EU budget. To tap into their share of the Fund, Member States will, in dialogue with the Commission, have to identify the eligible territories through dedicated territorial just transition plans. They will also have to commit to match each Euro from the Just Transition Fund with money from the European Regional

Development Fund and the European Social Fund Plus and provide additional national resources. Taken together, this will provide between 30 and 50 billion Euro of funding, which will mobilize even more investments. “The Fund will primarily provide grants to regions,” the European Commission emphasized. “It will, for example, support workers to develop skills and competences for the job market of the future and help SMEs, start-ups and incubators to create new economic opportunities in these regions. It will also support investments in the clean energy transition, for example in energy efficiency.”

2) A dedicated just transition scheme under InvestEU to mobilize up to 45 billion Euro of investments. It will seek to attract private investments, including in sustainable energy and transport that benefit those regions

Background

In December 2019, the European Commission presented the Green Deal. In January this year, the European Parliament voted to support the European Green Deal but wishes higher ambitions. Its members want the upcoming Climate Law to include higher targets for the EU’s 2030 goal of emissions reductions (55 percent in 2030 compared to 1990, instead of “at least 50 percent towards 55 percent”, as proposed by the Commission). “The EU should adopt these targets well in advance of the UN climate change conference in November, MEPs say. They also want an interim target for 2040 to ensure the EU is on track to reach climate neutrality in 2050”, the Parliament informed in a press release.

and help their economies find new sources of growth.

3) A public sector loan facility with the European Investment Bank backed by the EU budget to mobilize between 25 and 30 billion Euro of investments. It will be used for loans to the public sector, for instance for investments in district heating networks and renovation of buildings.

The Just Transition Mechanism is about more than funding: Relying on a Just Transition Platform, the Commission will be providing technical assistance to Member States and investors and make sure the affected communities, local authorities, social partners and non-governmental organizations are involved, the Commission underlined. “The Just Transition Mechanism will include a strong governance framework centered on territorial just transition plans.”

CLOSED LOOP FUND

Offered by the investment firm Closed Loop Partners, the Closed Loop Fund was established in 2014 to create economic value for cities by increasing recycling rates in communities across America and building circular supply chains. “Through project finance, the fund provides cities and companies with access to the necessary capital,” the homepage informs.

“Closed Loop Fund brings together the world’s largest consumer product, retail, and financial companies as investors committed to circularity.”

The Closed Loop Leadership Fund is a private equity fund focused on making control investments in companies that are building circular supply chains. “We partner with owners and management teams in the circular economy to build

their companies through a combination of strategic acquisitions and organic growth,” the investment firm emphasized. “In addition to providing growth capital, we also assist establishing supply relationships with our extensive network of corporate partners.”

www.closedlooppartners.com/closedloopfund/

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RECYCLED GLASS: OUTLOOK FOR GOOD BUSINESS CONDITIONS

If one believes the market researchers' forecasts, the global market for recycled glass will grow in the next years.

According to a report, published by Allied Market Research (www.alliedmarketresearch.com), the global recycled glass market was valued at 3.5 billion US-Dollar in 2017 and is projected to reach nearly 5.545 billion US-Dollar by 2025, growing at a CAGR (compound annual growth rate) of 5.7 percent from 2020 to the end of this period. Swift industrialization had resulted in large landfills of waste, which have boosted the demand for recycled products, the company said. This is one of the major factors driving the growth of the recycled glass market. "Additionally, several government initiatives and awareness campaign for cleanliness are also expected to fuel the growth of the global recycled glass market." On the contrary, complex manufacturing processes and contamination by unwanted materials present in product waste stream were expected to hamper the growth of the global recycled glass market.

The company Acumen Research and Consulting (www.acumenresearchandconsulting.com) has similarly optimistic expectations for the global recycled glass market. In its report, the firm predicts the market to grow

"Curbside pickups are time efficient and aid in maintaining locality cleanliness."



Photo: wikimedia

at a CAGR of around 6.0 percent over the forecast period 2019 to 2026 and reach the market value of around 5.723 billion by 2026. By region, North America accounts for the largest market share. "The increasing demand from the packaging industry – because it is cheaper as compared to the virgin glass and also needs less energy for processing – is driving the growth in the regional market," the company stated. "Apart from this, Europe is projected to be the fastest-growing region during the forecast period. Supportive government regulations in the Europe region are expected to create potential demand over the forecast period. In addition to these, the Europe government has applied strict restrictions on pollution, which is pushing manufacturers to opt for recycled glass, which is also a factor propelling the market value."

Global Market Insights, Inc. (www.gminsights.com) estimates that the

worldwide market will cross 4.5 billion US-Dollar by 2026. Increasing awareness associated with waste management and recycling would augment the industry growth during the forecast timespan. According to the estimation, curbside pickups will grow at a CAGR close to 7.5 percent. "Curbside pickups are time efficient and aid in maintaining locality cleanliness." Recycled glass powder will cross 230 million US-Dollar by 2026; it is used as a fine aggregate in concrete to improve compressive strength. "Rising construction activities all over the world will propel this sector's growth in the future," the company predicts.

As projected, the flat glass segment is likely to cross 600 million US-Dollar, because increasing applications of flat glass to manufacture mirrors, architectural structures, window glasses, to name but a few, will bolster the sector's growth. "Highway beads will grow with a CAGR over seven percent

within the forecast period. Beads made with recycled glass are used in road and highway construction to improve the visibility of road markings and ensure safety of road users.”

In general, the company is convinced that North America will capture con-

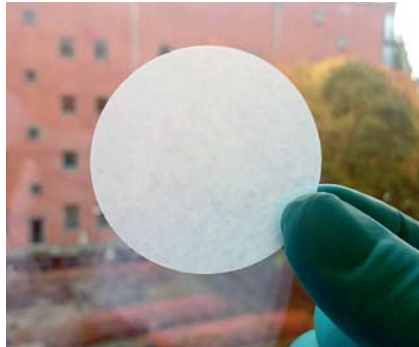
siderable volume share by 2026. “The regional governments are offering funding and grants to glass recycling businesses,” Global Market Insights, Inc. said. “In the United States, Glass Recycling Foundation (GRF) was established to offer and raise funds for domestic glass recycling activi-

ties. Furthermore, it will collaborate with Glass Recycling Coalition (GRC) and many recycled glass producers to bring investments together and improve the regional glass recycling rate. Such initiatives will spur the recycled glass market growth within the forecast period.”

PAPER FILTER FROM ALGAE FOR WATER TREATMENT

The problem of access to safe drinking water in most parts of Bangladesh is a persistent challenge. However, scientists from Uppsala University, Sweden, and Dhaka University, Bangladesh, have found a solution. The team of scientists has shown that a locally growing and previously unexploited green macroalgae species – *Pithophora* algae (or “Shewla”) – could be used to extract cellulose nanofibers, which can then be formed into paper sheets with a tailored pore size that are utilized for point-of-use water treatment. As reported, the paper filter “has demonstrated excellent virus and bacteria removal capacity both in the lab and in real-life tests”. The researchers believe that with further development, the filter could be an affordable and efficient remedy to prevent numerous potentially deadly water-borne infections.

Bangladesh is a country with a population of over 168 million people, which is larger than that of Russia (144.5 million). By 2050, the projected growth rates suggest that the population of Bangladesh may reach the mark of 200-225 million people. In parts of the biggest cities in Bangladesh, such as Dhaka or Chittagong, the density of population is as high as 205,000 inhabitants/square kilometer, which is almost 58 times more than that in Stockholm and nearly 20 times more than that in New York City. In 2018, about 15 million people lived below the extreme poverty line of 1.90 US-Dollar per day. “Hyper-high density



Paper filter
made from algae

of population, poor hygiene, and lack of clean water increase the risk of spreading water-borne infections,” the information says. “The cities of Dhaka and Chittagong are the only cities with extensive piped water and sewage system, but even there the water is available at most a few hours per day and may still be contaminated with infectious pathogens due to leakage in pipelines. With Dhaka population growing over 300,000 persons/year, access to clean water is critical for sustainable life.” To prevent the spread of water-borne infections, affordable point-of-use water treatment strategies that can be effective against all kinds of water-borne pathogens were needed. Boiling, sunlight pasteurization or chemical disinfection are some of the methods that are currently used for point-of-use water treatment. “An excellent way of treating water to physically remove all kinds of pathogens is filtration. Thus, new types of

affordable point-of-use filters that can remove all kinds of pathogenic bacteria, spores, and viruses are highly in demand.”

The project is funded by the Swedish Research Council and the Knut and Alice Wallenberg Foundation.

Photo: Albert Mitranyan/AlphaGalileo

PHARMACEUTICAL WASTE MANAGEMENT MARKET

According to a report published by Fior Markets, the global pharmaceutical waste management market is expected to grow from 1.19 billion US-Dollar in 2017 to 1.98 billion US-Dollar by 2025 at a CAGR (compound annual growth rate) of 6.11 percent during the forecast period 2018-2025. Pharmaceutical waste management is a serious issue worldwide, the US-based market intelligence company stated. Rises in government initiatives for safe disposal of unused medications and awareness about safe disposal of pharmaceuticals and environmental conservation were boosting the demand of the market. The non-hazardous waste segment was valued at around 690.27 million US-Dollar in 2017.

www.fiormarkets.com/report-detail/375983/request-sample


JOINT VENTURE IN CHINA


Danish Bjørn Thorsen A/S group and Chinese Chongqing Techxanadu Industrial Co., Ltd. have launched a new joint venture, the company Nordic Grafting & Compound Solutions Co., Ltd. (NGCS), located in Chongqing (China).

Based on licensing agreements with its European founding partners, NGCS will be scoped to produce advanced specialty compounds and compatibilizers (which can be used, inter alia, as a coupling agent for glass fiber, modifier to enhance the physical proper-

ties of recycled blends and adhesion promoter on polar surfaces). The aim is to replace non-recyclable thermoset solutions with recycled thermoplastic ones. According to the information, the company will provide the affiliates of the Bjørn Thorsen A/S group (Customized Compound Solutions A/S – CCS, Nordic Grafting Company A/S – NGC) and their Chinese partner with a capability to provide specialty products to the increasingly demanding Chinese market. These differentiated solutions would be built around the features of the Acti-Tech compati-

bilizer range developed by NGC, as well as on some proprietary tailored developments from CCS. The joint venture “will also aim to contribute to the development of post-consumer and post-industrial plastic recyclates in China, enhancing the quality and properties of these materials”, a press release said. “This will undoubtedly enable new application opportunities in collaboration with leading Chinese companies.”

 www.bjorn-thorsen.com

 www.techxanadu.com/en

DECISION GUIDE FOR WATER REUSE AND RECYCLING


The Beverage Industry Environmental Roundtable (BIER) – a technical coalition of global companies working together to advance environmental sustainability within the beverage sector – has published a Context-Based Decision Guide for Water Reuse and Recycling.


According to the US-based BIER, the guide “is designed to be relevant to any facility, in any industry, in any location in the world, and intended to accelerate internal conversations and decisions at the regional and facility level with regards to investments in

advancing water stewardship through reduction, reuse, and recycling”. It would emphasize:

- Why transitioning “beyond reduction” is important in addressing the shared global water challenges of today and tomorrow.
- Decision-making based upon an understanding of unique local watershed conditions or ‘context’ around a given facility.
- Practical guidance to accelerate conversations within companies and with other water stakeholders on water reuse and recycling opportunities at a regional and local level.

“We must adopt water circularity thinking whereby every drop of water is optimized towards a shared objective of a net water increase to local water supplies,” Nick Martin, Executive Director of BIER, is quoted.

BIER is facilitated by the international engineering and environmental consulting firm Antea Group ( www.us.anteagroup.com/en-us).

The complete guide is available for download at  www.bierroundtable.com/publication/decision-guide-for-water-reuse-and-recycling/.

NEW PLANT IN INDIA

Austria-based company Constantia Flexibles officially unveiled a new plant in Ahmedabad (India). The firm’s Ecoflex plant opened in November last year after more than two years of intensive preparations. In total, it has an area of 24,500 square meters and currently employs 50 people. The number is expected to triple by the second

quarter of 2020. The plant produces the packaging solution EcoLam by Constantia Flexibles. According to the information, EcoLam is a lightweight Mono-PE laminate suitable for a great variety of packaging applications and is part of Constantia Flexibles’ product line Ecolutions. Due to its mono-material structure, the material is fully

recyclable. It comes in different barrier grades to deliver the needs for a wide range of products. “Even though Constantia Ecoflex Ahmedabad is located in India, the plant will supply customers worldwide,” the manufacturer assures.

 www.cflex.com



TIRE RECYCLING: BREAKING THE SULFUR-TO-SULFUR BONDS

“The chemistry of the tire is very complex and does not lend itself to degradation – for good reason,” argues Michael A. Brook, a professor in the Chemistry Department at McMaster University in Hamilton, Canada. “The properties that make tires so durable and stable on the road also make them exceptionally difficult to break down and recycle.” But he and his research group have found a solution.

Tires are formed by a combination of sulfur and natural rubber, whereat connections between the natural polymers are built. The mixture’s transformation from fluid to rubber develops a net structure of polymers. The research group found a way to break the sulfur-to-sulfur bonds of the polymers by cutting the horizontal lines. The net structure is suspended into a large number of single ropes, ready to be isolated and reprocessed. The process starts by cutting the tires into material sections and shredding the rubber to a crumb. This granulate is treated under the addition of various hydrosilicones and $B(C_6F_5)_3$ as a catalyst for 45 minutes. The reduction by sialylation of the sulfur-to-sulfur bonds under different temperatures recovers the organic polymers as oils reaching from 56 percent yield for complex rubber mixtures to 93 percent yield for butyl rubber. A simple filtration removes substances like inorganic carbon, silica, metal and polyester cord fibers.

According to Michael A. Brook, the recovered oils are constitutionally very similar to the virgin polymers initially used for new tires. Thus, they can radically or oxidatively be crosslinked to generate new elastomers. Furthermore, the removed inorganic filtration residue could be reused as a reinforcing agent in the new rubber. “This process closes the loop on automotive rubber, allowing old tires to be converted into new products,” Brook underlines. And an article published in the journal Green Chemistry judges the process “a facile route to reutilize the organic polymers”, as it “has the potential to reduce the environmental impact of used, sulfur-crosslinked elastomers”. The researchers suspect some limitations of the treatment technique applied at an industrial scale. Amongst others, the efficient reduction of rubber requires relatively large quantities of the BCF catalyst, and a trial with Soxhlet extraction could neither increase the rate nor yield a reduction. “We’re working on it,” says Brook.

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Photos: Forrec S.r.l.

THE YOUNG HISTORY OF AN INTERNATIONALLY ACKNOWLEDGED COMPANY

Forrec – a growing and dynamic company that concentrates on the research, design and construction of a range of machinery for various fields of application – will exhibit at this year's IFAT in Munich. GLOBAL RECYCLING Magazine wanted to get to know the Italian-based company and discussed several topics with Marco Zoccarato, the company's CEO.

The quick internationalization of your company has given Forrec both national and international acclaim. Nowadays, Forrec has established collaborations with partners worldwide. But how would you describe the company's first steps?

Forrec was established in 2007. With the collaboration of its partners, the company can resort to twenty years of experience in designing and selling waste treatment plants.

The company has been established in Resana (Treviso) and after the first steps have been taken Forrec received positive feedback from not only renowned but also from new interested parties. In just a short time, the company acquired a pool of customers that appreciated the flexibility and attention given to each project. Only four years later, the company needed to find more space due to the exponential growth in production and its internal staff. In December 2011, Forrec moved to its new headquarters in Santa Giustina in Colle (Padua) to initial premises of about 3,500 square meters, which subsequently saw the addition of a warehouse of about 2,500 square meters, entirely used for spare parts.

The company, which had more than 90 employees at the end of 2019, runs a branch in Serbia. The country is an important partner that oversees parts of the production, i.e. heavy metal structural work. About 50 employees are working for the branch in Serbia. All of them are involved in developing projects which are researched and produced in the Italian headquarters. The development of the sales network and the quick internationalization process have given the company both national and international acclaim. Shortly, collaborations have been established with partners worldwide, while important goals have been achieved. Nowadays, the company has sales offices in Brazil, North America, Thailand, Russia, Turkey, Vietnam, Dubai, Morocco, France, The Netherlands and the UK.

Forrec designs and realizes industrial shredders, grinders and granulators. Thus, the company offers solutions for various fields of application. Which are your primary utilization fields?

In general, municipal and industrial waste is our field of application, since the beginning Forrec has given a lot of attention to all the different kinds of products to reintegrate them in the market. Nowadays, the market is always looking for cost-effective solutions. Sure, we are environmentally friendly, but – frankly speaking – how much can we earn from recycling? The trends are different, for a certain period, we have mainly dealt with multi-crushers, double shaft machines, which can prepare the municipal waste before transforming it in RDF (Residual Derived Fuel), but also



Marco Zoccarato

a powerful machine, that can process bulky and industrial waste in enormous quantities.

E-waste is always a primary application field for Forrec. The company's WEEE recycling plants and refrigerators recycling plants (last year, Forrec installed the two biggest ones worldwide) show what our technology can do. Moreover, an enormous number of other compo-

nents gravitate in the orbit of WEEE: cables, electric motors and metal scraps. But Forrec has developed its technology for the treatment of these components.

Moreover, tire treatment is also part of our daily work since the extra-European market is facing new directives to deal with this dangerous waste. However, Forrec has developed a complete system to get the crumb rubber (0-4 mm) from the process. This product is then integrated into the market with technical items and asphalt bitumen. Forrec has also designed a brand-new machine to obtain a "sharp-cut" 50x80 mm shredded tires, perfect as TDF (tire-derived fuel) for cement factories.

Your company offers a range of reliable, flexible, and manageable products such as shearing machines, crushers, or hammer mills. Can these products only be used as single machines, or can they be used in line with other equipment too?

All our machines are designed to be used as single machines but can be integrated into complete systems as well. Forrec has always produced turn-key installations tailor-made for its customers.

Your customers can visit you at this year's IFAT in Munich. From the range of products your company offers: Which machinery are you going to present?

The visitors are going to find us in hall B6 at our stand 209/308. There we are going to present two machines:

- the FR multi-crusher, a machine dealing with MSW, bulky waste, as primary shredder with special characteristics
- the TQ four shafts shredder, an extremely reliable machine that is suitable for a large range of products.

 www.forrec.it

SORTON: TURN-KEY FACILITIES BY CALAF CONSTRUCTURA

Starting in 2020, Calaf Constructura will use the brand Sorton for the design and construction of turnkey waste treatment facilities. The brand already offers all the solutions for the design of industrial facilities dedicated to the selection of waste or other materials. We also have a long journey through different sectors, such as mineral facilities, bulk or water treatment facilities, glass, plastic or packaging recovery facilities and paper as well as cardboard selection facilities.

Sorton represents the solution for the environmental industry and organizations that need to revalue, classify or

recycle any type of material or waste. The team wants to contribute to improving the environment most efficiently and sustainably possible. The R&D&I studies department and specialized partners integrate multidisciplinary engineers and professionals who are responsible for the study, resolution and profitability. Sorton treasures the largest specialized TRADE HUB in the sector, guaranteeing the achievement of all the challenges of the company's clients.

The company combines talent with technical capacity: extensive experience in research, development and



innovation allows us to provide increasingly complex solutions to offer the greatest revaluations. Through our service of pre-project studies and implementation and project management assistance services, we offer assistance independently and without commitment to future collaboration in the project.

Sorton has an enormous number of references in the sector of mineral recovery facilities, in the sector of facilities for the selection of plastic and glass waste, in separating glass from the rest of MSW materials or classifying it by colors, in metal and paper and cardboard sorting facilities and finally in bulk recovery facilities. Accordingly, we have experience in different sectors and numerous countries in North and South America as well as in Europe.

The Sorton solution takes hold in the Zero Waste movement of the European Union. This increasingly widespread movement encompasses all business actions to reach a circular and much more sustainable economy. Sorton not only participates in this "economy of the future" but also allows companies to participate in this movement through profitable options for them. The economic benefits of Sorton solutions add to the different environmental benefits of our solutions, which are less harmful to the environment.

 www.sorton.es



Photos: Calaf Constructura / Sorton

MORE RECYCLING IN SÃO PAULO

The manufacturer of household cleaning supplies and other consumer chemicals, SC Johnson, collaborates with reverse logistics startup Molécoola to sponsor recycling centers in São Paulo (Brazil). According to the information, consumers can return empty products from any of SC Johnson's brands at any of Molécoola's locations and earn points that can be redeemed using app technology for goods and services. "The points can also be used for charitable donations to communities in São Paulo", the multinational company emphasized.



Photo: Marcos Mark / Pixabay

As reported, Molécoola stores collect a broad range of recyclable materials including aerosol cans, beverage cans, paper, cardboard, chipboard, plastic, electronics, and cooking oil. Since first partnering with SC Johnson in November 2018, it has collected more than 360 tons of recyclable materials until the end of October 2019.

With more than 25 million tons of recyclable solid waste discarded per year in Brazil according to Brazilian Association of Companies for Public Cleaning and Special Residues Management (ABRELP), "this partnership is designed to help reduce the amount of waste entering landfills by incentiv-

izing people to recycle", SC Johnson underlined. Molécoola would help to build a circular economy to expand the current recycling level in Brazil of approximately three million tons per year (2017 Report on Urban Solid Waste Management by the National System of Sanitation Information – Ministry of Regional Development) through its one-stop-drop solution that collects a variety of post-consumer materials. "This new recycling chain effectively consolidates recyclables, enables the sale of materials directly to recyclers and is 100 percent traceable via its unique system that works on smartphone devices." From minimizing waste to using renewable energy to

fighting deforestation, SC Johnson has – by its own account – a long legacy of acting to protect the environment. "At the close of 2018/19, 100 percent of SC Johnson factories sent zero manufacturing waste to landfill, including the plant in Manaus, Brazil." The company also conducts an aerosol recycling program in São Paulo, "where it works alongside waste collection cooperatives, enabling more than 1,800 waste collectors and 95 additional workers to become involved in the recycling process while also bringing a positive social impact to the community".

🌐 www.scjohnson.com

🌐 www.molecoola.eco/lojas



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ERI IS THE “RECYCLERS’ RECYCLER”

ERI, the largest fully integrated IT and electronics asset disposition provider and cybersecurity-focused hardware destruction company in the United States, continues to provide a full suite of e-waste recycling services to other recycling companies.

Known in the industry as the “recyclers’ recycler,” ERI is the first organization in the world to be NAID, e-Stewards, and R2 certified at all eight of its facilities, setting the highest possible standard and leading the industry for both data destruction and responsible electronics recycling. The company provides the services other recyclers need to meet sustainability and data destruction goals. ERI now provides e-waste recycling solutions – ranging from commodities extraction and management, ITAD services, Circular Economy engagement, data destruction and logistics, among other services to more recycling organizations than any other organization in the industry.

ERI maintains eight NAID-, e-Steward- and R2-certified, state-of-the-art e-waste recycling centers, processing and responsibly recycling hundreds of millions of pounds of e-waste every year. With global consumer spending expected to double by 2030, there is an urgent need to secure resources as well as develop new production models that fit within planetary constraints, especially with electronic devices, the fastest growing sector of the waste stream today.

“ERI is proud to be the only ITAD company in the country that partners not only with manufacturers and retailers, but with other recyclers as well – to jointly trailblaze the Circular Economy by closing the sustainability loop,” said John Shegerian, ERI’s Co-Founder and Executive Chairman. “Thanks to our proprietary software tracking



Photo: ERI

system, our A.I.-driven robots and our innovative shredding technologies, all metals, plastics, glass, virtually everything, can be tracked and prepared for beneficial re-use into new products. Plus, all of our facilities are 100 percent zero waste, zero landfill and zero emissions.”

ERI has facilities in Fresno, CA; Sumner, WA; Flower Mound, TX; Aurora CO; Plainfield, IN; Badin, NC; Holliston, MA; and Lincoln Park, NJ.

“We know how important it is to recycling businesses of all sizes to be able to partner with a responsible, sustainable and fully certified electronics recycler and data destruction company they can trust,” added Shegerian. “ERI is standing by, available to help with all electronics recycling, ITAD, and sustainability needs.”

A Collaborative Spirit

ERI does not view most other recyclers as competition, but rather as partners in the ongoing battle to keep e-waste out of landfills. Plus, there is a tremendous amount of e-waste entering the global waste stream and as a leader in the responsible recycling of these items, ERI sees collaborating with other collectors, recyclers and ITAD companies as a natural part of its responsibility to the planet. Electronic devices are being discarded and replaced at the fastest pace in history. At the rapid

rate that technology is improving, businesses, government agencies, and individuals are all upgrading to the latest and greatest faster than ever before. This has produced a tremendous glut of e-waste – unwanted electronics containing toxic elements that historically end up in landfills. It is not a hard decision to make for environmentally responsible and sustainability-minded organizations to have their e-waste recycled. But what about the sensitive data those devices contain? Hardware hacking has become an epidemic, and companies, individuals, even government agencies have become vulnerable to attacks.

Numerous unstoppable business and societal trends are causing, and will continue to cause, spiking numbers in electronics turnover: desire for circular economy services; need for cybersecurity and responsible hardware data destruction; the impending 4G to 5G switchover; and the proliferation of the Internet of Things. These ever-growing trends mean that the tsunami of e-waste has no end in sight.

Fortunately, ERI, which has a unique 18-year track record of innovation, sustainability and cybercrime prevention, has emerged at the forefront of protecting people, the planet and our privacy. And they are doing it like nobody else

 www.eridirect.com

COEXPAN JOINS THE CHILEAN PLASTICS PACT

Coexpan Coemba Chile has become a member of the Chilean Plastics Pact, an initiative that falls within the framework of the Plastics Pact global network launched by the Ellen MacArthur Foundation in 2018.

The initiative, signed in April 2019 and led in Chile by the Ministerio del Medio Ambiente (Ministry of the Environment) and Fundación Chile, is focused on achieving a sustainable future for plastics by advancing towards a circular economy model. The visible image of the Chilean Plastics Pact is the campaign entitled "Circula el Plástico", whose slogan "More planet, less waste" seeks to engage citizens in the challenge of progressing towards a new plastics economy.

The Pact concentrates on three key strategies aimed at transforming the global plastic packaging market: recycling, redesign and reuse. This collaboration highlights the commitment of the different stakeholders in the plastics value chain to reach the targets set for 2025:

- Eliminate problematic and unnecessary single-use plastic instrument

packaging through redesign, innovation or alternative delivery models.

- Ensure that 100 percent of plastic packaging is reusable, recyclable or compostable.
- A third of all household and non-household containers and packaging should be effectively recycled, reused or composted.
- Increase recycled content in plastic packaging to 25 percent to boost the demand for recycled material.

According to Coexpan, the manufacturer of plastic sheets and products



within the Grupo Lantero, its vision of sustainability "is focused on a clear commitment to eco-design and to the circularity of its packaging". The Chilean subsidiary company had developed a system for decontaminating post-consumer PET obtained from recovered plastic bottles, the information said. "The technology for cleaning and decontaminating raw materials has been approved by the FDA in the USA and by the European Union. The project that was presented at last year's Latinpack Fair represents a solid contribution to the circular economy. Also, the past October Coexpan presented CorePET, the new 100 percent rPET tray for different applications, decontaminated for food contact use supporting the commitment announced last year by PET Sheet Europe."

Likewise, EMSUR Argentina partnered up with Coexpan Coemba Chile to develop a specific removable banderole for dairy products for Nestlé Chile contributing significantly to the recyclability of plastics.

 www.coexpan.com

Photo: Andi Kaig

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SOIL REMEDIATION ON CONTAMINATED LAND

CDEnviro's on-site equipment solutions wash and treat contaminated soil and sludge.

Soil pollution is typically caused by industrial activity, agricultural chemicals or improper disposal of waste. The risk of contaminants leaching into water sources can lead to direct contamination of human drinking sources or lead to bioaccumulation of chemicals in animals, which can eventually make their way into the food chain. Therefore, removing pollutants and contaminants in the soil is vital to ensure safety for humans and wildlife. There are several methods available for decontamination.

As a provider of solutions, CDEnviro delivers processing systems—such as equipment solutions for washing and treating contaminated soil and sludge—for clients in Europe, Australia, North America and South Africa. One example is the Swiss group Orllati, one of the leaders in construction in French-speaking Switzerland, which is using CDEnviro's equipment to process contaminated soils at the treatment facility on its Bioley-Orjulaz site and reuse the materials—gravel and sands—for concrete production.

The facility was installed in 2017 and treats various waste streams including contaminated soils excavated from various polluted sites across Switzerland. It is made up of a HYDRO:GRADE (for the separation of lightweight and fine constituents) and HYDRO:FLO (to minimize the volume of waste to be processed downstream; 90 percent of water can be reused) as well as various other components to ensure the effective treatment of this highly contaminated waste. Orllati uses the clean output products on the same site as their treatment facility to reduce transports and negative impacts on the environment.

Interview on CDEnviro's Contaminated Soil Washing

The Ireland-based company CDEnviro belongs to the internationally active CDE Group, and was established in 2011 with the main objective to primarily service the environmental wastewater sector in the UK and Ireland. Despite the various solutions the company is offering, GLOBAL RECYCLING Magazine wanted to know more about one specific topic.

Therefore, Andrew Wilson, CDEnviro's Business Development Manager, answered several questions about the provider's on-site equipment solutions for washing and treating contaminated soil and sludge containing hydrofluorocarbons, heavy metals and manmade chemicals.

Why has soil remediation on contaminated land become such an important issue?

There are two main drivers which are often interlinked.

- A. Environment and health risks associated with contaminated ground mean governments, local authorities, or private companies need to remediate the affected ground to prevent environmental or human harm.
- B. Land which is contaminated often cannot be utilized or built upon. This presents an opportunity for developers where the cost of remediation is lower than the present or future value of the uncontaminated land then a viable business opportunity presents itself. It is also important to note that science and techniques have advanced significantly in recent years in respect to in situ and ex situ processing. This knowledge enables projects to be viable which previously would have been financially prohibitive.

Contaminants leaching into water sources pose serious risks such as the direct contamination of human drinking sources. In which way do CDEnviro's on-site equipment solutions help to reduce or even eliminate these contaminants?

By treating the soils through a physical chemical system, contaminants can be liberated and concentrated into certain fractions. Typically, the goal with washing technology is to concentrate contamination into the fine filter cake fraction and light organic fraction. This results in the sand and aggregates being cleaned to an extent where they can go directly back into the ground or be used in concrete or back fill applications. By isolating the contamination, CDEnviro's on site equipment solutions help prevent leaching, groundwater contamination and other forms of transfer which in turn prevent the associated health risks of the contaminants. We are proud that our solutions are already making a difference in Switzerland, Australia, the USA and elsewhere around the world.

What kind of contamination can be treated with CDEnviro's on-site equipment solutions?

CDEnviro's solutions remediate soils containing various contaminants including hydrofluorocarbons, heavy metals, organics and others. Although the profile of man-made chemicals has risen in recent years, many are still in the

dark about the harmful risks. These chemicals are emerging contaminants as their full effects are still being studied. However, what we do know is that they have an extreme resistance to environmental breakdown and have been linked to cancer and many other health problems. Many manmade chemicals have now been banned in many countries but were previously used in surfactants, manufacturing, textiles and firefighting foams for many years. In 2000, around 95 percent of the world's population was thought to be contaminated with these chemicals, they have even been found in polar bears in the arctic. As they are extremely resistant to breakdown, CDEnviro solutions isolate the contamination, removing it from the soils so that they can be safely reused.



Andrew Wilson

Is it possible to adjust these solutions to a customer's needs?

The solution is always driven by the present contaminants, the level of these contaminants in the input material, and the required level of upgrade required, as well as the volume of material that requires processing. Numerous washing steps can be applied to further improve aggregate quality, and they are normally applied on a case by case basis. This often means a thorough pre-project analysis, which requires an in-depth and accurate understanding of the contaminants present on the site and within different localized areas of the site.

■ Meet Andrew Wilson at IFAT 2020 to discuss contaminated soils on Stand FGL.807/6.

🌐 www.cdenviro.com

LJUBLJANA'S WASTEWATER TREATMENT SYSTEM TO BE UPDATED WITH EXELYS

In January 2020, Danish environmental group Krüger A/S announced plans for the installation of a new factory-built wastewater treatment plant in Slovenia's capital Ljubljana.

The technology and capacity of the existing wastewater treatment plant in Ljubljana are no longer sufficient. The new facility will combine wastewater sludge treatment with the production of biogas for electricity and heating. Exemplary function fulfills the modern Billund Biorefinery in Denmark that has received worldwide plaudits for innovation and sustainability as it is much more than a wastewater treatment facility.

The plant in Danish Billund consists of three processing lines for wastewater, sorted municipal solids and residual industrial waste. The wastewater sludge passes the primary and partly a final settling, is collected in a buffer tank and led to a pulper, where it is mixed with shredded, sorted municipal solid. The mixture then reaches a biodigester whose biogas is collected and stored. Furthermore, the material from the biodigester is dewatered, caught in a silo, and will later be treated by thermal hydrolysis. Afterward, the residual sludge meets residual industrial waste that has passed a phase of hygienization, and then both enter another biodigester to produce biogas. The gas is stored and can be used for the production of electricity, heat or steam.

With additional technologies

The process is substituted by several advanced and trademarked technologies. The AnitaMox moving bed biofilm reactor converts ammonia to nitrogen using anammox bacteria without any additional carbon substrate. Precise control of nutrients is ensured by a



Hydrotech Discfilter with the option of coagulant dosing. Pathogens in the sludge are killed by BioPasteur before digestion. The initial coordination of the municipality's treatment plants and drainage systems is realized by Star Utility Solutions, a smart online system that measures processes online, switching over the plant's treatment capacity, monitoring and optimizing the biomass feed and thus ensuring optimal treatment while minimizing energy and chemicals use.

The most interesting innovation of the Billund Bio-Refinery is Exelys, a trademarked and patented plant for thermal hydrolysis, whose installation is planned for Ljubljana. While heretofore processing equipment count on bath treating of material requir-

ing large storage capacity, Exelys is a continuous process for pre-digested and dewatered substrates. According to a Veolia factsheet, the continuous thermal hydrolysis operates 24 hours a day with feed and removal levels that are adjustable in real-time, operating under controlled temperature (165°C), pressure (7.5 bar) and duration time (between 20 to 30 minutes) conditions. The system is controlled by a programmable logic controller that modulates the steam flow rate in line with the amount of sludge processed. The reactor volume is used in 100 percent of the time, can treat over three times the number of sludge solids compared to other plants, and results in lower steam demand per ton of dry solids. Its biogas production generates about three times the energy requirements of the plant itself – CO₂ neutral –, with the surplus being exported to the grid.

Significantly more biogas

Additionally, the operators at Krüger are convinced that the Billund BioRefinery system is, in any case, the unique solution to combine known and new technologies. Therefore, Lars Henrik Andersen, Project Manager with Krüger A/S, is looking forward: "Now, we install Exelys at the wastewater treatment plant in Ljubljana to enable them to produce significantly more biogas in the digesters, and the gas will thus operate the existing sludge dryers." According to Veolia figures, the Exelys plant produces 30 to 50 percent more biogas, 25 to 35 percent less dried solids, an increased cake dryness by five percent, and finally enhanced treated sludge of class A. Time will show if the old Ljubljana plant will be so compatible with the new technology that it can reach these quotas.

The new facility will combine wastewater sludge treatment with the production of biogas for electricity and heating.

 www.kruger.dk

PLANNED: RECYCLING FACILITY FOR POLYSTYRENE IN USA

Ineos Styrolution, the styrenics branch of the multinational chemicals group Ineos headquartered in London, will cooperate with the American company Agilyx to realize a polystyrene (PS) chemical recycling plant in Channahon (Illinois).

In 2018, the two companies had signed a memorandum of understanding for deploying Agilyx's de-polymerization technology at or near to an Ineos Styrolution Facility in North America. "The aim is to convert post-consumer polystyrene waste into styrene monomer that can be used to re-manufacture new polystyrene products," a news release said. Ineos Styrolution would intend to drive the advancement of the de-polymerization technology. At that time, together with several research institutions, the company was working on a technical feasibility study and was aiming at the development of a holistic recycling concept in collaboration with waste management companies.

Now, Ineos Styrolution and Agilyx are advancing the development of the planned recycling facility. If realized, it will be capable of processing up to 100 tons per day of post-consumer polystyrene and converting it into a styrene product that will go into the

manufacturing of new products. The plant will leverage Agilyx's proprietary chemical recycling technology, which can recycle polystyrene contaminated with food and other organics and convert it back into new, food-grade plastic products or packaging. To this effect, the process breaks the material

down to its molecular base monomers that will be used for the creation of new styrenic polymers. "This is a true circular recycling approach that enables everyday products, like a cup, to be recycled back into a cup", Ineos underlined.

As reported, Agilyx recently completed a successful development program for Ineos Styrolution that qualified the styrene product to Ineos' specifications and the identified post-consumer polystyrene feedstock for the process. The next phase of the project advances the engineering and design of the facility.



www.agilyx.com
www.ineos-styrolution.com

Agilyx, based in Tigard (Oregon), has developed the first system capable of recycling polystyrene waste into styrene monomers, the information says. The company also has commercialized a technology that converts mixed plastics to high-quality crude oil. Agilyx is working with waste service providers, municipalities, refiners, and both private and public enterprises to develop closed-loop industrial solutions for mixed waste plastics.

Ineos Styrolution provides styrenic applications for many everyday products across a broad range of industries, including automotive, electronics, household, construction, healthcare, packaging and toys/ sports/ leisure. In 2018, sales were at 5.4 billion Euro, according to the company, which employs approximately 3,500 people and operates 20 production sites in ten countries.

Photo: Félix Juan Gerónimo Beltré / Pixabay

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SUSTAINABLE DEVELOPMENT IS ACHIEVED BY THE APPLICATION OF CIRCULAR ECONOMY**



Đuro Horvat, CEO of the company Tehnix, expert for development of new technologies for sustainable development

European Union policy combines theory and practice to the fullest possible extent to develop and apply technologies and practical solutions that, in stopping climate change, can produce the best results in achieving circular economy's goals. The pollution of planet Earth by human beings and their activities is already causing a significant rise of global warming. The uncontrolled development of industry and transport has led to a climate change that we can no longer control sustainably. Nature rebels, protests in the same way as our body does infected by fever. It alerts us that we were doing something wrong. Immoral capitalism has neglected

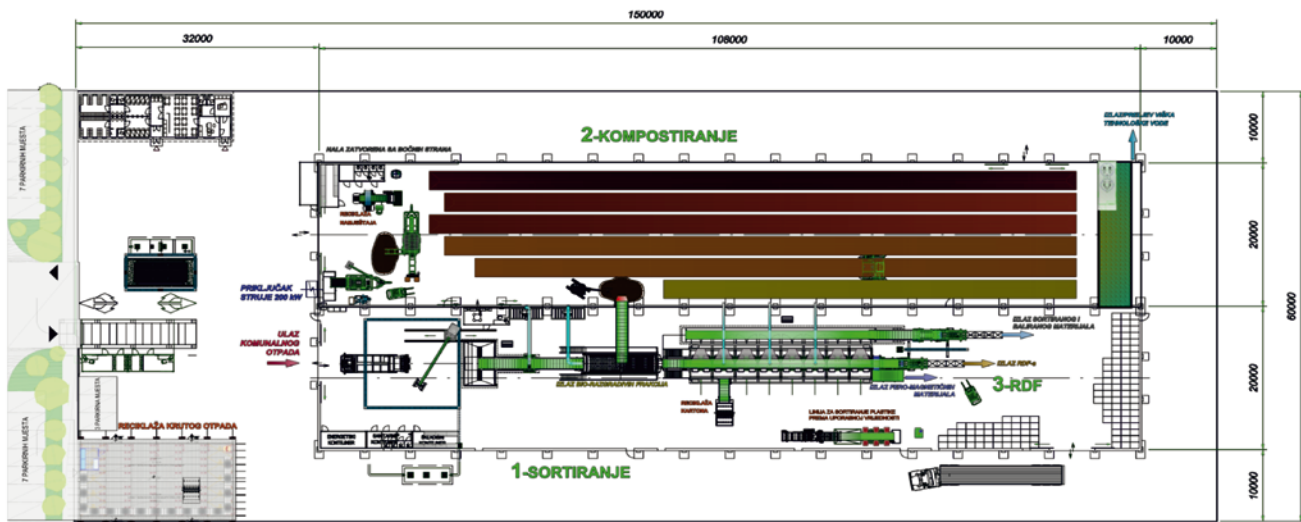
the sustainable development of the Planet. The increase of contagious diseases caused by climate change is a consequence of man's neglect of natural laws. For almost 50 years, I have been actively watching for changes in nature. 30 years ago, I founded Tehnix, an eco-industry together with my associates and experts, and I sought to develop technologies that can significantly contribute to sustainable development and achieve the goals of the circular economy. I am happy that our company is nowadays known for its sustainable development. We produce solar energy on the roofs of production facilities sufficient for the business and technological process. All waste is recycled. We have developed and are using a recycling system for wastewater treatment. Today, Tehnix is a leading eco-industry in Europe and worldwide. We produce 300 types of products that significantly contribute to environmental protection and the goals of the circular economy. We employ 500 people, experts, and engineers who, together with me, develop products for a sustainable future. We cooperate with several scientific institutions of the Republic of Croatia and started various cooperations with EU institutions and experts. We are generating new products and technologies needed for a prospective sustainable planet. By investing in our product development and new tech-

nologies, we have achieved over 50 patents and hundreds of innovations needed for global industrial growth. We have designed the best-in-class technology for the industrial recycling of mixed municipal waste called MO-BO-TO, which completely recycles the waste and achieves circular economy. Of course, I am worried about how the system of managing used products and waste materials works today. First and foremost, companies that have developed their products must provide a recycling system for used products by replacing the old by new ones, using valuable materials, a new design and new technological solutions for the novel features. Tehnix implements such an environmental measure together with its customers, achieving a circular economy. I think it is important to ban the construction of landfills for any kind of waste, especially municipal waste. Positive examples in developed countries of the European Union confirm that it is possible to recycle – to sort raw materials from waste according to useful values and return them to the new industrial cycle of sustainable production. Tehnix has processed a new type of technology that enables the complete recycling of municipal waste. We have evolved a new technology called MO-BO-TO. It is applicable everywhere in the world regardless of the stage of development. The typical advantages

of such technologies are the complete recycling of mixed municipal waste without using landfills, the ease of collecting dry mixed municipal waste, requiring fewer vehicles and drivers, fewer landfills in cities, around buildings, and in tourist centers. With MO-BO-TO technology we get eight types of raw materials, eco compost, and – it is especially important to note – quality RDF fuel. So far, the waste management model in Croatia is harmful

as well as impracticable, and a lot of financial resources have been spent on little environmental results. Moreover, enormous damage has been done to citizens and the environment. Yes, it is right, landfills are planet Earth's cancer. These projects are harmful to human beings and the environment. Funding for such projects has developed enormous amounts of corruption. It is only through new technologies that we can realize a far

better model for a sustainable planet Earth – more quickly and cheaper. Tehnix, with its development potential and new technologies, can help. We are committed to build, process and finance those systems that deliver the best practical results. By connecting scientific communities and the eco industry, we can create and apply sustainable development systems and achieve the circular economy's goals in industrial development.





MO-BO-TO = INNOVATIVE TECHNOLOGY FOR COMPLETE RECYCLING OF MUNICIPAL WASTE

EU PROJECT



MODERN STANDARD FACTORIES FOR COMPLETE INDUSTRIAL RECYCLING OF COLLECTED SOLID WASTE

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A BIN FOR BIO WASTE



MO-BO-TO

THE RIGHT SOLUTION

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MO-BO-TO TECHNOLOGY

COMPLETE WASTE RECYCLING

Tehnix ECO INDUSTRY

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3. PRODUCTION LINE FOR THERMAL PROCESSING AND BALING OF RDF FUEL
4. RECYCLING CENTER FOR REUSE OF DISPOSED PRODUCTS
5. SOLAR POWER PLANT INSTALLED ON THE ROOF WITH POWER UP TO 400kW

8 TYPES OF RAW MATERIAL

BIO-COMPOST

RDF FUEL

RECYCLING SYSTEM MO-BO-TO WITHOUT LANDFILL

INDIA'S SEWAGE TREATMENT POLICY:



Photo: BerginFoto / stockadobe.com

**BETWEEN DYSFUNCTIONALITY AND MULTI-
BILLION DOLLAR OPPORTUNITY**

India's expanding agriculture, industry and modern communities require increasingly large amounts of water. For the country facing a most serious water scarcity, polluted rivers as well as contaminated ground water, the cleaning and recycling of water seems the only solution. But the era of commonly functioning sewage treatment plants has just begun.

According to the environment agency Central Pollution Control Board (CPCB), India produces 62 billion liters of wastewater per day. Figures from 2010 show that water consumption comprised of 2.2 percent of industrial, 7.4 percent of municipal, and 90.4 percent of agricultural usage. The 500 million liters per day (mld) generation of industrial wastewater is composed of 200 mld of the production of pulp and paper, 98 mld of chemical and 96 mld of sugar production. However, concerning industrial wastewater, the Indian supreme court in February 2017 directed the CPCB to control the treatment in all industrial units; in case of violation, they are threatened by closure.

Urban and rural areas differ

The municipal wastewater generation must be distinguished between urban and rural: An official statistical status report for 2012 offers that in rural regions half of the households have no drainage; their wastewater is by 75.9 percent disposed to open low land areas. In urban regions, 45 percent of the dwellings are connected to an underground drainage system. But stormwater in the cities causes another problem: The rainwater cannot be absorbed into the ground and get percolated. Thus, it runs

off untreated into sudden drains and transports domestic waste and other water to lakes and rivers. Although partially water in agriculture and in horticulture – treated or untreated – is reused, this sector takes up about eight times as much water as the other two put together. The effluent load of the branch complies with the conditions of urban regions; the environmental contamination by agricultural fertilizers, dung and animal excreta is another chapter.

Treatment capacity underutilized

In 2016, the connection rate of the Indian population to the wastewater and sewage network in 2016 totaled 38.1 percent – differing between the regions. According to Stanford's Social Innovation Review in Spring 2017, India's smaller towns cannot afford to build dedicated treatment systems. Only the country's largest cities have centralized sewage systems that are completed with underground pipes, pumping stations, and treatment plants. "However, these systems are expensive to build and to operate, requiring uninterrupted power, skilled operators, and extensive maintenance." A survey report of the CPCB for 2014/2015 underlines that nearly 39 percent of the plants are not conforming to the general standards prescribed under the Environmental Protection Rules for discharge into streams. And – as the paper assesses – in several cities the existing treatment capacity remains underutilized while a lot of sewage is discharged without treatment in the same city. Even in July 2018, the existing sewerage infrastructure in most cities was characterized "by obsolete and faulty pipeline networks, insufficient treatment capacity and sub-optimal capacity utilization".

Capacity rose from 209 to 920 plants

During the years, the number of sewage treatment plants has increased. In 1992, a World's Health Organization study reported that out of India's 3,119 towns and cities just 209 had partial wastewater treatment facilities, only eight had full facilities, and 114 cities dumped untreated sewage and partially cremated bodies directly into the Ganges River. In 2014/15, the CPCB announced a total of 816 plants presenting a capacity of 23,277 mld. And in November 2016, Shri Anil Madhav Dave, Minister of State for Environment, Forest and Climate Change, disclosed newer CPCB figures: 193 common effluent treatment plants are installed in the country with a combined capacity of 1,474 mld. There are 920 sewage treatment plants (STPs) in different states, including Tamil Nadu and West Bengal, out of which 615 STPs are operational, 80 STPs are non-operational, 154 STPs are under construction, and 71 STPs are under planning stage. The estimated sewage generation in the country was 61,948 mld in 2015 against the available treatment capacity of 23,277 mld. This means in effect that 38,671 mld or 62 per-

cent are not treated. Figures of the Centre for Science and Environment for 2009 indicated the differences throughout the Indian regions: While the treatment capacity of 35 metropolitan cities with a population of more than one million people added up to 51 percent, Class I cities only commanded equipment for 32.5 percent, and Class II cities reached 12 percent. Numbers of Ernst & Young for 2013 differentiate that only 60 percent of industrial and 26 percent of domestic wastewater was treated in India.

Rising demand for treatment

However, the relations of water-consuming and therefore wastewater generating and application of sewage treatment facilities will change. The rising population of India and rapid urbanization are two reasons, dwindling freshwater reserves and a depleting groundwater table two other factors for a rising wastewater treatment demand. Growth is also caused by domestic and industrial water requirements expected to double by 2030, whereas agriculture's growth rate will only rise 11 percent. The demand is estimated to rise between 2010 and 2030 from 34 to 66 billion cubic meters in the domestic sector, from 40 to 91 billion cubic meters in the industry, and 606 to 674 billion cubic meters in agriculture, Ernst & Young gave account. The German Federal Ministry for Economic Affairs and Energy (BMWi) even expects a demand that will quadruple by 2030. Over the long term, India has to react to the low water quality and contaminants like geogenic dissolved Arsenic and Fluoride as well as man-made discharged pollutants like Chloride, Iron and Nitrates anyway. Besides that, the demand will increase by the necessity of better common collection, treatment and disposal or reuse of fecal sludge:

At the India Sanitation Conclave at New Delhi in April 2018, there was a loud call for an "open defecation free" India. A United Nations report in 2015 regarding this item indicated an estimated 65,000 tons of uncovered and untreated feces released to the environment in India every day. Manas Rath, senior advisor of Bremen Overseas Research and Development Association (BORDA), South Asia, expects a business potential of 4.5 billion US-Dollar in the sanitation sector within the next 10 years.

Between dysfunctional and operational

But the current equipment for sewage treatment – even in India's big cities – was not fit for the tasks. In 2003 the German Federal Agency for Foreign Trade spoke of a majority of 85 percent of plants treating sewage mechanically or biologically, while only 35 percent of them referred to a mechanical and chemical/physical procedure by leaching, infiltration, deposition or flotation. A study published by German RETech Partnership in 2018 illustrates that in these 85 plants drinking water is processed in mechanical treatment facilities by sedimentation, sand filtration and chlorination, which contributes to an improved water quality only to a lesser extent. In 2014, Prakash Javadekar, Union Minister of State for Environment, Forests and Climate Change, stated that 70 percent of India's sewage treatment plants were "dysfunctional". And the journal Water Online balanced in 2017: "In fact, of the waste treatment plants that are there, many are not even functioning. Either they are in severe need of repairs and maintenance, or they simply never took off." In contrast, a report on the sewage treatment market in India notifies that from 2009 to July 2018 the country's sewage treatment capacity increased from 11,787 mld to



Photo: Acque del Chiampo SpA / BPR London

26,066.31 mld in 2018 and that “about 83 percent is currently operational”.

A costly affair

Sewage treatment plants are a costly affair: The average setting up costs of a plant currently ranges from Rupees 7,000,000 to 11,000,000 (88,000 – 137,000 Euro) per million liters a day of sewage generated. Hence, a facility with 300 mld treating capacity is calling for Rupees 300 crore (Rupees three billion / 374 million Euro). If the primary treatment system of the plant is replaced by a primary + ultra-filtration system or even by a primary + ultra-filtration system + reverse osmosis, the capital costs can rise from Rupees three million to 14.5 million and the treatment costs from Rupees 4.4 million to 7.3 million, says a study published by the UN-Water Activity Information System.

Additionally, a medium-sized plant needs energy. According to the homepage of the Banega Swasth India Campaign, to work continuously, the treatment of 200 mld requires one MW of power supply, a quantity not given everywhere. In 2010 the CPCB surveyed 84 sewage treatment plants, of which only eight could access the public power grid steadily and 12 use alternative sources. Additionally, maintenance

costs for a medium-sized plant arise amounting from Rupees 7,000,000 to 20,000,000 (88,000 – 250,000 Euro). As a CPCB report of 2015-2016 estimated, nearly half of the plants had an outdated infrastructure based on old machinery, undersized balancing tanks or dated clarifiers. Not to forget the operating crew being understaffed or poorly trained. Against this background, the sewage treatment plant for the processing of 45 million gallons per day in Kondli near Delhi seems to be an exception, to follow Rajiv Mittal, Managing Director of water treatment firm VA Tech Wabag: “Our plant can generate two MW of power from sewage and will not need a single unit from the grid. The only cost that remains is manpower, chemicals, etc.”

Insufficient conditions

A discussion paper from the German Institute for Development Policy summarized the problems: “Regulatory gaps remain concerning taxation for sewerage when new buildings are constructed, the systematic integration of sewerage into water tariffs and the systematic setting of discharge standards, reuse standards and regulations for nutrient recovery from sludge.” Besides that, the paper criticized the delay of investments in energy-efficient and of lifecycle-oriented wastewater systems that would be most

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suitable for the concrete local conditions. “India lacks sewage systems and wastewater management plants sufficient to meet the needs of its growing urban population.” This was the thematic hook of a “sector analysis”, published by the Trade Council India in August 2015, offering opportunities in the Indian water market – worth around 12 billion US-Dollar with an annual growth rate of 15-20 percent – for the Danish water industry. The analysis paper did not keep secret that the Indian water and water treatment industries are very cost competitive and sometimes limiting the use of expensive (foreign) technologies. That bureaucracy and corruption represent a significant hindrance to the ease of doing business. And that locally fabricated equipment is about 30 percent cheaper than imported equivalents.

A great market potential

But it also illustrated existing opportunities through technical consultancy in the wastewater treatment industry through the contractual and/or joint venture route, a favorable business environment for production companies, the government’s investment in and focus on PPP in ambitious infrastructural projects, great opportunities for companies working with the membrane technology instead of chemical treatment and demineralization technologies as well as better capabilities of foreign firms in designing technologies for larger-scale water treatment plants. “Innovative and futuristic management techniques” were wanted to guarantee “minimum use of water, recycling and reusing wastewater for industrial uses and ensuring a highly efficient water use in irrigation”. A market analysis on India’s water and wastewater economy in 2016, edited by BMWI, condensed: “The Indian government has realized the problem of wastewater disposal and processing, shown by increasing numbers of requirements. Communities all over India are searching for efficient solutions for wastewater treatment.” The paper saw overall “a great market potential”.

Funded worldwide

The official policy supports the improvement in the water and wastewater sector. A National Water Policy exists since 1987 and was twice revised in 2002 and 2012. The 12th Five Year Plan intended the investment of 26.5 billion US-Dollar until 2017 to provide safe water to all Indians. After the election of Narendra Modi as state minister in 2014, India started up some new initiatives and also continued others of previous governments. During three years the construction of more than 100 sewage treatment plants was proposed. The policy was funded amongst others by the World Bank, Asian Development Bank, Japan Bank for International Cooperation (JBIC) and the German Society for International Cooperation (GIZ). Funding went inter alia to the Swachh Bharat Abhiyan or Clean India Mission

with approximately nine billion US-Dollar, the Amrut for Rejuvenation and Urban Transformation Mission for the enhancement of sewerage connections and sewerage treatment facilities and the Smart Cities initiative for sanitation and solid waste management plans. Among the dozens of projects of the National Mission for Clean Ganga, two billion US-Dollar were invested in river sanitation and new sewage treatment plants along the river Ganges.

Primarily demanded by the industry

Some years ago, wastewater treatment was primarily demanded by the industry. Firstly, because several branches like the pharmaceutical needed normal to ultra-purified water, secondly because municipal bodies could not obtain customers for the service of treated sewage water if it is not potable. (For comparison: The first Faecal Sludge Treatment Plant converting the toilet waste of a town of 30,000 into compost opened in May 2018.) As industry grows faster than the governmental water supply, the companies primarily backed private service in the area of water delivery and wastewater disposal. According to BMWi, experts expect the expenditures on corresponding technologies to grow annually by five to ten percent. German RETech Partnership estimates a growth rate of five to 15 percent annually in the market for industrial wastewater disposal. Shishir Joshipura, CEO at equipment processing manufacturer Praj Industries Ltd., expects the industrial wastewater sector to see a strong double-digit growth possibly in the range of 10 to 12 percent per annum. So does Christian Ziemer, Manager Business Development and Strategy, Water & Wastewater at Siemens AG. And he not only sees market opportunities in cooperating with large Indian businesses but also for small and medium-sized companies increasingly investing in innovative water and wastewater solutions. The homepage of Everything about Water presented estimations on India’s total water and wastewater treatment market being worth about 420 million US-Dollar and growing by an annual rate of about 18 percent. Merely the 12. Five Year Plan (2012-2017) considered an economic growth of eight to nine percent possible under the condi-

“Communities all over India are searching for efficient solutions for wastewater treatment.”

tion that water-related requirements of the growing population are met. Anyhow, the demand is present: End of July 2019, Suez signed a contract providing for a 3.5-year design and construction phase of the plant in New Delhi, followed by an 11-year operation and maintenance phase. Suez thus won a 145 million Euro contract to build and operate India's largest wastewater treatment plant.

A multi-billion Dollar opportunity

Prospectively, there will be increased demand for higher-value technologies also in the municipal area that meets the legal requirements which have become stricter. Franz Heindl, Director International Sales at Huber SE, is convinced: "This sector's market potential currently is higher than the one of municipal sewage treatment, as the statu-

tory provisions put enormous pressure on companies that in turn need to react fast. In the medium to long term, however, the municipal need will by far exceed the industrial one." This is proven by another contract subscribed by Degrémont, subsidiary of SUEZ Environment. Nearly contemporaneous with the Suez handshake, authorities in the Indian city of Chennai and Degrémont on the 19th of July 2019 opened the country's second-largest drinking water production plant. With total costs of 25.2 million Euro, this plant will provide 530,000 m³/day of potable water to almost four million people.

Not for nothing research store Research and Markets called his newest edition the "Multi-billion Dollar Opportunity for Project & Services in Water and Wastewater Treatment Industry in India: What is the Next Oil?"-report.

Saudi Arabia:

NEW INTEGRATED WASTE MANAGEMENT PLAN WITH EASTERN PROVINCE MUNICIPALITY

The goal is to recycle 81 percent of municipal solid waste and 60 percent of construction and demolition waste by 2035.

In January, the Saudi Arabian National Waste Management Center, Eastern Province Municipality and the Saudi Investment Recycling Company (SIRC) – a wholly-owned subsidiary of the Public Investment Fund (PIF) – signed a tripartite memorandum of understanding (MoU) to start integrated waste management and waste recycling activities in the Eastern Province of the country.

According to the information, all three parties intend to work on the execution of the overall waste management strategy for the Eastern Province to achieve a set of strategic objectives for recycling by 2035. This notably includes the recycling of 81 percent of the two million tons of annually produced municipal solid waste and 60 percent of the approximately 1.5 million tons of construction and demolition waste per year. "As part



Photo: SIRC

Abdulrahman bin Abdulmohsen Al-Fadley (Chairman of the board of directors of the National Waste Management Center), Fahad Aljubair (Mayor of the Eastern Province) and Jeroen Vincent (Chief Executive Officer of Saudi Investment Recycling Company) signed the agreement (left to right)

of an integrated waste management system, the National Waste Management Center and the Saudi Investment Recycling Company will build state-of-the-art recycling facilities in the

Eastern Province to recycle all types of waste. This includes recycling of municipal waste into recyclables such as fertilizer, paper, plastics and metals," a press release said.

SEVEN EUROPEAN CITIES PILOT SOLUTIONS TO BE MORE CIRCULAR

“CityLoops” is a new EU-funded project focusing on organic as well as construction and demolition waste.

Høje-Taastrup and Roskilde (Denmark), Mikkeli (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven European cities that will pilot a series of demonstration actions on these types of waste to achieve material circularity. According to the information, more than 30 new tools and processes will be tested as part of the “CityLoops” project with 28 partners involved, which will run until September 2023.

Construction and demolition waste (CDW) – including soil – and organic waste (OW) are two of the most significant urban material flows with a remarkable environmental impact in European cities. The EU-funded “CityLoops” project will develop a series of innovative procedures, approaches, open access and open source tools to embed circularity within planning and decision-making processes. The ultimate goal is to drive the transition to a circular economy, ICLEI – Local Governments for Sustainability, a global network of more than 1,750 local and regional governments committed to sustainable urban development, emphasized.

The seven pilot cities – all of them are small- to medium-sized ones – will structure their pilots in three phases: inception, preparation and replication



phase. The solutions and actions go from instruments for predicting future excavated CDW and soil production to awareness-raising campaigns, circularity decision-making support tools, simulation of impacts 3D visualization tools and procurement guidelines for OW products. A total of ten demonstration actions will be implemented, testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment will be carried out in each of the cities. The former will help to optimize the demonstration activities, whereas the latter will enable cities to effectively integrate circularity into planning and decision making.

Another key aspect of “CityLoops” is circular procurement: The seven demonstrator cities will explore how public sector purchases can create markets for innovative circular economy products and solutions – from more

circular design and increasing the use of recycled content in products, to ensuring reparability, reuse and appropriate recycling of products and materials, and promoting servicing models. The active involvement of key stakeholders in every stage of the project will be of crucial importance, too.

Waste volume

Construction and demolition waste is, in volume terms, the most significant waste fraction in Europe. In 2012 construction and demolition activities were responsible for 32 percent of all waste generated in the European Economic Area with a further 27 percent from mining and quarrying, ICLEI cited Eurostat (2015). Resource consumption for buildings and infrastructure in Europe is highly material intensive, consuming between 1.2 and 1.8 billion tons of materials per annum in Europe according to the research and consulting company Ecorys (2014). The construction sector is also economically important, contributing on average five to 13 percent of the total (gross) value-added (Eurostat, 2015).

Regarding organic waste, according to the European Commission, the European Union produces approximately 130 million tons per year, a number that is projected to have increased by 10 percent by 2020, ICLEI reported. Organic waste consists of organic fractions of municipal solid waste (MSW) as well as organic waste from commercial sources and public spaces. Overall, 68 percent of organic waste produced annually in the EU consists of food waste originating from food manufacturing and packaging processes (39 percent), household scraps (42 percent) and restaurants/grocery stores (19 percent).



“CityLoops” is a new EU-funded project focusing on organic as well as construction and demolition waste.

<http://iclei-europe.org>

Report:

THE FUTURE OF PLASTIC RECYCLING

Lux Research analyzed in a report the economic forces driving growth across the four main plastic recycling technologies.

Titled “The Future of Plastic Recycling,” the report looks at four of the main plastic waste recycling processes – mechanical recycling, depolymerization, pyrolysis, and solvent-based recycling – and analyzes the factors impacting the economic viability of each. Lux points to a near-term future where no one technology takes a commanding market lead and where market conditions and global public policy will significantly impact each technology, the company gave account. The report would aim to provide recyclers, chemical and material companies, government entities, investors and consumer-facing brands the insight they need to make critical business and public policy decisions.

“The economics of plastic waste recycling are in continuous flux, with political and economic winds impacting the direction of the four main recycling technologies,” Charles Willard, Lux Senior Research Associate and author of the report, is quoted. “Each technology has its own set of factors determining its growth in the short term, and we predict growth in some areas and contraction in others, but not enough to dictate a particular winning technology.”

The four types of recycling technologies studied are as follows:

- Mechanical recycling is the most common form of plastic recycling due to its cheap and simple nature. However, due to its reliance on inexpensive plastic feedstock, mechanical recycling is particularly susceptible to dips in feedstock supply. China’s recent ban on plastic

waste has increased that supply by 45 percent; however, Lux expects global recycling capacity to increase overall, enhancing competition and limiting short-term gains.

- Depolymerization is arguably one of the most effective plastic recycling techniques with its ability to convert polyethylene terephthalate into virgin-quality monomer precursors, the process is three times the cost of mechanical recycling and heavily reliant on low or negative feedstock prices. This elevation likely means that even with an increase in supply, depolymerization will remain a niche form of recycling.
- Pyrolysis is able to address mixed plastic waste streams in ways mechanical recycling cannot. Pyrolysis, though energy-intensive, could fill the gap in this area left by mechani-

cal recycling. If petroleum prices decrease, Lux predicts pyrolysis will alter its product distillation stream to target alternative chemical markets, partially insulating it from major market fluctuations.

- Solvent-based recycling, like pyrolysis, can address mixed plastic waste streams, giving it a natural advantage over standard mechanical recycling. However, the process has had contamination issues, limiting its growth to post-industrial waste, and its reliance on the cost of solvent makes it susceptible to market factors that could inhibit growth.

■ To learn more about the economic and political fluctuations impacting the future of plastic waste recycling, download Lux’s infographic: www.luxresearchinc.com/future-of-plastics-recycling-infographic



Photo: Ludwig Paul, Servicebetrieb Bau & Stadtgrün, Stadt Schweinfurt / abfallbild.de

RUSSIA: PLANS TO INTENSIFY RECYCLING ACTIVITIES

■ Author: Eugene Gerden

The country intends to increase the volume of domestic waste recycling during the next years.



Photo: Vlad Vasnetsov / PixaBay

Russia plans to significantly increase the volume of waste recycling during the next several years and to raise the level of profitability of this business, according to recent statements of the Russian Minister of Natural Resources, Dmitry Kobylkin, who is directly responsible for waste recycling in the Russian government. As part of these plans, 60 percent of the overall waste, which is annually accumulated in Russia, will become a subject of recycling already by 2021-2022. Accordingly, the amount will be significantly higher as the current figures of 7-9 percent.

New state strategy

Implementation of these plans will be part of the recently approved state strategy, known as "For the development of the industry of processing, utilization and recycling of industrial waste for the period until 2030", which was recently approved by the Russian government and signed by Russia's Prime Minister Dmitry Medvedev.

According to Medvedev, the problem of waste recycling currently remains extremely important and acute for Russia. This should be solved shortly, due to the ever-growing number of illegal dumping, which appeared in Russia in recent years and which damages the local environment and health of local citizens. "The development of the domestic industry of waste recycling will be one of the priority goals for the Russian government until 2030", Dmitry Medvedev commented. "We are planning to establish a new industry that will attract additional resources in the secondary turnover of waste and its recycling and will contribute to reduction of the volume of the burial of industrial wastes, which poses a threat to the local environment".

Earlier this year, Medvedev also signed a decree, that imposed a ban on the burial of 182 types of waste within the territory of Russia, which should become a subject

of recycling. According to official statistics of the Russian government, the total volume of waste, which is annually accumulated in Russia, is estimated at five billion tons – and this figure continues to grow each year.

In the heart of the new state program is the establishment of the national system of waste sorting. The new strategy will create conditions for the initial sorting and the transfer of various waste for recycling. These conditions involve the provision of financial incentives, which, according to an official spokesman of Dmitry Medvedev, will speed sorting and further recycling of waste in Russia.

The majority of funds for the implementation of these plans will be allocated from state sources, particularly the Russian state budget and the budgets of Russian regions, while the total volume of investments in the realization of the new strategy is expected to reach 10 billion US-Dollar. Furthermore, the government currently considers the partial lifting of taxes for companies involved in waste recycling.

Industry comments

Still, representatives of some leading Russian waste processing enterprises believe that the achievement of goals, set by the new strategy, may be associated with serious problems. According to them, waste recycling remains a low profitable business in Russia. However, there is a possibility that the situation may change this year.

Kirill Rieterman, general director of "Tiger-Siberia", one of Russia's largest waste processing companies, comments: "Waste recycling in Russia could be a profitable business only in the case of introduction of public-private partnerships between business and the government. Business cannot make this business profitable solely by its own forces. The government should create a scheme in which investors will understand that waste recycling is a long-term business



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in Russia, which will stimulate them to make investments in it, without the risk of losses of their funds”.

More importantly, to date, the rapid development of the waste recycling industry in Russia has been prevented by the existing problems, probably the most pressing of which was associated with a lack of necessary equipment for waste recycling and processing in Russia. Prior to 2017, the majority of equipment for the industry’s needs has been purchased by Russian businesses in the EU. However, the volume of supplies has significantly declined in recent years, when processors realized that the majority of equipment, imported from the EU, was not able to deal with Russian waste.

At the same time, another problem typical for the industry was related to the low cost of secondary raw materials. Russia’s leading waste-processors and recyclers also said that the main problems for their business in Russia come along with an enormous diversity of packaging, which is intended for the same type of products. According to them,

this diversity and lack of unified standards in packaging significantly complicate its sorting and further recycling.

“There should be some kind of centralized system and some unified state standards so that packaging can be processed more scrupulously”, Daniil Yudin, head of Polymer Recycl-N PTC, another leading Russian recycling enterprise, commented. “For example, packaging for certain category products, such as eggs, should be made from certain raw materials. In the case of eggs’ packaging, it is recommended to be made only from polystyrene. The same could apply to other categories of products and their packaging. Then it would be much easier to sort and process.”

Processors have also said, that – unlike other housing and communal services, which are based on the consumption of easily measured resources (gas, water, electricity) – the accounting of waste in Russia is usually associated with serious problems and the presence of unfair businesses, including those, which is affiliated with the mafia. In this regard, the government fears that the allocated funds for waste processing and recycling could become a subject of theft, due to the difficulties in the tracking of allocated cash flows.

Waste-to-energy plants

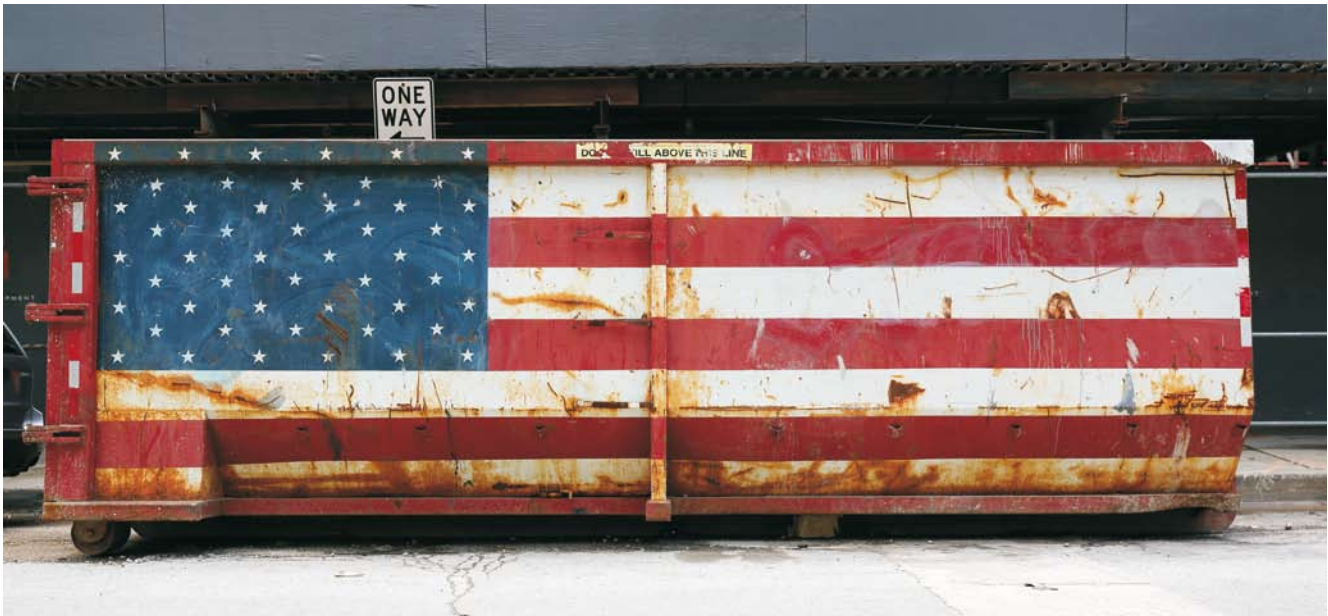
Finally, the new strategy also involves the development of the domestic waste-to-energy market. As part of these plans, several large-scale investment projects in this field will soon be implemented in Russia. One of them will shortly be launched in the Moscow region and involves the building of four innovative waste-processing plants, that will generate electricity through the recycling of solid domestic waste.

The project will be implemented by the Russian financial holding RT-Invest, together with Hitachi Zosen Inova, while the volume of investments in these plans may reach Russian Rubles 62 billion (1 billion US-Dollar).

According to the CEO of RT-Invest Andrei Shipelov, the total capacity of the enterprises will be 700,000 tons per year, while their annual electricity output will reach 70 MW. In addition to the Moscow region, a similar enterprise will be established in the Tatarstan Republic, a center of Russia’s petrochemical industry (which struggles from the ever-growing volumes of plastic waste), while its capacity will be 550,000 tons.

In terms of waste structure in Russia, up to 62 percent of waste in the country is generated in the oil and gas industry, while the share of local mining and minerals’ industries is estimated at around 31 percent.

“The development of the domestic industry of waste recycling will be one of the priority goals for the Russian government until 2030”



USA: NATIONAL FRAMEWORK FOR ADVANCING THE RECYCLING SYSTEM

The National Framework for Advancing the U.S. Recycling System, released in November 2019, is the product of a multi-stakeholder collaborative effort that began one year earlier.

As reported, in November 2018 the Environmental Protection Agency (EPA) hosted the first America Recycles Day Summit, which brought together stakeholders from across the U.S. recycling system to join the agency in signing the America Recycles Pledge. “Participants included representatives from federal, local, state and tribal governments; the recycling industry; non-profits; manufacturers; and product brands, who worked collaboratively over the course of 2019,” EPA informed. “All 45 signing organizations, including EPA, pledged to work together to identify specific actions to take in addressing the challenges and opportunities facing the U.S. recycling system.” In November 2019, the total number of pledge signers had grown to more than 165 and in December to 195. Through the pledge, organizations committed to leveraging their collective expertise, strengths and

resources to address these challenges and opportunities. Workgroups were formed to address four critical areas for action: promoting education and outreach, enhancing materials management infrastructure, strengthening secondary materials markets and enhancing measurement. “These action areas have been continually underscored and reaffirmed as the primary areas of need to address the challenges facing our recycling system.”

The national importance of recycling

“Recycling is an important driver of the United States’ economy and a way to conserve our resources and protect the environment,” EPA wrote in the executive summary of the national framework document. The U.S. Environmental Protection Agency’s “Recycling Economic Information Report” had found that, in a single year, recycling and reuse activities in the country accounted for 757,000 jobs, 36.6 billion US-Dollar in wages and 6.7 billion US-Dollar in tax revenues. As emphasized, this would equate to 1.57 jobs, 76,000 US-Dollar in wages and

14,101 US-Dollar in tax revenues for every 1,000 tons of material recycled. Besides, recyclable materials with a commodity value of approximately 8.9 billion US-Dollar were sent to landfills annually.

“Recycling also reduces the amount of waste sent to landfills and incinerators; conserves natural resources such as timber, water and minerals; and reduces pollution sources by reducing the need to extract new raw materials. While the benefits of recycling are clear, growing and strengthening the U.S. recycling system to support domestic industries and enhance environmental and community benefits will require multi-stakeholder collaboration to address the challenges currently facing the system,” the Environmental Protection Agency underlined. According to the information, the challenges include:

- Confusion about what materials can be recycled, which often leads to placing recyclables in the trash or throwing trash in the recycling bin or cart;
- Outdated recycling infrastructure

that is ill-equipped to keep pace with today's diverse and changing waste stream;

- Reduced export markets for recycled materials, requiring domestic markets to be strengthened;
- Varying methodologies to measure recycling system performance used across the country make it difficult to create effective goals and track progress.

"This National Framework for Advancing the U.S. Recycling System is an initial step toward defining and addressing the complex challenges facing the U.S. recycling system," EPA stated. To shift the system, it "will take a network of federal, state, local and tribal governments, manufacturers, brands, non-profit organizations, recycling industry associations, and waste management companies". To assist these

Waste Management in the USA

According to EPA's collected and reported data on the generation and disposition of waste in 2017, the total generation of municipal solid waste (MSW) in that year was 267.8 million tons (U.S. short tons, unless specified) or 4.51 pounds per person per day. "Of the MSW generated, approximately 67 million tons were recycled and 27 million tons were composted," the agency informed on its homepage. "Together, more than 94 million tons of MSW were recycled and composted, equivalent to a 35.2 percent recycling and composting rate. Also, more than 34 million tons of MSW (12.7 percent) were combusted with energy recovery, and more than 139 million tons of MSW (52.1 percent) were landfilled." The agency refers "to trash, or MSW, as various items consumers throw away after they are used. These items include bottles and corrugated boxes, food, grass clippings, sofas, computers, tires and refrigerators". As emphasized, MSW does not include everything that is landfilled in MSW – or nonhazardous – landfills, such as construction and demolition (C&D) debris, municipal wastewater sludge, and other non-hazardous industrial wastes.

efforts, EPA would continue to serve in its role as a convener and facilitator of the America Recycles network efforts.

www.epa.gov/sites/production/files/2019-11/documents/national_framework.pdf

INITIATIVES TO INTENSIFY RECYCLING

In November last year, politicians introduced two legislation acts.

As reported, the United States Senators Rob Portman and Debbie Stabenow introduced a new legislation – the Recycling Enhancements to Collection

and Yield through Consumer Learning and Education Act (RECYCLE Act) – to create a new federal grant program through the Environmental Protection Agency (EPA) to help educate households and consumers about their residential and community recycling

programs. Cosponsors of this legislation are the senators Susan Collins, Ron Wyden and Todd Young.

This legislation would help to increase recycling rates and reduce contamination in the recycling stream, they argue. Reports had indicated that consumer confusion on how to properly recycle would be one of the top recycling challenges and that education and outreach both increase participation in recycling and decrease contamination. On his homepage, Rob Portman emphasized that – according to EPA – the recycling rate in the country is 35.2 percent. Furthermore, nine billion US-Dollar worth of recyclable materials were thrown away each year, which would present a big opportunity to improve the nation's recycling systems. "In addition, recycling offers numerous environmental and economic benefits, including diverting materials from landfills, using less energy to reprocess recycled material – which



Photo: Hans Braxmeier / Pixabay

reduces emissions – and creating jobs”. EPA’s 2016 Recycling Economic Information (REI) Report had found that recycling supported more than 757,000 jobs and 6.7 billion US-Dollar annually in tax revenues.

If realized, the RECYCLE Act would:

- Authorize annually 15 million US-Dollar over five years in grants to States, local governments, Indian tribes, nonprofits, and public-private partnerships to educate and inform consumers and households about their residential and community recycling programs.
- Direct EPA to develop a model recycling program toolkit in order to improve recycling rates and decrease contamination in the recycling stream.
- Require EPA to more frequently review and revise, if appropriate, its

comprehensive procurement guidelines, which designate products containing recycled materials and provide recommended practices for federal agencies to purchase such products.

Some days earlier, U.S. Representatives Tony Cárdenas and Larry Bucshon had introduced the “Realizing the Economic Opportunities and Value of Expanding Recycling (RECOVER) Act”. It would allocate federal grants to states and municipalities to invest in improving their recycling programs and infrastructure, including upgrading plants that receive and process recyclables and enhance the recovery and collection of materials. According to Tony Cárdenas, the RECOVER Act would encourage local and state governments to invest in recycling programs and new technologies to increase collection rates and

promote consumer education. “This grant would support public-private partnerships and will help communities across the nation to expand and modernize our country’s recycling infrastructure. This bill would create new jobs, boosts our economy, and, ultimately, it is good for American families and the environment.” As reported by the media, the bill would allocate 500 million US-Dollar in matching federal funds for states, municipalities, and tribes. RECOVER is also to support the establishment of a recycling infrastructure program within the EPA. Furthermore, the bill would require the agency to submit a progress report to Congress no later than two years after implementation.

While many industrial associations welcome the RECYCLE Act, the RECOVER Act is not supported by all industry sectors.



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GHOST NETS: WHAT HAPPENS TO THE SPIRITS THE FISHERY INVOKED?

The number of abandoned, lost or otherwise discarded fishing gear (ALDFG) left in the oceans is unknown. The most mentioned figure is 640.000 tons each year, deriving from a joint report by FAO (United Nations Food and Agriculture Organisation) and UNEP (United Nations Environment Programme). Other estimations indicate that 46 to 70 percent of microplastic by weight are fishing gear or announce that 25,000 lost nets with a total length of 1,250 kilometers float in the European water's seas.

However, it is much more important to know who is trying to reduce the maritime and coastal waste and what is ultimately happening to the collected material.

GGGI – the leading platform

The Global Ghost Gear Initiative (GGGI) calls itself “the recognized leading platform for addressing abandoned, lost and discarded fishing gear globally”. In its 2018 annual report, the platform refers to 95 participants representing a wide range of stakeholder categories including the fishing industry, corporates, NGOs, academia, intergovernmental and private sector organizations; additional 14 governments – from the United Kingdom and Canada to the Republic of Vanuatu and Tuvalu – belong to the signatories. The report shows GGGI activities like building evidence working groups, defining best practices, informing policy working groups and creating catalyze and replicate solutions working groups.

At that time the initiative, amongst others, coordinated a project with the Indonesian Centre for Fisheries Research and another with the Kingdom of Belgium and the World Animal Protection, organized net recycling in Dutch Harbor, Alaska, held a workshop including delegates of the Aquatic Resources Authority of Panama and the NOAA Marine Debris Program, started a Zero Impact Campaign in Chile and began to create a circular economy from abandoned, lost and otherwise discarded fishing gear (ALDFG) in Peru.

Investment mobilized

In 2017, GGGI supported the mobilization of 524.6 million US-Dollar in investment, a record that significantly exceeded the year’s target of 64 million US-Dollar. Of this amount, 337 million US-Dollar of investment in Ethiopia, 60 million US-Dollar of investment in Rwanda, and 15 million US-Dollar of investment in Indonesia were mobilized from the private sector. The UK Government was said to commit over 130,000 US-Dollar for work in Vanuatu and the Solomon Islands and to provide training on best practice management of fishing gear in other Commonwealth countries. The Government of the Netherlands wanted to commit 110,000 US-Dollar towards continued project work in Indonesia.

The report provided some net fishing quota too: 80 end-of-life nets from Alaska yielded 124 tons in 2017 and 71 tons in 2018. The expanded Bureo’s Net+Positiva program in Chile was expected to result in 100 tons of end-of-life fishing nets recycled and be turned into skateboards, sunglasses and frisbees. And in Peru, NetPlus producer Bureo even targeted a collection of more than 1,000 tons of ghost gear – including nets – annually.

Healthy Seas – the removal network

The activity radius of the Healthy Seas initiative is smaller, as the organization focuses upon three European regions: North Sea (the Netherlands and Belgium), Adriatic Sea (Italy, Slovenia and Croatia) and Mediterranean (Spain). In 2013, the organization was founded by Nylon producer Aquafil Group, StarSock and Ghost Fishing, building an international and local network active in lost fishing gear removal.

The cooperation of a non-governmental organization and businesses shares cleaning the seas of marine litter, mainly derelict fishing nets, as a common mission. It is backed by twelve associate member partners, four associate donor partners (including NoFir) and 65 other partners (including GGGI). And it is working with two harbors in the Netherlands, three harbors in Italy and 22 fishing communities in Greece. The recovery results published by Healthy Seas show a total of 453 tons collected between 2013 and 2018. The work was done by 75 volunteer divers and by operation of 650 fishing boats.

EUfir and NoFir – collecting and recycling

In terms of fishing gear collection, the balance of EUfir, respectively NoFir, offers slightly higher results. Between 2011 and 2019, the scheme assembled a total of 41,634 tons of material from 17 mostly European countries; in 2019 there were 3,151 tons from 10 countries. EUfir is the short form of “A European system for collecting and recycling discarded equipment from the fishing and fish farming industry”, sponsored by the European Commission within the Eco-Innovation funding initiative, starting in 2012 and funded by 680,000 Euro. Norsk Fiskeriretur AS (NoFir) was founded in 2008 to establish a nationwide system for collecting discarded equipment in Norway.

Since 2012, it is the coordinator of the EUfir project with the task of organizing the transport of collected and recovered equipment. According to a life cycle assessment study conducted by Italian Life Cycle Engineering, EUfir is a real network comprising transport means, a fishnet dismantling and materials classification facility run by UAB NoFir in Lithuania, and – besides a nets reuse service – specific recycling plants for PA6, PE and PP, lead and steel. The material is first dismantled and divided into homogenous types at Nofir UAB factory and then addressed or delivered to reuse or recycling processes at Nofir partners’ facilities.

The resulting functional unit is “1 kg of average EUfir system output material” composed of 76 percent PA6, 13 percent Polypropylene, nine percent HDPE, two percent lead and one percent steel. The system is rated for an

output of 22 percent waste stocked for later treatment, two percent for reuse and 76 percent recycling. If the waste is managed without the EUfir system, only 20 percent is recycled, whereas 35 percent is dumped at sea and 45 percent disposed of.

Net-Works – the cross-segment initiative

Net-Works is another European cooperation founded by global carpet tile manufacturer Interface, Inc. and the Zoological Society of London (ZSL). The cross-segment initiative was originated to tackle the problem of discarded fishing nets in some of the world's poorest coastal communities. The program started at the Danajon Bank in the Philippines in 2012, was expanded to the Douala-Edea region in Cameroon in 2015, and activities in Indonesia were projected. As a whole, 40 local communities were involved, a community-based supply chain for discarded fishing nets established and “the potential to provide a continuous and steady stream of used nets into the global supply chain” discovered. Besides that, the initiative collected 224 metric tons of waste fishing nets since 2012. Interface summarized: “Net-Works focused on working with coastal villages to recover fishing nets and incorporate them into our supply chain, to see them made into recycled nylon for our products.”

Via the program of Net-Works – meanwhile trademarked –, Interface became a founding member of the NextWave Initiative delivering “environmental and social benefit through the creation of the first global network of ocean-bound plastic supply chains”.

Aquafil – the Econyl yarn producer

The biggest beneficiary of most discarded or ghost net recovery activities is Polyamide producer Aquafil, headquartered at Arco in the Italian province Trentino. Its registered Econyl regeneration system enables Aquafil to use 100 percent regenerated raw materials obtained from post-consumer waste made from Polyamide 6 including fishing nets, fluff and rigid textiles as well as pre-consumer waste, generated from the production of Nylon 6. And to produce Nylon 6 Econyl yarn from it. That is why Aquafil is co-founder of the Healthy Seas project and has been working with an ECNC group to harvest those discarded nets. The company is a purchaser of the material Interface receives from the Net-Works collections. NoFir works in partnership with the Aquafil plant in Slovenia to turn the recycled nets into regenerated polymers.

The net recycling program at the Steveston Harbour on the west coast of British Columbia was formulated together with the Aquafil Group. And the Aquafil sustainability report

2011 offers that waste – admittedly not only won from the sea – was collected world-wide in the United States, British Columbia, Greece, Turkey, Pakistan, Egypt, Thailand and Norway. The globally assembled nets are inspected, cleaned and prepared at Ajdovscina, samples may be taken so that the material can be analyzed in more detail at the chemical lab in Ljubljana, and the material is ready to end in Aquafil's Econyl regeneration plant in Ljubljana. (Along with these sources, Aquafil has a worldwide program that collects carpet fluff and fabrics – 30,000 tons worth between 2011 and 2013. Moreover, the company maintains a partnership with carpet producer Tarkett, with Aquafil sourcing post-use PA6 yarn from Tarkett to create its regenerated Econyl yarn to be used by Tarkett for new carpet tiles – a full circle).

Only two companies

Additionally, the group's financial report in 2018 provides patents dated March 2013 on the recycling of polyamide fibers from elastomeric products, dated June 2017 on the composition of fishing net coatings and dated June 2018 a method to recover copper from discarded fishnets. There is only one serious competitor to Aquafil in the field of recycling fishing nets to yarn on a large scale: The Danish cleantech recycling company Plastix is specialized in converting fibers, primarily used fishnets, trawls and ropes into high-grade and virgin-like Green Plastic raw materials. Plastix uses a market gap, as Aquafil only recycles and ships the Nylon 6 material, while fishing gear such as trawl nets and crab pots can partly not be recycled. Sourcing primarily fiber plastics from an increasing number of ports, net makers, and plastics collectors globally, the finally pelleted recyclate is called OceanIX HDPE. “Today, five years after, we have solved the challenge and developed a mechanical recycling plant with the capacity of 20,000 tons annually for the treatment of waste fishing nets, trawls and rigid plastics, built an advanced laboratory for quality assurance and documentation and developed an extensive input collection system”, Plastix CEO Hans Axel Kristensen gave account.

It is not correct that – as an online-magazine wrote in 2017 – gear recycling in the fishing industry is “finally catching on”; the impulses came mostly from outside. It is not correct that – as another online-magazine titled at the same time – recycling fishing gear is “a net positive for startups and oceans”; the consolidation is already progressing. And it is not correct that – what both articles balanced – “fishing gear recycling is still in its infancy”: Collection, recycling and use of secondary raw materials are well known and utilized. However, higher quantities and more investment in collection and treatment are necessary since an annual amount of 640,000 tons are waiting out in the seas.

“Circulytics”:

A NEW CIRCULARITY MEASUREMENT TOOL

Since January the Ellen MacArthur Foundation offers “Circulytics”, the “digital measuring tool which gives companies a fully comprehensive picture of their circularity across all operations”.



The new tool permits companies to track their progress. “Developed and tested by more than 30 companies from the Ellen MacArthur Foundation’s network, ‘Circulytics’ informs strategy, allows users to see where they lie in relation to their industry, and provides quick understanding for those actively moving away from the current ‘take, make, waste’ linear economy”. Furthermore, it would provide the option to have informed interactions about circular economy adoption should businesses wish to do so with investors and customers, while the foundation plans to engage with companies that generate outstanding scores to create inspirational case studies.

A freely available resource

The digital measuring tool “supports a company’s transition towards the

circular economy, regardless of industry, complexity or size. Going beyond assessing products and material flows, this company-level measuring tool reveals the extent to which a company has achieved circularity across its entire operations”. “Circulytics” measures a company’s entire circularity; supports decision making and strategic development for circular economy adoption; demonstrates strengths and highlights the areas for improvement; provides optional transparency about a company’s circular economy adoption and delivers clarity about circular economy performance, opening up new opportunities to generate brand value with key stakeholders. The indicators have been developed by the foundation in collaboration with 13 global partners and CE100 member

companies. “When creating ‘Circulytics’, we sought alignment with other circular economy-related initiatives, which will be in ‘other tools’ as they become available,” the Ellen MacArthur Foundation underlined.

Once the reporter of the corresponding company has submitted the details, he or she will be provided with access and a secure link to the survey platform, “along with the unique log-in”. After submitting the required qualitative and quantitative data in the platform, companies would receive a bespoke company scorecard, which features a comprehensive breakdown of their results and an circularity score. “The insights generated in this scorecard help companies identify opportunities to design out waste, keep materials and products in use, and generate environmental benefits.” All data and all the results generated in the scorecard are confidential and will not be shared with third parties.

www.ellenmacarthurfoundation.org/resources/apply/circulytics-measuring-circularity

Screenshot: Video „How to take part in Circulytics”.

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SUBSTANTIAL INVESTMENTS IN NEW PROJECTS SPUR GROWTH

The South African waste management industry is depicting continual growth, the market research store Research and Markets (www.researchandmarkets.com) informed as it introduced its new report “Middle East And Africa Waste-To-Energy (WTE) Market 2019-2027”.

According to the information, the industry in the Middle East and Africa (MEA) region would grow with a CAGR (compound annual growth rate) of 4.88 percent in the forecast duration from 2019-2027. The South African waste management industry is one of the most efficient waste management industries in the continent of Africa, the research store judged. In 2018, South Africa generated 42 million cubic meters of waste, most of it was discarded in landfills. Recycling waste has become necessary in the country, as the poor recycling rate (around 10 percent) has resulted in the reduction of the area available for landfilling. “Waste-to-energy management in South Africa would provide the country with significant benefits,” Research and Markets wrote. “For instance, with

the country increasingly falling short of space for landfilling, WtE management proves to be an excellent alternative to landfills.”

The “first large-scale WtE conversion plant in Africa” was launched in January 2017, in Cape Town’s Athlone, which was built five years after extensive planning. The waste contractor Waste Mart and Clean Energy Africa (CEA) collaborated for the development of this project worth 400 million South African Rand (about 28 million US-Dollar), which is owned and run by Clean Energy Africa’s subsidiary, New Horizons Energy. “By implementing this project, Cape Town has moved from being an electricity distributor to an electricity generator, reaching towards its goals of having 20 percent renewable energy in its energy mix,” the information said. As reported by African media, the facility is designed to convert 500 tons per day into renewable energy.

Another solution to generate electricity is to be realized in Johannesburg. The Climate Neutral Group captures

methane gas from five municipal landfill sites around Johannesburg, which is converted into electricity via a network of pipes in the landfill. The gas is pumped in a chimney where it is combusted into harmless emissions. This is the project’s first phase, the company underlined on its homepage. The project’s next phase would see the installation of five generators “that will channel the gas as fuel for electricity generation. The generators will transfer the energy to the municipal distribution grid.” When completed, the project would produce 19MW of electricity – enough to power 16,500 medium-sized houses. “This will make it the biggest landfill waste-to-energy project in South Africa,” the Climate Neutral Group is convinced.

The requirement exists

“As Europe’s WtE market approaches saturation, Africa is an obvious next step”, Cecily Davis – head of the Africa Group at law firm Fieldfisher and an engineering, procurement and construction specialist – wrote in the monthly magazine “The Africa Report” in October last year. Energy demand in the continent is predicted to rise by 127 percent by 2040, she informed, referring to BP’s Energy Outlook 2019. Electricity demand is expected to rise three times, and the share of renewables in Africa’s fuel mix should grow from one percent today to 16 percent over the same period. However, there are also significant challenges in developing WtE projects in countries with little or no organized waste collection, Cecily Davis noted. “This is compounded by a scarcity of finance and, in some countries, political instability.”

In 2018, the first facility in Ethiopia was inaugurated. The plant is built on the Koshe landfill site located on the

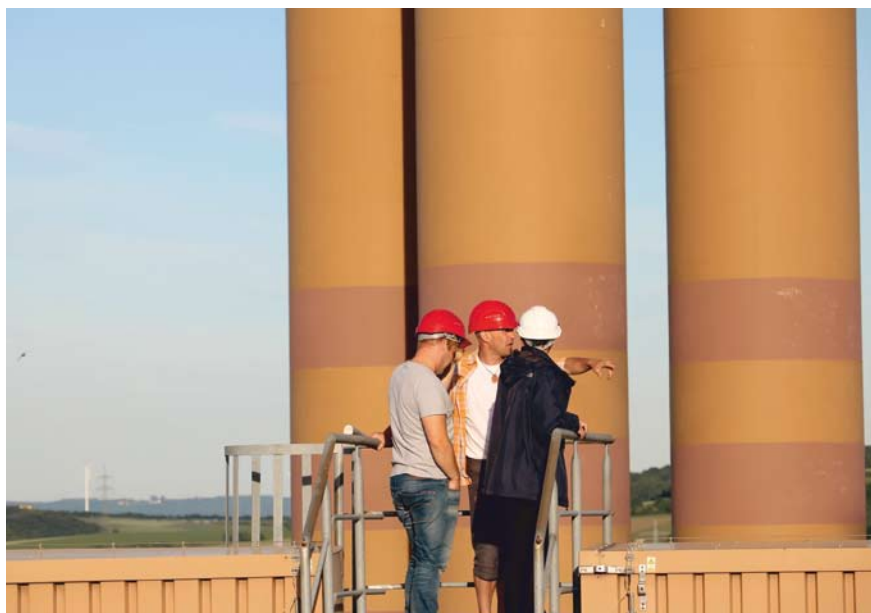


Photo: Harald Heintz / abfallbild.de

outskirts of the capital Addis Ababa, the online publication africanews.com reported. It was designed to take 1,400 tons of waste daily (which comes up to about 80 percent of waste generated by Addis Ababa) and to supply the capital with 30 percent household electricity needs.

“Some biogas facilities have been up and running for a few years, like the food-waste-fed Ketu Ikosi Biogas Project in Lagos, Nigeria, and Tropical Power’s 2.4 MW Gorge Farm Anaerobic Digestion Power Plant in Naivasha, Kenya, which runs on vegetable waste,” Mrs. Davis informed.

In her opinion, there are several opportunities for Waste-to-Energy in Africa:

- Rapid urbanization has created megacities (with populations of more than 10 million) across the continent including Cairo, Kinshasa and Lagos in Nigeria. According to the United Nations, Luanda, Dar es Salaam and Johannesburg will reach this status by 2030.
- The United Nation’s Sustainable Development Goal 7 focuses on delivering universal access to affordable, clean energy, “a policy that favors WtE in appropriate contexts”.
- Countries are changing their attitude to landfill – and governments consider more sustainable options for waste management.
- “If uninterrupted supplies of feedstock can be guaranteed, WtE does not have the intermittency issues that hinder solar, wind and

even hydro energy and is therefore technically more reliable than other forms of renewable energy”.

According to the expert, a “bonus feature of WtE projects is their capacity to generate revenue from by-products, such as metals sorted from the waste and residual products, which, depending on the type of feedstock used, can be made into construction materials, agricultural feed or fertilizer”.

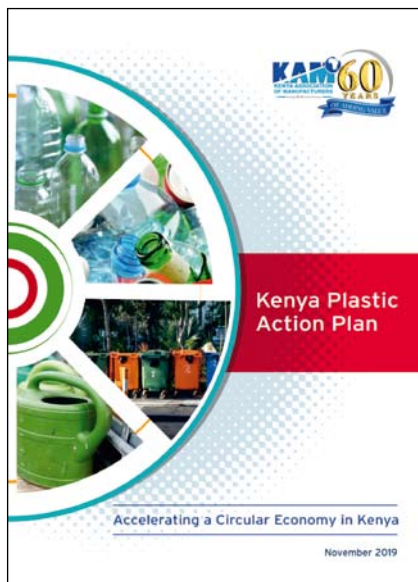
Furthermore, the moisture content of waste in African countries would present opportunities to harvest power from excess steam. WtE operators could also collect the water extracted from the waste during the drying process, for human or industrial consumption.

Kenya:

COLLABORATION TO MANAGE PLASTIC WASTE

After the launch of the Kenya Plastic Action Plan, which aims at enabling a circular economy for environmentally sustainable use and recycling of plastics in the country, the Kenya Association of Manufacturers (KAM) has partnered with Clever Green Kenya (CGK).

The goal is to manage post-consumer plastic waste in the country through the formation and management of a Producer Responsibility Organization. As announced, it shall set up Extended Producer Responsibility (EPR) schemes for the benefit of KAM Members and other plastic users, as per the recommendations of the Kenya Plastics Action Plan (www.kam.co.ke/kam/wp-content/uploads/2019/12/KPAP_Document-pages.pdf) launched in December 2019. This private sector-led policy and plan for measures identify the specific steps that the public and private sector should undertake to achieve this including waste manage-



ment at the county level, formation and regulation of EPR schemes and establishment of recycling value chains and standards.

As reported, CGK seeks to develop a sustainable waste management

ecosystem by creating a platform on which waste management stakeholders can interact. The EPR fees would be used to collect, sort and recycle waste. CGK, represented by its founders Raj Kent and Hasit Patel, intends to collaborate with public and private sector institutions to realize “a circular economy through sustainable waste management that will contribute to social, environmental and economic transformation in Kenya”. CGK’s long term vision is to offer practical solutions to tackle all plastic waste that can be recycled in the country.

Through this partnership, the two organizations – Kenya Association of Manufacturers and Clever Green Kenya – also seek to explore the possibility for support and collaboration in public and government engagement activities.

www.kam.co.ke

Source: Kenya Association of Manufacturers

POSSIBLE USES OF VORTEX LAYER SYSTEMS

According to the author, this technology is suitable for treatment, neutralization and disposal of various waste materials: Vortex Layer Systems is tested and can, for example, improve the quality of wastewater treatment.

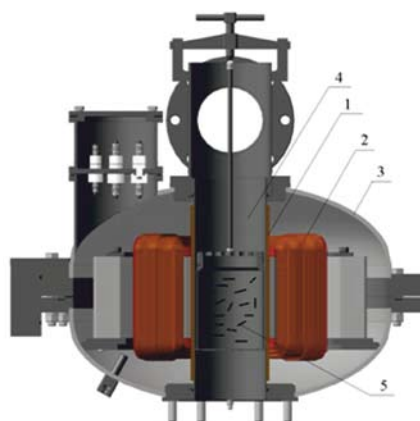
■ Author: Frank May

So far, there is no scientific and technological achievements which could improve the life of the human race on a global planetary scale. The world is contaminated with trash and hazardous industrial waste; climate change is becoming noticeable. Average temperatures are on the rise, which will eventually cause polar ice melting and flooding of low coastal lands all over the world. Uncontrollable extraction and processing of crude oil is also quite unacceptable.

However, several related technologies, which can address many of the above problems, already exist. These processes were originally suggested in the 1960s by a Ukrainian scientist, D. Logvinenko, but have not received due attention. The idea is based on new ways of influencing matter with energy: a rotating electromagnetic field. This process became the basis of industrial units with capacities two or even three orders of magnitude higher than those of traditional equipment used for the same purposes. At the same time, the energy, material, labor, and capital costs are 5-100 times lower. Process lines based on these systems can be used in just about any industry to great technological and economic effect, without the need to redesign the industry. Logvinenko called his invention the vortex layer system.

The principle of the vortex layer system

A typical vortex layer device uses three-phase industrial electric power



Ferromagnetic particle vortex layer device: 1 – protective collar; 2 – rotating EM field induction coil; 3 – induction coil housing; 4 – non-magnetic operating chamber; 5 – ferromagnetic particles

to easily generate a rotating electromagnetic field at industrial frequencies, just as it is done in regular electrically powered machines. However, DC static converters, quite accessible now, allow expanding the range of field parameters for fine-tuning the vortex layer system for a specific application.

The design of the device is similar to an asynchronous electric motor – without the rotor. Instead of the rotor, the device is equipped with a chamber. The main component, which generates the rotating field, is a magnetic induction coil, which includes induction core and a three-phase coil. The rotating electromagnetic field is

confined within the chamber, limited by the non-magnetic body. The processed material is supplied into the chamber along with ferromagnetic needles, which interact with the rotating EM field.

Chemical and physical processes are intensified due to extremely intensive mixing and dispersion of processed materials, acoustic and electromagnetic effects, high local pressures, electrolysis, etc. All processes occur in the same chamber, in the same mode. Any material can be processed in these units, as long as the particle size (for solid materials) corresponds with the size of the chamber and the needles, liquid fluidity is high enough, and powders can flow freely.

Using the vortex layer devices

One of the most promising directions of the vortex layer application is the



AVS-100 vortex layer device

processing of waste materials, neutralization, and disposal or recycling of industrial, household, and agricultural waste. Existing traditional neutralization and disposal technologies are inefficient, consuming much energy, materials, and land area. They can also be environmentally hazardous. Calculations show that the complete neutralization of an industrial waste stream with current methods will cost not much less than the production itself and with unreliable neutralization results.

There is a gigantic range of various technology processes and equipment, which perform their function, albeit not fully. The objective is to increase their efficiency without significant capital and power costs.

Now, this is possible. Vortex layer devices have one specific characteristic: They can be retrofitted into existing lines, increasing their efficiency immensely. Thus, quick and simple retrofit is possible to improve waste processing lines of any type.

The efficiency of vortex layer systems has already been tested and proven in the following processes with some environmental impact:

- neutralization and disposal of in-



Photos: Globecore

Commissioning of an AVS-150 System in a Paper Mill Wastewater Purification Line in China

- industrial, household and agricultural waste;
- clearing of small river beds;
- removal of solid household waste, dumps, landfills and wastewater;
- destruction of toxic materials, industrial and agricultural poisons;
- capture, neutralization, and disposal of industrial gas exhaust;
- processing of crude oil and oil products;
- production of biofuel etc.

Now for a more detailed explanation: The vortex layer system is not and should not be thought of as a device that can solve all the global problems mentioned above, which threaten humanity's continued existence. This system is a tool that accelerates processes and improves the efficiency of existing process lines.

For instance, vortex layer systems intensify and improve the quality

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of wastewater treatment by high-intensity mixing and dispersion, electrochemical factors, and high local pressures. These factors allow for efficient production of chrome-containing wastewater in one stage in alkaline media (reduction of Cr^{6+} to Cr^{3+} and formation of Cr^{3+} hydroxide at pH 7.5-8.5) instead of a two-stage process (reduction of Cr^{6+} to Cr^{3+} in acidic media at pH 2-3 and then formation of Cr^{3+} hydroxide in alkaline media), greatly simplifying the process and reducing chemical consumption.

The efficiency of heavy hydroxide formation during treatment of acidic and alkaline wastewater in vortex layer systems is due to the formation of metal hydroxides, their co-precipitation and sorption by iron hydroxide, activated colloidal iron which forms due to dispersion of ferromagnetic elements of the vortex layer in the device, due to the electrochemical processes and alkalization of wastewater. Field research in industrial facilities shows

About the Author:


Frank May is service manager of GlobeCore, based in Oldenburg, Germany. With more than 30 years of practical experience starting up, commissioning, and operating various industrial equipment, May now is focused on purification of domestic and industrial wastewater, as well as regeneration of insulating oils and maintenance of power transformers. He can be reached at energie@globecore.de.

that the high degree of heavy metals removal from wastewater (practically complete) is achieved when the pH of wastewater is close to the pH when the corresponding hydroxides begin to form (pH 7.5-8.5), which allows to significantly reduce the time of wastewater decontamination (such treatment in a vortex layer takes seconds, as opposed 15-30 minutes in traditional equipment) and decrease

alkaline chemical consumption. It is important to note that the vortex layer process for wastewater decontamination significantly accelerates precipitation of the metal hydroxides in settling tanks (1-1.5 hours, instead of the recommended 2-4 hours), reduces the amount of sediment and its humidity and improves filtration.

The uses of vortex layer systems in industrial wastewater processing reduce chemical use by 1.5-2.0 times and decrease electricity consumption (0.3 kWh per 1 m³ of wastewater instead of 0.6-0.8 kWh when using mechanical agitators, and 2-6 kWh with electric coagulation methods).

To sum up, the mentioned list of vortex layer system use is far from complete. This technology can be applied in other areas to improve the ecology. Further research is required, of course, and it is hoped that the development will continue.

 www.globecore.de

VENICE 2020

November 16 – 19, 2020 Venice (Italy)

VENICE 2020 – the eighth International Symposium on Energy from Biomass and Waste – will take place at the Scuola Grande di San Giovanni Evangelista in Venice.

The production of energy from alternative sources and its impact on climate change are among the main strategic tools implicated in the sustainable development of the society. Numerous types of biomass and

wastes contribute towards the production of energy and the reduction in the use of fossil fuels through biological, chemical and thermal processes. Existing biomass and waste to energy technologies are currently undergoing rapid development. Despite growing interest in the use of these technologies, in many countries, their implementation remains limited. The aim of Venice 2020 is to focus on the advances made in the application of

technologies for energy recovery from biomass and waste and to encourage discussion in these fields.

The symposium will last four days and include oral sessions, workshops, a poster session, an exhibition by companies working in the field and technical tours at biochemical and thermochemical plants.

 www.venicesymposium.it



INTELLIGENT NIR SORTING UNIT

The UniSort PR EVO 5.0 reflects Steinert's years of experience gained from several UniSort generations and the huge amounts of data that have been processed. Some sorting applications are far more complex than others and cannot be handled using conventional methods – for example sorting silicone cartridges. Since they comprise a polyethylene (PE) outer wall, they are valuable materials for recycling. Silicone residues inside the cartridge can, however, contaminate pure PE products, even rendering them unusable, and meaning that they have to be removed from the material flow.

The Intelligent Object Identifier – a system for sorting machines – has been developed for precisely this initial application, Germany-based manufacturer Steinert underlined. It is supported by Artificial Intelligence (AI) that detects and isolates these cartridges using optically detectable characteristics. "These additional distinguishing features make for a more stable sorting process, while also improving sorting results." In the future, this technology would also support other sorting tasks or make them possible for the first time, the company is convinced. For example, Steinert is working on an addition to the sorting program to separate polyethylene terephthalate (PET) bottles and trays that will further improve sorting reliability thanks to a new object detection feature. As reported, this solution can be integrated without any additional sensorics and is downward compatible with UniSort machines dating back to 2018 with a combination of NIR and color cameras.

Machine learning

This improvement has come about through software and the latest developments in the field of machine learning, especially in artificial neural



Photo: Steinert

UniSort PR EVO 5.0 is the fifth evolutionary stage of the NIR sorting machine with HSI camera technology, says the manufacturer

networks, one of the worldwide leading experts in sensor sorting and magnetic separation for waste and metal recycling emphasized. "Machine learning is the ability of algorithms to acquire information without being explicitly programmed to do so. In its most basic form, data can, therefore, be analyzed in order to learn recognition and distinguishing features on their own and then – in the case in question – to come to a conclusion about any silicone cartridges potentially present." The optimum precondition

for this training is comprehensive and detailed data, Steinert informed. Since hyperspectral imaging (HSI) technology was introduced in 2012, the company has been generating this data and uses this technology today to create the training conditions for algorithms, "which set the bar in this industry". The data also allows users to sort better and, in the long term, also to develop digitalization strategies, for example, for collaborations with customers and suppliers. "Users can then be provided with the best possible sorting result without having to configure parameters themselves or deal with programming."

The UniSort PR EVO 5.0 has been put through its paces in practical trials since 2019 and is the next logical step in the evolution of sorting machines, Steinert gave account. Furthermore, it would be a showpiece of modern technology and robust engineering work. Alongside a whole host of detail improvements, the latest iteration features a design which is much easier to maintain and delivers advanced sorting results.

In the future, this technology would also support other sorting tasks or make them possible for the first time, the company is convinced.

www.steinertglobal.com

CROSS WRAP OY OFFERS EFFORTLESS SOLUTIONS FOR RECYCLING

Finnish waste bale wrapping machine manufacturer Cross Wrap Oy has been providing automatic bale wrapping machines for over 25 years. The company's original Cross Wrap bale wrapping method has since become an industry-standard in waste and alternative fuel bale wrapping. Nowadays, Cross Wrap's machine lineup consists of two bale wrapping machines, one automatic bale opener machine, one bale dewiring machine and a separate machine for wrapping wood-based boards and products. More than 500 Cross Wrap machines in over 55 different countries are in use today.



Photo: Cross Wrap Ltd.

Automatic Bale Wrappers

Cross Wrap's bale wrappers, the CW 2200 Bale Wrapper and the CW Direct Bale Wrapper offer effortless operation and high efficiency for recycling and waste industry operators. The CW 2200 Bale Wrapper is usually used in waste bale wrapping lines equipped with channel balers. The CW bale wrappers' benefits are their high automation and gentle bale conveying operation paired with a highly compact modular structure.

The CW Direct Bale Wrapper's unique operation wraps the bales without ties. This model is engineered to operate with any two-ram-baler, and it of-

fers an even more compact wrapping line and simple enfolded bale structure, which is especially useful when wrapping SRF or RDF.

Automatic Bale Opener

The CW Bale Opener works automatically and with high efficiency. This machine has been adopted by Waste-to-Energy plants and cement mills, where the machine is used to open wrapped alternative fuel bales. This machine offers high-quality operation due to its bale wrap removing automation, which keeps the baled material stream separated from the baling wire and wrap.

Bale Dewiring for efficient and safe recycling

The newest Cross Wrap machine invention is the CW Dewiring machine, which is developed for opening wire tied bales such as recycled plastic and paper bales. This machine has had a great welcome from the plastics recycling industry as well as the paper manufacturing indus-

try. The Bale Dewiring machine has been acquired by many international customers and nominated as one of the recycling machine innovations for the year 2020 by Plastic Recyclers Europe. The CW Dewiring machine improves operation safety and efficiency and lowers the operational costs in recycling.

Get your Cross Wrap deals at IFAT

Cross Wrap Oy has been a veteran exhibitor at IFAT Exhibition, München, Germany. The company can be found at stand 353 in hall B5, 4.-8.5.2020. There Cross Wrap sales team is happy to introduce interested persons to all Cross Wrap machines and to reveal their benefits for the customer's process. This year there is also going to be a mobile CW Direct Wrapping machine on display at the Europress stand in the outdoor department of IFAT 2020. Interested parties are invited to contact the Cross Wrap sales team and to book a private appointment for the best Cross Wrap experience.

 www.crosswrap.com



AUTOMATIC DEPOLLUTION OF FLAT PANEL DISPLAYS

The USA-based company FPD Recycling has created a fully automated system, which simplifies the e-waste processing and increases the throughput.

The recycling of Flat Panel Displays (FPD) is dangerous, time-consuming and costly. Paudy O'Brien, CEO and founder of FPD Recycling, is convinced that he and his team of specialists have designed a solution to the problems that face e-waste recyclers the world over. To remove the hazardous components, they have created the system FPD Pro. According to the company, its technology uses artificial intelligence to enable substantially greater process speeds. The system is able to depollute 60 flat panel displays per hour – as opposed to a manual recycler, which – on average – can



recycle just six per hour. As emphasized, the FPD Pro is a fully enclosed automated recycling technology that utilizes equipment for the automotive and pharmaceutical sectors to recycle FPDs. It meets the requirements of the EN 50625, 2-2 Treatment for CRT and FPDs 2015, EN 50625: 3-1 General depollution and EN 50625: 3-3 Depollution specification for CRTs and FPDs, the homepage informs. While tubes containing mercury are isolated,

LC panels and diffuser sheets are separated and collected in bins. FPD shells can be further processed using standard recycling techniques.

“Effective dust and mercury capturing equipment ensures the recycler is not exposing their workforce to hazardous materials,” the company FPD Recycling assures. Along with the intrinsic design of the system, the technology would capture data such as weight, manufacturer, model and size during the recycling process, which can be used to build customized reports for the recycler. Additionally, there are more advantages provided by FPD Pro: The system realizes low operating costs and enables recovery rates of more than 80 percent.

 www.fpdrecycling.com

Photo: FPD Recycling



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MONDAY, 12 OCTOBER 2020

09.30 Opening Session
 10.30 Spotlight on Trade
 12.00 World Council of Recycling Associations
 13.00 Networking luncheon
 14.00 International Environment Council
 15.30 Non-Ferrous Metals Division
 17.00 Paper Division
 19.30 Welcome Evening

TUESDAY, 13 OCTOBER 2020

09.30 Ferrous Division
 10.30 Shredder Committee
 12.00 E-Scrap Committee
 13.00 Networking luncheon
 14.00 Keynote Session
 15.00 General Assembly (TBC)
 16.00 Stainless Steel & Special Alloys Committee
 17.00 Textiles Division

WEDNESDAY, 14 OCTOBER 2020

09.00 Plastics Committee
 11.00 Tyres & Rubber Committee

More information on the Convention Programme, Online Registration and Sponsorship Opportunities on www.bir.org/istanbul2020

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FELEMAMG: MAGNETIC SEPARATION

Since the establishment of Felemamg in 1970, a complete technique in the magnetism area has been developed, or more precisely, its application in the magnetic separation area has been evolved.

The magnetic separators, the “RS” and “RC” series, remove unwanted ferrous material from the non-magnetic ones in conveyor burdens. Usually, they are suspended over conveyor belts or vibrator conveyors.

Moreover, the company manufactures another separator, an eddy current

Felemamg separators are available in two series:

- The RS series (permanent magnet or electromagnet) has to be cleaned manually
- The RC series (permanent magnet or electromagnet) is a self-cleaning model (Overband).

separator type SFME, with an eccentric rotor, ideal for the recovery of aluminum, copper, brass, shredder plants, waste plants, glass and plastic recycling plants or wood recycling plants.

The separator element is a magnetic rotor provided with high remanence Neodymium permanent magnets.

The created magnetic field with high frequency induces the Foucault currents in the conductor metallic pieces; these pieces create a magnetic field opposed to the rotor. The result is a repulsion force to the metallic elements, whereas the rest of the products carry on with their natural trajectory.

The basic version of the SFME non-ferrous eddy current separator is composed of:

- Eccentric magnetic rotor, with permanent magnets (Nd-Fe-B)
- Rotor outer shell, in fiberglass
- Conveyor belt with double longitudinal guided and double lateral contention rejections
- Motor and motor-gearbox for conveyor belt and rotor joined with transmission belts and their protections
- Lateral and frontal protection
- Adjustable divider wall in height and angle
- Electric equipment with rotor and belt speed regulation
- Rotor brake system

Optional, it can also be supplied with:

- Vibrating feeder
- Product output chutes
- Upper protections

 www.felemamg.com



Photo: Felemamg



QUALITY ASSESSMENT OF RECOVERED PAPER

Digital trading platform and logistics partner for buyers and vendors of recovered paper, merQbiz, collaborates with German Papiertechnische Stiftung (PTS) to back the “BaleVision” project in North America – a sector-wide leading quality solution for recovered paper. As reported, merQbiz – which was developed by Germany-based technology provider Voith – uses “BaleVision” intending to enable companies in North America to get detailed information on the quality of recovered paper as a secondary fiber source.

In this project, “the market-leading measuring device for quality assessments of recovered paper” is combined with the evaluation and visualization of extensive data. The purpose is to assist buyers in maximizing the suppliers’ quality performance.

In return, the vendors of recovered paper would get a fair price for their merchandise. The technical solution and thus the data acquisition basis for “BaleVision” is the PaperBaleSensor (PBS) developed by PTS. The device allows immediate quality control of recovered paper bales. It involves drilling a core hole and introducing a probe with a NIR sensor into the bale. Based on the spectroscopic data thus obtained, a computer software then calculates information on moisture, plastic, ash, mechanical and chemical pulp contents.

The fluctuating quality of recovered paper is one of the greatest disruptive factors in the preparation of secondary fiber pulp in paper mills: The ash content, the content of tacky contaminants (stickies) and the deinkability of graphic papers affect the quality of

the manufactured paper. The digital marketplace merQbiz intends to use the “BaleVision” to increase the number of bales to be inspected. The measured data is analyzed and visualized through dashboards to ensure transparency of information. Based on a combination of customer data with seasonal and market data, the system provides trend analyses in terms of quality, operations, procurement and finance.

BaleVision and thus the PBS is available in North America through merQbiz, the information says. In the European market, the system could be obtained directly from PTS or through local partners.

www.ptspaper.com/fileadmin/PTS/PTSPAPER/02_Produnkte/Dokumente/PBS_mini_engl.pdf

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ELDAN SUPER CHOPPER REDUCES THE POWER CONSUMED TREMENDOUSLY

Recent advances in the market of electrical components have made it possible for Eldan to develop a frequency drive for the new versions of the Eldan Super Chopper, with a significantly lower power consumption and at a remarkably lower expense than previous models.

For more than 20 years the Eldan Super Chopper has been the first choice for a heavy-duty pre-chopper in any recycling process. It can be used for pre-chopping of most materials e.g. tires without prior de-beading, cables and electronic and electrical waste, refrigerators, aluminum, municipal solid waste (i.e. MSW), wind turbine wings (cut-off), plastics and industrial waste. One part from the traditional hydraulic version, the Eldan Super Chopper is now also available in frequency drive. The new Eldan Super Chopper Frequency Drive has the same strength, capacity and function as the hydraulic version, but will also reduce the power consumed tremendously.

Lower energy consumption

“We launched the Eldan Super Chopper with frequency drive during the first quarter of 2018, and it has been very well received by customers. We already have several new machines in operation and additional ones to be installed soon. The customers are located all over the world e.g. in Russia,




Northern Africa, Ecuador and southern Europe,” says Jan Kjær, Manager R&D at Eldan. “The energy consumption of the Eldan Super Chopper with frequency drive is even lower than we first predicted. The start-up power is less than 10 percent of nominal KW, and the average power consumption is reduced by up to 50-60 percent.”

Further development

The Super Chopper SC 1412-II and the slightly bigger version SC 2118-II are the results of further development of the single shaft shredders. The Super Chopper has been developed to handle larger volumes, but also to be able to shred bigger size input material. Eldan Recycling A/S has sold the Twin Shaft Super Chopper for many different purposes so far; e.g. tire shredding in Spain / cable and

aluminum shredding in the UK, as well as copper wire in Texas, USA. The company has just prepared orders for two new units, one for Spain and one for the US market. The previous Super Choppers were hydraulically driven. But as Eldan has been facing demands for more climate-friendly machines, the company has developed the frequency drive units. This allows for great savings in terms of power consumption and thus cut production costs considerably. This makes the new Super Chopper environment-friendly and cuts CO₂ emissions. Apart from the above improvements, this new version of the Super Chopper works just like the traditional hydraulic version. Full power forward, reversing when overloaded using less power (KW) and rotational speed (RPM).

 www.eldan-recycling.com



Photos: Eldan Recycling A/S

Tomra Sorting ebook:

DETAILS THE POTENTIAL ARTIFICIAL INTELLIGENCE HOLDS FOR THE RECYCLING INDUSTRY

Imitating human learning, deep learning shows promise to find solutions to sorting challenges where none currently exist. Deep learning is on the rise in the recycling industry, according to the new eBook “Harnessing the Potential of AI” from the global leader in sensor-based sorting, Tomra Sorting Recycling. Dispelling a common misconception about AI, this latest Tomra eBook chronicles the long, 30-year history and contributions AI has already made to the recycling industry, as well as the bright future that lies ahead.

“In the months and years to come, those in the recycling industry will hear much more about deep learning, a powerful component of Artificial Intelligence,” says Daniel Bender, Technical Manager, Deep Learning for Tomra Sorting. “Deep learning shows the promise of providing solutions for the industry’s most complex sorting challenges. Recycling operations at the forefront of using AI to sort material stand to gain a significant

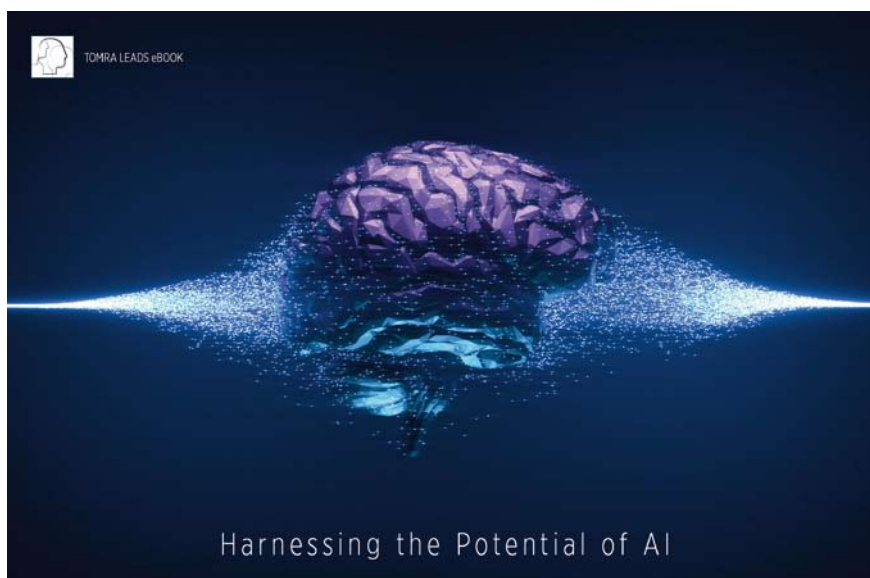


Photo: Tomra

advantage over companies who do not.” The free-to-download eBook goes into detail of how deep learning works and learns to identify materials to resolve problems not solvable with classical machine learning. The book claims deep learning holds the key for achieving more consistent detection rates than manual sorting,

elevating material purity while lowering costs.

■ To download the English copy of the new Tomra eBook on AI and Deep learning, please visit <https://solutions.tomra.com/ai-ebook>

www.tomra.com

EFFICIENT TECHNOLOGY FOR RESIN PRODUCTION IN PLASTIC RECYCLING

Melt delivery and pelletizing components of the BKG-type from US-based manufacturer Nordson transform purified polyamide from APK AG process into resins comparable to virgin technical polymers.

The German company APK AG has deployed a complete downstream melt processing system from Nordson Corporation for use with its Newcycling process. The BKG equipment includes a BlueFlow gear pump, HiCon screen changer, polymer diverter valve, underwater pelletizer and Master-Line

process water/pellet dryer system. The Newcycling process produces polymers in purified form by shredding the mixed and multi-layer waste, using solvents to selectively dissolve the plastics, separating liquid and solid components, purifying the polymer, and removing the solvent for reuse in the process.

Moreover, an extruder delivers polyamide to BKG melt delivery and pelletizing components for the production of APK’s Mersamid polyamide resins. The first Newcycling plant, located in

Merseburg (Germany), began commercial operation in June last year with an annual capacity of 8,000 tons and is used for separating polyethylene and polyamide from multi-layer packaging films (post-industrial source). According to the information, APK intends to build a second Newcycling plant, with a capacity of 20,000 tons. This plant will be used for processing of mixed film waste of post-consumer origin in Europe.

www.apk-ag.de

www.nordson.com

COMPACTED: 1,000 TONS CARDBOARD PER MONTH

Recycling plays a crucial role at Sports Direct International's distribution center in Shirebrook, Nottinghamshire. The company is the UK's largest sporting goods retailer and operates a diversified portfolio of sports, fitness, fashion and lifestyle brands. Each month the retailer collects around 800 to 1,000 tons of cardboard, for which they use HSM machines to manage their waste from across 1,000 stores across the UK. Recycling plays a major part in the organization's corporate responsibilities. The company's "strict" recycling standards means all UK stores are monitored closely, ensuring there is no cross-contamination between recyclable materials such as wood, cardboard or plastics, to name but a few.

The company's Shirebrook headquarter contains nine HSM automated balers for cardboard and five V-Press models for plastic waste with the latter recycling up to 40 tons each month and around 480 tons annually. According to the information, 2,200 bales are produced monthly across all baler machines within the warehouse.

The entry-level "Mill Size" Model HSM VK 4812 automated baler incorporated an in-line feeding conveyor as part of HSM's design. This ensured that the full working width of existing Sports Direct dock levelers was optimized and resulted in the creation of an exceptionally large



Photo: HSM

Martyn Joyce: If any complications arise, HSM's service team will respond promptly. With 2,200 bales produced each month, this has helped to improve productivity and decrease downtime of the baling machines which are in continuous operation

charging area to enhance speed of loading, increased capacities and, above all, to achieve real labor savings by eliminating a need to tie-off bales manually. Some solutions within Sports Direct were further adapted to accept packaging via mezzanine gravity discharge chutes permitting two waste streams to be processed simultaneously. From a logistical perspective, each baler is assigned to different locations within the distribution center, to improve productivity and decrease downtime. Akin to the cardboard and plastic balers, around 150 tons of

dry mixed recycling is put through the site's balers each month, before being sent out to a third party who will "recycle as much as they can out of it", Facility Manager at Sports Direct, Martyn Joyce, informed. "The cardboard boxes produced here do not have any rubbish in them such as plastics or staples, so we've had no issue selling our products because of their great quality."

Sports Direct acquired its first HSM Baler in 2000, which "paid for itself in no time", according to Martyn, who has been responsible for the management of waste in the company for more than 14 years. One of the changes made more recently to this system was mainly for utilizing a more efficient and sustainable "automated" recycling method to reduce the firm's carbon footprint, rather than flat packing cardboard and placing it into open-top skips.



www.hsm.eu

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A NEW SHREDDER FOR SWEDISH KINNARPS AB

The international supplier of complete interior design solutions for offices, schools and health care, Kinnarps AB, has bought a Universal Shredder FRP for its furniture production plant in Kinnarp, Sweden, from the international technology group Andritz. The new machine is capable of shredding up to four tons of wood waste per hour from the furniture production plant, the provider underlined. After processing, the waste is used as biomass to generate district heating for the entire Kinnarp area.

The new FRP2000P replaces a pre-shredder and a hammer mill as the

furniture manufacturer was previously forced to shred the wood waste in a two-step process. As reported by Andritz, the FRP is a powerful single-shaft shredder with a large cutting surface area and unique cutting geometry that enables one-step processing of waste as well as the removal of metal parts. The cutting system consists of overlapping knives to ensure a uniform breakdown of materials and consistent particle sizes. The scope of delivery also included the supply of the input hopper and the discharge screw conveyor.


 www.andritz.com



Photo: Andritz AG

Universal Shredder FRP

NEW CHARGER FOR THE INCREASING DEMAND

Eriez Europe has invested in another capacitive charger to keep up with increasing demand to provide magnets with a superior magnetic field and guaranteed performance strength for separation processes. The new charger will be used to magnetize permanent ferrite and rare earth magnetic assemblies, such as Eriez' range of suspended permanent magnets, which are most commonly installed above process lines to remove ferrous contamination. As underlined by the company, this second charger would allow Eriez also to have a large stock of equipment ready for immediate sale, continuing and verifying its status as a leading magnetic separation manufacturer.

 www.eriez.eu

CHINAPLAS POSTPONED

August, 3-6, 2020 Shanghai (People's Republic of China)

The event's show organizer, Adsale Exhibition Services Ltd., has formally issued the notice that the CHINAPLAS 2020 is rescheduled to 3-6 August 2020 at the National Exhibition and Convention Center (NECC) in Shanghai. According to Ada Leung, General Manager of Adsale, the event has expeditiously responded to the market needs due to coronavirus. "We believe that once the outbreak is controlled, all suppressed market demand will be released. The postponement of CHINAPLAS to August in Shanghai will help the upstream and downstream industries to seize business opportunities during market rebound period."

As reported, in this epidemic, plastics and rubber have been used as important raw materials for preven-

tion supplies such as medical protective clothes, medical masks, goggles, gloves, medical equipment, pharmaceutical packaging, and disinfection supplies.

Recently, the Ministry of Industry and Information Technology of the People's Republic of China announced the scope of medical emergency protection materials. In the list, there are coated spunbond, breathable film, melt-blown non-woven fabric and other important raw materials for producing medical protective clothes and masks. "The epidemic will also trigger the industries to rethink future manufacturing processes, consumers' pursuit of healthy lifestyles, safe and private commute, and sterilizing electric appliances," the organizers stated.

CHINAPLAS will focus on the following aspects:

- Medical plastics technology
- Automation production technology
- Digital technology allowing remote production control
- Safe packaging technology
- Protective materials
- Recycling and circular technology

Focusing on "Smart Manufacturing", "Innovative Materials", and "Green & Circular Solutions", the organizers expect to bringing together 3,800+ global exhibitors. Visitor pre-registration is opened and those who pre-register on and before 22 May 2020 will receive a visitor badge by mail in advance.

 www.ChinaplasOnline.com

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3/2020 – 08.09.2020 (Release Date: 08.10.2020)
Topics: ISWA-/Ecomondo-/Pollutec-Special, Urban Development & E-Mobility, IoT (Internet of Things), Software in the Recycling Industry, E-Waste Recycling, WEEE, Battery Recycling, Car & Tire Recycling

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SSO: heterogeneous material originating from waste collections from the roadside, markets, shopping centres and large-scale retailers as well as from stations, ports and airports. **FAULTY/EXPIRED PRODUCTS:** Foodstuffs, cosmetics and detergents



OUTPUT stream characteristics:

- With a near 100% recovery of the wet material, value can often be added to the dry fraction or redirected to the responsible chain
- The vertical separation system ensures the recovery of the highest quality material possible.

