

# ISWA WORLD CONGRESS 2022

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## ‘Don’t Waste Our Future’ theme of this year’s ISWA World Congress

The global event by the International Solid Waste Association will take place in Singapore from Sep 21-23. BY NARENDRA AGGARWAL

DON'T Waste Our Future is the theme of the 3-day International Solid Waste Association (ISWA) World Congress 2022 taking place in Singapore from Sep 21-23 at the Sands Expo & Convention Centre.

The global meeting is set to receive 1,000 foreign and local delegates. It also includes technical site visits and a cultural and social programme where professionals, government officials, industry leaders, academics, policymakers and scientists will exchange views on sustainable solid waste management.

The ISWA World Congress is a key international solid waste management event and this year, its 38th edition will be hosted by the Waste Management and Recycling Association of Singapore (WMRAS).

WMRAS was set up in 2001 as a not-for-profit trade association for solid waste management to advocate best practices, and to share and transfer knowledge between industry players, the government and community.

Key themes at this year's 2022 ISWA World Congress include sustainability – even in waste management; circular economy; robotics; and blockchain.

The Congress will take place both on-site and online, reflecting the realities of the post-Covid world. Of the 1,000 in-person attendees, 60 per cent are expected to come from overseas.

A highlight of the ISWA World Congress will be 35 booths on site, with a big Singapore Pavilion.

ISWA is an international network of waste professionals and experts whose mission is “to promote and develop sustainable and professional waste management worldwide and the transition to a circular economy”.

It hopes to achieve this by bringing to-

gether waste experts from around the world to network, create best practices, produce industry reports, as well publish its own scientific journal, *Waste Management and Research*.

This year's Congress will highlight the human impact on the environment with targets to promote economic growth, increase efficiency in production and consumption, sustainably manage waste and resources, and to take action to tackle climate change.

ISWA also plans to release a white paper on available technologies in the field of waste to energy at the upcoming Congress. The white book on energy-from-waste (EFW) technologies will help stakeholders involved in the development of municipal waste management solutions in countries where EFW is not yet a familiar solution.

With the increasing number of large cities where waste collection and climate change are becoming major concerns, this project is one of the many urgent and positive solutions for the global community, says ISWA.

The association also plans to release a report on sustainable collection and transport technologies at the 2022 Congress. Led by the Working Group on Collection and Transportation Technologies and funded by the NVRD (Dutch Solid Waste Association), this project, launched following dialogue with international experts, aims to benchmark international best practices in collection and transport.

The project aims to find strategies to improve air quality within cities, through an analysis on low emissions or emissions-free vehicles. The focus of the work will be on developments and best practices in upper-middle income economies and high-income economies, says ISWA.



This year's Congress will highlight the human impact on the environment with targets to promote economic growth, increase efficiency in production and consumption, sustainably manage waste and resources, and tackle climate change. PHOTO: PIXABAY

Financing waste management is another key issue, said the association. Studies show that waste generation could rise significantly in the coming decades, driven by population growth and increased affluence. The waste management industry provides adaptable and scalable solutions suitable for different communities, and can meet the challenge of collecting, transporting, and treating this waste, while extracting value from it and utilising energy within it – all while minimising harm to people and the environment.

Several parts of the world, however, still lack well-functioning waste management services. Securing the funding to provide

these services is a challenge, and only a small fraction of international development investment and aid goes towards waste management, says ISWA.

To increase funding for waste management services, the sector must demonstrate and communicate the value of sustainable and efficient waste management, and actively engage in making itself attractive to available financing mechanisms.

Other topics that will be discussed in the ISWA World Congress include sustainable living and sound decision-making in waste recovery, looking at developing a community waste recovery framework to conserve the ecosystem and enhance live-

ability. It will also explore key factors for the treatment or recycling of the different types of materials such as plastics, waste from electrical and electronic equipment, chemicals, organics, and so on.

On the circular economy and green financing, industry experts will look at the key building blocks and how we measure effectiveness, as well as how to pay for waste management and recycling.

Sessions on waste management through technology will explore technological adoption such as artificial intelligence, big data, blockchain and Internet of Things within the waste management industry.

According to a 2018 World Bank report titled *What A Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*, waste generation rates are rising around the world. In 2020, the world was estimated to generate 2.24 billion tonnes of solid waste, equivalent to about 0.79 kg per person per day.

With rapid population growth and urbanisation, annual waste generation is expected to increase by 73 per cent from 2020 levels to 3.88 billion tonnes in 2050. Globally, less than 20 per cent of the waste generated is being recovered and recycled.

ISWA World Congress 2022, the organisation's first physical event after 2 years, will be attended by delegates from around the world and features high-level plenaries on comprehensive programme in waste management and towards building a sustainable liveable future.

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# Sustainable living key to tackling climate change

ISWA's James Law explains how changing people's mindsets and behaviours could just save the day. **BY NARENDRA AGGARWAL**

SUSTAINABLE living is increasingly becoming important in view of the worsening global climate change situation – as witnessed in recent months in different parts of the world, which experienced extreme temperatures never seen before in some locations.

"Many human activities, such as burning fossil fuels and deforestation, contribute to these extreme climate changes – such as heat waves, severe drought and unusual weather patterns, wildfires, and the melting of the Arctic glacial ice – that have been observed in recent years. Our climate will continue to get worse if we do nothing," says James Law, who was recently re-elected for a second term as chair of the Working Group on Landfill (WGL) at the International Solid Waste Association (ISWA). He is also chair of the Task Force for Closing Dumpsites (TFCD) initiative, and on his last year of his third term as a board member of ISWA.

Law is a vice-president at SCS Engineers in the US and has been with the firm for over 30 years. "Wildfires are no longer just rampant over the western United States in the California area, but now they are occurring in Europe and Africa. For example, a heatwave fuelled wildfires that raged across Western Europe. In Portugal on Jul 13, temperatures reached 45 deg C in the town of Leiria, and burned down over 3,000 hectares of land," he tells *The Business Times* (BT) in an interview.

There is a direct link between human health and the extreme heat from global climate change conditions, he says.

"Sustainable living, in a nutshell, may just save the day, because it helps us to manage properly the use of our limited natural resources and with creating less waste and conserving environmental resources for our future generations. Therefore, we must commit to promoting sustainable living in all nations."

He is of the view that action needs to be taken by countries to promote sustainable living, which he believes every policymaker in every country needs to promote.

"Our education system and outreach programmes need to focus on human activities contributing to climate-change conditions, followed by what actions can

be taken by all citizens to promote sustainable living practices," he tells BT.

There are some actions that he suggests be taken for promoting and practising sustainable living:

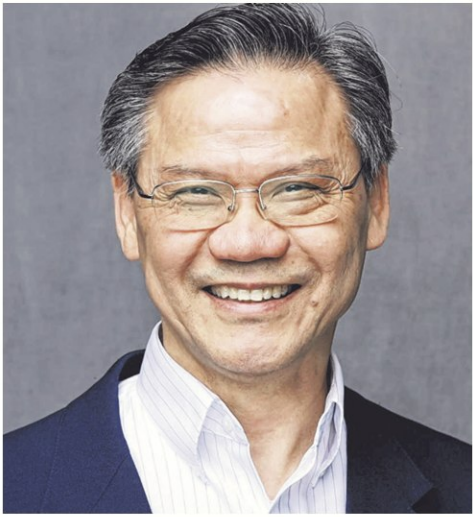
- Define the goals and objectives and on what topics or past practices that we want to change our behaviour from,
- Bring in experts to provide education and outreach programmes to targeted communities,
- Get support from politicians and the approval from the government,
- Create a common agenda for the enactment of laws and policies and establish minimum regulations requirements such that it is enforceable and observable by an agency,
- Find local champions who can take the ownership seriously to implement an executable work plan that is measurable based on the goals and objectives set up at the beginning of the process,
- Engage the entire population within the selected communities to participate.

#### Assuring a success story

To practice sustainable living in a rewarding way, you must do it with everybody in order to assure a success story to tell later, says Law. An example of actions used against fossil fuels include the carbon tax policy, emissions tax on greenhouse gas (GHG) emissions, or energy tax. These laws enacted must be backed up with heavy penal sanctions and fines, including the shutting down of industries generating high levels of GHG.

The WGL chaired by Law is 1 of the 10 working groups under ISWA's Scientific Technical Committee with the primary mission of promoting sustainable and best waste management and sound landfill operations and management practices worldwide. The group's members are experts from all over the world who volunteer their time to share their experience and to get involved in activities that benefit others who want to improve their waste management practices, for better protection of human health and a clean environment.

"Currently, we have about 100 members worldwide. We also give training workshops, publish case studies, white papers and guidance documents on specific topics of interest based on current challenges and trends on waste management practices and landfill operation issues," Law tells BT. "We have the expertise and a clear goal



**"Our education system and outreach programmes need to focus on human activities contributing to climate-change conditions, followed by what actions can be taken by all citizens to promote sustainable living practices."**

James Law (left)

of providing capacity building, educating and sharing our experience with interested landfill operators in many developing countries to improve their landfill operation and management practices, including issues with health and safety that impacts the workers' health."

An example is the WGL's involvement in teaching and training participants at the ISWA-Solid Waste Institute for Sustainability (ISWA-SWIS) Winter School programme directed by Dr Sahadat Hossain at the University of Texas in Arlington, Texas.

Since 2016, it has been involved with the 2-week training programme, covering landfill operations, management and landfill mining, for more than 300 participants from over 80 countries.

The WGL has a 2-year work programme that helps in organising its international efforts. The current one is for 2022-2024.

Another "hot initiative", implemented since 2018, is the TFCD, which Law also chairs. "Its aim is to promote dumpsite closure worldwide as eliminating dumpsites is urgently needed to improve local, regional, and global health and the environment," he tells BT.

In July, the United Nations (UN) General Assembly adopted a historic resolution declaring access to a clean, healthy and sustainable environment a universal human right. "The resolution is a major achievement for the world and a game changer for the environmental industry, with ISWA as

one of its representatives. This comes at a good time, supporting our continued call for closing all dumpsites and stopping open burning of waste," says Law. "A clean, healthy and sustainable environment will only be realised and possible with sound waste management by all nations."

#### Psychological challenge

For the next 4 years, the TFCD initiative will work to help many communities and inhabitants live a healthier life along with a clean environment. Its action plan will continue supporting waste diversion, waste recovery, and generation of biofuel from the landfills as alternative waste management systems during or after closing of dumpsites.

The WGL will continue publishing documents and case studies highlighting the benefits of closing dumpsites and managing waste in a sustainable and responsible manner. It offers support to countries and cities addressing this issue and suggesting potential funding agencies, Law adds.

"The WGL's vision is to close all dumpsites worldwide and to transition into engineered sanitary landfills, along with other practical and affordable integrated waste management systems. To be an influential organisation globally, it is important for us to provide case studies on the success stories and to publish guidance documents and publications addressing basic education and training for achieving better

waste management practices at all levels."

This is an effective way in changing people's mindsets and behaviours to then practice innovative and sustainable waste management for a better sustainable living. "I believe these types of activities will provide a bigger impact factor that attracts big funding players such as the World Bank and the UN's Waste Management Division," says Law. "We need these players to support us and also provide financial aid to those countries who want to implement better and sound landfill operations and management practices and to achieve their dream of proper waste handling and management opportunities."

"In particular, a significant effort and funding are needed to transition from dumpsites to sanitary landfill operations."

Funding is often a key to success when experimenting or executing developmental work such as implementing sustainable living or better waste management systems that have not been tried before. Sustainable living requires well thought-out programmes with goals and objectives, along with estimating new employment opportunities and revenues. When trying out other waste management systems, capital costs, operation and maintenance costs, and cost-benefits analyses must be discussed and done to determine what level of funding is needed, Law tells BT.

"The challenge has a lot to do with the psychology of changing people's old mindsets and traditional ways of doing things. There are a few steps that I would like to suggest doing before we get into the funding needed to practice sustainable living or to improve better waste management practices in a locality or community," says Law. "We must define the goals and objectives before deciding on the technologies or funding; bring in the experts to educate and present facts to decision-makers; and get approval from the local government. A road map must be laid out to track progress with budget and spending, with a clear payment schedule justified by actual results."

Most of these development works are done through funding from the local government, a regional development bank, foreign investors or a private-public partnership programme who bring in the technologies, the money, and the know-how to execute the work, he adds.

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# Circular economy, green financing the way forward

Close the loop by bringing together ecology and economy, says Roland Berger's Hani Tohme. **BY NARENDRA AGGARWAL**

THE fairly new concept of a circular economy – supported by green financing – is fast gaining importance given the current worldwide situation, including the many global warming events being witnessed particularly in the last few months in many places around the world.

"In our fight against climate change, we tend to ignore circularity and focus on carbon-dioxide emissions," Hani Tohme, senior partner, head of Sustainability Mena (Middle East and North Africa) and head of Waste Management Global, Roland Berger, United Arab Emirates, tells *The Business Times* (BT) in an interview.

"However, the impact of circularity is estimated at 45 per cent on climate impact. Safeguarding resources is our first step to ensure that all national commitments towards climate change are met. A good example is the delay in manufacturing of windmills due to the scarcity of rare earth material. This tells us that circular economy is a prerequisite that we can't ignore," he adds. "Moreover, circular economy is a concept that brings together ecology and economy – as such, businesses would take it more seriously as they would still meet their traditional key performance indicators (KPIs) of profitability and achieving the desired internal rates of return (IRRs) while meeting the planet's KPIs."

The circular economy model is based on giving organic material back to the earth and the non-organic material back to the industry. It is about closing the loop and avoiding creating true "waste". In order to do that, people have to think of industries as a whole and not as silos. There is a need to create the link between the manufacturer, the seller, the transporter and the recycler.

According to Hani Tohme, there are 3 fundamentals that need to be achieved for circularity: change the design taking the end of life of products into consideration; change the concept of ownership, allowing manufacturers and original owners of products to stay close to their material; and change the concept of material flow,

allowing products to be looped back into the industry or earth.

A circular economy can be an instrument to tackle issues such as resource scarcity, climate change, and the problem of pollution. And there are some key building blocks of a circular economy.

"To achieve circularity, you would need to rethink the current status quo to enable economic and ecological savings," says Hani Tohme. For this to happen, we would have to:

"Rethink the design" to better assess what product to use to limit waste at the end of the life-cycle; what technology to use, making sure the most efficient and the least energy-consuming one is selected; what source of energy to use, ensuring it has the least impact on the environment; and, in many cases, the best financial impact on the business, and so on,

"Rethink the ownership", understanding who is responsible for the product consumption and disposal, how to raise awareness to limit the unnecessary consumption and improve reuse levers, and who will take care of it, etc,

"Rethink the transportation", or to make the wise decision on collection and transportation, leveraging latest clean fuel sources (from waste, from agri-sources, from hydrogen and carbon), and maximising digitalisation to streamline routes and itineraries, thereby reducing redundancy,

"Rethink the material flow", instating the correct waste management fundamen-

als to assess how to treat each waste stream; which technology is best to use based on the existing market characteristics; and what regulations need to be in place to enable appropriate treatment, reduce resources scarcity, and eliminate pollution.

For measuring the progress towards the building of a circular economy, different metrics can be set to track the progress such as the share of recycled materials in the raw material sourcing, share of clean energy used in production, share of clean fuel for transportation, recovered and recycled material rate, landfill diversion on a country level. All these factors need to be considered in the product life-cycle assessment.

## Fundamental shifts

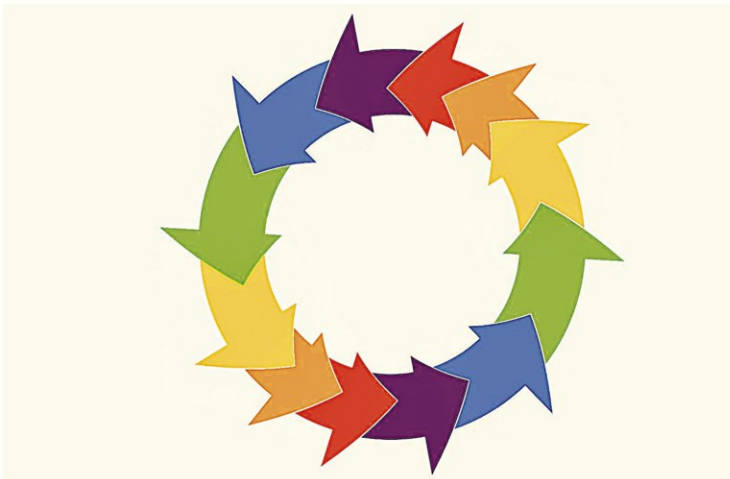
"Having said that, a circular economy is based on creating fundamental shifts in the behaviour and the way industries operate and therefore can't be seen as the short-term impact. An analogy that is often used is when you place your kids in school, you don't expect that they start generating a return the next year," Hani Tohme tells BT.

"Instead, you would hope that after 18-20 years, your kids would be well positioned to become effective in society and, among other activities, they would be having a good and impactful job. Businesses have always been short-sighted, driven by monthly stock price or yearly budgets," he adds. "We have to break that thinking and focus on the long-term sustainability of businesses."

As for the new field of green financing,

**"To achieve circularity, you would need to rethink the current status quo to enable economic and ecological savings."**

Hani Tohme (left), Roland Berger



A circular economy can be an instrument to tackle issues such as resource scarcity, climate change, and the problem of pollution.  
PHOTO: PIXABAY

he says that it can be defined simply as financial instruments where proceeds are used for green projects only. The main purpose of green debt is to address climate-change mitigation, natural resources depletion, loss of biodiversity and air, water and soil pollution.

Several standard financial instruments are currently used to finance green projects. This includes bonds, loans, sukuk (an Islamic financial certificate similar to a bond), and carbon market instruments.

"Industries have been built with the industrial era in mind. The more you produce, the better; the higher the profit, the better. Industries are not taking into account the indirect impact of their work on the environment," he tells BT.

"When green financing is introduced, new KPIs that matter become a priority to the chief executive officers and the C-suite in general. Green financing would therefore shift behaviours to help economy in meeting ecology, as they are complementary rather than opposite."

The possibility of green financing paying for waste management and recycling efforts is being looked into. However, many of the waste management activities and recycling efforts are not financially sustainable when compared to raw material production and subsidised sectors.

"When the financial viability in its current definition is not met, businesses and investors are not excited to push for best practices and would instead consider sustainable investments as corporate social responsibility, killing the true purpose of circularity," he adds.

The ultimate objective of sustainable financing is to lower the bar to make the right and responsible decisions and to raise the bar for other polluting activities.

The firm Hani Tohme works for, Roland Berger, acknowledges that sustainability is a prerequisite for any sector to thrive and

to exist in the coming years. As such, it has created a dedicated competence centre for sustainability but, more importantly, ensured that every sector it addresses embeds the fundamentals of sustainability, climate change and circularity.

"Through our work, we impact decisions made at national levels, in board rooms and on the shop floors. We therefore recognise the responsibility we have in shaping the mindset of the decision-makers. Our projects cover defining new sustainable strategies, rethinking the portfolio and operating model, developing countries' Nationally Determined Contributions (NDCs), developing environmental, social and governance (ESG) strategies, conducting mergers and acquisitions to expand the sustainable offering – and the list goes on," he tells BT.

Hani Tohme says focusing on sustainability gives him the satisfaction of supporting businesses as well as contributing to the future planet which his children and grandchildren will inherit.

"Being exposed to topics such as waste management, where 50 per cent of the world's resources are still being landfilled, or water management, where our most precious resource is being polluted and wasted, gives me the urge to be fully invested in making a change," he tells BT.

Founded in Germany in 1967, Roland Berger now operates in more than 50 countries. The company invests in knowledge, building its internal capabilities via different trainings, conferences attendance, and obtaining certifications, and conducting necessary market understanding through its large network of subject matter officers. However, the main source of expertise remains the field work it does with its clients, listening to their concerns and problems to actively provide the most tailored and sustainable solution.

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# Circular economy key in battle against global warming

Recycling, composting not enough to improve resource efficiency, says OVAM's Christof Delatter. BY NARENDRA AGGARWAL

THE uncontrollable warming of our planet is all too often reduced to a problem of energy policy, which is a rather short-sighted approach, says Christof Delatter, interim secretary-general of the Public Waste Agency of Flanders (OVAM), which acts as the Flemish ministry responsible for waste management and soil remediation policy.

Flanders, Belgium has been one of the leading regions within Europe in setting out ambitious policies and targets on household waste management. OVAM is one of the founding figures of the Circular Flanders network, which brings together all societal actors that could play a role in the shift towards a more circular economy. It is also active internationally as a leading partner in developing an ambitious European and international policy.

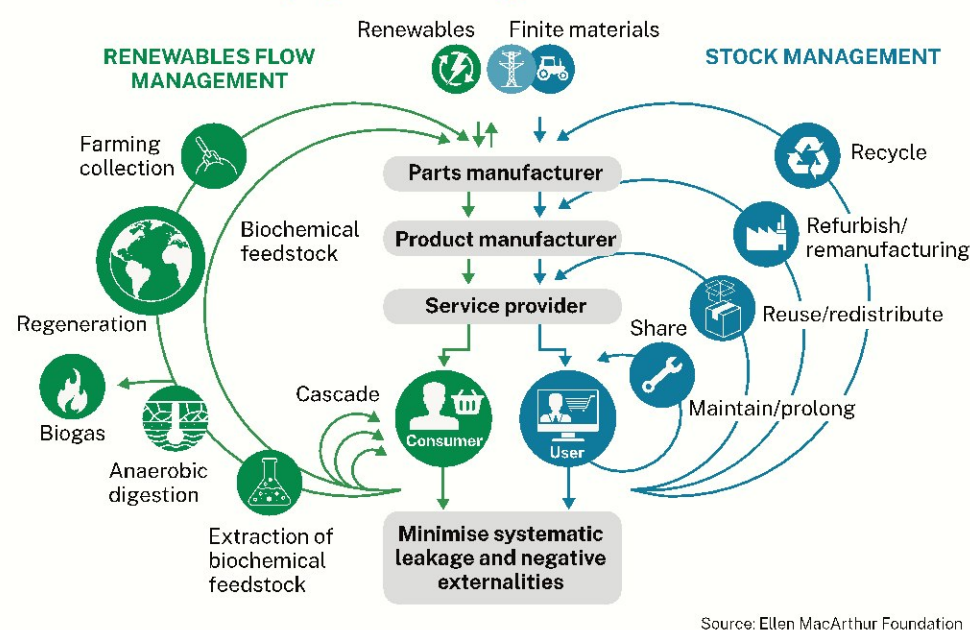
Studies by the Organisation for Economic Co-operation and Development, which are also used as a basis for an analysis on the impact of material use by the region of Flanders, show that the consumption of resources causes more than 65 per cent of the impact in the form of greenhouse-gas emissions.

"Circular economy will therefore be key in the battle against global warming. We need a lot more resource efficiency than is the case now. Our resource footprint has to go down," Delatter tells *The Business Times* (BT) in an interview.

Asked what is a circular economy, Delatter refers to the butterfly diagram created by the Ellen MacArthur Foundation. Circular economy has a biological side and a mineral side, and there is a need to develop policies on both elements. In Flanders, there is already quite a good system of recycling and composting, as it collects almost 70 per cent of the household waste separately for that goal.

"However, the inner circles of the Ellen MacArthur diagram are the key components. It is good to recycle and compost, but we need a real shift to more prevention, more sharing of goods, prolonging life expectancy of appliances, and more reuse and repair. Those are the key components," he stresses.

## Circular economy systems diagram



Delatter, an expert with almost 30 years of experience in waste management policy, says implementing a circular economy entails a clear choice of sharing of goods as this has a direct impact on a lower use of resources. "This also goes without saying, to a lesser extent, for maintaining goods and prolonging their life of use and for reusing goods for the purpose they once were produced," he says. "Recovering resources for remanufacturing and recycling avoids demand for primary resources. Product design is key for that. Every new product should be designed in such a way that it has a long-life span, that repair is an option, and that recycling can be done without harm to the environment."

### Key building blocks

"We far too often see new products containing substances of high concern. This is one of the biggest threats to circularity. For the biological feedstock, cascading the use of it can create different forms of carbon sinks, where we fixate carbon for longer

periods and where we avoid turning it into carbon dioxide in our atmosphere."

As for the key building blocks of a circular economy, he tells BT that there is a need to focus on product design. "In my opinion, every product designer should first work in the remanufacturing and recycling sector for at least 6 months. It is stunning that even in these days, we still see products that have short life spans, that you cannot dismantle in order to repair or recover components. New products still far too often contain dangerous chemicals, which has an impact on the recyclability of the materials after use."

"Eco-design – design for repair, design for recycling – is a condition for circular economy. Different instruments should be used to favour eco-design. Producer responsibility and internalising the environmental cost of a product in its price can give an incentive for better and more eco-design, supporting the transition towards a circular economy."

At the same time, there is a need to mea-



OVAM's Christof Delatter says implementing a circular economy entails a clear choice of sharing of goods as this has a direct impact on a lower use of resources. PHOTO: CHRISTOF DELATTER

sure the progress towards building a circular economy. In Flanders, Circular Flanders has created a Circular Economy Monitor for the region of Flanders. The monitor looks at more than 100 indicators to assess how far the model has progressed in Flanders. "It starts from a top layer of macro-indicators giving insight in the consumption of materials, water, soil and space. A second layer links to the needs in housing, food and water, consumer goods and mobility. Adding figures for certain specific products or services gives a representative sample of daily consumption. All of these indicators give an idea of the level of circularity in our economy and the evolution of that in time," Delatter tells BT.

### 'Every penny for the right goal'

Green financing, in his opinion, also shows a clear shift where financial institutions clearly favour circular and climate-friendly approaches when supporting industrial investment. This should also apply to government subsidies and policies – high prices for fossil fuels should be seen as an opportunity to speed up the phasing-out of their use; rising costs for resources should trigger a policy that looks at more resource efficiency.

"Every penny should be used for the right goal, regardless of whether it comes

from government or private financing," says Delatter. "I realise that it is not always easy to clearly define what the right investments are. Should we support recycling of certain plastics, when phasing out their use might be a better option? Governments and scientific institutions should cooperate worldwide on gathering knowledge on these questions."

Governments, development banks and commercial banks all have a role to play in green financing. To Delatter, it is logic that taxpayers' money should only be used for circular and sustainable goals, focusing on a just transition. Development banks can play an important role in developing nations, supporting the right policy choices.

Policy decisions in many of those countries in the next decades might have an important impact on reaching certain climate goals (or not). Commercial banks can give a strong signal to the private sector by clearly favouring sustainable investment.

But again, financial institutions will need the support of universities, researchers and knowledge institutions in making the right choices, he tells BT.

Can green financing pay for waste management and recycling efforts?

"There was a strong debate on the European Union level on the so-called taxonomy for sustainable activities: what activities can be accepted as sustainable so that investors, financial institutions can make the right choices and avoid the trap of greenwashing. This debate was, as could be expected, characterised by strong lobbying from different industrial sectors. I believe that our sector has to be exemplary and clearly should promote the inner circles of the Ellen MacArthur butterfly diagram. Those are the activities that should always be favoured in green financing," says Delatter. "I also see a great need for financial support for better waste management in general, especially in developing countries. The environmental gain of 1 euro (€1.41) spent on waste management in those countries might have much more effect than a similar investment in a region with high separate collection rates. Climate change and resource scarcity are global problems, and should be addressed globally."

"Waste management policy has a direct impact on the everyday life of every citizen. It defines the simple decision taken in every kitchen of which bin to throw a certain product in once it has been used," he tells BT. "We try to influence what is put on the market. We work on individual behaviour – at home, in the office, or while being outdoors."





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# Circular fashion now in style

A sustainable clothing movement is gaining momentum in Europe and beyond. **BY NARENDRA AGGARWAL**

A WHOLE new movement of creating circular fashion has been gradually gaining momentum in Europe and elsewhere, as people become more aware of the need for sustaining the Earth.

Circular fashion is based on the main principles of circular economy and sustainable development. It relates to the fashion industry in a wider sense, and concerns the entire life-cycle of a product, from design and sourcing, to production, transportation, storage, marketing and sale, as well as the user phase and the products' end of life, says Anna Vilen, head of communication at Siptex.

The plant is operated by Sysav, a not-for-profit company owned by the local authorities in Malmo, a coastal city in southern Sweden. It is the world's first large-scale facility of its kind. It sorts textiles by colour and fibre composition using near infrared light, making it possible to handle large flows and produce textile fractions adapted to different recycling processes.

Siptex, which stands for Swedish Innovation Platform for Textile Sorting, is the result of collaboration between Swedish textile and fashion companies, research insti-

tutes and authorities, including IVL, Stadium, H&M, Ikea, Stadium, the Swedish Environmental Protection Agency, Re:newcell and Myrorna. The facility is located in Malmo, the third-largest city in Sweden, after Stockholm and Gothenburg.

Circular fashion can be defined as clothes, shoes or accessories that are designed, sourced, produced, and provided with the intention of being used and circulated responsibly and effectively in society for as long as possible in their most valuable form, and hereafter return safely to the biosphere when no longer of human use, Vilen highlights, quoting Anna Brismar's 2017 work *Green Strategy*.

## Dress for success

The concept of circular fashion and its green strategy comes originally from Sweden, Vilen tells *The Business Times* (BT) in an e-mail interview. Her company has been driving campaigns on sustainable consumer behaviour for textiles for many years.

"We were the company launching the campaign '4-fit-challenge' ... in 2015. The challenge was to choose 4 items in your wardrobe

and use them only for a week (excluding underwear, socks and sportswear). The campaign was a success, and Sysav was suddenly in focus in both national and international media; it also got international attention from decision-makers," she tells BT.

Siptex was launched in 2018 and, by 2020, had a full-scale facility in place. It now provides customers with material for fibre-to-fibre recycling for creating a sustainable life-cycle of textiles.

There had been a bottleneck for being able to scale recycling operations – fibre-to-fibre processes have purity standards for feedstock in order for the processes to work. One such example is 95 per cent cotton, Vilen points out. "And for the bigger investments in recycling to take place, you need to know that there are steady, large volumes of raw material available," she adds.

"I have always been interested in fashion ... But as my knowledge about the industry's heavy impact on climate grew, I couldn't consume clothes the way I used to. I believe that fashion can stay fun and creative – it really is a form of art – but the system needs to change.

The fast-fashion business model, with massive amounts of poor-quality clothing, has to end, and we must find smarter ways to consume."

The business she works for, Sysav, is a resource and waste management company aiming to create one of the world's most sustainable regions. "This means that we need to be innovative and be in the forefront always, and for all materials and products. We receive and treat waste to be reused, recycled or treated as rest products for energy recovery and disposal. All material that enters the company is seen as a resource, even if others think of it as waste," Vilen tells BT. "What's unique with Sysav is that we are owned by the local authorities and are a not-for-profit company. This means that we can try new solutions more easily than private companies can and will do."

Every year, she notes, more than 100 million tonnes of textiles are produced, with only a fraction of it being recycled. The rest is incinerated or landfilled which contributes to the release of greenhouse gases into the atmosphere.

"Add to this that in 2050, there will be more than 10 billion people



**"The fast-fashion business model, with massive amounts of poor-quality clothing, has to end, and we must find smarter ways to consume."**

Anna Vilen (left), Siptex

on the earth and the need for new textile fibres is expected to increase by 150 per cent by 2050. Most of the textile fibres available today are synthetic fibres of fossil origin or water-intensive cotton. There is no room for growing more cotton in the future. All arable land will be needed for food production," she tells BT.

## On the right track

There are many things that must change regarding textiles and its value chain. For instance, there is a need for standardisation of fabrics and methods for production to get truly sustainable and recyclable goods. Consumer behaviour must also change – we need to buy more sustainable products, and use them for longer. There is also a need for legislation that supports circular fashion on all levels. And this comes with a price.

"The fact that we get so much attention to our campaigns and the

sorting facility must mean that we are on the right track! More and more people are for sure interested in sustainable fashion, though it is still not easy to know if you choose correctly or not. It must be (made) easier to make the right choices going forward," says Vilen.

How can investment be promoted for recycling to take place on a bigger scale in her country and globally? "Investments are closely interlinked to the after-market for recycled goods. We mean that prices for virgin material must increase, so it is cheaper to use recycled materials. If so, there will be more companies interested in fibre recycling and the demand for the fibre increases," she says.

"As an example, it is not reasonable to buy a T-shirt for 5 euros (\$\$7.07) and believe that all people (involved in its production) have been paid for their work. Somewhere, the value chain is broken – and it must be fixed."

# Common approaches needed to cut waste generation

Infrastructure, policy and behavioural insights need to come together. **BY NARENDRA AGGARWAL**

AS the world's population continues to grow and more waste is generated by both people and businesses, the areas of infrastructure, policy and behavioural insights need to come together and develop solutions.

"We need to set the right political frameworks, or come together as different industry players and devise some common approaches – for example, on which materials and combinations we use, what re-

cyclability we require, and to what extent we consider products' end-of-life phase and repurposing in product development," says Henrik Siepelmeier, a PhD research fellow in the Department of Management, University of Agder in Norway. "We also need to finally incorporate our knowledge of human behaviour in planning of waste infrastructure and move from systems designed to simply 'get rid of

waste' to those aimed at closing the loop and adapting a more holistic approach towards the role of waste in our economy," he tells *The Business Times* (BT) in an interview.

In his view, much of this involves more collaboration and exchange between the involved parties, from manufacturers to disposal companies, and including the consumer in-between.

"I think moving beyond silos and towards common approaches is key for tackling this urgent issue. In all of this, we should aim to apply a global perspective, too, and

move away from solutions focused only on developed and Western countries – something that's true for my own research, too," he adds.

From different collection technologies and vehicles to treatment mechanisms, Siepelmeier believes that the waste field has always had a close connection to technological development.

In this, there are 2 areas of technological improvement he is particularly excited about: Improved sorting techniques and plants that may allow a substantial increase in the purity and quality of recycled

materials, and novel data collection opportunities offered by 'smart' devices, new sensors and Internet of Things (IoT).

The use of artificial intelligence (AI), big data, blockchain and IoT in waste management is starting to become popular, but there remains a lot of untapped potential. "From AI-supported analyses of waste collection routes and routines that could increase efficiency to ... much more granular data collection opportunities offered by IoT, these technologies could become useful in many ways," he says.

"An IoT example, from my niche area as a behavioural scientist working with consumption choices, waste and recycling behaviour, is a recent project together with the Swedish company Envac, in which we use novel smart waste chutes to automatically collect household waste data, and use this to devise targeted behavioural interventions aimed at increasing recycling and decreasing overall waste. "What we find is that not only do these new technologies and interventions have a meaningful impact on people's recycling behaviour, they also move waste disposal from being like a black hole to something transparent that people can keep track of and feel more engaged in."

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# New energy and the triple bottom line

Waste-to-energy technologies can be adapted to the needs of any location worldwide, says Dr Michael Langen of HTP Engineers. **BY NARENDRA AGGARWAL**

NEW energy is energy from renewable sources such as solar, wind or biomass, says Dr Michael Langen, a partner and managing director of HTP Engineers in Aachen, Germany, which works in the areas of recycling and renewables and does technical consulting.

Waste-to-energy (WTE) technologies explore biomass such as bio-waste, wood, or residual waste, which contains biomass to a considerable extent. Technologies applied are bio-digesters including biogas purifiers and incinerators with combined heat power (CHP) units, he adds.

"These technologies are flexible and can be adapted to the needs of any location worldwide – for example, for district heating where residential areas are nearby, electricity production or feeding to the local gas grid," he tells *The Business Times* (BT) in an interview.

WTE strategies are environmentally beneficial in 2 ways. Firstly, they reduce the waste to be disposed of. Secondly, they save primary resources by substituting coal, crude oil or natural gas, he adds.

Dr Langen says good examples are the recycling of bio-waste from private households in bio-digesters, the reuse of the biogas after purification as fuel for the waste trucks which collect the waste, and the use of the digestate as a soil fertiliser. Such a project was implemented by Berlin.

Another good example is the modular WTE and recycling site of Attero, in the Netherlands. The so-called Energy Transition Park features a comprehensive inventory of new-energy generating facilities such as digesters, waste incinerators with CHP and recycling facilities. There are several more across Europe and the world.

"Let me make a general remark on the semantic of 'reuse and recycle', which is sometimes mixed up. Reuse means the extension of the lifetime of a certain good – for example, the refill of a drink bottle or the repair of an electronic gadget. Recycling means to loop the material of which the good is made back into a product of the same material type, not necessarily an identical product," Dr Langen tells BT.

"The benefits of reuse and recycle strategies are manifold and add to each other rather than being contradictory.



The challenges in plastic recycling are exceptionally high as plastic is a much more complex material than metal, glass or even paper. PHOTO: PIXABAY

"The most important benefits are cost savings, localisation of supply chains (as both reuse and recycle strategies can be implemented on regional levels) and the minimisation of the environmental footprint of industry and commerce as well as society at large."

#### Decisive factors

The importance of WTE, sorting and biological treatment (biogas) facilities stems from the position of such plants in the circular economy. None of the goods, which are being disposed of once a reuse strategy is no longer feasible, can be mechanically or energetically recycled without facilitating advanced technologies.

WTE, sorting, reprocessing and biotreatment plants are the essential hubs by which the material or energy content is valorised. The right design, capacity and location of these hubs are decisive factors to accomplish the environmental and economic goals of modern waste management, says Dr Langen.

His work in plastic recycling goes back to the 90s, when a cluster of research organisations in Germany developed a fully automatic process to recycle plastic packaging waste. His role was at the transfer point from science to industry to implement that process and demonstrate its feasibility in the industrial scale plant at the Expo 2000 world exhibition in Hannover, Germany.

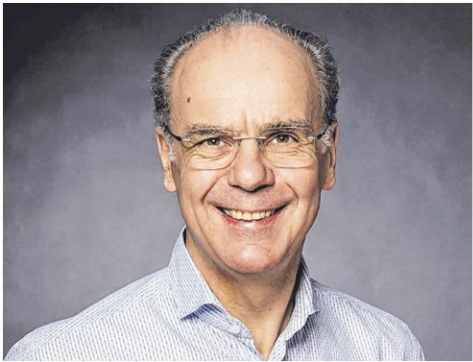
"It was a huge success and the plant had

been in operation for about 10 years now. My personal vocation has always been to implement advanced recycling technologies as a consulting engineer and partner of HTP," Dr Langen tells BT.

The challenges in plastic recycling are exceptionally high, as plastic is a much more complex material than metal, glass or even paper. A clear understanding of the cost structures, technologies and markets is particularly important when making plastic recycling successful, he adds.

The recycling industry is transforming rapidly from a volume-based to a quality-based approach. The volume-based approach was mostly driven by the waste management companies, which in the past needed easy, fast, and cost-efficient solutions for the recycled streams. Waste managers always take a volume approach as this is a core basis of their business model. Success of recycling was measured by recycling rates that considered the recycled volumes only.

"Today, the transformation of a linear economy to a circular economy leads to the involvement of any player in the supply chain and henceforth a shift in focus," says Dr Langen. "Success of recycling is being monitored by recycled content of the packaging and goods placed in the market additionally. As any player must safeguard recyclability and the recycled content, the quality of recycled commodities becomes a core issue. It does not mean volume is no



"Today, the transformation of a linear economy to a circular economy leads to the involvement of any player in the supply chain and henceforth a shift in focus."

Dr Michael Langen (left)

longer important – contrary to that, only a quality-based approach can ensure the most needed volume increase."

Companies in the circular economy help to save natural resources, give employment to people, clean-up and save the habitat of wildlife and care for sustainable economies. These targets are manifold, as the activities of individual companies are wide and diverse, covering science and education at universities and private institutions, engineering, analytical services, manufacturing, operations, sales and application engineering, collection, and clean-up services, monitoring, and so on.

"The key target is to collaborate truthfully, open-minded, and amicably across disciplines, regions, and industry segments. It is for the benefit of all, and there is more to gain from collaboration than from being seclusive and competing just for individual success," Dr Langen tells BT.

#### New players

Some experts say that a circular economy for plastics can only be successful economically when it is decoupled from the oil market.

"Formerly, recycled plastics could only be sold at a discount against virgin plastics. With virgin plastic prices following a similar volatility as crude oil, the small and medium-sized companies in the recycling industry could never weather the lows," says Dr Langen. "Additionally, recycled plastics carry the cost of disposal services – collection, cleaning and so on – which virgin plastics do not. These are the 2 main factors which put recycled plastics at an insurmountable disadvantage."

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# Waste-to-energy emerges as new form of investment into industry projects

It's now possible to implement the energy recovery process on an even larger scale than before, says WTE expert Johnny Stuen. **BY NARENDRA AGGARWAL**

NEW energy can be produced from waste, and a whole new field of waste-to-energy (WTE) technologies has developed to produce economically beneficial results in the process of waste management.

"New energy is energy produced on renewable sources or energy recovered from resources that are already spent and cannot be recovered in any other way or form, at least for now," says Johnny Stuen, WTE and onshore carbon capture and storage (CCS) area manager at KANFA/Technip Energies, a Norwegian firm.

WTE, also known as energy from waste, is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste or the processing of waste into a fuel source.

"The most visible way it has been adopted is by applying the R-formula that states that if you recover less than a specified amount of the energy in the waste to be incinerated, you are not a recovery operation but a destruction operation. This is done as a European regulation all over the European Union," Stuen tells *The Business Times* (BT) in an interview.

"If you are not able to fulfil the R-formula, you are shut out from large parts of the market trading in waste treatment (as this is a sellable commodity) and financing becomes much harder. We see also now that some governing bodies are preparing to demand carbon capture from WTE, to make a kind of licence to operate. It is not done anywhere yet, but we expect the demand to come."

Stuen has been active for over 10 years in the International Solid Waste Association (ISWA) working group for energy recovery, serving as its chair over the last 5 years. "We want to spread knowledge about how the technology works, how it is wise to use it, and how it is safe," he tells BT.

"WTE must be a part of a total waste management system; it is not a silver bullet alone. We discuss technology, improvements in technology, frame conditions, environmental approach, et cetera."

"The fact that the group is worldwide means that we also can spread best practices from one part of the world to another, often with very concrete ideas and actions. We try to give as many facts as possible around the development of WTE to everybody, both the public and decision-makers. We were, for instance, very early in discussing carbon capture as a possible technology and tool for WTE, even though this will be a financial hurdle for much of the industry. We tie experts and knowledge



Stuen says direct reuse of municipal waste is the simplest and best way to benefit society, but is also very hard to achieve. PHOTO: PIXABAY



**Johnny Stuen (above) of KANFA/Technip Energies says waste-to-energy is a much better alternative as the final sink than a landfill.**

about WTE and waste management together all over the world."

Stuen has been working with the Waste Management Agency, City of Oslo, in the area of production and technical development – for instance, dividing the responsibility of the WTE in the city into municipal and commercial parts. The commercial part is also responsible for running the district heating network in the city, where WTE has priority. This gives both legal and economic right of way for efficient WTE plants that deliver as much energy as possible. At the moment, the city has started to build the first full-scale carbon-capture

plant at a WTE facility in the world, even though it is a very expensive venture.

Asked how municipal waste can be reused for the benefit of people who produce it and society at large, he says direct reuse is the simplest and best, but also very hard to achieve. Next would be being able to recycle the materials directly without too much processing – but that is hard to achieve, and to find the right places and applications. Biological waste is best treated anaerobically, producing biogas and fertiliser. That biogas can be transformed into other useful gases/chemicals or used as a fuel.

"Then, when we have recycled and treated these fractions, we have a residual that is too dirty, too mixed and too polluted to recycle. It is best recovered as energy, both electrical and as heat," says Stuen. "There are many ways to do this, and more innovative solutions come up now, especially in an energy crisis as we are seeing today."

While WTE, sorting plants and biological treatment (biogas) are important in general, they are being deployed for heating in Europe to lower the pressure on resources, many of them scarce, and to lower carbon dioxide emissions in waste treatment.

"Using the biogas instead of diesel or replacing fossil methane is very sound, and reusing the residual waste as energy gives very good results in these directions. If we can reuse the materials directly or recycle them without using too much energy, that must be done first. For that, the development of robust and precise sorting tech-

nology is very important. The sorting technology must be developed much more and put in front of biological treatment and WTE," says Stuen.

"It is a much better alternative as the final sink than a landfill. One tonne of residual waste incinerated lets out 1 tonne of carbon dioxide. Left in a landfill, it will release at least the equivalent of 2.5 tonnes of carbon dioxide."

## Concentrating on carbon

Since 2015, he has been focusing on carbon capture, especially from WTE. That along with the transportation and storage/use of carbon dioxide are areas that are growing in importance in the global economy.

"The world lets out somewhere between 35 and 40 billion tonnes of carbon dioxide every year. To be able to keep the temperature on Earth within the 2 deg C target, this must go down to net zero by 2050," Stuen tells BT.

"We can produce lots of renewable energy in the future, we can recycle much more and better, but there will always be 2 factors that emit carbon dioxide: the treatment of waste that is not recyclable, and the processes that emit carbon dioxide in their nature – for instance, the production of cement. These emissions can be stopped by capturing the carbon dioxide and storing it under the surface of the earth."

"I have been a part of this business and projects since 2015, when we started to develop the project in Oslo. We have been testing technology, developing projects, legal matters, and value chains. We now

see that this is possible to do within the constraints of economy, law, and technology," he shares.

To actually get to net zero, he says, we must continue to develop the competence and knowledge in this area, and make many more people aware of it.

In any new area, especially with work of a developmental nature, getting financing is an uphill task. "It is difficult to compare money that you must spend now, to money that you must spend in 25-30 years," says Stuen.

"Now, the signs are quite clear, so now the investment money and the public money are coming to this industry, both because of the world actually experiencing some of the consequences of climate change already and also thanks to the perseverance and patience of the scientists and industrial people working on this."

There are some creative and successful ways to get financing for waste management and create bankability in projects.

"One of the best examples I know of is industries using their waste, either from industrial processes or municipal waste, as their energy source, often getting paid for it, instead of having to pay for treatment of their waste. Placing a WTE close to an industrial area that needs electricity, steam and heat is very good," says Stuen.

"Many other successful projects look in the same direction, making either an income or a neutral cost to a problem that before has meant considerable cost. Of course, public regulations are a very good tool for this. Landfill ban or high landfill taxes is the best incentive of them all."

## Critical new technologies hold key to emerging energy trends

Waste-to-energy, sorting plants and biogas emerge at forefront of waste management. **BY NARENDRA AGGARWAL**

THE term "new energy" covers a number of concepts – some established, some new, including the use of new technologies to generate electrical energy and increasingly capture the production of "future fuels", such as hydrogen, ammonia and methanol, says Michael Harrison, a partner in Ashurst LLP who's based in Singapore.

Harrison, along with colleagues, has been involved in over 30 waste projects, and is currently working on 10 projects, all of which are at various stages of development. "We are seeing a focus – as yet a niche one – on technologies to create biogas and bio-methane and liquid fuels and feedstocks from waste streams. Things are moving beyond the 'proven' technologies, that combust waste to produce steam to create electricity, and into the realms of deriving hydrogen from waste streams and cracking waste plastics to create fuels and feedstocks," he tells *The Business Times* (BT) in an interview.

"There is also an increasing buzz around biogas or bio-methane, where food waste and organic waste are processed into methane for blending into mainstream gas distribution networks."

Commercial, industrial and municipal waste can often be reused for the benefit of those who produce it and for society at large. Commercial and industrial (C&I) waste and municipal solid waste (MSW) often contain materials that can be recycled and, if not recyclable, can be used as feedstock for waste-to-energy (WTE) projects.

"(This) means that those wastes do not go to a landfill – which, in itself, has very real benefits to society: organic waste in landfill gives rise to landfill gas (comprising methane and carbon dioxide) as it decomposes; methane and carbon dioxide are both greenhouse gases which, when emitted to the climate system, give rise to climate change," says Harrison.

The use of C&I waste and MSW to generate electrical energy and produce future fuel reduces greenhouse-gas emissions. And the benefit to those that produce these wastes is that the energy or feedstock can, in some cases, become part of a virtuous loop. For instance, combustible parts of C&I can produce energy that can feed back into district heating or cooling systems for customers that produce the C&I, he adds.

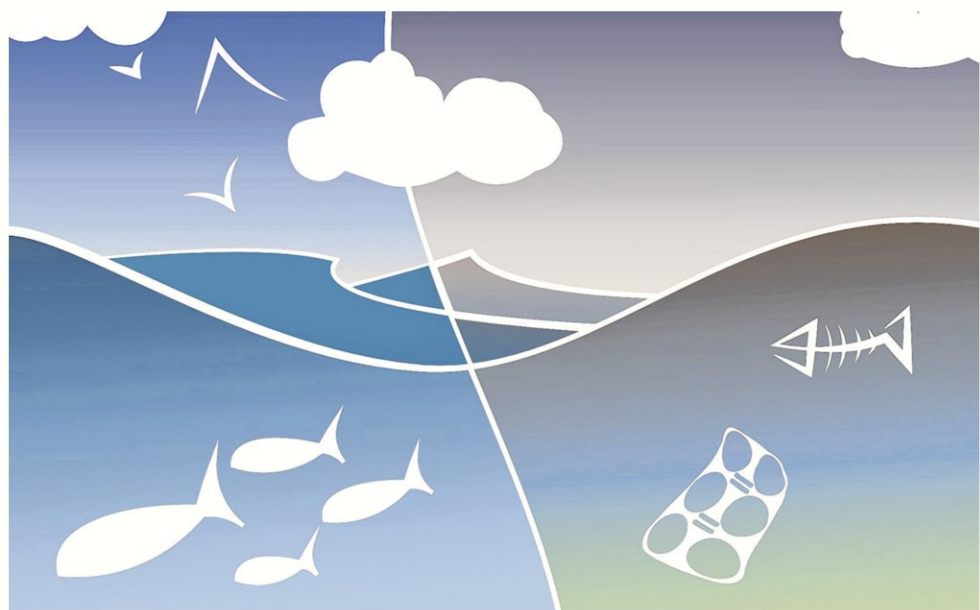
## The next level

WTE, sorting plants and biological treatment (biogas) are important as the spotlight on waste management grows larger in global efforts to protect the environment.

"In the absence of sorting plants – dry and wet material recovery facilities, WTE facilities and anaerobic digestion technologies – it is likely that waste will go to landfills," says Harrison. In some parts of the world, even landfills represent progress in efforts to protect the environment and oceans, as pollution becomes an ever-rising challenge. Taking WTE and sorting to the next level helps in further protecting oceans and undeveloped land. The use of sorting plants also allows for the recycling of materials that might otherwise have to be produced using energy and to transport both raw materials and finished products to the point of use, he adds.

"Anaerobic digestion plants are likely to increase in use, in particular in the context of the organic fraction of the waste stream and in the context of the processing and treatment of waste water – again, reducing greenhouse-gas emissions."

In the field of waste management, the collection and recycling of plastics is important because of the mass of plastic produced each year (made from hydrocarbons – fossil fuels) and in the absence of collection, plastics are finding their way in-



to our waterways and oceans and, increasingly, into the global food chain.

"The collection and recycling of plastic allows some plastics to be recycled, but not all. In fact, the majority of plastics produced are not capable of being recycled effectively using current mechanical thermal technology," says Harrison.

"In more recent times, technologies are being developed and deployed to allow the chemical recycling of plastics to reduce plastics to their original compounds, and to reuse those compounds to produce new plastics or to refine those compounds to produce future fuels, including sustainable aviation fuel."

Of the virgin plastic produced since 1950 and is no longer in use, it is estimated that, by mass, 9 per cent has been recycled, 12 per cent has been treated thermally, and 79 per cent has been discarded or disposed of via landfills (the vast majority, other than by safe disposal, to controlled or sanitary landfill). Any initiative that increases the recyclability of plastic has to be good, including chemical treatment to allow for the production of recycled plastics

or liquid fuels. But the phasing-out of plastics that cannot be recycled is just as important.

Harrison says that the pace at which the recycling industry is moving to a quality-based approach is a function of both technology (critically chemical recycling) and the market for recyclables. In respect of plastics, as the price of hydrocarbons rises (to produce virgin plastics), so the demand for recyclables increases – in more developed markets, at least. As demand for recyclables (and price) increases, so do collection rates.

There is a role for the government in respect of all the materials that may be recycled – the provision of funding to allow effective separation at source and collection from source. For example, the introduction of container deposit schemes that encourage the depositing of containers which can be recycled by providing for a payment to be made with the deposit of each container.

Harrison says for a circular economy to work in real life in the context of waste, the model requires policy settings that en-



**Michael Harrison (above) of Ashurst LLP says the collection and recycling of plastic allows some plastics to be recycled, but not all. In the absence of collection, plastics are finding their way into our waterways and oceans and, increasingly, into the global food chain.** PHOTOS: MICHAEL HARRISON, PIXABAY

courage the separation of waste streams at source – critically, the organic waste stream from the inorganic – and recyclables, including cardboard and paper, glass, metals and plastics, as well as the commitment to move to zero use of landfills.

As for obtaining financing, he says it is important to keep in mind that waste projects of any kind are environmental and greenhouse-gas abatement projects and as such, many of these are equity-financed rather than debt/project-financed.

"In more developed markets where there is reasonable certainty of the mass of waste arising, waste projects are able to obtain debt/project financing. Critical to project financing is getting comfortable with a change-in-law risk in any country, as well as understanding the practical impact that change in law may have on a project," Harrison tells BT.

"The more developed the market for waste, critically the more established the collection systems, the greater the certainty of the mass of waste that will be available," he adds. Certainty or at least relative certainty around these matters is key to any waste project, whether equity-funded only or debt and equity funded, he says.



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 [www.blueplanet.asia](http://www.blueplanet.asia)

 [info@blue-planet.com](mailto:info@blue-planet.com)

Scan to reach us

Sustainable technology lifecycle solutions

As a global sustainability leader, we are closing the loop on lithium-battery production and improving the collection, treatment and recycling of the scarce metals they contain.

With best-in-class expertise and recycling facilities to match, we are revolutionising battery recycling, allowing us to recover 99% of high purity commodities such as graphite, cobalt and lithium, cobalt and lithium, flowing them back into the supply chain.

Globally, we have over 40 facilities in more than 20 countries, a reach that gives us a unique insight into local laws and an expert knowledge of international regulations governing hazardous and dangerous waste. These facilities include a new lithium battery recycling plant strategically located at the Port of Rotterdam, Europe's largest sea port, while a new Shanghai plant opens later in 2022, to be followed by an even larger in northern China in the next two years.

Our wider portfolio of services is designed to help companies that want to improve how they manage the lifecycle of their technology assets and leverage the value locked into them when they are reused or recycled.

Our advanced and secure processes bring peace of mind and help to eliminate the risks associated with technology assets when they come to the end of first life.

21 COUNTRIES

43 FACILITIES

99% RECOVERY RATE OF PURITY PRODUCTS

ADVANCED AND SECURE PROCESSES

90% RECOVERY RATE OF ALL RE-USABLE MATERIALS

Together with our partners and customers, we are committed to achieving innovative and world-leading circular outcomes, and ensuring the reuse of some of our rarest materials.

To find out more about how we can boost sustainability in your business, visit:  
[www.tes-amm.com](http://www.tes-amm.com)

TES

Sustaining Tomorrow



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JOIN US AT LEVEL 4, SANDS EXPO & CONVENTION FROM 21 - 23 SEPTEMBER 2022

SEE YOU THERE