

RēSource



Institute of
Waste Management
of Southern Africa

THE CIRCULAR ENERGY STORY



**MAKING WASTE-TO-ENERGY
WORK IN SOUTH AFRICA**

**What does “true
sustainability”
look like?**

HOT SEAT



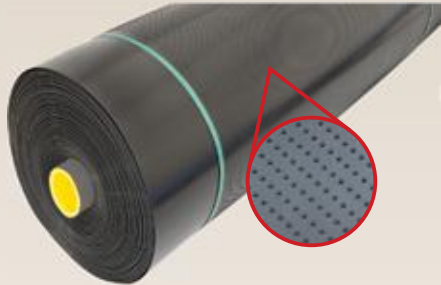
“The first five years of EPR should be viewed as a necessary foundation-building phase. We now have enough experience to see where the weaknesses and gaps are and, importantly, to build from that experience.” **Keith Anderson** CEO of eWASA

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How much will it really cost? and what if we screw it up anyway?

During a bout of electrical maintenance, I set up at a cafe and typed away. Eventually my headphones died, but in an effort to seem less approachable, I left them on, and the ambient chatter of the cafe became my soundtrack.

Across from me were, what I can only guess, consultants from a McKinsey type organisation. Oblivious to my accidental eavesdropping, they chatted candidly about money.

It is no secret that consulting firms are where money likes to be spent, but even with that prior preconception, the figures they were casually dropping seemed astronomical.

In stark contrast to the infinite money flow of consultation, whenever anyone brings up waste management, sustainability, recycling, etc, the budgets seem to fight back. To be fair, there has been a considerable shift in mindset over the past few years: sustainability is a good business decision, efficient waste management can reduce expenditure, recycling can actually be an income stream. This is no small part thanks to the waste sector's constant innovation, making impossible tasks possible, convincing board members, and execs whose idea of being green is building new golf courses that waste is important. Even with this progress, there is still not enough time and capital allocated to what is surely "a very important task."

If the ocean is polluted, we have to clean it, but we ask, "How much will this cost?" If landfills are filling up and we need diversion schemes, we go, "What will that cost me?" You get the point.

While waste is a sector rooted in business, there is also a considerable social aspect to it, and if we only address very surface-level economics, we might miss the bigger socio-economic picture: what is the cost of NOT doing anything? Inspired by one of the stories in this edition, I am now looking at everything through that lens, "What does it cost if we just do nothing about it?"

The health costs of not having a clean environment, the social costs of climate change, the economic implosion of mass unemployment as we keep doing what we are doing despite it not working?

If waste management, sustainability, and climate resilience are expensive (and it really isn't in the grand scheme), maybe they should be afforded the same benefit of the doubt; you get what you pay for, and wouldn't we all want a safe and clean environment rather than not?

On the other end of the spectrum, the European Union irked every single small business within its policy reach. On August 12th they updated their extended producer responsibility laws, effectively stopping small businesses from operating. In that way we are in a great position in South Africa, we have chosen to enable SMME development not stop it in some misguided "greener than thou" policy war. It also shows that we ought to be very careful; what we borrow from across the pond, because while the Eu is regarded as the gold standard, largely by themselves, they get things wrong. This is an important lesson that the Department of Forestry Fisheries and Environment should keep in mind as they craft EPR 2.0 in South Africa. ■

Duncan



COVER OPPORTUNITY

In each issue, **ReSource** offers companies the opportunity to get to the front of the line by placing a company, product or service on the front cover of the magazine. Buying this position will afford the advertiser the cover story and maximum exposure. For more information, contact Sindi Moni on +27 (0)82 212 4574, or email sindi@infrastructurenews.co.za.

The Institute of Waste Management of Southern Africa has had an incredibly busy year. There have been site visits and presentations galore, all while preparing for WasteCon 2026. Not content on just hosting the largest Waste Management Conference, IWMSA have launched a webinar where enthusiasts can learn about waste management on their lunch break. The first

one saw African Eagle Waste Management talk through their successes. The KZN branch have also begun judging their Waste Management Awards for 2026.

All the branches have also celebrated the 50th Anniversary of the IWMSA each showing off their own members, and history as the Institute prepares for WasteCon 2026.

Litterboom Project and IWMSA KZN team up



The IWMSA KZN Branch Committee joined The Litterboom Project for a beach clean-up at uMngeni Beach in celebration of World Oceans Day on the 8th of June.

It was inspiring to see such strong community support, with volunteers coming together to protect our oceans while enjoying the beauty of the coastline. Every bag of litter collected is a step towards healthier oceans and a cleaner future for all.

On 30 July 2026, Dr Mark Williams-Wynn, Chairperson of the IWMSA KZN branch, attended The Litterboom Project NPC Project's (TLP) Annual Partner Event at the Beachwood Country Club in Durban. The event celebrated the project's partners and showcased the positive environmental and social impact that TLP has achieved over the past 18 months.

The programme offered attendees insight into TLP's operational efforts. Highlights included a tour of the TLP Hub, where guests viewed demonstrations of TLP's product manufacturing process, alongside presentations from the TLP team, including Cameron Service, Evan Masson, Nelson Dumakude, and Rudi Clark.

The IWMSA KZN Branch remains a proud supporter of TLP. Both organisations share a fundamental commitment to proactive environmental management, prioritising education and prevention to stop waste from entering the environment at the source.

Recycling centre launch at the Tonkmeter Resource Facility Recycling Centre



The IWMSA was proud to be represented at the official launch of the infrastructure handover and recycling centre initiative at the Tonkmeter Resource Facility Recycling Centre.

This important partnership between PETCO, MetPac-SA and Tonkmeter Recycling Centre is a significant step towards diverting waste from landfill, empowering waste entrepreneurs, and strengthening South Africa's recycling value chain.

The event was officially opened by Leon Grobbelaar, former IWMSA president and managing director at Raalebborg Environmental while Kamogelo Hamisi, regional recycling officer in Gauteng for PetCo outlined the vision and impact behind the initiative.



IWMSA supports vegetable garden

IWMSA is grateful for the opportunity to support the Emthonjeni Vegetable Garden initiative, which promotes sustainability and food security within the community.

Emthonjeni currently maintains 27 vegetable boxes with a combined growing area of 122 m². To ensure healthy soil and productive crops, the focus is on enriching the existing soil rather than completely filling the beds.

By donating 6 tonnes of compost, the IWMSA Central Branch has supported Emthonjeni's efforts to maintain a sustainable and productive vegetable garden. The project not only contributes to food security but also equips young beneficiaries with practical agricultural skills and hands-on experience.

The produce harvested from the gardens helps provide meals for approximately 400 people on site each day, making a meaningful contribution to community well-being while fostering long-term sustainability.



IWMSA Western Cape Branch breakfast

The IWMSA's Western Cape Branch held their annual breakfast seminar at Hotel Verde, Cape Town Airport on 15 July 2026.

Mr Saliem Haider, Director: Waste Management, Department of Environmental Affairs and Development Planning took the delegates through different aspects of the current situation in the Western Cape, under the title "Cape

of Storms or Cape of Good Hope?" which included:

- The Impact of the storms on waste management facilities
- Update on Organic Waste Diversion
- Waste Economy: SMME Support
- Bulk Funding for Infrastructure update
- Waste Regional Landfill sites update in the Western Cape

As usual the event was well attended by about 40 people. Guests participated in an insightful time of Q&A, enjoyed a sumptuous breakfast, and took advantage of the excellent networking opportunities.



IWMSA participates in the South African Student Symposium

The Institute of Waste Management of Southern Africa (IWMSA) was honoured to participate in the IAIA South Africa Student Symposium, held on 23 June 2026.

Representing the Institute were Vishan Singh, IWMSA Vice Chair, and Sanki Tshabangu, Central Branch Manager. IWMSA was proud to host an exhibition stand, providing students and attendees with an opportunity to learn more about the Institute, the waste management profession, and the opportunities available within the sector.

IWMSA celebrates Mandela Day



In celebration of Mandela Day, on 17 July 2026, IWMSA Central Branch Manager, Sanki Tshabangu, proudly joined hands with Emthonjeni Community Centres, based in the Zandspruit Informal Settlement, Honeydew, Roodepoort, to support Project Intombi.

The initiative brought together four dedicated women from various companies who volunteered their time to make a meaningful difference. Together, they assisted with cutting fabric and packing 50 buckets containing reusable sanitary pad kits.

Every bucket packed and every piece of fabric cut represents more than just a donation – it is an investment in the dignity, confidence, and well-being of young girls in the community. By supporting access to reusable sanitary products, Project Intombi helps keep girls in school, promotes menstrual health awareness, and empowers them with sustainable solutions.

Mandela Day reminds us that even the smallest acts of service can create lasting change.

IWMSA's KZN Branch on tour

On Thursday 30 July 2026 Fibertex Nonwovens A/S kindly hosted KZN LaWTiG on a tour of their facility in Hammarsdale.

It was interesting and enlightening to understand and see the whole process from start to finish. From the mixing and extruding of the base granular products (plastic, dye & UV protection) to the production of the final roll of fibre. It was also comforting to note how many checks take place during the process to give confidence that the product produced does meet the required specifications.

It was also very informative to see the various tests that are carried out in the laboratory to ensure a quality product is produced.



The Circular Energy Story

The story of Circular Energy NPC began long before the organisation itself existed. Its roots lie in South Africa's evolving waste management and Extended Producer Responsibility (EPR) landscape.

During 2017, many currents were moving all at once; the lighting industry faced ever-increasing pressure to become compliant, while industry sectors adopted voluntary product stewardship as an alternative approach, and Patricia Schröder had established an environmental consulting practice, building on her extensive experience in waste management, environmental compliance and industry engagement.

Through her work, she developed relationships with international organisations such as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the World Resources Forum, United Nations Environment Programme (UNEP), the BRS Secretariat, and United Nations Industrial Development Organisation (UNIDO), while assisting industries and sectors to navigate environmental regulations and represent their interests responsibly.

Building a new compliance framework

As South Africa's EPR regulations evolved, government and industry worked together to develop a practical compliance framework. Following various consultations, regulatory amendments and industry engagements between 2018 and 2021, Patricia was appointed to a ministerial EPR task team and contributed to shaping the Section 18 EPR regulations. These regulations were eventually republished in May 2021 and required implementation by November 2021, creating a completely new compliance landscape for producers and importers across multiple sectors.

The renewable energy industry quickly recognised the significance of the new regulations. Industry associations including SAPVIA, SAWEA and SAESA understood that their members would require support to become compliant. Patricia was approached by these organisations to assist their members and guide the establishment

of an industry-managed Producer Responsibility Organisation. It was agreed that a dedicated PRO should be created for the EEE sector, and Patricia accepted the challenge of building it from the ground up.

With the support of two fellow founding board members, Circular Energy NPC was formally established and registered in October 2021. The newly formed organisation was registered with the CIPC and the DFFE, initially covering lighting, electrical and electronic equipment, and related waste streams.



Patricia Schröder, CEO of Circular Energy

From zero funding to a growing organisation

The early days were challenging. Circular Energy had no funding, no established member base and no proven operating model. Patricia personally carried the financial and operational burden of establishing the organisation, funding critical activities herself and committing countless hours to developing implementation plans, compliance systems and governance structures. The risk was significant, but so was the belief that the industry needed a credible, trusted and effective compliance solution.

In November 2021, Circular Energy submitted its implementation plans to the DFFE and received approval a month later. Patricia drove every aspect of the organisation's development, from creating the logo (initially hand-drawn) and the governance and operational framework to conducting webinars, educating companies and building awareness of EPR obligations. At a time when many organisations were still uncertain about the regulations, Circular Energy became a source of guidance and reassurance.

One of the greatest challenges was educating companies that compliance was necessary, and that Circular Energy was a legitimate and



Circular Energy's reception area, designed to reflect the company's commitment to sustainability and the circular economy

trustworthy organisation. Many businesses were sceptical of the new regulations and uncertain about the government's intentions. Patricia spent countless hours presenting to organisations, explaining legislative requirements, answering difficult questions and building confidence in the importance of compliance.

A defining moment came in 2022 when LG and Rubicon became Circular Energy's first major members. After extensive engagement and education, more entities joined the organisation and actioned the required compliance steps, resulting in 6 compliant members by December 2022. The companies represented the Electrical and Electronic, Lighting and Automotive sectors. This milestone provided critical funding, validated Circular Energy's credibility and created momentum for further growth. The organisation could finally begin investing in people, systems and operational capacity.

Following the onboarding of its new members, administrative and financial support staff were appointed, and Circular Energy established its first office at iZulu Office Park in November 2022 in Ballito's



commercial district. Although Patricia continued to manage most operational activities, the foundation for a sustainable organisation had been laid.

Growth, impact and a broader circular economy

The years that followed were characterised by exceptional growth. Membership expanded from only a handful of members in 2022 to 21 members in 2023, 50 members in 2024 and 84 members in 2025. Revenue grew exponentially, moving from a negative financial position in 2022 to exceeding 100 million in 2025. Circular Energy had evolved

Recognised for innovation and industry leadership, Circular Energy recently won the PV R&D Leadership Award at the 2026 SAPVIA Industry Awards, adding to its growing list of accolades for advancing renewable-energy solutions

from a start-up compliance initiative into one of the fastest-growing PROs in the country.

Growth brought new challenges. The organisation needed to recruit the right people, maintain exceptional standards and preserve the personal relationships that had been central to its success. Circular Energy deliberately focused on finding individuals who shared the organisation's values, passion and commitment to environmental impact. Participatory leadership, strong governance and a culture of purpose became defining characteristics of the organisation.

Healthier planet and stronger communities

Beyond compliance, Circular Energy increasingly focused on creating meaningful environmental and social impact. In 2024,



EcoBot®, the Circular Energy mascot, brings the circular economy to life by making e-waste recycling more relatable, engaging and accessible, particularly for younger generations

As solar PV modules reach the end of their operational life, Circular Energy is developing solutions to recover their value and keep these materials out of the waste stream



“If we think sustainability is just something to report on, we will never be sustainable. The day we understand sustainability is good for business, the planet, and the people, we will succeed.”

The organisation also expanded its regulatory scope. Following engagement with the DFFE, Circular Energy secured registration for additional waste streams, including paper and packaging, portable batteries and lubricant oil, broadening South Africa's EPR framework. At the same time, awareness initiatives were developed to inspire future generations, including the creation of EcoBot®, a mascot designed to educate children about sustainability and environmental responsibility.

The next chapter: EPR 2.0

By 2025, Circular Energy had outgrown its original premises and in 2026, relocated to larger offices in Simbithi Verve to accommodate its expanding team. The move symbolised how far the organisation had come in only a few short years. What began as a high-risk venture run largely by one individual had become a respected organisation serving prominent corporate brands and helping to shape the future of responsible resource management in South Africa.

Throughout this journey, governance remained central to the organisation's success. The Board evolved alongside the organisation, bringing expertise in industry engagement, government relations, risk management and commercial waste solutions. Their guidance helped Circular Energy transition from start-up mode into a mature organisation with a growing strategic focus and long-term vision.

Today, Circular Energy stands as a testament to perseverance, courage and purpose-driven leadership. Built on a foundation of compliance, it has grown into an organisation focused on impact, innovation and collaboration. From home offices to established headquarters, from uncertainty to industry recognition, and from a single founding vision to a thriving national organisation, Circular Energy has established itself as a trusted partner in South Africa's transition to a circular economy.

Reflecting on the journey, founder Patricia Schröder often emphasises that sustainability

must be embedded in the way organisations create value:

"If we think sustainability is just something to report on, we will never be sustainable. The day we understand sustainability is good for business, the planet, and the people, we will succeed. The companies who get it are leaping forward. Those that don't are increasingly isolated."

This philosophy has shaped Circular Energy's approach from the beginning, positioning sustainability not as a compliance exercise, but as a driver of innovation, resilience and shared value.

Circular Energy's next chapter will focus on strengthening strategic alliances, developing technical standards, expanding circular economy initiatives and deepening its contribution to environmental sustainability, whilst embarking on the EPR 2.0 journey, which will be implemented in 2027. Guided by the same passion that inspired its creation, Circular Energy is well positioned to continue leading the way in renewable energy stewardship, resource recovery, and responsible environmental management—spanning waste electrical and electronic equipment, batteries, lighting, packaging, and lubricant oils – for years to come.

At the end of EPR 1.0, Circular Energy finished off with more than 100 members, 16 staff members, a solid financial foundation with proven tangible impact, and both positive environmental and social impacts that have won awards and are recognised nationally and internationally. ■



From discarded cables to valuable materials, Circular Energy is helping to drive responsible e-waste recovery and a more circular approach to electronics

concerns raised by members about the responsible management of solar panels and batteries led to the development of Energy 4 Hope, a techno-social impact initiative focused on the repair, refurbishment, reuse and responsible management of renewable energy equipment. The vision was to create an independent platform capable of delivering both environmental and social benefits while remaining aligned with Circular Energy's broader mission.



www.circular-energy.org

E-WASTE COLLECTION CHALLENGE HELPS DIVERT WASTE TO LANDFILLS

Gauteng recorded the highest participation in Vodacom South Africa's Turn Your E-Waste into Rewards Challenge, demonstrating that South Africans are willing to embrace responsible e-waste recycling when it is made simple, convenient and rewarding.



Vodacom's Turn Your E-Waste into Rewards Challenge illustrates the convenience is a key component of e-waste collection

Delivered in partnership with Circular Energy NPC, the challenge collected more than 2 270 kilograms of electronic waste through 114 home collections across eight provinces, preventing unwanted electronics from ending up in landfill, while encouraging consumers to adopt more sustainable disposal habits.

Gauteng led the initiative, collecting more than 1 330 kilograms of e-waste, followed by KwaZulu-Natal (609.8kg) and the Western Cape (307kg). The results highlight the positive impact that accessible collection initiatives can have in addressing one of South Africa's fastest-growing environmental challenges.

According to the UN Global E-Waste Monitor, South Africa generates an estimated 530 million kilograms of e-waste every year, which is almost eight kilograms per person. However, much of it remains stored in homes or is disposed of incorrectly despite containing valuable materials that can be recovered and reused through responsible recycling.

The competition formed part of Vodacom's ongoing partnership with Circular Energy to make responsible e-waste recycling more accessible through convenient home collections, supporting the company's broader commitment to advancing a circular economy.

Takalani Netshitenzhe, Director: External Affairs at Vodacom South Africa, said, "The results of this

initiative demonstrate that South Africans are ready to embrace more sustainable behaviours when we make it easy for them to do so. Collecting more than 2.2 tonnes of e-waste through just 114 home collections shows that convenience and collaboration can play a powerful role in changing consumer behaviour."

"At Vodacom, we believe that protecting the planet requires partnerships that make sustainable choices more accessible. Through our collaboration with Circular Energy, we're helping customers responsibly recycle old mobile phones and tablets that would otherwise end up in landfill. This partnership forms an important part of our circular economy strategy, helping us keep valuable materials in use for longer, reduce

waste and connect people to a better future," added Netshitenzhe.

The challenge encouraged participants to schedule free home collections through Circular Energy, making it easier for consumers to dispose of unwanted electronics responsibly without leaving their homes.

"Electronic waste is one of the fastest-growing waste streams in South Africa, yet far too many unwanted devices remain in cupboards, garages and storerooms or are disposed of incorrectly. The success of this campaign demonstrates that when recycling is made convenient through services such as free home collections, people are willing to do the right thing," said Patricia Schröder, CEO of Circular Energy.

"Partnerships such as this one with Vodacom are essential to building a circular economy that keeps valuable materials in circulation, diverts waste from landfill and supports South Africa's Extended Producer Responsibility regulations. Every electronic device returned helps conserve resources, protect the environment and contributes to the growth of a more sustainable and resource-efficient economy," Schröder concluded.

The initiative builds on the partnership between Vodacom and Circular Energy announced in 2024, which aims to strengthen South Africa's e-waste management ecosystem by improving the responsible collection, recovery and recycling of electronic waste.

As part of its broader circular economy strategy, Vodacom continues to invest in initiatives that extend the lifespan of devices, reduce waste and create shared environmental and social value. This includes its RedLovesGreen programme, which enables customers to repair, refurbish, resell or responsibly recycle devices, alongside ongoing efforts to reuse, resell or recycle network equipment and contribute to the growth of South Africa's green economy. ■



Over one tonne of e-waste was collected from households in Gauteng alone



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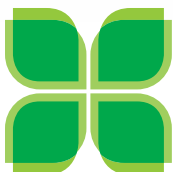
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Building on 50 Years of Progress

They say time goes by faster the older you get. You can decide on the merits of that for yourself, but I cannot believe it has already been more than two months since I took up the role of President of the IWMSA!

It has indeed been a whirlwind of engagement, learning and reflection so far, and I want to start by thanking our members for the warm welcome and the trust placed in me to lead the Institute into this next chapter. It is a responsibility I do not take lightly, particularly in a year as significant as this one, as we celebrate 50 years of the IWMSA advancing waste management across Southern Africa.

Coming into this role, my vision has been shaped by more than fifteen years of involvement with the Institute, from my early days with the Central Branch committee, through to my time chairing the Western Cape Branch, to serving as Vice President. This journey has shown me what makes the IWMSA so unique: a community willing to share knowledge freely, mentor the next generation, and keep showing up for an industry that does not always get the recognition it deserves.

For the next year, my focus is on building our already strong foundations rather than reinventing them. Growing our membership base is a priority, but growth on its own is not the goal. I want every member, whether newly joined or with decades of involvement, to feel that belonging to the IWMSA adds real value to their career and their organisation. That means continuing to invest in webinars, technical sessions, site visits, regional events and, of course, our flagship WasteCon conference, so

there are more touchpoints for members to connect and learn from one another.

Youth involvement will remain another focus area for us as Council. Our sector's long-term health depends on attracting young professionals and giving them meaningful platforms early in their careers, while creating space for experienced members to pass on hard-won knowledge. Alongside this, strengthening the relationship between government and industry will also be a key focus. Some of our biggest sector challenges, from policy implementation to infrastructure delivery, only get resolved when these groups are talking to each other, and the IWMSA is well placed to keep creating opportunities for that dialogue.

I would be lying if I said the year ahead doesn't come with its own set of challenges. Our membership spans an enormous diversity of sectors, disciplines and career stages, each with different expectations of what the Institute should deliver, and balancing those expectations will require careful listening rather

than assuming I already know the answers. Resourcing our ambitions, largely through the goodwill of volunteers and branch committees, will also require ongoing attention, as will keeping pace with a policy and technology landscape that continues to shift quickly, from extended producer responsibility to advances in recycling and recovery technology. None of these challenges are new to the IWMSA, but they will need consistent, honest engagement over the coming months.

Conversely, there is a great deal to look forward to. WasteCon 2026 in October will be a particular highlight, not only as our 50th anniversary conference, but also as a genuine opportunity to ask what the next 50 years of waste management in Southern Africa should look like. I am encouraged by the enthusiasm I have experienced with both long-standing and retired members who remain keen to contribute, alongside a growing wave of interest from younger professionals entering the sector. That combination of institutional memory and fresh energy is, I believe, one of our greatest assets going into this milestone year.

I would like to extend my sincere thanks to my predecessors and to everyone who has served the Institute over the past five decades. The IWMSA's standing as a trusted and respected voice in the waste sector exists because of their dedication, and it is a legacy I intend to build on rather than take for granted.

I look forward to seeing you at WasteCon 2026! ■



Reon Pienaar, President of the Institute of Waste Management of Southern Africa (IWMSA)

IWMSA PATRON MEMBERS



Past presidents of the IWMSA

The Institute of Waste Management for Southern Africa celebrates an impressive milestone: 50 years! That is how long the Institute has been serving the waste management sector, adding knowledge, innovation, support, and connection.

During those 50 years, the organisation has been helmed by trusted members of the IWMSA who take on the responsibility of steering the organisation through the challenges and opportunities that lie ahead.

At this year's WasteCon, a biannual conference organised by the IWMSA, the Institute takes stock of the last 50 years and will use this unique platform to spotlight the past presidents in a unique panel that brings these past voices to the foreground. The event will host a panel of past presidents to enter a discussion on the IWMSA over the last 50 years: how it has changed, how it has remained steadfast to its mandate.

Ahead of the conference, ReSource managed to get input from some of these past presidents, and we asked them to share their thoughts with us before their panel at WasteCon.

Jarrod Ball 1994-1996



The IWMSA is an instrumental organisation; for example, from the mid-1970s to the early 1980's, the IWMSA succeeded in changing the status of the "lowly municipal cleansing function" into the "formal discipline of Waste Management".

And then from the mid 1970's until the present, the IWMSA has consistently promoted the science and practice of waste management through ongoing education and technology transfer.

What advice would you give to a new president as they take up the role?

Continue to promote the science and practice of waste management through ongoing education and technology transfer; never losing sight of the practicability, the economic realities and sustainability.

Suzan Oelofse 2013-2016



For five decades, the IWMSA has provided the leadership, professional community and technical foundation that have supported the development of South Africa's waste management sector. By connecting people, sharing knowledge, developing skills and promoting sound environmental practice, the Institute has enabled practitioners to respond to evolving legislative, technological and societal challenges. Its enduring contribution lies not only in influencing policy and practice, but also in nurturing a professional community committed to protecting the environment, recovering resources and improving the quality of life of all South Africans.

What advice would you give to a new president as they take up the role?

Lead with integrity, listen with humility and act with courage. Build bridges rather than silos, develop people rather than programmes, and focus on creating lasting value rather than short-term achievements. If, at the end of your term, IWMSA is more respected, more inclusive, more

influential and better equipped to serve both its members and society, then your presidency will have been a success.

Leon Grobbelaar 2018-2020



The IWMSA provides a platform where government, municipalities, academia, and the private sector can collaborate to address the region's waste management challenges. Through training, technical guidance, conferences, research, and policy engagement, the Institute contributes significantly to improving environmental compliance, resource recovery, and the transition towards a circular economy.

What advice would you give to a new president as they take up the role?

"Leave the Institute stronger than you found it."

Every President builds on the work of those who came before and prepares the way for those who will follow. Success should not be measured only by conferences hosted or policies influenced, but by the lasting impact the Institute has on the profession, the environment, and the people who dedicate their careers to improving waste management. If the next President can inspire collaboration, uphold technical excellence, mentor the next generation, and continue to position the IWMSA as the trusted voice of the industry, they will make a lasting contribution to both the Institute and Southern Africa's environmental future.

At this year's WasteCon, a biannual conference organised by the IWMSA, the Institute takes stock of the last 50 years and will use this unique platform to spotlight the past presidents in a unique panel that brings these past voices to the foreground."



Brendon Jewasklewitz 2020-2022



The IWMSA is a special and important organisation in that although it is not a statutory body with regulatory powers, it has the potential to generate collective influence and power by bringing the vastly diverse waste management sector together to achieve positive outcomes that would otherwise not be possible. This can only be done through the direct involvement and collaboration of positive, knowledgeable and truly altruistic people, and the IWMSA's role should be to attract, educate and empower the many participants in the waste management sector, with the ultimate goal of improving the way in which waste is managed and bridging the many gaps between the public and private sector.

What advice would you give to a new president as they take up the role?

I would advise the new president to remain steadfast and to stay the course. The commitment made to the IWMSA in this role demands significant time, effort, and attention to detail, and it must be given to the best of their ability. I would also advise them to listen to the differing views of all involved; there is much to be learned from those with different backgrounds and training, and to involve those who show willingness and enthusiasm actively. Finally, I would also advise them to keep in touch with the needs of the IWMSA membership base, as they will always be looking for value in their membership of the IWMSA.

Mpendulo Ginindza 2022-2024



The IWMSA plays a vital role in professionalising and strengthening the waste management sector. Waste management is still not always fully understood or appreciated as a profession, even among some stakeholders working within the sector. Yet it requires specialised technical knowledge, ethical leadership, effective governance and continuous professional development.

The Institute helps to build this professional identity by connecting practitioners, promoting knowledge exchange, supporting professional development and providing a credible platform through which the sector can engage government, industry, academia and communities. Its role extends beyond serving its members: it helps demonstrate that sound waste management is fundamental to environmental protection, public health, resource efficiency, the circular economy and sustainable development.

What advice would you give to a new president as they take up the role?

Take good care of yourself, body, mind and soul because your ability to serve the Institute effectively depends on your own wellbeing and resilience. The presidency is both an honour and a significant responsibility. It requires strategic thinking, difficult decisions, listening to different perspectives and balancing the immediate needs of the organisation with its long-term interests.

Lead with purpose, but do not try to carry everything alone. Draw on the strengths of the Council, branches, staff, members, young professionals and regional partners. Protect the institutional integrity of IWMSA, invest in relationships and make decisions that will continue to benefit the Institute after your term has ended.

Ultimately, leadership is not measured only by what is achieved while you are in office, but also by the people, systems, partnerships and opportunities that remain and continue to grow after you have left.

Patricia Schröder 2024-2026



IWMSA drives sustainable practices by uniting industry professionals. As a central knowledge hub, the Institute helps companies build best practices and reduce environmental and human health impacts through effective waste management.

What advice would you give to a new president as they take up the role?

Prioritise maintaining a stellar reputation while advancing the proud legacy of the Institute. Moving forward, the leadership must anchor the organisation's core focus around regenerative, circular economy principles. ■

eWASA speaks frankly about EPR in South Africa

Launched in 2021, South Africa's Extended Producer Responsibility system took a then-voluntary approach and turned it mandatory. These regulations have been a key driver of sector growth, building waste management infrastructure, enabling recycling, and creating meaningful employment.



Producer Responsibility Organisations (PROs), such as the EPR Waste Association of South Africa (eWASA), play an important role in enabling the circular economy by turning responsible waste management into practical action. One example is the donation of durable desks and chairs, crafted from multilayer recycled materials, to pre-schools, giving waste materials a new life while creating a lasting benefit for young learners

This is not to say South Africa is cruising smoothly, or that it can rest on the first iteration of the regulatory framework. For eWASA CEO Keith Anderson, “this is only the beginning, and while EPR has been great, we need to grow the regulations to make it even more effective.”

Anderson sat down with ReSource editor Duncan Nortier and spoke frankly about EPR over the last five years in anticipation of the next phase of EPR in South Africa.

Looking back at the first five years of EPR implementation, what do you believe are the biggest weaknesses in the current regulatory framework that need to be addressed? Conversely, what was its biggest strength?

Keith Anderson (KA): The first five years should be viewed as a necessary foundation-building phase. We now have enough experience to see where the weaknesses and gaps are and, importantly, to build from that experience.

The biggest weakness is the uneven implementation of the system. In particular, enforcement against non-compliant producers, or what we often refer to as free riders, needs to be stronger.

There is a fundamental fairness issue here. Compliant producers are carrying costs that their non-compliant competitors avoid. You have companies doing everything correctly, investing the money, paying their fees and fulfilling their obligations, while a non-compliant competitor can place products on the market without carrying the same responsibilities. That effectively penalises companies doing the right thing.

Another major weakness is inconsistent data quality. We are seeing fragmented data, inconsistent reporting between sectors and a lack of standardisation. The fee structure also needs greater transparency. Producers need to understand what they are paying for and how the fee has been calculated.



EPR can be a powerful vehicle for social good, creating opportunities for recycled materials to deliver meaningful benefits to communities

The biggest strength, however, is that South Africa now has mandatory EPR. It is formal, it is here and it is being built upon. Having a mandatory legal framework creates the foundation for producer accountability, PRO participation, registration, reporting and investment in end-of-life management. The foundation is laid; now we need to build on it.

How should the regulations be improved to ensure that all obligated producers, not just those already engaging with PROs, are contributing to EPR?

KA: The regulations should be strengthened around practical enforceability, with clearer and easier compliance checks.

Registration should be treated as the entry point rather than the end of the process. There needs to be a clearer system for checking who is actually obligated and whether those companies are meeting their responsibilities.

That requires evidence-based data. Government should be able to use registration information and other available information to identify obligated producers and determine whether they are complying.

Voluntary compliance alone does not create a fair system. The objective should not be to punish legitimate businesses. It should be to create a level playing field in which every producer placing an obligated product on the South African market declares accurately, joins or establishes an appropriate compliance scheme, contributes appropriately and reports its performance.

If those things can be measured and meaningful action can be taken against companies that do not comply, the system becomes much stronger.

There is also an important development around public disclosure of non-compliant companies. Government has indicated that, while it is waiting for the necessary authority to issue certain penalties or funds, it is looking at publishing the names of companies that are non-compliant. That creates reputational risk. Responsible



companies are concerned about being associated with non-compliance, and public disclosure can therefore become an important enforcement mechanism.

Is the current EPR fee structure providing sufficient funding for collection, recycling, refurbishment and recovery, or does South Africa need a different approach to financing EPR?

KA: South Africa needs to move away from a basic compliance-fee mindset towards a more transparent, change-centred fee structure.

EPR fees need to be sufficient to support the activities that the system is supposed to deliver. That includes collection, transport, sorting, treatment, recycling, refurbishment, recovery, administration, awareness, reporting and the infrastructure required to develop the sector.



Keith Anderson, CEO of eWASA

At eWASA, we have tried to make this transparent from the beginning. From year one, we have explained how every rand received is spent. The allocation is broken down so that producers can see where the money goes, and that information is published and provided to producers.

The problem is that when PROs compete primarily on price, it can create a race to the bottom. If one organisation charges a significantly lower fee, producers may choose it because of the price rather than its infrastructure, network, services or outcomes.

That is dangerous because EPR must not become a box-ticking exercise. The fees have to support the purpose of EPR.

Interestingly, different PASA, PRO Alliance of South Africa (not the paper and packaging PRO Alliance of South Africa) members have independently developed fee structures through their own research and mechanisms, and those fee structures are broadly similar. That suggests there is a common underlying cost structure within the industry.

One possible way of changing the competitive dynamic would be to remove price as the primary differentiator. If every PRO charged a hypothetical flat rate, producers would have to choose between PROs based on their ability to deliver value, infrastructure, networks and outcomes rather than simply choosing the cheapest option. That would be a game changer.

What changes are needed to improve the quality and consistency of data on products placed on the market, collection rates and recycling outcomes?

KA: Data quality needs to become one of the core reform areas for the next five years.

One of the key problems is that different participants have developed their own approaches



As EPR enters its next phase, effective enforcement will be critical to strengthening the sector and ensuring that the system delivers on its objectives

to categorising and reporting information. We need standardised product categories, weight classifications, material definitions and declaration templates across the sector.

Consistent compliance requires consistent reporting. There also needs to be a clearer relationship between what is placed on the market and what subsequently happens to those products. We need to reconcile products placed on the market with products collected, sorted, recycled, recovered, exported or sent to landfill.

If the integrity of that evidence can be established, decisions can be based on actuals rather than estimates.

PROs and producer-run schemes should be required to retain auditable evidence and submit information through a more consistent digital reporting system. Independent audits, site verification, common reporting definitions and regular quality checks would help ensure that targets and policy decisions are based on credible information.

Better data also supports better fee structures and enforcement. If we know what is being placed on the market, what is being collected and what is ultimately being recovered, we can make decisions based on evidence rather than fragmented information. This is one of the key areas PASA will be raising with government.

How can government, PROs and industry better address the informal sector and ensure that waste pickers, collectors, refurbishers and smaller recyclers are properly integrated into the EPR system?

One of EPR's greatest successes is facilitating the integration of waste pickers into the formal waste management system. By supporting key areas of the waste value chain, EPR helps create more stable incomes and sustainable livelihoods for waste pickers

KA: The informal sector should be treated as part of the collection infrastructure, rather than as a side issue. That is one of the major lessons of the first five years.

The next phase should focus on turning that principle into a practical operating model. That means registration pathways, fair collection fees, EPR training, access to collection points, safe sorting areas, links to PRO-funded projects and fair contracting arrangements with collectors, refurbishers and smaller recyclers.

Should South Africa move towards stronger eco-modulation of EPR fees, where producers pay more for products that are difficult to repair or recycle and less for products designed for circularity?

KA: Yes, but it should be phased in carefully and supported by reliable data. Eco-modulation can become an important design signal. Products that are easier to collect, separate, repair, reuse, refurbish or recycle should not necessarily carry the same fee exposure as products that create higher downstream costs and environmental risks.

In principle, it is a logical development of EPR. It would move EPR beyond simply paying for waste

management and make it a mechanism that influences product design. That is an important shift because EPR should ultimately move up the value chain.

However, this can only work if the data is reliable enough to support the differentiation. The system needs clear criteria. These could include recyclability, hazardous components, repairability, recycled content, material complexity and the existence of end markets.

Producers would also need sufficient guidance and transition time.

The current system places significant administrative and reporting requirements on producers and PROs. What could be simplified or standardised without weakening accountability?

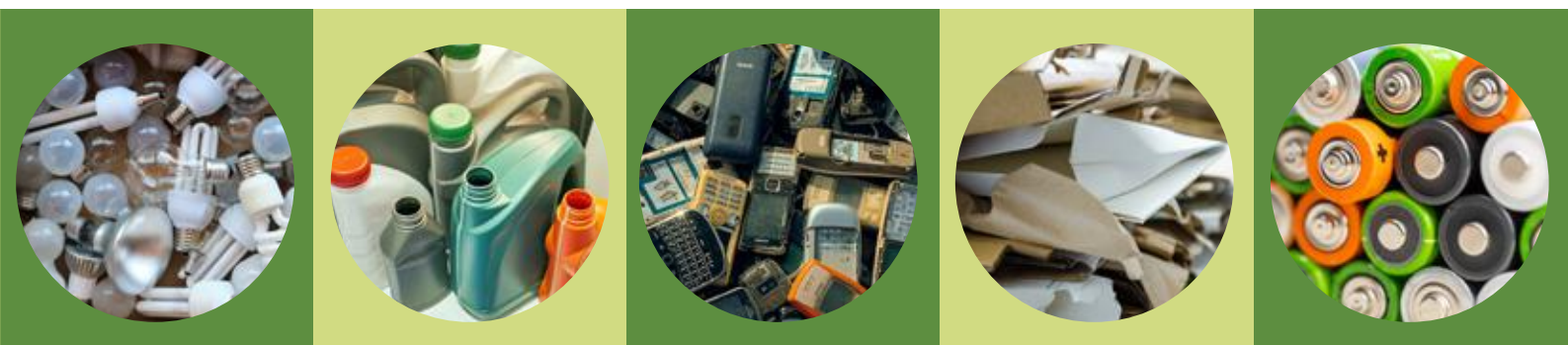
KA: The system is heavily paper-driven, but simplification should come through standardisation rather than reduced accountability.

Producers and PROs would benefit from common definitions, common sector templates, common declaration formats, common reporting calendars, standardised product classification rules and consistent audit evidence requirements.

At the moment, different organisations can approach similar audits in very different ways. One organisation may conduct a highly complex audit while another may assess substantially less information.

There needs to be a common standard. A single digital reporting pathway, or better integration between the relevant government and PRO reporting





systems, could reduce duplicate administration and misinterpretation while improving the quality and integrity of the information being submitted.

What should not be weakened is the requirement to declare accurately, fund appropriately, keep records, report performance and provide auditable evidence.

The objective is to simplify compliance, not simplify avoidance. Standardisation should make it easier for companies to comply correctly while maintaining the evidence and accountability that make the system meaningful.

What role should municipalities play in EPR over the next five years, particularly where EPR-funded collection and recycling systems overlap with municipal waste-management responsibilities?

KA: Municipalities should become formal implementation partners in EPR, particularly where EPR-funded activities overlap with municipal waste services. This requires closer cooperation between municipalities, PROs and industry, with practical local agreements clearly defining responsibilities, streamlined processes, coordinated infrastructure, data sharing and community education.

Municipalities could also make greater use of vacant or underutilised buildings and land as buy-back centres or other recycling facilities, helping to formalise the informal sector while creating jobs and improving collection efficiency. PROs should not be expected to carry municipal obligations, nor should they unnecessarily duplicate functions already performed by municipalities. Instead, the focus should be on creating a coordinated local operating model that makes the system more effective and cost-efficient.

There are already examples of what can happen when municipalities, PROs and industry work together. Through collaborative initiatives, collection volumes can move from kilograms to tonnes because participants are working together rather than operating in isolation. This cooperation can also support the integration of waste pickers, collectors and smaller recyclers into a more formal system, while allowing municipalities to benefit from improved collection and potentially lower waste-management costs.

Over the next five years, the relationship between PROs, municipalities and metros therefore needs to become much closer, with

existing infrastructure and resources used more effectively to build a stronger EPR system.

Beyond increasing collection and recycling rates, what regulatory changes are needed to make EPR drive product redesign, repair, refurbishment, reuse and the development of domestic secondary-material markets?

KA: The regulation needs to place stronger emphasis on circular design rather than focusing primarily on end-of-life recovery.

Existing EPR requirements already point in this direction through requirements around life-cycle assessment, material minimisation, design for reuse and recovery, recycling and reducing environmental toxicity. The next phase should strengthen those requirements. That could include stronger repairability and refurbishment pathways, reuse and refill targets where appropriate, incentives for recycled content, support for domestic beneficiation and stronger demand for secondary raw materials.

EPR should help build markets for recovered resources so that materials can be processed and used productively within the local economy.

South Africa already has facilities capable of processing certain materials. There is therefore an opportunity to use policy and EPR to support the development and utilisation of that domestic capacity rather than simply assuming that recovered materials must be exported.

The argument that South Africa does not have the facilities to process materials should not automatically become a reason to continue exporting them. Where capacity exists, the next question should be how policy can support markets that allow that capacity to operate effectively.

There is also a broader economic consideration. Exporting materials can make commercial sense for individual businesses because international markets can offer dollar- or euro-based pricing. But there can be a longer-term cost to the local economy when valuable resources consistently leave the country rather than being processed domestically.

If you could change three things about South Africa's EPR regulations today, what would they be, and what would success look like by 2030?

KA: The first priority would be universal participation and enforcement so that free riders cannot undermine compliant producers.

The scale of free riding appears to be considerably greater than initially anticipated. An independent study commissioned by eWASA has provided a clearer picture of the issue, including information gathered across different government departments.

The second priority would be improving data integrity and fee transparency. Fees need to reflect real end-of-life costs, and performance needs to be auditable. Without credible data, it becomes much harder to establish appropriate fees, measure outcomes or make sound policy decisions.

The third priority would be to use EPR properly as a circular economy instrument. That means strengthening eco-modulation, product design, municipal cooperation, informal-sector integration and the participation of obligated producers.

If those elements are working together by 2030, success would mean an EPR system visibly delivering measurable outcomes.

Waste pickers and SMEs would be properly integrated. Municipalities and PROs would have clear local operating models. EPR fees would fund measurable recovery, refurbishment, reuse and recycling. Producers would be participating fairly, and the data would be credible enough to guide future targets and investment.

The next phase of EPR must be fair, enforceable and evidence-based. South Africa has the regulatory foundation. The opportunity now is to turn compliance into a mature circular economy system that rewards responsible design, funds real recovery and includes the people and enterprises already doing the work on the ground. ■



EPR Waste Association
of South Africa

www.ewasa.org



LIFECYCLE ASSESSMENTS AND PRODUCT STEWARDSHIP

After five years of mandatory Extended Producer Responsibility (EPR) in South Africa, there is considerable pressure to move away from a compliance only mindset towards measurable environmental progress.

One of the ways that EPR aims to achieve this measurable progress is for producers to conduct lifecycle assessments (LCAs) on the products they place on the market, taking more responsibility for how the products are produced as well as disposed of. According to the Council of Scientific Research (CSIR), which developed the guidelines for LCAs, conducting an LCA is not a data developing exercise, but a procedure rooted in reevaluating design processes and material choices in order to shift linear products towards the circular economy.

A LCA is a structured methodology used to evaluate the environmental impacts of a process,

service, or product from the extraction of raw materials through manufacturing, converting, distribution, use and end-of-life, including recycling or disposal. Often referred to as a “cradle-to-grave” assessment, an LCA can be used to identify where the highest environmental impacts occur and thereby highlight opportunities for improvement.

For producers, LCAs provide evidence-based insights that support better decision making. Rather than relying on assumptions, businesses can quantify impacts such as carbon

emissions, water consumption, energy use, climate change, and resource efficiency, among others.

This can assist manufacturers in designing packaging that is not only more sustainable, but also more competitive in an increasingly environmentally conscious marketplace.

Which producers are required to conduct an LCA?

The requirement applies to producers of packaging operating under South Africa’s EPR Regulations who place identified products and packaging on the market. These regulations require packaging producers to ensure that life



Edwin Botha,
LCA and Paper
Recyclability
Officer

cycle assessments are undertaken as part of their broader environmental performance obligations.

Under South Africa's EPR regulations, specifically Regulation 5(1)(k), packaging producers are legally required to conduct an LCA for their products, in accordance with applicable standards, within 5 years of the implementation of their EPR scheme. For the paper and paper packaging sector, this is not an open-ended suggestion; it is a hard regulatory milestone.

But Regulation 5 does not merely mandate any generic environmental assessment. Regulation 5(1)(l) strictly dictates that these LCAs must focus on three areas of environmental performance:

1. Minimisation of material used in the identified product.
2. Designing the product to facilitate reuse, recycling, or recovery without compromising its primary functionality.
3. Reducing the environmental toxicity of the resulting post-consumer waste stream.

For affected brands, this means that compliance cannot be achieved with a generic, off-the-shelf LCA or a quick checklist. The assessment must be a precise, product-specific diagnostic that proves a producer is actively working to minimise raw material consumption, design circularity, and purge toxicity from the waste stream.

Crucially, because an LCA is a complex scientific undertaking that can take months to complete, waiting until the eve of the regulatory deadline to engage is risky.

Paper has been used for thousands of years and, despite its declining use alongside the digital revolution, it remains essential to plan for its end of life



More than a compliance exercise

Beyond regulatory compliance, LCAs are valuable business tools that help manufacturers design products with sustainability in mind.

By identifying environmental "hotspots", producers can evaluate alternative raw materials, reduce unnecessary packaging, improve recyclability, increase recycled content, and optimise manufacturing processes. These improvements often result in lower production costs, greater resource efficiency, and reduced environmental impacts.

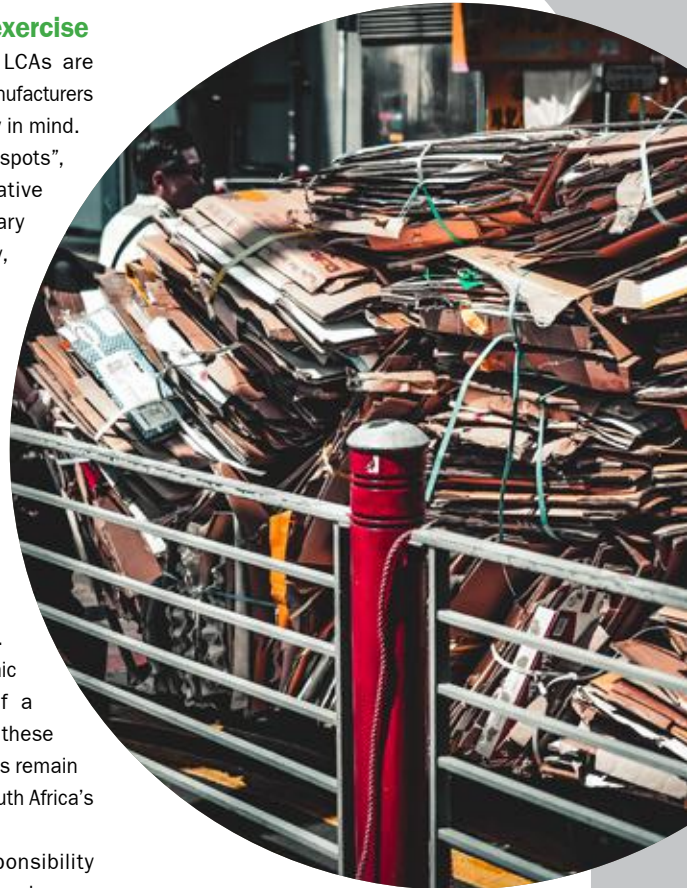
As consumer expectations and international sustainability standards continue to evolve, LCAs can provide businesses with valuable information to inform sustainability related decisions. When considered alongside economic and social factors as part of a broader decision-making process, these considerations can help businesses remain competitive while contributing to South Africa's transition to a circular economy.

As the leading Producer Responsibility Organisation (PRO) for the paper and paper packaging sector, Fibre Circle is helping its members prepare for the growing importance of LCAs. Rather than expecting each producer to independently develop all the technical expertise and resources required to conduct LCAs, Fibre Circle is taking a collaborative approach by providing guidance, facilitating industry collaboration, promoting consistent methodologies, and improving access to environmental data.

According to a 2026 report by the CSIR, Fibre Circle's members collectively place 95%-96% of the locally consumed packaging papers in South Africa on the market. This represents an opportunity to collect a large amount of data and make a real shift in how paper packaging is designed and disposed of in South Africa.

The organisation is also driving initiatives such as the South African Repulpability and Recyclability Standard, which complements LCA work by encouraging packaging designs that are more recyclable and better aligned with South Africa's recycling infrastructure.

The message to producers is clear: an LCA should not be viewed simply as a compliance requirement. It is a strategic business tool that helps identify opportunities to reduce material use, improve resource efficiency, eliminate unnecessary environmental impacts, and design packaging that is better suited to a circular economy.



Packaging represents a significant waste stream, and reducing the volume sent to landfill depends on designing packaging for circularity

Preparing for a circular future

By using LCA findings to inform product and packaging decisions, businesses can strengthen regulatory compliance, prepare for future policy developments such as eco-modulated EPR fees, lower material costs, and build brands that demonstrate genuine environmental stewardship. Five years into South Africa's EPR journey, LCAs have become an important driver of innovation, competitiveness, and long-term sustainability within the paper and paper packaging sector. ■



www.fibrecircle.co.za



Price is not the right question; it is what it is containing and what the consequences are if containment fails

ASKING THE RIGHT QUESTIONS

In modern landfills, the geomembrane liner forms the key component to the critical barrier system. Its job is simple to state, but demanding in practice: “reliably isolate waste and leachate from the surrounding environment”. **By Peter Hardie, technical and international sales manager at AKS Lining Systems**

In a landfill the chemistry of what’s being contained can change over time. So, the liner has to be a dependable barrier against a broad spectrum of potential contaminants. That’s why HDPE geomembranes are so widely used.

But it’s not as simple as dropping in a sheet of plastic and walking away. Smooth HDPE is common, but textured geomembranes are often crucial on side slopes. Texturing increases interface friction, which gives the designer far more control over slope stability. By engineering different asperity heights on each side of a liner, we can help the engineer define higher factors of safety and even preferential slip planes within the system.



Now, material choice matters too. HDPE is the workhorse – it’s been tried and tested, but LLDPE, with its extra flexibility, can be useful where differential settlement is anticipated, like in landfill caps and closures. The key is to treat the liner as an engineering component, not a commodity. The liner also needs to function as part of an overall barrier system, which might include other layer-works like low permeability clay or GCLs, protection geotextiles, grids and drainage medium. Each has a specific designed function to perform.

Another point that deserves attention is the installation environment. A well-installed liner still remains key to the barrier system’s success. A single poor or failed weld could mean overall failure of the system. Special attention is always needed at pipe penetrations, sumps, leachate collection points and other high-risk or challenging installation areas within the barrier system.

Underpinning all of this is traceability. Knowing exactly what was made, tested and installed. Every roll should be identifiable from resin right through to site installation. That chain of evidence supports long-term accountability. At the same time, manufacturing quality control can only go so far. All of the good work we do in the factory needs to be supported by equally reliable on-site quality control and testing.

The liner and barrier system doesn’t just sit there; it actively protects soil and groundwater from contamination for decades. And that means the right question isn’t ‘How much does the barrier system cost?’ but ‘What are we containing, and what are the consequences if it fails?’ ■



Peter Hardie, technical and international sales manager at AKS Lining Systems

WHAT DOES

“TRUE SUSTAINABILITY” LOOK LIKE?

Recycling diverts waste from landfill and reduces reliance on virgin materials, but it is only as useful as its downstream impact. For recycling to be effective, it has to create demand for a secondary-goods market as well as ensure that materials made from recycled goods are also recyclable. **By Duncan Nortier**

For Steffen Schröder, managing director of Reclite SA, a recycling company, this is where “true sustainability” in recycling begins. Schröder adds, “This starts with a simple principle: recycling must be about resource recovery, not simply moving waste away from landfill.”

His focus on “true sustainability” is based on an observation: “The rules of the game that we’re playing are not really equal. Not everybody plays by the same rules.”

Rather than pointing fingers, he believes the industry needs to establish a clearer understanding of what sustainable recycling actually looks like. For him, that means balancing the three Ps: people, planet and profit, while also considering safety and sound environmental management.

“Driving recycling as a process for resource recovery for manufacturing of new products that again add value to the economy” is the starting point, he says. But this creates a further



Reclite SA's Managing Director,
Steffen Schröder

challenge: the products made from recovered resources must themselves be designed for recovery and recycling.

One of the biggest differences between conventional recycling metrics and Schröder's approach is what happens after material leaves the recycler. He describes a “two-level down transparent system”, where recyclers monitor not only their immediate downstream customer, but where the recovered resource ultimately ends up.

“If the aluminium that we recover gets sold to a smelter, then we find out what products the smelter makes out of that, and then we also qualify the environmental performance of our downstream partner,” he explains.

This matters because simply transferring 100% of a material to another company does not necessarily mean 100% has been sustainably recycled. Downstream processing can generate its own waste and environmental impacts. “If we supply a dirty material, and there's a lot of waste on our downstream vendor, that has an impact on the way that we see our recycling capability of that product.”

For Schröder, greater transparency can also help recyclers work with customers to improve material quality and overall recovery efficiency. ▶



The problem with only recycling the valuable fractions

Contamination, infrastructure, markets and economics all create challenges for recycling, but Schröder identifies a more fundamental problem: the tendency to focus on the easiest and most valuable materials. “I believe the biggest hurdle is that it’s easier to recover only the high-value fractions without investing into the entire product or waste chain.”

Developing solutions for difficult materials requires time, experimentation and investment. The immediate financial return may not justify that investment, particularly when simpler materials can generate better margins.

Yet if recyclers only pursue high-value fractions, difficult materials remain unresolved. Schröder points to plastics, fibre-optic cables and brominated flame-retardant-containing materials as examples. Developing viable recovery processes can take years, and sometimes requires accepting losses while a market develops.

“We treat waste streams where we don’t make a single cent, maybe even a loss,” he says. “But if we don’t do it, no one else does it.” This does not mean recycling businesses should ignore profitability. Rather, the industry needs to recognise that developing new recycling streams can require long-term investment before they become commercially viable. Reclite SA offer a good example, where fluorescent bulbs were seen a “negative income” stream, Reclite SA continued to recycle the material

while developing a use for it on the market, and now it is a core element of their business.

Recycling has to compete with extraction

The environmental sustainability of recycling is also questioned because recycling itself requires energy, transport, water and infrastructure. Schröder argues that the better question is where the break-even point lies compared with virgin resource extraction.

Mining benefits from concentrated resources. Recycling has the opposite problem: valuable materials are dispersed across households, businesses and communities and must be collected before they can be processed.

“A mine has a relatively small footprint when compared to an entire country,” he says.

The answer, therefore, cannot be for individual recyclers to solve the logistics problem alone. Collection, transport, infrastructure and recycling need to operate as a connected system.

“Recycling is possible, but not in isolation,” says Schröder. “It’s a multi-stakeholder approach driving logistics and collection sustainably forward.” This is one area where Extended Producer Responsibility (EPR) and Producer responsibility Organisations (PROs) can play an important role by creating the infrastructure needed to bring dispersed waste streams into the recycling value chain.

Without an end market, is it really recycling?

For Schröder, the end market is fundamental: “Recycling for the sake of recycling alone can never achieve true sustainability.”

Recovered material needs to become a useful input into another manufacturing process. Otherwise, recycling risks becoming an expensive form of waste management rather than genuine resource recovery. He adds, “The objective is to move waste from being a liability towards being a resource with economic value. At the end of the day, we’re doing it for the consumer; the consumer is the one that ends up with a new product as well.”

This also means product manufacturers need to take greater responsibility for what happens at end of life. Schröder sees EPR and PROs as potential links between recyclers and



“Recycling for the sake of recycling alone can never achieve true sustainability.”





manufacturers, enabling information about end-of-life challenges to influence future product design.

“If you’re a really good recycler, you’re a producer,” he says. In this sense, recycling can become a manufacturing activity in its own right, rather than a waste management service.

Recycling’s overlooked workforce

True sustainability also has a social dimension, particularly in South Africa’s recycling system.

Schröder questions whether describing reclaimers and dismantlers as the “informal sector” accurately reflects the businesses many of them operate.

“They have premises. They pay rent. They have people. They have weighing scales. They pay money to people dropping off items. They get paid for what they recover. What’s informal about that?”

Whatever terminology is used, he argues that these actors need to be recognised as part of the recycling value chain. “The collection system is right there. We only have limited access; they have unlimited access.”

This is particularly important in developing countries and communities where formal collection systems are limited. Integrating reclaimers and dismantlers into broader recycling systems could

increase diversion from landfill while creating meaningful income-generation opportunities.

Measuring recycling performance differently

Tonnes collected and recycled remain useful metrics, but Schröder believes they are not enough. “The current metrics are valid. However, more relevant metrics need to be added that can help drive better sustainability,” says Schröder.

One measure should be whether projects supported through EPR funding eventually become independent, value-adding operations. Another should examine whether collection infrastructure generates sufficient value over its lifetime to justify its cost.

Most importantly, the industry should track whether increasing volumes are making recycling more or less economically efficient.

“If we’re driving more volume, is it becoming more costly per tonne?” he asks. “Where is the system going long term?” For Schröder, an EPR system that continually becomes more expensive as volumes increase is a warning sign rather than a success.

Setting minimum standards

Schröder believes South Africa needs stronger standards for licensed recyclers. His proposal is to make environmental performance audits mandatory as part of external licence reviews and establish minimum recycling standards for specific products and waste streams.

“Anyone not meeting these limits is no longer considered a recycler.” Such standards would create a more level playing field and prevent companies that invest heavily in comprehensive recycling from competing against operators that only recover the easiest fractions.

“It would create a level playing field and drive better environmental performance,” he says.

However, Schröder distinguishes between licensed recyclers and reclaimers or dismantlers. The latter should not face more regulation. “The reclaimer and dismantler market, they don’t need a stick; they need a carrot.” For licensed recyclers, however, he believes higher standards should be welcomed. “If we’re saying we do, well, audit me against it. Let me live and fall by it.”

For Schröder, that is ultimately what true sustainability in recycling requires: clear standards, transparent downstream recovery, viable end markets, better product design and a value chain that delivers environmental, economic and social value. “You want recycling? You want diversion from landfill? Set the standard.” ■



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INDUSTRIAL ECOLOGY IN ELECTRONIC INFRASTRUCTURE

As South Africa's technological and renewable energy transitions accelerate, electronic equipment and solar photovoltaic (PV) systems have shifted from niche installations to core infrastructure across commercial, industrial, and residential sectors. With vast volumes of electronics active nationwide, the e-waste management conversation must mature alongside the rapid pace of adoption. **By Dr Mark Williams-Wynn**

The fundamental challenge facing the sector is no longer simply recognising the need to divert items from landfills; it is establishing scientifically validated, scalable frameworks for full lifecycle stewardship across all electronic equipment streams.

Extended Producer Responsibility (EPR) regulations have introduced a vital catalyst into this landscape, encouraging producers, importers, and recyclers to evaluate the complete operational lifespan of their products. Central to this regulatory philosophy is the need to conduct thorough Life Cycle Analyses (LCAs) right from the front end. A comprehensive LCA requires analysing the exact chemical and structural composition of equipment prior to deployment. By characterising trace elements, material breakdown, and exposure profiles over the entire life cycle of any electronic asset, including consumer hardware, industrial electronics, and solar infrastructure, the sector can design targeted operational interventions that mitigate ecological and health risks long before equipment reaches end-of-life.

Translating these insights into practical industry standards requires moving away from fragmented waste conversations. Instead, the sector must adopt an integrated industrial ecology framework,



Dr Mark Williams-Wynn, chief technical officer at EWaste Africa

one that connects professional decommissioning protocols and global testing standardisation with advanced materials engineering.

Upstream decommissioning logistics and the global application of testing standards

A critical yet frequently overlooked phase in the equipment lifecycle occurs during physical decommissioning, removal, and initial sorting. Substandard handling techniques during uninstallation often result in severe mechanical damage, micro-cracking, or structural glass

compromise, which complicates downstream processing and transforms salvageable assets into hazardous scrap. Establishing professional decommissioning standards is essential to preserve structural integrity and protect handling personnel from electrical and physical hazards.

Once equipment is safely removed and transported to processing facilities, a major structural vulnerability in the global circular economy emerges: the under-utilisation of existing international testing benchmarks. International testing standards already exist to govern electrical safety, insulation resistance, wet leakage currents, thermal integrity, and mechanical stability. However, these standards are currently not widely applied or enforced on a global scale. Without the widespread adoption and enforcement of these established testing protocols, there is a pervasive risk that substandard, degraded, or electrically unsafe hardware will re-enter supply chains, creating severe fire, safety, and operational hazards for end-users.

Advocating for the broader global application and enforcement of these existing standards is essential across all electronic streams. Enforcing established benchmarks ensures that equipment considered for secondary deployment meets non-negotiable safety criteria, effectively preventing

Solar panel glass recycling is crucial for South Africa's circular ambitions



substandard devices from compromising market trust or public safety.

Precision materials engineering: chemical matrix integrity and amorphous safety

For electronic assets and solar hardware that have reached absolute end-of-life due to severe degradation or irreparable structural damage, true circularity depends on advanced material recovery rather than basic destructive shredding. While metallic components like heavy aluminium frames, copper interconnects, and circuit board metals possess established commercial recycling pathways, complex non-metallic fractions require specialised material engineering.

In solar PV modules, the glass fraction accounts for more than 80 percent of total mass. To transform this recovered glass into a usable secondary raw material, the extracted panels undergo specialised mechanical crushing, milling, or granulation processes. This mechanical processing reduce the solid glass sheets into a fine, granular material commonly referred to as solar sand.

Understanding the safety and stability of solar sand requires examining the precise atomic structure of the original glass. Solar panel glass is a bulk oxide matrix containing an inorganic, vitrified amorphous network composed primarily of silicon dioxide, calcium oxide, magnesium oxide, sodium oxide, and aluminium oxide. While constituents such as antimony oxides are purposefully added as fining agents to enhance light transmission and efficiency, other trace elements integrated into this network are either functional dopants or contaminants introduced during manufacturing. Acknowledging these specific additives allows the sector to design targeted material recovery pathways that safely stabilise them into secondary products.

From an occupational health perspective, solar sand offers a profound safety advantage over

1 Understanding the safety and stability of solar sand requires examining the precise atomic structure of the original glass

2 By 2030, South Africa will generate an estimated 750,000 tonnes of electronic waste

3 Understanding these geometric and physical constraints, processed solar sand can be safely directed into appropriate industrial applications, civil aggregates, and construction materials

natural crystalline quartz sand, such as river sand. Because the silicon dioxide within solar glass exists strictly as an inorganic vitrified amorphous network rather than crystalline silica, processing and handling solar sand eliminates silicosis risks associated with crystalline silica, though standard airborne dust mitigation protocols (PPE, dust extraction) remain required for fine particulates, without introducing any additional hazardous properties. Evaluating the material's health hazards according to the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) confirms that this amorphous structure fundamentally alters its hazard classification, establishing solar sand as a significantly safer alternative to natural crystalline sand for workers and handling technicians.

When solar sand is incorporated into secondary value-added products, such as concrete products, chemical stability profiling demonstrates robust material encapsulation. When these final composite products are subjected to rigorous leaching tests under harsh acidic environments, trace elements and heavy metals, including antimony, lead, and barium, are locked into the binder matrix of the concrete product. Because these elements are firmly stabilised within the product matrix, they do not

leach into surrounding environments, provided appropriate mix designs and binder chemistries are used.

The physical particle geometry and grain size distribution achieved during milling dictate the specific engineering parameters for where the material can be effectively utilised and where it cannot. By understanding these geometric and physical constraints, processed solar sand can be safely directed into appropriate industrial applications, civil aggregates, and construction materials, providing a scientifically sound, long-term material sink for end-of-life glass.

An integrated vision for valorisation of waste

Building a resilient, sustainable circular economy requires aligning material science, front-end lifecycle analysis, and the widespread application of established testing standards into a unified operational framework. By combining accredited testing protocols to prevent substandard equipment from entering the market with a rigorous understanding of matrix chemistry, product-level heavy metal stabilisation, and safe material processing, the sector can demonstrate that environmental responsibility actively supports economic growth.

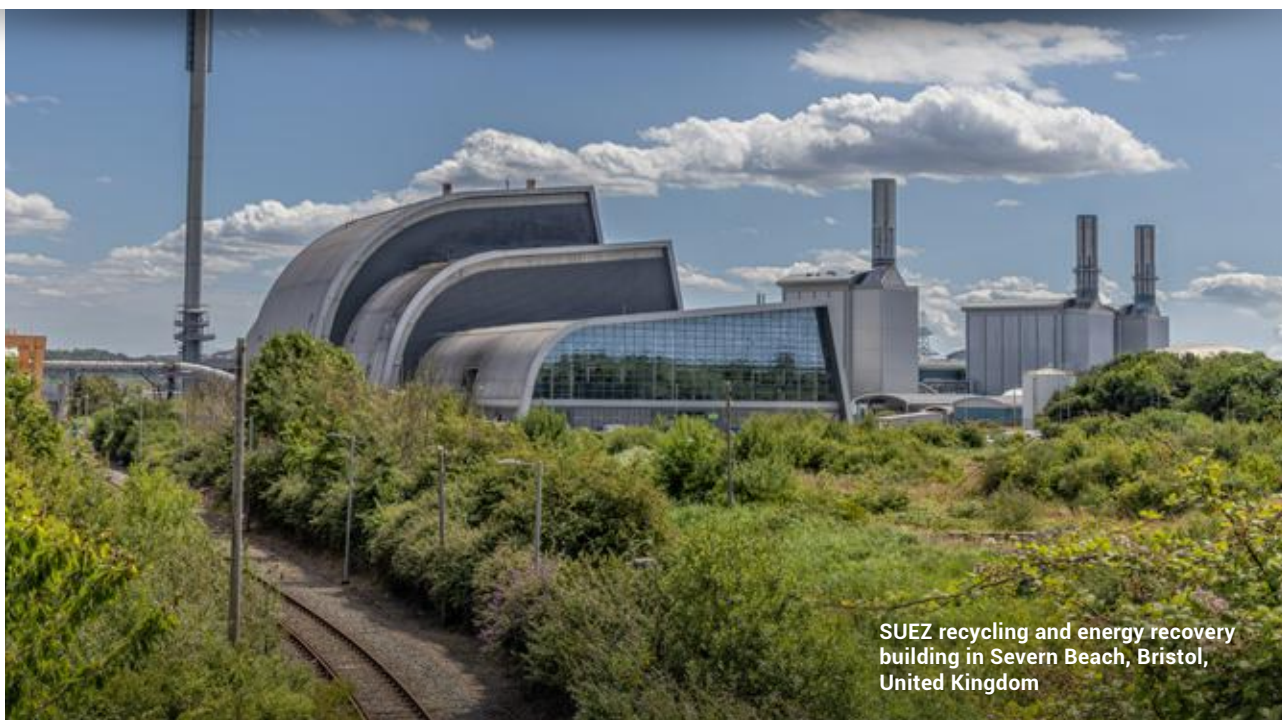
This end-to-end framework proves that the technical challenges of electronic and solar waste management can be solved through rigorous science, established safety standards, and practical material engineering. ■



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Making waste-to-energy work for South Africa

As South Africa increasingly turns to waste-to-energy to relieve pressure on municipal landfills and constrained power grids, Kate Stubbs – business development director at EnviroServ, a SUEZ company – unpacks the technologies, opportunities and misconceptions shaping its adoption.



SUEZ recycling and energy recovery building in Severn Beach, Bristol, United Kingdom

“One of the greatest misconceptions is that waste-to-energy refers to a single treatment option. Waste-to-energy encompasses many technologies and different types of solutions. Technologies include landfill gas recovery, anaerobic digestion, pyrolysis, refuse-derived fuel, co-processing and large-scale thermal treatment. Each requires a suitable and consistent feedstock, appropriate infrastructure and a viable market for the energy or fuel produced,” states Stubbs.

All of these solutions and technologies have been implemented extensively in Europe, China and a growing number of developing economies. SUEZ, parent company of EnviroServ, has implemented and currently operates over 40 waste-to-energy plants internationally. Their long operating histories also provide municipalities and investors with proven performance data.

The choice of technology depends on the type and classification of the waste, the regulatory requirements governing its treatment, the local availability of suitable processing facilities, energy offtake, and the client’s objectives and budget.

Making projects affordable

Despite the environmental case for waste-to-energy, affordability remains one of the greatest barriers to its large-scale adoption

in South Africa. “There are many available waste-to-energy solutions, but they must be commercially viable,” explains Stubbs.

Landfill disposal remains relatively inexpensive in many parts of the country, particularly where municipal tariffs do not yet reflect the full cost of operating a compliant disposal facility. Alternative treatment technologies must compete with these low gate fees while covering the costs of collecting, transporting and processing waste.

“We speak positively about waste as a resource, but it still needs to be collected, transported and processed. Zero waste to landfill or waste diversion does not mean zero cost,” Stubbs emphasises.

Waste-to-energy facilities must also meet environmental, waste-management and air-emission requirements. Licensing, monitoring



Kate Stubbs, strategy, marketing and business development director, EnviroServ

and the safe management of residual materials add to project costs.

In Europe, higher landfill gate fees, landfill taxes and strict regulatory diversion objectives make waste-to-energy comparatively more attractive.

Large scale South African waste-to-energy projects therefore require funding. This may be in the form of blended finance, including private investment, public funding, grant funding and international climate finance, to close the affordability gap.

In addition to the significant upfront capital, large waste-to-energy projects need to operate for decades to recover their investment. Stubbs believes public-private partnerships offer an appropriate structure for projects developed with municipalities.

"You may be looking at an agreement of at least 20 years. If there is a long-term waste supply agreement, it should be matched by a long-term power purchase agreement that secures the offtake of the electricity."

A bankable project requires a long-term waste supply agreement that guarantees sufficient feedstock, as well as a corresponding electricity or energy offtake agreement. Payment security, reliable waste volumes, suitable tariffs and clearly allocated risks are equally important.

The technology provider and operator must also have sufficient experience to design, construct, operate and maintain the facility over its full lifecycle. As a SUEZ company, one of the international leaders in waste and water services, EnviroServ can draw on the group's waste-to-energy expertise and its experience of long-term public-private partnerships.

"When an investment is this substantial, operational expertise, experience and credibility are critical. South Africa cannot afford failed solutions. Projects must be properly structured and supported by experienced partners that can remain accountable over the long term," says Stubbs.



More than incineration

Another misconception is the close association of waste-to-energy projects with incineration and air pollution. In fact, modern waste-to-energy plants use sophisticated flue-gas treatment systems to control particulate matter, acid gases, heavy metals, dioxins and furans, and must comply with prescribed emission limits. Diverting biodegradable residual waste from landfill can also reduce future methane emissions.

"People often hear waste-to-energy and immediately think of burning waste and creating air pollution. However, uncontrolled burning is not waste-to-energy. Large-scale thermal facilities are highly regulated, with strict standards governing their emissions," says Stubbs.

She adds that many engineered landfills make a meaningful contribution to the circular economy through abstracting and converting gas to energy.

Landfill gas recovery

Landfill gas recovery offers an opportunity to capture methane and convert it into useful energy. EnviroServ owns and operates six landfills in South

Africa, among which three are presently suitable for landfill gas recovery due to their size, age, waste composition and operating conditions.

"Every landfill is different. Its viability depends on the size and age of the site, the age of its cells, the type of waste received and the way it has been operated," says Stubbs.

EnviroServ has been involved in landfill gas extraction and energy generation since 2008. Its Chloorkop landfill gas initiative has generated approximately 1.5 million certified emission reductions since inception. The company is also installing and investigating gas recovery systems at Shongweni and Vissershok, although grid capacity and access remain challenges.

A place within the waste hierarchy

Waste-to-energy should never be viewed as a replacement to interventions within the waste hierarchy. These solutions are complementary. The waste hierarchy begins with avoiding waste, followed by reducing, reusing and recycling materials. Treatment, recovery and disposal follow once these options have been exhausted.

"We will still need compliant landfills because waste-to-energy processes produce residues that must be safely managed," explains Stubbs.

A large-scale municipal solid waste-to-energy facility may leave approximately 20% of its original feedstock as bottom ash. Some of this material can be beneficiated and used in construction products, but the remainder must be managed or disposed of safely. Fly ash captured by emission-control systems is hazardous waste and requires specialised treatment and disposal.

A role in South Africa's waste future

Waste-to-energy will not resolve every waste-management challenge. Nor will it eliminate the need to prevent waste, expand recycling or operate compliant landfills. Nevertheless, Stubbs believes it should become an important component of integrated waste planning, particularly in larger metropolitan areas where volumes are sufficient to support viable projects.

"South Africa has a waste management crisis. Developing new landfills is difficult, suitable land is becoming scarce, regulations are stringent, and transporting waste over longer distances increases costs," she says.

Waste-to-energy facilities can potentially be located closer to urban centres, reducing transport distances while supplying electricity or other forms of energy. For municipalities, this offers an opportunity to address two infrastructure challenges through an integrated solution.

"The legislation is moving in the right direction, but it must be enforced, and suitable projects must be brought to market. Waste-to-energy certainly has a role to play in South Africa's long-term, sustainable approach to waste management." ■



In the not-too-distant future, the man-made “mountains” that have long dominated Johannesburg’s skyline, such as Pikitup’s Robinson Deep, Goudkoppies, Ennerdale and Marie Louise landfill sites, will gradually become a thing of the past.

Traditional landfilling is becoming obsolete

The partial closure of the Marie Louise and Ennerdale landfill sites is a clear indication that landfilling is no longer a sustainable long-term waste management solution. Instead, these sites are paving the way for more advanced and sustainable waste management practices centred on recycling, resource recovery and the circular economy.

Evidence of this transformation is already visible across the city. The waste management landscape is changing rapidly, as demonstrated by the growing number of waste entrepreneurs who compete with Pikitup’s collection vehicles and personnel for recyclable materials. Items once regarded as waste are increasingly being recognised as valuable economic resources capable of creating jobs, generating income and supporting local industries.

This transition away from landfilling, in line with the National Waste Management Strategy and the principles of waste minimisation, has led to the establishment of material recovery and sorting facilities at several of Pikitup’s landfill sites. Robinson Deep Landfill is one such example, where a dedicated sorting facility has been developed to support waste recovery initiatives.

The facility comprises four large sorting bays allocated to waste cooperatives. These cooperatives recover recyclable materials from the incoming waste stream, separate and sort them, and prepare them for sale to recycling companies that process the materials into new products. This initiative not only diverts waste from landfill but also supports the circular economy, creates employment opportunities and promotes environmentally sustainable waste management practices.

The initiative also reflects Pikitup’s commitment to diverting waste away from landfill sites while ensuring that waste reclaimers and recycling cooperatives participate meaningfully in the waste value chain.

Creating opportunities through recycling

One of the cooperatives operating from the Robinson Deep sorting facility is the ABMP Cooperative, which commenced operations on 13 July 2026 under the leadership of its Director, Mr Philemon Vusi Thomo. The cooperative employs nine additional workers.

Thomo, who lives in White City, Soweto, has been involved in the recycling industry for the past 15 years. Through recycling, he has been able to provide for his family and build a sustainable livelihood. Reflecting on the opportunity to operate from the new sorting facility, he said:

“It is a wonderful place. We now have toilets, running water and shelter. Before, we were exposed to the elements and could not work during severe weather conditions. I am grateful because this facility gives us dignity and makes us feel valued.”

The ABMP Cooperative recovers and recycles cans, cardboard, glass bottles and plastic. In



Pikitup envisions sorting facilities as a means to displace traditional landfilling





addition to providing operating space, Pikitup has also made a truck available to the cooperative to assist with the collection of recyclable materials from communities primarily serviced by the Southdale Depot.

Another cooperative benefiting from the facility is the Goranola Cooperative, which has five directors and employs ten workers. One of its directors, Mr Koikoi Maruping, developed a passion for environmental conservation long before entering the recycling industry. He previously volunteered in initiatives aimed at eliminating illegal dumping sites in his community before establishing the cooperative.

Maruping described the opportunity to operate from Pikitup's sorting facility as a significant improvement. "We used to operate from a dark and unsuitable area, but now we have a proper facility with essential amenities. I only wish the space was larger, but we are grateful for this opportunity."

Unlike traditional garden refuse sites, these integrated facilities accept a wider range of recyclable materials, including cardboard, cans, plastic, glass, used oil and small quantities of builders' rubble, in addition to garden waste

Like ABMP, the Goranola Cooperative also benefits from Pikitup's support through access to transport and improved operating facilities. Together with other recycling cooperatives, these organisations play an important role in helping the City of Johannesburg and Pikitup divert waste from landfill, increase recycling rates and strengthen the city's circular economy.

Expanding infrastructure for waste diversion

Pikitup is further expanding its recycling infrastructure through the construction of large sorting facilities at the decommissioned Linbro Park Landfill. At present, several cooperatives operate from the site under temporary open-air conditions. Once completed, the new development will provide safer, more efficient and weather-resistant workspaces for many more recycling cooperatives.

Approximately five sorting facilities are currently under construction, with the project estimated to be about 90% complete. Once operational, the facilities will significantly enhance Pikitup's material

recovery capacity while creating additional opportunities for small recycling enterprises.

The construction of sorting facilities is only one aspect of Pikitup's broader waste diversion strategy. The entity is also upgrading its garden sites into fully integrated waste management facilities designed to encourage recycling and responsible waste disposal.

Unlike traditional garden refuse sites, these integrated facilities accept a wider range of recyclable materials, including cardboard, cans, plastic, glass, used oil and small quantities of builders' rubble, in addition to garden waste. By providing residents with convenient locations to separate and dispose of recyclable materials responsibly, these facilities will further reduce the volume of waste sent to landfill.

Through these initiatives, Pikitup is laying the foundation for a modern, resource efficient waste management system that views waste not as something to be discarded, but as a valuable resource capable of creating employment, stimulating economic growth and protecting the environment for future generations. ■



ZERO WASTE SYSTEMS OFFER VIABLE ALTERNATIVE TO WASTE-TO-ENERGY

South Africa's growing landfill crisis can be addressed through decentralised zero-waste circular economy systems rather than costly waste-to-energy (WTE) incineration projects, according to Zero Waste Association of South Africa CEO Keith Roman. **By Duncan Nortier**



ZWASA's electric cargo transport designed specifically for narrow township roads

Roman argues that municipalities should prioritise source separation, composting, recycling and community-based waste systems before considering large-scale incineration technologies. “The criteria that we all use to make the comparisons are highlighted, i.e., definition of the system, environmental impact, job creation impact and the financial impact of the two systems,” says Roman.

Roman explains that ZWASA, a non-profit and public benefit organisation, is part of the global zero-waste movement through affiliations with the Global Alliance for Incinerator Alternatives and the Break Free From Plastic movement.

He defines a zero-waste circular economy as “the conservation of all resources by means of responsible production, consumption, reuse and recovery of products, packaging and materials without burning and with no discharges to land,

water or air that threaten the environment or human health”.

Source Separation Critical

Roman repeatedly emphasises that separating waste at source is the foundation of an effective zero-waste system.

“Source separation includes the community mobilisation and education and awareness,” he says. “Suffice to say that the source separation

is the most important.” Drawing on international examples, Roman notes that zero-waste systems are already achieving substantial results globally. “In San Fernando in the Philippines, where I obtained my Zero Waste Academy certificate, they separated more than 91% in 2025,” he adds.

Another example is in Italy’s Treviso province, where municipalities have reduced residual waste dramatically. “Treviso province in Italy has reduced its average residual waste rate to 41 kg per person per year,” he explains. “Some of those municipalities are achieving a residual waste rate of 31 kg per person per year.”

By comparison, South Africa generates vastly higher levels of residual waste. “South Africa’s average residual waste rate is approximately 900 kg per person per year,” Roman says.

Roman warns that the country’s continued dependence on landfill disposal is creating an escalating environmental and financial crisis. “All that waste that we generate mostly goes to landfill sites.” He specifically highlights the shortage of remaining landfill airspace in the Western Cape, noting “landfill culture has led to a serious landfill crisis in South Africa.”

Roman says that the government has already recognised the urgency of the problem: “In order to address the landfill crisis, the Department of Environmental Affairs has given a directive that all municipalities must divert 100% of the organic waste from landfills by 2027.”

However, municipalities cannot achieve this objective without community participation. “In order to separate organic waste at source, you need the support of the communities,” Roman explains. “Municipalities cannot separate kitchen organic waste at source. You need the communities to assist you with it.”

Cape Winelands Pilot Demonstrates Potential

Roman outlines how ZWASA developed a decentralised waste management model in the Cape Winelands District Municipality, specifically within the Zwelitsha community.

The programme includes household education, source separation, composting, waste picker training and decentralised collection systems. “We developed a model which has been adapted from the European and other benchmark cities around the world,” he says.

The initiative also includes training programmes for waste pickers and unemployed youth. “We provided training and mentorship to waste pickers and unemployed youth who were sent



Zero Waste Association of South Africa
CEO Keith Roman

on composting and vegetable farming training courses,” Roman says. Initially, collection systems relied on wheelbarrows before transitioning to electric cargo transport designed specifically for narrow township roads. “We developed an E cargo bike and an E trailer bike, 100% manufactured in Stellenbosch,” he says. “These E-bikes and E-trailers are ideal for the narrow street roads of Zwelitsha.”

Source separation includes the community mobilisation and education and awareness.”



Roman explains that decentralised treatment facilities located close to communities significantly reduce transport costs, “Instead of us transporting organic waste Struisbaai to Bredasdorp and then from Bredasdorp to Karwyderskraal in Botrivier, more than an hour-and-a-half drive away, we can treat the waste where it is generated.”

According to Roman, transport represents one of the biggest municipal waste expenses, taking 60-80% of any solid waste department’s budget.

Aside from cost savings, separating organic waste at source also improves recycling quality. “By separating organic waste at source, we prevent cross-contamination,” Roman says. “We can improve the quality and quantity of recyclables.”

Having better recycling rates and separated organics leads to better use of organic waste. “We can add value to that compost by using it on vegetable farms and then selling vegetables to the communities,” he says.

The compost produced through the project is used to grow vegetables, supporting local food security while improving soil health.

“The compost that we produce is used on farms to produce organic vegetables,” Roman explains. “This helps to mitigate food insecurity.” He links the project directly to broader social challenges, citing statistics on hunger and child malnutrition in South Africa. “Food insecurity in South Africa stands at about 23.6%,” he says, adding that chronic malnutrition affects “27% for children under five years of age”.

Climate and Health Benefits

Roman stresses that landfill diversion has major environmental and public health benefits.

“By separating organic waste at source and diverting that organic waste from landfills, we reduce greenhouse gas emissions significantly, especially methane gas,” he says.

He notes that landfill sites are major climate contributors. “Landfills are amongst the top five biggest greenhouse gas emitters in the world,” he says.

Roman also references global air pollution research as a motivating factor: “According to the Centre for Environmental Rights, air pollution is the world’s largest environmental health threat, accounting for seven million deaths around the world every year.”

Citing Professor Thomas Münzel of the Johannes Gutenberg University Medical Centre, Roman adds: “The effects of air pollution are so great that officials should consider it a pandemic.”

Energy vs other initiatives

Roman is sceptical of waste-to-energy systems, particularly incineration-based technologies.

“Waste-to-energy systems are the most expensive way to produce electricity,” he says. ▶

Waste to energy can be used for specific purposes but ZWASA argues that some cases benefit more from a Zero Waste approach



Tackling collection in townships enables better recycling practices

He argues that mixed waste streams, especially organic waste, are unsuitable for efficient combustion.

"It is a waste of energy to burn organic waste," Roman says. "Organic waste constitutes 60% to 97% water. Cucumbers and watermelon have a very low calorific value, you are essentially burning water."

Roman also argues that burning recyclable materials undermines circular economy objectives. "It is also a waste of energy to burn plastic, paper and cardboard when it could be reused to produce new products and new jobs," he says.

He references comments by Swedish combustion expert Haakon Hjortland, who reportedly says that gasification, pyrolysis and plasma arc systems struggle to process heterogeneous municipal waste streams effectively. "The technology is not applicable for mixed waste," Roman says.

Financial and Social Risks

Roman also says that WTE facilities create long-term financial risks for municipalities. "Cities cannot afford the costs of building waste-to-energy plants, which typically cost about US\$650 million per plant."

He adds that incineration discourages recycling and creates dependency on continuous waste generation. "It demands a certain volume of flammable waste to remain solvent," Roman says. He warns that this creates "a lock-in effect, thus delaying waste minimisation practices".

Roman cites international examples where municipalities moved away from incineration because of rising operational costs or environmental concerns, including cities in the United States, Italy, Portugal, Canada and the UK.

He also notes that European policy is increasingly discouraging waste incineration investments. He further highlights research from the Netherlands and Slovakia showing elevated levels of persistent organic pollutants near incineration facilities.



Zero Waste Creates More Jobs

"The zero waste system creates 200 times more jobs than the linear landfill and waste incineration system, says Roman. By contrast, the Roman states that WTE "creates the least number of jobs of any waste management approach by far".

Roman also warns that waste-to-energy threatens informal recycling economies and producer responsibility schemes. "Waste pickers and local recyclers are the first impacted," he says.

According to the Roman, WTE systems "discourage recycling" and "will destroy the EPR and PRO system."

South Africa already has practical examples of zero-waste systems to demonstrate its effectiveness, with a pilot project underway "We envisage that by the end of this year, Zwelitsha will be the first zero organic waste-to-landfill town in South Africa," he says.

His message to municipalities is clear. "Waste-to-energy is the least preferred option to divert organic waste from landfills. Municipalities should first try zero-waste circular economy systems before embarking on large, risky capital-intensive waste-to-energy systems." ■

Diverting waste to landfills is one goal of Zero Waste initiatives

WHAT IS AI'S ROLE IN WASTE MANAGEMENT?

There is no avoiding it: artificial intelligence (AI) is everywhere, and it is already in the waste sector. But what exactly is it doing there, how does this square with South Africa's waste management practices that use the sector as an employment booster, and does it make financial sense? **By Duncan Nortier**

AI has been used in the global waste sector since as early as 2016, when cameras were used to scan incoming and outgoing waste to monitor the materials and processes. While present-day AI use remains operationally similar, the emergence of agents, autonomous software systems powered by artificial intelligence, has changed what is possible in terms of decision-making and efficiency.

In South Africa, Anisoptera, the company behind the Dragonfly AI platform, began work in material recovery facilities (MRFs) in Stellenbosch. Its focus is on connecting AI agents to real-world operations so that waste companies can make faster, better-informed decisions. The results were impressive. Using their AI software, the MRF was able to

increase its diversion from landfill by an additional 640 tonnes a year. Over a one-year period, this generated R400 000 in additional revenue, while saving roughly R400 000 on disposal fees. The site also saw a 30% decrease in waste to landfill.

Sean Kelly, chief technical operator for Dragonfly, elaborates, "When an MRF loses recoverable material to landfill, it imposes a double cost: the loss of the material as well as disposal fees. When this process becomes more efficient, the recovered material is revenue but also a savings." Waste management is a business where volume matters, and Kelly adds, "Dragonfly's AI is primarily about efficiency, increasing the volume."

Dragonfly operates in South Africa and the United States, where Kelly says, "the differences are enormous." The US is highly automated, and the



Sean Kelly, Co-founder & CTO of Anisoptera

use of technology like AI drives a reduction in labour, whereas in South Africa the waste sector is a high-employment space. A public concern with AI is that this automation technology will reduce available jobs in an already job-scarce economy, but returning to the Stellenbosch Pilot project, this increased efficiency led to secure long-term jobs and a wage increase between 10%-15%.

The agent impact

Dragonfly describes their AI as 'agentic', which Kelly says, "if you ask 10 technical people what 'agentic' is, you will get 10 different answers. Broadly speaking, the concept of agentic is an AI agent that acts by instruction or autonomy." Mira, Dragonfly's AI agent, is designed to absorb information from across a waste company. This may include conveyor-belt and MRF data, vehicle information, baler data, SCADA systems, camera and sensor outputs, and safety and

Waste management and resource recovery benefit from small changes in efficiency across operations



“This is a shift from AI collecting or displaying information towards using information to support an operational response.”

access information. “Instead of requiring managers to examine each data stream separately, Mira interprets the information and provides recommendations,” says Kelly. The differentiating factor between

the old-style AI camera systems and Mira is Mira’s ability to suggest changes, and in some cases act on those changes. “In the US, where automation is viewed more positively, Mira can detect X, Y and see that Z happened as a result. It then says ‘my recommendation is to reduce the conveyor speed by 0.1 metres per second’. It asks permission, and then it does it.”

This is a shift from AI collecting or displaying information towards using information to support an operational response. This becomes increasingly important as the volume of data available to waste operators grows. Dragonfly can classify more than 20 material classes in real time, depending on the facility and system configuration. Its basic setup consists of

cameras connected to an on-site edge-computing unit.

Edge computing brings AI closer to the waste facility

A key part of Dragonfly’s architecture is its use of edge computing, which brings the processing power needed for computer vision directly into the waste facility. Rather than sending every image captured by cameras on a conveyor belt to a remote data centre for analysis, the system processes the imagery locally using an on-site edge-computing unit.

Kelly describes the edge unit as a “local mini cloud”. “Cameras feed images into the unit, where AI algorithms analyse the material and identify objects and materials in real time. The resulting information is then sent to the cloud as structured data rather than continuously transmitting the underlying video footage.”

The hardware uses NVIDIA chips and can support a significant number of cameras depending on configuration. “Our biggest box, for example, can run around about 60,

65 cameras in one single box,” Kelly says. “All those cameras are feeding through to the box, literally feeding the imagery. An algorithm is running on it, and it’s sending the results of what it is detecting to the local cloud.”

The architecture is particularly suited to industrial waste environments because it addresses one of the major limitations of cloud-based AI: latency. In a conventional cloud model, images captured at a facility must travel over a network to a remote data centre, be processed and then return as information that can be acted upon. With edge computing, that processing happens at the facility itself. “If I went to MRF, and I wanted to analyse what is coming into the conveyor belt. I could rely on a public cloud where the image travels 700 or 800 kilometres to a data centre, or I could use

AI has come a long way from a simple camera on a belt, and while that remains the operational core, it has grown to be a real value add to material recovery facilities





Dragonfly's edge system brings computing to the site and not a public cloud far away

In this model, the architecture becomes a direct link between the physical waste stream and operational decision-making: cameras capture what is happening, edge hardware processes the information, AI interprets it, and the resulting recommendation can be used

to guide an intervention.

the edge-based AI which is 10 metres away," Kelly explains. Those milliseconds add up, making for a far more responsive system.

For waste operations, this difference can be significant. The objective is to identify changes as they happen and provide information quickly enough for operators or AI agents to respond.

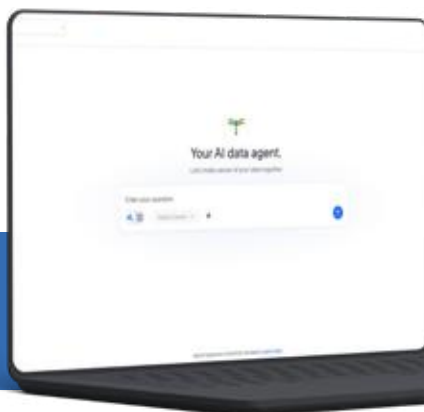
This is particularly relevant for applications such as detecting a fire, identifying a dangerous object or spotting a sudden change in material quality. The shorter the distance between the physical process and the computing system, the less time is required to analyse the event and generate a response.

Another advantage of edge computing is that it reduces the amount of data that needs to travel between the facility and the cloud. A conveyor-belt camera can generate a continuous stream of high-resolution imagery. Sending all of that footage to a remote data centre requires substantial bandwidth and a reliable internet connection. By processing the imagery locally, Dragonfly can instead transmit the relevant results. Rather than sending hours of video, for example, the system can send structured information such as "plastic bottle detected"* or "person detected".

This is particularly important for waste facilities operating outside major urban centres, where connectivity may be limited or unreliable.

The trade-off is that edge computing requires computing hardware to be installed at the facility, increasing the initial capital requirement. However, this can reduce ongoing dependence on network connectivity and external computing resources. "We follow the edge compute world because we want to live in the hardcore industrial world: low latency, low connectivity; that's where we want to live," Kelly says.

Dragonfly's agent, Mira, is capable of proving recommendations and in some cases acting on them



Mira is able to quantify losses in rand value, making it easier for facilities to understand operational inefficiencies and recommendations



As data becomes easier to generate the volume increases beyond what human beings can understand

Paying for itself

Kelly says that the ability of Mira must translate into tangible gains, "while we, as the AI platform provider, talk about efficiencies, that has to make financial sense to those on the ground.

This means that the agent needs to speak the language of business. He adds, "Specifically, what the computer vision detects is not random waste but the rand or dollar value of the material is based on its mass. In order to estimate that, we estimate the mass. And we use some kind of clever tricks to do mass estimation based on pixel-to-centimetre conversion."

The result is a way of expressing operational losses in financial rather than purely technical terms. "For an operator, "we lost 48,000 bottles" may be less immediately useful than knowing that approximately R5,000 worth of PET was lost during a particular period. Putting a financial value on the missed material can help managers understand the scale of a problem and prioritise interventions," says Kelly.

The potential value also increases with the scale of the facility. A one percentage-point improvement in recovery can represent very different amounts depending on the size of the operation. "A 1% change in SA is, for argument's sake, R10000," Kelly says. "A 1% change in an enormous MRF in the USA is a million dollars."

This makes the ability to identify relatively small performance changes potentially significant for large-scale operators. Rather than treating recovery rate as a single headline figure, AI can help identify where losses are occurring and what operational changes might improve performance.

In terms of return on investment, Kelly says, "Most deployments show measurable ROI within 6 months, with many customers seeing initial results in the first quarter after deployment." ■

What do those numbers on plastic mean?

There are persistent myths around the numbers on plastic items. Some start in childhood, a popular one being the number shows how many times it can be reused before it is poisonous.

Some of these myths persist long past childhood because there are a lot of odd stories about those numbers, some of them are true, like when the early plastics industry purposely used the arrows around their number system which led to consumers thinking it as recyclable as it looked similar to the universal recycling symbol.

Plastic is an everyday item, and people are still not too sure what those numbers mean, but thankfully it is rather simple: the numbers tell us what type of plastic it is. ■

Symbol	Plastic	Common uses	Recycling
	Polyethylene terephthalate	Water bottles, soft-drink bottles, food containers	Widely recycled
	High-density polyethylene	Milk bottles, detergent bottles, shampoo bottles	Widely recycled
	Polyvinyl chloride	Pipes, flooring, cables, some packaging	Difficult to recycle
	Low-density polyethylene	Plastic bags, cling film, flexible packaging	Limited recycling
	Polypropylene	Yoghurt tubs, bottle caps, food containers, automotive parts	Increasingly recycled
	Polystyrene	Takeaway containers, foam packaging, disposable cups	Difficult to recycle
	Other plastics or combinations	Polycarbonate, bioplastics, multilayer packaging	Usually difficult to recycle

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Part of PepsiCo's sustainability philosophy is approaching farming in a sustainable manner

FROM FARM TO PACKAGING:

THE APPROACH TO A MORE SUSTAINABLE FOOD SYSTEM

For PepsiCo South Africa (SA), sustainability is positioned as a core part of the way their food and beverage business operates and not as a separate corporate responsibility initiative. The company analyses every step of their supply chain from the farm that supplies them, to the consumer packaging. **By Duncan Nortier**

In South Africa, the company's approach is guided by PepsiCo Positive (pep+), its end-to-end transformation strategy, which places sustainability and human capital at the centre of long-term value creation. With a business that spans agriculture, manufacturing and consumer products, PepsiCo SA says its sustainability priorities are closely linked to the resilience of the wider food system. "As a food and beverage company, we depend on agriculture, water, energy and other natural resources, so sustainability is closely connected to the resilience of the business itself," says Steven Wolfaardt, Sustainability Director at PepsiCo Southern Africa.

That perspective is reflected in the breadth of the company's sustainability programme, which encompasses agriculture, water stewardship, climate and energy, packaging and partnerships. While regulation remains an important driver of responsible business, Wolfaardt says, "Compliance is an important part of operating

responsibly, but pep+ reflects a much broader approach to how PepsiCo does business."

The strategy is intended to influence decisions across the value chain, including how agricultural



Steven Wolfaardt, Sustainability Director at PepsiCo Southern Africa

ingredients are sourced, how manufacturing facilities use resources, and how the business approaches energy, packaging and relationships with communities and partners.

The need for this broader approach is particularly evident in areas such as water security, climate resilience and packaging circularity, where individual companies cannot address systemic challenges on their own. "Partnership is an important part of this," Wolfaardt says. "Challenges such as water security, climate resilience, and packaging circularity involve systems that extend well beyond one business."

Building more resilient agriculture

Agriculture is fundamental to PepsiCo's operations, particularly in South Africa, where the company has significant connections to crops including wheat, maize and potatoes.

Through pep+'s Positive Agriculture pillar, the company is focusing on sustainable sourcing and farming practices that can improve resilience while recognising that agricultural conditions differ between crops and regions.

"Regenerative agriculture is not one prescribed set of farming practices," explains Wolfaardt. "It is an approach aimed at improving the health and resilience of agricultural systems over time."

Rather than applying a single model, PepsiCo says its approach considers factors including

soil health, water availability, weather conditions and the requirements of individual crops.

For the company, this is also a question of business resilience. More resilient farming systems can support the consistent quality and availability of the ingredients required by the food manufacturing sector, while helping farmers respond to changing conditions. Technical support and shared learning are therefore important components of the approach, with the emphasis on practical improvements that make sense within individual farming systems.

Climate change is adding urgency to this work. Wolfaardt says farmers are increasingly dealing with changing weather patterns, water constraints and other pressures that can affect both productivity and livelihoods. "Our role is to work with farmers and partners to help strengthen resilience over the long term," he says.

Water, energy and climate

The Positive Value Chain pillar addresses the environmental footprint associated with production and distribution, with water, climate and packaging among the major areas of focus in South Africa.

Water stewardship includes improving efficiency at manufacturing sites while also contributing to the restoration and replenishment of watersheds on which operations and communities depend.

PepsiCo has worked with organisations including WWF South Africa on projects involving invasive alien vegetation clearing and water-system restoration. According to Wolfaardt, such partnerships

can also generate wider community benefits, including employment and support for water access, irrigation and farming.

The company's climate strategy similarly combines operational improvements with longer-term changes to the energy mix.

Solar installations have been implemented at several sites, while energy-efficiency measures continue across manufacturing operations. PepsiCo SA is also exploring cleaner fuels and power purchase agreements as potential routes to reducing emissions.

Globally, PepsiCo has committed to achieving net-zero emissions by 2050 or sooner, with its climate targets validated by the Science Based Targets initiative. By 2030, against a 2022 baseline, the company aims to reduce Scope 1 and 2 emissions by 50%, Scope 3 Forest, Land and Agriculture emissions by 30%, and Scope 3 Energy and Industry emissions by 42%.

For South Africa, Wolfaardt emphasises the importance of translating those global ambitions into projects that are technically and commercially viable.

The challenge extends beyond PepsiCo's own facilities. Scope 3 emissions occur throughout the wider value chain, including suppliers and logistics, making collaboration increasingly important. "The ability to scale lower-carbon solutions depends on more organisations participating and helping to establish those solutions commercially," he says.

Tackling the packaging challenge

Packaging represents another significant challenge, particularly flexible plastics used in snack packaging, which can be difficult to collect, sort and recycle. PepsiCo SA is therefore looking beyond packaging design alone and exploring what happens to materials after they have been used.

The company is working with the City of Cape Town to separate flexible snack packaging at material recovery facilities. Once collected and bailed, the material can be processed into other plastic products.

Trials are also examining whether recovered material could be used to manufacture products such as bread crates for local PepsiCo's bakery operations. "The work is helping us understand what is technically possible and what is needed to build a viable route for flexible packaging after use," Wolfaardt says.

The company is also exploring pyrolysis as another potential route. Recovered flexible plastic can be processed into



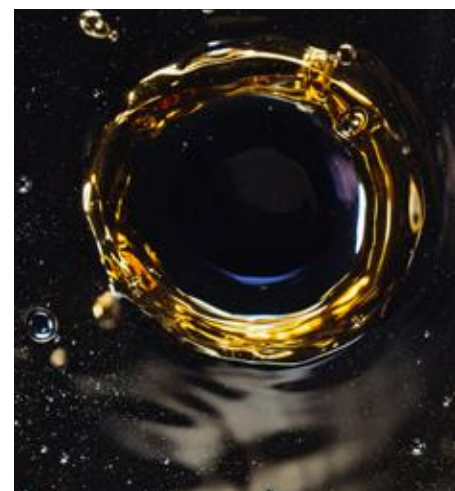
Turning waste into energy: PepsiCo uses food manufacturing waste to help power operations at selected plants

an oil that could ultimately serve as an input for polymer production. However, Wolfaardt notes that establishing a commercially viable value chain around the technology will require further development.

This illustrates a broader point about circularity: changing the material itself is only one part of the solution. Collection, sorting, processing and markets for recovered materials all need to function together.

PepsiCo's approach places considerable emphasis on partnerships, reflecting the systemic nature of many of the challenges it is attempting to address. The company works with organisations including WWF South Africa and The Nature Conservancy, as well as municipalities, communities, Producer

PepsiCo is pursuing pyrolysis, recovering plastic packaging into an oil that could ultimately serve as an input for polymer production



By rethinking plastic packaging, sustainability becomes a core part of the business rather than an afterthought



Ensuring packaging is sustainable lends further credibility to their product offering

is coupled with on-site solar for even further carbon reduction.

This circularity, from farm to landfill diversion is a benchmark in South Africa.

Making sustainability part of the business

Ultimately, PepsiCo South Africa's sustainability strategy reflects an attempt to connect environmental performance with the resilience of the business itself.

For Wolfaardt, the relationship between companies, communities and the environment is particularly tangible in South Africa. "That is why sustainability cannot sit outside the business," he says. "It has to be part of how we grow, how we manage risk, how we make decisions and how we create value over the long term."

The approach places PepsiCo's sustainability ambitions within a wider food-system context. Agriculture, water, energy, climate and packaging are not isolated challenges, but interconnected elements of the system required to produce and deliver food.

"Business is not the only answer to these challenges," Wolfaardt says, "but it has an important role to play in helping to build a more resilient future." ■

Responsibility Organisations and other industry partners.

Wolfaardt says partnerships with PROs are particularly important in strengthening packaging recovery systems. "Packaging circularity cannot be achieved by one organisation alone," he says. "It requires collaboration across the entire value chain, from producers and retailers to waste collectors, recyclers, government and consumers."

South Africa already has an established recycling economy, he says, but greater circularity depends on collection, sorting and recycling systems working effectively

together. "One of the biggest opportunities lies in greater collaboration across the packaging value chain," Wolfaardt says. The challenge is to build the infrastructure and market capacity required to process recyclable materials at scale while also focusing on the product design.

Waste to energy

While PepsiCo has stringent standards regarding food waste in their manufacturing process, it is an inevitable part of the food and beverage sector. Rather than letting this fact sit on its own PepsiCo has invested in waste to energy solutions at their Isando Plant. This

PepsiCo at a farm





WHAT DOES IT COST TO DO NOTHING ABOUT AHP?

Circularity and sustainability is often spoken in terms of “how much will it cost” but Nicky van Hille, strategist for The Moss Group, a consulting company that helps businesses integrate sustainability thinking into their operations, wants to frame the question differently, “How much does it cost if we do nothing?”

By Duncan Nortier

One of the most difficult to deal with waste streams for South Africa are absorbent hygiene products (AHP), especially in rural areas where service delivery is infrequent at best, and absent at worst. Speaking at the IWMSA Eastern Cape Conference, van Hille says the challenge is no longer simply recognising the environmental harm caused by AHP waste but understanding its real financial cost.

“We all look at these things, and say, ‘It is awful. We really need to change it,’” van Hille says, “But until the actual costs of the impact are calculated, we are just not going to move forward.”

The project, funded by Kimberly-Clark in the United States aims to create a globally applicable framework that quantifies the economic cost of mismanaged AHP waste.

“They want us to build a framework for quantifying what the true economic cost, rands or dollars, of mismanaged AHP waste actually is,” she says. “And they want to use this framework around the world.”

Van Hille says the company’s selection of South African experts to develop and test the framework

reflects the country’s experience with complex waste management challenges.

She also notes that AHP waste is “broadly mismanaged within Global South countries, resulting in many visible and hidden costs,” while quantifying those costs could “inform the business case for investment in effective AHP waste management systems.”



Nicky van Hille, strategist for the Moss group

The research team includes The Moss Group, The Green House, the University of the Western Cape, and Green Edge.

A global problem with local consequences

AHP waste is a growing issue across the Global South, with similar disposal patterns emerging in South Africa, Southeast Asia, South America, and Central America.

“We know that there are many costs, visible and invisible, but the point is to get a picture of these costs, who is bearing the brunt of these costs, how much the costs really are, and what is really happening on the ground.”

The project’s literature review found that although AHP waste impacts are recognised globally, they remain poorly understood and are rarely separated from broader household waste discussions.

“What we discovered was, first, South Africa is amongst the most well-researched areas in the world in terms of AHP waste and mismanagement.” They also found that many global studies are superficial, “Many of these global studies were

Dumping of AHP is brought on by lack of service delivery, the cost of inaction is complicated and potentially enormous

extremely broad. They do not dive into the details like how this impacts rivers; how it is impacting informal communities, no one has dug into this properly.”

The literature review also highlighted that disposal impacts are often excluded from life-cycle assessments of nappies and other absorbent hygiene products.

“These assessments often forget the end of life,” van Hille says. “They consider aspects such as the super absorbent polymers, the outer layers and actual manufacture, but they neglect the fact that, once disposed of, the used product will take hundreds of years to break down.”

Mapping the impacts

Following the literature review, researchers held a stakeholder workshop involving government, industry, civil society, NGOs, and academia to map disposal routes and associated impacts.

Van Hille says the resulting “spaghetti diagram” of impacts became extraordinarily complex once every disposal pathway was unpacked.

The project identified impacts across air, water, soil, infrastructure, and living organisms. Common disposal routes include flushing products down toilets, dumping them in pit latrines, illegal dumping, shallow burial, and open burning.

“Burning the waste impacts the air quality, emits odours, produces particulate pollution, and that all contributes to health issues, which also bear an economic cost.”

She says the consequences extend far beyond visible litter. “We are talking about the impacts of human waste. The stakes are high.” The project prioritised impacts across three broad categories: environmental pollution, location-specific impacts, and community wellbeing impacts.

These include carcinogens, toxicity, climate change impacts, eutrophication, microplastics, infrastructure damage, ecosystem degradation,

human health impacts, agricultural losses, and human well-being effects.

Quantifying the damage

Van Hille says the next stage of the project involved converting each impact into measurable economic values.

“We want to work out the costs of all of those impacts in monetary terms,” she says, adding, “We developed a framework and then a computational model that can quantify each one of these things.”

The work includes modelling large-scale environmental impacts such as toxicity, carcinogens, climate change and microplastics, alongside more localised impacts affecting infrastructure, water systems, human health and agriculture. “For example, the project is looking at determining the actual economic cost of treating children who get diarrhoea from playing on or near illegal dumpsites that contain AHP waste.”

The research also examines the impacts on livestock and agriculture. “When people lose economic livelihoods because they cannot sell their meat anymore, you start seeing the real economic impact,” van Hille notes.

Community wellbeing impacts are also being assessed, including neighbourhood cleanliness, air quality, drinking water, and mental wellbeing.

It is complicated to put a rand value to wellbeing, but we know it is a critical issue, she adds.

Testing the model in KwaZulu-Natal

The framework is now being tested through a case study in KwaZulu-Natal, focusing on the Johanna Road informal settlement and the nearby Siyathuthuka area.

Johanna Road already has a nappy collection system in place, while Siyathuthuka currently does not.

Van Hille says researchers will conduct extensive fieldwork, including household interviews and municipal engagement, to gather real-world data. “We are launching the field work in the next two weeks,” she says.

The study area borders the uMngeni River, one of South Africa’s most polluted river systems.

“We know that a lot of what is dumped ends up going down into the river and washing onto the beach and into the ocean,” van Hille says.

She believes the findings could significantly influence future investment and policy decisions around AHP waste management. Once we put all of that together, we will give enough people enough of a fright to know how much this (mismanaged AHP waste) is costing us, she says. “And then we’ll do something about it.” ■



Reusable sanitary pads might be a solution to the ongoing AHP waste problem



FROM 'BLACK BOX' TO 'BLUE BOX' IN TSF WATER MANAGEMENT

In many mine-wide water balances, the tailings storage facility (TSF) still appears as a single line item – a convenient 'black box' where water goes in, something comes out, and the rest is blurred, assumed or simply left unknown.

Yet the TSF is one of the largest and most dynamic water stores on site, with stored water volumes directly affecting stability, water recovery and regulatory compliance. By recasting the TSF as a 'blue box' instead – a clearly defined, quantified system with known inflows, outflows and storage – operators gain the transparent, decision-ready information they need to manage these facilities proactively over their full life cycle.

According to Annelie Scholtz, civil engineer at SRK Consulting, a critical issue in current practices is that site-wide water balances often do not explicitly state the current storage volume of water contained within the TSF. A paper was presented at the Southern African Institute of Mining and Metallurgy (SAIMM) 2026 Tailings

Conference, where Scholtz argued that this leaves the facility as essentially a 'black box' – allowing little insight into operational behaviour and safety risks.

The paper, entitled 'TSF-Specific Water Balance as a Standard Practice' co-authored by Scholtz and SRK Consulting principal engineer Kurt Uderstadt, environmental scientist Louis de Villiers and corporate consultant Dr Graham Howell.

Measure to manage

"If the volume of water in the TSF cannot be quantified, it cannot be effectively managed," argues Scholtz. She explained that a typical water balance follows a fundamental equation where inflows minus outflows equals ΔS – the change in storage volume.

"Inflows include slurry water, precipitation on the TSF surface, surface runoff entering the TSF and groundwater inflows," she says. "Outflows include evaporation from the TSF surface, seepage through the TSF base and walls and recovered water via decant systems and underdrains – as well as entrapped water within the tailings."

She highlights that a staged approach allows operators to move from simple checks to comprehensive modelling – so they can visualise how water storage changes over time. This transforms the facility into a managed 'blue box' system to reduce risks while supporting sustainable and responsible water use.

"This progression paves the way for proactive management, so that boundary conditions such as phreatic surface levels and freeboard requirements are continuously monitored," she adds. "Importantly, preventative actions can then be timeously triggered, such as halting deposition during extreme rainfall events."

Three stages

Scholtz proposed a structured three-stage process to develop a robust water balance for a TSF, giving mines the ability to assess its

storage capacity effectively. This begins with a basic ‘matchbox’ check, where current information at hand is used to compare inflows and outflows – giving an estimate of changes in storage. This might take a matter of days or weeks.

“The second stage is more informed by data from site monitoring, to refine the stage one estimates, and could take from a few weeks to three months,” she says. “Data should include slurry densities, rainfall records, evaporation records, pond levels, seepage flows, piezometer measurements and phreatic levels.”

The third stage is a detailed analysis using advanced tools such as three-dimensional modelling, survey data, and geotechnical investigations to capture the spatial and temporal behaviour of water within the facility.

“It involves a detailed process to acquire spatially distributed hydraulic and geotechnical properties, bathymetry, survey grids, 3D models and ensembles – all related to the stability of the facility,” she explains. “The time to complete this phase may be anything from three months to a year.”

Valuable tool

Progressing systematically through these stages allows a mine to turn the water balance from a simple check to a comprehensive management tool, ensuring that both short-term operations and medium and long-term risks can be fully addressed.

“Conducting a site-specific water balance for a TSF is essential for moving beyond assumptions and unknowns,” emphasises Scholtz. “The exercise allows operators to quantify, track and manage the movement and storage of water – with several important outcomes.”



Construction of lined tailings facility over several stages

Among the most important of these are clarity on water storage and early warning of risks, along with useful insights into whether the TSF is being constructed and managed as per design. Storage volumes in the facility are central to both stability, water recovery and water supply planning, while risks can be flagged by discrepancies between inflows and outflows – from seepage, rising phreatic surfaces or unmeasured discharges.

An accurate water balance creates a structured basis for operational decisions such as assessing energy balance, reducing pond size, adjusting deposition, changing of slope angle, enhancing drainage or preparing for storm events.

“It (a blue box approach) can even help mines improve their water efficiency by quantifying return water and losses – supporting process water recovery and reducing reliance on external water sources,” says Scholtz.

Given the inherent risks of water-driven TSF behaviour and increasing pressure on mines to use water efficiently, the era of treating TSFs as opaque ‘black boxes’ is over. Adopting TSF-specific water balances as standard practice turns that blurred, assumption-based view into a ‘blue box’ – a well-understood, continuously updated picture of how much water is stored, where it is, and how it moves. This shift from unknowns to quantified insight underpins safer operation, sharper responses to changing conditions, improved water recovery, and more transparent engagement with regulators and stakeholders, firmly positioning the TSF as a managed asset rather than an unmanaged risk. ■



Silt trap to maintain return water dam capacity



Building trust and dignity

INTO THE CIRCULAR ECONOMY THROUGH WASTE RECLAIMER INTEGRATION

Recycling in South Africa has long depended upon an informal workforce that recovers millions of tonnes of valuable material every year. These waste reclaimers are responsible for diverting the majority of recyclable packaging from landfill, yet many are still not reaping the benefits of Extended Producer Responsibility (EPR) regulations. **By Duncan Nortier**

A new collaboration between the Paper and Packaging PRO Alliance, the African Reclaimers Organisation (ARO), the South African Waste Pickers Association (SAWPA), and the Fair Circularity Initiative (FCI) aims to change that. Through a combination of national registration, digital payment systems and stronger partnerships with buy-back centres, the initiative seeks to integrate tens of thousands of waste reclaimers into South Africa's formal recycling economy while ensuring they receive recognition and fair compensation for the environmental services they provide.

While the announcement marks a significant milestone for EPR implementation, Makgabo van Niekerk, Executive Director of the PRO Alliance, stresses that the project is built on years of work rather than representing an entirely new beginning.

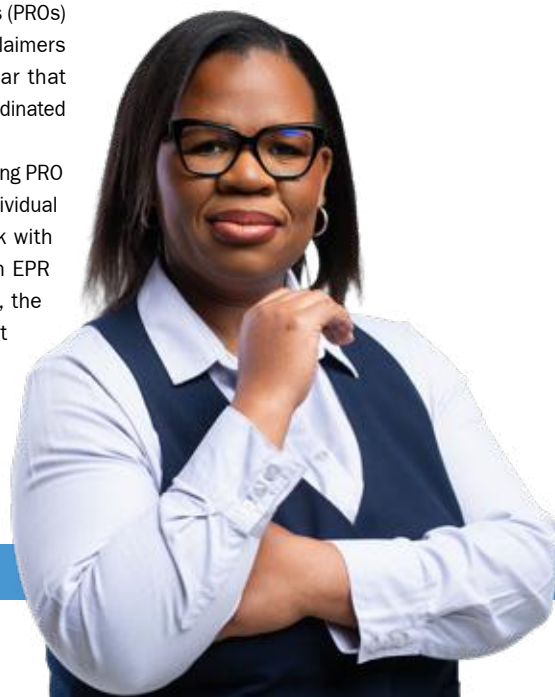
According to van Niekerk, the catalyst for the stronger collaboration was the introduction of mandatory EPR regulations in 2021. Although many Producer Responsibility Organisations (PROs) had already been working with waste reclaimers individually, the legislation made it clear that large-scale integration would require a coordinated approach.

"Before there was the Paper and Packaging PRO Alliance, there were PROs, and in their individual capacities they were already doing work with waste reclaimers," she explains. "When EPR regulations became mandatory in 2021, the PROs came together and realised that some of the work would be better done collectively rather than individually."

Rather than duplicating efforts, the PRO Alliance deliberately chose to build on the experience and relationships

established with PROs, ARO and SAWPA over many years. "ARO and SAWPA together represent the most recognised waste reclaimer organisations in the country," says van Niekerk. "You cannot genuinely claim to want to work with reclaimers while excluding two of the most recognisable and established representative bodies of reclaimers in the country at present. They know the reclaimers, they have relationships with them, and they understand the realities on the ground."

The collaboration also reflects a recognition that waste picker integration is about far more than regulatory compliance. "I think because EPR in South Africa is new for everybody, everybody is



Makgabo van Niekerk, Executive Director of the PRO Alliance



asking, 'What can I do to make it a success?'" She says, "It's fascinating watching people across the sector genuinely want to make this work."

Registration must create value

One of the project's priorities has been registering waste reclaimers through the South African Waste Picker Registration System (SAWPRS), while simultaneously enabling them to receive waste picker service fees. Waste picker fees are the mandatory fees paid to reclaimers per kilogram of recyclable material they bring in. This supplements the money they earn from selling recyclables.

For van Niekerk, these two elements are inseparable. "Registration must have value," she says. "Payment goes hand in hand with registration. Registration becomes a way of bringing dignity and recognition to this vocation." If the integration were merely a numbers exercise and not linked to a tangible benefit, the buy-in would be exceedingly difficult.

The system ensures that service fees reach people who recover recyclable material. "We need to make sure that we are giving service fees to deserving people, the people who literally do the work," she explains.

Each registered reclaimer receives formal recognition through SAWPRS, creating accountability while ensuring payments cannot be duplicated. "It creates sustainability of operations," says van Niekerk. "It prevents double drops, allows us to track the labour being done and actually count the number of people doing the work."

The information generated also provides South Africa with reliable national data on the informal recycling workforce. "I don't think anybody has ever been completely certain just how many waste reclaimers we have in South Africa," she says. "The system is yet another measure to help us

Waste reclaimers are vital to South Africa's recycling efforts, ensuring they earn fair living is key to the sector's ongoing success

CAUTION:
WASTE PICKERS @ WORK



EARNING A LIVING.
PLEASE BE PATIENT



understand who they are, where they work and what they collect.”

Since May 2025, approximately 20,000 waste reclaimers have already been registered, representing significant progress despite understandable hesitation from some participants.

“There is sometimes skepticism,” van Niekerk explains. “People ask, ‘Why do you want my ID?’ They do not always trust others with their personal information. This is where SAWPA and ARO play another crucial role. They help us explain why registration is important. Together, we provide awareness and training. The waste reclaimer organisations already have trusted relationships with reclaimers, and they help people understand the benefits.

The role of SAWPRS

Originally hosted by the Council for Scientific and Industrial Research (CSIR), SAWPRS has evolved. It is not only a registration platform but also one of the key enablers of South Africa’s EPR system. “The CSIR initially launched SAWPRS, and it was intended to make sure we understood who the key players in South Africa’s circular economy are,” says van Niekerk. Today, the platform performs multiple functions.

She further explains, “It is both a registration system and a data collection system. Brand owners know how much packaging they place on the market, but they don’t always know exactly what comes back.”

By tracking recovered materials, SAWPRS provides insight into recycling performance while improving transparency throughout the

value chain. “It gives an idea of what is being recycled and in what quantities,” she says. “The data also confirms something we’ve always known waste reclaimers are the people doing the majority of recycling in South Africa.”

Trust remains the biggest challenge

Despite the progress already made, van Niekerk is clear that implementing EPR at national scale comes with challenges. “EPR is still new,” she says. “Everybody wants to see it succeed, but there are naturally going to be teething problems.” Many of these challenges stem from bringing numerous independent organisations together under a single vision, van Niekerk notes. “Truly aligning around a shared vision takes time.”

Buy-back centres present one of the biggest operational considerations. Although they are receiving substantial investment through the project, they remain independent of businesses with varying operational capacity.

“We invest in software, hardware and infrastructure, but then we become responsible for managing relationships with a lot of independent businesses,” says van Niekerk. “They’re not regulated in the same way that PROs are.”

Operational realities such as electricity interruptions, management changes, and inconsistent reporting all require ongoing support. The digital platform supplied by Lariat Technologies has become an important part of overcoming some of these challenges.

“As we use the system, we continually identify new reporting needs,” says van

Niekerk. “We want to understand how many reclaimers are women, how many are young people, where they are located and what materials they collect.”

Transparency has also been designed into the system. “It isn’t enough to simply weigh a bag,” she explains. “We also want an image of what’s inside the bag so there’s accountability throughout the process.”

Measuring success

For van Niekerk, registration statistics alone will not define success. “We don’t just want to talk about how many people we’ve registered,” she says. “Next year this time, we want to be able to say, ‘This is how much we’ve paid in waste picker service fees,’ and we want it to be considerable.”

She says the Paper and Packaging PRO Alliance will measure progress across several indicators.

- The first is reliable national data that accurately reflects South Africa’s recycling economy. “The data must match what producers are putting into the market.”
- The second is sustained growth in registrations and participation by buy-back centres.
- The third is perhaps the most important thing. “We need to build trust among all stakeholders involved in South Africa’s EPR system.”

Success is measured by service fees reaching reclaimers. “If more waste reclaimers are registered and more of them are receiving waste picker service fees, then we know the system is working.”

Reclaimers are often suspicious of outside organisations, which is why SAWPA and Aro are so important to this project’s success





Reclaimer fees are paid out on top of the money they receive selling their recyclable



Waste reclaimer integration into the larger formal system helps build dignity for them



This integration project aims to generate data that could help South Africa's recycling efforts

Beyond compliance

Although the project has been developed to support EPR implementation, van Niekerk believes its impact extends well beyond regulatory compliance. “The system goes beyond the individual,” she says. “It promotes South Africa’s circular economy journey.”

Formal registration gives reclaimers access to more than financial support. “It provides pathways to more stable income, training, skills development and enterprise support.”

She points out that reclaimers have already demonstrated the value of their work long before EPR existed. “Something that SAWPA and ARO always say is that people have put their children through school doing this work.”

For her, formalisation is fundamentally about recognition and economic inclusion. “We are saying to reclaimers that they are not invisible. We want them to be formally recognised and fairly compensated.” That recognition benefits the entire recycling value chain, adding that “Recycling must work for everyone.”

A different model of collaboration

Van Niekerk believes what distinguishes this initiative from previous attempts to formalise waste reclaimers is that it builds existing efforts, expertise, and relationships rather than seeking to replace them. “We’re relying on the work that’s already been done. We’re building on previous efforts, networks and institutional knowledge within the sector, and working with partners who already have credibility and experience.”

The collaboration itself is carefully structured, van Niekerk explains, “We have bi-weekly governance meetings involving PRO Alliance, our member PROs, ARO, SAWPA and FCI.” These meetings establish shared priorities and measurable objectives: “We’ve agreed on what success looks like and regularly agree on what needs to happen.”

Perhaps most importantly, they allow decisions to be informed by people working directly with reclaimers.

“PROs are on the ground, but ARO and SAWPA provide an additional layer of insight and on-the-ground knowledge,” says van Niekerk. “If they know reclaimers don’t have PPE, or if there are communities where registration needs to happen, we can mobilise quickly.”

The PRO Alliance then coordinates its members of PROs to ensure resources are deployed effectively across the paper and packaging sector.

The role of PROs

Despite PROs existing for several years prior to mandatory EPR regulations, many people still do not fully understand the critical role they play. “They’re not waste management companies, and they’re not recyclers,” van Niekerk says.

Instead, PROs occupy a unique position within the circular economy, coordinating brand owners, producers, municipalities, recyclers, and waste picker organisations while also engaging with government legislation and infrastructure.

“We’re talking to brand owners about making packaging more sustainable and recyclable. Those conversations happen long before packaging

becomes a waste. PROs encourage better decisions upstream.”

She also praises the willingness of government departments and municipalities to engage with industry. “What I’ve found since joining the PRO Alliance is how engaging DFFE has been. The municipalities have also been very willing to collaborate. I think South Africa is in a beautiful position because we recognise the value of engagement.”

Building an inclusive circular economy

The Waste Picker Integration Project demonstrates what becomes possible when producers, PROs, government, and waste picker organisations work towards a common objective. By combining trusted community relationships with modern digital systems and long-term investment, the initiative aims not only to improve recycling performance but also to create a more equitable circular economy.

For van Niekerk, however, the project’s success ultimately comes down to a simple principle. “They have been doing this work for years,” she says. “The tonnages they recover are impressive. It’s only fair that they are finally included in South Africa’s economy.”

If the collaboration succeeds, it will not only register thousands of waste reclaimers or improve compliance with EPR regulations. It will create a system that recognises the people who have long formed the backbone of South Africa’s recycling economy, ensuring that dignity, fair compensation, and inclusion become just as important as the tonnes diverted from landfill. ■



Strengthening Namibia's wastewater sector

Werner Pumps, a specialised jetting equipment manufacturer in South Africa, is deepening its presence in Namibia as growing demand for reliable wastewater maintenance equipment produced in the southern African region continues to grow.

The Municipality of Walvis Bay recently took delivery of two additional Werner Pumps units, bringing the municipality a step closer to replacing its ageing wastewater maintenance fleet with modern, locally manufactured equipment.

"Walvis Bay has committed to a long-term fleet replacement programme," explains George Jolly, National Sales Manager at Werner Pumps. "They initially purchased a combination jetting and vacuum truck, followed by a jetting trailer. We've now handed over a dry combination unit and a dedicated vacuum truck, and they are looking to add additional units as required. It's rewarding to see a municipality investing strategically in modernising its wastewater maintenance capability."

Jolly believes repeat orders reflect growing confidence in Werner Pumps' equipment and after-sales support. Previous deliveries have enabled Walvis Bay to strengthen sewer maintenance,

unblock sewer lines more efficiently and improve pump station cleaning, while the latest additions further increase operational capacity.

Local support for long-term partnerships

Supporting this growth is the appointment of a local Namibian dealer, Aligned Enterprises, which will provide servicing, maintenance and parts support for Werner Pumps equipment in the country. Aligned Enterprises will be supporting maintenance contracts for the Walvis Bay units and has secured its first order for a Werner Pumps jetting trailer for another Namibian customer.

Jolly says that for municipalities operating essential service infrastructure, local technical support can be as important as the equipment itself. "We don't just want to sell equipment into Namibia. We want customers to know that there is local backup, local technical support and readily available parts. Having an established partner

on the ground gives municipalities confidence that their equipment will remain operational for years to come. Aligned Enterprises is a locally owned company that is involved in the supply of chemicals and other equipment solutions to municipalities, wastewater treatment works, mines, ports, and other industrial facilities. Their service technicians have already received training on servicing and maintaining our machines. We look forward to the growth that this partnership will offer both companies."

The expanded dealer relationship also creates opportunities for Werner Pumps to introduce additional municipal solutions from its range to the Namibian market, including road sweepers and other specialist cleaning equipment.

A growing regional presence

Werner Pumps has supplied high-pressure jetting and vacuum equipment across Southern Africa for many years, with its equipment operating successfully in South Africa, Botswana, Namibia and the DRC.

The company's product range includes combination jetting and vacuum trucks, dedicated jetting units, water recycling systems and trailer-mounted solutions designed to meet the varying needs of municipalities, utilities and contractors.

Because the equipment is manufactured at its own facilities in South Africa, Werner Pumps is able to customise units for customer requirements while maintaining close control over quality, lead times and after-sales support.

The company's expansion in Namibia reflects a broader strategy of building lasting regional partnerships rather than simply exporting equipment.

"We've had our eyes set on supplying equipment beyond South Africa for a few years now, and it's great to see neighbouring countries start to realise what's available in the region," says Sebastian Werner, MD at Werner Pumps. "They don't have to import trucks from Europe – they can get equipment built for local conditions with a proper local supply chain in place, for less than they would spend on imported alternatives. We're looking forward to partnering with more customers and partners in the region to make sure their needs are met, sustainably and affordably." ■



An example of a combination jetting and vacuum truck that was delivered to Walvis Bay

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