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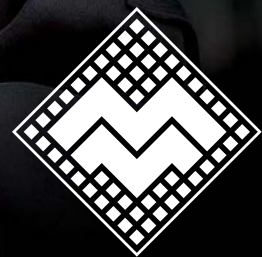


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Editor: Peter Middleton
 e-mail: peterm@crowm.co.za
 Advertising: Elmarie Stonell
 e-mail: elmaries@crowm.co.za

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FUELS INDUSTRY ASSOCIATION SA

- 6 **Embracing the Future of Energy Mobility**
 The theme for the 2026 Fuels Industry Imbizo highlights the industry's transition toward a diversified energy mix – spanning from conventional fuels to rapidly emerging alternatives. Registration for the event, which takes place on 10 and 11 June at the Sandton Convention Centre in Johannesburg, is now open.

WATER, WASTEWATER AND PUMPING SOLUTIONS

- 8 **Climate change: a significant risk to African mining**
 Climate change is no longer a distant threat; it's a present-day disruptor reshaping industries, economies and ecosystems, argue WSP's Kierra Chetty and Nirvishee Juggath.
- 10 **Dewatering trends shaping pump choices in Africa**
- 12 **The central role of pumping equipment manufacturers**
- 13 **Does water management need AI?**

POWER TRANSMISSION, BEARINGS, BUSHES AND SEALS

- 14 **SKF SA's engineered solutions and circularity**
 Janus Bezuidenhout of SKF South Africa discusses SKF's lifecycle services strategy, which starts with engineered, locally manufactured customisations and extends to a comprehensive range of lifecycle management and life-extension services.
- 16 **Engineered torque transmission solutions from Bi**
- 18 **ACTOM's approach to reliable medium voltage supply**
- 19 **Trafo mobile substation for Australian mine**

MINERALS PROCESSING AND MATERIALS HANDLING

- 20 **SA's role in advancing DMS coal processing**
 Following the successful South African-hosted International Coal Preparation Congress (ICPC 2025) last year, MCA meets Ernst Bekker and Frikkie Enslin, who highlight South Africa's key role in advancing coal-processing technology.
- 23 **Smartflow digital mine management platform launched**
- 24 **Driving sustainability through full-value-chain insight**
- 26 **Safe, sustainable and efficient chemical tank farm management**

POWERGEN, PETROCHEM AND SUSTAINABLE ENERGY MANAGEMENT

- 28 **SA's nuclear imperative and its challenges**
 In light of the recent Nuclear Forum held during the 2026 Africa Energy Indaba in Cape Town, Dr Yves Guenon highlights the critical need and the challenges involved in expanding our nuclear programme.
- 30 **Bosch Steam Boiler Systems: efficient and reliable technologies with advanced controls**
- 32 **Are we ready for businesses to go off-grid?**

MAINTENANCE SOLUTIONS AND ASSET MANAGEMENT

- 34 **Rock breaker rebuild**
 Sandvik Rock Processing has completed a full OEM-standard refurbishment of a Sandvik BR3288i hydraulic breaker and a Sandvik BB8094R breaker boom for a major gold mine in Ghana.
- 35 **Hitachi reinvents Ellipse Enterprise Asset Management (EAM)**
- 36 **isoPOD: minimising lubricant contamination**
- 37 **Common conveyor problems and best-practice maintenance**

LOCAL MANUFACTURING AND FOOD PROCESSING

- 38 **SA global home for ENDURON® elite screens**
 South Africa is now the global manufacturing hub for Weir's advanced ENDURON® Elite banana screens, following major investment in the Alrode facility, the world's first dedicated facility for this range.

ENVIRONMENTAL MANAGEMENT

- 40 **Five women driving the future of forestry through science**
 To celebrate the United Nations International Day for Women and Girls in Science, Forestry South Africa (FSA) has launched two complementary campaigns to amplify women's voices, inspire more women to pursue STEM careers in forestry, and challenge outdated perceptions of the forestry sector.

INNOVATIVE ENGINEERING

- 46 **Scalable, digital industrialisation for African realities**
 Purpose-built automation platforms, edge-to-cloud connectivity and integrated process intelligence are enabling African industries to modernise sustainably without sacrificing existing infrastructure investments. Johan Nieuwenhuizen of Adroit Technologies explains.

REGULARS

- 2 **Peter's comment: Moving from decline to prosperity?**
- 4 **On the cover: ENGEN: Platinum Sponsor of the Fuel Industry Imbizo, 2026.**
- 42 **Products and industry news**
- 48 **Back page: HVAC systems purpose-built for underground**

Peter Middleton

COMMENT

Moving from decline to prosperity?

This year seems to have started with South Africa in a better place, with a stronger Rand, a high gold price and indications of a fragile economic recovery. Cyril Ramaphosa's 2026 State of the Nation Address (SoNA) on 12 February left me feeling far more optimistic about South Africa's future than I have for some time.

Centred around moving South Africa from an "era of decline" to one of "prosperity and growth", he noted in his introduction that the world is rapidly changing; narrow self-interest has replaced the common good; trade is used as an instrument of coercion; might is right, and the powerful impose themselves on the weak.

To navigate this new world, said Ramaphosa, we must draw on our strength as a nation: "our values of dignity and equality, of non-racialism and non-sexism, diversity, and of the inherent worth of every person." A unifying message for South Africans that, I believe, would have made Archbishop Desmond Tutu feel proud.

Turning towards economic successes in 2025, he cited two consecutive primary budget surpluses; an improved credit rating; interest rates, inflation and national debt coming down; the strengthened Rand; and the JSE performing "exceptionally well" – all reflecting a "broader economic recovery, investor confidence and increasing interest in South African equities".

Budget interventions announced included: a commitment of over R1-trillion to public infrastructure over the next three years; a reassurance that loadshedding had ended; a commitment to a more resilient energy system; and that, by 2030, "40% of the energy supply will come from renewable sources". He also announced small-business support of over R3.5-billion and a 150% tax deduction for investments in new-energy vehicles.

A key priority for 2026, he announced, will be to tackle the national water crisis. Ramaphosa identified dysfunctional municipalities as a key problem in this regard, with poor planning and maintenance as drivers of service delivery failures.

The government has committed over R156-billion in public funding over the next three years for water and sanitation infrastructure, with work advancing on major projects, including the Lesotho Highlands Water Project (Phase 2), the Ntabelanga Dam (Mzimvubu Water Project), and the uMkhomazi Dam.

A critical problem, he suggested, is that many metros, cities and towns use water revenue for other purposes, and very little is invested in upgrading and maintaining water infrastructure. "To address this challenge, in line with the commitment we made last year, we have introduced a new R54-billion incentive for metros to reform their water, sanitation and electricity services. This will

ensure that revenue from water usage is put straight back into fixing pipes, reservoirs and pumping stations.

"Water outages are a symptom of a local government system that is not working," he continued, before announcing "a far-reaching overhaul" to address the root causes of dysfunction in many municipalities.

The government is in the final stages of establishing the National Water Resource Infrastructure Agency to better manage and mobilise funding for infrastructure. The Water Services Amendment Bill will introduce a licensing system for water service providers, allowing the government to revoke licenses for poor performance or failure to meet quality standards. In addressing broken water infrastructure, he said the government will work with municipalities to establish professional, ring-fenced utilities for water and electricity to ensure investment is directed toward maintenance.

He also announced a local government overhaul with a view to creating a modern, fit-for-purpose system: "Arresting the decline of local government will require our collective action, which we are now taking. Learning from our experience over the past 30 years, we will, in the coming months, finalise a revised White Paper on Local Government. This will provide solutions for an effective local government system that will reimagine how local government works," he said, adding that the current system is too complex and fragmented. "We will propose fundamental changes that recognise that some municipalities can assume more functions than others, and that we need a differentiated approach to municipal powers and responsibilities."

The funding model for municipalities will also be reviewed to ensure they have a sustainable revenue base for service delivery. At the same time, the government will expand support to municipalities that require technical assistance.

"This must be the year that we make South Africa stronger," Ramaphosa said in his conclusion: by fixing local government, fighting crime and corruption, creating jobs, and building a state that works.

"We must ensure that this rising tide lifts every South African. In this way, we can build a stronger, more resilient, and more equal society – one that stands tall among the nations of the world. We have indeed turned a corner. Now, we must look ahead and move with speed."

While positive spin is inherent to any presidential address, my key takeaway is that Ramaphosa is aware of the headwinds South Africa faces and is striving to put in place sensible, long-term solutions, "with unity and partnerships as the primary drivers for South Africa's transition from recovery to long-term prosperity".



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Engen: Securing South Africa's Energy Future Through Scale, Partnership and Purpose



George Roberts, Engen CEO and Executive Vice President, South for Vivo Energy.

Recent geopolitical tensions, particularly the conflict involving the United States, Israel and Iran, have heightened volatility in global energy markets and exposed the fragility of concentrated supply routes. For South Africa, this underscores a critical reality. Energy security depends not only on access to supply but also on the ability to pivot dynamically in response to disruptions. Diversified supply chains are therefore fundamental to ensuring continuity, stability and long-term resilience.

Against this backdrop, Engen stands firmly positioned as South Africa's leading fuel and convenience company. As part of Vivo Energy, Africa's largest fuel retailer and distributor, and ultimately backed by Vitol, the world's leading independent energy trader, Engen combines deep local expertise with global reach to secure supply, enable industry and support national growth.

Yet Engen's market leadership has not been built on scale alone. It has been shaped over decades by a disciplined focus on customers and a legacy of innovation that has consistently redefined the fuel retail experience in South Africa.

A Customer-Led Pioneer in Fuel and Convenience

From the outset, Engen has anticipated and responded to evolving customer needs. In the 1980s, the introduction of 1Stop Service Stations transformed long-distance travel, offering 24-hour fuelling, safe rest facilities and quality food in an era when such infrastructure was limited. In the early 1990s, Quickshop redefined the forecourt by introducing

As South Africa's fuel industry convenes at the Fuel Industry Association of South Africa Imbizo in June 2026, the sector finds itself at a defining moment. Global energy markets remain volatile, supply chains are increasingly complex, and the pace of transition is accelerating. In this environment, scale, resilience and responsible stewardship are not optional; they are essential.

South Africa's first branded convenience retail format.

The early 2000s marked another pivotal shift with Engen's pioneering partnership with Woolworths. By integrating premium food retail into service stations, Engen fundamentally elevated customer expectations and reshaped the competitive landscape.

This partnership remains a cornerstone of Engen's retail strategy. Recently renewed for a further 10 years, it reflects continued confidence in the model and its relevance to evolving consumer preferences. Looking ahead, Engen aims to double the contribution of the Woolworths Foodstop offering to its bottom line within the next five years, reinforcing its role as a key driver of growth and differentiation.

More recently, Engen has expanded its range through Café365 and Brazmata premium coffee, responding to demand for quality, speed and convenience. Café365 reflects a deliberate strategy to offer good quality, well-priced food and beverages across all LSM segments, ensuring that accessible, high-quality convenience is available to a broad spectrum of South Africans.

"Being customer-led is not a slogan for us, it is a discipline," says George Roberts, Engen CEO and Executive Vice President, South for Vivo Energy. "From Engen 1Stop to Quickshop, and from our Woolworths partnership to Café365, we have continuously reimagined the role of the forecourt. Today, our ambition is to make every Engen site the fourth stop in our custom-



Engen 1Stop, Quickshop, and partnerships with Woolworths and Café365 have reimagined the role of the forecourt.

ers' daily lives, after home, work and social spaces. By offering convenience, quality and value that truly resonates, Engen is not just another petrol station, it's a place where life happens."

A Pan-African Champion with Global Reach

The completion of the transaction integrating Engen into Vivo Energy in mid-2024 created a true pan-African energy champion. The enlarged group operates more than 4,000 service stations across 28 African markets, with recent expansion beyond the continent into Jordan. This scale provides access to diversified supply corridors, global trading capabilities and sophisticated risk management expertise.

For South Africa, this integration is transformational. Through Vivo Energy and Vitol, Engen can leverage multiple sourcing options across global refining hubs, reducing dependence on any single region and strengthening the country's ability to respond to market disruption.

"Energy security is fundamental to economic stability," says Roberts. "Our ability to draw on diversified supply sources and global trading expertise ensures that we can respond dynamically to market volatility and maintain reliable supply for our customers."

Engen's transition from refining to a modern import-and-storage model further enhances this position. By sourcing refined products globally and efficiently distributing them through local infrastructure, Engen improves flexibility, reduces environmental impact and strengthens resilience.

Investing for Resilience and Growth

Sustained investment remains central to Engen's strategy. The company is currently investing approximately US\$130 million (R2.2 billion) in supply infrastructure in South Africa, including the addition of around 250,000 m³ of storage capacity. This significantly enhances the country's fuel import and distribution capability, reinforcing long-term energy security.

At the logistics level, Engen continues to modernise its fleet, recently adding 30 Euro V fuel-specification trucks equipped with advanced driver assistance systems, AI-enabled monitoring and in-vehicle tracking technologies. These investments improve safety, reduce emissions and strengthen operational oversight.

"Our investments are focused on building a resilient, future-ready supply chain," Roberts explains. "From storage infrastructure to logistics and digital systems, we are strengthening our ability to deliver

safely, efficiently and reliably."

Beyond Retail: Enabling South African Industry

While Engen's retail network of more than 1,000 service stations provides strong consumer visibility, its role extends far beyond the forecourt.

Engen is a critical enabler of South African industry, supplying fuels, lubricants and specialised products across sectors including mining, agriculture, construction, marine and manufacturing. These sectors form the backbone of the economy, and their productivity depends on a reliable, high-quality energy supply.

"Retail is what customers see, but behind the scenes, we are deeply embedded in the industries that drive South Africa's GDP," Roberts notes. "Our role is to ensure that these sectors can operate efficiently, safely and competitively."

In an environment of economic pressure and currency volatility, this reliability becomes even more critical. Engen's integrated supply model provides the consistency and performance that businesses require to operate effectively.

Safety at Scale

With scale comes responsibility. Across its operations, Engen places safety at the centre of its operating model.

Advanced technologies, including predictive cruise control, electronic braking systems and AI-driven fatigue detection, support a layered approach to risk management across its logistics fleet. Real-time monitoring of vehicle performance and driver behaviour enhances compliance and accountability.

"Safety is non-negotiable," says Roberts. "Operational excellence and safety leadership go hand in hand. We are committed to maintaining the highest standards across every part of our business."

A Responsible Corporate Citizen

Engen's leadership in fuel and convenience is matched by its longstanding commitment to transformation and socio-economic development. Its Level 1 B-BBEE certification is underpinned by strong performance across key pillars, including leadership representation.

Following integration into Vivo Energy, Engen South Africa remains 26% owned by historically disadvantaged persons, including a 21% shareholding by the Phembani Group and a 5% employee share ownership programme, which is expected to grow to 9% over time, further deepening employee participation and shared

value creation.

"Transformation is integral to who we are," Roberts emphasises. "It is about building a business that reflects South Africa and contributes to inclusive economic growth."

Through its corporate social investment programmes, Engen continues to support education, skills development and community upliftment. The company's enterprise and supplier development initiatives strengthen local supply chains and create opportunities for small businesses.

Driving a Progressive Energy Future

As the energy transition accelerates, Engen is evolving to meet changing demands. The importation of cleaner Euro V fuels supports improved emissions standards, while investments in infrastructure and efficiency reduce environmental impact.

At the group level, Vivo Energy is investing in renewable energy solutions, including solar generation, supporting a balanced and pragmatic transition to a more sustainable energy future.

"We recognise that the future of energy will be more diverse and more sustainable," adds Roberts. "Our responsibility is to ensure security of supply today while building the systems and capabilities required for tomorrow."

Partnership as a Foundation for Progress

Central to Engen's approach is the strength of its partnerships. In South Africa, this includes collaborations with suppliers, government and communities. Across the continent, through Vivo Energy, it extends to a broad network of stakeholders working together to build resilient energy ecosystems.

"These partnerships enable investment, support localisation and strengthen supply chains, ensuring that energy continues to power economic growth across Africa," concludes Roberts.

As the industry gathers for the Fuels Industry Imbizo 2026, Engen's message is clear. Scale matters. Partnership matters. Purpose matters. And in a rapidly changing world, the ability to combine global strength with local relevance will define the future of energy.

Rooted in South Africa, strengthened by a pan-African platform and backed by global expertise, Engen continues to secure supply, enable industry and enrich lives, building on a legacy of innovation that remains firmly focused on the future.

<https://www.engen.co.za/>

Embracing the Future of Energy Mobility

The theme for the 2026 Fuels Industry Imbizo: Embracing the Future of Energy Mobility, highlights the industry's transition toward a diversified energy mix – spanning conventional fuels to rapidly emerging alternatives. Registration for the event, which takes place on 10 and 11 June at the Sandton Convention Centre in Johannesburg, is now open.

The theme for the 2026 Fuels Industry Imbizo: Embracing the Future of Energy Mobility, highlights the industry's transition toward a diversified energy mix – spanning conventional fuels to rapidly emerging alternatives. As global and local energy ecosystems evolve, the conference will explore how South Africa can position itself for a sustainable, efficient and low-carbon future. The focus is on equipping stakeholders with the insights, regulatory clarity, and strategic direction needed to thrive amid technological, environmental, and policy shifts.

The two-day programme will feature keynote addresses and panel discussions on Clean Fuels II, the NEV revolution, LPG for clean cooking, pipelines and storage, and South Africa's fuel pricing framework.

The conference will highlight the need for a change in mobility in response to the long-term outlook for oil demand.

Panel discussions have been arranged to unpack Clean Fuels II, which was promulgated by the Minister of Mineral Resources and Energy, Gwede Mantashe, on 24 June 2022. These regulations establish new petroleum product specifications and standards that

are due to take effect on 1 July 2027. The far-reaching implications for the petroleum industry will be unpacked, including infrastructure upgrades, refining investments, regulatory readiness, and opportunities to improve air quality and drive technological innovation.

Sessions will be dedicated to the decarbonisation of transportation, with a panel discussing the new energy vehicle (NEV) revolution and what it means for the petroleum sector: how NEV uptake will redefine energy demand, influence long-term fuel consumption trends, and prompt strategic shifts.

Other issues planned for discussion include climate change and air quality; the expanding use of Liquefied Petroleum Gas (LPG) for clean cooking; and the challenges involved in scaling LPG availability to support broader sustainable development objectives.

Security of supply through resilient pipeline networks and adequate storage infrastructure will feature, as these are essential to maintaining energy stability. A session is planned to demystify South Africa's fuel pricing framework, which governs petrol, LPG, and Illuminating Paraffin through distinct mechanisms.

Alongside the Imbizo, a Sustainability Expo will host exhibitions showcasing the collective impact of its members, industry suppliers and stakeholders across skills development, enterprise and supplier development, and socio-economic upliftment. The exhibitions will include a licensing booth and highlight real-world initiatives, future-focused career pathways, and innovative collaborations that are shaping a resilient and inclusive energy sector.

This platform aims to connect, inspire and showcase how the industry is actively fuelling South Africa's just energy transition.

"Because the decisions we make between now and 2027, when CF2 goes live, will lock in quality, cost and carbon outcomes for the next generation, the Fuels Industry Imbizo is a vital forum for policy-makers, refiners, importers, logistics operators, automotive stakeholders, aviation/marine stakeholders, financiers and technology providers," says the Fuel Industry Association's Chief Executive, Avhaphani Tshifularo.

To register for the Fuels Industry Imbizo 2026, click here.

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With a history stretching back to 1881, and trading as Engen since 1993, ENGEN has grown its business in South Africa to include manufacturing plants, distribution networks and retail service stations. It is widely recognised for the supply and distribution of primary refined petroleum products and the provision of convenience services via an extensive retail network.

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These facilities support our aim of providing a reliable supply of oil products and services to coastal nations and the landlocked countries beyond. It does this through its network of over 20 affiliates and commercial partners, which deploy smaller storage units and professional logistics networks, to ensure fuels, lubricants and LPG reach consumers and industries across the continent.

For the Fuels Industry Imbizo, Oryx Energies is the Registration Sponsor, providing registration logistics and administrative support before and during the event.

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WHAT IS A TRUE HERO?

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Climate change a significant risk to African mining

Climate change is no longer a distant threat; it's a present-day disruptor reshaping industries, economies and ecosystems. In Africa, few sectors are as exposed or as vital as mining. WSP in Africa's Kierra Chetty, Principal Consultant for Climate Change, and Nirvishee Juggath, Director of Water Management, highlight the risks and the need for a shift toward resilience-focused innovation and adaptive measures.



Left: Chetty, Kierra (1), Principal Consultant for Climate Change at WSP. Right: Nirvishee Juggath, Director of Water Management for WSP.

Intensifying droughts, erratic rainfall, and rising temperatures are placing growing pressure on water availability and operational stability. For mining companies, the compounded risks of environmental volatility and resource scarcity demand urgent attention.

"Climate variability has shifted from rare disruptions to an operating baseline, reshaping how the mining sector plans and protects its people. Weather extremes are no longer outliers but a reality that must be engineered into every decision to ensure operational stability and long-term value," says Kierra Chetty, Principal Consultant, Climate Change, WSP in Africa.

For many African countries, mining is not just a sector; it's an economic backbone. In South Africa, for instance, mining contrib-

utes approximately 6% to the national Gross Domestic Product (GDP). Any disruption to operations, such as those triggered by the early onset of the Covid-19 pandemic and lockdown measures, can reverberate across the economy, affecting employment, exports, and fiscal revenue. Recovery from such shocks is often slow and complex, underscoring the sector's critical role in economic resilience.

Unlike sudden disruptions, the risks posed by climate change are largely predictable, yet the risks are intensifying in both frequency and severity. The Lloyds Register Foundation's Global Safety Evidence Centre reports that mine workers are increasingly on the front lines of this growing threat, facing extreme weather events and rising temperatures that compromise safety and

productivity. The Foundation's World Risk Poll reveals that one in five workers worldwide, 18%, faced harm at work in the past two years, a number that rises to 21% in the mining and quarrying sector. Workplace health and safety conditions are further compounded by operational challenges, especially in water-scarce countries like South Africa, where the ongoing water crisis adds another layer of complexity to mine sustainability and resilience.

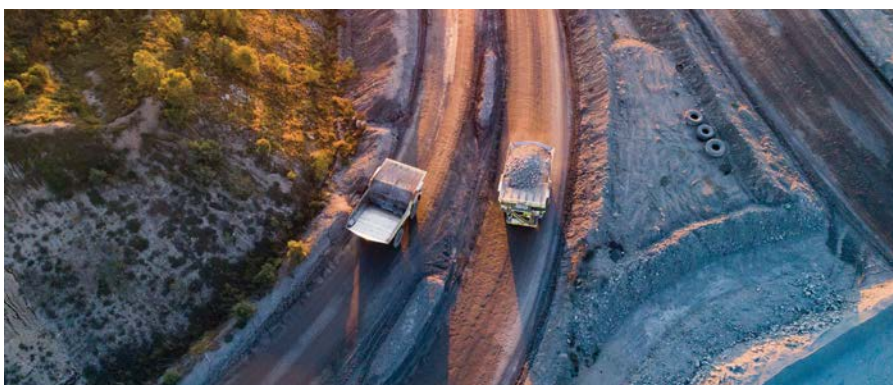
"One of the most significant and complex climate-driven challenges facing mining operations across Africa is the need to manage water effectively. Water risk in mining is no longer just about scarcity; it's about volatility. Sudden stormwater surges, prolonged dry spells, and shifting water quality demands require adaptive systems that can capture, store, treat, and reuse water efficiently and safely," says Chetty.

During extended droughts, mines struggle to secure the water needed for core functions such as mineral processing, dust suppression and equipment cooling. This is especially problematic in arid regions where water scarcity is already a concern.

"In a country as water-stressed as South Africa, long-term performance relies on circularity such as protecting catchments, designing for reuse, and treating water as a shared resource to sustain both operations and communities," says Chetty. "Additional rainfall would not resolve mining's water challenges. When high intensity or out-of-season storms do occur, they frequently overwhelm mine infrastructure, flooding pits, tunnels, haul routes and waste areas, disrupting operations and introducing substantial safety hazards."

Managing excess water is a delicate balancing act: mines must determine not only how to remove it, but also where and how to discharge it without breaching environmental regulations or causing downstream harm. Failure to do so can result in contamination, legal consequences and reputational damage.

Compounding these challenges is outdated or insufficient infrastructure, often built in an era when climate volatility was



By integrating science-based insights, strengthening critical infrastructure, and optimising water and energy systems, mining operations can safeguard performance, protect communities, and reduce vulnerability while adapting effectively to an increasingly volatile climate.

not a design consideration. Many mining facilities weren't designed to withstand today's extremes, let alone meet evolving regulatory standards.

"This means that infrastructure was not designed for extreme events or even for the current design requirements being stipulated by global standards. Regulatory requirements have also improved over the decades, and design criteria for climate impact must be revised from original design requirements," explains Nirvishee Juggath, the Director of Water Management at WSP in Africa.

"Whether it is underground, open cast or open pit mining, the act of mining has an impact on water resources and water quality, while inflow from rain, runoff, recharge and lateral groundwater ingress is inevitable," adds Juggath.

To stay resilient, mining companies must strike a careful balance, adopting innovations in production and methodologies to improve water efficiency while also developing strategies to capture and store excess water during the wet season for use in the dry season.

"During high rainfall events, water availability is not an aspect of concern for communities and industries, but during the dry season, that's when water quantity

and quality become an issue," says Juggath. "Irresponsible use and management of water do not help the situation."

In many African countries, the relatively low cost of water – particularly in regions where pricing models fail to account for scarcity or environmental stress – can diminish the financial incentive for mining companies to invest in robust water management practices.

Juggath notes that while water stewardship has often been deprioritised in favour of more immediate profitability, this is changing. "As mines are at the forefront of the risks climate change poses, with the inevitable impact on infrastructure and productivity, industries want to better understand how good water management can prevent loss, and mitigation measures they can take."

Juggath encourages mining companies to reassess their risk profiles, operational plans and environmental commitments. This includes reviewing infrastructure against best-practice design standards and conducting design reviews, reliability assessments and risk analyses. "Mining companies should develop a risk-based action plan that identifies vulnerabilities and prioritises upgrades, particularly for critical systems and facilities."

"We are seeing a clear shift across the sector toward resilience-focused innovation and adaptive measures, where renewable and hybrid power systems, advanced process optimisation, real-time monitoring, and closed-loop water solutions are being integrated to reduce dependence on vulnerable resources, strengthen operational continuity, and enhance overall efficiency under increasing climate pressures," says Chetty.

Infrastructure upgrades are also gaining momentum, with emphasis on building resilience into tailings storage facilities, haul roads and processing plants.

"The frequency and severity of climate-related extremes are increasing, but so is our capacity to engineer resilience. By integrating science-based insights, strengthening critical infrastructure, and optimising water and energy systems, mining operations can safeguard performance, protect communities, and reduce vulnerability while adapting effectively in an increasingly volatile climate landscape," concludes Chetty.

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JOHANNESBURG
Tel: 011 397 2833

DURBAN
Tel: 031 579 2593

South Africa:
0861 103 103

E-mail: sales@valve.co.za
www.valve.co.za



Dewatering trends shaping pump choices in Africa

Dewatering on African mines is being reshaped by deeper underground workings, unpredictable rainfall and rising energy costs, influencing whether diesel-driven or submersible pump solutions are most suitable. Integrated Pump Technology's Jordan Marsh explains.

As African mines go deeper and rainfall patterns grow increasingly unpredictable, dewatering has moved beyond being a support function to become a strategic discipline. The choice between diesel-driven and electric submersible pumps is now influenced by evolving risk profiles, both underground and on the surface, as well as considerations of energy efficiency, maintenance and mobility.

On surface mines, the challenge is amplified by heavier storm bursts and the need to keep haul roads and pit floors stable. Short, intense downpours can cause sudden pit-lake rises and flooding that demand rapid response. In these situations, high-throughput diesel-driven pumps mounted on trailers or skids are often favoured, as they can be moved quickly to different locations without relying on fixed electrical infrastructure. The ability of auto-priming diesel pumps to handle fluctuating inflows without priming delays makes them indispensable for these unpredictable surface applications.

Mobility is a further consideration. Production teams require equipment that can follow the work, particularly in operations where water inflow points shift as pits expand. Diesel-driven solutions with built-in fuel tanks and controls reduce setup time and enable small teams to respond effectively. Pontoon-mounted units also provide reliable suction conditions despite fluctuating water levels, reducing the risk of cavitation and protecting pump performance. With surface water often carrying abrasive silt and fines, durability is critical, making pumps with robust wear-resistant components an important investment.

Underground mines, however, face a different set of challenges. Longer declines, wetter stopes and tighter control over electricity usage are driving demand for efficient submersible pumps that can operate continuously and reliably. Rising energy costs mean that submersibles sized precisely to their duty offer significant advantages, especially when coupled with automated level controls and start/stop systems to reduce unnecessary run hours. The compact design of submersibles also makes them well-suited to confined underground environments, eliminating the need for suction lines and reducing potential



Integrated Pump Technology supports mines with high-performance dewatering solutions designed to keep operations stable during heavy rainfall and changing pit conditions.

trip hazards.

In many cases, underground water is not only abundant but also dirty or chemically aggressive. Pumps must therefore be equipped with seals, cooling systems, and materials that can withstand abrasive fines and corrosive conditions without frequent maintenance. Built-in motor protection, leakage sensors and durable cabling extend operational life and reduce downtime.

Choosing between diesel-driven and submersible pumps ultimately comes down to the application. Diesel-driven auto-priming pumps are ideal for emergency bypasses, stormwater management and pit-lake dewatering where mobility and independence from the grid are crucial. Submersibles, by contrast, excel at routine, continuous underground operations or fixed surface installations where reliable electrical power is available.

The total cost of ownership further influences the decision. While diesel pumps bring fuel and engine servicing costs, they eliminate the need for electrical infrastructure. Submersibles, meanwhile, generally offer lower energy costs and fewer moving parts but require correct protection systems and monitoring to achieve maximum lifespan.

Jordan Marsh, Managing Director of Integrated Pump Technology, stresses the importance of not treating dewatering as an afterthought. "The best dewatering outcomes come from pairing proven technology with a

clear understanding of each mine's hydraulic realities," he explains. "That is why we supply world-class brands with long African track records – Grindex for electric submersibles and Godwin for diesel-driven auto-priming units – and the local application know-how to specify them correctly for reliable long-term performance supported by localised support across the region."

Specification errors can be costly. An undersized pump may result in flooding and lost production, while an oversized pump wastes energy and accelerates wear. Mines also operate in remote locations where logistical challenges make access to spares and technical support critical.

Marsh highlights this as another reason why the supplier relationship is so important: "Mines need pumps that start every time, run to duty and keep running. Grindex submersible pumps and Godwin diesel-driven units have earned their reputations in Africa for exactly that, reliability in tough conditions. Our job is to combine these technologies with rapid support, correctly specified accessories and a spares pipeline that keeps risk low and output high."

Integrated Pump Technology's approach focuses on ensuring mines receive not only the right pump but the complete solution. This includes correctly matched accessories such as pipework, valves and strainers as well as service models that balance cost and



Left: By supplying both diesel-driven and electric submersible pumps, Integrated Pump Technology enables mines to respond quickly and effectively to fluctuating water inflows. **Right:** Integrated Pump Technology helps surface operations maintain safe haul roads and pit floors through rapid-deployment diesel pump solutions built for high-volume stormwater control.

flexibility.

Commenting on rental options, he says these are often best suited to seasonal peaks or emergency response, while ownership

works for long-term, predictable duties.

Further, controls, monitoring and telemetry are increasingly integrated into solutions to provide real-time feedback on

pump performance, ensuring issues can be addressed before they become failures. "With climate variability, deeper mining operations and increasing emphasis on energy efficiency, dewatering in Africa is undergoing significant change. Selecting the appropriate pump is no longer a matter of preference but of detailed engineering and risk management," Jordan says.

"By working with a reputable, established company like Integrated Pump Technology that offers proven global brands such as Grindex and Godwin, backed by local expertise, mines can ensure they have reliable, efficient dewatering solutions that safeguard production and protect profitability," Marsh concludes.

<https://www.pump-technology.com>

Energy-efficient pumping for irrigation

BMG and Agrico have collaborated to enhance compatibility between BMG Synergy PI500 variable speed drives (VSDs) and Agrico's Web Control platform, giving farmers and industrial users across Africa new options for efficient, intelligent pumping and motor control.

"Through close collaboration and extensive on-site testing, teams from BMG and Agrico have verified the seamless operation of Synergy PI500 VSDs within the Agrico Pump Controller ecosystem," explains Mike Williams, BMG's Product Specialist for BMG Synergy VSDs in the Cape Region and Namibia. "This compatibility enables operators to integrate Synergy drives into Agrico's Web Control environment for convenient access to performance data and energy-saving tools.

"This development benefits irrigation schemes and agro-industrial plants, where pumping systems represent a significant share of total energy use. When used together, Synergy VSDs and Agrico's remote monitoring platform help users reduce energy consumption, simplify management and improve system reliability.

"Remote access to real-time operating data enhances decision-making, while integrated protection and automation functions reduce downtime. In one installation, an irrigation customer achieved energy cost savings of nearly 20% and eliminated unnecessary pump stoppages during peak season."

Advanced control and connectivity

BMG's Synergy PI500 inverter range is designed for high-performance motor applications, offering vector control for synchronous, asynchronous, and permanent-magnet motors. Through automatic tuning and precise algorithms, the system maintains stable torque and accurate speed regulation across

a wide operating range.

With Agrico's Web Control integration, users can manage Synergy VSD installations remotely via GSM or Ethernet, accessing real-time data, fault notifications and scheduling features from any location.

Agrico's Web Control platform extends traditional starter and drive systems with cloud-based operation, monitoring and protection, supporting a wide range of compatible VSD brands, including the Synergy PI500 series.

Flexible pump control and energy optimisation are achieved via the Agrico Pump Controller, which manages up to nine pumps on a single manifold when connected to a master VSD. Functions, including dynamic energy optimisation, section control and multi-pump coordination, are enhanced when paired with a Synergy drive, ensuring precise pressure control and efficient power use. Users can configure automated triggers, receive SMS or call alerts for critical events and perform remote firmware updates.

The Synergy PI500 inverter features robust hardware with wide input-voltage tolerance, a protective coating against dust and moisture, and advanced cooling for extended service life. Safety and reliability are reinforced through EMC compliance, with built-in protection against overvoltage, undervoltage, overcurrent, and overheating. Peripheral options include braking units, reactors and PLC function cards, while communication is handled via RS485 and Modbus RTU for smooth integration with Agrico controllers. The Synergy PI500 VSD series also supports a full Hybrid AC and DC-voltage supply (Solar and Eskom) when installed in a BMG hybrid enclosure. This enclosure boasts advanced cooling features and DC-to-AC interference mitigation.

BMG's nationwide technical support, large stockholding for units up to 400 kW, and training and repair services ensure optimal installation and maintenance of the Synergy PI500 range. Agrico complements this with its dedicated Web Control help desk, assisting clients with connectivity and configuration issues.

<https://www.bmgworld.net/>



BMG and Agrico have collaborated to improve compatibility between BMG Synergy PI500 variable-speed drives (VSDs) and Agrico's Web Control platform.

The central role of pumping equipment manufacturers

Following Water Week from 16-20 March, Hugo du Plessis of KSB Pumps and Valves highlights the importance of our water infrastructure and the significant role manufacturers can play if included in the full circle of developing, engineering, operating and maintaining it.

Equipment manufacturers in the water industry should play a central role in developing solutions to the country's growing potable and wastewater challenges.

Hugo du Plessis, market area manager for KSB Pumps and Valves, says manufacturers of pumps, valves and related equipment are most important when systems are being designed or upgraded, as they know their products' capabilities better than anyone else. Therefore, manufacturers should be included at every stage of a project to ensure that the work is carried out within the equipment's capabilities.

Furthermore, global companies like KSB have a wealth of institutional knowledge and technical expertise that they can lend to consulting engineers, municipalities and waterboards to determine the best solutions for a region's challenges.

"In South Africa, our water boards manage decades-old infrastructure. Their challenges include leaks and the maintenance of equipment such as pumps and valves. During Water Week from 16-20 March, we decided to make our services available to help water boards run more efficiently and to identify how best to address issues such as skills shortages and staff training," says Du Plessis.

It is clear, he continues, that our water delivery infrastructure needs an overhaul, with ageing pump stations, rising demand, and water treatment costs that cannot be billed due to leaks or other losses. This makes deliv-

ering a reliable water supply a daily challenge for municipalities and water utilities. Ensuring that water reaches households, businesses and even livestock requires technical expertise and partnerships with original equipment manufacturers (OEMs).

"Our operations combine local manufacturing with global engineering knowledge, and our engineers can support municipalities directly, evaluating systems and optimising pump performance for bulk water transfer, treatment works and reticulation networks. Working closely with OEMs also ensures local authorities have rapid service response and on-the-ground technical support once projects have been completed. "The pump stations operate 24/7 under heavy demand. Having trained engineers who understand the full system helps utilities maintain supply," Du Plessis adds.

He explains that KSB is currently helping many of the country's utilities and municipalities to map and measure water supply, assess pump performance and plan remedial action where necessary to ensure systems are operating at full capacity. Advanced tools, including smart meters and data-driven pump monitoring for system optimisation and preventative maintenance, are also being used to enable water boards to identify problem areas and adjust operations before minor issues escalate into major failures.

KSB staff are currently working with several progressive municipalities on maintenance programmes and refurbishment projects to ensure

that pumps operate efficiently and safely over the expected decades-long operation of such systems. It also provides training and educational presentations to the next generation of engineers, helping them understand the full water cycle from river to tap and back to treatment so that they can manage infrastructure sustainably.

"We engage directly with water boards and consultants to offer solutions that will last 20-30 years, where we assist with planning and executing systems that can withstand daily demand and ever-growing communities," he concludes.

<https://www.ksb.com/en-za/>



The Jericho Pump Station in Mpumalanga, built in South Africa in 1967 and still in operation, reliably delivers water to communities and industry.



Left: KSB ETAnorm irrigation pumpsets, if well maintained, will still be operating after 20 years of irrigating crops. Right: A critical water pump station in Freestate, where two FBL 500-400 Double Suction Split Casing Pumps have been in operation since 1967. They were built in South Africa and regularly maintained.

Does water management need AI?

Chetan Mistry, Strategy and Marketing Manager at Xylem Africa, summarises findings from the Xylem Water Technology Trends 2025 report and highlights how AI and digital systems are making water management smarter and more efficient.

The right combination of data and algorithms can produce astounding improvements in efficiency, speed, and oversight. While many water utilities already use digital monitoring and analytics to manage operations, artificial intelligence builds on these capabilities by identifying patterns in large datasets, enabling predictive insights, and supporting more informed decision-making. Utility managers are taking note, with around 15% of large water utilities worldwide using artificial intelligence, projected to reach 30% by 2026, according to the Xylem Water Technology Trends 2025 report. By 2035, three-quarters of water utilities will use some form of AI.

With ageing infrastructure, climate variability, and rising water demand placing increasing pressure on water systems, utilities are seeking more resilient and adaptive ways to manage operations. Data-driven and AI-enabled tools are emerging as part of this broader digital water transformation.

Experts have good reason to be optimistic about AI adoption in the sector. Digital water management systems are already producing excellent results. For example, Yorkshire Water Services in the UK uses Xylem Vue digital services, which reported a 57% reduction in visible leaks and a 30% reduction in annual distribution main repairs.

Similar digital and AI-driven capabilities are also expanding into industrial water and wastewater operations, where predictive monitoring and process optimisation help improve compliance, reliability, and resource efficiency.

Such outcomes show the hidden capacity at every water management site, says Chetan Mistry, Strategy and Marketing Manager at Xylem Africa, WSS.

"Water distribution and treatment sites produce far more data than they use. But that data gets neglected due to capacity constraints. It would take an enormous amount of time to organise and study the data for patterns and insights. Digital and AI systems are solving those problems. Digital systems record and share accurate and reliable data, which AI systems use to rapidly produce planning information, automation options and other improvements."

Water management sites utilise smart data and AI services in several ways, including:

- **Real-time process adjustment:** Water treatment is at its best when the system can maintain consistency, a laborious task since water flows keep changing. Intelligent water systems add intelligence

that adjusts processes such as reagent dosing and treatment line control in real time. Site operators define specific scenarios that automatically adjust operations based on information from external technologies, such as water management applications and business intelligence systems.

- **Predictive demand and optimisation:** AI systems predict conditions to manage demand and optimisation. Predictive maintenance systems rely on predictive analytics and AI-driven models that use performance data and digital twins to anticipate equipment maintenance needs. Similar technologies have expanded to help water managers forecast demand, such as consumption peaks. They also optimise energy consumption by adjusting operations based on demand.
- **Advanced metering infrastructure:** Smart meters have radically improved water distribution's performance and efficiency, using digital technologies to gauge consumption and feed reliable data into water planning systems. Advanced metering infrastructure (AMI) is the next step in that journey. AMI performs remote reading and integrates information into AI systems, reducing information intervals towards almost real-time monitoring and feedback.
- **Decision support systems:** Water utilities are using decision support systems (DSS) to inform real-time, medium- and long-term planning and management. DSS tools use AI to analyse large datasets and information from different disciplines, including data from hydrological and meteorological stations, expert knowledge and local inputs. This analysis models different situations, from simulating water bodies to predicting usage patterns.



While these and other data-driven improvements sound very attractive, utility and infrastructure managers are not always sure where to start. Successful deployment depends on data quality, integration with existing infrastructure, and organisational readiness. Deploying digitisation can become complicated, which is why leading water technology OEMs develop and maintain extensive software platforms designed to meet water utility challenges.

"Companies like Xylem invest substantially in developing water management platforms that are secure and simple to deploy, while ensuring the data remains with the utility," says Mistry. "They create interactive and customisable dashboards and reports, which authorised staff and contractors can access on-site through smart devices and computers."

The real advantage of using data-driven water management platforms is not just in the new features they offer. Still, it enables utilities to leverage information they already have: "Data that does nothing only takes up space. But data made useful through cloud-based management software opens additional dimensions for planning and predictive actions such as maintenance," concludes Chetan Mistry.

<https://www.xylem.com/en-za/>



Approximately 15% of large water utilities worldwide are using artificial intelligence, with the figure projected to reach 30% by 2026, according to the Xylem Water Technology Trends 2025 report.



SKF SA's engineered solutions and circularity

Janus Bezuidenhout, Application Engineering Manager for SKF South Africa, discusses SKF's lifecycle services strategy for supporting the African continent, which starts with engineered, locally manufactured customisations and extends to include a comprehensive range of lifecycle management and life extension services that ensure long-term value, reliability and sustainability.

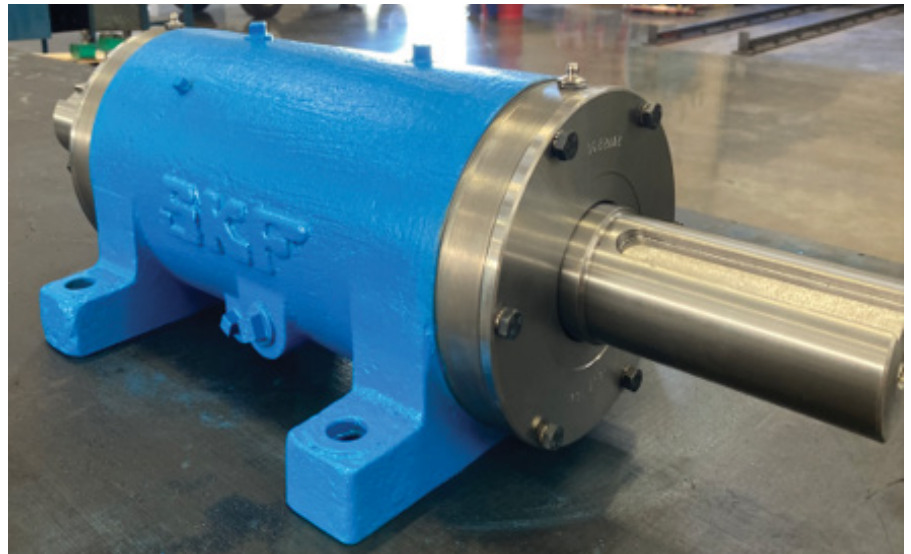
Janus Bezuidenhout joined SKF in 2013 as a project engineer. "Before that, I worked for a company called Henred Fruehauf, part of SA Truck Bodies, as a design engineer for truck axles and suspension systems. I qualified as a Mechanical Engineer from the University of Pretoria with a specialisation in maintenance and reliability, so I have always found SKF a good fit for my skills and interests," he tells *MCA*.

He began his SKF journey in the Project Engineering division. "Back then, the Engineering Department at SKF was still split into two: Applications Engineering and Project Engineering. Application engineering typically handled technical issues, assisted customers with designs and technical inquiries, and conducted failure analyses, among other tasks. At that time, Project Engineering was responsible for customised solutions here in South Africa.

"For many years, we have relied on local suppliers to manufacture components for our South African clients to enable us to deliver customised designs to meet niche requirements. In Southern Africa, we often have to supply replacement bearing solutions based on designs from the 1940s, for ageing plant equipment still in use today. So whenever customers can't find what they need in a catalogue, SKF South Africa can help by manufacturing a housing, seals and any other non-standard elements, and locally assembling a bearing to meet the requirement," he explains.

As a project engineer, Bezuidenhout worked with high-hitting customers on in-depth projects, not just in South Africa, but also in Australia, Europe, and the Asia region. "In 2017, I took the role of Senior Project Engineer, and I became the Project Engineering Team Leader in 2019.

"Then, in 2020, COVID hit, we moved into a new building, and we had to restructure. Within the global SKF Group, Project Engineering is not well known. It was a service unique to South Africa. So we decided to integrate the project engineering and application engineering teams into a single Applications Engineering Division while maintaining all the core services we have always offered," Bezuidenhout explains, adding that local customisations and local manufactur-



An SKF South Africa customised and manufactured dual-bearing housing unit ready for installation at a plant in South Africa.



For horizontal grinding mills, SKF South Africa can custom-engineer and locally manufacture mill pinion housing assemblies.

ing remain key performance indicators within the team.

SKF's One Africa strategy

"Now, from an engineering perspective, SKF South Africa is not only supporting South and Southern Africa, but we are also responsible for delivering Application Engineering support

to the whole of Africa. We currently target and support key countries. Still, if there are needs and opportunities in any other African countries, we are willing and able to respond," he continues, adding that SKF application engineers have been appointed to support the Northwest Africa and Central East African regions, and there are now seven engineers operating out



Left: Locally manufactured trunnion housing assemblies. One housing has been remanufactured, and the lead time has been reduced from 10 weeks for new production to 3 weeks for remanufacturing. Right: A set of SKF plummer block housings for mill pinions that were custom-designed and manufactured in South Africa.

of the South African office in Gauteng who are available to deliver support and promote SKF's customised solutions offering.

"OEMs operating in South Africa have installations across Africa. In North-West Africa, for example, we recently had a customised bearing housing manufactured here in South Africa and then shipped it for installation. SKF South Africa-manufactured products are already in many African mines. We also want to develop direct relationships with these customers, through SKF distributors or through our expanding Africa-wide SKF Applications Engineering network," he says.

Localised manufacturing in SA

"We don't yet have an SKF manufacturing facility in South Africa, so we make use of authorised suppliers that are very close to SKF South Africa and comply with the quality standard of the SKF Group. Some have been working with SKF South Africa for more than 40 years. These foundries and machine shops are all audited and authorised to manufacture products for SKF South Africa in accordance with SKF policies and global SKF quality standards.

"So the products that have been manufactured in South Africa are as good as any SKF Product from Europe. In some cases, the designs are more robust and better suited to the harsh site conditions we have customised them for," assures Janus Bezuidenhout.

Lifetime service solutions

An integral part of SKF SA's Application Engineering strategy is to incorporate reliability services into the solutions it engineers. "Application Engineering also incorporates services such as installation, lubrication systems, condition monitoring, and bearing remanufacturing. We want to do more than develop and install housings, bearings and sealing solutions. We want to promote services that help ensure SKF bearings last to their maximum predicted life," he explains.

Without correct lubrication systems and schedules, for example, even if the correct bear-

ing or housing is installed, premature failure will occur. With manual lubrication, human error can affect the delivery of the correct lubricant, quantity and timing. Lubricating too much, too little or too late can all lead to catastrophe. Automatic lubrication solutions remove uncertainty, improve reliability and extend component life.

"Also, there are certain applications where access to the bearings is unavailable while the system is in operation. You don't want to have to switch off a grinding mill, for example, to lubricate the pinions," he says.

Poor installation may cause misalignment, contamination or even component damage, which can accelerate failure: even with proper lubrication, accumulated wear or seal damage can initiate a failure. "Unless bearings are being monitored, this can lead to a catastrophic failure. We want to be able to inform our customers of that danger before it happens," he says.

SKF South Africa can assist with skilled technicians that will install bearings and assemblies according to well-established SKF procedures and methods, says Bezuidenhout, adding that the best way of ensuring that failures do not happen is to use vibration analysis, condition monitoring and lubrication analysis, which can detect the onset of a failure well in advance.

"Using service level agreements, we are trying to incorporate all of our life extension service aspects into our engineered solutions offering, so that customers receive the full benefit from their investments," he says.

Remanufacturing and circularity

Condition-monitoring information is ideal for scheduling a just-in-time shutdown for maintenance or investigation. Bezuidenhout cites two reasons: first, to prevent a catastrophic failure that would result in an unscheduled plant shutdown; and second, to limit damage so that a bearing nearing primary failure can be remanufactured.

"Remanufacturing is a very big drive for us. In terms of ESG, it's a sustainability and resource efficiency issue. We can remanufacture bearings and housings from SKF South Africa. The

drive is not only to save the customer on cost and delivery time, but also to reduce CO₂ emissions," he points out.

"We have proven bearing remanufacturing capabilities at SKF South Africa, where we reuse as much as we can to give a bearing another life, while significantly reducing the replacement cost. Large-sized bearings are only available from the factories. To bring that new bearing from Europe, it takes about 8 to 10 weeks by sea freight, but if the bearing is reused, remanufacturing it at SKF South Africa takes less than two weeks.

"Also, though, for a new medium-sized bearing housing that might take 6 to 8 weeks to produce from scratch, we can remanufacture a bearing housing in two to three weeks back to the original design requirements."

Replicating past successes

Most importantly, according to Bezuidenhout, SKF SA wants to replicate its engineering successes. "We have implemented several successful solutions for clients over the past few years. For horizontal grinding mills, for example, we custom-engineer mill pinion housing assemblies. These mills are critical to mine production and always operate in harsh environments, continually exposed to fine dust and water. So our customised bearing and housing solutions are not only more robust but also feature an upgraded seal design to prevent ingress.

"What is also good is that when a condition monitoring system is included, we can monitor these bearings remotely from South Africa, which enables an inspection to be scheduled as soon as we begin to detect problems.

"We see similar opportunities to showcase what we have done in plants in Southern Africa, highlighting how long our custom solutions are lasting, how reliable they are, and just how valuable a similar solution might be in extending the life and improving the reliability of critical assets at other mines in Africa," Janus Bezuidenhout concludes.

<https://www.skf.com/africa/en>

Engineered torque transmission solutions from Bi



Hilton Woest, Product leader for Torque Transfer and Field Services at Bi, highlights the importance of managing torque in a drive train system and the value of adopting an engineered approach to optimise power transmission systems, ensuring maximum reliability, efficiency, safety, and plant uptime.

“Torque transmission is about how we transfer energy from an electric motor to a machine in a controlled and reliable way.

Torque is the turning force (Nm) that makes a shaft rotate at speed (RPM), and torque and speed are directly related through power. If speed is reduced while delivering the same power, torque increases. That’s why most industrial systems use some form of speed reduction, so that the motor shaft speed can be reduced and the torque increased to the output levels needed by the machine,” explains Hilton Woest, Bi’s product leader for torque transfer.

A typical drive train, he says, starts with

an electric motor, then a coupling, and then some form of speed reduction, which can be a belt-and-pulley drive, a chain drive or a gearbox. These are then connected to the shaft that powers equipment such as conveyors, pumps, crushers or mills. “Along that whole drivetrain, torque is not just transmitted, it’s managed. Engineers have to consider shock loads, misalignment, start-up torque, overload conditions and more to ensure the torque delivered to the machine is always within the safe working range,” Woest says, adding “managing torque is about protecting assets, reducing downtime and maximising lifecycle value.”

Transmission solutions and couplings

Belt-and-pulley systems, says Woest, are simple, flexible and cost-effective. They absorb torque changes and shock loads well because of the inherent elasticity of the belt



Endura Hi-Tech belt drives from Bi. Belt drives can be tailored for diverse industrial applications, including mining and manufacturing plants, offering both individual products and comprehensive system solutions.

material, their ability to slip on the pulley wheel during torque spikes, and the damping effect from tension changes.

“Then there are chain-and-sprocket systems, which are positive drives that cannot slip and are well-suited for higher torque applications. However, they require precise sprocket alignment and proper lubrication, and they do not tolerate misalignment or shock loads as well as belt drives,” Woest notes.

Directly coupled gearboxes offer compact, high-efficiency torque multiplication, but the choice of gearbox-to-coupling is critical to enable the system to handle misalignment and vibration.

There are many external factors to consider when selecting a torque coupling, Woest says. A coupling for a crane, for example, may be 50 m above the ground. If using a grid coupling, for example, it will require



Bi recently installed a high-performance Kobo dual/double-chain pan conveyor in the cement industry, a first-of-its-kind installation in South Africa. Kobo heavy-duty chains can enhance reliability, efficiency and longevity.

regular greasing, and any maintenance at height is difficult and costly. Here, we would prefer a flexible elastomer coupling that is maintenance-free and provides excellent vibration protection.

"Absorbing vibration from the electric motor is a key factor in pump application, as well. In some cases, a diesel engine might be used to drive a water pump, and if that vibration is transmitted to the pump via a rigid connection, the pump's bearings and seals can fail rapidly. A flexible tyre or elastomeric coupling allows the rubber to absorb vibration from the motor or engine drive, preventing it from being transmitted to the pump itself.

Controlling torque

Torque control involves more active torque management through solutions such as mechanical torque limiters, fluid couplings, or variable-speed drives (VSDs). These help protect against overload, control start-up torque and can react to torque overloads.

Torque limiters are like a mechanical 'fuse'. They protect the drive train by breaking the connection between the drive and the driven shafts as soon as the limiter's preset torque is exceeded. There are different types, such as spring-loaded friction plates that act like a clutch, or shearing mechanisms that break to separate the input and output shafts.

A fluid coupling is filled with oil between the drive-side and the driven-side impeller. "On startup, the drive-side impeller accelerates the oil, which transfers momentum to the driven-side impeller, causing the output shaft to rotate. Slip between the impellers allows controlled torque transmission and damping of shock loads," Woest explains.

At speed, the whole volume rotates as if the impellers were connected, with much better torque control, first because of the softer start-up, and second because, at speed, the impellers can still slip relative to one another to reduce torque spikes and prevent them from being transferred through the coupling to the gearbox and motor," Woest explains.

"For finer torque control, however, the modern tendency is to move away from mechanical solutions and to rather look at electronic soft starters or variable speed drives (VSDs)," he notes.

VSDs are used to control the speed and torque of the electric motor driving the system. On startup, a VSD can slowly ramp motor speed and power to keep torque within the system's operating range. Compared to the direct online startup of a motor, soft starters and VSDs significantly reduce the inrush current experienced by electric motors, thereby reducing the electrical infrastructure

required and improving equipment energy efficiency.

In addition, a VSD can quickly reduce the motor's speed and power delivery in response to an unexpected torque overload, protecting drive components, improving reliability and extending equipment life.

"Modern managed drive-train systems often integrate VSDs. These allow soft starting, torque limiting, speed control and reduced mechanical stress. With added torque, vibration and temperature monitoring, and the move toward predictive maintenance, drive systems can react to torque spikes, actively preventing damage before it occurs. In addition, regenerative braking through VSDs can also be part of a Bi torque management solution," he adds.

"There is a place in the market for both mechanical and electronics torque management solutions, however. We offer the full suite of solutions to suit almost any drive application," he adds.

Engineered drive train solutions

"Torque control becomes especially important in heavy-duty applications, such as apron feeders, bucket wheel excavators, long conveyor systems and mill drives, where start-up torque can be much higher than running torque. It is also vital for protecting critical plant systems, where downtime can have a knock-on effect on the whole plant, causing production to stop with very costly consequences," he says.

"If torque isn't controlled properly, broken belts, damaged gearboxes, or stalled motors can result, so in these cases, managing torque during start-up is often more important than steady-state operation," Hilton Woest tells MCA.

A good example of a torque-related challenge would be when a mining conveyor experiences repeated belt failures due to aggressive starts and shock loading. "Instead of repeatedly replacing belts, we would analyse the torque profile with a view to removing torque peaks: by introducing components such as electronic soft-starting methods, torque-limiting couplings, or a size-optimised pulley system. Key to this approach is that the solution addresses the entire drive train, not just the failed component, which is sure to deliver longer component life and far less downtime," he says.

"This is really where Bi's strength lies – engineered drive train solutions. The process usually starts with understanding the application: load type, inertia, duty cycle and environmental conditions. Then, torque calculations are done – including start-up and



The Rexnord Falk True Torque coupling is a reliable, cost-effective solution for protecting valuable equipment from torque overload damage.

peak loads, not just nominal power.

"From there, risks like over-torque and shock loading are identified, and components are selected accordingly – belts, couplings, gearboxes, brakes, and even control systems. The goal is to optimise reliability and minimise lifecycle costs, which always delivers much better performance and much lower total costs than the minimum-cost repair would," he points out.

"Bi's offering spans the full spectrum, from basic mechanical torque transmission using belts and chains, to engineered drive trains, torque control solutions, braking systems, advanced VSD integration, and ongoing technical support. It's a comprehensive approach to managing torque safely, efficiently and reliably throughout the lifecycle of an equipment investment," says Hilton Woest.

Service and support

After-sales support is also a major part of Bi's torque management offering. This service includes site inspections, failure analysis, alignment checks, root-cause investigations, and recommendations for improvement. "It's about ensuring the installed solution continues to perform as intended, while preventing repeat failures," he continues.

"We have an extensive branch network, with over 50 branches in South Africa. These are all conveniently located near our key industrial installations, enabling us to respond quickly when our customers need us.

"We are also continually expanding our product and service offering to the market, working with our suppliers to ensure that we can continue to offer globally recognised product brands for any application; brands that we know will meet the needs of our customers' requirements," he concludes.

<https://www.bearings.co.za/>

ACTOM's approach to reliable medium voltage supply

ACTOM MV Switchgear's design and development manager, Rhett Kelly; after-sales manager, Avrille Cape; and services manager, Marius Lombard, talk about mission-critical environments where the company's modern maintenance-free interruption technologies and technical services are being employed to deliver the highest performance, reliability and safety levels.

Many sectors across South Africa and the broader region depend on mission-critical facilities to deliver uninterrupted services. Hospitals, data centres, and large industrial operations cannot afford downtime, and their performance relies heavily on stable, resilient Medium Voltage (MV) electrical systems. Ensuring these facilities operate without disruption requires equipment that can support fluctuating energy demands, withstand grid instability, and provide robust protection and monitoring.

Mission-critical environments

A mission-critical facility is defined by its need for maximum uptime and minimal room for error. Rhett Kelly, Design and Development Manager at ACTOM MV Switchgear, explains that MV switchgear serves as the backbone of the electrical network: "It provides the switching capability needed for operational flexibility and protects upstream equipment by interrupting downstream faults and isolating them from the healthy network. Monitoring and protection systems ensure that operators have full real-time visibility of network conditions both onsite and remotely via a Supervisory Control and Data Acquisition (SCADA) system."

To meet the varied needs of hospitals, data centres, and industrial plants, ACTOM offers a wide range of switchgear solutions with various configurations, insulation technologies, and busbar options. All solutions are designed and type-tested to both local and international standards, ensuring they meet the performance and safety requirements demanded by high-reliability environments.

Reliability through robust design

Reliability in MV systems is achieved through both technology and endurance. Switchgear needs to employ modern maintenance-free interruption technologies and durable operating mechanisms that have been tested by internationally rec-

ognised facilities for extended electrical and mechanical endurance, i.e. classified as E2 and M2, respectively, in accordance with IEC 62271-100. This testing ensures resilient electrical and mechanical performance over long periods, reducing maintenance requirements and supporting continuous operation.

While grid instability and rapid load fluctuations remain ongoing challenges across the region, MV switchgear is designed to tolerate the voltage and current variations typically associated with these conditions. This resilience helps operators maintain stability even when external factors are unpredictable.

Real-world support in times of outage

Beyond the physical equipment, long-term support is vital to maintaining supply continuity. Avrille Cape, After-sales manager at ACTOM MV Switchgear, highlights the importance of a rapid response capability. "Effective outage management requires established rapid-response protocols, qualified technical personnel, and local availability of critical spares to ensure minimal service interruption. Network operators and switchgear service providers typically maintain 24-hour support capabilities and implement structured maintenance schedules and/or condition-based maintenance to identify and address potential failure points before they escalate.

"It is important to work with a company that operates a dedicated Services division with multiple regional branches," says Services Manager Marius Lombard. "Providing customers with true 24/7 technical support and access to specialists in the maintenance, inspection, and life-cycle management of MV switchgear installations is vital. Proactive and condition-based maintenance strategies ensure early identification of wear, degradation, and operational risks before they progress into costly failures. By combining field expertise, structured maintenance

programmes, and access to OEM-level technical resources, a services division plays a critical role in safeguarding network reliability and extending the asset life of customer installations."

When unplanned outages occur, coordinated field service teams can expedite restoration through on-site fault assessment, component replacement, and system recommissioning. Importantly, holding essential inventory and adhering to stringent response times are key to restoring network integrity and maintaining supply continuity across power distribution systems."

Using technology to enhance resilience

Digitalisation is reshaping how operators manage electrical infrastructure. By integrating online condition-monitoring systems into MV switchgear, such as temperature and partial discharge monitoring, early warnings can be provided to help prevent failures. Features such as infrared windows allow technicians to conduct inspections safely while equipment remains energised. These tools support a shift from time-based maintenance to predictive, condition-based strategies, improving both safety and efficiency.

As global environmental standards evolve, so too must MV switchgear technology. New product ranges that eliminate reliance on fluorinated gases, such as SF₆, including solid-dielectric insulated switchgear (SIS), must be continuously developed in line with international regulations. With SF₆-free solutions extending up to 40.5 kV, 3 150 A (4 000 A at 17.5 kV), and 40 kA, ACTOM aims to ensure that mission-critical facilities can meet rising energy demands while adapting to a rapidly changing power landscape.

Keeping abreast with '4IR' trends, ACTOM has introduced QR-code access to documentation, making it easier for customers and operators to retrieve online cloud-based manuals, drawings and test reports when needed.

Reliable MV infrastructure underpins the performance of South Africa's most essential facilities. As energy systems evolve and digitalisation accelerates, investment in durable, well-supported switchgear remains essential. Through a combination of technical capability, long-term service support, and ongoing innovation, a resilient foundation can be built for sectors that cannot afford interruption.

<http://actom.co.za>

Trafo mobile substation for Australian mine

A turnkey mobile transformer solution has been designed and supplied to an Australian mine by South Africa-based Trafo Power Solutions, opening doors to export markets.

A depth of experience across industries – combined with in-house design expertise and a responsive approach to business – has underpinned Trafo Power Solutions' recent success for an Australian mining customer.

According to Trafo Power Solutions Managing Director, David Claassen, the company designed and supplied a robust skid-mounted transformer solution for an opencast mine in Queensland. The turnkey substation project allows the customer to step up their generated power supply from 400 V to 6,6 kV, with the mobile substation able to accompany the customer's generator set around the mine site.

"Our 2 000 kVA substation includes the necessary low voltage and medium voltage switchgear, and gives the customer quick and easy plug-and-play functionality when moving locations," says Claassen. "This means there is no need for time-consuming termination of cables when the unit is moved and reconnected to the generator. To facilitate mobility, the skid is equipped with hooks for dragging as well as push bars for moving it into position."

He notes that it was important to account for the high vibration levels when specifying components for the design, with rigid mounting for strength and the use of anti-vibration equipment. Meeting the region's specific standards was also an important aspect of the contract. "The design needed to be conducted within the requirements of Australia's national standards and specifications, with which we have extensive experience from our work there with other customers," he explains. "Further, the customer also wanted certain equipment specified that was common in the Australian market, as this was an important consideration to ensure adequate technical after-sales support."

This demonstrates the flexibility in Trafo Power Solutions' design process, Claassen points out, which can accommodate and meet any national standards and incorporate customer preferences for certain locally sourced equipment. This was especially relevant in the low-voltage aspects of the design, such as protection relays and monitoring systems.

"We are not rigid in the options that we consider, and can easily adapt to customers'

choices that best suit their preferences and local market availability," he says.

Claassen highlights that inspections and witness testing remain a core priority for fulfilling export orders, despite the customer's physical distance from the country of design and manufacture. The Covid pandemic has encouraged the development of various communication technologies, which the company now harnesses to ensure customer involvement in the technical aspects of the contract.

"We put this technology to good use, allowing the customer on this project to carry out all necessary inspections and factory acceptance testing remotely and to their satisfaction," he says. "At Trafo Power Solutions, we take pride in being easy to work with and finding creative solutions, even across long distances and under tight deadlines."

The contract has been an indicator of the company's growing success not only in the international market, he says, but also in its journey from being a transformer supplier to becoming a turnkey electrical power solutions provider.

<https://www.trafo.co.za/>

Protecting drive equipment against overload

BMG's Power Transmission division has expanded its Rexnord product range to include Autogard torque limiters, designed to protect machinery, enhance reliability and minimise downtime in demanding industrial environments.

"In local industries – including wineries and breweries, mining, cement, sugar milling and bulk materials handling – where conveyor blockages, crusher jams and process surges are common, torque limiters play an important role in protecting high-value equipment," says Carlo Beukes, Business Unit Manager, BMG's Power Transmission division. "Rexnord Autogard torque limiters efficiently protect drive equipment against overload, thus preventing damage and minimising downtime in industries that depend on continuous operation.

Unlike conventional mechanical shear pins or friction devices, the Autogard system delivers optimal performance and repeatable accuracy with minimal maintenance requirements.

"Rexnord Autogard torque limiters protect drive systems by mechanically disconnecting the drive when the preset torque limit is reached. Once the overload condition clears, the unit resets automatically, allowing operation

to resume without manual intervention. These robust devices prevent mechanical damage to motors, gearboxes and couplings and reduce unplanned downtime in continuous process environments."

The Autogard range covers torque capacities from approximately 3.0 Nm to 45 000 Nm, allowing selection for light, medium and heavy-duty applications, including conveyors, mixers, crushers and process machinery.

These torque limiters comprise a mechanism that provides precise, repeatable disengagement and consistent performance over many cycles. Units can be installed in standard shaft and coupling configurations and are suitable for both new assemblies and retrofit projects.

"BMG technical experts can specify torque-limiting solutions matched precisely to heavy-load operating conditions, through sizing, alignment and commissioning assistance. The team also provides a dependable back-up support service via the company's extensive branch network."

BMG's Regal Rexnord power transmission components also include industrial gear units, low-speed backstops, idlers, couplings, bearings and shaft locking assemblies. Other important

components include Falk True-Hold low-speed backstops and Rexnord Omega and Viva elastomeric couplings.

As the official Rexnord partner in Southern Africa, BMG offers comprehensive technical support – from product selection and sizing, to installation, commissioning and after-sales service.

This partnership combines Rexnord's advanced products with BMG's technical expertise and a wide branch network, ensuring that customers in diverse industries benefit from reliable system protection, optimised uptime and lower total cost of ownership.

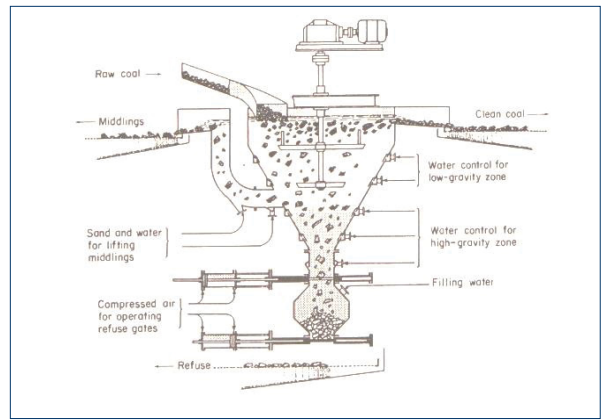
<https://www.bmgworld.net/>



Rexnord's Autogard torque limiters from BMG protect machinery, enhance reliability and minimise downtime in demanding industrial environments.

SA's role in advancing DMS coal processing

Following the successful South African-hosted International Coal Preparation Congress (ICPC 2025) last year, MCA meets Ernst Bekker and Frikkie Enslin, who highlight South Africa's key role in advancing coal-processing technology.



Left: Multotec's dense medium cyclones are the equipment of choice for coal preparation, iron ore upgrading, and the pre-concentration of diamonds, metalliferous, and industrial minerals. **Right:** The Chance dense-medium washing process, also known as the coal-washing sand flotation process, was the first commercial dense-medium washing process for coal.

At the South African-hosted 21st International Coal Preparation Congress (ICPC 2025) last year, the foremost international event for researchers and industry leaders in the coal preparation industry, Frikkie Enslin, Product Manager for Cyclones at Multotec; and Ernst Bekker, the company's Cyclones Process Equipment Specialist in South Africa, presented a paper about South Africa's role in advancing dense medium separation (DMS) technologies for the coal industry.

Entitled 'Beyond Bessemer: the past, present, and future of dense medium separation in the coal industry', the paper traces the development and evolution of DMS equipment in the coal industry, beginning with Sir Henry Bessemer's 1858 patent.

"This conference makes one appreciate the fact that we still need coal, and while many of those who need to hear this don't attend, it's a good networking opportunity to share future trends and identify core priorities for today's coal industry, bringing people up to speed in terms of the latest developments," begins Multotec's Ernst Bekker.

Bessemer holds many patents in his name, including a lesser-known invention for a gravity-based process to concentrate minerals. "In his laboratory, Bessemer noticed that he could manipulate the density of a liquid to control which particles float and which sink. As metallurgists, we are manipulators of natural properties, and his observation has assisted us for over 150 years in becoming better and better manipulators of dense media technologies for coal separation," he adds.

Early coal separation technologies

In the early days, coal separation relied on

handpicking, where workers, often young boys, would stand beside a table or a slow-moving belt and physically remove rocks, shale, and other impurities from lumps of coal on the line. With declining ore grades, smaller liberation sizes, shifts in economic scales, and new technologies, however, hand sorting quickly fell out of practice.

An early technology was simple jigging, in which a coal-and-rock mix in a basket was submerged in water and then shaken up and down. Higher-density material sinks faster than the lower-density coal, causing the coal to migrate to the top and the heavy impurities to the bottom of the heap.

"More sophisticated jig washers are still a popular choice for coal beneficiation today, because of their relative simplicity and low operational costs. They are more efficient in treating coarser particle sizes, though, and liberation plays a major role in raising separation efficiency," notes Frikkie Enslin.

During the operation of early forms of jig washers, it was observed that a concentration of fine-grained heavy minerals formed a semi-stable suspension that behaved like a heavy fluid, causing low-density material to float, regardless of particle size.

"This observation led to the deliberate inclusion of semi-suspended fines in the water used in jig washers. The concept was further developed with the introduction of trough-and-cone washers, eventually leading to the emergence of the first commercial dense-medium washing process, known as the Chance process or 'sand flotation process of coal washing,'" Enslin explains.

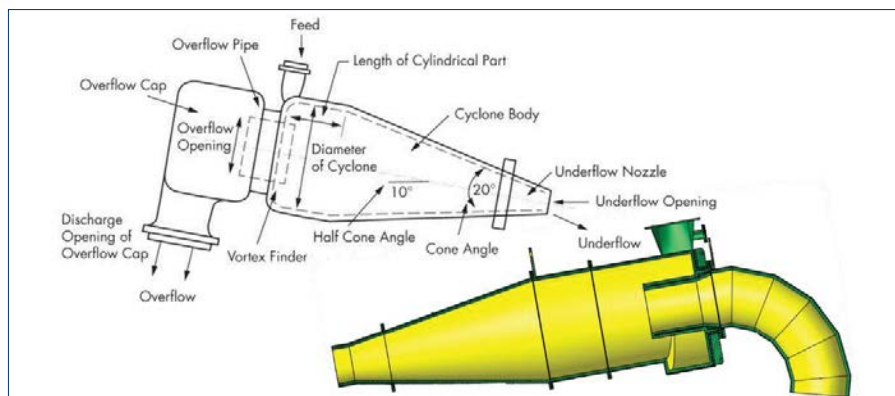
Chance's separator paved the way for the development of other processes using different separating media, such as the Conklin process

using fine magnetite and water, the de Vooy's process employing finely ground barite (BaSO_4) and loess (fine-grained silt), and the Wuensch process that used natural fine clay and slate. "In addition to these processes, attempts were made to commercialise the use of saturated salts and organic liquids as dense media, such as a saturated solution of calcium chloride (the Lessing process), and chlorinated hydrocarbons (the DuPont process).

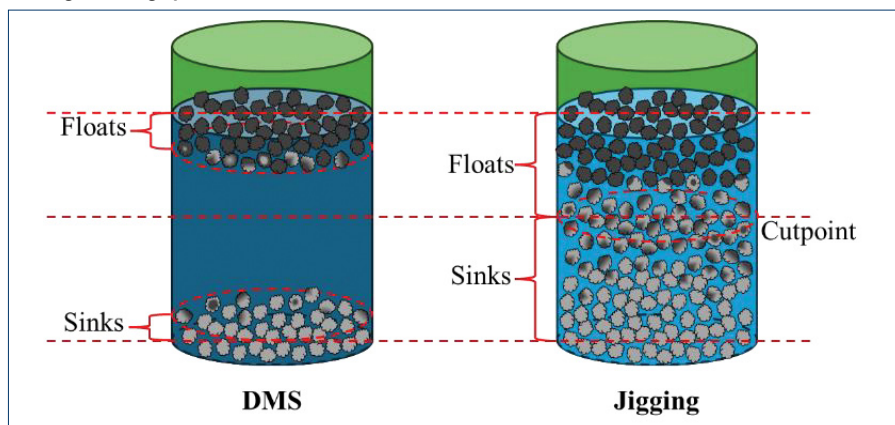
In the early 1930s, significant developments in dense medium technology took place in the Netherlands, with the enhancement of De Vooy's process into the renowned Barvoys' process, and the introduction of new methods by Tromp that used finely ground magnetite or pyrite. "The breakthrough in modern dense medium separation came from the work of Staatsmijnen in Linburg, where the first dense medium separator was installed in a commercial plant in 1937, sparking global interest in DMS methods.

Developed in the mid-1900s, a key South African DMS invention was the Norwalt Washer, a bath-type washer with the feed introduced into the middle of the vessel. The bath was fitted with stirring arms, which whisked the floats off to the edge of the vessel whilst the sinks collected at the bottom. Scrapers at the bottom transport the sinks to an exit point into a sealed elevator, which continuously removes discarded material. "These are no longer used, but they were quite popular from the 1950s to the 1970s. So we in South Africa have long had clever people making significant contributions to global DMS development," Ernst Bekker points out.

"I've never seen one, but the literature and the people I spoke to suggest that this development pushed the boundaries of efficiency with



Enslin points out that, despite improvements over the years, a modern DSM cyclone still resembles the original design published in the DSM bible.



A comparison between the separation efficiency of dense-medium separation and jig-washer technologies.

respect to dense medium recovery efficiency and energy consumption," says Enslin.

"Today, we still use ground magnetite to make a dense medium. For coal, because we cut at a relatively low density, magnetite is ideal. For other higher-density minerals, such as diamonds and iron ore, we use ferrosilicon (FeSi)," he notes.

"Within each dense media type, there are also different grades based on their particle size distributions and shape. Magnetite can have a fine, medium, or coarse particle distribution, which can each be chosen to optimise cut points to best suit the composition of the coal being cleaned," he explains.

The dense medium cyclone (DMC)

According to popular accounts, the DMC was first identified around 1939 by the Dutch State Mines (DSM) in the Netherlands, when a hydro-cyclone used to process loess in a dense medium circuit for coal cleaning became clogged. During cleaning, a significant amount of clean coal was found in the vortex finder, indicating that it was being concentrated in the cyclone's overflow, prompting further research and development that culminated in DSM's patenting of its DMC in 1942.

DSM established a subsidiary, Stamicarbon, which licensed the technology along with a design manual for its licensees, the DSM bible. "Despite improvements over the years, a modern DSM cyclone still looks very similar to the original design published in the DSM bible,"

says Enslin.

Despite the many DMS technologies now on the market, he continues, the humble dense medium cyclone is still the technology of choice in the vast majority of coal-handling and processing plants. Enslin quotes Tim Napier-Munn, the minerals engineer, professor and author of Statistics for Mineral Engineers, who said: "It is difficult to see a serious competitor for the DMC in the foreseeable future in the processing of bulk commodities such as coal and iron ore."

Napier-Munn's reasons include:

- Efficient separations at a specific density.
- The wide particle size that can be treated.
- High tonnage throughput for a relatively small footprint.
- A mature technology with relatively straightforward operation.

With larger DMS cyclones up to 1.45 m in diameter now available to efficiently wash coarser coal particles, the need for DMS baths is also waning, notes Enslin.

Fines separation and SA's contribution

"Back in 1949, under PJ van der Walt at the Fuel Research Institute of South Africa, we were one of the very first countries to investigate fines separation using DMCs, and we still have some of these original fines DMC plants in South Africa today. As a result of this work, we can get higher efficiencies from DMS separation than any other conventional fines processing

technology," Enslin tells MCA.

"South Africa's coal has a notoriously high ash content, along with high percentages of near-density material in the mix. So, despite the high efficiency of DMS processes in general, the finely dispersed mineral particles in our coal require us to constantly weigh separation efficiency against the economic value of recovering the fines.

"Coal mining regions in South Africa, India, China and certain parts of Australia tend to mine coal seams inevitably with rock mixed in. To liberate the coal particles, we crush the rock to break it apart and release the coal. At this point, we have lumps of coal and lumps of rock, and that's where the dense medium separation comes in.

But with our coal, we often need to crush it finer to achieve the required liberation, typically to a size fraction +1.0 mm," he explains.

"For many years, our dense medium cyclones have been suitable for use to separate particle size fractions down to +2.0 mm. To further improve efficiency, the -2.0 mm discards would be sent to spirals, teeter-bed/fluidised-bed separators, or similar units for further beneficiation. But we have discovered that even this fine fraction can be processed using a dense-medium cyclone. It does present challenges on the plant design side, but we have proved that it is possible," adds Frikkie Enslin.

"Multotec continues to play a leading global role in advancing DMC technology, building increasingly efficient plants that can treat fine fraction material. So instead of sending fines through an additional separation process, such as spirals, the dense medium cyclone plant can deliver higher efficiency fines separation directly," says Bekker.

"And while dense-medium cyclone plants are expensive to build and magnetite is costly, the value of the fine size fraction often makes dense-medium separation a cost- and resource-efficient way to go, particularly for the coal ore bodies we have in the southern hemisphere," he concludes.

A key takeaway, according to Bekker, is that although dense medium cyclone design has remained largely unchanged over the years, our understanding of the separating mechanism and the interaction between the cyclone and the overall process has improved. This understanding is helping provide better recommendations on selecting cyclone units and the overall process, which benefits the clients.

This understanding also helps determine where dense medium separation is the best option and where other separation processes could be more economical, which can only be done if one understands the advantages and limitations of dense medium cyclones and the dense medium separation process.

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Smartflow digital mine management platform launched

Becker Mining South Africa has launched Smartflow[®], an agnostic integrated software platform that connects hardware systems, communication networks and operational processes into a single mine management solution.

Becker Mining SA's new Smartflow[®] platform is an advanced system that consolidates IoT-enabled monitoring, safety devices and production data, providing operators with real-time oversight of underground and surface operations through a 3D web-based interface.

According to Becker Mining specialists, Smartflow tracks personnel, vehicles, energy use, ventilation and haulage. This system applies predictive analytics to support timely decision-making. By merging data into a unified digital environment, the platform improves efficiency, reduces downtime and enhances occupational safety.

Becker Mining's Smartflow platform brings digital transformation to the mine, improving safety, sustainability and worker well-being. By unifying data from equipment, energy and personnel monitoring, this system provides operators with a comprehensive view of operations and the tools to make informed, proactive decisions.

The modular Smartflow structure is designed for interoperability, allowing seamless integration with Becker Mining systems and certain other mining equipment. Modules range from location and tracking, collision awareness, and dispatch management to energy monitoring, ventilation, leaky-feeder systems, telemetry and haulage control. Each module can operate independently or as part of the connected Smartflow platform, providing flexibility for specific mining conditions. The advanced engineering module enables this system to be efficiently used for specific mine design and future planning.

In keeping with the global commitment to improved environmental trends, sustainability and Environmental, Social and Governance (ESG) compliance are integrated into the platform. The energy monitoring module records consumption at substation level, generates billing and efficiency reports and supports operational strategies that minimise waste.

Ventilation control and haulage optimisation reduce unnecessary power consumption and extend equipment service life. Preventive and predictive maintenance help limit costly downtime and reduce premature equipment replacement, thereby improving resource efficiency in mining operations.

Workforce well-being is a central feature of Smartflow. The telemetry module collects information on equipment operation and operator behaviour, identifies misuse and fatigue, and en-

ures training needs are met. In addition, vital signs monitoring can be integrated to assess heart rate, oxygen levels and fatigue indicators, creating safer working conditions and enabling rapid response to health incidents.

To enhance safety on site, the collision awareness system adds another layer of protection, using Wi-Fi and Bluetooth to detect personnel and vehicles and provide early warnings of potential accidents.

The Dispatch Centre provides full traceability of Personal Protection Equipment (PPE), tools and equipment through Radio-frequency identification (RFID) allocation, improving compliance with safety regulations and reducing the risk of lost or damaged assets. Together with evacuation management, bi-directional alarm notifications and access control, these features improve both operational reliability and safety in mining operations.

Connectivity is supported by the Smart Edge network monitoring system, which maintains high-bandwidth fibre links with redundancy features. This ensures Smartflow functions reliably even in harsh underground environments, while supporting integration with CCTV, Wi-Fi access points and other smart devices.

Smartflow is currently being deployed across underground and surface sites in mines worldwide, with future development focusing on additional modules and expanded ESG applications. Becker Mining's advanced platform supports the mining industry's transition towards more sustainable, energy-efficient and worker-centred mining.

Becker Mining offers customised solutions for energy, automation, communication, transporta-



Becker Mining South Africa has launched Smartflow[®], an agnostic integrated software platform that connects hardware systems, communication networks and operational processes into a single mine management solution.

tion and infrastructure technology, to meet the specific requirements of every mine.

The team, committed to the highest quality and safety standards, offers technical advisory, repair, testing, and backup services throughout Africa. A specialised consulting, training, and support facility ensures optimal efficiency across a wide range of equipment and total worker safety.

Included in the company's product range are intrinsically safe (IS) and flameproof underground electrical reticulation products, as well as fluid transfer, rigging, rope attachment, steel arch tunnel support and chairlift solutions. An important feature of all Becker Mining systems is that they are designed to facilitate future upgrades.

<https://www.becker-mining.com/en>



Becker Mining's Smartflow[®] platform consolidates IoT-enabled monitoring, safety devices and production data for real-time oversight of underground and surface operations.



Left: Angus Bracken, Mining Sector Lead for Africa and the Middle East at SLR Consulting.



Right: Dieter Rodewald, International Environmental and Social Impact Assessment (ESIA) Lead for Africa and the Middle East at SLR Consulting.

Navigating mining's fast-changing sustainability landscape begins with a full understanding of the entire value chain, says SLR Consulting's Angus Bracken, Mining Sector Lead for Africa and the Middle East. Whether a project is at conceptual scoping, operational execution, or preparing for closure, he argues

Driving sustainability through full-value-chain insight

SLR Consulting emphasises that sustainable mining depends on early integrated partnership across the entire value chain, supported by multidisciplinary expertise and deep stakeholder engagement. This enables SLR to help clients navigate evolving ESG expectations, rebuild trust and unlock opportunities.

that consultants deliver the greatest value when they can see, interpret, and advise at every stage of the process.

Central to SLR Consulting's mining advisory model is its integrated structure of eight Communities of Practice aligned to the mining cycle. These span strategic advisory, resource development, environmental, social and governance (ESG), climate change, water management, tailings and mine closure. This multidisciplinary approach allows the company to bring the right blend of expertise to each project.

"Clients don't want advisers who only see one slice of the project," Bracken says. "They want teams who understand the whole value chain, from strategy and financing to environmental performance and community engagement, and who can walk with them from the earliest concept right through to closure."

He notes that full cycle visibility strengthens technical decision-making and supports the collaborative relationships that mining projects depend on. "Meaningful partnership is only possible when you understand what

each stakeholder needs, including operators, investors, regulators, lenders and communities," he continues. "That requires seeing the entire landscape, not just your own discipline."

SLR Consulting has expanded rapidly in recent years. The company now employs 4 500 people across 135 offices in 28 countries, with a growing presence in key African markets, including Morocco, Egypt, Ghana, the Democratic Republic of Congo, Rwanda, Kenya, Namibia and South Africa.

To reinforce integration across its network, the business recently combined Africa, the Middle East and Europe into a single 'super-region' to promote seamless collaboration and technical exchange. Bracken highlights that investors in the Middle East are increasingly focusing on African mining opportunities, making the company's office in the United Arab Emirates strategically important.

"Our model prizes local understanding paired with deep global expertise," he explains. "We want the right team, local and global, around the table for every project; that is how we bring depth, context and perspective."



Through its integrated Communities of Practice, SLR Consulting brings multidisciplinary expertise to every mining project, ensuring technical, environmental and social factors are aligned from the outset.

Dieter Rodewald, SLR Consulting's International Environmental and Social Impact Assessment (ESIA) Lead for Africa and the Middle East, stresses that building a mining project that is financially viable, operationally robust and socially responsible requires early and continuous alignment among all stakeholders.

"This is where SLR Consulting positions itself not just as a technical consultant, but as a strategic partner," he says. "People often think environmental and social assessments are just compliance exercises. However, our work starts much earlier, helping clients navigate ESG imperatives from day one so that sustainability becomes embedded in decision-making rather than added as an afterthought."

Rodewald notes that early partnership is increasingly vital as mining jurisdictions across Africa tighten and modernise their regulatory frameworks. At the same time, international financiers are imposing more rigorous ESG standards for funding approvals.

"If a client wants access to capital, they need to meet global good practice, not just national regulations," he explains. "Financial institutions want assurance that the full range of project risks is understood and managed from the start."

Many mining projects also face legacy issues that require careful handling. Rodewald recalls a case in which SLR Consulting supported a client

in reviving a project burdened by socio-political challenges inherited from previous owners. The new project team urgently need to reach financial close, finalise engineering designs and complete ESG baselines, but community mistrust threatens progress.

"We had to work with the client to take a step back and help them rebuild trust," he says. "The solution was a grassroots engagement strategy that reset expectations and re-established transparent communication. Over just a few months, we saw marked improvement in community confidence."

This experience underscores critical lessons: social licence cannot be rushed, and project timelines must account for community realities.

Looking ahead, Bracken notes that technology is opening powerful new avenues for mining in Africa, but only if the right partners are brought in early. He points to renewable energy integration as an area where early engagement enables independent power producers and mining operations to collaborate to reduce carbon footprints and secure long-term power supply.

"Digital innovation and artificial intelligence can transform monitoring and planning, through digital twins, predictive analytics and hyperspectral imagery, for example," he adds. "Remote sensing and advanced satellite data can now support improvements in everything



Early and continuous stakeholder alignment is central to SLR Consulting's approach, ensuring mining projects meet regulatory requirements, secure financing and maintain long-term social licence.

from exploration to tailings monitoring and biodiversity assessment."

For both Bracken and Rodewald, the message is consistent: sustainability in mining requires strategic partnership, whole-of-value-chain insight, and early engagement across disciplines. With this approach, mining projects can achieve more resilient operations, stronger ESG performance and deeper trust with the stakeholders who ultimately shape their success.

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Safe, sustainable and efficient chemical tank farm management

This success story from Friedrich Scharr KG's state-of-the-art chemical tank farm in Stuttgart, Germany, highlights how intelligent measurement technology from VEGA, combined with well-thought-out plant design, contributes to safety, sustainability and efficiency in chemical logistics.

With a storage capacity of 2 million litres, distributed across 40 tank chambers in 22 above-ground tanks, a new tank farm at Friedrich Scharr KG is a high-performance centrepiece of the company's chemical logistics operations. A wide variety of water-polluting substances, such as solvents and fuels, are stored and processed there.

A fully automated filling system for all container types and a 15 000-litre mixing tank for customer-specific solvents round out the existing infrastructure. During the construction of the new tank facility, special requirements, such as earthquake safety and the placement of storage containers across multiple floors of the building, had to be addressed. The project aimed to improve economic efficiency, maximise plant safety and minimise environmental impact. These requirements are being met thanks to advanced level and pressure measurement technology from VEGA.

Efficient chemical logistics

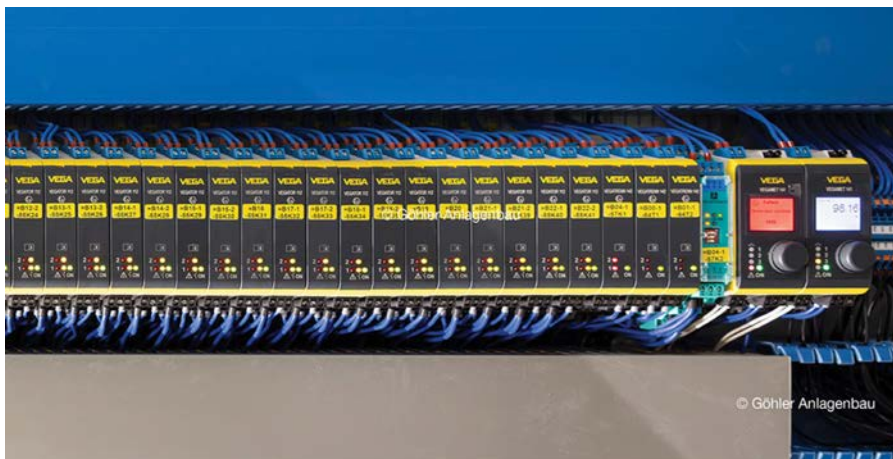
By eliminating internal shuttle trips between the old tank farm and the truck scales on the company premises, the new tank farm could also be optimised for emissions and energy consumption. The measurement technology integrated into the processes played a decisive role here. Precise pressure measurement technology and level monitoring, with continuous data transmission, ensure that hazardous substances do not escape or mix. The VEGA instrument technology, therefore, not only ensures safety but also helps to automate the filling and mixing processes. The use of renewable energy sources, such as photovoltaics and district heating, improves the ecological balance and promotes sustainability.

Key technology supplied by VEGA

For precise level monitoring, overflow protection and early leak detection, the company relies on advanced measurement technology from VEGA. Among other instruments, around 170 VEGASWING series 63 and 40 vibrating level switches, as well as 40 VEGAPULS series radar level sensors, have been deployed. These not only enable con-



The new chemical tank farm at Scharr is equipped with around 170 VEGASWING 63 vibrating level switches, which protect the tanks from overfilling and leaks.



WHG testing of overflow protection devices is considerably simplified by using VEGATOR controllers.

tinuous level measurement but also provide reliable overflow protection in accordance with the WHG (German Water Resources Act).

At the heart of the system is a VEGATOR controller installed in a switching cabinet, which allows the sensors to be tested centrally without entering hazardous areas. This controller transmits NAMUR signals (IEC 60947-5-6) and provides a relay output for VEGASWING, VEGAVIB and VEGAWAVE vibrating level switches.

This effectively moves the test button for the function check from the tank level switch to the controller in the switching cabinet,

where a simple WHG-compliant function check can be carried out at the touch of a button, allowing all sensors to be tested centrally. And all of this without having to apply time-consuming and costly methods, such as filling the container to the response level during operation or manually checking the individual probes by dismantling them, an action that can also be extremely dangerous.

The use of VEGA instrumentation, therefore, not only saves time and money but also increases occupational safety. This represents a huge advantage in plant operation, especially in the hazardous areas of chemical plants,

where many sensors are installed.

Flexible sensors for maximum safety

VEGA technology also impresses users with its safety features: Thanks to flexible locking screw fittings, VEGASWING vibrating level switches can be configured in standard lengths, which simplifies spare parts inventory and planning. Furthermore, the sensitivity of the level switches used as pump leakage sensors can be adjusted individually, enabling reliable detection of even low levels in collecting trays – a decisive advantage when storing volatile or low-viscosity chemicals such as solvents.

The VEGAPULS radar sensors installed utilise 80 GHz technology, which offers numerous advantages: they require only small process fittings, and thanks to their narrow-beam focusing, they deliver precise readings even in tanks with agitators or internal fixtures. What is more, the free-air radar operates without contact with the medium, so material resistance is less of an issue.

VEGA uses high-quality materials such as 316L stainless steel and, for radar antennas, the super-tough plastic, PEEK, which guarantees a long service life and maximum chemical resistance, even in extremely aggressive media.

These properties are indispensable in chemical logistics, where reliability is paramount.

In the Scharr project, plant engineering firm Göhler implemented very high safety standards and used additional mechanical level switches to minimise risks.

The new chemical tank farm at Friedrich Scharr KG is a prime example of how intelligent measurement technology, combined with well-thought-out plant design, can contribute to safety, sustainability and efficiency in chemical logistics. With its level and pressure measurement solutions, VEGA provides the technological backbone for safe and environmentally conscious operations.

“VEGA measurement technology sets standards in operational safety and measurement accuracy for these processes,” explains René

Kozica, project manager at Göhler.

The project impressively demonstrates how technological innovations address major challenges in chemical logistics – while meeting legal requirements and high safety standards and offering economic benefits, particularly through operational efficiency.

Measurement technology is far more than just a technical component; it is the key to sustainable storage of hazardous substances. By leveraging diverse redundancy – by combining different measurement principles – Scharr achieves the highest level of operational safety. Even though modern radar systems can already take over the task of overfill prevention in compliance with WHG, Göhler relies on additional mechanical point-level sensors to minimise risk.

<https://www.vega.com/en-za>



The tightly focused measuring beam of the VEGAPULS 6X radar level transmitter with 80-GHz technology allows installation with small process fittings.

CSIR champions EU-SA partnership on battery raw materials

South Africa is taking a leading role in the global green economy through a new European Union (EU) partnership to build a world-class value chain for battery raw materials. The Council for Scientific and Industrial Research (CSIR) has been selected to drive the Team Europe Initiative (OP-VET), which will align skills development, industrial investment and clean energy innovation to create jobs and unlock local economic value.

This initiative, born from the South Africa-EU Clean Trade and Investment Partnership, will equip youth and women with the skills needed for a sustainable, high-tech future, from mining and refining to recycling critical minerals. By linking education, industry and innovation, South Africa is not just powering batteries, it is powering a new era of green industrial growth and employment.

The initiative builds directly on the Clean Trade and Investment Partnership signed at the South Africa-European Union Leaders' Summit on 20 November 2025, held ahead of the G20 Leaders' Summit. The partnership commits South Africa and the European Union to deepen cooperation in the extraction, processing, refining and recycling of critical raw materials, particularly for the battery value chain, while advancing decarbonisation, clean supply chains, and inclusive economic growth through invest-

ment, skills development and job creation.

The OP-VET project aims to strengthen the capacity of South African Technical and Vocational Education and Training (TVET) institutions, as well as the broader skills development ecosystem, to deliver demand-driven, employment-oriented training aligned to the critical minerals and battery value chain.

By integrating industrial skills foresight, curriculum adaptation, lecturer upskilling and structured workplace learning, the project seeks to improve employability outcomes for youth and women, support industry access to a skilled workforce, and contribute to sustainable local value addition.

The expected impact includes improved alignment between industrial investment and skills demand and supply, increased absorption of graduates into decent work, and the institutionalisation of an opportunity-driven TVET model that can be replicated across other Global Gateway-linked sectors.

Key outcomes and deliverables of the project include the identification of priority occupational profiles and skills needs across the critical raw materials and battery value chain, led by the CSIR. In collaboration with consortium partners, including the Energy and Water Sector Education Training Authority, the project will support demand-led co-development and

accreditation of new or adapted occupational qualifications and short courses. TVET college capacity will be strengthened through train-the-trainer initiatives and targeted infrastructure support for technical workshops.

The project will also facilitate training, internships and Work-Integrated Learning (WIL) placements with private-sector partners, ensuring practical workplace exposure and clearer employment pathways for graduates. Additional deliverables include strengthened public-private partnerships, enhanced policy uptake through engagement with national institutions, and the development of a scalable model to support South Africa's growing green industrial economy.

The CSIR's participation in the TEI underscores South Africa's growing role in the global green economy. It reflects the shared commitment of the EU and South Africa to skills development, clean industrial growth and sustainable value chains.

By linking education, industry and innovation, the project will not only enhance employment opportunities for youth and women but also establish a replicable, opportunity-driven model for TVET and workforce development across critical sectors, driving long-term economic and environmental benefits for the country.

<https://www.csir.co.za/>



SA's nuclear imperative and its challenges

In light of the recent Nuclear Forum held during the 2026 Africa Energy Indaba in Cape Town from March 3-5, Dr Yves Guenon highlights the critical need and the challenges involved in expanding our nuclear programme in South and Southern Africa.

With over 30 years of experience in South Africa's nuclear industry, Dr Yves Guenon is a prominent nuclear energy expert. Now Chairman of the French South African Chamber of Commerce and Industry (FSACCI), he was a key player in preparing and negotiating Eskom's 2008 Nuclear 1 contract for two light-water reactors for France's Areva, which collapsed because the South African Treasury saw the R120-billion price tag for the two EPR reactors as uncompetitive.

He was also instrumental in the success of the multi-year steam generator replacement (SGR) project at Koeberg, which hopes to extend the operational life of our only nuclear power station by a further 20 years.

The 2026 Nuclear Forum convened following approval of South Africa's revised Integrated Resource Plan (IRP 2025), which proposes investments of R2.23 trillion in

energy infrastructure by 2042. Alongside a massive expansion of renewables – 34 GW of wind, 25 GW of solar PV and 8.5 GW of battery storage – 16 GW of gas and 5.2 GW of new nuclear capacity are envisaged, projected to account for around 16% of generation capacity when installed.

In light of the clean-energy transition, African leaders, policymakers, investors, technology providers and industry experts met at the 15th Nuclear Forum from March 3-5, 2026, as part of the Africa Energy Indaba, to explore the evolving role of nuclear energy.

Nuclear is critical in the energy mix

As the world transitions away from fossil fuels for electricity generation, nuclear power is critical to the energy mix, Guenon says. While supporting renewable energy growth, he notes that intermittent sources cannot sustain the national grid on their own. It will therefore be essential to replace ageing coal-fired plants in South Africa with a solution that offers high energy availability.

Citing France and Germany's power gen-

eration choices, he says that today, France generates electricity with a carbon footprint 10 times smaller than Germany's, despite Germany's strong focus on renewable investments. "As a result, France is attracting a lot more energy-intensive industrial investments, many of these for data centres," he tells MCA.

He cites two key reasons: "First, the availability of experienced engineers, and the second is that France produces clean energy from a mix dominated by its nuclear plants. This is not going to be matched by Germany or South Africa in the near future," he says, adding that this enables producers in France to sell lower carbon products and more easily avoid global carbon taxes.

Highlighting the energy needs of modern data centres, he says that a single large data centre, which must operate 24 hours a day for 360 days per year, will consume the energy equivalent of one entire unit of the Koeberg Power Station. To reduce their carbon footprint, data centre infrastructure will therefore migrate to countries with strong, stable and clean electrical energy networks.





The two-unit Koeberg Nuclear Power Station with a capacity of approximately 1 854 MW is currently the only nuclear power plant on the African continent.

“Not only is nuclear energy clean, but it also offers high reliability with a 90% energy availability factor (EAF), which provides consistent and continuous power that cannot be matched by renewables such as wind or solar,” Dr Yves Guenon points out.

The role of Small Modular Reactors (SMRs)

“A key issue at the Nuclear Forum for me is that everybody thinks that smaller is cheaper. While SMRs are cheaper than industrial-scale nuclear reactors, they produce less energy. Now, when one calculates the cost per megawatt generated, the smaller the reactor, the more expensive the cost per MW.”

Other key issues affecting the comparative viability of SMRs are regulatory, compliance and licensing requirements. “Most SMRs are small versions of light-water nuclear power reactors (PWRs), so they generally require the same level of licensing complexity as an industrial-scale nuclear power station. In some cases, in fact, because the designs are newer and less proven, the requirements for an SMR may even be more rigorous, which adds to the installation costs,” he points out.

SMRs have a role, however. “Even if the price per unit of power is higher, it often makes sense to adopt a smaller nuclear plant solution. Namibia, for example, has a total demand of around 600 MW, so a big reactor is unnecessary,” he explains.

Even in some parts of South Africa, such as Phalaborwa, a large PWR reactor would be impossible because it would require access to too much water. In these places, an SMR designed to use dry cooling with air-cooled condensers (ACCs) would be suitable, a cooling solution that is not feasible for large multi-unit nuclear plants.

In addition, most African countries have

very weak power transmission grids, says Guenon, so a few strategically placed SMRs could be a more realistic way to distribute power to where it is needed.

Financing and localisation challenges

Dr Yves Buenon believes that financing a nuclear new build is relatively easy, but warns of the need for realistic expectations regarding the challenges of localising nuclear technology in Africa.

“The first obstacle is the Nuclear Safety Authority, which needs to be strengthened before a new nuclear programme can be established. Engineers must be recruited who are properly trained and experienced in nuclear technology. To do this properly takes time, and even for South Africa’s current new reactor plans, the size of the Safety Authority will have to be increased drastically, and not in five years; it must be done now.

“Also, before starting to construct a nuclear plant, the vendor process needs to be put in place. Few people realise the size of this task or the amount of documentation involved – and very few people in Africa are qualified to do this,” he adds.

“I think people have to be realistic about what they need and what they can manage. Cheap energy that is locally developed, procured and constructed in African countries, including South Africa, is unrealistic. It is impossible to reach the localisation levels the government wants us to, and there is a huge shortage of local competency. When we negotiated the Nuclear 1 project in 2007, we estimated that 25-30% local procurement was the best we could achieve for local content,” he advises.

“The financing itself, though, on an EPC basis, is not complex, but it has been done

country by country,” he says, but warns that “the build, own, operate model is very dangerous, particularly now that the world is so politically volatile.”

Education and Training for Nuclear Energy

Guenon goes on to express concern about the way engineers and technicians are trained in Africa. In France, he says, engineering students have to complete an internship for every year of study to ensure they emerge with both practical and theoretical knowledge. “And these internships are not projects done online; they are real, hands-on engineering projects where the student works on-site, in the industry for several months at a time,” he points out, adding that many of those who study here emerge as good scientists rather than good engineers.

Also, he points out, hands-on internships in the nuclear industry are difficult when there is only one nuclear plant on the continent. “So we need to find ways to change the way we educate nuclear engineers here in Africa,” he suggests.

Africa-wide cooperation

“South Africa is the ideal place in Africa to rebuild its base-load energy capacity around nuclear power, because of its economy and the mineral resources that need to be locally benefited. In addition, South Africa is well placed to become the hub for nuclear power in Africa, because no country can afford to go it alone in this industry. Cooperation among African countries to share resources and expertise in nuclear technology, education and training will be essential.

“I must also emphasise the importance of taking a long-term view and establishing realistic goals for all nuclear energy projects in Africa,” concludes Dr Yves Guenon.

<https://www.fsacci.com/>

Bosch Steam Boiler Systems: efficient and reliable technologies with advanced controls.



The Bosch team at the 2024 Energy Indaba.

Bosch Industrial Boilers is renowned worldwide as a specialist supplier of boiler systems in all sizes and output categories, having provided innovative OEM-built industrial boilers for over 150 years. Founded in 1865 as a small boiler maker under the Loos family name, the company has grown into a leading global systems supplier for industrial boilers, with more than 120 000 units installed in 140 countries, all manufactured at one of two facilities: Gunzenhausen, Germany, and Bischofshofen, Austria.

Key design and durability features

Thanks to an optimised water-to-steam ratio, Bosch boilers are optimised for rapid heating and high steam quality. An ideal temperature

This article introduces the Bosch Steam boiler product range, which delivers highly efficient, reliable process heat while reducing production costs and emissions.

distribution and the release of vapour bubbles enable the boilers to operate very efficiently, even during dynamic load periods. Compared to other boiler designs, the Bosch design, with its high steam chamber, minimises high-water shutdowns and water entrainment.

An intelligent three-component control, combined with pilot signals from large consumers and less frequent pre-ventilation (burner starts), enables the boilers to respond quickly and reliably to load peaks.

In terms of durability, a boiler design traditionally used in old steam locomotives has been continuously evolved. With its fully inserted fire tube and without stud bolts, this offers the highest level of robustness and greater resistance to cold starts.

Manufacturing quality and monitoring

Because they are pressure vessels, all Bosch steam boilers are manufactured to comply with the latest applicable pressure equipment standards in over 140 countries. The quality

management systems at the German and Austrian factories are certified to strict standards, and additional checks are conducted to meet specific client requirements.

Quality is a top priority. Plant inspectors certified by TÜV, and TÜV employees, monitor and document quality from manufacture through to acceptance. An in-house laboratory for welded seam inspections and material analysis provides maximum transparency. Up to 100% of the pressure vessels' welding seams are X-ray inspected. In total, more than 25 000 X-ray images are analysed in the company's three X-ray chambers every year.

Bosch electric steam boiler ELSB

The ELSB (Electric Steam Boiler) is a highly efficient, electrically heated steam generator for 350 to 7 500 kg/h steam at up to 24 bar. When operated with green electricity, the boiler enables a CO₂-neutral steam supply.

These boilers are individually configured, manufactured and equipped for specific applications. They include replacement com-



The Robert Bosch GmbH Research and Development (R&D) centre in Schwieberdingen, Germany, develops advanced energy solutions from traditional industrial boilers to future-proofed, decentralised systems.

ponents integrated into the heating assembly as standard to improve long-term availability, and Bosch ELSB systems can also be incorporated into existing boiler systems to meet multiple demands, such as space heating and domestic hot water.

The steam chamber on the ELSB produces high-quality steam with low residual moisture. Thanks to its variable output, the thyristor-based control circuit achieves high efficiency across the entire load range. Furthermore, the output can be automatically adjusted to the requirements or to available surpluses of self-generated electricity.

In addition, Bosch offers solutions for water treatment, condensate management, and energy savings through economiser technology, for example, enabling a complete system to meet onsite demands from a single OEM supplier.

Bosch's industrial service also provides pre- and after-sales advice and maintenance for all ELSB systems.

The Bosch UNIVERSAL steam boiler range Bosch UNIVERSAL CSB ultra-compact steam boilers are available with output ratings of 300 to 4 800 kg/h at between 0.5 and 1.0 bar (low pressure); or 300 to 23 600 kg/h at up to 16 bar (high pressure). These boilers are designed to deliver future-proof, low-emission performance for multi-fuel firing using oil, gas, biogas, bio-oil, 20% hydrogen and other special fuels. They offer high efficiency and are an ideal solution for the food and beverage, manufacturing, hospital, laundry and hotel industries.

The boiler components are configured to achieve low emissions, high steam quality, and optimal energy efficiency, supported by an integrated economiser and modular heat-recovery systems. User-friendly operation is achieved through: Individually configurable boiler control (BCO), Automatic start-up control SUC, ready to connect to automation systems, a digital efficiency assistant called MEC Optimize, and MEC Remote, a protected remote access solution.

This three-pass, shell-and-fire-tube steam boiler is suitable for a wide range of applications. It can be combined with all other available system components from Bosch Steam Boilers' modular range, such as fuel and water supply, water disposal, water analysis, and heat recovery.

A three-pass technology, a compact footprint, and a modular design based on the systematic use of features and parts also used in other boiler types ensure a particularly attractive price-performance ratio. Reduced installation is required because the unit is supplied as a single unit, with the firing and economiser already factory-fitted, and plug-in connections to simplify wiring to the controller.



By replacing a 30-year-old boiler with a new Bosch UL-S steam boiler, a brewery in the Czech Republic improved operational reliability and reduced fuel costs by approximately 16%.

Bosch U-MB UNIVERSAL steam boilers consist of several modules designed to fulfil individual requirements. These are suited to applications in the food and beverage, laundry and cleaning industries.

The U-MB is a fire-tube boiler comprising several modules: a heat-generating section with a three-pass design, a steam chamber above the heat-generating section, and an integrated economiser. This overcomes the requirement for flow components in the fire tubes. Based on the well-proven UNIMAT boiler design, the U-MB offers a generously sized flame tube geometry that delivers efficient combustion.

The integrated economiser directly affects energy efficiency. The heat in the flue gases is used to preheat the boiler feedwater, thereby reducing fuel consumption and emissions.

The U-MB is offered as a complete, customised boiler system that includes the basic equipment: the boiler pressure vessel, control and safety components, burner unit, integrated economiser, pump module, terminal box and control cabinet; the intelligent boiler control BCO; along with sensors, actuators, and country-specific safety devices.

A range of compatible products is also available, including a flue-gas heat exchanger for condensing use, a feedwater cooling module, a condensate service module, a water service module, a water treatment module, and more. A combination of these can be added to the UNIVERSAL U-MB product to tailor a solution that best suits on-site needs.

The Bosch UL-S and UL-SX UNIVERSAL steam boilers are designed to produce saturated (UL-S) and superheated (UL-SX) steam, respectively. These highly efficient and reliable solutions for the food and beverage industries, manufacturing and municipal facilities set new standards in process heat supply.

The UL-S steam boiler is designed to meet requirements for capacities up to 28 000 kg/h, pressures up to 30 bar, and temperatures up to 230 °C, while the UL-SX can accommodate steam temperatures up to 300 °C.

The three-pass patent, dating back to 1952, underpins the ongoing success of this series. The lateral fire tube (1st pass) and the adjacent fire-tube bundles (2nd and 3rd pass) are ideally integrated into the pressure vessel, together with the fully wetback reversing chamber. This design results in a large heating surface with the smallest possible overall dimensions.

The ZFR and ZFR-X UNIVERSAL steam boilers, with a double-fire-tube design, deliver high performance and a wide range of control. They are an ideal solution for energy providers, power plants, municipal facilities and manufacturing industries. Also available for producing saturated (ZFR) and superheated steam (ZFR-X), these systems can deliver up to 55 000 kg/h of steam.

The double fire-tube boiler, which has separate flue-gas paths, is also suitable for single-burner operation, enabling a significantly extended modulation range while maintaining the same high efficiency. The ZFR/ZFR-X range is manufactured on a project-specific basis, with multiple optional components, such as superheated steam generation, available to meet plant requirements.

Across its product range, Bosch Steam Boilers offers extensive service and support for steam boiler systems throughout their lifecycle, including 24/7 service availability and a network of technicians for quick response. Remote analysis capabilities via Bosch's MEC Remote solution are also available for efficient troubleshooting, and reliable OEM spare parts are readily available to ensure high system availability.

www.bosch-industrial.com/africa

Are we ready for businesses to go off-grid?

Francois van Themaat, co-founder and managing director for large projects at Sustainable Power Solutions (SPS), suggests that going off-grid is no longer just a backup option; it's the strategic choice for energy security, sustainability and predictable costs.

Energy technology and economics are finally aligning. For years, complete energy independence seemed out of reach. Technology was expensive, storage options were limited, and generating enough power to run a business off-grid felt impractical. That is changing rapidly. Modern solar panels capture sunlight far more efficiently, while battery storage enables businesses to use that energy at night or when clouds block sunlight.

South Africa is particularly well-positioned to benefit, with abundant sunlight across much of the country. Nature has shown us the way; each tree is, in essence, a small factory. A tree's leaves capture sunlight and convert it into energy to grow and produce fruit. The tree's trunk can be thought of as a battery which stores energy, for when it is needed. Off-grid systems operate on a similar principle at an industrial scale, turning sunlight into reliable, usable power for businesses.

Costs have dropped dramatically. Solar panels are now more than 80% cheaper than a decade ago, while batteries, the key to energy storage, have fallen nearly 90% in price over a similar period. With improved efficiency and large-scale production, self-generation is becoming increasingly competitive with traditional grid electricity, turning a long-dreamed-of possibility into a practical reality.

What off-grid really means in practice

Going off-grid requires a deliberate decision to disconnect from the utility grid. All energy needs must be generated on-site using a combination of solar panels and battery storage, with a diesel generator for extended periods

of cloud cover. Today, well-designed off-grid systems can supply 95% or more of an operation's energy from clean sources, with diesel used only during extended periods of heavy cloud or rain.

This approach provides three key benefits: predictable costs, reliable supply and a lower carbon footprint. Businesses are no longer subject to volatile electricity tariffs, punitive regulations or intermittent grid supply. Operations can run smoothly, while sustainability performance increasingly meets global expectations for export-focused companies.

Increased financing and accessibility options

Historically, the upfront cost of going off-grid was a major barrier. That barrier is now changing thanks to innovative financing solutions. Models such as Power Purchase Agreements (PPAs) and Energy-as-a-Service (EaaS) enable businesses to adopt off-grid systems without a large upfront investment. Providers take responsibility for design, installation, monitoring and maintenance, including component replacement for the duration of the contract. Performance guarantees ensure that clients are compensated if energy targets are not met.

These arrangements allow businesses to focus on running their operations while enjoying the benefits of reliable, sustainable, and cost-effective power. For many, off-grid energy is no longer only feasible but also financially sensible.

Strategic considerations and opportunities

Off-grid solutions are not a one-size-fits-



all. Space constraints limit the feasibility of high-demand facilities such as data centres or dense urban buildings, which may instead rely on wheeling or embedded energy solutions. For businesses with sufficient rooftops, land, or even the ability to create additional space through carports and storage areas, going off-grid makes strategic sense.

Electric vehicles with vehicle-to-load (V2L) capabilities, now readily available in South Africa at competitive prices, offer additional options for creative load management.

The projects SPS has implemented in the hospitality sector in the Seychelles, Kenya and Botswana demonstrate that fully off-grid operations are both technically feasible and economically viable. However, new developments should incorporate off-grid planning from the start, as buildings designed to maximise solar exposure and utilise unshaded areas can help avoid the high costs of grid connection, reduce operational risk, and create more attractive, sustainable properties for tenants or buyers.

Off-grid energy as a strategic advantage

Off-grid energy has matured from a niche experiment into a strategic business solution. Falling technology costs, innovative financing models, and the urgent need for reliable power provide companies with a clear reason to take control of their energy. For C&I businesses with sufficient space, the choice is obvious: off-grid energy is cheaper, cleaner, and more predictable than staying tied to the grid.

In the next five years, off-grid energy is set to become mainstream in South Africa. Businesses that embrace it now gain resilience, operational certainty, and sustainability advantages that will give them a competitive edge well into the future.

<https://sps.africa/>

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Rock breaker rebuild

Sandvik Rock Processing has completed a full OEM-standard refurbishment of a Sandvik BR3288i hydraulic breaker and a Sandvik BB8094R breaker boom for a major gold mine in Ghana, restoring a critical asset in the primary crushing circuit, significantly improving uptime and production.

At its well-equipped technical workshop in Kumasi, Sandvik Rock Processing recently completed a full refurbishment of critical rock-breaking equipment for a major gold mining customer in Ghana.

The large range Sandvik BR3288i hydraulic breaker, mounted on the Sandvik BB8094R breaker boom, is positioned at the mine's run-of-mine (ROM) grizzly, where it breaks large boulders after blasting to prevent blockages and to streamline the crushing process.

"This project restored a vital asset that plays a central role in the mine's primary crushing circuit," Amos Fordjour, Senior Service Technician at Sandvik Rock Processing, says. "Our extensive rebuild has returned the machine to OEM performance standards, significantly improving the mine's reliability and production continuity."

The rock breaker had been operating for more than five years and was due for its scheduled refurbishment. Fordjour explains that the work began on site, where Sandvik Rock Processing dismantled the 11-tonne boom assembly using the mine's cranes. The components were then transported to Sandvik Rock Processing's Kumasi facilities, a journey of over three hours.

"Once in the workshop, our technicians stripped the units completely, checking for critical components such as pins, bushings, cylinder seals and mounting brackets that required replacement," he says. "The boom was sandblasted and inspected for cracks, the hydraulic cylinders were rebuilt and

pressure-tested, and the hammer was fully refurbished."

According to Haqq Abdul Rahman, Graduate Technician at Sandvik Rock Processing, maintaining a robust inventory of components and spares is key to accelerating refurbishment projects. He notes that many mines struggle with oversized material arriving at the ROM grizzly, and temporary mobile breakers typically take far longer to process these rocks.

"It was important that we controlled the turnaround time on this project so the mine could put the equipment back to work as soon as possible," Rahman says. "This particular unit breaks oversized rocks much faster than the smaller mobile units that the mine had to rely on while this one was being refurbished."

The Sandvik BB8094R breaker boom, with an input power of 55 kW, offers a maximum reach of 12.7 m, a nominal horizontal reach of 9.8 m, a nominal vertical reach of 9 m and a 360° swing. The 2.3 tonne Sandvik BR3288i hydraulic breaker is built on an innovative operating principle that optimises stroke length, blow energy and Sandvik's idle blow protector. This allows the breaker to be adjusted for different applications while improving hydraulic efficiency and safety.

Fordjour emphasises that quality assurance underpins every stage of the rebuild process at Kumasi. "We follow strict operating procedures and standards in everything we do," he says. "This includes using only genuine Sandvik parts, which allows us to

guarantee the quality of both the components and the workmanship."

After the rebuild was completed, Sandvik Rock Processing returned to the site to install and commission the breaker. The three-week process required close coordination between Sandvik Rock Processing and the mine to manage crane access, electrical connections, equipment positioning and safety protocols.

"We work very closely with customers during removal, installation and commissioning," Fordjour notes. "In this case, the mine provided the cranes and support equipment, and we handled all the technical work; that collaboration is critical."

Rahman explains that the refurbished boom and hydraulic breaker now deliver several operational benefits. Restored OEM clearances and structural integrity ensure smoother swing and boom movement, more efficient energy transfer and high twist capacity, all of which contribute to improved durability under high-impact conditions.

"For the mine, the biggest impact is uptime and production," he says. "Without this breaker, their crushing circuit slows down considerably; now that it is back to full performance, production is consistent again."

Fordjour adds that Sandvik Rock Processing's support continues long after commissioning. The company conducts quarterly inspections to check pins, seals and overall structural condition, and the service team remains available for call-outs whenever required.

<https://www.rockprocessing.sandvik>



Left: Installation of the refurbished Sandvik BR3288i hydraulic breaker and BB8094R breaker boom has been completed, and the unit is now ready for testing in the primary crushing circuit. **Right:** Coupling of the main boom to the pedestal is underway as part of the Sandvik rock breaker installation.

Hitachi reinvents Ellipse Enterprise Asset Management (EAM)

Hitachi Energy, in collaboration with Microsoft, is accelerating the digital transformation of essential infrastructure – from electricity networks and transportation corridors to heavy industrial operations – by reinventing how critical assets are managed and maintained.



Hitachi Energy is reinventing its Ellipse enterprise management (EAM) software solutions by integrating it with Microsoft Dynamics 365, Microsoft Fabric, Microsoft 365 Copilot and Microsoft Foundry to form a unified solution for managing data, analytics and business operations.

Hitachi Energy is reinventing its Ellipse Enterprise Asset Management (EAM) with Microsoft Dynamics 365, Microsoft Fabric, Microsoft 365 Copilot and Microsoft Foundry – into a unified solution to manage data, analytics and business operations.

“Hitachi Energy has decades of experience building and operating the infrastructure that keeps modern life running,” says Massimo Danieli, Executive Vice President and Managing Director of the Business Unit for Grid Automation at Hitachi Energy. “Microsoft technology accelerates and enhances value to our Ellipse customers, while also bringing to market a solution that is unmatched in terms of IT and OT capabilities, offering essential service providers the ability to operate more intelligently and sustainably.”

“Critical Infrastructure operators need insight they can act on. Together with Hitachi Energy, we’re combining AI, cloud and enterprise systems to help organisations move from reactive maintenance to predictive operations, improving reliability, safety, and long-term value for the infrastructure society depends on,” adds Dayan Rodriguez, Corporate Vice President, Manufacturing and Mobility for Microsoft.

The solution leverages a combination of advanced digital solutions, including Microsoft Foundry, Fabric, Microsoft 365 Copilot and Microsoft Dynamics 365, to integrate critical datasets supporting as-

set operations and provide unprecedented visibility of equipment across entire networks. It can recommend the best time for maintenance based on supply chain, HR and financial data, ultimately helping organisations operate and plan investments more efficiently. This means more reliable services, safer operations and fewer emergency repairs, which are often the most expensive and disruptive.

The Value of Integration

Traditionally, EAMs and supporting systems, like ERPs and CRMs, operate independently, creating data silos. EAM data focuses on asset lifecycle management but can be strengthened when combined with supporting data, such as financials, procurement and workforce planning, often found in an ERP or CRM systems. This separation often leads to inefficiencies, data duplication and limited visibility.

By integrating these systems with Microsoft’s Agentic business applications, utilities gain end-to-end visibility, optimised asset management, improved reliability and resilience through predictive maintenance, access to integrated data, streamlined processes, and alignment with regulations and sustainability goals.

The Hitachi Energy solution will be delivered through the company’s ecosystem of system integrators, including Hitachi Solutions, a global systems integrator within the Hitachi Group, as the foundational advisor and partner to implementation design.

Hitachi Solutions’ recent recognition as Microsoft Dynamics 365 (Finance) Partner of the Year, along with its extensive experience delivering large-scale, global digital transformations, will help accelerate adoption and provide consistent, high-quality outcomes for end users.

“Hitachi Solutions is proud to support this strategic reinvention and the tremendous impact it can have to drive new efficiencies into critical OT applications,” says Soichiro Ohara, Chairman and CEO, Hitachi Solutions America, Ltd. “Our role is to drive rapid deployment, integration, and business outcomes, ensuring customers realise the full potential of this industry-leading AI-driven solution.”

For customers, this integration can become the backbone and strategic enabler of their digital transformation priorities. It empowers organisations to move from reactive to proactive operations, leverage advanced analytics, and deliver value to customers while controlling costs. This integration transforms tools from passive repositories into dynamic, self-optimising platforms that consolidate data, automate processes and drive enterprise-wide efficiency.

Ellipse is part of the Asset and Work Management suite of solutions, which supports the HMAX Energy portfolio of digitally enabled services. HMAX by Hitachi is a suite of next-generation solutions that brings the power of AI to social infrastructure.

<https://www.hitachienergy.com>

isoPOD: minimising lubricant contamination

Industrial maintenance teams know that proper lubrication is critical to equipment performance. What many don't realise is that the battle for equipment longevity and efficiency is often lost before the lubricant ever touches the machine.



The isoPOD tackles the contamination problem at source, keeping lubricants clean and dry from storage through to dispensing.

Lubrication Engineers (LE) South Africa has identified that 90% of lubrication contamination happens during storage and dispensing – not during application. To address this costly problem, it offers the isoPOD, a portable 'plug and play' lubrication storage and dispensing unit that's a first for the South African market.

"Contaminated lubricants don't just damage equipment, they create a cascade of environmental and operational problems," says Gavin Ford, National Marketing Manager at LE South Africa. "Increased equipment wear leads to higher energy consumption, more frequent

oil changes, and ultimately more waste." The isoPOD tackles this problem at its source by keeping lubricants clean and dry from storage through to dispensing.

Unlike traditional permanent lubrication storage rooms that require significant capital investment and site preparation, the isoPOD is designed for speed and flexibility. The unit is ready for use: maintenance teams only need to connect their air supply and install their lubrication containers.

"The isoPOD requires minimal site preparation and is quick to install," says Ford. "It is also portable, so it can be moved when operations need to be relocated or expanded."

The secure pod ensures controllable access to valuable lubricants while providing comprehensive protection from dust, light and the elements during both storage and dispensing. A range of designs with customisable options allows maintenance teams to adjust the solution to suit their exact requirements.

The e10 Series isoPOD has storage and dispensing capacity for up to four lubrication containers, each with a capacity of 4 000 litres. Designed specifically for dispensing large volumes via hose reels and hand nozzles, it is a flexible, cost-effective solution that reduces the need to design or build permanent structures.

The modular units can be stacked to increase

storage space as operations grow, making them a scalable investment that adapts to changing needs.

Standard isoPOD features include: Dispensing capacity for four standard IBC containers; Premium filtration rated to $\beta \geq 1000$; Heavy-duty Flexbimec® pumps and hose reels with digital metered hand nozzles; Filtered ventilation; Rear passage with dual doors for direct access to pumps, filters and fluid connections; ISO shipping container lockdown points; Crane lifting lugs and forklift channels; and Heavy duty bi-fold lockable doors.

Several optional features can also be included, depending on a client's specific needs. Among these are: dispensing bay orientation; custom paint colours; internal and external lighting; fitted steel liquid tanks; a waste oil evacuation system; a Kaeser® air compressor; external power connectivity; internal power points; solar power; drum dispensing; and OilSafe® oil containers.

"The isoPOD brings environmental benefits and operational efficiency," says Ford. "By preventing contamination at the source, we help companies reduce waste, extend equipment life and lower their environmental footprint without the complexity and cost of permanent construction," he concludes.

<https://lubricationengineers.co.za/>

WearCheck showcases predictive maintenance expertise

At the 2026 Investing in Africa Mining Indaba last month, WearCheck showcased a range of condition-monitoring solutions. From scientific oil analysis and transformer oil testing to asset reliability care services and water testing and analysis, the company highlighted how predictive maintenance can strengthen mining performance across the continent.

As a specialist in condition monitoring, WearCheck supports mining operations across Africa with practical tools and programmes to reduce unplanned downtime, improve asset reliability, and extend component life. The company's offering spans both laboratory-based diagnostics and on-site technical services, enabling mines to build a clearer, more complete picture of equipment health.

A team of technical specialists was available throughout the event to explain the company's latest capabilities, share real-world applications and demonstrate technology-driven solutions that can be built into site maintenance strategies.

'Mining Indaba brings together exactly the type of audience we want to speak to,' says Evans. 'It's a place where we can have meaningful conversations about operational challenges and show, using real examples, how condition monitoring can make a measurable difference. We value the opportunity to meet new contacts, but it's equally important to reconnect with long-standing customers and update them on the latest developments across our divisions,' he says

At the heart of WearCheck's services is the scientific analysis of used oil, fuel and other fluids. By examining samples for microscopic wear debris and other indicators, the company can flag early-stage abnormal wear and developing faults in mechanical systems.

Beyond fluid analysis, WearCheck has built a portfolio of complementary predictive maintenance services. These include asset reliability care (ARC); transformer chemistry services; advanced field services (AFS); non-destructive testing (NDT); technical compliance (TC); rope condition assess-

ment; and lubrication-enabled reliability (LER).

WearCheck's scope also includes scientific water testing through its dedicated water division, which assesses the quality of wastewater, groundwater and surface water in and around mining and exploration sites. This work supports both operational requirements and environmental responsibilities. Water quality testing can also inform decisions about whether water is suitable for different on-site uses, such as equipment applications, washing and safety considerations.



At the heart of WearCheck's services is the scientific analysis of used oil, fuel and other fluids.

Common conveyor problems and best-practice maintenance

Tru-Trac's Douglas van der Westhuizen and Guy Fitt outline best-practice maintenance approaches to keep conveyors running at peak performance in demanding conditions.

Quarries and mines lose thousands of productive hours each year due to common conveyor system issues such as misalignment, material carryback, and rip events – all of which directly impact throughput, operational costs, and safety.

Drawing on decades of field experience, Tru-Trac's Douglas van der Westhuizen and Guy Fitt outline some best-practice maintenance approaches to keep conveyors at peak performance.

One of the most common causes of unscheduled downtime on conveyor systems is belt misalignment, which often results in spillage, belt edge damage, structural damage, increased power consumption and increased labour costs. According to Guy Fitt, National Sales Manager at Tru-Trac, a specialist provider of conveyor components for the global mining and bulk material handling industries, misaligned belts will ultimately result in lost production, increased operating costs and safety hazards.

Douglas van der Westhuizen, Technical Sales Representative at Tru-Trac, says misaligned belts can also cause environmental issues by increasing material spillage and dust generation, which can contaminate nearby ecosystems and water sources, lead to regulatory non-compliance, and negatively affect the health of workers and nearby communities.

Apart from belt misalignment, carryback is another common enemy in conveyor systems. Carryback directly reduces conveyor productivity by creating unscheduled downtime for cleanup, degrading components such as rollers and pulleys, and causing material loss, leading to belt-tracking issues that necessitate further maintenance. Carryback represents loss of product, which, over time, can result in high financial costs, especially in systems handling large volumes," says Fitt.

Commenting on some of the best-practice maintenance approaches to keeping conveyors at peak performance, Fitt says that continuous inspection is one of the principal ways to ensure that conveyor systems function optimally. With this approach, minor issues are identified early on before they escalate into major problems that lead to unexpected breakdowns. This minimises unplanned interruptions, ensuring that material transport is uninterrupted and production schedules are maintained.

"Continuous condition monitoring of con-



Left: Guy Fitt, National Sales Manager at Tru-Trac. Right: Douglas van der Westhuizen, Technical Sales Representative at Tru-Trac.

veyor components is one of the best practices in ensuring correct belt tracking. It is essential to be fully aware of the basic characteristics of the different belt tracking components and for these to be employed correctly," Van der Westhuizen says, adding that all the structural conveyor components, such as pulleys, idlers, take-ups and the supporting structure, should

always be properly aligned at all times.

"In fact, these should be the principal areas of concern whenever trying to identify belt tracking problems. All pulleys, snub rollers, troughing and return idlers must be square with the frames parallel to each other, and also be level," Van der Westhuizen concludes.

<https://tru-trac.com/>



With Tru-Trac solutions, conveyors stay centred, reducing downtime and protecting surrounding structures from unnecessary wear and damage.



Tru-Trac trackers correct belt misalignment, preventing costly spillage and edge damage while keeping conveyor systems running smoothly.

SA global home for ENDURON® elite screens



Alandr  van Vuuren, Integrated Supply Chain Director at Weir.

South Africa has cemented its position as a global centre for the production of Weir's cutting-edge ENDURON® Elite banana screens. Backed by major infrastructure investment at Weir's Alrode facility in Gauteng, this site is now the first in the world dedicated solely to manufacturing this advanced new range.

The Alrode expansion adds a further 1 600 m² of dedicated production space under roof, equipped with two 63 t gantry cranes operating at a clearance height of 18.5 m, according to Alandr  van Vuuren, Integrated Supply Chain Director at Weir. This strategic upgrade was driven by a landmark  53 million contract awarded to Weir by Barrick for the Reko Diq copper-gold project in Pakistan, which includes the supply of fine-grinding, separation,

and tailings solutions. "The advanced technological capability and rigorous quality assurance at our Alrode plant, together with our robust local and regional supply chain, enabled us to manufacture the first two ENDURON® Elite screens even before completion of the expansion," says Van Vuuren. "We already had the specialised expertise and

equipment in place, including a laser facility capable of cutting the massive 12 m by 5 m side plates. In parallel, we ran a targeted supplier development programme to further strengthen and empower our local supply partners."

The outcomes of this process were rigorously assessed and audited by both an independent third party and Weir's own technical



The new heavy bay screen manufacturing facility at Weir Alrode is now producing ENDURON Elite double-deck banana screens for the Reko Diq order.



The recent expansion at Weir Alrode, which included the addition of a heavy bay screen manufacturing facility, has added a further 1,600 m² of dedicated production space under roof.

team, clearing the way for the expansion which commenced in early 2025.

Construction has required substantial earthworks and piling, with excavations reaching two storeys below ground to accommodate the concrete and steel structure of a 1 000 t plinth. This specialised plinth is engineered to absorb the intense vibration forces generated by the exciters during product testing.

The expansion has created two dedicated assembly stations for the high-capacity double-deck ENDURON® Elite screens – each weighing nearly 50 t, with deck dimensions of up to 4.3 m wide by 8.5 m long.

“This expansion marks a significant boost to South Africa’s manufacturing capacity,” he says. “Facilities with heavy engineering capability and crane clearance at these heights are rare in the country, yet they are essential to support the ambitious manufacturing plans we are rolling out at Alrode.”

The upgraded facility enables the safe and efficient assembly of large-screen components, including the subframe, screen body, screen deck and exciters, with completed units reaching heights of over 15 m, Van Vuuren notes.

The new production bays will have the capacity to manufacture at least two ENDURON® Elite screens per month, without disrupting Alrode’s ongoing output of small, medium and large screens across the broader ENDURON® range.

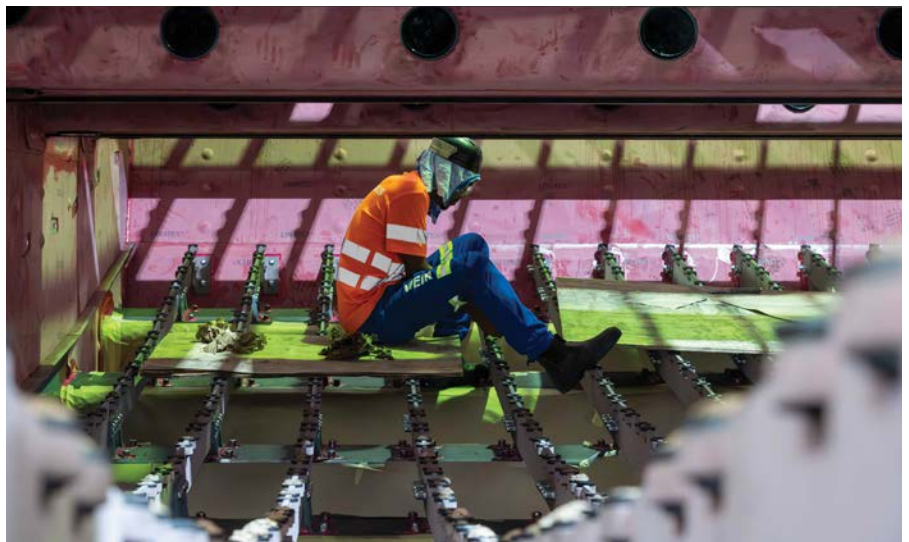
“Our production for the first half of 2026 will be dedicated to fulfilling the Reko Diq contract, but market interest in our larger ENDURON® Elite screens is already strong,” he says. “We anticipate ramping up production soon and have deliberately designed the facility to accommodate future capacity upgrades as demand grows.”

Weir is advancing the development of its Alrode plant in line with its strong sustainability commitments, with the expanded facility serving as one of the company’s pilot sites for water-based paint application. This shift helps lower carbon emissions across both the production process and the supply chain, he notes, supporting Weir’s global target to reduce carbon emissions by 50% by 2030.

“The facility is running entirely on renewable energy from a solar power generation system,



The new Screens Heavy Bay facility at Weir Alrode was opened recently by Bridget Ledwaba, Managing Director, Weir Africa, and Ryan Hilton, Regional Managing Director for EMEA at Weir.



The expansion at Weir Alrode, with the construction of its new heavy-bay screen manufacturing facility, created around 40 new positions in screen assembly, hand lining, and painting.

with the only exception being the variable speed drive used to start up the screens,” he says. Van Vuuren emphasises the broader economic benefits of the expansion, including boosting local procurement and export earnings, creating jobs and developing skills. While most of the ENDURON® Elite screens produced at Alrode will be exported, nearly all components and materials are sourced locally.

“The expansion opened up around 40 new

technical positions at Alrode, including roles in screen assembly, hand-lining and painting,” Van Vuuren explains. “We upskilled some of our current employees as assemblers and fitters, giving them a path into formal trades and supporting career growth from within. At the same time, we are creating opportunities for new entrants in lower-skilled roles, with a focus on developing their potential over time.”

<https://www.global.weir>

Your vision, our mission ENDURON® Crushers

We listened. We redesigned. We rebuilt

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WEIR

Five women driving the future of forestry through science

To celebrate the United Nations International Day for Women and Girls in Science, Forestry South Africa (FSA) has launched two complementary campaigns to amplify women's voices, inspire more women to pursue STEM careers in forestry, and challenge outdated perceptions of the forestry sector.

Modern forestry is not just about growing trees. It spans a wide range of STEM careers, including genetics, climate science, ecology, data science, engineering, logistics, planning and applied research. Across South Africa, women are leading important research in these fields, improving forest productivity, strengthening climate resilience and delivering tangible social and economic benefits, particularly in rural communities.

"It's not enough to recognise women in science – we need commitment and transformation across all industries and sectors," says Dr Yolandi Ernst, senior lecturer at the Global Change Institute. "It sends a message to young girls that careers in environmental science, climate research and forestry are not only possible, but vital. Climate-resilient landscapes are built through science-based decision-making, and women are already central to that process."

Five women give voice for sustainable forestry

The first FSA campaign is a series of thought-leadership pieces featuring women in forestry science that explore how research and innovation enable the sector to respond to global climate challenges, support national economic growth, and sustain rural livelihoods. The five women contributing to this campaign are:

- Professor Ilaria Germishuizen – Research Director, Institute for Commercial Forestry Research.
- Professor Sanushka Naidoo: Programme Leader, Forest Molecular Genetics – Eucalyptus and Pine Pathogen Interactions (EPPI) – Forestry and Agriculture Biotechnology Institute (FABI).
- Dr Yolandi Ernst: Senior Lecturer, Global Change Institute.
- Dr Noxolo Ndlovu: NCT Forestry, Forestry Research Scientist.
- Jacqui Meyer: Co-ordinator, Timber Industry Pesticide Working Group.

Thought leadership summaries

Ilaria Germishuizen: Research is future-proofing the forestry sector

Scientific research conducted by the ICFR underpins the long-term sustainability and competitiveness of South Africa's plantation forestry sector. Through applied, collaborative

research spanning tree improvement, forest protection, soil and site resilience and advanced spatial technologies, ICFR equips the sector with evidence-based solutions to manage finite land and water resources, adapt to climate change and mitigate growing pest and disease risk. This work ensures that productivity gains are sustained across multiple planting rotations while safeguarding ecosystem function, supporting credible carbon reporting and strengthening responsible forest management. By simplifying science into practical decision-making, ICFR not only future-proofs the forestry value chain but also contributes to national economic growth, rural livelihoods and South Africa's climate resilience.



Sanushka Naidoo: Building resilient forests

Molecular genetics and genomics research allow forestry companies to respond proactively to climate change and growing resource constraints. Through advanced genetics and genomic tools, researchers are identifying trees with superior resilience to drought, heat, pests and diseases, enabling precision breeding and smarter deployment of planting material across South Africa's limited plantation landscape. This approach accelerates breeding cycles, reduces operational risk and improves long-term productivity while strengthening ecosystem services such as carbon sequestration. By integrating cutting-edge molecular research with industry partnerships, this work ensures that future forests are not only more productive and

predictable but also better adapted to a changing climate, supporting sustainable economic growth, rural livelihoods, and national resilience.



Naidoo Forest Molecular Genetics

Yolandi Ernst: Climate science central to forestry's future

Predictive, finer-scale climate modelling is essential for long-term forestry planning. Forestry's future depends on forward-looking climate science: historical weather data remains valuable, but it is no longer sufficient on its own as a reliable guide in a world of shifting rainfall patterns, rising heat extremes, and highly localised risks. Turning this science into real-world impact requires sustained partnerships between research institutions, the industry and public bodies, so that complex climate data is translated into practical, decision-ready insights embedded in strategy, operations and regulation.



Ernst Global Change Institute

The benefits reach far beyond improved yields; climate-informed forestry underpins jobs, strengthens rural economies, stabilises supply chains and supports national development and climate-resilience strategies, ensuring that

forests continue to sustain both people and landscapes in a rapidly changing world.

Noxolo Ndlovu: Forestry grounded in evidence-based science:

Using her own inspiring journey from a 15-year-old unsure of her future to achieving a PhD in Forestry and becoming a researcher at NCT Forestry, Noxolo illustrates how embracing STEM subjects in high school opened unexpected and meaningful career opportunities in forestry science. Her story highlights how forestry is grounded in evidence-based science, contributes to climate mitigation, supports rural communities and drives sustainable land management. It underscores the importance of encouraging young people, especially girls, to pursue STEM careers that combine scientific curiosity with real-world impact



Jacqui Meyer: Pesticide research and a safer world

Science-led pesticide research is strengthening the forestry sector's social licence to operate while safeguarding human health, ecosystems and market access. Through coordinated research and stewardship led by TIPWG, the sector is moving beyond efficiency-driven decision-making to a transparent, cradle-to-grave approach that prioritises worker safety, community wellbeing and environmental protection.



By generating credible, independent data and translating complex science into practical standards, training, and operational guidance, this research enables forestry to meet evolving regulatory and public expectations, reduce reputational risk, and adopt safer, lower-hazard alternatives. In doing so, it supports responsible production, protects biodiversity and water resources and ensures South African forestry remains competitive and trusted in global markets.

STEM and the social side of science

"Forestry research is a space where women can, and increasingly do, make a meaningful difference," says Professor Germishuizen. "It is interdisciplinary, applied and closely connected to society's future needs. For young women considering STEM pathways, it offers the opportunity to combine scientific excellence with tangible environmental and economic outcomes."

FSA has embarked on a month-long social media campaign running from 11 February to 11 March, during which women share what they do, why they chose a STEM career, and offer words of encouragement to young people, particularly girls, who may be considering similar paths.

"For young women considering a STEM career, the sector offers far more pathways

than many expect," says Meyer. "It is diverse, impactful and globally connected. Forestry creates local benefits while contributing to global sustainability goals."

At the heart of both campaigns is a commitment to nurturing the next generation of scientists. "The future of forests and the communities that rely on them will be shaped by our willingness to integrate scientific insights with purpose, deliberate inclusiveness and shared responsibility," says Professor Naidoo, emphasising the importance of visibility, mentorship and confidence-building.

"It is important that we encourage girls to engage with STEM, as this field will open tremendous opportunities. We need to help them overcome a lack of confidence in STEM subjects like mathematics to unlock the wide array of STEM careers waiting for them. Initiatives like this one, that show relatable faces succeeding in STEM, will help achieve this."

Dr Ndlovu appeals to young women and girls: "The world needs your curiosity, questions and perspectives. STEM careers are not reserved for the select few; they are built by ordinary people who are willing to learn, persist and believe that they belong!"

<https://www.forestrysouthafrica.co.za>



Sanushka Naidoo and her team of investigators strive to ensure that future forests are more productive, more predictable and better adapted to the changing climate.



Modern forestry spans a wide range of STEM careers, including genetics, climate science, ecology, data science, engineering, logistics, planning and applied research.

Turning bottlenecks into profits

An engineered, low-cost component used to reorient cans or containers has the potential to significantly boost production, delivering an unparalleled return on investment



Juan-Eric Davidtz demonstrates the company's game-changing can-turning device for high-volume conveyor applications.

for packaging operations across southern Africa.

Manufactured by polymer specialist igus, the 3D-printed product turner is designed for high-volume packaging environments to reorient cans and containers for downstream processing. These processes operate under continuous load and friction, where traditional parts wear quickly, leading to stoppages and driving up maintenance costs. The solution from igus uses a tribologically optimised polymer called iglidur i150 Tribo-Filament, which is highly wear-resistant and can be 3D-printed on demand for end-use applications.

According to Juan-Eric Davidtz of igus, the material is specially engineered for high abrasion resistance with excellent strength and mechanical properties. Unlike standard PLA or ABS polymers, iglidur i150 is an engineered compound that also contains solid lubricants, which enable it to run dry with no external lubrication while offering significantly longer service life in sliding and rotating applications. The material's inherent wear resistance means that these critical elements retain dimensional stability far longer than conventional printed plastics, reducing part replacements and

extending maintenance intervals.

"We have demonstration models that we are showing across the region in different industries, wherever products need to be turned. Although our demonstration models are designed to reorient aluminium cans and PET containers on high-speed conveyors, we can also work with clients to develop solutions for their packaging needs wherever they are needed.

"3D printing unlocks fast prototyping and rapid scale-up from prototype to production-grade parts, which is a big advantage in these fast-paced manufacturing environments. Importantly for food and beverage packaging lines, our iglidur i150 is compliant with EU Regulation 10/2011 for food contact applications when appropriately specified," says Davidtz.

He adds that the solution interfaces perfectly with the company's 3D printing service, which supports a wide range of motion and wear parts, from plain bearings and gears to custom rollers in igus materials that offer lubrication-free, maintenance-free performance. For packaging engineers, the ability to print mechanically strong, abrasion-resistant parts on demand can significantly improve processes and reduce downtime.

<https://www.igus.co.za/>

Water tank safety and responsibility: an open letter from JoJo Tanks

South Africa is under growing water pressure, and for many households and communities, water tanks have shifted from being optional extras to essential infrastructure. A full water tank, however, is more than a simple container. It is a structure carrying significant weight, and when placed on unstable ground or supported by inadequate stands, the risks increase significantly.

Recent events have reinforced the importance of proper installation, appropriate support structures, and regular maintenance to ensure the safety of water storage systems. This is a shared responsibility.

Proper installation is not a technical formality; it is a safety requirement. Engineered, load-bearing stands, level and stable foundations, strict adherence to installation guidelines, and routine inspections are all essential. When these elements are overlooked, manageable risks can quickly escalate, especially in environments where children and other vulnerable community members are present.

Consumers are often encouraged to prioritise capacity and price when selecting water storage solutions. Yet true quality extends beyond the tank itself. The stand, foundation preparation, installation

method, and ongoing maintenance all play a critical role in ensuring long-term safety.

As water storage becomes more widespread, education around these factors must keep pace. Safety guidance should be clear, visible, and consistently reinforced, whether the tanks are installed by private contractors, municipalities or community-based programmes.

JoJo calls on all stakeholders to take proactive steps to prevent future harm:

- Municipalities and public bodies must ensure that tanks installed as part of water relief or infrastructure projects meet appropriate safety and installation standards.
- Installers and contractors must use fit-for-purpose, load-bearing stands and follow installation guidelines without compromise.
- Consumers and communities should ask questions, insist on compliant installations, and ensure that tanks and stands are kept secure and inaccessible to children.

Water insecurity should not introduce new risks to life and safety. Access to water must go hand in hand with responsible infrastructure decisions.

At JoJo, we remain committed to promoting safe water storage practices and supporting education around proper installation and use. If greater awareness today can prevent tragedy tomorrow, then this conversation is worth having.

<https://www.jojo.co.za/>



Recent events have reinforced the importance of proper installation, appropriate support structures, and regular maintenance to ensure the safety of water storage systems.

Building resilient food supply chains in Southern Africa



Lourens Pieterse, Head of Sales, Bühler Southern Africa.

For decades, food systems were built to maximise efficiency, scale and affordability. Today, climate-related disruptions, energy shocks, and market volatility are exposing the structural fragilities of that model, says Lourens Pieterse, Head of Sales, Bühler Southern Africa.

To remain resilient and competitive, these systems must be redesigned. Grain systems – from agriculture through silo storage to processing – sit at the core of this shift, as they shape how shocks propagate – or are contained – across the food system.

Milling and food processing are not simply industrial functions; they are critical infrastructure for food security. By converting raw agricultural commodities into safe, storable and transportable food, food system producers form the backbone of reliable food availability. Effective processing reduces post-harvest losses, extends shelf life, and ensures consistent quality, even when agricultural production or weather patterns are unpredictable.

Strengthening resilience across the milling value chain requires a system-wide approach. Modern, reliable equipment is

essential. Predictive monitoring to prevent unplanned downtime, improved storage to safeguard grain quality, and robust logistics are equally critical.

Just as important is investing in local expertise through continuous training and closer collaboration among farmers, processors and other supply chain partners. Together, these measures enable mills to maintain safe, consistent food production – even amid external disruption.

Innovation only strengthens resilience if it is adapted to local realities. In regions facing persistent energy and infrastructure constraints, solutions must be practical, robust and designed for operating conditions on the ground. Energy-efficient equipment helps sustain output during power disruptions, while modular and scalable processing systems allow capacity to adjust as conditions change. Robust storage infrastructure protects raw materials and finished products, and digital tools built to operate under limited connectivity ensure that technology enhances resilience rather than introducing new vulnerabilities.

Energy efficiency, automation and process optimisation are therefore directly linked to food security outcomes. Bühler's energy-efficient grinding and processing technologies, combined with automated process control and digital monitoring solutions, help reduce operating costs and energy demand while maintaining consistent throughput. Advanced automation and quality control systems support food safety and product consistency, while data-driven workflow optimisation and predictive maintenance services minimise waste and unplanned downtime.

Together, these solutions help ensure

that food production remains stable and reliable, even in challenging operating environments.

Sustainability is not an abstract environmental objective; it is a prerequisite for stable food production. Reducing waste, improving energy efficiency, and ensuring safe, high-quality output directly affect the availability and affordability of food. When combined with local training and technical support, sustainable solutions strengthen food systems and contribute to long-term food security.

Critical aspects such as fortification, food safety and waste reduction are sometimes overlooked in discussions about resilience, yet they are fundamental to building a stable and nutritious food system.

Across Africa, Bühler has supported food fortification initiatives in countries such as Nigeria, Kenya, Tanzania, and Ethiopia, working with millers, governments, and development partners to integrate precise dosing, mixing, and quality-control solutions into maize and wheat milling operations. These efforts help staple foods deliver essential micronutrients at scale.

Local presence and regional expertise are also vital in turning these principles into practice. This includes customer service, maintenance and close collaboration with local teams. Understanding local challenges, responding quickly to operational issues, and tailoring solutions to specific conditions all depend on being embedded in the region.

"Bühler's strategy places strong emphasis on training and upskilling local teams, ensuring that technical expertise, operational know-how, and service capabilities are available where they are needed most," says Pieterse.

www.buhlergroup.com

GEMÜ butterfly valves certified for hydrogen applications

Valve specialist GEMÜ has successfully had several butterfly valves certified in accordance with DIN EN 13774 and DVGW-CERT ZP4110. The test, conducted by the German Technical and Scientific Association for Gas and Water (DVGW), confirms that the valves are fully suitable for use with hydrogen in gaseous form.

The butterfly valves GEMÜ R480, R481, R487, R488 Victoria, as well as GEMÜ R470, R471, R477 and R478 Tugela, are suitable for operation with hydrogen. The certification applies to all body configurations and pressure ratings.

This makes GEMÜ butterfly valves suitable for a multitude of industrial applications in the hydrogen sector. They are used

in electrolysis, PPE and fuel cell plants, as well as in distribution networks for isolating and controlling gas and liquid flows. They are also used in auxiliary processes, such as cooling-water and gas treatment systems. In power-to-liquid plants, they enable precise control of hydrogen, CO₂, and synthesis gas flows in reactor and supply circuits.

The certified series complies with all technical requirements for hydrogen applications, including a compact design, short switching times and suitability for a wide range of media.

With certification complete, GEMÜ butterfly valves are now available for all gaseous hydrogen applications. This means that customers can benefit from proven



GEMÜ R480, R481, R487, R488 Victoria Butterfly valves are now certified in accordance with DIN EN 13774 and DVGW-CERT ZP4110 for use with hydrogen in gaseous form.

solutions for safely, reliably and efficiently operating hydrogen-based systems.

<https://www.gemu-group.com/en/>

Allmech recognised at global Runxin conference

Allmech managing director Lionel Maasdorp recently attended the Runxin International Conference in China. This event brought together distributors and agents from 144 countries to mark Runxin's 25th anniversary and showcase new developments in control valve technology.

Allmech, a leading South African manufacturer of boilers and supplier of water treatment equipment and chemicals, attends the conference annually. Maasdorp says the 2025 meeting highlighted Runxin's long-standing commitment to affordable access to clean drinking water and the strength of its global partner network.

"What stood out most was the depth of the relationships," he says. "There is a real sense of trust and mutual benefit between Runxin, its management and staff, and its international agent base. During the celebrations, Runxin acknowledged its very first appointed agents who believed in the company from the beginning."

During the event, Allmech was named one of just 18 agents worldwide to receive Runxin's Best Empowered Company award. "It came as a surprise and was received with gratitude," says Maasdorp. "The award reaf-



Runxin plans to expand production capacity, to improve lead times and create new solution opportunities for South Africa and the region.

firms Runxin's commitment to Allmech as its South African agent and recognises the work we do in promoting their full product range, from household softeners and home reverse osmosis (RO) units to industrial valves, filters and ceramic core ball valves."

Beyond the recognition, the conference offered valuable opportunities to share insights with peers from around the world, explore best practices and engage with

new product developments. "Being part of a movement focused on delivering clean, drinkable water at an affordable price is important to us," Maasdorp adds.

"Runxin continues to innovate, and with plans to expand production capacity, we expect improved lead times and new solution opportunities for South Africa and the region in 2026," he concludes.

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RS adopts sustainable packaging

As part of the Plastic Out programme led by the RS Group, RS South Africa is aligning with a global drive to reduce plastic waste. The initiative forms a key pillar of the Group's 2030 ESG action plan, which aims to reduce emissions, minimise waste and transform packaging across its international operations and value chain.

As customer expectations around sustainability continue to rise, RS is rethinking how packaging is designed, sourced and used, ensuring that environmental responsibility goes hand in hand with operational efficiency and product protection. For South African customers, this global programme provides access to proven, scalable approaches to more sustainable packaging that support their own ESG ambitions.

One of the most significant milestones in the Plastic Out programme has been the introduction of bio-based polymer carriers for electronics distribution from RS Group's Corby site in the UK. Developed in partnership with Chestnut Biopolymers Ltd., the material is produced by fermenting sugars and blending them using patented technology to deliver strength and durability without generating microplastic waste.

Since mid-2025, more than 100 000

biopolymer units have been deployed, replacing approximately 80% of conventional polypropylene packaging at the site. This marked the first time a bio-based carrier had been implemented at scale within RS Group. It demonstrates that sustainable alternatives can meet the performance demands of electronics distribution while significantly reducing single-use plastic.

Another major step forward has been the introduction of paper-based sealing tape at RS Group's Bad Hersfeld and Beauvais distribution centres in Europe. Developed in partnership with Tesa, the FSC-certified tape enables cartons to be recycled without removing plastic sealing, improving recyclability while maintaining operational efficiency and a high-quality unboxing experience.

Following successful adoption, the paper tape solution is being rolled out more widely across the Group's EMEA distribution network, supporting the long-term ambition to eliminate unnecessary plastic from packaging operations.

RS Group has also replaced traditional plastic infill materials with paper-based alternatives across applicable packing areas in the UK. The initiative has removed an

estimated 15 tonnes of plastic, while maintaining packaging integrity and ensuring products arrive safely and securely.

The paper infill contains 50% recycled content, is FSC certified, and has been designed to integrate seamlessly into existing packing processes, reinforcing the principle that sustainability improvements should not compromise reliability or service quality.

While these initiatives have been implemented in other regions, they play a critical role in shaping RS South Africa's approach to sustainable packaging. By drawing on global experience and proven solutions, RS South Africa can assess how similar principles can be applied locally, taking into account market needs, operational requirements and national sustainability priorities.

"Sustainable packaging is no longer optional; it's essential. At RS South Africa, we are accelerating this transition by implementing solutions that have already demonstrated success globally, ensuring our customers can rely on packaging that is both responsible and efficient," says De Wet Joubert, Operations & Strategic Projects Director at RS South Africa.

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Scalable, digital industrialisation for African realities



As Africa accelerates its industrial growth, digital transformation is no longer a strategic luxury, but an operational necessity. Yet across the continent, industrial modernisation must contend with legacy infrastructure, constrained budgets, variable connectivity and skills shortages. Against this backdrop, proudly South African industrial software leader Adroit Technologies continues to demonstrate how innovation, when designed for African realities, can deliver scalable and sustainable industrial transformation.

Building on more than three decades of industrial automation expertise and over 35 000 installations worldwide, Adroit Technologies has positioned itself as a proudly South African software developer delivering advanced SCADA, IIoT, MES and cloud-enabled solutions tailored to local conditions. Through its flagship Adroit SCADA platform, the Mitsubishi Adroit Process Suite (MAPS), and the Adroit Edge Gateway, the company is redefining how African industries capture, contextualise and leverage operational data.

Engineering digital resilience for African operations

Industrial operators across Africa face a distinct challenge: how to modernise with-

Purpose-built automation platforms, edge-to-cloud connectivity and integrated process intelligence are enabling African industries to modernise sustainably without sacrificing existing infrastructure investments. Johan Nieuwenhuizen, Sales Director and co-CEO of Adroit Technologies, explains.

out replacing entire infrastructures. Many plants operate in hybrid environments where modern programmable logic controllers co-exist alongside legacy systems that remain mechanically reliable but digitally isolated. Wholesale system replacement is often neither economically viable nor operationally prudent.

Adroit's architecture is specifically designed to integrate new and legacy systems within a unified supervisory environment. Through native support for industrial communication standards such as OPC UA, MQTT and Modbus, as well as high-performance, dedicated drivers for leading automation platforms from Mitsubishi Electric, Schneider Electric, Siemens and Allen-Bradley, the platform delivers a robust, standardised abstraction layer between field devices, control systems, and enterprise applications. This allows organisations to progressively digitise operations while preserving previous capital investments.

Equally important is the company's licensing model. Rather than charging per client or imposing restrictive internal I/O limits, Adroit licences are structured around real data points, with unlimited internal input/output processing and concurrent client access.

This ensures that operational requirements rather than licensing constraints govern system expansion. When combined with Rand-based pricing, the approach mitigates foreign exchange exposure and provides predictable total cost of ownership for African industrial operators.

Advanced SCADA built for performance and scale

At the core of Adroit's ecosystem lies a high-

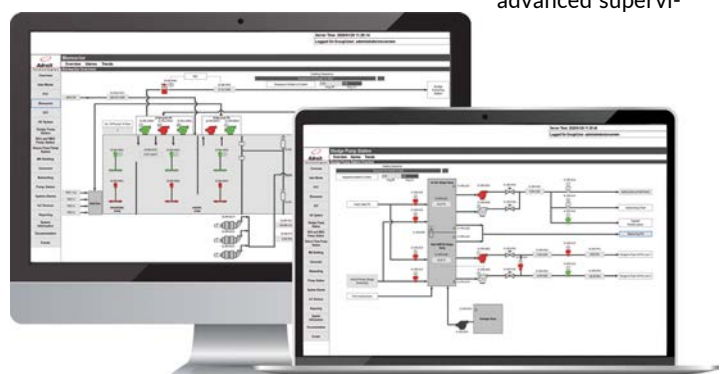
performance Supervisory Control and Data Acquisition (SCADA) platform engineered for distributed, high-demand industrial environments. The system supports clustered architectures and central OPC server configurations, enabling high availability and redundancy in mission-critical applications such as mining, water treatment and energy generation.

The platform is capable of high-speed data acquisition and deterministic processing across extensive tag databases, ensuring time-sensitive industrial processes are monitored with precision. Integrated alarm management and event handling systems provide structured escalation pathways, historical logging, and compliance-ready audit trails, supporting both operational responsiveness and regulatory reporting requirements.

Historian integration enables long-term data archiving and advanced trend analysis, transforming transient process variables into actionable operational intelligence. Multi-user concurrent access ensures that operations personnel, maintenance engineers, and executive management can simultaneously interrogate live and historical datasets without degrading performance. This scalability allows a single architecture to support both plant-level control rooms and enterprise-wide visibility across multiple geographically dispersed facilities.

Mitsubishi Adroit Process Suite (MAPS)

As co-developer of the Mitsubishi Adroit Process Suite (MAPS), Adroit has extended its innovation into a tightly integrated automation ecosystem that combines Mitsubishi Electric's hardware capabilities with Adroit's advanced supervi-



Left: Adroit Technologies plays a vital role in sustainable and inclusive industrial development in Africa. Right: At the core of Adroit's ecosystem lies a high-performance Supervisory Control and Data Acquisition (SCADA) platform engineered for distributed, high-demand industrial environments.

native integration between Mitsubishi Electric PLC platforms and Adroit visualisation and control layers, reducing the need for third-party middleware and minimising engineering complexity. Centralised configuration management enables consistent tag definition, device mapping and system structuring across the entire automation hierarchy, improving commissioning efficiency and lifecycle maintainability.

The suite is engineered to manage high-throughput process environments, where large volumes of data must be processed, contextualised and transmitted without latency. Built-in enterprise integration via APIs and open industrial protocols ensures that plant-floor data can be seamlessly integrated into MES, ERP and business intelligence platforms. For industries such as food processing, power generation, and advanced manufacturing, this vertical integration eliminates silos and enables real-time performance optimisation across the value chain.

The Adroit Edge Gateway: where industry meets the cloud

While traditional SCADA architectures focus on plant-level supervision, modern industrial transformation requires secure cloud connectivity and distributed intelligence. The Adroit Edge Gateway functions as the critical bridge between operational technology (OT) environments and cloud-based analytics platforms:

- **Secure cloud connectivity:** Security is foundational to the gateway's architecture. Encrypted communication channels protect data as it transitions from edge devices to cloud services, preserving confidentiality and integrity throughout the transmission lifecycle. Support for MQTT, OPC UA and HTTP protocols enables integration with leading cloud platforms and enterprise systems while maintaining compliance with modern cybersecurity standards. This secure-by-design framework allows organisations to extend digital transformation initiatives beyond the plant perimeter without exposing core operational networks.
- **Contextualised data for UNS adoption:** Raw sensor data alone has limited enterprise value unless enriched with contextual metadata. The Adroit Edge Gateway adds business-relevant context such as asset identity, geographic location and process classification, aligning with Unified Namespace (UNS) principles. By standardising and aggregating data at the edge, the system reduces network congestion and streamlines downstream analytics ingestion. This preprocessing approach ensures that cloud platforms

receive structured, meaningful datasets rather than unfiltered signal streams.

- **Flexible deployment models:** The Adroit Edge Gateway can be deployed as a lightweight standalone solution for single-site applications or scaled as an enterprise-grade aggregation layer collecting data from multiple facilities. This flexibility supports phased digital adoption strategies, allowing organisations to pilot cloud integration at one site before rolling out enterprise-wide deployments.
- **Merging IT and OT for smarter operations:** The convergence of IT and OT remains one of the defining challenges of modern industrial environments. Historically isolated control systems must now interoperate seamlessly with enterprise IT platforms to unlock advanced analytics, predictive maintenance and centralised performance monitoring.

Through its SCADA architecture, MAPS integration, and Adroit Edge Gateway connectivity, Adroit Technologies provides a unified framework that synchronises plant-floor operations with enterprise-level intelligence.

Real-time dashboards and remote accessibility enable operational oversight from any authorised location, while advanced analytics capabilities support predictive maintenance and process optimisation. The result is a holistic digital infrastructure in which operational data informs strategic decision-making without compromising the integrity of control systems.

Innovation designed for African scalability

Beyond technological sophistication, Adroit's differentiation lies in contextual engineering. African industries require solutions that accommodate infrastructure variability, capital constraints and skills development needs.

In addition to software innovation, the company provides structured training programmes, certified integrator networks, gold-tier telephonic support, and a dedicated Digital Services Division specialising in Cloud, IIoT, and AI. This ecosystem ensures sustainable knowledge transfer and long-term operational independence for customers.

"As Africa moves towards the next phase of industrialisation, reliable, affordable and locally supported technology is essential," says Johan Nieuwenhuizen, Sales Director and co-CEO. "Our mission is to ensure every customer can modernise at a sustainable pace without sacrificing existing investments."

Real-time monitoring, advanced analytics and multi-site visibility directly contribute to improved energy efficiency, reduced waste and optimised resource utilisation.

By enabling incremental modernisation rather than disruptive replacement, Adroit supports both economic sustainability and environmental responsibility.

As Africa advances towards increasingly integrated industrial ecosystems, technologies that unify OT and IT, secure cloud adoption, and scalable automation will define competitive advantage. "Through its advanced SCADA solutions, the Mitsubishi Adroit Process Suite, and the Adroit Edge Gateway, Adroit Technologies continues to provide the engineering foundation for resilient, scalable and future-ready industrial growth across the continent," adds Nieuwenhuizen.

Next phase of industrial intelligence

As African industry moves beyond basic digitisation toward true industrial intelligence, the focus is shifting from data collection to data orchestration. Modern operations require architectures capable not only of monitoring assets but also of enabling autonomous optimisation, predictive intervention, and enterprise-wide performance alignment.

Adroit's integrated ecosystem, spanning SCADA, MAPS and Edge-to-Cloud connectivity, provides the digital backbone required for this evolution. By combining deterministic control environments with scalable data aggregation and advanced analytics readiness, the platform enables organisations to transition from reactive maintenance models to condition-based and predictive strategies.

High-resolution edge data capture, contextual modelling aligned to Unified Namespace principles, and secure API-driven enterprise integration collectively ensure that operational intelligence is structured, portable and future-proof.

Importantly, this architecture does not assume unlimited bandwidth, unlimited capital, or unlimited technical resources. It is engineered for staged deployment, modular expansion and long lifecycle support, all characteristics essential for infrastructure-intensive sectors such as water, mining, energy and manufacturing across the continent.

As industrial ecosystems become increasingly interconnected, resilience, cybersecurity and interoperability will define long-term competitiveness. Through locally developed engineering expertise, open-standards compliance, and a scalable automation framework, Adroit Technologies is not only supporting Africa's current industrial needs but also enabling the continent's transition to a data-driven, intelligently automated future.

<https://adroitscada.com/>

HVAC systems purpose-built for underground

Booyco Engineering designs and manufactures purpose-engineered HVAC and climate control systems to withstand the extreme heat, dust, humidity and long operating hours of underground mining, ensuring operator safety, regulatory compliance and reliable vehicle performance.



Booyco Engineering's underground HVAC units are engineered for a wide range of mining vehicles, from personnel carriers to heavy production machines.

Underground mining remains one of the toughest operating environments in the world, placing extreme demands on both personnel and equipment. Heat, dust, humidity, and long operating hours all contribute to conditions that require robust, purpose-built climate-control solutions. For more than four decades, Booyco Engineering has led the field in specialised HVAC and climate control systems engineered specifically for underground mining vehicles.

Proven in global applications, including 20-hour duty cycles in high-heat Indian mines, these robust systems provide clean, cooled, pressurised air across a wide range of underground vehicle types, supporting productivity and operational continuity.

With extensive experience across South Africa and global mining markets, Booyco Engineering designs and manufactures HVAC systems that ensure operator safety, equipment reliability and compliance with stringent mine health regulations. These systems are proven to withstand high dust loads, corrosive atmospheres, constant vibration, tight installation spaces and extreme thermal conditions.

Booyco Engineering's underground HVAC units are available in a range of duty

ratings to suit diverse vehicle categories, including personnel carriers, utility vehicles, LHDs, rock drills, scalers and telescopic handlers. Systems typically deliver cooling capacities of 5.5-12 kW in +46°C ambient conditions, depending on the application, while maintaining positive cab pressure and clean-air delivery through specialised cyclonic dust-scavenging filtration and robust airflow designs.

A recent international application highlights the durability and reliability of Booyco Engineering's technology. In a large underground mining operation in India, a low-profile 30-man personnel carrier equipped with a Booyco climate control system operates up to 20 hours per day in high-heat, high-humidity conditions.

Running continuously at this decline shaft operation, the personnel carrier transports crews to and from the working areas. Also, it serves as an underground recuperation chamber, allowing personnel to recover from severe ambient temperatures. The HVAC system maintains safe air quality and comfortable temperatures despite the extreme duty cycle.

Central to the performance of Booyco Engineering's underground systems is the integration of dual-system designs and purpose-engineered filtration. Units are equipped with high-efficiency Sy-Klone filtration systems that remove airborne dust and other contaminants before they reach the operator's breathing zone. This

ensures the air inside the cab remains within mandated occupational exposure limits, a critical requirement in hot, dusty and gas-laden environments.

The rugged construction of Booyco Engineering's HVAC units includes corrosion-protected materials, reinforced housings, sealed electrical components and vibration-resistant mounting systems. Intelligent control interfaces enable operators to adjust airflow and temperature to maintain safe, productive conditions. In addition, the systems are designed for ease of maintenance with accessible components and service intervals suited to intensive underground schedules.

"With the harsh realities of underground mining, climate control is far more than a comfort feature; it is a vital part of occupational health compliance and operational continuity," Brenton Spies, Managing Director of Booyco Engineering, says. "Our HVAC and climate control systems are engineered to keep operators safe and equipment running, no matter how demanding the conditions."

Across Africa, India, and other global mining regions, Booyco Engineering continues to set the benchmark in purpose-designed underground HVAC and climate-control technology. From personnel carriers to heavy utility machines, its solutions ensure mines can maintain safe working environments while improving productivity and reducing equipment downtime.

<https://www.booyco.co.za/>



In a demanding underground mine in India, Booyco Engineering's HVAC system operates up to 20 hours a day in high heat and humidity.



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