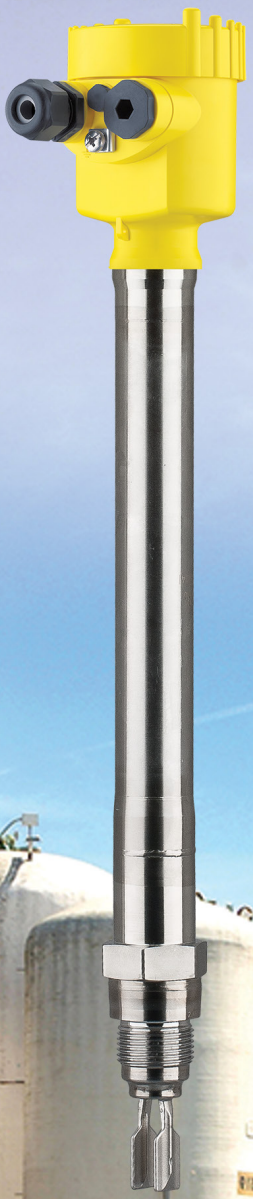

FEATURES:
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Point-level measurement: Proven technology for energy applications

04/2026

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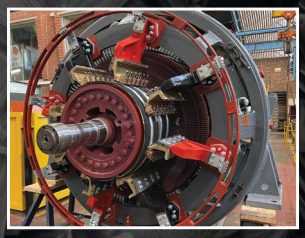

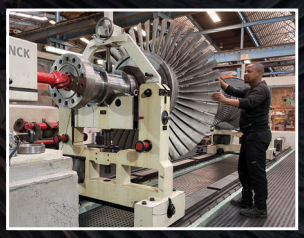

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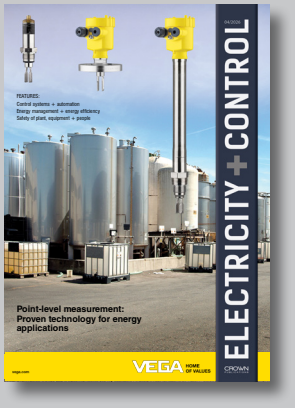

In the energy sector, point level measurement plays a critical role in plant safety and equipment protection. Continuous measurement provides process visibility, and point level detection delivers decisive action.
(Read more on page 3.)

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Getting to grips with a crisis

Every now and again it seems to become quite evident that we live in a mad world, doesn't it?

Geopolitics rears its head and seems to have ripple effects no matter where one looks. This also does suggest that power is such a rare gift for any nation or any person that it really needs to be entrusted to those who appreciate the fact.

To some extent, here, at the southernmost tip of a continent, we sit and watch what goes on. To some extent we feel out of control. We do face an international crisis – and it is possible that, as a nation, we have not quite come to grips with that.

My mind immediately reverts to the old saying: never waste a crisis. This is an often-used phrase (or variations of it) and it has been variously attributed, but I understand it generally to be ascribed to Winston Churchill who clearly did face a crisis or two.

I will not comment on what we should do as a country to capitalise on the emerging crisis, save to say we really do need to try a bit harder.

What I would like to do is reflect on our capacity to deal with our own (generally self-inflicted) crises – and the obvious one relates to energy. We faced a bulk energy crisis, and we have emerged on the other side of it in a better position – although I recognise quite a few counter-views that do have merit.

But think about this: the national utility has made significant improvements in the Energy Availability Factor – getting it to 69% by the end of last year. This is, of course, still way below the levels of the early part of this century.

There was once a narrative that the trouble the utility faced was the need to deliver more energy than in the past – but that was not the problem at all. The problem was the decline in the energy availability factor, implying that, over the years, less and less energy was available to drive the economy.

Even as we built new power stations (which were delayed by a significant period), the increase in generation capacity was obliterated by the decline in the energy availability factor. Sad.

This trend seems to have been reversed.

It was, however, an absolute crisis.

And this was a crisis that saw some remarkable things happen. Industry, and even private individuals, took the opportunity – driven by necessity – to install their own energy sources. There was too a relaxation in the policy environment to make this possible.

Remarkable what a crisis can do – and it does leave one wondering if there may have been a less disruptive method of driving users towards 'cleaner' off grid technologies.

I am certain that, had the utility continued providing the energy needs of the country, we would never have seen the incredible growth in solar and wind technologies that we have seen. The progress has been spectacular.

There is a catch – with so much of the load now off grid, who will continue to fund the utility? And, no matter what, will it remain a sustainable entity? Maybe that will present another crisis?

Never waste a crisis.

Ian Jandrell

PrEng IntPE(SA), BSc(Eng) GDE PhD,
FSAAE FSAIEE SMIEEE

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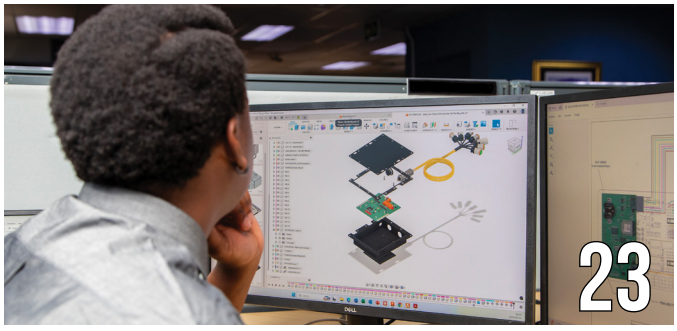

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Point level measurement in the energy sector: Reliable switching for critical applications

In the energy sector, point level measurement plays a critical role in plant safety and equipment protection. While continuous measurement provides process visibility, point level detection delivers decisive action, preventing overfills, protecting pumps from dry running and ensuring reliable operation under demanding conditions.

Across Sub-Saharan Africa's energy landscape, from coal-fired power plants to renewable and emerging energy technologies, vibrating point level switches have proven to be a robust and dependable solution. Their product-independent operation, millimetre-precise switching accuracy and minimal maintenance requirements make them well suited to harsh industrial environments.

Liquid applications: safety and process reliability

The VEGASWING 63 vibrating level switch provides reliable point level detection for liquids with densities between 0.5 and 2.5 g/cm^3. A key advantage is its tube extension, which allows the switching point to be positioned up to six metres from the installation location, offering flexibility in tanks and vessels where the ideal switching point cannot be achieved with a compact sensor.

The instrument delivers consistent switching performance regardless of mounting position or medium properties, making it suitable for overfill protection in fuel and oil storage tanks, providing dry-run protection for pumps and empty/full vessel detection in auxiliary systems. The product-independent switching point eliminates the need for calibration with the process medium, reducing commissioning time and maintenance effort.

For high-temperature and high-pressure applications, the VEGASWING 66 offers dependable point level detection in demanding process environments. Designed for use with liquids with densities from 0.42 to 2.5 g/cm^3, it is available in a compact version or with a tube extension of up to three metres.

Typical applications include steam generators, condensate tanks and auxiliary vessels in thermal power plants. Continuous sensor self-monitoring and robust construction ensure reliable operation and enhanced safety, even under extreme conditions.

Bulk solids: coal and ash handling applications

The VEGAVIB 63 vibrating rod level switch is designed for use with granular and coarse-grained bulk solids with densities as low as 20 g/l. A tube extension of up to six metres enables precise switching point placement in silos, bunkers and transfer points.

Its smooth, seamless rod design prevents material build-up, ensuring reliable operation in coal handling and biomass-related applications. Medium-independent setup and low maintenance requirements make this switch well suited for use in harsh, dust-laden environments.

Powdered and fine-grained solids

For powdered and fine-grained bulk solids such as fly ash and fine coal dust, the VEGAWAVE 63 vibrating fork level switch delivers reliable detection for materials with densities as low as 8 g/l.

The robust tuning fork ensures stable switching performance, even with adhesive or abrasive products. With tube extensions up to six metres, the switching point can be positioned precisely to suit process requirements.

Proven technology for energy applications

Vibrating point level switches are widely used in the energy sector due to their reliability, simplicity and durability. Key benefits include millimetre-accurate switching, independence from product properties, fast commissioning and low maintenance.

As the energy sector across Sub-Saharan Africa continues to evolve, dependable point level detection remains essential for operational safety and continuity. VEGA's VEGASWING, VEGAVIB and VEGAWAVE instruments provide robust, application-driven solutions for both liquid and bulk solid processes throughout the energy value chain.

For more information contact VEGA Controls (Pty) Ltd.
Tel: +27 (0)11 795 3249
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Website: www.vega.com

VEGA's vibrating point level switches have proven to be robust and dependable in coal-fired power plants as well as in new renewables applications.

Kobus Vermeulen, Schneider Electric.

Towards AI-driven process automation

As process industries advance towards an AI-driven future, Kobus Vermeulen, Direct Sales Executive, Process Automation at Schneider Electric, outlines four major trends that are set to redefine automation strategies through 2026: hyper automation, AI-first automation, low code/no code platforms, and real-time process intelligence.

From unified platforms that blend AI, machine learning, and robotic process automation (RPA) for end-to-end optimisation, to AI-driven self-healing operations, 'citizen developer tools', and predictive process intelligence, these trends provide a view into how process automation will evolve.

Hyper automation: a new era of integration

Leading industrial organisations are increasingly incorporating hyper automation into their strategies. This integration of AI, machine learning, and RPA into unified platforms provides end-to-end process optimisation, particularly in complex industrial environments. Platforms like AVEVA Unified Operations Centre and UiPath Hyper automation enable organisations to gain greater visibility and control across operational technology (OT), information technology (IT), and business workflows.

The trend towards agentic AI and autonomous operations is also gaining ground. AI agents embedded in industrial software can take over automated tasks such as dashboard creation, alarm management, and predictive analytics. Cloud-native copilots, such as Microsoft Azure Copilot, facilitate lifecycle governance and optimisation of automation agents, creating an environment where real-time decision-making and closed-loop optimisation are achievable.

Furthermore, improved process intelligence is enabling organisations to identify bottlenecks more effectively, generating automation-ready workflows through process mining and modelling tools. Integrating these tools with manufacturing execution systems (MES), computerised maintenance management systems (CMMS), and asset performance management (APM) systems, organisations can achieve real-time execution and create feedback loops that inform continuous improvement. The results are notable: documented benefits include up to a 27% reduction in downtime, 10 to 30% cost savings, and significant gains from predictive maintenance and enterprise visibility.

AI-first automation: autonomous operations come into view

The shift towards AI-first automation signals a change in how organisations are approaching operational processes. Through 2026, businesses will increasingly rely on AI systems not only to automate tasks but also to predict potential issues and respond automatically. In predicting issues, AI-driven platforms will analyse real-time and historical data from IT systems, OT assets, and IoT sensors, allowing organisations to anticipate failures and intervene proactively.

Automated responses and closed-loop control mechanisms enabled by AI will further facilitate operational continuity. We expect to see businesses implementing AI-driven platforms that ensure dynamic load balancing, auto-scaling, and real-time parameter adjustments without human intervention, thus minimising mean time to repair (MTTR).

The implementation of self-healing infrastructure will elevate AI-first automation to a new level. AIOps and agentic AI will empower IT and OT systems to self-repair, autonomously

Process intelligence is evolving to become integral to AI-driven automation strategies.

addressing issues: restarting failing services, for example, patching vulnerabilities, or resolving configuration drift. For manufacturing operations, this means adopting technologies that can automatically recover and optimise processes, enhancing overall efficiency.

Low code/no code platforms: empowering citizen developers

As organisations move towards the new automation environment, low-code/no-code (LCNC) platforms will play an essential role, empowering non-technical users to develop and deploy automation without deep coding knowledge. The tools are now seen as fundamental components in digital transformation frameworks, particularly for industries like manufacturing, utilities, and mining.

Providing visual drag-and-drop interfaces and pre-built templates, LCNC platforms will enable business users from diverse departments – such as operations, HR, finance, and marketing – to automate repetitive tasks and prototype applications independently. The democratisation of development opens the door for citizen developers to innovate, bridging IT skills gaps and reducing reliance on specialist developers.

Gartner forecasts that by 2026, over 80% of new digital initiatives will leverage LCNC platforms, with a substantial portion of automation drivers emerging from user departments rather than traditional IT settings. This shift will accelerate digital transformation and support a culture of continuous improvement through rapid iteration and scaling.

Process intelligence: evolving to meet future demands

Process intelligence is evolving beyond process mining to become integral to AI-driven strategies. Organisations will increasingly leverage real-time analytics from various operational and business systems, moving from historical data analysis to predictive insights. This will enable businesses to ask – and answer – not only, 'What happened?' but also, 'What will happen?' and 'What should we do next?'

AI-powered analytics will allow leaders to anticipate equipment failures, detect process deviations, and provide actionable recommendations. Further, using digital twins, organisations can simulate 'what-if' scenarios, so they can make the best decisions. This proactive approach helps reduce waste, improves operational efficiency, and can support sustainability goals, making process intelligence a strategic advantage for the future.

The road ahead: aligning with evolving trends

These four trends, hyper automation, AI-first automation, low-code/no-code platforms, and process intelligence, will clearly shape the broader landscape of process automation in 2026 and going forward. Organisations that harness these innovations will improve operational efficiencies and enhance decision-making and agility, to ensure they remain competitive in an increasingly dynamic market.

The convergence of the technologies can create a cohesive ecosystem where automation is faster, smarter and more responsive to real-time needs. Embracing these trends, businesses can empower their workforce, streamline processes, and achieve sustainability goals. We anticipate a renaissance in process automation that drives significant value creation and sets new standards for operational excellence.

For more information visit: www.se.com

Smarter batch automation

Valmet has expanded its automation solutions portfolio for the process industries with the release of Valmet FlexBatch®8, the latest version of its advanced batch automation and recipe management software. Valmet FlexBatch was originally developed for the Valmet D3 automation system and with the newest version, it is fully integrated with Valmet DNAe and Valmet D3 automation solutions.

Valmet FlexBatch delivers advanced batch automation and recipe management, empowering fast, safe, and ISA-88-compliant batch production. The software enables operators to manage batch processes using intuitive drag-and-drop tools, without the need for programming. Using Valmet FlexBatch integrated with Valmet DNAe, operators can take full advantage of a modern web-based user interface for batch operations.

"The new release, with the possibility to integrate with Valmet DNAe, is a significant step forward in expanding our automation portfolio in the process industries, especially in the chemical industry where our customers need to produce batches with consistent quality, quickly and cost-efficiently with secured traceability," says Tiina Stenvik, Director, Process Industries, Energy and Process Systems Automation, Valmet.

Valmet FlexBatch introduces capabilities that simplify batch processing and improve operational efficiency. Operators can monitor current and historical batch results directly within the Valmet DNAe interface, which provides real-time visibility and control.

Enhancements include manual step acknowledgment, an improved user interface and permissions, and simplified reuse of recipe components for faster development. Built-in campaign tools help maximise throughput and efficiency, and compliance features, such as full electronic recordkeeping, support ISA-88, FDA 21 CFR Part 11, and ISPE GAMP-5 standards.

Valmet FlexBatch is now available for Valmet DNAe customers and it remains fully compatible with the Valmet D3 Distributed Control System. Valmet provides a clear upgrade path from previous Valmet FlexBatch versions to make new advanced features available for existing Valmet FlexBatch customers.

For more information visit: www.valmet.com

Valmet FlexBatch introduces capabilities that simplify batch processing and improve operational efficiency.

Lourens Pieterse, Bühler Southern Africa.

Building resilient food supply chains in Southern Africa

Across Southern Africa, food supply chains are operating under increasing strain. Climate volatility, infrastructure constraints, energy instability, rising input costs, and exposure to global trade disruptions are everyday operating pressures. Lourens Pieterse, Head of Sales, Bühler Southern Africa, says in this context, resilience has become just as important as efficiency in ensuring long-term food security.

Reliable equipment, smart automation, real-time monitoring, strong customer support, and skilled local talent all play a role in building a more sustainable and dependable food value chain.

For decades, food systems have been built to maximise efficiency, scale, and affordability. Today, climate-related disruptions, energy shocks, and market volatility are exposing the structural fragilities of that model, which assumed relatively stable climate conditions, predictable energy supplies, and reliable global trade. To remain resilient and competitive, the systems need to be redesigned. Grain systems – from agriculture through silo storage to processing – are at the core of this shift, as they shape how shocks propagate – or are contained – across the food system.

In volatile environments, milling and food processing operations constitute critical infrastructure for food security. Converting raw agricultural commodities into safe, storable, and transportable food, producers in the food system ensure reliable food availability. Effective processing reduces post-harvest losses, extends shelf life, and supports 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, as they contribute to operational stability. Investing in local expertise through continuous training and closer collaboration among farmers, processors, and other supply chain partners is another key factor. Together, these measures enable mills to maintain safe, consistent food production where there may be external disruption.

As well as the value of reliable equipment and automated processing, Bühler recognises the importance of collaboration across the wider agricultural ecosystem.

Reliable equipment, automation and process optimisation

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

Energy efficiency, automation, and process optimisation are 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. Data-driven optimisation of workflows and predictive maintenance services minimise waste and unplanned downtime. Together, these solutions help ensure that food production remains stable and reliable in challenging operating environments.

Sustainability is central

Sustainability 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 to ensure food safety and reduce waste 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. These efforts help staple foods deliver essential micronutrients at scale.

Close to customers

Local presence and regional expertise are key 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 local teams in the region.

Being close to customers depends on people. Local presence and regional expertise are built by investing in talent – developing the skills needed to operate, maintain, and improve complex food-processing systems continuously under local conditions. This is why Bühler places strong emphasis on training and upskilling local teams, ensuring technical expertise, operational know-how, and service capabilities are available where they are needed.

Building talent in the regions it serves, Bühler strengthens customer support, accelerates problem-solving, and thus contributes to reinforcing the long-term resilience of local food systems. One example of this approach is the African Milling School in Nairobi, Kenya. Since 2015, the African Milling School has trained more than 1 600 millers from over 30 countries across Africa, the Middle East, and India.

Collaboration across the wider ecosystem

Collaboration across the wider ecosystem is equally important. Partnerships between industry, government, and communities bring together expertise, resources, and coordination. Such collaboration enables better planning, shared infrastructure, and joint initiatives that reduce risk and improve efficiency, contributing to a consistent and safe food supply across Southern Africa.

Looking ahead, there are clear practical steps that can be taken now to prepare for future disruption. Investment in modern, reliable equipment, digital monitoring, and energy-efficient technologies will be critical. Strengthening storage and logistics, developing local skills, and fostering closer collaboration across the food system will further enhance resilience.

Partnerships involving industry, government, and communities bring together expertise, resources, and coordination – helping to reduce risk and improve efficiency.

By taking these steps, the region's food and milling industries can build supply chains that are better equipped to withstand climate, market, and infrastructure challenges, supporting long-term food security for Southern Africa. Bühler teams are ready to support this transition with local expertise and long-term partnerships across the region.

For more information visit: www.buhlergroup.com

Automated tracking and management of IT assets

Manual IT asset management is often described as flexible. However, Valene Nagiah, V-Track Head Asset Tracking and Management cautions that in modern hybrid environments, it is a growing liability. Organisations relying on spreadsheets and periodic reconciliations are not cautious. They are operating without real visibility, she says.

Research reported by Mordor Intelligence[1] links automation directly to improved control. As IT estates expand across cloud platforms and remote users, manual tracking fails under complexity. The weakness is not only inaccuracy. It is delay. By the time information is verified, audits, renewals, or security incidents are already under way.

Studies consistently show that poor asset visibility leads to overspending on licences and avoidable audit penalties. Without real-time reconciliation of ownership and usage, organisations pay for what they cannot validate.

Automation shifts IT asset management from reactive to a proactive capability. Continuous discovery replaces periodic stock takes. Exceptions are flagged immediately. Visibility improves financial control and audit readiness.

V-Track embeds automation into daily operations through real time dashboards, usage visibility, and structured lifecycle tracking. Security exposure decreases because assets remain accountable from deployment to retirement.

Nagiah avers that manual management does not save money. It defers cost until it appears in audit findings, compliance penalties, or forced write offs. Automation is today the baseline for responsible governance. Organisations that delay will fall behind, and at a.cost, she says.

Reference

[1] https://www.mordorintelligence.com/industry-reports/it-asset-management-market

For more information visit: www.vtrack.io

Using AI in automating water management

In many applications, the right combination of data and algorithms can produce marked improvements in efficiency, speed, and oversight. While some, even most water utilities already use digital monitoring and analytics to manage operations, artificial intelligence can build on these capabilities by identifying patterns in large datasets, enabling predictive insights, and supporting more informed decision-making. Recognising this, around 15% of large water utilities around the world are already using artificial intelligence. This is set to reach 30% by 2026, according to the Xylem Water Technology Trends 2025 report. By 2035, it is expected that three-quarters of water utilities will use some form of AI.

With aging 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 transformation in the water sector.

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

Similar digital and AI-driven capabilities are also being used in 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 because of capacity. 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 produce planning information, automation, and other improvements, fast."

Water management sites utilise smart data and AI services in several ways.

Real-time process adjustment

Water treatment is at its best when the system can maintain consistency. This is a laborious task because 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 using 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, which use performance data and systems such as digital twins to anticipate maintenance conditions for equipment. Similar technologies have expanded to help water managers forecast demand, such as consumption peaks. They can also optimise energy consumption by adjusting operations based on demand.

Chetan Mistry, Strategy and Marketing Manager at Xylem Africa, WSS.

Advanced metering infrastructure

Smart meters have improved the performance and efficiency of water distribution networks, 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 and processes information into AI systems, significantly 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. Such analyses can model different situations, from simulating water bodies to predicting usage patterns.

While these and other data-driven improvements seem 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 like Xylem develop and maintain extensive software platforms designed to meet water utility challenges.

The real advantage of using data-driven water management platforms is not just in the new features. 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."

For more information visit: www.xylem.com/en-za/

Although data-driven improvements seem attractive, Xylem notes that successful deployment in water management utilities depends on data quality, integration with existing infrastructure, and organisational readiness.

Championing sustainable, scalable industrialisation across Africa

South African industrial automation software leader Adroit Technologies reaffirms its commitment to accelerating Africa's industrial growth by providing resilient, affordable, and future-ready digital solutions for utilities, manufacturing, and process industries. With more than three decades of experience and over 30 000 licences deployed across six continents, the company continues to build technologies shaped by the realities of African operations.

Adroit Technologies maintains prices in line with African markets and all licences, services, and support are based on South African currency. This way African customers avoid exposure to volatile foreign exchange rates. It makes advanced SCADA, IIoT, MES, mobility, and digital transformation solutions accessible to organisations that need predictability and cost-efficiency. The company's technology integrates seamlessly with new and legacy infrastructure, enabling gradual modernisation without disruptive system replacement.

Thus, Adroit Technologies plays a role in sustainable and inclusive industrial development. Its software supports critical sectors including mining, manufacturing, water management, food processing, energy, and public utilities.

In addition to technology, the company provides comprehensive skills development through structured training, top-tier telephonic support, certified system integrators across the continent, and a dedicated Digital Services Division specialising in cloud, IIoT and AI. It serves customers not only as a software supplier but as a long-term partner.

Johan Nieuwenhuizen, Sales Director and Co-CEO says, "As Africa moves towards the next phase of industrialisation, reliable, affordable and locally supported technology is essential. The Adroit Supervisory and Human Machine Interface software was built in Africa for African conditions, and our mission is to ensure every customer can modernise at a sustainable pace without sacrificing existing investments."

The company's flexible approach reduces the barriers to digital adoption: it offers licensing based on real data points, unlimited internal I/O, and concurrent client licensing. Owning its intellectual property and maintaining rand-based pricing, Adroit Technologies claims that it delivers one of the lowest total costs of ownership (TCOs) on the continent.

Johan Nieuwenhuizen, Sales Director and Co-CEO, Adroit Technologies.

The company's platforms directly support ongoing industrialisation across the African continent by assisting economic transformation through sustainability, regional integration, and innovation. Its solutions help reduce energy consumption, enable multi-site visibility across borders, and introduce Industry 4.0 capabilities without requiring infrastructure replacement.

Adroit Technologies also bridges the OT/IT divide with native OPC UA and MQTT integration (Open-Platform Communications Unified Architecture and Message Queuing Telemetry Transport, the standard messaging protocol for machine-to-machine communication in IoT applications), secure mobility, cloud-ready edge technologies, and enterprise-friendly APIs (Application Programming interfaces). With strong engineering support and specialised training, African organisations can confidently maintain integrated digital ecosystems for long-term efficiency.

"By extending rather than replacing existing systems, we enable industries in Africa to modernise without operational disruption. This strategy, combined with robust local support and accessible pricing, continues to position Adroit Technologies as a trusted partner in the continent's industrial transformation," says Nieuwenhuizen.

For more information visit: https://adroitscada.com/

Ensuring product quality in motion plastics

Motion plastics manufacturer igus has expanded its testing facilities to a total test laboratory footprint of more than 5 500 m^2 of dedicated research space in order to accommodate its increasing product portfolio and enable continuous improvement of its product quality.

The newly enlarged test laboratory combines several testing areas for energy chains, highly flexible chainflex cables, iglidur plain bearings, drylin linear technology, low-cost automation components and igus:bike applications. New developments are expected to enable deeper and broader evaluation of product performance before any products are released to customers.

Ian Hewat of igus South Africa says, "igus has expanded its test laboratory to support faster innovation cycles and more comprehensive real-world testing scenarios. This means customers will benefit with greater confidence that the components they use will perform reliably in their specific applications under the most demanding conditions.

"A feature of the expanded facility is the new 1 500 m^2 test area, adding to existing dedicated outdoor and indoor test spaces. The testing environments simulate real operating conditions, including outdoor weather exposure, extreme temperatures down to -40°C, cleanroom-comparable environments and customer-specific application trials," Hewat says.

At the igus test facility all tests are conducted according to international standards.

He adds that the test laboratory runs more than 15 000 individual tests across over 742 test stations every year. These include endurance runs, multi-axis stress tests and application-specific cycles such as long travel simulations for energy chains and dynamic loads for bearings. The extensive data generated in the expanded facility feeds into igus's online tools, including the service life calculator, product finders, CAD configurators and predictive maintenance tools. As a result, the tools help engineers and procurement professionals more accurately define the right components for their projects.

For more information visit: www.igus.co.za

Siemens advances its control and protection portfolio

Siemens Smart Infrastructure has announced significant advances in its portfolio of industrial control and protection devices. The company is expanding the functionalities of its semiconductor-based SENTRON Electronic Circuit Protection Device (ECPD) and introducing the SIRIUS 3RW5 -Z R11 refurbished soft starter, its first product designed according to circular economy principles. These developments will help customers in industrial environments enhance electrical safety, increase system availability, and improve their environmental footprint.

As the world´s first of its kind, Siemens' SENTRON ECPD was introduced to the market in 2024. It provides up to 1 000 times faster secure electronic switching to minimise short-circuit energy and protect systems. It offers 10+ configurable functionalities in a single device, reducing space in the distribution board by 80% and allowing for flexible, software-based parameterisation.

Left: The single-phase version of the SENTRON ECPD with RCM, right: a model of the future three-phase version of the SENTRON ECPD.

The single-phase version of the ultra-fast SENTRON ECPD is planned to follow soon and will be available as a standalone product featuring an integrated Residual Current Monitoring (RCM) function. RCM allows for continuous monitoring of residual currents, enabling the early detection of faults in electrical circuits without interrupting operations. This ensures 24/7 system uptime and protects valuable equipment. This functionality is particularly suitable for systems with high safety relevance and/or high system availability standards like data centres and various industrial applications. In addition, the RCM function can replace complex, recurring inspections, simplifying maintenance procedures.

To address high-voltage systems (400 V/32 A/50 Hz), Siemens also plans to introduce a three-phase version of the SENTRON ECPD. Offering the same functionalities, its scope of use will include infrastructure and industrial applications, like conveyor belts, elevators, heat pumps, air conditioning systems, safe and stable power distribution for events or UPS (uninterrupted power supply) systems.

SIRIUS 3RW5 -Z R11 refurbished soft starter

"Siemens is leveraging advanced semiconductor technology to redefine industry standards in circuit protection," said Andreas Matthé, CEO Electrical Products at Siemens Smart Infrastructure. "Our SENTRON ECPD offers unparalleled speed, precision, and a compact design that ensures maximum operational uptime and protection for our customers' infrastructure."

Driving sustainability through circularity in industry

Siemens launched the SIRIUS 3RW5 -Z R11 refurbished soft starter at Light & Building 2026. Described as the first circular soft starter, the product is created through a controlled refurbishment process of used soft starters, resulting in a reduction of CO_2 emissions of typically up to 50% compared to a new device through reduced resource consumption. The process is transparently documented with Environmental Product Declarations (EPDs).

During refurbishment, used devices are thoroughly tested. Critical components are replaced, and all functions are tested to meet new device quality standards. The result is a soft starter technically equivalent to a new one, fully compatible in installation, parameterisation, and functionality, allowing seamless integration. Devices have CE certification, with CCC, UL/CSA, and ATEX certifications pending.

"The new offering underscores Siemens' commitment to innovation, sustainability, and resource efficiency in industrial applications. With our SIRIUS 3RW5 -Z R11 refurbished soft starter, customers get a refurbished product that performs as well as a new one, providing a dependable and environmentally friendly option," Matthé added.

SIRIUS 3RW5 -Z R11 refurbished soft starters are circular by design. Their modularity allows easy dismantling and repair, with identifiable components for efficient refurbishment. As a smart device, the soft starter provides usage and condition data from its first life cycle, enabling targeted remanufacturing for a second. The ID Link, a unique QR code, ensures traceability for both first and second life products. This ID Link, and a data architecture currently under development, using Asset Administration Shell (AAS) and Distributed Ledger Technology (DLT:IOTA), paves the way for a Digital Product Passport (DPP) in line with the EU's Ecodesign for Sustainable Products Regulation (ESPR), ensuring transparency and audit-proof lifecycle information.

For more information visit: www.siemens.com

Partnership drives opportunity and economic growth in Limpopo

Ecovado, an emerging agri-processing company founded by local entrepreneur Hulisani Mudau, recently launched its new avocado oil processing plant in partnership with Alfa Laval Middle East, South and East Africa. The project supports economic development in the u Vhembe District community in Limpopo, South Africa.

Ecovado was established by Mudau who recognised the region's untapped potential in an abundance of avocados – which he saw could help address the limited economic opportunities in the area. The company was created to stimulate local development through job creation, fruit-for-cash initiatives, and long-term agricultural sustainability.

To help the company realise its vision, Alfa Laval facilitated funding through the Swedish export credit agency, EKN, enabling Ecovado to build and equip an avocado oil processing plant with a 100% Alfa Laval processing line. This world-class technology enables Ecovado to produce high-quality avocado oil, most of which is destined for export markets.

Additionally, Alfa Laval donated funds to purchase avocado seedlings for small-scale farmers in the surrounding communities. This initiative aims to expand local avocado production, ensuring long-term supply for the plant and creating new income streams for households.

Rooted in community impact

"This project represents what sustainable industrial development should look like, world-class technology enabling local entrepreneurship, job creation, and long-term community development. We are proud to support Ecovado in transforming the abundant harvest of avocado farming in Venda into real economic opportunity. This project captures Alfa Laval's purpose, 'Pioneering positive impact'" said Bongani Twala, General Manager of Alfa Laval South and East Africa.

For Ecovado, the partnership marks a business milestone and is a catalyst for regional transformation.

Product tasting at the launch.

Hulasani Mudau, Managing Director of Ecovado, highlighted the significance of the initiative saying, "This project was born from a desire to change the economic landscape of my home community. With Alfa Laval's support, we have been able to build a facility that processes avocado oil and at the same time creates livelihoods. The funding, equipment, and seedlings donation have empowered us to grow an industry that belongs to the people of Venda."

A model for rural industry

The Ecovado plant is fully operational, employing local residents and sourcing fruit directly from small-scale growers. As production scales, the company aims to expand its network of community suppliers and increase export volumes, positioning Venda as a competitive player in the global avocado oil market.

The partnership between Ecovado and Alfa Laval demonstrates how strategic investment, local leadership, and advanced technology can build economic potential in underserved regions.

For more information visit: www.alfalaval.co.za

Emerging agri-processing company Ecovado recently launched its avocado oil processing facility in partnership with Alfa Laval.

Tracking energy efficiency progress globally

In its latest annual analysis on global energy efficiency developments,* Energy Efficiency 2025*, the International Energy Agency (IEA) reveals recent trends in energy intensity and demand, investment, employment and policy. The report, released in November 2025, provides sector-specific analysis on industry, buildings, appliances and transport and explores system-wide themes such as emissions reductions, energy security, affordability and competitiveness.

Although there is significant scope to progress energy efficiency, IEA analysis shows that efficiency gains since 2010 have had a major impact in reducing today's greenhouse gas emissions and energy efficiency remains one of the key drivers to lower emissions in future.

The Executive summary of the report outlines key findings, as below.

Global energy efficiency progress was set to improve by 1.8% in 2025, up from around 1% in 2024. Preliminary estimates indicate several key regions are showing signs of stronger progress compared to their average since 2019. For example, energy intensity progress in 2025 was estimated to be over 3% in the People's Republic of China (hereafter 'China') and over 4% in India, well above their averages in the years since 2019. In the United States and the European Union (EU), on the other hand, progress in 2025 was set to fall below 1% after several years of stronger performance following the energy crisis.

Yet the world remains off track to achieve the COP28 ambition for 2030. In 2023, nearly 200 governments agreed at COP28 in Dubai to work together to collectively double the global average annual rate of energy efficiency improvements by 2030. However, global energy efficiency progress – measured by the rate of change in primary energy intensity – has fallen to 1.3% per year on average since 2019. This is just over half its longer-term average of around 2% per year in the period 2010 to 2019, and well below the COP28 target of a 4% annual improvement by 2030.

Four key trends are holding back faster progress.

Slow progress in the industrial sector

Around two-thirds of global final energy demand growth since 2019 has been concentrated in industry, a sector where energy intensity progress has slowed sharply. Industrial energy demand growth has accelerated since 2019, while the average annual rate of industrial energy intensity improvement fell to under 0.5% over that same period, compared to almost 2% in the last decade. This global shift towards more intensive energy use in industry is offsetting gains made in other sectors and is weighing down overall efficiency progress.

Policy is lagging technology

Policies have lagged technology progress, leaving significant savings on the table. Many appliances being sold today are only half as efficient as the best available models. As technologies have become more efficient in recent years, energy efficiency standards have not progressed at the same pace. For example, the efficiency of best-in-class lightbulbs doubled in the last 15 years, yet minimum performance standards have gone up by only 30%.

Rapidly rising cooling demand

Increased access to air conditioners has pushed up cooling-related electricity demand. Higher living standards have allowed more people to afford cooling technologies such as air conditioners, especially in emerging economies. Energy for space cooling has seen the fastest growth of any end-use in buildings since 2000, growing over 4% per year. However, this increased demand has been met with equipment that is not highly efficient, further straining energy systems at a time of rapid growth. If every air conditioner bought since 2019 had been the most efficient available, the world could have avoided electricity demand growth equivalent to the demand growth from data centres over the same period.

System inefficiencies

Electricity demand growth has outpaced renewable supply leading to an overall increase in less efficient fossil fuel generation. Electricity demand has grown two to three times faster than overall energy demand since 2019. In some regions, this rising demand has led to greater use of inefficient generation sources, placing upward pressure on primary energy demand and slowing progress in improving energy intensity.

The report further notes that investments in advancing

energy efficiency and employment have grown, but higher costs and labour shortages remain as challenges.

Investments in energy efficiency

Global energy efficiency-related investment was set to reach almost USD 800 billion in 2025, growing by 6% compared to the previous year and over 70% compared to 2015. However, in some countries, public support schemes have declined amid budgetary constraints, and material costs have risen. For instance, construction prices in the European Union have increased over 20% since 2021. Geographic disparities in investments remain, with two-thirds of end use investment taking place in China, the United States and the European Union, although the fastest growth in the last 10 years happened in India and Southeast Asia.

Employment and skills

Nearly 18 million people were employed in energy efficiency in 2024 around the world, but the sector continues to face labour and skills shortages. Overall efficiency-related employment increased over 6% from 2023 to 2024. Most efficiency workers are in China, the European Union and the United States, but emerging markets like India have seen a rapid increase in recent years. Other IEA surveys in 2025 highlighted persistent labour shortages and the need to increase efforts to attract and train workers.

Efficiency gains and energy policy priorities

New IEA analysis shows the impact energy efficiency policies have had on global energy policy priorities. Notably, without efficiency gains since 2010, today's greenhouse gas emissions would be 20% higher, and energy efficiency remains one of the key drivers to lower emissions in the future.

Efficiency actions since 2000 have reduced household energy bills in advanced economies by up to 20%. In 2025, several major economies put in place efficiency policies specifically linked to enhancing energy affordability. Efficiency has also improved competitiveness, with industries today producing 20% more value per unit of energy consumed than in 2000.

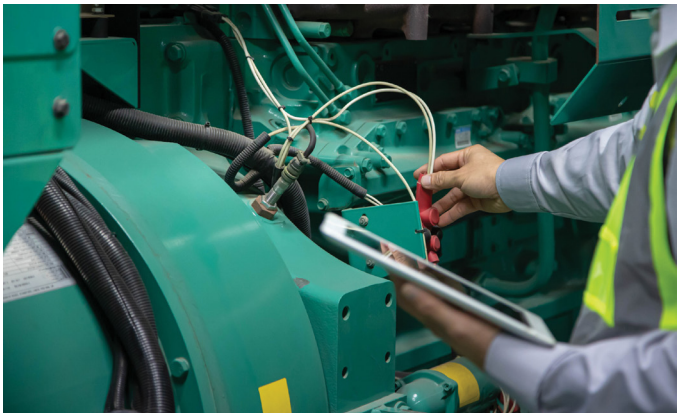
Efficiency gains have also avoided the need for 20% more fossil fuel imports in IEA countries over the same period. For example, new data shows that efficiency actions accounted for two-thirds of the gas demand savings in European households during the energy crisis, enhancing energy security and strategic independence in the EU.

The role of energy efficiency in wider energy policy goals was recognised at the 10th Annual IEA Global Conference on Energy Efficiency in June last year. Participating governments reaffirmed their commitment to stronger energy efficiency action and particularly highlighted its role as a key tool to address energy affordability, quality of life and industrial competitiveness.

The IEA further highlights in its *Energy Efficiency 2025* report that to accelerate efficiency progress, governments need to raise their ambitions and close policy gaps.

Governments implemented over 250 new or updated efficiency-related policies in countries around the world in 2025. These countries represent over 85% of global energy demand, compared to countries accounting for 70% of total energy demand taking efficiency-related policy actions in 2024. The updated targets for energy efficiency in countries' revised Nationally Determined Contributions shared at COP30 will form the basis for faster progress.

IEA Executive Director Fatih Birol says: "Energy efficiency has the power to enhance people's lives and livelihoods through greater energy security, more affordable bills, improved economic competitiveness and lower emissions."



The IEA's Energy Efficiency 2025 *report highlights that energy efficiency improvements in industry have slowed sharply since 2019.*

Countries can accelerate efficiency improvements in two ways.

Raise the ambition of existing policies

As technology improves, many policies have not been kept up to date, and policy ambition varies widely among countries. In some countries, for instance, a building that meets the local efficiency standard may be using three times as much energy as one in another country with a similar climate. There is significant room to raise the bar and accelerate progress using existing and well-proven policy tools. When policy frameworks are already in place, this represents the fastest and easiest way to accelerate efficiency progress.

Close policy gaps

There are still many areas where policies are either absent or limited. For example, around half of countries globally still do not have efficiency standards for new buildings, including in regions experiencing rapid growth. Similarly, there are still no mandatory energy performance standards for industrial motors in two-thirds of all countries globally. Identifying and closing specific policy gaps, prioritising where energy use and savings potential are the highest, can help countries accelerate progress. [It is worth noting that on these last examples of policy gaps in many countries around the world, South Africa is progressing at least in terms of establishing energy efficiency standards for some categories of buildings, and in establishing minimum energy performance standards for industrial motors.]

For more information visit: www.iea.org

Grid modernisation as a catalyst for SA's industrial future

By the end of 2025, the country's cumulative installed solar photovoltaic capacity surpassed 10.2 GW. This achievement ranks South Africa first in Africa for installed capacity per capita and places it among the top 20 solar markets globally.

Sim Khuluse, SAPVIA.

However, as the pipeline of renewable energy projects grows – now at 220 GW, of which 72 GW is already at an advanced stage of development – the industry has reached a critical bottleneck. The challenge is no longer a lack of investment appetite or technology readiness; it is the physical and regulatory capacity of the national grid.

The South African Photovoltaic Industry Association (SAPVIA) puts it this way: The energy transition has moved beyond the need to generate electrons; the need now is to build the infrastructure that carries them.

The 2025 South African Renewable Energy Grid Survey (SAREGS) highlighted that developers are ready to build, but grid connection remains the single biggest hurdle to timely delivery. In high-resource areas like the Northern Cape and the Eastern Cape, projects are competing for limited connection points, leading to a 'gridlock' that threatens to stifle private-sector-led growth.

"We have the current; we just lack the conduit," says Sim Khuluse, Technical and Policy Manager at SAPVIA.

"The priority has shifted from incentivising investment to actively unblocking the grid. By expanding and modernising our national grid infrastructure and refining wheeling frameworks, we will be able to move the 220 GW renewable pipeline into active production. In 2026, grid connectivity, not capital, is the final arbiter of South Africa's energy success."

SAPVIA has been a vocal advocate for the "liberation" of the transmission grid. The association welcomed the Electricity Regulation Amendment Act of 2025, yet concerns remain regarding the unbundling of Eskom. Khuluse emphasises that for the National Transmission Company South Africa (NTCSA) to succeed, it needs to function as an investment-grade, standalone entity capable of raising the capital required to deliver the 14 500 km of new transmission lines needed this decade.

"The economics are simple: a transmission operator without a strong asset base is a high-risk borrower," he notes. Khuluse argues that to attract the R440 billion required for new power lines, the NTCSA must evolve beyond its status as a subsidiary of the national utility. Investor trust depends on two non-negotiables: transparent governance and a firewall between the entities managing the grid and those generating the power."

Beyond physical infrastructure, policy tools like the Grid Capacity Allocation Rules (GCAR) approved in November 2025 are essential. By adopting a "first-ready, first-served" approach, these rules prevent "grid hogging" and ensure only viable projects with secured permits and financing gain access to the limited network capacity.

As well as being larger, the future South African grid needs to be smarter. 2026 is set to see a growing number of hybrid plants, with nearly 50% of new projects incorporating battery energy storage systems (BESS). This transition from variable renewables generation to firm, dispatchable power, capable of providing ancillary services like frequency regulation is the new baseline for grid stability, says Khuluse.

Smart infrastructure, including advanced metering, automated wheeling billing at the municipal level, and utility-scale storage, will allow the grid to act as a dynamic marketplace rather than a one-way supply line. With the South African Wholesale Electricity Market (SAWEM) expected to come into effect in 2026, the ability to "time-shift" solar generation into peak periods will become a commercial necessity.

As the voice of the solar PV industry, SAPVIA continues to drive the dialogue among key stakeholders. Championing quality standards through the PV GreenCard and successfully lobbying for the October 2025 simplification of Small-Scale Embedded Generation (SSEG) registrations, the association seeks to ensure that the transition is not only fast but technically sound, safe and sustainable.

"Our vision is for solar PV to be a significant and reliable contributor to the South African electricity mix," says Khuluse.

"For 2026, the focus must be on expanding and modernising the grid. This will enable us to solve the current technical problem – and to secure the industrial and economic future of the country."

For more information, visit www.sapvia.co.za

Understanding harmonic profiles

Too often, harmonic profiling is handled as a simple 'box-ticking' exercise – an approach that runs many industrial sites into trouble. Without a proper understanding of the harmonic profile across the whole installation, decisions are based on incomplete or misunderstood data. Here, John Mitchell, Global Sales and Marketing Director at CP Automation, explains why getting the profile right is essential to solving the root cause of many issues, not just the symptoms.

CP Automation is a trusted provider of power quality monitoring equipment and services in the drives, automation and power quality markets.

Where a misguided box-ticking approach is used, it very quickly becomes apparent in the numbers being used to justify harmonic mitigation. It's not unusual to hear that a site 'needs' a 300-amp harmonic filter. Yet, when asked where that figure originated, it is often the case that it has been passed down from those specifying or installing the equipment.

When you dig into the measurements, the data may say very little. Sometimes the calculation is wrong, sometimes it's incomplete and sometimes it's correct, seemingly by chance. That is the risk of not fully understanding the harmonic profile of an asset or piece of equipment.

Measuring does not equate to understanding

Power quality meters generate huge amounts of information, including voltage, current and frequency. However, the results aren't always interpreted correctly. A common error is measuring a single branch of an installation, seeing current distortion rise when a particular machine runs and immediately blaming that load for the wider site issue. The bigger picture is missed.

A common example is in measuring harmonics on a new machine while a variable speed drive (VSD) or HVAC system is running elsewhere on the site. Without a site-wide assessment, the distortion could be incorrectly attributed to the machine, and mitigation specified for a problem that is not actually present.

When assumptions get designed in

Such assumptions frequently begin at the design stage. Consultants may size a transformer and allow space for protective devices that feed power factor correction or harmonic mitigation, without carrying out a harmonic study. Those early protection and space decisions then dictate what is possible later.

By the time someone realises a harmonic filter is required, the conversation becomes, "We need a 300-amp filter because the MCB is rated at 300 amps." The actual harmonic current on site rarely drives that conclusion.

Instead, it typically reflects the fact that the upstream protection and cabling were sized early in the project, often before any harmonic analysis was carried out. Once derating is considered, that protection realistically supports only a 200 to 250-amp filter. The limitation is not technical. It is based on assumption.

We have also seen sites where the harmonic filter was correctly sized for the load, but upstream protection was not. As a result, we had to limit the filter output deliberately to prevent nuisance tripping until costly retrofits could be made.

Another common misunderstanding is how harmonic currents combine, because Individual harmonic components do not add directly.

A long-term picture

That's why a harmonic profile is a long-term picture. What's more, getting the full picture involves monitoring a site for around seven days, allowing for typical operation, peak conditions, worst-case scenarios and averages to be captured.

From that, the correct mitigation can be specified to keep the site within relevant standards.

Profiling often highlights issues beyond harmonics alone. Failed power factor correction equipment, redundant systems, and opportunities to integrate power factor correction directly into a harmonic filter can all become clear once the data is properly understood.

Harmonic profiling does not have to be a one-off exercise. Fixed power quality analysers act as a continuous safeguard, showing exactly when distortion rises and what changed at that moment. This helps turn reactive troubleshooting into informed decision-making, ensuring investment is spent on the equipment that solves the root cause, not just the symptoms.

CP Automation offers insights into industrial power quality, including measurement and mitigation options, to inform the right on-site engineering decisions.

For more information visit: https://www.cpaltd.net

Expert O&M in embedded energy generation

Dane Links, Head of Operations & Maintenance and Hanno Mostert, Chief Asset Management Officer at Sustainable Power Solutions (SPS), suggest that South Africa's clean energy sector is entering a new phase. The focus is shifting from installing new capacity to how consistently these assets perform.

Dane Links and Hanno Mostert, SPS.

As more companies depend on embedded generation to stabilise operations and manage electricity costs, day-to-day performance has become one of the most critical factors influencing business continuity. This shift places Operations and Maintenance (O&M) at the centre of long-term energy efficiency, reliability and financial returns.

Why O&M matters

O&M is the specialised discipline that ensures power plants operate as intended throughout their lifespan. It covers technical oversight, continuous monitoring, preventive maintenance, fault detection and on-site interventions. In practice, it serves to keep energy infrastructure and operations delivering at designed performance levels.

Although many organisations have internal engineering or facilities teams, few have the expertise needed to manage today's distributed generation plants. Modern installations often combine several technologies that must work together seamlessly and dynamically. This makes performance management more complex than general maintenance. It requires dedicated skills to ensure small deviations are noticed, operational decisions are proactive and performance is maintained optimally.

This is why more businesses are choosing to treat O&M as a specialist function rather than an internal add-on. The increasing complexity of energy systems requires focused attention and that technical capability may be difficult to maintain in-house.

Complex energy operations

What were once relatively simple photovoltaic arrays have evolved into integrated power systems that may include energy storage, wind inputs, generators and sophisticated control software. These assets operate under challenging conditions such as temperature extremes, exposure to dust, storms and fluctuations in grid quality. Each of these variables affects performance and raises the probability of inefficiencies.

Traditional, schedule-based maintenance can no longer keep pace. Intermittent site visits may identify visible issues, but they do not detect gradual efficiency loss or emerging faults that occur between inspections. Over time, such undetected issues accumulate and erode output, reducing financial returns and weakening operational resilience.

Modern O&M models address this by combining continuous system visibility with timely intervention, ensuring that distributed generation remains stable even under variable conditions.

Using data-driven intelligence

O&M has expanded from reactive repairs to a technical discipline driven by real-time intelligence. Connected sensors and asset management platforms provide continuous insight across multiple sites, monitoring generation levels, storage behaviour, inverter efficiency and environmental conditions. Early warnings identify potentially problematic issues before they affect performance. Predictive analytics strengthen this capability by identifying patterns that indicate future failure risks, such as rising temperatures in storage units or gradual dips in electrical performance.

Various technologies can be used to support this proactive approach. Drones, for example, improve inspection accuracy, robotic cleaning systems keep panels performing well in dusty regions, and infrared imaging highlights hotspots that signal

O&M is a specialised discipline that ensures power plants operate at designed performance levels throughout their lifespan.

component stress. When combined with strong analytics, these tools allow O&M teams to resolve issues before they escalate, supporting predictable output and protecting long-term returns.

Outsourced O&M is gaining favour

As energy systems become more complicated, the skills needed to manage them have become similarly specialised. Few organisations have the internal capacity to interpret performance data, carry out predictive maintenance or respond quickly to complex system faults. This capability gap is driving the increasing adoption of outsourced O&M.

External providers bring the technical depth, structured processes and advanced monitoring systems needed to ensure consistent plant performance, without the cost of developing and retaining the skills in-house. They bring dedicated teams, 24-hour oversight, defined response procedures and expertise across multi-technology installations. For business and industrial organisations relying on complex, hybrid generation plants, this reduces operational risk and allows internal teams to focus on core business priorities rather than the demanding daily requirements of power plant operations.

A strong O&M partner supports performance with clear reporting, robust preventive and predictive maintenance frameworks and reliable supplier relationships. They also offer transparency and accountability, helping asset owners understand system behaviour and the steps being taken to safeguard performance.

Building resilience for South Africa's energy future

As clean energy adoption continues to increase, resilience will increasingly determine the success of energy projects. Asset owners require systems that can withstand environmental pressures, grid fluctuations and the operational complexity of modern, decentralised generation. Data-led O&M, supported by experienced partners, is essential to achieving this resilience.

South Africa's energy future depends on adding new generation capacity and equally on ensuring that existing assets deliver consistent, measurable value. By adopting modern O&M practices and partnering with specialists that understand the intricacies of distributed energy, businesses can secure reliable performance, protect returns and build a more stable, sustainable operating environment.

For more information visit: https://sps.africa/

Reliable power protection for mission critical industrial operations

Vertiv has released the Vertiv™ PowerUPS 6000 Industrial uninterruptible power supply (UPS) system, designed to deliver reliable power protection for commercial and industrial (C&I) markets. The solution supports operations for industries such as manufacturing, transportation, oil and gas, pharmaceuticals, food and beverage, packaging, and steel.

"Industrial environments can face electrical instability, high temperatures, and airborne contaminants that traditional UPS systems aren't built to withstand," said Greg Funk, Vice President of modular power converters at Vertiv. "The Vertiv PowerUPS 6000 Industrial is engineered specifically for Industry 4.0 applications, delivering reliable performance in demanding environments that can cause power fluctuations and create harsh conditions on factory floors, refineries, and production lines."

The Vertiv PowerUPS 6000 Industrial has an Ingress Protection rating of IP42, indicating that it is built to withstand dust, humidity, and ambient temperatures of up to 50°C. The UPS protects critical industrial control systems such as PLCs (programmable logic controllers) and SCADA systems (supervisory control and data acquisition systems), industrial networking equipment, and production-line automation. Thus, it helps maintain operational continuity across applications where power reliability is essential.

The UPS has a compact cabinet footprint, enabling installation in space-constrained environments. In addition, the UPS supports installation and operation using front access only, simplifying deployment, maintenance, and service. Engineered for energy efficiency and operational reliability, the Vertiv PowerUPS 6000 Industrial UPS achieves

Vertiv™ PowerUPS 6000 Industrial uninterruptible power supply delivers reliable power protection for mission-critical operations in demanding industrial environments.

up to 97% efficiency in double-conversion mode and 99% in ECO mode, with compatibility for valve-regulated lead-acid (VRLA), Nickel-Cadmium (Ni-Cd), and Lithium-Ion (Li-ion) battery cabinets to meet diverse runtime requirements. The system manages industrial power fluctuations with a wide input voltage range (-40% to +25%) and delivers conditioned power with low harmonic distortion, reducing stress on upstream infrastructure. Parallel capabilities support capacity expansion and redundancy. Certified to European standards EN 50121 and EN 50171, the system is engineered for mission-critical industrial applications.

For more information visit: www.vertiv.com

Battery energy storage systems in the energy transition

Last year, Spain and Portugal lost up to 60% of their electrical power within seconds. The fallout exposed a misalignment between traditional grid infrastructure and the future of energy. To avoid a similar grid crisis in South Africa, battery energy storage systems are critical for the energy transition.

Renewables in SA

Across public and private sectors, South Africa's investment in renewable energy sources and the outcomes have been remarkable.

By the end of last year, South Africa's installed solar PV capacity had surpassed 10 GW, according to the South African Photovoltaic Industry Association (SAPVIA). Looking back, the shift to renewable energy seems almost inevitable, says Pervin Gurie, Director, Digital & Systems Division at WEG Africa.

Pervin Gurie. WEG Africa.

"Sunlight is a widely available natural resource for South Africa. Although it took an energy crisis to develop a significant energy industry around that resource, we're already enjoying major advantages, like helping to overcome load shedding, improving energy independence, and supporting economic growth."

However, as the rollout of renewable energy developments continues, there is now a further concern that needs attention, Gurie adds. "With capacity rising, there are more questions about access to power reserves and grid stability."

Grid stability and access

When parts of Spain and Portugal experienced extensive power outages in late April 2025, the causes of the blackouts were fiercely debated – and the debate continues. But the general view is that the grid produced too much power.

Some critics blamed renewables for creating the instability in the grid. Other experts dismissed those claims and noted that the event underscored how traditional grid designs are no longer keeping up with energy innovations. Xavier Daval, Chair of the Solar Commission at the French Renewable Energy Association, wrote in *PV Magazine*[1] that the issue arose as a result of grid codes causing inverters to disconnect due to frequency changes in the grid. Saying that grids need to be redesigned, he added that "blaming renewables for Spain's blackout is like faulting the thermometer for the fever."

The above situation confirms that grids need to catch up with energy innovation, says Gurie.

"An abundance of energy can create issues, but it's a good problem to have. The events in Spain and Portugal reveal the importance of balancing generation with demand. It's a reminder that the way we operate energy distribution needs to evolve. This shift in perspective has made battery energy storage systems more topical."

Stability through battery storage

Energy storage is a cornerstone in helping stabilise and upgrade grids, and Battery Energy Storage Systems (BESS) are becoming important facilitators in this field.

As large battery systems they 'plug into' local grids, including those of public utilities, large business premises and community substations. They store energy to be used later, such as during peak periods when grid power becomes pricier, or to inject power when there is insufficient sunshine or wind to drive renewable power plants.

"BESS infrastructure helps take pressure off grids, giving them room to adjust and upgrade without disrupting energy delivery to communities and businesses. BESS help shave the peaks and reduce the overall load on the grid. These systems enable companies to perform energy stacking: to generate and store energy when that available through the utility grids is cheapest, to use generated energy on tap, and wheel energy into the grid," says Gurie.

The range of BESS solutions serves small-scale to utility-scale sites and they are used in industries including mining, agriculture, light and heavy industrial installations as well as commercial installations. They enable large businesses, commercial and industrial parks, and entire communities to store and access power reliably, without placing stress on the national grid.

But BESS is not only about storage. It is a pathway to modern energy technologies. Generally, BESS solutions incorporate Industry 4.0 technologies that modernise energy operations. Leading BESS vendors such as WEG also offer digital power management systems to increase control, visibility, and automation of energy systems.

Stabilising the future energy supply

The abundance of renewable energy in South Africa is helping overcome the country's energy shortages. But that abundance will be wasted and even damaging if it cannot be stored and managed. Energy infrastructure and operations need to be modernised and upgraded. This is where BESS will play a fundamental role, says Gurie.

"We can use batteries to establish the foundation of our modern energy system. We are building the capacity to create cheap and abundant energy. Now, we must invest in making sure that capacity always serves our needs. BESS is a central part of that investment."

Reference:

[1] https://www.pv-magazine.com/2025/05/07/blaming-renewables-for-spains-blackout-is-like-faulting-the-thermometer-for-the-fever/

For more information visit: www.weg.net

Fibre-optic cabling for safety critical systems in mining

Mining is a hazardous environment at the best of times and is becoming increasingly complex, with long-distance conveyor systems, underground networks and distributed electrical infrastructure all posing increasing safety challenges. As sites expand, systems must transmit shutdown commands reliably over tens of kilometres and verify that they have been executed. Here, Ian Loudon, International Sales and Marketing Director at remote monitoring specialist Omniflex, highlights the role of fibre-optic technology in delivering such applications.

Conveyors are used in coal extraction, transportation and processing, but they also represent one of the greatest sources of operational and safety risk. As mines have grown larger and more complex, belts that once stretched a few hundred metres now extend for many kilometres, often across uneven terrain or deep underground. Ensuring safe operation across these distances depends on reliable emergency signalling, responsive shutdown systems and verifiable feedback loops.

Conveyor belts often run up to 20 to 30 km, with multiple drive motors, synchronised programmable logic controllers (PLCs) and intermediate loading or discharge points. When failure occurs at any point along that distance, the consequences can escalate rapidly.

Traditional copper cabling was never designed to carry safety-critical signals over the 10 to 30 km spans now common in mining operations. Signal degradation, voltage drop and electromagnetic interference (EMI) from surrounding drives, motors or switching equipment all undermine reliability. When signalling runs require repeaters, the number of dependency points increases and so does the potential for failure.

Copper cabling is therefore no longer fit for purpose in long-distance or electrically hostile mining environments. Lengthy copper runs are prone to EMI and voltage loss, and any attempt to push signals beyond around 10 km typically demands additional converters or amplifiers, creating further vulnerability. Underground, signal strength can be limited as dense rock formations and heavy electrical infrastructure disrupt transmissions.

Importantly, traditional one-way signalling introduces dangerous uncertainty. In the event of a shutdown request, mines are left relying solely on the fact that a command was sent, rather than knowing that it was received and acted upon. For safety-critical equipment such as conveyors, crushers or ventilation systems, certainty is essential.

Fibre-optic technology provides certainty

To address the reliability limits of copper and legacy one-direction shutdown circuits, many operators are turning to fibre-optic transmission for safety-critical signalling. Fibre offers several advantages in mining environments: it is immune to EMI, intrinsically non-sparking and capable of reliably transmitting contact signals over distances of 20 to 30 kilometres. In long-distance conveyor networks, deep underground haulage routes or electrically hostile substation areas, these characteristics eliminate many of the vulnerabilities that compromise the performance of conventional signalling systems.

The most important evolution in thinking is the shift from simply issuing a shutdown signal to verifying its result. In mining environments, the difference between ‘signal sent’ and ‘shutdown confirmed’ can determine whether or not machinery continues running with a damaged belt, a stalled crusher or elevated gas readings.

Specialist fibre-optic modules designed for safety-critical applications, including SIL-rated bidirectional contact repeaters, embody this approach. These devices replicate contact states over long distances and provide dual-redundant monitoring and clear feedback to the originator. By transmitting both the initiating signal and its confirmation across the same optical link, they reduce uncertainty, minimise wiring infrastructure and support compliance with mine shutdown, emergency isolation and interlock requirements.

As conveyor systems grow longer, underground workings expand and electrical networks become more distributed, this approach offers a path to greater resilience, clarity and safety. Rather than relying on inferred responses, operators benefit from confirmed proof: the shutdown command travelled, the machinery responded, and the system is now in a safe state. That level of certainty forms the basis of a robust safety culture in modern coal operations, reflecting a broader industry shift towards verified safety rather than assumed outcomes.

Coal mines and other safety critical environments are switching to fibre-optic signalling systems to support safe shutdown procedures.

Omniflex has extensive experience in engineering SIL-rated fibre-optic systems for long-distance, safety-critical environments. The company’s fibre modules are designed for bidirectional contact replication, auxiliary confirmation and fail-safe behaviour, and have been deployed across mining, nuclear and electrical infrastructure where reliability and verification are important.

For more information visit: www.omniflex.com

GMP is decided not in audits but in everyday production

In the pharmaceutical industry, one of the most strictly regulated industries worldwide, all regulatory requirements focus on one clear goal: medicines must be safe, effective and of consistent quality, always. To ensure this, binding rules on Good Manufacturing Practice apply. Minebea Intec highlights the role of weighing technologies in GMP in pharmaceuticals production.

In the highly regulated pharmaceutical industry binding rules on Good Manufacturing Practice apply.

More than a formal requirement, GMP defines binding rules for how products are manufactured, tested, documented and released – and turns many individual process steps into a controlled, traceable overall chain of production. Quality is not created at the end but is systematically ensured throughout the manufacturing process.

Quality is created in the process

GMP describes a comprehensive set of rules that cover all areas of pharmaceutical manufacturing – from raw material acceptance and processing to packaging and documentation. GMP applies through every step on the path to the end product. Every process step must be planned, controlled and reproducible.

In practice, this means production processes must be validated, responsibilities clearly defined and deviations systematically recorded. Machines, equipment and measuring instruments may only be used if their suitability has been proven. Work instructions must be comprehensible, up-to-date and binding. GMP thus creates the framework for production in which quality is built into the manufacturing process.

Ensuring traceability

Complete traceability is a core principle of Good Manufacturing Practice Every measurement, every count and every release must be clearly assignable to a product, a batch, a point in time and a responsible person.

GMP therefore requires all relevant data to be documented completely, correctly and in a tamper-proof manner. Changes to parameters, interventions by operators or repetitions of measurements must be traceable. This transparency forms the basis for internal quality assurance as well as for external audits by authorities.

Documented proof

In GMP-regulated production environments, documentation is key. if it is not documented, it is considered not to have been done. Documentation is therefore not a downstream administrative step but an integral part of every quality relevant process.

In addition to digital systems, printed protocols continue to play an important role. They enable direct control at the process point and serve as reliable evidence for auditors. Printed documents offer a decisive advantage, especially for critical process steps: they allow for the clear personal signature of the responsible person. This signature confirms that a work step has been carried out and that the document's content is correct and has been approved.

The combination of structured data acquisition and personal confirmation creates a high degree of transparency and accountability. Process reliability increases, room for misinterpretation is reduced and traceability in the event of an audit query is significantly improved.

Weighing technologies in GMP

Scales and weight indicators, which are usually used in

combination as bench and floor scales in the pharmaceutical environment, are integrated at numerous critical points in GMP-regulated processes – for example, when weighing active ingredients, in counting of tablets or performing final checks on packaged medicines.

GMP sets high requirements here: measurements must be precise, stable and reproducible. At the same time, they must be clearly assignable and documented in a traceable way. The systems used must also work reliably under demanding conditions, such as in clean rooms. Any deviation can have a direct impact on product safety and compliance.

Modern weight indicators support manufacturers in implementing GMP requirements in everyday production – especially in the areas of documentation, user control and traceability.

The MiNexx®weight indicators from Minebea Intec, a leading global manufacturer of weighing and inspection technologies, are designed to support these requirements. They enable weighing and counting results to be printed directly at the process point, providing an immediate, structured documentation basis. Printed receipts contain information such as weight or number of items, date and time, product or batch identifiers and user information. This results in complete, traceable documentation. Manual transfers of information are no longer necessary and the risk of errors is reduced.

Another key aspect in the GMP environment is access control. The 3-level user management of the MiNexx weight indicators supports clearly defined roles and responsibilities. Operating actions can be assigned to individual persons and documented in line with audit-requirements. At the same time, unauthorised access is reliably prevented. In combination with the systematic recording of process data, the need for traceability is met and consistently anchored in everyday work.

In combination with high-resolution weighing platforms, such as the MiNexx 3000 from Minebea Intec, coordinated weighing systems are created and these are suitable for various pharmaceutical applications – from high-resolution counting

The MiNexx® family of weighing technologies.

processes to the weighing of larger containers. The consistent system architecture supports reproducible measurements and facilitates qualification in regulated environments.

Integrated processes support auditability

GMP compliance is particularly evident in audits. This is when it becomes clear whether processes are defined and reliably implemented. Integrated weighing technologies with structured documentation make this verification considerably easier.

When measurements are clearly documented, immediately available and logically structured, processes can be quickly explained and verified. This saves time, reduces uncertainty and strengthens in-house and auditors' confidence in processes and quality management.

Everyday implementation

Rather than being seen as a rigid set of rules, GMP can be viewed as a quality standard put into practice. Precise weighing technologies, controlled processes and reliable documentation all work together.

Systems that consistently combine measurement, user control and documentation help pharmaceutical manufacturers to implement strict regulatory requirements reliably – not as an additional burden but as an integral part of stable, transparent and auditable production processes.

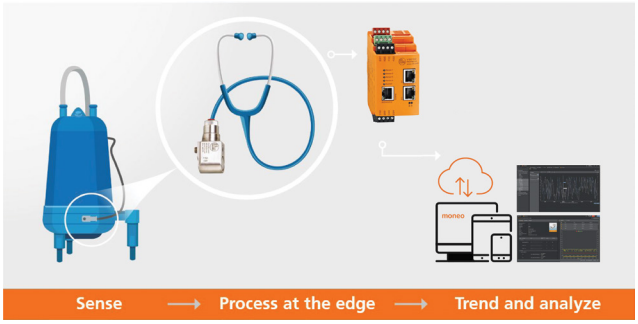
For more information visit: www.minebea-intec.com

Submersible / immersible pump protection

Submersible pumps assist in the essential but dirty work of transporting sewage to treatment plants. Prone to blockages, ragging, and general wear and tear, the pumps need to be monitored to avoid events such as overflow and environmental contamination of public and residential areas.

How do you monitor a pump submersed in a wet well and pumping sewage? The conditions can be described as, at the least, hostile. Not only is it impractical and costly to monitor pumps manually, this also raises occupation, health and safety concerns. However, pumps are expensive assets and difficult to replace. This makes an online monitoring solution appropriate.

With ifm's remote monitoring solution customers can visualise the condition of submersible pumps and diagnose issues before they become serious problems. It combines ifm's VSE proven diagnostic technology, which uses task-specific submersible accelerometers. Data from this system is coupled directly to ifm's



ifm provides sensing protection for submersible pumps used in the toughest conditions.

analytics software to identify pumping issues – in turn providing current data and warnings via email or text.

For more information visit: http://www.ifm.com

Behind most mine incidents

Arjen de Bruin, Group CEO at OIM Consulting, says most mine safety incidents start with decisions taken under pressure, not machinery or conditions. OIM's latest data confirms that behaviour is where safety holds or breaks.

Arjen de Bruin, OIM Consulting.

According to de Bruin, South Africa's mines still see injuries and fatalities for one dominant reason: human behaviour under pressure. OIM's latest analysis, drawn from more than a decade of on-site data, shows that close to 80% of incidents occur as a result of human actions, and only 3% stem from unsafe conditions. That means most accidents occur even when equipment is sound and safety procedures are in place. They happen when stress, time pressure and split-second decisions override the rules.

For years, the mining sector has been diligent about safety, although this has historically been seen by some as more of a box-ticking or compliance exercise. Procedures have been updated and equipment has improved, yet incidents still occur because the focus has in many instances been in the wrong place.

OIM's SafetyDNA data makes it clear that the real issue is behaviour under pressure – this is measured by how consistently workers apply safe habits during real operational demands. The scale runs from one to ten and reflects the strength of behaviour, not knowledge. Following the rules averages 7.74, which shows that crews understand what is required. But two indicators expose the real risk: risk aversion sits at 3.79, and emotional control at 5.26. These figures show that the moment a shift falls behind schedule or the plan changes without warning, people start cutting corners to regain momentum – and that is when accidents occur.

When pressure hits underground

Interviews across sites tell the same story. Workers know the rules, but they carry too much, and supervisors juggle administration, production pressure and constant interruptions. When a delay hits or something breaks, that pressure lands on the crew, and people move faster to keep the shift on track instead of sticking to the safest method. That's how the paperwork ends up looking perfect but the work turns risky. So, safety paperwork is complete – but the hazard is still present.

In one operation, for example, we saw one technician use the same shortcut repeatedly without consequence, and over time he began to treat it as normal. Once a shortcut works a few times, people start becoming reliant on it, and no amount of documentation pulls them back.

Frontline supervisors influence safety more than any system on site. Under pressure, teamwork sits at 75%, which shows crews work well together. But receptiveness drops to 54% – a clear indication that many workers stop taking in guidance when they feel pressure. When instructions shift or conditions change, people push ahead with whatever feels familiar rather than adjusting to the safer option. Psychological fitness at 58% reinforces the point: workers manage a normal day, but once pressure rises, their ability to absorb information and make steady decisions thins out. That is when incidents happen.

Supervisors hold the line

Supervisors sit at the centre of this. Crews take their cues directly from the person leading them. When a supervisor explains the next step clearly and sets a workable pace, teams follow the safer path even when the shift goes off track. When a supervisor reacts sharply or rushes to recover time, the crew closes up as well. We see the difference in the numbers: coached supervisors record fewer incidents because their teams still listen, still raise concerns and still adapt safely when the plan breaks down.

The path forward counts on mines moving from 'safety as a system requirement' to 'safety as a personal standard', where workers understand why rules matter, where people speak up without fear, where supervisors lead rather than enforce, and where behaviour is shaped through daily reinforcement.

South Africa's mines have come a long way in system compliance. The next frontier is behavioural capability. If we tackle that gap with the same intensity applied to engineering controls and documentation, the industry can make real progress, with fewer incidents and stronger crews.

OIM is an experienced business consulting company in South Africa, specialising in organisational development, operations management and people management across mining, manufacturing, FMCG (fast moving consumer goods) and other sectors.

For more information visit: https://oimconsulting.com/

Industry alignment will advance mine safety

As African mines move towards higher safety standards and respond to tightening regulations and rapid technological change, Booyco Electronics says the future of proximity detection systems (PDS) will be shaped by strong long-term industry collaboration.

Booyco Electronics CEO Anton Lourens says aligning efforts across the mining value chain is essential. “Effective rollout of PDS only happens when technology suppliers, OEMs, mines and regulators work in step,” he says. “We have seen real progress but the industry needs to deepen these partnerships if we want sustainable long term success.”

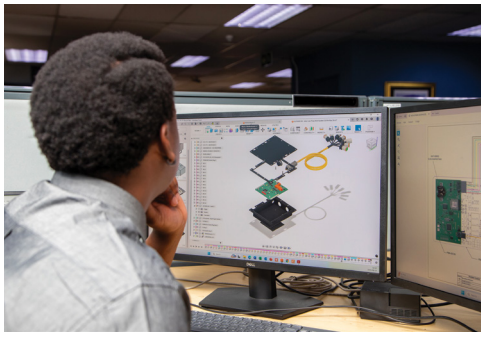
Reflecting on nearly two decades of innovation, Lourens notes that Booyco Electronics has grown alongside the sector. “When we first introduced what were then called collision warning systems, the technology and regulatory landscape looked very different,” he says. “Working closely with OEMs and mines over the years, we have ensured that our solutions evolve with their real-world operational needs.”

A key factor for PDS success, he explains, is structured change management. “Phased implementation works,” he says. “When operators, supervisors and management understand the system and buy into the process, you get safer more responsive environments and far fewer disruptions.”

The introduction of South Africa’s Level 9 vehicle intervention requirement has intensified the need for collaboration. “Level 9 has accelerated conversations across the industry,” Lourens says. “But technology alone cannot overcome challenges around operator resistance, production concerns or fears of nuisance trip-outs. Those issues require engagement, communication and shared commitment.”

He emphasises that mines involving all key departments from the outset see the best outcomes. “When production, engineering, finance, HR and safety sit around the table from day one, implementation is smoother and acceptance is higher,” he says.

Lourens adds that risk-led planning is non-negotiable. “A PDS can only protect people if the mine’s baseline risk assessment is current and aligned with its traffic management plan,” he says. “Without that foundation, you cannot determine meaningful intervention zones or identify the highest risk equipment.”



Successful PDS implementation depends on strong alignment of technology suppliers, OEMs, mines and regulators working together towards shared Zero Harm objectives.

Operational readiness has emerged as another critical success factor. “We often find that mines have the hardware on site but the people, processes and infrastructure aren’t ready,” he says. That misalignment leads to bypassing, delays and low acceptance. The operational readiness assessments help close that gap before deployment begins.

Lourens says the shift towards sensor fusion will depend on greater industry cooperation. “Mixed fleets need interconnected technologies,” he explains. “Standardised interfaces are a step forward, but genuine supplier-to-supplier collaboration is what will unlock full fleet-wide protection.”

He emphasises the importance of collaboration. “PDS touches everything – compliance, mine planning, equipment design and behaviour on the ground. No single stakeholder can deliver all that. Partnerships remain key to a future-ready Zero Harm mining environment.”

For more information visit: www.booyco-electronics.com

Fully rugged notebook for teams on the move

The TOUGHBOOK 33 is a 12.0” fully rugged notebook with hot swappable twin batteries, detachable keyboard with optional backlit keys, and highly configurable capabilities. It offers flexibility and performance for mobile business computing, With its detachable keyboard design and six usage modes, the TOUGHBOOK 33 2 in 1 DETACHABLE is ideal for mobile workers such as field service workers, maintenance teams, and service technicians in utilities and telecommunications, as well as government agencies and emergency services.

The TOUGHBOOK 33 fully rugged notebook is engineered for teams on the go and working in harsh environments.

Fully rugged, always ready

The device is engineered to be used on the go and in harsh environments, tested to military standards (MILSTD810G) and officially IP65-rated for water and dust resistance. The TOUGHBOOK 33 can also survive drops, knocks, vibrations, extreme temperatures and more.

When technicians or service teams are regularly rotating between indoors and out, night and day, good and bad weather, the screen needs to respond seamlessly. With a 12” QHD display, the TOUGHBOOK 33 provides clear images in bright sunlight and dim settings and, although toughened, it is responsive to finger, glove and pen (even in wet conditions.) It also has a 3:2 aspect ratio. This taller screen shows more words, spreadsheets, engineering drawings, code and business apps – which makes for easier reading and more productivity.

4G LTE offers optimised connectivity and more than a day of battery life (20 hours) with hot-swap options.

The TOUGHBOOK 33 is slim, lightweight and easy to carry, and can be easily integrated into vehicles. So teams can always communicate, access critical info and report in real time when on the move.

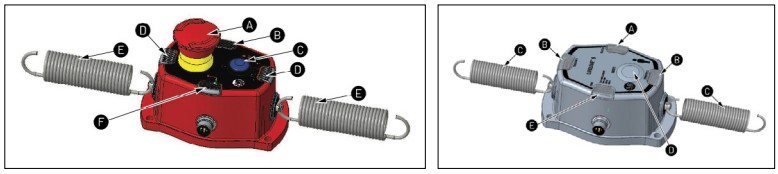
A multitasking tool

The TOUGHBOOK 33 comes with multiple configuration and customisation options to fit the user’s way of working. It includes front and rear cameras, a loud stereo speaker for ease of communication over sirens or alarms, and enhanced voice recognition while driving, as well as a dedicated GPS, backlit keyboard and smartcard and fingerprint readers.

Complementary accessories, vehicle mounts and docks are also available.

For more information email: sales@vepac.co.za

Safety pull switches with expanded reach



The Dual Head Lifeline 5 safety pull switch can be supplied with standard aluminium housing or enclosed in stainless steel for corrosive environments.

Local distributor for some of the world's leading electrical and automation brands, Referro Systems has added the latest Dual Head range of Allen-Bradley's Guardmaster Lifeline 5 Safety Pull Switches to its portfolio.

Used extensively in materials handling, conveyor systems and manufacturing lines, Lifeline 5 is ideal for protecting long stretches of equipment where quick access to a safety pull switch and emergency stop can be critical.

MD of Referro Systems, Adrian van Wyk notes, "These systems can easily be overlooked in an industrial environment, but we have found that they become an integral part of a working system. The system continuously monitors cable tension to prevent false trips caused by thermal expansion, sag and/ or contraction, ensuring dependable operation in industrial settings, even under tough environmental conditions."

The Dual Head Lifeline 5 has a greater maximum cable span than the single-head model. The existing single-head Lifeline 5 supports cable lengths up to 100 metres, and the new dual-head model extends this reach to 200 metres. This allows plants and conveyor systems with large footprints to protect longer sections using a single integrated safety system, reducing complexity and installation costs.

The dual-head configuration means two microprocessor-based switches operate on the same pull rope, improving system reliability and safety through redundancy. "If one switch encounters an issue, such as a trapped or snagged rope, the second switch on the opposite end can still detect cable pulls or slack, maintaining continuous protection. This redundancy is particularly valuable in environments where obstacles or wear and tear create a higher probability of cable entrapment," adds Van Wyk.

Both single and dual-head Lifeline 5 units share advanced diagnostics and safety features. The switches monitor rope tension actively, compensating for thermal expansion, sag and false trips to ensure accurate signalling. Their design includes highly visible 270° LED indicators that assist technicians in tensioning the cable properly and provide clear status feedback continuously. The switches meet stringent safety standards with PLe Category 4 and SIL 3 certifications, guaranteeing top-tier protection for conveyor systems and other machinery.

Referro Systems offers the Lifeline 5 units housed in robust die-cast aluminium or stainless steel enclosures, the latter intended for use in harsh, corrosive, high wash down areas, and food and beverage environments. Both models operate reliably across the same temperature and environmental ratings, providing consistent performance regardless of installation conditions. Wiring options are compatible with standard industrial connectors such as M12, although dual-head systems require careful wiring and safety circuit design to manage two switch heads.

"The choice between the single-head and the new dual-head Lifeline 5 depends on site-specific safety risk assessments," says van Wyk. Single-head units offer a simple and cost-efficient solution ideal for shorter spans. The dual-head Lifeline 5 is designed to meet the needs of large-scale facilities that require extended cable lengths, added safety redundancy or higher resistance to trapped cable scenarios.

"With this extended product line-up we continue our commitment to enhancing industrial safety standards, protecting lives and businesses," van Wyk.

For more information visit: www.referro.co.za

Motor test systems and equipment

Doble is globally recognised as the leading manufacturer of motor test systems. It claims more systems supplied worldwide than all other manufacturers combined. With its engineering expertise and in-house manufacturing capabilities Doble can deliver fully customised solutions for the most specialised motor testing requirements.

From concept through commissioning, it works closely with each customer to provide complete system design, installation, and ongoing support – and it continues to introduce innovations that keep its customers ahead in the market.

Doble's Phenix Technologies systems can perform testing on all types of ac and dc motors, traction motors, synchronous motors, induction motors, and shunt- compound- and series-wound motors.

Doble leads the industry in motor test systems – enabling smarter, more advanced motor testing results.

For more information visit: www.doble.com

Phenix Technologies 300-2 500 kVA High-Power Motor Test Systems.

Non-compliant cables are causing electrical failures

According to South Ocean Electric Wire (SOEW), failures of cable and wire products are occurring regularly across South Africa from household installations to critical generation, transmission and distribution infrastructure.

Andre Smith, CEO of the JSE-listed company, which is one of the largest manufacturers and distributors of low-voltage electrical wire, cable and accessories in South Africa, says the main causes are products that do not comply with specifications and the use of inferior materials.

"Non-compliance against specification typically involves issues with the type and quality of conductor measured by conductor resistance, insufficient radial thickness of the extrudate and incorrect lay length.

"Inferior materials being used include recycled metals or cladded metals with reduced current-carrying capacity, or insulation material not suited to the environment and failing environmental stress crack resistance."

Smith adds that there is often a lack of metal deactivators in insulation materials or inadequate, lack of or inferior ultraviolet stabilisers such as carbon black, and poor or inadequate dispersion of these essential additives in the extrudate.

"Another frequent cause of failure is that, for transport or storage, cables are wound onto drums where the minimum bending radius is exceeded. This occurs when cables are wound onto a drum with a reduced belly diameter, either after rewinding onto a different drum by a wholesaler, distributor or contractor, or by an original equipment manufacturer seeking to maximise use of space in a container for import purposes.

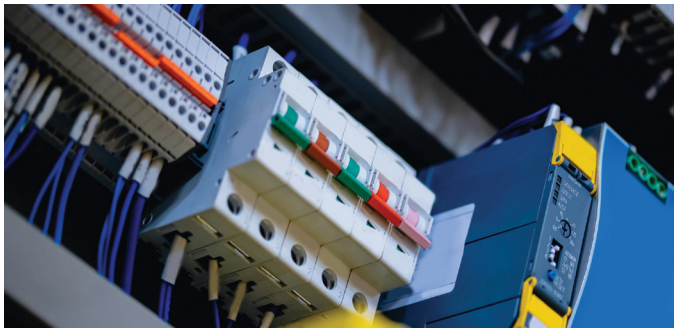
"Exceeding the bending radius severely damages cable integrity, harming insulation and creating air gaps between the conductor and insulation, leading to an eventual breakdown," Smith explains.

"Some cables fail during commissioning and testing, others immediately after energisation. Some may operate for a period before failure occurs. Whenever failure occurs, it results in unwanted downtime, costly fault-finding and repairs."

He highlights another issue with imported products which is that the original equipment manufacturer is often difficult to reach, warranties may not be honoured, and replacement stock is frequently unavailable locally at the time of failure.

To avoid these risks, Smith advises all users of electrical cable and wire to purchase products from a reputable local manufacturer with sound guarantees in place. "Because SOEW maintains a fully compliant test laboratory capable of testing from raw material through to finished product, including ageing tests, the company can provide the necessary guarantees, backed by a 35-year history in the South African cable sector."

For more information visit: www.soew.co.za



Quality is critical for the safe and efficient performance of electrical cables.

Managing complexity in industrial demolition

When businesses move or industrial facilities close down, the need arises for safe, strategic decommissioning and demolition solutions.

Jet Demolition has long been a trusted partner for companies managing complex industrial sites, from mining to large-scale processing plants. Demolition projects in industry often involve ageing infrastructure, heavy process equipment, and structurally complex environments that require careful planning and execution.

"Complex industrial demolition involves more than dismantling structures," says Jet Demolition Contracts and Project Manager Kate Bester. "It requires detailed planning, engineering input, and a clear understanding of operational and safety risks to ensure every project is executed safely and efficiently."

Heavy industrial environments present particular challenges, including confined spaces, elevated structures, heavy concrete and steel components, and potentially hazardous materials. Jet Demolition approaches each project with a comprehensive assessment to determine the safest and most efficient demolition methodology.

Specialised equipment and attachments are used to enable precise dismantling and limit risk exposure. Where necessary, sectional demolition techniques are applied to minimise disruption to surrounding operations. "Our methodology derives from minimising risk at each step," says Bester. "By planning and sequencing each stage, we ensure demolition is carried out safely and without compromising surrounding infrastructure."

Jet Demolition offers a broad scope of services aligned to heavy industrial requirements. These include handling of hazardous material, removal of large-scale plant and equipment, and associated site clearance activities. The company also undertakes mine-related demolition works such as shaft capping and closure activities, supporting clients in meeting regulatory obligations.

Demolition in high-risk industrial environments demands strict adherence to health, safety, environmental, and quality standards. Jet Demolition maintains a strong focus on SHERQ compliance, supported by trained personnel, engineered methodologies, and appropriate equipment selection.

"Safety is non-negotiable on every site," adds Bester. "Our teams are experienced in complex environments and trained to manage hazards effectively, prioritising risk mitigation at all times."

As heavy industrial facilities face restructuring, downsizing, realignment, or end-of-life decommissioning, responsible closure is a strategic necessity. Professional demolition ensures unsafe structures are removed, hazardous areas are secured and sites are prepared for rehabilitation or future use. "Responsible closure is about leaving a site in a condition that meets regulatory requirements and supports long-term sustainability," says Bester.

For more information visit: www.jetdemolition.co.za

Valid alcohol testing in the workplace

Rhys Evans, Managing Director of ALCO-Safe.

In South Africa's safety-critical industries, a single breathalyser reading can carry serious consequences – ranging from removing a worker from a site to defending a dismissal at the CCMA. Yet workplace alcohol testing operates in an environment with limited formal regulation, leaving employers without backup when results are challenged.

In this environment, ALCO-Safe has stepped forward, becoming the first privately owned laboratory in South Africa to achieve accreditation from the South African National Accreditation System (SANAS) for breathalyser calibration. And it is the only privately owned provider accredited to manage the full lifecycle of handheld breathalysers, from sales and servicing to calibration, under a single accredited framework.

The accreditation from SANAS is a significant step, formally recognising the technical competence of ALCO-Safe's calibration laboratory and confirming that its breathalyser calibration and verification processes meet strict national and international standards for accuracy, consistency and traceability.

Turning uncertainty into defensible certainty

In the absence of a prescribed national standard for workplace breathalyser testing, employers are often required to justify the credibility of their testing equipment after the fact, particularly if CCMA or Labour Court proceedings follow.

"Without an independent benchmark, employers can find themselves trying to prove the accuracy of their instruments every time a result is challenged," says Rhys Evans, Managing Director at ALCO-Safe. "SANAS accreditation removes the uncertainty, confirming that our calibration procedures, documentation and accuracy calculations have already been independently assessed and approved."

The accreditation process required ALCO-Safe to demonstrate the precision of its calibration instruments, and the strength of its quality systems. Detailed procedures, traceable records and repeatable methods ensure calibration results remain consistent, no matter which technician performs the work.

Protecting safety programmes and labour outcomes

For organisations operating in mining, construction, transport, and manufacturing, the risks associated with inaccurate alcohol testing extend beyond compliance. Questionable results can undermine zero-tolerance policies, expose employers to costly disputes and weaken the overall safety culture.

"The risks of using non-accredited calibration services are not only technical, they are also operational and legal," Evans notes. "If a breathalyser result cannot be defended, employers may be forced to reinstate employees or settle cases, even when safety was genuinely at risk."

SANAS accreditation strengthens the legal defensibility of test results, giving employers confidence that alcohol testing outcomes will stand up to scrutiny when challenged.

Making audits simpler and compliance stronger

The benefits of SANAS accreditation also extend into day-to-day operations, particularly during audits and safety reviews. In heavily regulated sectors, employers are often required to demonstrate that their testing equipment meets recognised standards.

"When customers are audited, they can point directly to the SANAS certificate of the laboratory that supplies and calibrates their breathalysers," Evans says. "That single document carries significant weight and removes the need for lengthy technical explanations or repeated verification requests."

The certification also reduces the administrative burden by streamlining audit processes and minimising delays linked to calibration challenges.

A new benchmark for workplace alcohol testing

With this accreditation, ALCO-Safe has strengthened its position as a leader in breathalyser distribution, maintenance, and calibration in South Africa. "This accreditation is about more than compliance," Evans says. "It's about trust, trust in the numbers, trust in the process and trust that employers are making decisions based on results that are accurate, fair and defensible." Achieving SANAS accreditation, ALCO-Safe has reinforced its own standards and raised expectations for workplace alcohol testing across South Africa's safety-critical industries.

For more information visit: www.alcosafe.co.za

Fire safety for above-ground petroleum storage facilities

Above-ground storage tanks (ASTs) play a critical role in the handling of petroleum products, particularly in refineries, fuel depots, and bulk distribution hubs. Their design and function mean that they present among the highest fire risks in the energy and petrochemical sectors. ASP Fire, a leader in fire-risk management and safety engineering, emphasises the importance of specialised fire protection strategies to safeguard facilities, communities, and the environment.

ASP Fire CEO, Michael van Niekerk, highlights that: "Unlike underground systems, above-ground tanks are directly exposed to environmental conditions, mechanical damage, and operational hazards. This exposure, combined with the inherent volatility of fuels, makes them highly

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vulnerable to ignition sources. Once ignited, petroleum products stored in bulk have the potential to escalate a small incident into a large-scale fire or explosion."

Effective protection of AST facilities requires a combination of compliant engineering design, specialised suppression systems, and strict operational controls. Van Niekerk cites South African national standards such as SANS 10131, and international codes from the National Fire Protection Association (NFPA), which provide detailed guidelines on tank spacing, bund wall construction, emergency venting, foam application rates, and fixed-versus-mobile fire suppression options.

Fire scenarios at AST sites often involve complex interactions between heat, vapour release, and structural integrity. "If the tank shell is exposed to prolonged radiant heat, there is a risk of boil-over or structural collapse, which can spread burning fuel over a wide area. That is why a properly engineered fire protection system must be in place, not only to detect and suppress flames, but also to prevent escalation," says van Niekerk.

In its approach to designing fire safety systems for AST facilities, ASP Fire integrates risk assessment, hazard modelling, and system design tailored to each site's configuration. This includes evaluating the placement of tanks, the volume and type of petroleum stored, ignition probability, and the adequacy of firefighting resources. The company also focuses on ensuring emergency response planning is aligned with the technical realities of AST fires, which often require high-capacity foam delivery, cooling water systems, and coordination with local fire authorities.

"Every above-ground storage facility has specific risks depending on its layout and operating conditions," says van Niekerk. "Our role is to combine our technical expertise with practical solutions that deliver real protection. Fire safety in petroleum storage is non-negotiable. It is the foundation of operational continuity, safety on-site and community safety."

For more information visit: www.aspfire.co.za

Above-ground petroleum storage tanks present a particularly high fire safety risk and require specialised fire protection systems.

Aligning workforce capabilities with national water priorities

Dr Mmaphefo Thwala, Water Sector Manager at EWSETA

Dr Mmaphefo Thwala, EWSETA.

The Energy and Water Sector Education and Training Authority (EWSETA) supports President Cyril Ramaphosa's call to restore and upgrade critical water infrastructure – and we believe water reform is as much a skills issue as a funding one. In February, in the State of the Nation Address, President Ramaphosa went as far as saying that "water is now the single most important issue for many people in South Africa".

The president acknowledged years of underinvestment, maintenance backlogs and system failures. However, infrastructure alone will not secure South Africa's water future. The system only works when there are skilled people to [build] operate and maintain it.

There is a clear opportunity for EWSETA to extend its contribution to water sector recovery. Working with national and local government, municipal water utilities, water boards and industry, EWSETA has already been involved in supporting skills development in the sector. However, considering the scale of the challenge outlined in the 2026 SONA, there is scope for EWSETA to take on additional skills development initiatives.

Creating a practical link

EWSETA is supporting the changing landscape of water management and better aligning workforce planning with infrastructure investment will mean driving skills development that is guided by what is happening in treatment plants, pump stations, and across reticulation networks. When training priorities are informed by municipal maintenance backlogs or system failures, they can respond directly to the pressures faced on the ground. This focuses workforce development to support infrastructure upgrades and sector reform.

By strengthening training for water artisans such as plumbing and millwright technicians and expanding our programmes that upskill and reskill the existing municipal workforce, we can strengthen the technical skills in the system. Building technical competencies in operations and maintenance through artisanal learnerships and recognition of prior learning, ensures skills development responds directly to where the system is under strain. This also speaks to the dual training model noted by the president, which links formal education with structured workplace experience. EWSETA plays an important role in connecting training institutions such as TVET colleges with employers and public utilities, ensuring that learning is tied to the realities of plant operations and distribution networks through workplace-based learning. A critical continuing focus must be on reducing the disconnect between qualification and competence.

Identifying gaps, building capacity responsively

Increased collaboration with industry is important in uncovering where the skills gaps are and where existing training no longer matches the realities of the water system. By engaging with water boards, municipalities and private industries, EWSETA helps to close the gaps and assist with designing qualifications that address operational demands. EWSETA has developed suitable water-focused occupational skills programmes for qualifications across various skill levels, from Water Conservation Practitioner, Industrial Water Plant Operator, and Borehole Pump Operator, all at NQF Level 4, to Industrial Water Process Controller (NQF 5), Water Works Management Practitioner, and Water Control Officer (both NQF 6), Water Use Specialist (NQF 7) and Water Resource Manager (NQF 8).

However, aligning qualifications to current needs is only part of the issue. The pressures facing the water system are constantly evolving due to climate change, ageing infrastructure, rising demand, pollution impacts and rapidly advancing technologies. Skills development must therefore look beyond keeping today's infrastructure operational and begin actively preparing the workforce for what lies ahead. Training that builds capability in smart systems, digital water management systems, nature-based solutions and sustainable water management will enable long-term resilience across the sector.

Meeting national accountability

The introduction of licensing for water service providers and the possibility of criminal consequences for ongoing failure, highlight that performance in the water sector is now directly linked to accountability. The establishment of a National Water Crisis Committee, chaired by the president, also confirms that water has been elevated to a matter of national priority. This shift reframes the crisis not only as an infrastructure challenge, but as a test of professional competence and institutional responsibility.

A sector facing stricter oversight and public scrutiny cannot function without a workforce able to operate and maintain increasingly complex systems. Investing and strengthening the skills base of South Africa's water workforce will improve the sector's ability to respond to immediate failures and future pressures, making skills development essential to ensuring water security.

For more information visit: www.ewseta.org.za

Renewable energy opens careers for SA youth

[Credit: Mulilo]

Young South African participants in the Mulio Danish Vocational Programme.

South Africa's renewable energy industry is emerging as a key driver of economic growth and job creation, offering a wide range of future-focused career opportunities. Research forecasts between 85 000 and 275 000 new green jobs by 2030, particularly in energy and power production. Solar energy alone is expected to generate around 140 000 roles across technical, commercial and operational disciplines.

Irma Pienaar, Chief Operations Officer at Mulilo, highlights that the renewable energy sector is so diverse there is a place for everyone, unless the position calls for a very specialised field of study. "Engineering disciplines – including mechanical, electrical, civil and chemical – are in high demand. Finance professionals, legal experts, project managers and quantity surveying specialists are also highly sought after in the industry."

Skills in these areas are essential to ensure renewable energy projects are technically sound, financially viable and delivered on time. Engineers design and optimise energy systems, finance professionals manage budgets and investment, legal teams navigate complex contracts and project managers coordinate complex timelines and stakeholder engagements.

"The great thing about these career paths is they can be applied anywhere in the project lifecycle," Pienaar adds. "This flexibility allows young professionals to find roles that align with their interests and strengths."

Education and training pathways

For many roles in the sector, a Bachelor of Science (BSc) degree or a BSc in Engineering is typically preferred. However, diplomas in relevant fields, coupled with practical experience, can also open many doors. Recognising the importance of hands-on training, renewable energy companies – including Mulilo – are expanding graduate and vocational programmes to support youth as they enter the industry and bridge the gap between academic learning and real-world application.

Mulilo's social impact initiatives include the Danish Vocational Programme (DVP)[1] a flagship skills-development programme launched in 2025 and now entering its second phase with a new intake. The anchor funders of the programme include the Mulilo Community Trusts, namely, the Mulilo Prieska Solar Community Trust, the Mulilo De Aar Solar Community Trust and the Mulilo Wind Community Trust. The programme is delivered in partnership with Mulilo's majority investor, Copenhagen Infrastructure Partners (CIP), and the Danish government. It enables students from local communities to access specialised vocational training abroad, equipping them with critical technical skills in the sector. In addition, Mulilo runs a two-year graduate programme and will launch an internship programme in 2026.

What SA's youth bring to the sector

On this question, Pienaar offers a considered view. "Each generation brings its own benefits," she says. "We notice that the generation coming through is a 'lazy generation', which sounds negative, but is actually positive and welcomed. What we mean is that they are challenging conventional methods of doing things and [in some instances] finding shorter, innovative ways to achieve the same result."

She says this ability to think differently, combined with technical or commercial qualifications, will help youth drive innovation across the renewable energy value chain.

South Africa's renewable energy sector is still young, but the growth trajectory is strong as the country works towards cleaner, more reliable energy sources. Beyond energy generation, renewable energy projects unlock unique opportunities for remote and under-served communities.

"A typical renewable energy plant has an operating lifespan of about 20 to 30 years, which means it is also a 20 to 30-year investment in the local communities where the plant is built," says Pienaar. "This unlocks opportunities like bursaries, job creation, vocational training, internship opportunities, support for local businesses and socio-economic development programmes."

For young South Africans considering their career paths, the renewable energy sector offers exciting employment prospects and the chance to build sustainable careers that contribute meaningfully to economic growth and community upliftment.

Reference

[1] https://www.mulilo.com/social-impact/

For more information visit: www.mulilo.com

Electrifying boilers to decarbonise industry

Zach Winn, MIT News

AtmosZero, co-founded by Addison Stark SM '10, PhD '14, developed a modular heat pump to electrify the centuries-old steam boiler.

More than 200 years ago, the steam boiler helped spark the Industrial Revolution. Since then, steam has been the lifeblood of industrial activity around the world. Today the production of steam – created by burning gas, oil, or coal to boil water – accounts for a significant percentage of global energy use in manufacturing, powering the creation of paper, chemicals, pharmaceuticals, food, and more.

Now, the startup AtmosZero, founded by Addison Stark SM '10, PhD '14, Todd Bandhauer, and Ashwin Salvi, is taking a new approach to electrify the centuries-old steam boiler. The company has developed a modular heat pump capable of delivering industrial steam at temperatures up to 150 degrees Celsius to serve as a drop-in replacement for combustion boilers.

The company says its first 1-megawatt steam system is far cheaper to operate than commercially available electric solutions due to ultra-efficient compressor technology, which uses 50% less electricity than electric resistive boilers. The founders are hoping that's enough to make decarbonised steam boilers drive the next industrial revolution.

"Steam is the most important working fluid ever," says Stark, who serves as AtmosZero's CEO. "Today everything is built around the ubiquitous availability of steam. Cost-effectively electrifying that requires innovation that can scale. In other words, it requires a mass-produced product – not one-off projects."

Tapping into steam

Stark joined the Technology and Policy Programme when he came to MIT in 2007. He went on to complete a dual master's degree – adding mechanical engineering to his studies.

"I was interested in the energy transition and in accelerating solutions to enable that," Stark says. "The transition isn't happening in a vacuum. You need to align economics, policy, and technology to drive that change."

Stark stayed at MIT to earn his PhD in mechanical engineering, studying thermochemical biofuels.

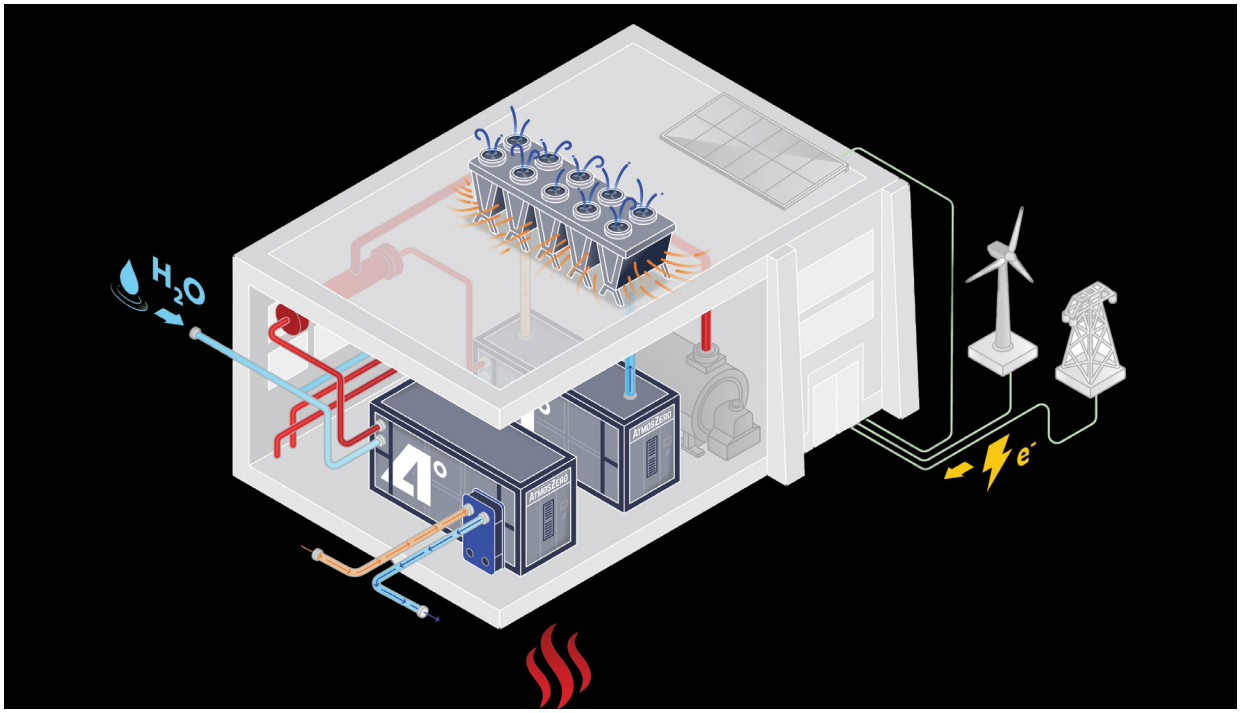
After MIT, he began working on early-stage energy technologies with the Department of Energy's Advanced Research Projects Agency – Energy (ARPA-E), with a focus on manufacturing efficiency, the energy-water nexus, and electrification.

"Part of that work involved applying my training at MIT to things that hadn't really been considered for innovation for 50 years," Stark says. "I was looking at the heat exchanger. It's so fundamental. I thought, 'How might we reimagine it in the context of modern advances in manufacturing technology?'"

The problem is as difficult as it is consequential, touching nearly every corner of the global industrial economy. More than 2.2 gigatons of CO_2 emissions [1] are generated each year to turn water into steam – accounting for more than five percent of global energy-related emissions.

In 2020, Stark co-authored an article in the journal *Joule* with Gregory Thiel SM '12, PhD '15 titled, '*To decarbonize industry, we must decarbonize heat*' [2]. The article examined opportunities for industrial heat decarbonisation, and it got Stark excited about the potential impact of a standardised, scalable electric heat pump.

Most electric boiler options today bring huge increases in operating costs. Many also make use of factory waste heat, which requires pricey retrofits. Stark never imagined he'd be-



[Credit: Courtesy of AtmosZero]

"Steam is the most important working fluid ever," says AtmosZero co-founder Addison Stark.

come an entrepreneur, but he soon realised no one was going to act on his findings for him.

"The only path to seeing this invention brought out into the world was to form and run the company," Stark says. "It's something I didn't anticipate or necessarily want, but here I am."

Stark partnered with former ARPA-E awardee Todd Bandhauer, who had been inventing new refrigerant compressor technology in his lab at Colorado State University, and former ARPA-E colleague Ashwin Salvi. The team officially founded AtmosZero in 2022.

"The compressor is the engine of the heat pump and defines the efficiency, cost, and performance," Stark says. "The fundamental challenge of delivering heat is that the higher your heat pump is raising the air temperature, the lower your maximum efficiency. It runs into thermodynamic limitations. By designing for optimum efficiency in the operational windows that matter for the refrigerants we're using, and for the precision manufacturing of our compressors, we're able to maximise the individual stages of compression to maximise operational efficiency."

The system can work with waste heat from air or water, but it doesn't need waste heat to work. Many other electric boilers rely on waste heat, but Stark thinks that adds too much complexity to installation and operations.

Instead, in AtmosZero's novel heat pump cycle, heat from ambient-temperature air is used to warm a liquid heat transfer material, which evaporates a refrigerant so it flows into the system's series of compressors and heat exchangers, reaching high enough temperatures to boil water while recovering heat from the refrigerant once it reaches lower temperatures. The system can be ramped up and down to fit seamlessly into existing industrial processes.

"We can work just like a combustion boiler," Stark says. "Customers don't want to change how their manufacturing facilities operate in order to electrify. You can't change or increase complexity on-site."

That approach means the boiler can be deployed in a range of industrial contexts without unique project costs or other changes.

"What we really offer is flexibility and something that can drop in with ease and minimise total capital costs," Stark says.

From 1 to 1 000

AtmosZero already has a pilot 650 kilowatt system operating at a customer's facility near its headquarters in Loveland, Colorado. The company is currently focused on demonstrating year-round durability and reliability of the system as the team works to build out their backlog of orders and prepare to scale.

Stark says once the system is brought to a customer's facility, it can be installed in an afternoon and deployed in a matter of days, with zero downtime.

AtmosZero is aiming to deliver a handful of units to customers over the next year or two, with plans to deploy hundreds of units a year after that. The company is currently targeting manufacturing plants using under 10 megawatts of thermal energy at peak demand, which represents most US manufacturing facilities.

Stark is proud to be part of a growing group of MIT-affiliated decarbonisation startups, some of which are targeting specific verticals, like Boston Metal[3] for steel and Sublime Systems [4] for cement. But he says beyond the most common materials, the industry gets very fragmented, with one of the only common threads being the use of steam.

"If we look across industrial segments, we see the ubiquity of steam," Stark says. "It's a ripe opportunity to have impact at scale. Steam cannot be removed from industry. So much of every industrial process that we've designed over the last 160 years has been around the availability of steam. So, we need to focus on ways to deliver low-emissions steam rather than removing it from the equation."

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[3] https://news.mit.edu/2024/mit-spinout-boston-metal-makes-steel-with-electricity-0522
[4] https://news.mit.edu/2024/sustainable-cement-startup-sublime-eliminates-co2-gigatons-0809

For more information visit: https://news.mit.edu/

[Credit: Courtesy of AtmosZero]

Stark says once the system is brought to a customer's facility, it can be installed in an afternoon and deployed in a matter of days, with zero downtime.

SA does not lack plans but delivery systems

Acting Director General of the Department of Electricity and Energy, Subesh Pillay made the point at the recent CESA Infrastructure Indaba that, "South Africa does not lack plans or budget allocations [to deliver its infrastructure projects], but lacks a delivery system capable of consistently converting these into completed and functioning infrastructure assets".

In his keynote speech at the Consulting Engineers South Africa (CESA) Infrastructure Indaba 2026, held in Durban in mid-March, Pillay said, "Despite significant public infrastructure allocations over the medium-term, underspending and delays persist across national departments, state-owned entities and municipalities."

He noted further, "Infrastructure performance is not just lagging; it is structurally constrained. Gross fixed capital formation contracted in 2025, construction output declined, and the pipeline of projects entering the system has weakened."

This systemic delivery gap was starkly quantified by the Auditor General of South Africa's Deputy Business Unit Leader National, Tintswalo Masia, who revealed 292 material irregularities in national and provincial government for the 2023-24 year.

These irregularities stemmed from non-compliance, suspected fraud, and issues like payments for undelivered goods or services, unfair procurement, lost value for money, unrecovered revenue, late payment penalties, and wasteful spending, resulting in R14.3 billion in losses. The AG logged 446 irregularities in local government causing R8.47 billion in losses.

Positively, she noted that recovery efforts have yielded R1.3 billion overall (R709.26 million recouped, R244.12 million prevented, R370.24 million pending), highlighting procurement reforms' potential to turn underspending into assets.

Nonetheless, Pillay suggested that infrastructure expansion requires a fundamental reconfiguration of resources, rebuilding an ecosystem of skilled engineers and investments in project preparation capacity, amid global supply chain pressures and long lead times for specialised equipment. He highlighted that projects that form part of the Integrated Resource Plan (IRP 2025) alone would require an estimated generation investment pipeline in the order of R2 trillion to R3 trillion, which would require careful planning and allocation.

"Engineers play a central role in project preparation, procurement and asset management, and we need joint accountability between government and the profession to shift from planning to execution," he stated.

From left: CESA CEO Chris Campbell, Acting Director General of the Department of Electricity and Energy, Subesh Pillay, and CESA President, Dr Vishal Haripersad.

This view was shared by CESA President, Dr Vishal Haripersad, as he urged early integration of engineers into decision-making processes. "Pioneering change requires that engineering insight helps shape strategies, budgets and national priorities," Haripersad said. In his opening address at the indaba he emphasised that when engineering expertise informs decisions early, infrastructure performs better, lasts longer, and delivers greater value to society.

"Infrastructure represents public trust made concrete. When governance fails, when quality is compromised, or when corruption takes root, the consequences are felt not in reports or balance sheets, but in communities and livelihoods. This is why transparency, professional standards, and ethical leadership remain essential to building infrastructure that serves the public good," Haripersad said.

Acknowledging the shortage of some 60 000 professionals in the engineering industry, Haripersad's insights were echoed in other sessions that amplified these themes. The need for development of young professionals and for mentorship and investment was in focus in the session on 'Transformation: Advancing an inclusive engineering profession through BBBEE, employment equity targets, and diversity initiatives' which was facilitated by Sechaba Kou of Isao Consulting.

Jabulile Msiza, CESA Vice-President and Director at Jones & Wagener, highlighted mid-career progression bottlenecks in mentoring, registration and retention, noting that consulting engineering firms in some cases advance juniors but stall at senior targets. She added that many engineers in this timeframe have often moved into other sectors or found employment in overseas companies, which further constrains the skills development in South Africa.

Ntsoaki Mamashela from the Department of Employment and Labour clarified that sectoral employment equity targets are flexible guidelines, not quotas, to diversify senior levels and seize opportunities. Sekadi Phayane-Shakhane, SAICE CEO, highlighted the low representation of women, despite 65% youth membership, advocating for intentional inclusion, mentorship, and professionalisation as pillars of infrastructure success.

Further sessions addressed capacity building to support excellence in professional engineering in public and private sectors, and engineering, procurement, and delivery models for infrastructure. In this session, participants from both public and private sectors shared their insights on how infrastructure ecosystem role players could activate an accountability ecosystem to address the root causes of poor institutional integrity, a lack of accountability and consequence management.

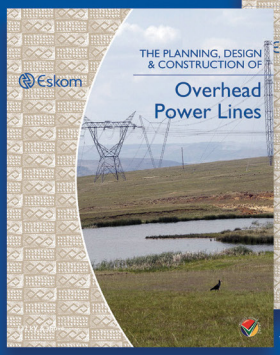
CESA CEO Chris Campbell closed the first day of the event highlighting that the country's infrastructure sector requires bold thinking, strong collaboration and capable institutions to unlock the full potential of infrastructure as a catalyst for economic growth, job creation and social development.

"The conversations today speak directly to the role that engineering leadership, policy direction and collaboration must play in shaping infrastructure that supports sustainable economic growth and meaningful development across South Africa," Campbell said.

For more information visit: www.cesa.co.za

Eskom

The Eskom Power Series was conceived in response to the continuing worldwide loss of critical technical skills and experience. The aim of the series is to promote international best practice, including experience acrued by Eskom over the years, as a guide and legacy and to serve as a source of reliable, reputable and highly technical information.



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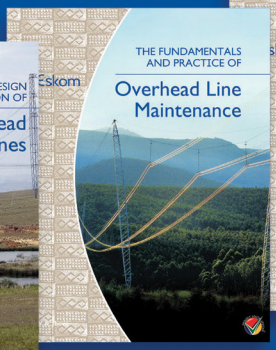

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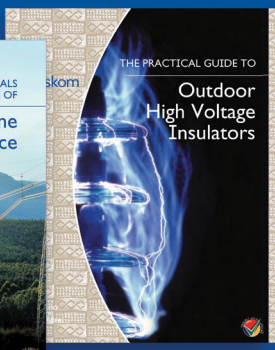

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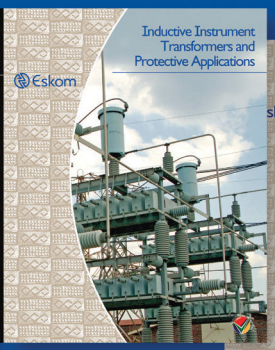

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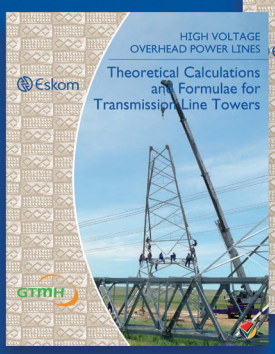

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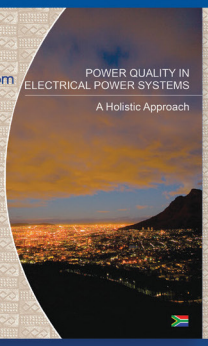

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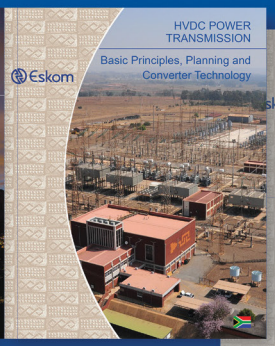

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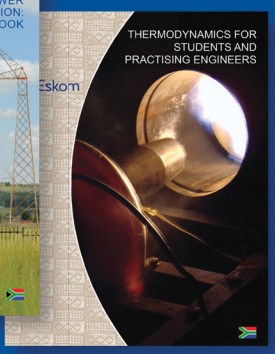

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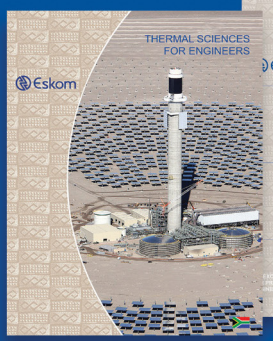

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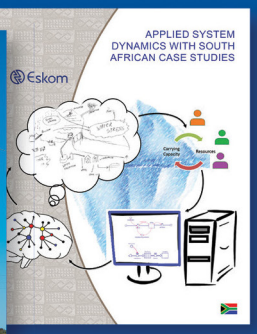
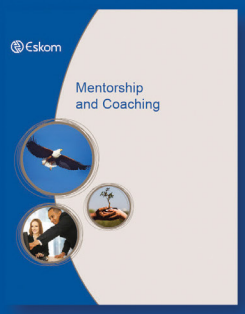


Volume 13: Applied System Dynamics with South African Case Studies

The Eskom Leadership & Management Series was introduced by Eskom at the request of readers and stakeholders of the Power Series who felt that the series should be expanded to include non-technical topics. These topics are often not well understood by technical practitioners and can pose a risk to the sustainability of their businesses. To date, the Power Series team, with assistance from experts in the various fields, has produced two volumes.



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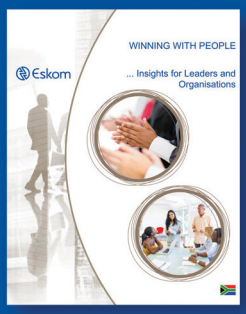

Volume 2: Winning with People ... Insights for Leaders and Organisations

Volume 1: Procurement Management Key Concepts and Practices

Based on the success of the Eskom Power Series and the Eskom Leadership & Management Series, the Professional Development Series was created. It aims at developing various professions within South Africa so that large state-owned enterprises and the private sector can grow and facilitate job creation in the country. Unlike the Power Series, both the Eskom Leadership & Management Series and the Professional Development Series have a broad readership, including those residing in the private sector, State Owned Companies (SOCs) and academic institutions.

Eskom has also published: GENERATION, TRANSMISSION AND DISTRIBUTION: A large Southern African utility. This is an introduction to the technology that has developed, over time, in response to growing demand in the electricity utility industry in South Africa. It provides a 'soft-landing' for those who need, or want, to engage with the technology in a large electricity utility.

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Sustainable Industrial Spaces Programme

A partnership that is enabling the advancement of greener, low-carbon industrial spaces in South Africa

Industrial spaces are catalysts for economic growth and vital enablers of sustainable industrial development.

The National Cleaner Production Centre (NCPC) is leading national efforts to catalyse sustainable industrial development within SA's industrial spaces. Together with the Department of Trade, Industry and Competition (**the dtic**), and the United Nations Industrial Development Organization (UNIDO) the NCPC supports these economic hubs to reduce environmental impact, develop sustainable energy models and support the national vision of a low-carbon economy.

The four high-impact, donor-funded projects implemented by the NCPC and UNIDO, at varying stages of implementation.

Visit: www.ncpc.co.za to view Sustainable Industries 2025 conference sessions

- Global Eco-Industrial Parks Programme (GEIPP)
- Sustainable Energy Systems for Industrial Development Project (SESID)
- Global Clean Hydrogen Programme
- Low Carbon and Positive Energy in Industrial Spaces (TBC)

Funding partners

the dtic
Department:
Trade, Industry and Competition
REPUBLIC OF SOUTH AFRICA

Schweizerische Eidgenossenschaft
Confédération Suisse
Confederazione Svizzera
Confederaziun Svizra
Swiss Confederation
Federal Department of Economic Affairs FDEA
State Secretariat for Economic Affairs SECO

gef
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