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energy + information in industry

South Africa's renewable energy sector continues to grow as the energy transition progresses and the country moves towards a liberalised, competitive, electricity market, placing new demands on the transmission grid.

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SA's young scientists compete with the best

As I write this, I have just returned from the 'far west' of the planet having attended the Regeneron International Science and Engineering Fair (ISEF), a programme of the Society for Science and the Public in the USA.

The ISEF is the largest pre-college science and engineering fair internationally, attracting well over 1 700 young scientists from across the world. They are judged based on the quality of their work presented at the fair.

Although there are many special awards, made by groups and institutions interested in specific attributes of the competitor and their work – for instance, the award of a scholarship to study at a university close to the youngster's hometown – the really significant awards are the Grand Awards.

Grand Awards judges are selected from industry, research, academia – and from across all nations. Their task is to identify the work deserving gold, silver, bronze and 4th awards in each category – where typically a category will have one gold award, and possibly three silver awards and so on. It is a remarkably competitive environment.

In South Africa, the Eskom Expo for Young Scientists is the local fair affiliated to the ISEF, and each year selected South African youngsters have the chance to compete against the very best in the world at ISEF. No amount of speaking and sharing can ever compensate for actually being there, being part of the fair, and engaging with other young people who share your own passions.

In my view, what happens at ISEF is that bright young people discover that they are part of a growing and vibrant international group of like-minded youngsters who can only see a better world driven by Science, Technology, Engineering and Mathematics.

And so it should be! These are our people! They are the real 'rock stars' of the future, these are the youngsters who will build our collective future.

Based on my observations, I would rate this year's ISEF as having the highest overall standard I have ever seen at the fair. It is undeniable that the whole Covid pandemic affected basic education around the world – but it is clear to me that we are more than over that hiccup now. And it is heartening to see this.

It means young scientists, and their educators, are right on top of the latest challenges, the latest technologies, and the latest tools to add value to research.

And of course, AI is part of the deal. It is to be embraced, but to be used ethically and smartly, as it should be. I recall that when I was at school, we were allowed to use calculators… now, that may be obvious to some, but it was not a common trend back then. Many thought it was the worst possible thing that could be done. Well, we survived, and frankly had a far better education, pushing far more boundaries than folk limited to log books and counting on their fingers…

While I was at the ISEF, I was reminded that I have been a Grand Awards judge there for 15 years now, and a Co-Chair for seven. Time flies when you are having fun, doesn't it?

It is my fervent view that the Eskom Expo for Young Scientists must continue to participate in this pinnacle event – and challenge our own basic education system to step up and reach the general standards that we know it is capable of – indeed, that we know it has to reach if, as a nation, we are going to hold our own on the planet!

Our top performing learners are world class, of that there is no doubt, but we need to lift everyone up to those levels. We have no time to waste, and we have no option!

Ian Jandrell

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

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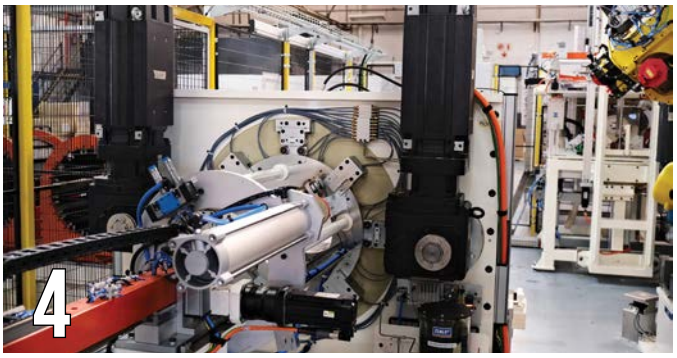

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AEF returns to Cape Town this year

At a time when governments and investors are focused on industrial growth, grid expansion, energy security and regional competitiveness, South Africa remains one of the continent's most closely watched energy markets – from electricity reform and generation capacity to infrastructure delivery, battery storage, nuclear energy and industrial innovation.

The Africa Energy Forum (aef) 2026, to be held at the Cape Town International Convention Centre from 16 to 19 June, welcomes a strong South African public sector delegation, bringing together ministers, regulators, utilities and state agencies.

Minister of Electricity and Energy Dr Kgosientsho Ramokgopa will lead the South African delegation and will host key conversations, steering the continent-wide industrialisation and production hub discussions.

Deputy Minister, Samantha Graham-Maré, will also be participating and she will join Dan Marokane, GCE of Eskom, and others, in the opening session to explore investment, partnerships, and opportunities in South Africa.

Further public sector institutions to be represented include the National Energy Regulator of South Africa (NERSA), the IPP Office, the Nuclear Energy Corporation of South Africa (NECSA), the South African National Energy Development Institute (SANEDI), Department of Mineral & Petroleum Resources, and the Central Energy Fund (CEF).

As governments, utilities and investors focus increasingly on industrial growth, energy security and infrastructure delivery, South Africa's presence at aef 2026 reflects the country's central role in Africa's energy and industrial landscape.

More widely, Africa's transmission sector, now seen to be entering a new phase, will be in focus. Projects once viewed as too complex or too dependent on public funding are moving into execution – with private capital increasingly entering the grid.

As governments accelerate industrialisation strategies, transmission is increasingly becoming the critical infrastructure challenge. In South Africa, NTCSA's Transmission Development Plan aims to deliver 14 500 km of new transmission infrastructure over the next decade as the country looks to unlock renewable capacity, strengthen grid resilience and support long-term industrial growth. At aef 2026, senior leaders from across the public and private sectors, including local and international financial development institutions, will debate what comes next for transmission investment, open access and regional power.

For more information visit: https://info.energynet.co.uk

Made in Africa, for Africa

Manufacturing Indaba is set to take place on 14 and 15 July at the Sandton Convention Centre in Johannesburg.

Africa is home to 15% of the world's population and abundant resources, yet it contributes only around 3% to global manufacturing. Manufacturing is fundamental to economic growth, driving job creation, trade, and industrial development across the continent. It offers a pathway to self-sufficiency and creating new markets.

Yet, Africa's manufacturing sector struggles with import dependency, underinvestment, trade barriers, and a skills shortage. Strengthening local production, innovation, and industrial collaboration is key to building a resilient, competitive sector.

Manufacturing Indaba is an established annual event dedicated to driving Africa's reindustrialisation, supporting local manufacturing, connecting leaders, and empowering businesses to grow.

The event brings together industry leaders, policymakers, and investors to tackle challenges and unlock opportunities relating to manufacturing. The conference programme is geared to generate dynamic discussions and networking opportunities to shape Africa's manufacturing future, opening routes to expand markets, adopt advanced technologies, and shape industrial policy.

The programme is structured to cover a spectrum of key current issues including:

- Localisation & industrial strategy
- AI, automation & Industry 5.0
- Sustainability & Green manufacturing
- Market access & Trade expansion – leveraging AfCFTA and regional trade agreements
- Investment & incentives - understanding the financial support programmes available, and building public-private partnerships
- Workforce & skills development.

For more information visit: https://manufacturingindaba.co.za/

Industrial innovations at Electra Mining Africa 2026

Emerging innovations are transforming the South African mining, manufacturing, industrial and automation sectors and driving the deployment of advanced technologies and solutions across operations. Innovations in mechanisation, automation and digitisation are improving safety and productivity in mines, production facilities, industrial plants and warehouses. To deliver real value, these technologies must be cost-effective and designed to address practical, people-centred industry challenges.

The current growth in automation is impacting local industries positively – facilitating investment in innovation, data analytics and skills development, and helping to develop local competitiveness and export potential as local African solutions are adapted to be exported regionally and globally. South African engineers are leaders in innovation and technology development. Many of these innovations and newly automated systems will be on display at Electra Mining Africa 2026, the largest trade-show of its kind in Southern Africa, set to take place at Nasrec in Johannesburg in September.

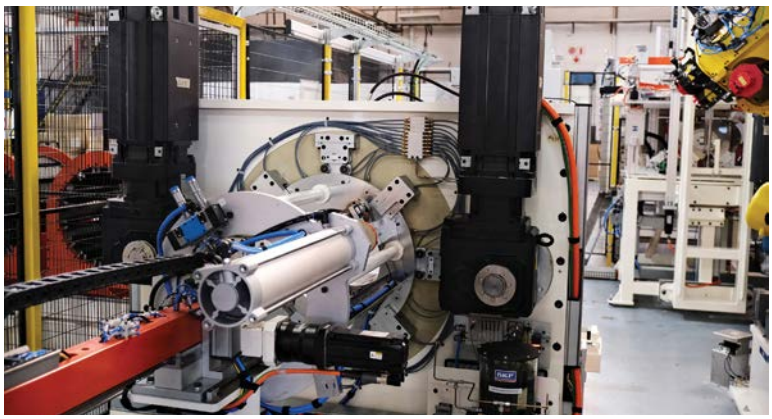
For example, automation software for CNC specific user interfaces that simulate part machining using real-time data will be on show, as will new developments in intelligent, digitally-enabled power solutions for modern, mission-critical facilities. Specialised industrial sensing and monitoring technologies that ensure the reliability of data feeding into industrial systems will also be on display – demonstrating digital speed, position and condition monitoring solutions designed for use in demanding industrial environments.

These and many other new technologies from more than 1 000 exhibitors will be on display across different zones at Electra Mining Africa, which this year will run from 7 to 11 September.

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

Ensuring precision in automotive ‘shrinker’ machines

Jendamark Automation’s innovative catalytic converter ‘shrinker’ machine, designed and built in South Africa for export worldwide, uses SEW-EURODRIVE’s advanced servo-geared units and motion control software for its precision operation. The highly automated assembly cell integrates multiple machines, robots and laser measurement systems.



SEW-EURODRIVE servo gear units and motion control software ensure dynamic precision in Jendamark Automation’s catalytic converter shrinker machine.

Based in Gqeberha in the Eastern Cape, Jendamark Automation is a specialist in advanced automated assembly systems for powertrains, catalytic converters, hydrogen technologies and various automotive components. About 95% of Jendamark’s locally produced systems are exported to markets in Europe, India and the USA. Yanesh Naidoo, Executive Innovations Director at Jendamark Automation, explains the shrinking machine – or ‘shrinker’.

“This is a core component within our catalytic converter assembly cell. The cell is a highly automated production environment in which machines, robots and laser measurement systems operate in coordination.”

The process begins with the core of a catalytic converter – a ceramic ‘brick’ or monolith, coated with precious metals such as platinum and palladium, that converts exhaust gases into less harmful emissions. This brick is wrapped in a thick spring-like insulation mat and inserted into an outer casing (or can) of stainless steel.

Naidoo says that in this process, there are many variable factors to consider. “Because the ceramic monolith is extruded and baked, its diameter can vary slightly – by two or three millimetres in a passenger vehicle converter and up to ten millimetres in a truck converter. This makes the size of every monolith slightly different.”

To secure the monolith inside the casing with the right spring load, the casing itself has to be adapted. This is the key function of the shrinking machine – to reshape the stainless steel casing to the exact diameter required for each brick and mat combination. Shrinking stainless steel to tolerances of 50 microns requires enormous force and control, which the shrinker achieves by closing a set of heavy tapered segments around the can.

“For a passenger vehicle converter, we use twelve segments, and for a commercial vehicle converter, which is larger, we use sixteen,” Naidoo says. “We pull a massive steel ring back over those segments and as the ring moves the segments close in, collapsing the can evenly around the monolith.”

Servo motor systems

Driving that motion are two powerful SEW-EURODRIVE servo motor systems, each connected to precision roller screws that pull the ring from both sides. Synchronising the drives is critical.

“If one side is pulled just a few millimetres more than the other, this will damage the very expensive roller screws,” Naidoo explains. “This is where we rely on SEW-EURODRIVE’s technology; the drives and controllers keep the two motors synchronised to within very fine tolerances, even at the high speeds we need to hit our 30-second cycle times.”

The speed at which Jendamark Automation’s shrinker operates is one of its critical advantages, Naidoo emphasises, and this has been achieved through its innovative tool changer. He notes that flexibility is particularly important in converter production for commercial vehicles as variants change every few hours. Traditionally, each change required a lengthy manual tool change, which would mean two to three hours of downtime.

“This is why we developed an automatic tool change system for the shrinker,” he says. “We have two cartridges outside the machine, one of which is preloaded with the next set of 16 segments. When the operator hits ‘tool change’ the machine ejects the old set, inserts the new one and locks everything down – all automatically – in about 45 seconds.”

That innovation, also powered by SEW-EURODRIVE servo drives, has transformed productivity.

“We have reduced tool changing times significantly, giving our customers more production time per shift, allowing them to produce around 80 additional parts,” he says. “With two or three tool changes a day, the gains are massive.”

The entire catalytic converter assembly cell can contain up to 30 SEW-EURODRIVE servo drives, powering and synchronising various machines – from laser measuring systems to robotic handlers. Behind the scenes, Jendamark’s proprietary Variant Manager software orchestrates these movements.

“Every part coming down the line is slightly different, so every 30 seconds a new set of parameters – such as diameters, spring loads and positions – is sent to the drives,” Naidoo says. “There are no fixed positions; it is completely dynamic, adapting in real time.”

Parallel to this performance, he adds, is an equivalent focus on reliability as customers require minimal downtime to ensure their processes and products remain viable. He notes that a USA customer, Cummins (through its acquisition of Faurecia’s USA factory), has been running Jendamark’s shrinker for almost six years, during which time it has produced over three million catalytic converters.

Continued on page 5

Technology convergence is redefining competitive advantage

A recently released World Economic Forum report indicates that competitive advantage is shifting from owning key technologies to combining them across data, people and ecosystems. It suggests that the next wave of competitive advantage will come not from individual breakthrough technologies but from the ability to combine and scale multiple technologies across entire operating systems.

As artificial intelligence, robotics, advanced materials, spatial computing and next-generation energy systems mature simultaneously, the organisations and countries moving fastest to apply these technologies together in intelligent systems are already pulling ahead.

The report, *Technology Convergence: The New Logic for Competitive Advantage*, produced in collaboration with Capgemini, draws on cross-industry research and real-world case studies in 12 sectors, identifying recurring patterns, including the blending of mature and experimental technologies and the blurring of industry boundaries, that determine whether convergence scales or stalls.

"Breakthrough technologies are advancing rapidly, and value is created when they are applied together," said Cathy Li, Head of the Centre for AI Excellence and Member of the Executive Committee, World Economic Forum. "The real differentiator is not who owns the most advanced tools, but who can combine them across systems and applications at scale."

As advanced technologies scale, the main bottlenecks to competitive advantage are no longer time or materials but how well organisations connect digital tools with physical operations. This is already playing out across sectors and geographies. From factory floors and power grids to research labs and healthcare, converging technologies are reshaping how systems perform worldwide.

In the United Kingdom, surgical robots are extending clinicians' capacity and preserving workflow continuity across care teams. In China, automated labs are linking robotics, AI and data platforms to accelerate discovery as they coordinate workflows across research networks.

The advantage of combining technologies carries implications for companies as well as national growth strategies and industrial policy.

"Technology convergence has evolved from a technical discussion into a strategic leadership mandate with direct operational impact," said Aiman Ezzat, CEO of Capgemini Group. "Competitive advantage increasingly depends on an organisation's ability to integrate technologies, teams, partners and operating processes into coherent systems that deliver value at scale. Leaders who master orchestration, not just adoption, are translating convergence into sustained performance and growth."

Jeremy Jurgens, Managing Director of the World Economic Forum added: "This shift has implications for companies as well as for national growth strategies and industrial policy. Economies that align talent, infrastructure, data and policy will be better positioned to capture the benefits of converging technologies in a fast-shifting global landscape."

The report is part of the World Economic Forum's Technology Convergence Initiative, launched in 2024, and builds on the first edition published in 2025. It draws on two years of cross-industry research, including interviews with experts, workshops and case studies.

For more information visit: www.weforum.org

Continued from page 4

"Apart from greasing the screws, there has been no major maintenance required and no drive failures at all," he says. "That is a testament to the robustness of our overall design and the reliability of SEW-EURODRIVE equipment."

The customer was so impressed that it decided to standardise globally on Jendamark's machines.

"They had two other suppliers' machines next to ours on the same line," Naidoo says. "Now they're replacing those with Jendamark machines, because of reliability and consistency of quality."

Advanced motion control

Phillip Steyn, Branch Manager at SEW-EURODRIVE in Gqeberha, says the project exemplifies how advanced motion control systems enable complex automation.

"Our MOVIAXIS multi-axis servo system, combined with our efficient servo motors and dynamic gearboxes, provides the accurate positioning and torque this machine needs," Steyn says. "The challenge was to deliver very high torque while maintaining precise synchronisation and feedback at high speeds."

He says it is easier to be accurate when machinery is moving slowly, but it becomes much more challenging in the context of high-speed machines like this one. SEW-EURODRIVE's control architecture ensures that every motion – from the synchronised pulling of the ring to the positioning of the auto-tool change mechanism – is tracked and verified before the next cycle begins.

"There is a great deal of feedback between the drive and the upper level controller," Steyn explains. "The system scans the input data – the product types and can sizes – and adjusts torque and position in real time. It is the brain and the muscle working together."

Naidoo highlights the value of SEW-EURODRIVE's integrated unit – the motor, gearbox and drive – which is already matched for torque and speed.

For more information visit: www.sew-eurodrive.co.za

Efficiency and traceability in feed production

As South Africa's poultry industry continues to evolve in response to rising demand, cost pressures, and stringent quality requirements, producers are increasingly turning to advanced automation systems to optimise operations. At Sovereign Foods, one of the country's leading poultry suppliers, a large-scale automation project has delivered significant gains in efficiency, traceability, and operational control.

Working in partnership with proudly South African industrial software leader Adroit Technologies, Sovereign implemented the Mitsubishi Adroit Process Suite (MAPS) across a key feed production facility, creating a scalable, integrated system capable of supporting current operations and future expansion.

Bradley Campbell, Adroit Technologies.

Dominik Zabiegaj, MAPS Project Engineer, says, "The system is fully integrated, from materials and recipes through to batching and reporting. Everything is built into the platform, which means no separate systems or add-ons are needed."

Integrated SCADA and PLC layers

"From a project perspective, one of the biggest advantages of the MAPS suite is the reduction in engineering time," says Bradley Campbell, National Sales Manager. "Because the SCADA and PLC layers are integrated, the engineering effort is, in effect, halved, complexity is reduced, and the quality of the system is improved. That translates directly into cost savings for the customer, along with the benefit of strong local support."

Neil Hewitt, Sovereign Foods.

Starting in 2019, the project was implemented in phases, allowing Sovereign to align the system rollout with broader operational goals and capital planning. By the time Senior Production Manager Neil Hewitt joined the business in late 2020, the system had been installed but was not yet fully operational.

"I came on board to manage the mechanical and electrical aspects of the project," Hewitt explains. "I was involved in the commissioning phase and understanding how the system interacts with the plant. From there, it was about refining the system to ensure it works optimally from an operator and maintenance perspective."

Reduced engineering complexity

The integrated SCADA and PLC functionality on the MAPS platform in a single environment significantly reduces engineering complexity. It also meets a further key requirement for Sovereign – ensuring that the system is intuitive and accessible for operators at all levels.

Integrated automation enhances visibility and control across poultry operations.

According to Hewitt, this has been one of the standout successes of the project. "For the end-user, the system is far more user-friendly than others I have worked with," he says. "The graphics are clear, it is easy to see where faults are, and operators can quickly understand what is happening in the plant."

This usability extends beyond operations into maintenance and troubleshooting. "It is not just about running the plant, it is also about maintaining it," adds Hewitt. "The system makes fault-finding and troubleshooting very straightforward, which reduces downtime and helps us keep the plant running efficiently."

Processing live operational data

One of the most powerful aspects of the MAPS system is its ability to capture and process live operational data. This provides Sovereign with deeper insight into performance, energy usage, and production efficiency. "The system allows us to gather a significant amount of live data that we can use to continually improve our processes," says Hewitt.

"We can extract it into reports, track efficiencies, and monitor electricity usage. We have only scratched the surface of what is possible." This data-driven approach enables more informed decision-making and supports continuous improvement across the operation.

Traceability supports quality control

In a highly regulated industry like animal feed production, traceability is critical. The MAPS system provides full visibility across the production process, from raw material intake to final product delivery. "Traceability is one of the most important aspects for us," Hewitt adds.

"We can track materials from the point they enter the plant, through batching and processing, to the final product delivered to farms." This level of detail supports quality control and risk management.

"If there ever is an issue, we can trace exactly what was used, where it came from and where it went, within minutes. A further benefit is that if something is out of specification, the system will stop the process immediately. That allows us to address issues in real time, rather than after the fact."

Operational consistency

Technically, the MAPS platform delivers a high degree of integration and standardisation, simplifying initial deployment and future modifications. This standardisation also benefits long-term maintenance and scalability.

"By standardising on MAPS, any contractor can come into the plant and quickly understand the system," Zabiegaj highlights. "It makes fault-finding easier and ensures consistency across the operation."

Additionally, the system architecture enables expansion without significant re-engineering. "It is based on a client-server model, so if the plant grows, the user can simply upgrade licences and add more I/Os or PLCs. There is no need to redesign the system," says Zabiegaj.

Sovereign designed the system with future expansion in mind, ensuring additional capacity and functionality could be added with minimal disruption. "We took a phased approach and built in the capability for expansion from the start," says Hewitt.

"That means we can add new equipment and functionality without major changes to the infrastructure." This flexibility has already been demonstrated, with additional plant capacity introduced in 2023. "It is

largely a matter of programming and commissioning, rather than extensive new hardware," says Hewitt.

Advanced automation features

The system also offers advanced automation features that can enhance efficiency over time.

"There are capabilities around automated routing, prioritisation and production optimisation that we haven't made full use of yet," notes Hewitt. "But the functionality is there, and it gives us a clear path for future improvements."

Beyond the technology, the success of the project has been underpinned by strong collaboration between Sovereign and Adroit Technologies. "There was a lot of communication throughout the process, especially during commissioning," says Hewitt. "Any challenges were addressed quickly, and the support has remained strong."

Delivering automation projects

For Campbell, this reflects a broader shift in how automation projects are delivered. "It is not just about supplying a product. It is about building a long-term partnership," he says. "As the customer's needs evolve, the system evolves with them."

Today, the MAPS implementation is delivering clear benefits across Sovereign's operations, including improved efficiency, reduced downtime, and enhanced product quality. "From my perspective, the system is reliable, user-friendly and continues to improve as we build on it," Hewitt says. "It has made a real difference to how we operate."

As the poultry sector continues to face increasing pressure to optimise performance and maintain strict quality standards, integrated automation solutions such as MAPS are set to play an increasingly important role in enabling sustainable, scalable growth.

For more information visit: www.adroitscada.com

Control systems + automation: Products + services

2DJET™ – A new coding class for product packaging

At interpack in May this year, LEIBINGER unveiled its 2DJET™, a new coding class and a completely new approach to industrial coding and marking. Built to solve a key challenge currently facing the packaging industry – the transition to GS1 2D codes – 2DJET delivers razor-sharp, GS1-compliant 2D codes at up to 300 dpi and printing speeds of up to 120 m/min across a wide range of packaging materials and formats, without compromising productivity or flexibility. It is designed for seamless integration into existing production lines and is easy to install and operate, helping manufacturers simplify implementation and GS1-compliant day-to-day production.

2D codes – setting the pace for the future

In packaging, across food, beverage, pharmaceuticals, and FMCG, 2D codes are rapidly becoming the new standard. They promise more data in less space, improved traceability, greater flexibility in information management, stronger consumer engagement, and better control across the value chain – with relevance extending to emerging requirements such as the EU Digital Product Passport.

[Source: Paul Leibinger GmbH & Co. KG]

Real print samples: 2DJET™ delivers razor-sharp, GS1-compliant 2D codes at up to 300 dpi and printing speeds of up to 120 m/min across a wide range of packaging materials and formats.

With GS1 standards gaining momentum globally, the strategic importance of 2D codes is clear. How to implement them in real production environments is what needs to be resolved – where speed, uptime, cost-efficiency and maximum flexibility across a variety of packaging materials still define success. And this is where theory and practice have often diverged.

A new approach

LEIBINGER is taking the next step in industrial coding. As an innovation leader in CIJ, the company brings decades of expertise in high-speed high-reliability coding. It also offers extensive ink know-how, built on the development and in-house manufacturing of a broad ink portfolio. With 2DJET, LEIBINGER is introducing a new coding class developed specifically for the next generation of packaging requirements.

The new system features a continuous ink supply designed for uninterrupted production. It delivers clear codes at up to 300 dpi and printing speeds of up to 120 m/min, with the capability to print QR codes in up to 33 x 33 modules. Built on LEIBINGER's deep understanding of industrial coding in real production environments, this newly developed approach redefines what manufacturers can expect from 2D coding.

For a wide range of packaging

For packaging manufacturers, this new coding class has been designed for print quality and to meet practical production needs. As a touchless printing technology, 2DJET brings with it the core advantages that have made CIJ successful in industrial environments. It can be used across various packaging materials and for different product shapes and surface conditions – from flat to curved, and from smooth to more challenging surfaces.

With a throw distance of 8 mm, the compact printhead can be integrated into production lines with a high degree of flexibility, making installation easier even where space is limited or packaging geometries vary.

Having demonstrated the prototype at interpack, LEIBINGER is planning pilot trials and demo installations for the end of this year and commercial launch of 2DJET in early 2027

For more information visit: www.leibinger-group.com

Smart milling – efficiency, consistency and competitiveness

Digitalisation, automation, and data-driven decision-making are transforming the global milling industry. The SmartMill approach is emerging as a pathway to improved efficiency, consistency, and competitiveness. Swiss technology company Bühler highlighted these developments at the 90th congress of the National Chamber of Milling (NCM) held earlier this year in Knysna, Western Cape.

Speaking at the event, Fabio Curatolo, Senior Customer Relationship Manager at Bühler Southern Africa, outlined how the SmartMill concept is helping millers respond to growing operational pressures, tighter margins, and increasing quality and compliance demands.

Fabio Curatolo, Bühler Southern Africa.

Curatolo explains that SmartMill is not a product, but a concept, incorporating hundreds of complementary innovations designed through close collaboration with the industry. It represents a shift towards more connected, transparent, and automated milling operations. Integrating sensors, digital platforms, and advanced analytics, mills can move from manual checks and experience-based decisions to real-time data-driven process control.

"The SmartMill means using connected equipment, sensors and software to make milling operations more predictable and responsive," says Curatolo. "Operators can rely on real-time data to maintain optimal performance, ensure consistent quality, and react faster to deviations."

A complex operating environment

Like other industrial operations, millers today face a complex operating environment. Variable raw material quality, rising energy and utility costs, maintenance reliability challenges, and skills shortages are making consistent production performance more difficult to maintain. At the same time, the market is demanding tighter margins, greater traceability, and higher standards of food safety and quality.

"In South Africa, these pressures are more pronounced as a result of energy instability and rising operating costs," notes Curatolo. "SmartMill technologies help millers address these challenges by improving process control, strengthening traceability, and making operations more resilient."

Digital monitoring and data collection play a central role in this transformation. "Data turns milling from a 'best effort' operation into a controlled, evidence-based process," he says. "By analysing trends and detecting changes early, mills can adjust parameters proactively, prevent downtime, and maintain consistent output."

The SmartMill approach

Bühler supports millers in transitioning to smart milling through a process that spans consulting, engineering, digital solutions, and ongoing operational support. "Our goal is to help millers translate data into measurable improvements in yield, energy use, and plant performance," says Curatolo. The technologies that help to enable this transformation include advanced automation systems, digital production management platforms, and specialised process optimisation tools. For example, Bühler's digital platforms like Bühler Insights and ProPlant allow millers to organise and monitor maintenance, production, and process data in real time. Solutions such as temperature and vibration monitoring help optimise grinding performance and reduce energy consumption.

One advantage of the SmartMill approach lies in it being an incremental journey rather than an abrupt change. This allows customers to join at the point that best suits their business, then the pace and direction of the journey is up to each company.

Bühler says anyone thinking of being part of the journey going forward, should be thinking now about installing sensor technology and the connectivity that offers the necessary production transparency to inform decision making. This is the foundation for the whole SmartMill process.

Increasing digitalisation

Curatolo expects digitalisation in the milling sector to accelerate significantly over the next decade. "We expect to see wider use of automation, with AI-driven analytics for process optimisation, predictive maintenance, and to meet the increasing requirements for full traceability across the value chain," he says. "Sustainability will also be a major driver, pushing mills to reduce energy use, emissions, and waste, as well as improving resource efficiency."

However, Curatolo emphasises that a successful SmartMill journey requires more than installing new technologies. "The SmartMill works best when it is implemented as a practical, step-by-step programme," he says. "Clear performance targets, a reliable data foundation, and strong operator engagement are essential. When those elements come together, the result is more efficient, resilient, and competitive milling operations."

Innovation remains at the core of Bühler's long-term competitiveness and its ability to create impact for customers. In 2025, R&D expenditure amounted to 4.8% of turnover and the Bühler Group launched 60 new products successfully into the market, reinforcing its commitment to purposeful innovation driving performance and sustainability. The group's innovation capability is supported by Bühler's global innovation network of 26 research and training centres.

For more information visit: www.buhlergroup.com

30 years of TwinCAT – a single platform for all automation functions

For 30 years, TwinCAT by Beckhoff has provided an integrated software foundation for PC-based control technology across all industries and automation functions.

The introduction of TwinCAT in 1996 marked a decisive evolutionary step in the model for PC-based control. With the switch from DOS to Windows, programming in accordance with IEC 61131-3, and integrated engineering, Beckhoff created a solution based on the principle of separating hardware and software. Today, the TwinCAT platform combines all automation functions in a strictly deterministic, real-time environment – from PLC and motion control through CNC and measurement technology and beyond to vision, robotics, and pioneering AI tools.

By abstracting the control function from proprietary device hardware, Beckhoff achieved a paradigm shift in automation. Building on this, the market launch of *The Windows Control and Automation Technology* (TwinCAT for short) 30 years ago established the basis for the success PC-based control sees today. TwinCAT provided a means for transferring IT standards to automation and building them into an integrated, high-performance and deterministic control platform with real-time extensions – initially with a focus on Windows, but since then also on operating systems such as TwinCAT/BSD and Linux®. In addition, Beckhoff combined all the engineering in a single software concept and supported globally established PLC programming conforming to IEC 61131-3, as well as IT standards including C, C++, MATLAB®, and Simulink®.

From the start, TwinCAT has been characterised by outstanding performance data: PLC cycles were radically shortened to as little as 100 µs and main memory became available in almost unlimited quantities. TwinCAT also offered extremely powerful motion functions, from simple standard axes to electronic gearing and cam plates to 5-axis CNCs.

The number of axes that could be controlled grew every year, from 10 to 50 to 100 to over 1 000 axes today, with the cost per axis sinking simultaneously. With the concept of the all-electric machine, more powerful, more precise, and more efficient solutions could be implemented early on. Even then, the visionary software-centric approach liberated machine builders from the narrow performance limits of conventional control hardware in a way that would stand the test of time.

Openness and functionality

A key way in which the TwinCAT architecture adds value results from its openness, which consolidates the full spectrum of automation in a single software concept. While the focus was initially on PLCs, motion control, and I/Os, the platform now comprises well over 100 highly specialised functions, including functions for high-performance measurement technology, control technology, and communication. All machine functions are thus calculated deterministically on a central industrial PC and transferred to the I/O level with exact clocking via the high-speed EtherCAT fieldbus. This allows processes to be controlled and regulated with top temporal resolution and accuracy. In terms of practicality, the installation work, space required in the control cabinet, and overall costs are all reduced.

The performance capability of advanced industrial PCs also facilitates seamless integration of many other high-end technologies. Machine vision with TwinCAT Vision and the system-integrated robot controller are anchored in the software as native runtime modules. Implementing artificial intelligence is rapidly increasing in importance. The TwinCAT Machine Learning Creator can be used to generate AI models for analysing image data, time series, and process data without any previous experience or prior knowledge, making local monitoring solutions and anomaly detection possible directly in the control environment. The TwinCAT CoAgent assistance tool supports users throughout the life cycle – from engineering to live machine operation.

Fit for the future

As the software-centric design of the architecture continues to work on the inherent principle of scalability and convergence with IT, even three decades after its market launch, TwinCAT users are well equipped for future challenges. PC-based control provides an ideal foundation for deep IT/OT integration and integration into cloud or edge infrastructures. Whether physical AI, new communication standards, or stringent cybersecurity concepts – TwinCAT adapts all new market requirements as a modular framework. At the same time, machine builders are safeguarding their ability to innovate in the long term with the combination of computing power, availability, and openness the platform provides.

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

Diverse energy sources meet growing global demand

According to the latest edition of the International Energy Agency's (IEA's)* Global Energy Review*, worldwide energy demand grew at a slower pace in 2025 than in the previous year, but electricity consumption continued to rise much faster than overall demand – with solar PV becoming the largest contributor to growth in global energy supply for the first time.

The world's energy demand increased more slowly last year against a complex economic and geopolitical backdrop, but electricity use continued to rise strongly.

The report provides a comprehensive global assessment of trends across the energy sector in 2025. Based on the latest data, it covers energy demand, electricity generation and use, energy technology deployment and energy-related carbon dioxide emissions.

Global energy demand growth slowed to 1.3% in 2025, slightly below the previous decade's average of 1.4% and significantly lower than in 2024 amid lower global economic growth, less extreme temperatures in some regions and the rapid uptake of more efficient technologies. At the same time, global electricity demand increased by around 3% – slower than in 2024, but still above the average of the past decade.

Electricity demand growth was driven by multiple sectors across buildings and industry – and boosted by fast-growing demand from electric vehicles and data centres.

In terms of energy generation, all major fuels and technologies expanded in 2025 to meet rising demand, although at very different rates. Solar PV was the single largest contributor to growth in global energy supply, accounting for more than 25% of the increase – the first time on record that a modern renewable source has led growth in global primary energy supply. Natural gas took the next largest share, at 17%, reflecting its critical role in power generation in many countries.

Overall, renewable sources and nuclear met nearly 60% of all growth in energy demand – and power generation from these sources exceeded total growth in electricity demand.

Global oil demand rose by 0.7%, in line with IEA projections. This reflects continued growth of electric vehicles, which constrained demand for road fuels. Electric car sales in 2025 increased by over 20% to more than 20 million units – making up around one in four new car sales worldwide. Strong renewables growth reduced coal use in power generation in China, although coal demand increased in the United States as high natural gas prices drove gas-to-coal switching in electricity generation. Overall, the rate of coal demand growth slowed in 2025.

Commenting on the report, IEA Executive Director Fatih Birol said: "Global energy demand continued to increase in 2025 against a complex economic and geopolitical backdrop, with one trend unmistakeable: the expanding electrification of economies. Electricity consumption is growing faster than overall energy demand – and solar PV is growing faster than any other energy source. It accounted for over a quarter of the world's energy demand growth – more than any other source, for the first time. Natural gas followed. In today's rapidly shifting landscape, countries that prioritise resilience and diversification will be best placed to manage volatility and deliver secure and affordable energy in the years ahead."

Beneath the global totals, trends diverged sharply across major economies. Energy demand growth in the United States rose to its second-highest level this century – excluding post-recession recovery years – boosted by strong electricity demand from data centres, robust industrial activity and colder winter temperatures. China accounted for the largest overall share of global energy demand growth last year, but its growth rate dropped sharply to 1.7% as renewables displaced coal, which is less efficient, and broader energy efficiency gains strengthened.

At the same time, growth in global energy-related CO_2 emissions slowed in 2025, rising by around 0.4%. According to the report, China's emissions declined in 2025, supported by a surge in renewables and other low-emissions technologies. India's energy-related CO_2 emissions were flat for the first time since the 1970s – excluding the Covid-19 pandemic – with the effects of an unusually strong monsoon season playing a significant role in curbing emissions growth. By contrast, in advanced economies, an especially cold winter pushed fossil fuel use and emissions higher. Taken together, these developments meant that emissions from advanced economies grew faster (+0.5%) than those from emerging and developing economies (+0.3%) for the first time since the 1990s.

In the electricity sector, the additional 600 terawatt-hours of solar PV generation worldwide in 2025 marked the largest structural increase ever recorded in a single year for any electricity generation technology, contributing to a decline in coal-fired electricity generation globally. Battery storage was the fastest-growing power sector technology in 2025. The roughly 110 gigawatts of new battery storage capacity added during the year exceeded the largest annual capacity additions to date for natural gas. In nuclear power, construction began on over 12 gigawatts of new nuclear reactors in 2025, a reflection of renewed momentum for nuclear projects in several regions.

The IEA reports that cumulative deployment of low-emissions technologies since 2019 now means the avoidance of annual fossil fuel consumption equivalent to the entire energy demand of Latin America. Use of technologies such as solar PV, wind power and heat pumps now displaces natural gas demand equivalent to half of all global annual LNG exports.

The report and an accompanying dataset can be downloaded from the IEA website.

For more information visit: www.iea.org

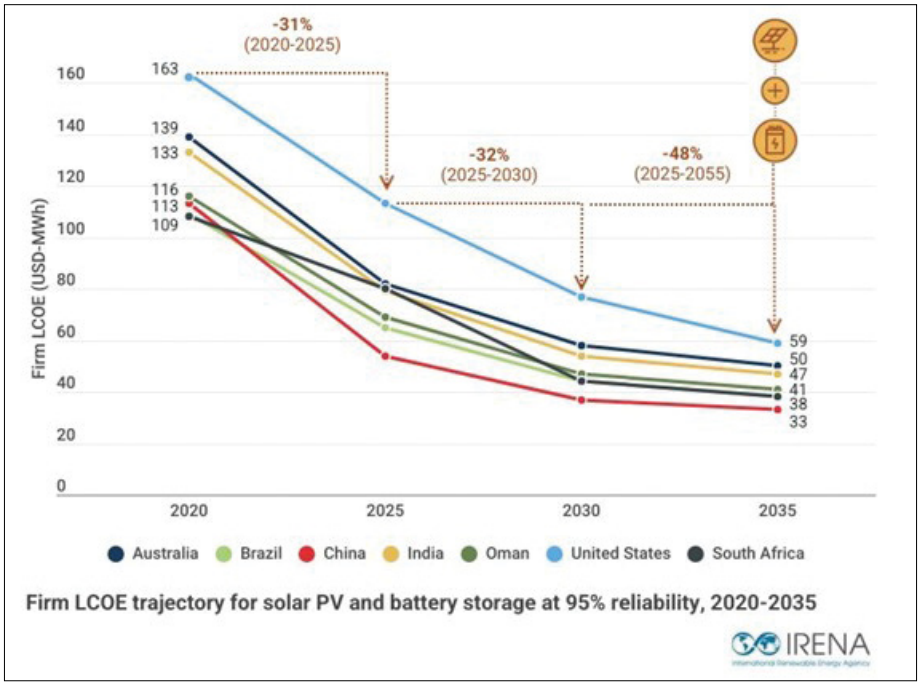
24/7 renewables outcompete fossil fuels on costs

A new report from IRENA – the International Renewable Energy Agency – confirms the cost-competitiveness of round-the-clock renewable power through hybrid solutions of solar and wind with battery storage.

The report, *24/7 renewables: The economics of firm solar and wind*, confirms that in prime solar and wind regions, hybrid solutions combined with storage deliver round-the-clock power at lower costs than fossil fuels.

Firm levelised costs of electricity ('firm costs') for solar plus storage range from USD 54 to USD 82 per megawatt-hour (MWh) in high-quality resource regions, compared with USD 70 to 85 per MWh for new coal in China and more than USD 100 per MWh for new gas globally.

Commenting on IRENA's new report, United Nations Secretary-General António Guterres said: "The worst energy crisis in decades has exposed the true cost of fossil fuel dependence. But another path is now possible. Renewable power is increasingly the most affordable, reliable and secure option. Let us accelerate the transition, invest in energy infrastructure, and strengthen international cooperation to deliver clean, homegrown power to people everywhere."



The report shows that around the world hybrid solar, wind and battery storage deliver reliable, cost-effective round-the-clock electricity.

IRENA Director-General Francesco La Camera added: "24/7 renewable power is now cost-competitive with fossil fuels. The long-standing argument that renewables lack reliability no longer holds. Today, renewables (with battery energy storage) can deliver reliable, round the clock power. As oil and gas markets remain exposed to geopolitical shocks, including ongoing disruptions in the Strait of Hormuz, we must insulate our economies with resilient renewable systems. The economics of the entire energy system have shifted: the battery revolution has driven down costs and accelerated advances in storage. The advantage of renewables is not only economic but strategic, strengthening resilience, stability, and energy security in times of crisis."

24/7 renewable power optimises the use of constrained grid connections, shifts electricity production to higher-value hours and reduces exposure to price volatility. These hybrid solutions are well positioned to serve the most demanding electricity users, including artificial intelligence (AI) and data centres that require uninterrupted supply as one of the key commercial benchmarks. Firm renewables also enable the production of clean fuels for hard-to-abate sectors, where economic viability depends on costs and on the ability to operate at high utilisation rates.

Analysis in the report shows that firm costs have declined rapidly, driven by falling costs for solar PV, wind power and battery storage. Since 2010, total installed costs declined by 87% for solar PV and by 55% for onshore wind. Battery storage costs fell more sharply, declining by 93%.

Construction timelines are also shortening with projects typically being built within one to two years of securing permits and grid connection, well ahead of new gas-fired alternatives in most markets.

Continued technology learning, manufacturing scale and supply chain integration are expected to drive further cost reductions across all three technologies. As costs fall simultaneously across solar, wind and batteries, their combined effect on hybrid systems is already significant.

IRENA analysis of solar-plus-battery configurations across different countries shows that firm costs have fallen from above USD 100 per MWh in 2020 to around USD 54 to 82 per MWh by 2025 in high-irradiance solar regions and strong wind corridors.

Further cost reductions of roughly 30% by 2030 and around 40% by 2035 are projected, bringing firm costs below USD 50 per MWh at the best-performing sites by 2035. The United Arab Emirates' Al Dhafra complex, for example, which pairs solar PV with battery storage, already illustrates what this means in practice: delivering a firm 1 gigawatt of clean electricity at around USD 70 per MWh.

Firm wind plus storage systems are also becoming increasingly competitive. IRENA's estimates for 2025 show that firm wind-plus-storage costs ranged from around USD 59 per MWh in Inner Mongolia to around USD 88 to 94 per MWh across Brazil, Germany, and Australia, with costs projected to fall to roughly USD 49 to75 per MWh across these markets by 2030.

Costs decline further when wind is combined with solar PV, leveraging complementary generation profiles to reduce storage requirements and overall system cost.

24/7 renewables: The economics of firm solar and wind provides a sound benchmark for evaluating and comparing the costs of round-the-clock renewable power, analysing cost trends, cost drivers and regional variations in hybrid, solar, wind and storage systems.

For more information visit: www.irena.org

Claude Peters, RenEnergy.

EPC selection is critical for new energy projects

As more companies move to private energy supply as a preferred option for business, an important consideration often overlooked relates to selecting the right EPC partner. Claude Peters, Managing Director at RenEnergy, notes that two solar systems, built alongside each other, can deliver materially different outputs over time depending on engineering quality, with long-term implications for uptime, cost, and operational continuity.

In South Africa, where we see continuing strong growth in the renewable energy sector, more companies are turning to private energy infrastructure to manage costs, reduce reliance on the grid and secure long-term power supply. Commercial solar installations, hybrid systems and off-grid solutions are increasingly becoming part of core business strategy in sectors ranging from mining and manufacturing to agriculture and logistics.

The technology behind renewable energy has advanced significantly and Peters emphasises that the decision on who builds that infrastructure has become just as important as the decision to invest in it.

For companies planning energy projects that may operate for 20 years or more, selecting the right engineering, procurement and construction (EPC) partner is emerging as one of the most consequential decisions in the process. Poor engineering choices, inexperienced contractors or weak operational support can undermine system performance, introduce safety risks and erode the financial case for renewable investment.

As the market grows and new entrants emerge, more business leaders are asking the same question: how do we distinguish a credible EPC partner from a risky one?

Why EPC selection matters now

The growth in South Africa's commercial and industrial renewable energy market over recent years has been driven by electricity supply instability, rising tariffs and regulatory changes that have opened the door to private generation. Companies that once relied exclusively on a single national supplier are now entering long-term infrastructure partnerships with private energy providers. That shift fundamentally changes the decision-making process.

"Now that companies can choose a partner for their energy infrastructure, that decision should not be driven by cost alone," Peters says. "There are many other factors that matter first."

Unlike short-term operational purchases, energy infrastructure projects operate on timelines of decades. A poorly designed or poorly maintained system may continue to operate for years but at significantly lower performance levels.

"You can install two solar systems of exactly the same size next to each other," Peters says, "but if one is engineered better, it could produce five to ten percent more energy every year. Over twenty years, that difference becomes enormous."

Thus, renewables infrastructure is not just about installing panels. It is about engineering an energy system that performs reliably over decades.

Growing risks in an expanding market

Rapid industry growth inevitably attracts new operators. Many may be experienced engineering firms expanding into renewables, others enter the market with limited large-scale project experience. This creates a new set of risks for businesses investing in major energy infrastructure.

"Inexperienced operators can present themselves as capable EPC providers very quickly," Peters notes. "But installing a row of rooftop panels is very different from designing and building a complex commercial energy system."

The consequences of poor project design can be significant. Substandard engineering can introduce electrical safety risks, compromise building infrastructure or result in systems that fail to deliver expected energy output. In extreme cases, companies may discover that the contractor responsible for installation is no longer operating when problems arise.

RenEnergy solar installation for Agrico.

"If the EPC is no longer in business, who do you call?" Peters asks. "Renewable energy installations are a long-term asset. You need to know the partner behind it will be there for you over time."

Another risk is underperformance. A solar installation may be sold on the basis of projected energy production for example, generating one million kilowatt-hours per year, but poor design or inadequate maintenance could result in significantly lower output.

"It might have been cheaper upfront," Peters says, "but if the system only produces 60% of what was promised, it becomes a costly decision."

What to evaluate in choosing an EPC

For executives evaluating future renewable energy projects, selecting an EPC partner requires a structured due diligence process. While the technical details may differ across industries and project types, several key evaluation criteria consistently emerge.

Engineering capability

Engineering design is at the core of any renewable energy project. A credible EPC partner should demonstrate strong internal engineering expertise and the ability to model energy generation, system integration and load management across the lifecycle of the electricity system.

"In renewable energy engineering you are looking at the full journey of electricity," Peters explains. "From generation to grid interaction to consumption. That requires a broad engineering perspective."

Companies should consider whether engineering work is conducted in-house, the experience level of the engineering team, and whether designs are tailored to each project's environment and energy requirements.

Procurement standards and technology selection

Component selection – including panels, inverters, mounting systems and batteries – has a direct impact on system reliability and lifespan. A credible partner selects 'bankable' technology components that insurers and lenders trust for the long haul.

Businesses should evaluate how EPC providers source equipment, whether they work with established technology suppliers and whether procurement processes include competitive supplier evaluation.

Environmental conditions also matter. Equipment that performs well in one setting may be unsuitable in others, in high-dust mining environments or extreme temperatures, for instance. "Certain technologies perform better in specific conditions," Peters notes. "The right solution should be selected for the environment."

Installation quality and construction control

Even well-designed projects can fail if installation standards are poor.

Construction quality includes electrical integration, structural mounting systems and civil engineering considerations, particularly in regions exposed to strong winds or extreme weather.

Peters recalls a recent example in the Langkloof region where severe storms damaged surrounding structures while a nearby solar installation remained intact. "The mechanical design and installation quality make a significant difference in how systems withstand real-world conditions," he says.

For this reason, forward-thinking companies prioritise EPC partners that maintain direct oversight of construction, ensuring accountability is not lost in a chain of subcontractors.

Long-term operations and maintenance

Renewable energy systems are often marketed as low-maintenance, but that does not mean they are maintenance-free. Cleaning, system monitoring, component replacement and performance optimisation all play a role in maintaining long-term energy yield.

"Solar systems need to be looked after," Peters says. "Something as simple as panel cleaning can affect performance."

Equally important is the responsiveness of the service provider when problems arise.

"Infrastructure failures rarely happen during office hours," he notes. "If a facility loses energy production on a Friday night, the response time matters."

Sim Khuluse, Technical and Policy Manger of the South African Photovoltaic Industry Association (SAPVIA), reinforces this lifecycle view: "Quality in solar projects cannot be confined to installation alone. It must be embedded across the full lifecycle, from engineering and procurement and through operations and maintenance, ensuring long-term performance and reliability. SAPVIA will be launching a Working Group focusing on operations and maintenance to address this."

Solar energy for biogas plant near Cape Town.

Financial stability and track record

Because renewable energy projects operate over long timelines, the financial stability and operational history of the EPC partner should also be considered. A strong balance sheet, established project portfolio and verifiable client references can provide reassurance that the company has the capacity to support infrastructure over its lifetime.

Companies evaluating EPC providers should request reference projects and speak directly with existing clients not only about successful projects, but also about how problems were handled when they occurred.

From an industry perspective, SAPVIA has increasingly emphasised the importance of standardisation and due diligence in EPC selection. "Best-practice frameworks exist to guide engineering design, procurement quality and construction management," Khuluse notes. "These are critical for project success and in maintaining investor confidence in the sector."

Lessons from industry

As the renewable energy sector matures, industry standards and regulatory frameworks are gradually strengthening. Compliance requirements, engineering sign-offs and installation standards now play a greater role in project evaluation.

SAPVIA is not a regulator but plays a key role in shaping these standards through industry guidelines, working groups and quality frameworks. Initiatives such as Operations and Maintenance best-practice guidelines and the PV GreenCard programme aim to improve installation quality, safety and compliance across the sector.

"Industry bodies provide an important function in helping to ensure that projects meet recognised standards for safety, performance and regulatory compliance, even in a rapidly evolving market." says Khuluse

Financial institutions are also introducing their own due diligence processes for EPC providers involved in financed projects, reflecting the financial risks associated with underperforming infrastructure.

Yet many experienced industry participants argue that regulation alone cannot guarantee quality. Responsible project development requires informed decision-making by businesses if they choose to embark on such long-term investment projects.

"When companies invest in a renewable energy system, they are integrating new infrastructure into the most critical part of their operations – the electrical network of the facility," Peters emphasises. "No corners can be cut."

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Anja Visagie, SPS Africa.

Countering rising energy costs and carbon taxes

South Africa's manufacturing and industrial sectors are increasingly facing major energy challenges. With global markets demanding reduced carbon emissions and the cost of domestic carbon taxes on the rise, local manufacturers have to navigate an increasingly complex landscape. Anja Visagie, Chief Growth & Marketing Officer at Sustainable Power Solutions outlines the current context and a route to counter rising costs.

Carbon costs at the border

The European Union is targeting high-emission imports, implementing several tax measures. One of the most significant is the Carbon Border Adjustment Mechanism (CBAM). This is a carbon import tax introduced by the EU to level the playing field between local (EU) and foreign manufacturers. It raises a carbon-based fee on selected imported goods based on the CO_2 emissions embedded in their production. This regulation specifically targets carbon-intensive products exported to the EU, such as steel and aluminium, placing a levy on imports to the EU from countries where the energy mix is heavily dependent on coal power.

CBAM aims to prevent 'carbon leakage', where companies relocate production to countries with weaker climate regulations to avoid carbon costs. It ensures that imported goods face the same carbon pricing as those produced in Europe.

The CBAM rollout[1] has been structured into phases. From October 2023 to December 2025, a transitional phase was in place during which companies were required to report emissions for CBAM-covered goods, although no fees would be applied. From January 2026, a definitive phase began with EU importers required to start paying CBAM fees on goods based on reported emissions. Between 2030 and 2034[2], CBAM is expected to expand further to cover indirect electricity emissions and additional sectors such as hydrogen, chemicals, and plastics.

The CBAM rate is linked to the EU Carbon Price (EURO / tonne) and is calculated as follows:

- Embedded emissions (tonnes CO_2 per tonne of product) × EU carbon price (€/tonne)
- Less any domestic carbon tax paid (that is, in South Africa, for example).

This presents a significant challenge for South African exporters in sectors like iron, steel, aluminium, cement, and fertilisers.

To avoid the financial impact, manufacturers need to demonstrate their direct emissions (that is, fossil fuel combustion during production) and emissions from grid electricity use. This is where renewables can play a valuable role. Although renewables cannot reduce direct emissions, they can help by replacing diesel generators or reducing diesel usage and electrifying fossil fuel-based processes (such as furnaces).

As CBAM takes effect, local exporters will need to act fast to remain competitive.

South Africa's carbon tax

Locally, South African businesses are also facing increased carbon taxes being introduced by government and particularly targeting high-emissions sectors such as manufacturing, mining, transport, agriculture and waste. Proposed amendments include a gradual increase of the current carbon tax rate of R236 per tonne of CO_2 and the introduction of a mandatory carbon budget system[3] in 2026, which will require industries to meet emissions reduction targets. These changes highlight the growing focus on sustainability and the need for businesses to adapt by finding solutions to comply with new

By transitioning to renewables, manufacturers can address sustainability goals and save on energy costs.

regulations, avoiding potential impacts to the bottom line.

However, businesses that can demonstrate a lower carbon footprint, whether through clean energy adoption or other sustainability measures, such as reducing waste through recycling and reusing materials or adopting sustainable transport options, can mitigate or avoid these additional tax burdens, to maintain a competitive edge.

Corporate climate commitments

Beyond CBAM and government carbon taxes, some major corporations, even if they are not subject to direct carbon taxes, have committed to reducing their global carbon emissions by a specified percentage within a set timeframe, in line with their Environmental, Social and Governance (ESG) goals. These commitments place considerable pressure on subsidiary manufacturers to implement carbon reduction strategies as well.

Solar energy delivers dual benefits

Harnessing solar energy can assist South African businesses in reducing their carbon footprint. With the country's grid still largely coal-dependent, every kilowatt-hour of solar energy consumed in place of grid electricity cuts carbon emissions by one kilogram. This reduction is greater than that arising in countries with cleaner energy sources and highlights the potentially significant impact of solar energy in South Africa's sustainability transition.

For instance, if a manufacturing facility installs a rooftop solar plant to generate 30% of its power needs, it achieves a corresponding 30% reduction in its carbon footprint with regard to energy usage. This not only helps the business to align with emissions reduction targets but also lowers operational costs by decreasing its dependence on more costly grid electricity. This dual advantage sets solar apart from alternative compliance strategies for businesses, like purchasing carbon credits. While businesses have the option to purchase carbon credits the drawback is that they provide no direct financial savings. Solar energy, on the other hand, is a strategic investment that addresses sustainability goals and contributes to improving the bottom line.

Access options

Despite the long-term financial and sustainability benefits for commercial and industrial clients, particularly in energy-intensive sectors, the upfront capital investment required to build a solar plant can be substantial. Investing in solar infrastructure can divert funds away from core business priorities such as the expansion of facilities or acquisition of new equipment. To overcome these barriers, businesses can consider a funded solution in the form of a Power Purchase Agreement (PPA) or equipment rental.

Obtaining a funded solution from a renewable energy provider allows businesses to secure long-term access to clean electricity without owning the generation assets. Another advantage is that the provider will also take care of the renewable energy plants, thus the client does not need to worry about maintaining and operating the plant – which can also raise unforeseen costs and risks. With a funded solution, these costs and services are included in the monthly rate.

Renewable energy providers such as Sustainable Power Solutions (SPS) offer fully integrated end-to-end solutions which include Funding, Engineering, Procurement and Construction (EPC) and ongoing O&M services.

For businesses, it is also important that they look to engage with reputable renewable energy providers that can deliver turnkey, holistic solutions tailored to their needs. Whether those relate specifically to carbon reduction objectives, financial requirements, or energy security, a quality provider will begin with a comprehensive assessment of a client's needs, targets, and long-term operational goals to design a customised solution at a competitive rate.

Carbon taxes, emissions regulations, and corporate sustainability mandates are fast becoming real cost factors that can significantly impact a business's bottom line. For South African manufacturers and exporters, adopting renewable energy is a strategic step that enables them to stay competitive in a changing global economy.

Solar energy, in particular, offers a clear way to cut carbon emissions and reduce operating costs simultaneously. And for those without the capital or appetite or in-house expertise to own and manage energy infrastructure, fully funded, turnkey solutions offer a practical, hassle-free path forward.

With the right partner, transitioning to clean energy need not be complex – it can be smart, simple, and sustainable.

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

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A long-term partnership

For many organisations, renewable energy investments are among the largest infrastructure decisions they will make this decade.

Panels, inverters and batteries may be the most visible components, but the long-term success of the projects depends on the engineering and operational ecosystem behind them. That is why industry experts increasingly encourage businesses to approach EPC selection not as a procurement exercise, but as the beginning of a long-term partnership.

"The real test of a partner is not when everything is working perfectly," Peters says. "It is when something goes wrong and they are still there to solve the problem."

In the growing renewable energy market, that distinction may determine whether an energy investment delivers its promised returns or becomes a costly lesson in inadequate due diligence.

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

Tracking South Africa's energy market transition

Shailin Moodley, Chief Technology Officer at EXSA says although South Africa's efforts to decarbonise its energy mix significantly by 2030 have progressed since the commitment was made in 2021, momentum picked up earlier this year.

Shailin Moodley, EXSA.

There was much focus on energy reform in President Ramaphosa's State of the Nation Address, and in the National Budget delivered by Treasury. Then in April, the Department of Electricity and Energy announced a timeline on the phasing in of the wholesale electricity market (contingent on regulatory, commercial and technical enablers).

Against this background Moodley flags significant challenges ahead. He sets out four key signposts as markers to track South Africa's progress on its journey to a diversified, liberalised energy market.

Capacity mix: From coal to a diversified portfolio

The first and most obvious signpost is the actual shift in the generation mix. Progress won't be measured only by new megawatts, but by how the new capacity changes the overall profile of supply.

The Integrated Resource Plan (IRP) 2025 projects significant new generation capacity by 2030, with a major focus on gas, wind, solar, and battery storage. The rapid addition of private embedded solar, particularly rooftop PV, is already a strong indicator. Additionally, the IRP 2025 reflects an increase in load factor of gas-to-power plants (to 50%), indicating a potential shift in use from exclusively peaking to baseload. The broadening of the target energy mix is encouraging.

A positive marker in the scorecard for the energy transition is already appearing, with new utility-scale solar and wind projects reaching financial close and beginning construction. The start of construction on large-scale battery storage projects is another significant indicator, as it signals a move toward grid stability.

However, any major delay in the decommissioning of old coal plants without sufficient replacement capacity would raise a red flag. This could signal a lack of confidence in the new market. Continued reliance on expensive diesel peaking plants to cover the gap would also be a negative indicator. The risk of the duck/canyon curve and load shedding would need intentional solutions requiring advanced planning and execution.

Trader participation: From contracts to a competitive market

Traders are key players in a liberalised power market (connecting generators to users, creating liquidity, and managing risk), and the number of active participants in the energy market is an indicator of its health.

The number of licensed electricity traders and aggregators could grow steadily for some time. These companies facilitate bilateral PPAs and will be the main participants in the future wholesale market – taking on the technological and operational burden of participation.

In late November 2025, NERSA announced a series of decisions that, together, aim to expedite the transition to a competitive electricity market: the approval of the Market Operator Licence to enable the shift to a multi-buyer, multi-seller model, the finalised Grid Capacity Allocation Rules (GCAR) for readiness-based allocation and queue management, the constitution of the Electricity Market Advisory Forum (EMAF) to facilitate stakeholder input and expert oversight as the market is established, and the issuance of a notice of public participation on the draft Electricity Trading Rules[1] which Minister of Electricity and Energy, Dr. Kgosientsho Ramokgopa, has committed to have gazetted by June 2026[2]

When the sector begins offering nuanced products (such as short-term contracts, hedges, or derivatives), this will mean the market is becoming more sophisticated. The launch and successful operation of a day-ahead market by the National Transmission Company of South Africa (NTCSA) would be the first step – and a major step – involving a lot of preparatory work such as wholesale tariff restructure, trading rules, market code approval, market phasing, and vesting arrangement approval.

The president's announcement in the 2026 SONA on the intention to unbundle the NTCSA from Eskom[3], and the funding announced weeks later in the National Budget Speech, are clear statements of intent and should pave the way for transparency and innovation in the private energy market.

The state of the grid: From bottleneck to backbone

The biggest technical challenge to South Africa's transition is the grid. Its expansion rate is a critical signpost of progress in the energy sector.

The NTCSA's Transmission Development Plan (TDP) 2024[4] sets ambitious targets for new transmission lines (nearly 1 500 km per year). Consistent announcements of new transmission line projects reaching financial close and beginning construction are crucial.

Additionally, despite delays and industry concern over complexities, the successful implementation of the Independent Transmission Projects Programme, attracting private investment for grid infrastructure, would be a major leap forward and a strong vote of confidence for South Africa's transition strategy. Treasury's announcement of a new Credit Guarantee Vehicle, created in partnership with the World Bank, to encourage large-scale Investment In transmission Infrastructure signals momentum in the space. Additionally, government is set to start the first round of independent transmission projects this year[5]

Nonetheless, delays in environmental and land-use approvals for new transmission lines would be a significant roadblock, beyond which infrastructure takes time to deploy. An inability to meet the TDP's annual targets would mean that new renewable capacity is built in suboptimal locations and/or cannot get power to consumers, in effect stranding billions in potential investment.

Everything hinges on private capital

Market liberalisation is about attracting private capital, bolstered by regaining trust in the system and promoting competition. The regulatory environment and government policy will be the main drivers of investor confidence.

Although competitive market positioning existed under earlier legislation, implementation of the 2024 Electricity Regulation Amendment Act further strengthens the legal framework for a competitive market. Clarity on wheeling tariffs and a transparent grid access process from NERSA are also crucial.

Leveraging the Just Energy Transition Partnership, the collaboration involving several developed markets and South Africa, will also be a key enabler. The partnership aims to support South Africa's energy transition through initial clean energy funding projects.

New legislation has been positive, but any sign of a reversal of policy or political pushback on the transition would negatively impact the flow of capital needed. This might be anything from another pause on private licensing to a suboptimal market launch. A lack of transparency in the procurement process would also deter investors, as seen in other countries. And it is important to note, struggling municipal performance in the distribution sector distorts the perception of municipalities as reliable offtakers, hindering new generation.

The transition to a liberalised energy market is a marathon. South Africa's energy landscape is positioned for significant change in the next few years. Trader participation, investor sentiment, grid capacity, and diversification of the energy mix will mark progress as we forge a path to a secure, reliable, and sustainable energy future.

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For more information visit: www.exsa.io

South Africa's energy landscape is positioned for significant change in the next few years.

Global Wind Report 2026

The Global Wind Energy Council (GWEC) released its* Global Wind Report 2026 *in April – revealing 2025 as another record year for wind energy development and highlighting several notable trends.

The Global Wind Report 2026 *reflects growing wind energy installations and emerging trends.*

The global wind industry installed 165 GW of new capacity in 2025. That's a new record, and it pushes cumulative global wind power past 1 299 GW worldwide. Behind the headline figure, GWEC sees this as confirmation that wind energy is becoming essential to grids, to industry, and to governments, all recognising the link between energy security and energy independence.

Asia is leading, by a long way

The most striking data in this year's report comes from Asia.

China installed more than 120 GW of wind in 2025 – close to the world's 2024 total. India recorded its best year to date, installing 6.34 GW of new onshore capacity, an 85% jump on the previous year, reclaiming its position as the world's third-largest wind market.

South Korea, Vietnam and the Philippines are converting regulatory reform into live project pipelines. GWEC projects that the Asia Pacific region (outside China) will become the third-largest offshore wind growth market globally by 2030.

Energy security redefined

The report is published against a backdrop of extraordinary geopolitical pressure impacting fossil fuel supply chains, generating erratic price shocks and cascading economic consequences, which have once again exposed the structural vulnerability of fossil fuel-dependency.

The countries less affected are those that have already started building wind energy generation capacity at scale.

The GWEC makes the point that wind delivers across all four dimensions of energy security: availability, accessibility, affordability and acceptability. It reduces reliance on imported fuels, stabilises long-term electricity costs and offers governments a path towards sovereign, resilient energy systems.

Alongside climate considerations, wind supports energy security. And it is being used around the world.

Saudi Arabia more than quadrupled its annual installations to 1.5 GW. Chile tripled its additional capacity to over 1.1 GW. Türkiye extended its position as one of the most active onshore markets, approaching 16 GW cumulative installed capacity. Sweden and Romania posted some of the sharpest year-on-year growth rates in Europe.

Wherever such growth emerges, the pattern is the same: stable policy, efficient permitting, coordinated grid planning, alignment between energy and industrial strategy. It's proven and this year's report profiles the markets putting it into practice – and those with the potential to follow.

An economic strategy as much as an energy strategy

The markets winning on wind in 2025 are not looking only at decarbonising. They are investing in ports, in manufacturing, in supply chains, in rural economies, and in workforces.

Large-scale wind deployment triggers spending far beyond the turbines. Onshore wind distributes long-term investment into regional communities. Offshore wind is driving port modernisation, high-voltage transmission upgrades and specialised maritime services. And floating offshore wind is opening deep-water markets that didn't exist five years ago.

According to the GWEC, the countries that recognise this next phase of economic competition are already forging ahead.

Tackling the challenges

It also acknowledges that record installations don't mean everything is working.

The GWEC notes that misinformation campaigns are becoming more sophisticated, working to undermine public confidence in wind energy. Protectionist trade measures are threatening the diversified supply chains the industry depends on. And despite record wind auctions globally, offshore wind installation rates are not keeping pace with what's needed for 2030.

The most successful markets last year were those that moved ahead despite the challenges.

The report sets out how others can do the same.

It emphasises that wind power is no longer only an environmental solution, but is a strategic infrastructure asset, delivering economic, industrial and energy security benefits at scale, across every region, and in markets that didn't appear on any deployment map five years ago.

The *Global Wind Report 2026* offers the most comprehensive analysis of where the industry stands and what it will take to sustain the momentum.

To download the full report go to: www.gwec.net

Computational precision in utility-scale solar design

Design software platforms like AutoPV enable engineers to model, simulate, compare configurations, and optimise complex solar power plants, quickly.

Global renewable energy is forecast to grow by 4 600 gigawatts (GW) by 2030 and solar generation capacity is expected to claim 80% of this total renewable energy growth [1] .

Although AI is capturing headlines and can play a valuable role in the energy sector, for utility-scale solar design, precision is essential. The 90 to 95% accuracy that AI models produce is not good enough for engineers designing large, complex utility-scale projects. They need highly accurate, build-ready outputs.

"Energy engineers tend to have a challenging relationship with AI when precision is non-negotiable," says Paul Nel, CEO of 7SecondSolar, the solar engineering studio that developed AutoPV™. "In utility-scale solar, a single percentage point error in cable routing or inverter placement could translate into thousands in revenue loss over a project's lifetime. That's where computational design software, based on tested engineering algorithms, delivers what AI cannot: predictable and accurate construction-ready design outputs."

Where AI fits and where it falls short

AI has become a catch-all term for a plethora of data analytics tools. A key distinction should be made between Machine Learning and Generative AI.

Machine Learning – ML – has been around for some time and is quite good at pattern recognition and forecasting when considering large data sets. Generative AI, however, which is driving a lot of the hype in industry today, is based mainly on large language models (LLMs) to generate new data. ML is more aligned with engineering processes as it is essentially an extension of the engineer's data analysis toolbox, whereas Generative AI can contribute in other areas of solar project development. It serves feasibility studies, site screening, and preliminary analysis, where approximate answers can help identify feasible sites. AI is transforming the early stages of energy project development, with reports suggesting that AI-accelerated simulations and report generation can cut proposal and initial feasibility times by up to 40%[2]. But when projects advance beyond feasibility into a design phase, AI's limitations become risks that energy engineers should avoid.

The core problem with Generative AI in a design environment is that it relies on a corpus of data and information that is not easily verifiable and can include inaccuracies. While this produces plausible outputs, they are most likely not accurate ones, and very difficult, if not impossible, to verify. "Engineers must always be able to verify that their designs are safe and fit for purpose. This means the calculations and design process must be independently reproducible," says Nel. When designing large complex solar farms with thousands of components and often thousands of kilometres of cabling, 'plausible' is just too risky.

The precision imperative

Computational software operates on fundamentally different principles to AI. AutoPV was built by engineers who understand electrical engineering constraints, terrain analysis, and construction requirements, using deterministic algorithms that produce design outputs which can move into the construction phase.

"The acceleration in utility-scale solar deployment is increasingly powered by computational software. Platforms like AutoPV are enabling engineers to rapidly model, simulate, compare configurations, and optimise complex solar power plants," says Nel. "AutoPV enables engineers to generate multiple design configurations and compare them objectively. Each iteration includes exact cable routings, inverter placements, and complete power loss calculations. Engineers can evaluate cost versus energy yield with confidence because the numbers are exact, not estimated." A recent 214 MW project designed with AutoPV illustrates that computational software is more than a 'guesstimation' tool; it is an engineering tool that delivers accurate, construction-ready designs. Engineers generated eight design iterations in a single morning, comparing configurations that would traditionally require months of manual design. The analysis revealed dramatic variations across iterations. One configuration saved $1million in cable costs alone. Another optimised for maximum lifetime energy production, generating an additional $50 000 in annual revenue. A third balanced construction cost against operational performance. Each design included AutoCAD drawings that could transfer to construction, a complete bill of quantities, and validated electrical calculations.

Adding another critical layer of accuracy, AutoPV has integrated terrain adaptation into its design automation software. This allows engineers to upload site topography in CSV or XYZ formats directly into the design engine. As we move into more complex landscapes, integrating terrain awareness ensures that the designs remain grounded in engineering reality rather than assuming a flat-site.

The path forward

AI will continue to play a role in early-stage feasibility studies and in Operations and Maintenance, where it can be used for predictive maintenance and performance monitoring. Computational design software will, however, likely be the primary driver for solar design, which requires accuracy and enables energy engineers to focus on value engineering rather than repetitive design tasks.

"To meet global solar energy targets, it will cost engineering firms $12 billion to develop pre-construction designs for the solar projects. That equates to roughly 12 000 work years. Design automation without compromising safety and accuracy is really important if we want solar energy to lead the renewable energy mix by 2030," says Nel.

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For more information visit: https://autopv.io/

Progressing major solar PV projects

Mulilo has announced successful financial close on the 380 MWdc Beaufort West Solar PV facility, one of South Africa's largest utility-scale solar photovoltaic (PV) developments, located near Beaufort West in the Western Cape.

With an installed capacity of 380 MWdc and a contracted export capacity of 250 MWac, the facility will connect to the Droërivier main transmission substation, enabling efficient integration into the national grid.

This is the fourth project Mulilo has brought to financial close since the start of 2026, following successful financial closure on the Orkney Solar PV project in North West Province, and the Middlepunt Solar PV project and Mercury BESS project in the Free State. With the addition of the Beaufort West Solar PV project, Mulilo is ahead of its target to deploy 1 GW of renewable energy projects annually, bringing its total portfolio – across already-operational and construction phases – to over 2 GW. This reflects the company's rapid expansion as a leading player in the renewable energy sector.

The Beaufort West solar PV project, once operational, is expected to generate around 818 GWh of clean electricity annually, sold to commercial and industrial customers across South Africa through a multi-year Power Purchase Agreement with NOA. That is enough electricity to power about 345 000 households annually, and it means an estimated 860 000 tonnes of CO_2-equivalent emissions will be avoided per year.

Achieving financial close on this major project was made possible with the support of Mulilo's shareholders, Copenhagen Infrastructure Partners (CIP) and Norfund, and through close collaboration with its funding, legal and advisory partners – including Absa, Standard Bank, Investec and Nedbank, as well as Bowmans, PepperTree Capital, Fasken and Arup.

"The Beaufort West Solar PV project is Mulilo's first renewable energy project in the Western Cape and confirms Mulilo's continuing commitment to driving South Africa's energy transition. We are pleased to have worked alongside NOA to bring this project to financial close, with a shared commitment to quality and long-term value creation. Delivering reliable, clean power at scale, we are addressing the country's immediate energy needs and paving the way for a sustainable and prosperous future." said Jan Fourie, CEO of Mulilo.

Karel Cornelissen, Group Chief Executive Officer at NOA, commented: "Mulilo is a partner with proven ability to deliver high-quality renewable projects, and this financial close reflects the strength of our collaboration and shared ambition. With this transaction, NOA's diversified portfolio now approaches 1.5 GW of generation capacity in construction and development across owned assets and strategic offtake partnerships, enabling us to connect reliable renewable energy to commercial and industrial customers that need certainty and long-term supply."

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

Bolobedu solar power plant commissioning

Richards Bay Minerals (RBM) and international renewable energy company Voltalia recently announced the commissioning of the Bolobedu Solar Farm, located in South Africa's Limpopo Province. In April 2026, RBM reported the first megawatt-hours of green electricity had been successfully fed into the national grid – marking a key milestone in the long-term partnership between both companies and in South Africa's energy transition.

Following the agreement signed in 2022, Voltalia and its local Black Economic Empowerment (BEE) partners have built the plant to provide a total installed capacity of 148 MW. Once fully operational, it will reduce RBM's annual baseline greenhouse gas emissions by at least 10%, that is about 237 000 tonnes per year.

This is one of the largest solar plants in South Africa dedicated to meet the energy needs of a single company and represents a critical step forward for RBM in its commitment to sustainable mining into the future as part of the recently approved Zulti South project. The renewable power is supplied to RBM's KwaZulu-Natal operations through a wheeling arrangement via the Eskom Transmission network.

RBM Managing Director Werner Duvenhage said: "Commissioning of the Bolobedu Solar Farm marks a defining moment for RBM as we celebrate 50 years of operations in South Africa. This initiative is not just about energy security but is also about the long-term sustainability of the business. As we break ground on Zulti South, the Bolobedu project paves the way for a cleaner energy future, contributing to the national power grid and our global decarbonisation targets."

Voltalia Chief Executive Officer Robert Klein commented: "The delivery of the first megawatt-hours from Bolobedu illustrates our commitment to accelerating the decarbonisation of industries and supporting an inclusive energy transition in South Africa involving local communities."

This initiative is part of RBM's broader portfolio of renewable energy projects, including wind power purchase agreements, which together are expected to reduce the operation's Scope 1 and 2 greenhouse gas emissions by around 60% compared to a 2018 baseline.

Reflecting a shared commitment to transformation and local development, the Bolobedu project is the first large-scale renewable energy initiative in the region to involve exclusively local women investors, ensuring that the transition to green energy creates direct equity and wealth for the host communities.

Beyond its technical achievements, the Bolobedu Solar Farm is already delivering benefits for the broader community.

For more information visit: www.riotinto.com

The Bolobedu Solar Farm is part of RBM's broader portfolio of projects aimed at reducing its operations' GHG emissions.

Measurement as the foundation for governance

On 20 May 2026, World Metrology Day, South Africa joined metrology organisations around the world in this annual observance marking the signing of the Metre Convention in Paris on 20 May 1875. The global theme for World Metrology Day 2026, Metrology: Building trust in policy making, highlights the increasingly important role of reliable measurement systems in supporting governance, regulatory certainty, economic participation and public confidence.

To celebrate the occasion, the National Metrology Institute of South Africa (NMISA) and the National Regulator for Compulsory Specifications (NRCS) jointly hosted a national virtual webinar bringing together policymakers, regulators, technical experts, academics, industry stakeholders and media to explore how trusted measurement systems support evidence-based policymaking, fair trade, consumer protection and effective regulation.

World Metrology Day commemorates the signing of the Metre Convention on 20 May 1875, when representatives of 17 nations established the framework for international collaboration in the science of measurement (metrology). The convention led to the establishment of the International Bureau of Weights and Measures (*Bureau International des Poids et Mesures, BIPM*), laying the foundation for a globally harmonised measurement system that supports scientific innovation, industrial development, international trade and environmental protection.

The World Metrology Day project is jointly coordinated by the BIPM and the International Organisation of Legal Metrology (OIML). South Africa participates in both organisations, with NMISA representing the country at the BIPM and the NRCS representing South Africa at the OIML.

Measurement at the centre of governance

As governments and institutions globally face increasing scrutiny regarding transparency, accountability and the integrity of information used in public decision-making, the 2026 theme places accurate measurement results at the centre of trusted governance.

Reliable measurements provide the foundation for informed policy decisions across sectors such as energy, healthcare, environmental management, infrastructure development, food safety, industrial production and trade. Measurements influence critical areas of daily life, from ensuring accurate electricity billing and fuel dispensing to supporting environmental compliance, consumer protection and public health systems.

South Africa's institutional framework reflects this important relationship between measurement and governance. NMISA is responsible for maintaining the country's National Measurement Standards in line with international benchmarks; the NRCS, through its Legal Metrology function, ensures measurements used in trade are verified, traceable to the National Measurement Standards compliant with national legislation, and demonstrably accurate through traceability to the National Measurement Standards.

The joint NMISA–NRCS webinar provided a national platform for dialogue around how trusted measurement underpins policy decisions and strengthens confidence in public institutions, regulatory systems, and market participation.

Discussions focused on how accurate, traceable and consistently applied measurements support:

- Evidence-based policymaking
- Fair trade and market confidence
- Consumer protection
- Energy regulation and sustainability
- Environmental monitoring and compliance

Reliable measurement forms the foundation for sound decision-making across sectors ranging from energy to environmental management, food safety, industrial production and trade.

- Food safety-related regulation and policy development
- Industrial competitiveness and innovation
- Public trust in governance systems.

The virtual discussions also reflected South Africa's active participation in regional and international metrology initiatives through organisations such as the Southern African Development Community Cooperation in Legal Metrology (SADCMEL), the Intra-Africa Metrology System (AFRIMETS), BIPM and the OIML, which collectively support regulatory harmonisation, technical cooperation and international trade facilitation.

Trusted measurement systems support transparent policy implementation, economic growth, market confidence and public trust. Legality in metrology ensures that measurements used in trade remain accurate, traceable and aligned with national and international standards.

Scientific metrology in South Africa

South Africa's scientific metrology system is anchored by the National Metrology Institute of South Africa (NMISA), established in terms of the Measurement Units and Measurement Standards Act, Act 18 of 2006. NMISA is mandated to realise, maintain, and disseminate the National Measurement Standards, ensuring measurement traceability, accuracy, and international comparability across the South African economy.

Legal metrology in South Africa

South Africa's legal metrology framework, governed by the Legal Metrology Act, Act 9 of 2014, establishes the regulatory requirements necessary to ensure fair and accurate measurements in trade and legally controlled applications. The NRCS Legal Metrology Business Unit is responsible for regulating measuring instruments used in trade to protect consumers and businesses against inaccurate measurement practices.

For more information visit:
The National Metrology Institute of South Africa (NMISA)
The National Regulator for Compulsory Specifications (NRCS)

Monitoring material flow of small parts

ifm's Inductive ring sensors monitor material flow of small parts in assembly processes.

Inductive ring sensors are used in feeding technology to detect metallic parts such as screws or nuts as they are transported through tubes. Objects are identified at speeds of up to 35 m/s, no matter their size. This enables precise counting and efficient flow control. Blockages, standstills or incorrect conveyance (no part or several parts at once) can be reliably detected.

Static and dynamic applications

Inductive ring sensors from ifm can operate either statically or dynamically: Static sensors detect permanently present metal parts, for example, for level monitoring. Dynamic sensors react only to passing parts and are suitable for counting tasks or flow control. Both versions ensure a trouble-free production process in assembly systems.

IO-Link functions

The sensitivity of the devices can be conveniently adjusted using a potentiometer. Extended parameters such as pulse stretching, electrical design (PNP/NPN) and output function (NO/NC) can be configured via IO-Link. The sensors also offer IO-Link-specific features such as piece counting and diagnostic functions.

ifm will be exhibiting at the upcoming Electra Mining Africa show from 7 to 11 September 2026 at Nasrec, Johannesburg. Its inductive ring sensors will be among the products on display.

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

Fast 14 bit arbitrary waveform generator

The ARB Rider AWG-7000 is claimed to be the world's fastest 14 bit arbitrary waveform generator: 20 GS/s real time update rate and 14 bit vertical resolution. Available in 2- or 4- channel models, ARB Rider AWG-7000 is the fastest AFG (arbitrary function generator), reaching up to 6.5 GHz sine wave. With SimpleRider software, AWG-7000 offers best in class performances and an easy-to-use interface.

10 GHz bandwidth, up to 5 Vpp (Volts peak to peak) output range and up to 9 G sample memory depth, make the AWG-7000 a suitable choice for physics experiments, fast quantum key distribution (QKD), quantum sensing, optics and photonics, RF/wireless and aerospace and defence applications.

No compromise on analogue performances, the fast rise time of 50 ps can be achieved at the maximum amplitude of 5 Vpp

Up to 32 digital channel options, combined with two or four analogue channels make the AWG-7000 a comprehensive mixed signal generator. It's now possible to generate up to four analogue signals fully synchronised with 32 digital lines (LVTTL or LVDS standards) at the highest frequency.

A dedicated, intra-chassis synchronisation bus allows multi-instrument synchronisation of up to four units: 16 analogue channels and 128 digital channels for a powerful mixed signal generator.

The ARB Rider AWG-7000 is available locally from Vepac Electronics.

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

A waveform generator is used to generate electrical signals which act as a stimulus to a device under test (DUT), allowing engineers to verify a circuit's performance, among other things.

Automation in process control pinch valves

The GEMÜ Q50 eSyStep motorised pinch valve.

With new product developments GEMÜ is consistently advancing automation and electrification in biopharmaceutical processes: The motorised pinch valve, GEMÜ Q50 eSyStep, is now also available for tube sizes of up to 1" inside diameter. With this new actuator size, GEMÜ is specifically expanding its product range and now enables the automated control of all tube sizes covered by GEMÜ pinch valves.

Maximum flexibility for all tube sizes

The new actuator size 1 provides for the use of tubes with an outside diameter of up to 1½" (38.1 mm) and inside diameters of up to 1" (25.4 mm). This means that GEMÜ's actuators Q50 eSyStep cover the full range for which GEMÜ offers pinch valves. This offers customers maximum choice and flexibility in process automation.

Automation in the spotlight

The ongoing electrification of single-use processes is a decisive factor in ensuring competitive, cost-effective and future-ready production. With the Q50 eSyStep, GEMÜ offers a modern solution for the automated control and monitoring of the most varied media. Features such as the IO-Link connection system, end position programming, tool-free tube replacement and integrated position indicator facilitate smart integration into existing and new plants.

For more information visit: www.gemu.group.com

A point level switch for hygienic applications

The Liquiphant level sensor is recognised globally as one of the most reliable point level detectors for industrial plants.

The Liquiphant level sensor has been installed more than eight million times worldwide. Developed based on a new measuring principle to meet customers' challenges in the 1980s, it is today considered one of the most reliable and safe point level detectors in industrial plants. The latest generation of devices is ready for Industry 4.0 and the newest addition, the Liquiphant FTL63, is ideally suited for applications with hygienic requirements.

At the end of the 1970s, Georg H Endress asked developers at the company for an all-metal and thus permanently sealed sensor that could switch reliably and trouble-free in any application, without needing to be adjusted for different media. It quickly became clear that the capacitive and conductive probes used until then could not meet the requirements fully. This led to the development of a new measuring principle: vibronics. Within a short time, this new technology became the best-seller from Endress+Hauser and, to this day, the vibrating metal fork is recognised as the most reliable and safe limit switch. Used for overfill or dry-run protection, the Liquiphant performs various tasks in process automation. More recently, the sensor has been equipped to incorporate the shift to digital technologies.

The Liquiphant FTL51B can be used as an all-rounder for point level detection in all pumpable liquids. The Liquiphant FTL62 scores with its coatings which make it suitable for use in aggressive liquids. At high process temperatures of up to 280°C, the Liquiphant FTL64 is the preferred measuring instrument due to its special high-temperature design. The portfolio is now completed with the Liquiphant FTL63 – ideal for the food and beverage and life sciences industries due to its hygienic design.

The Liquiphant FTL63 is used for point level detection in process and storage tanks, as well as in pipelines. Typical use cases include empty level detection in milk tanks, dry-run protection for pump monitoring in the cleaning system of fermentation tanks for beer production and overfill protection in the concentrate tank in fruit juice production. In all these applications, the technology works reliably in all pumpable liquids.

Ideally suited for use in hygienic applications, the all-metal sensor meets the highest requirements for robustness as well as hygienic design (3-A certified and ASME-BPE compliant), making the device reliable and nearly maintenance-free in operation. The completely welded sensor concept guarantees cleanability in the process (CIP/SIP) and thus ensures efficient operation.

The point level switch can be put into operation in a few minutes without adjustment to the respective medium. The Liquiphant FTL63 switches reliably even where other measuring principles reach their limits, for example, due to changes in conductivity or dielectric constant, build-up, foam, turbulence or air bubbles. The Liquiphant technology is therefore ideal for replacing float switches, capacitive or optical sensors, and meets the current requirements for Industry 4.0.

Digital capabilities

Migration to Industry 4.0 requires sensors that provide relevant data to trigger process optimisation and efficiency gains. In the Technology Roadmap: 'Process Sensors 4.0', NAMUR calls for an additional, mobile way of communicating with the sensor. This information is used for predictive maintenance and process optimisations. Furthermore, additional product information, such as manuals or certificates, is available online on site at any time.

The latest generation of the Liquiphant offers users several ways to know their process status clearly. The ultra-bright LEDs indicate switching status. The Liquiphant FTL63 also allows operators to communicate with the sensor via Bluetooth® Technology and the SmartBlue-App from Endress+Hauser. The app makes all product and diagnostic data easily available, which is particularly helpful in installation locations that are difficult to access. The diagnostic function of the Heartbeat Technology can also be accessed via the SmartBlue-App.

In addition to current device diagnostics, Heartbeat Technology enables guided verification from the control room. Verification sets the foundation for predictive maintenance through frequency monitoring. By performing the verification, trends can be detected, which then provide an indication of corrosion or build-up on the sensor. When these are addressed in good time, plant shutdowns can be prevented, and plant availability increased. Verification is carried out via the SmartBlue-App directly from the control room without removing the device or interrupting the process, and is completed with an automatically generated, traceable verification protocol.

For more information visit: www.za.endress.com/

The latest addition of Liquiphant FTL63 with its hygienic design is ideal for the food and beverage and life sciences industries.

Powering South Africa's industrial revival

Mervyn Naidoo, ACTOM Group CEO.

South Africa's leaders have consistently highlighted the importance of localisation, industrialisation and rebuilding the country's manufacturing base. Investment conferences continue to attract significant commitments, and policy documents underscore the value of growing domestic capability. Here, Mervyn Naidoo, CEO of the ACTOM Group, emphasises that as the country moves from policy ambition to implementation, procurement frameworks will play an increasingly important role in ensuring these goals are fully realised.

This is especially relevant in the country's transmission build programme, which aims to deliver some 15 000 km of new transmission lines over the next 10 to 15 years, with an estimated investment of more than R400 billion. This is one of the most significant infrastructure programmes currently on the horizon and will be critical to unlocking new generation capacity.

At the same time, the structure of the Independent Transmission Programme (ITP) presents an opportunity to ensure local firms that have helped build and maintain the national grid over many decades can continue to play a leading role in the next phase of expansion.

Some reports on the ITP suggest that elements of it could be reviewed to help ensure that South African companies are able to compete effectively for lead roles in the implementation of the Transmission Development Plan.

Policy alignment

This points to the need for clear alignment between industrial policy objectives and the design of procurement frameworks. Local manufacturers have invested substantially in plant, skills and capacity in anticipation of a long-term infrastructure pipeline that can support industrial growth. ACTOM, for example, has operated in South Africa for more than a century and is now a majority black-owned electrotechnical manufacturer supplying transformers, switchgear and high-voltage equipment. The company is currently investing R250 million to support grid expansion. These are the kinds of businesses that can help advance the country's industrial ambitions.

Localisation is most effective when it is embedded not only in policy statements and investment targets, but also in the practical design of procurement frameworks. When domestic suppliers are fairly included and supported, infrastructure investment can generate broader value through local production, industrial expansion and job creation.

Rebuilding industrial capacity

The stakes are high. The metals and engineering sector, which underpins much of the manufacturing involved in building transmission networks, has lost more than 212 000 jobs over the past 15 years. This reflects the effects of underinvestment and uneven demand over time. A programme on the scale of the broader Transmission Development Plan could help reverse this decline by rebuilding domestic capability and supporting thousands of direct and indirect jobs.

Electro-mechanical manufacturers have an important role to play in Africa's industrial future, producing the infrastructure that enables energy access, supports industrial activity and expands manufacturing capacity. Providers of electro-mechanical equipment and solutions also contribute to skills development and employment by creating opportunities for artisans, engineers and technicians.

South Africa's transmission build programme presents a clear opportunity to implement localisation policy and rebuild the country's industrial capacity.

When local firms invest in these skills, they contribute to South Africa's long-term industrial resilience. To sustain that investment, however, they need procurement frameworks that provide visibility, consistency and a clear pathway for local participation.

Predictable demand

This is key to South Africa's reindustrialisation. Government leaders have repeatedly emphasised the importance of localisation. At the 2026 South Africa Investment Conference, President Cyril Ramaphosa noted that domestic investors are showing renewed confidence in the economy, with major commitments across sectors. Turning that confidence into long-term industrial growth will depend on predictable demand, transparent procurement and policy mechanisms that help reinforce the local industrial base.

If South Africa is to deepen industrialisation, expand employment and maximise the impact of infrastructure spending, careful attention must be given to the details of procurement design. Qualification thresholds, scoring methodologies, local content requirements, and tender structures all influence whether South African manufacturers can compete effectively and contribute meaningfully.

Beyond the aspiration, localisation is a practical discipline that depends on aligning procurement with policy intent. South Africa has a valuable opportunity to ensure that infrastructure investment strengthens domestic capability and supports the businesses that are investing in the country's future. ACTOM is one example of what is possible when local firms commit capital, skills and long-term capacity to national development. With the right procurement approach, that commitment can be matched more widely in an enabling environment that helps build a stronger local industrial economy.

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

Digital substations – modernising the grid

As Africa's energy systems face mounting pressure from increasing urbanisation, ageing infrastructure and the accelerating shift towards renewable energy, utilities are being challenged to do more with less and to do it faster. In this context, digital substations are emerging as a critical enabler of grid resilience and modernisation.

Traditionally, substations have relied on extensive copper wiring, manual monitoring, and reactive maintenance. However, the demands of today's energy landscape, characterised by decentralised generation, fluctuating loads and increasing electrification, require a fundamentally different approach. Digital substations represent a key step in that shift.

From infrastructure to intelligence

In digital substations conventional point-to-point copper connections are replaced by fibre-optic communications networks, enabling real-time data exchange across the grid. This transition allows utilities to move from static infrastructure to dynamic, data-driven systems that can respond instantly to changing conditions.

By integrating advanced sensors, automation systems and cloud-enabled analytics, operators gain access to up-to-the-moment information, allowing for faster, better-informed decision-making.

Mohamed Hosseiny, Oversight Country Managing Director for Africa at Hitachi Energy, explains. "Digital substations change how utilities see and manage their networks. Instead of reacting to faults after they occur, operators can anticipate issues, optimise performance and improve reliability in real time."

Enabling renewables integration and grid stability

A major challenge facing African utilities is the integration of renewable energy sources. Solar and wind energy offer significant opportunities, but their intermittent nature introduces volatility into the grid.

Digital substations play a crucial role in managing this complexity. By improving data quality and reducing decision-making time during disturbances, they enable utilities to maintain stability even as energy inputs fluctuate.

Incorporating renewable power into the grid is an essential aspect of the energy transition and utilities need to ensure the grid can handle that transition. Digital substations provide the visibility and control needed to balance supply and demand in increasingly complex systems.

Efficiency, safety and cost savings

Beyond performance improvements, digital substations deliver wider operational benefits. The reduction in physical cabling significantly lowers installation and maintenance costs, as well as decreasing the overall footprint of substations, a particular advantage in space-constrained urban environments.

Safety is also enhanced. By removing traditional electrical connections between high-voltage equipment and control systems, digital substations reduce the electrical hazards for personnel.

In addition, continuous monitoring and predictive maintenance capabilities help utilities reduce downtime, extend asset lifecycles, and improve service reliability.

A leap forward for Africa

For many African countries, the transition to digital substations presents an opportunity to leapfrog legacy infrastructure and adopt future-ready systems from the outset.

With more than 20 years of substation communication experience and hundreds of thousands of control and protection systems deployed globally, Hitachi Energy brings to the sector the expertise and the proven technology needed to support this transformation.

"Africa has an opportunity to build smarter grids from the ground up," notes Hosseiny. "Digital substations are a foundation for long-term energy security, sustainability and economic growth."

The future grid

As utilities across the continent navigate the pressures to expand access and improve reliability, there is a clear need for intelligent, adaptable infrastructure. Digital substations offer a path forward, enabling utilities to move beyond traditional limitations and build grids that are more resilient and ready for the demands of a rapidly evolving energy future.

For more information visit: www.hitachienergy.com

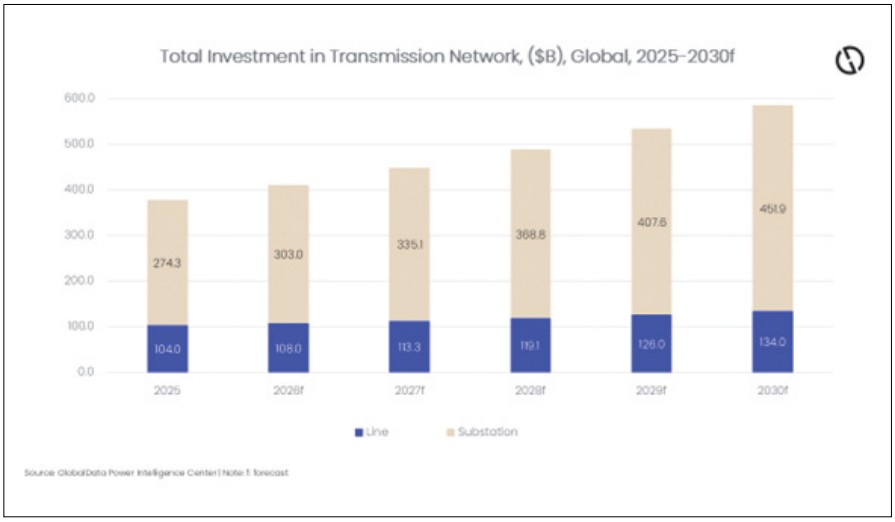
Operators use real-time data to optimise performance and reduce downtime.

AI-enabled smart grids and the clean energy shift

AI-enabled smart grids are transforming energy production and distribution through real-time predictive analytics and machine learning, dynamically aligning supply with demand. AI is changing grid ecosystems, optimising operations, bolstering reliability and strengthening resilience. By integrating IoT-embedded infrastructure with advanced forecasting and optimisation systems, utilities gain greater efficiency, adaptability, and robustness. This is the view of Global Data, a leading research, intelligence and productivity platform.

As AI-powered models project demand at micro-scales, empowering utilities to fine-tune load balancing, smart grids are set to reshape the power sector by facilitating the transition to cleaner energy and enhancing reliability.

GlobalData's latest report, *Smart Grid: Strategic Intelligence*, indicates that AI serves as the intelligence behind smart grids, driving optimisation, stability, and security across energy networks. It cites specific examples in companies such as Solcast and RisingStack using AI and satellite imagery to assess current solar irradiance and forecast PV output, helping grid operators curtail less and schedule reserves more effectively. Likewise, Hornsdale Wind Farm's AI systems, using atmospheric and performance data, are significantly improving forecasting accuracy, enabling better anticipation of variability and avoiding wasted capacity. Additionally, utilities such as National Grid harness sensor data to monitor critical systems and predict failures, significantly cutting downtime.



Global Data's projected investment in transmission networks globally to 2030.

Rehaan Shiledar, Power Analyst at GlobalData, comments: "Government initiatives, renewable integration, the demand for a more resilient and efficient grid, and technologies such as smart meters, AI, and IoT are driving investment in the power transmission market. Global transmission investment in 2025 stood at $378.3 billion, increasing by 10.1% over 2024. The investment was primarily in substations at $274.3 billion, followed by transmission lines at $104 billion. The transmission investment is estimated to grow from $378.3 billion in 2025 to $586 billion in 2030 at a compound annual growth rate (CAGR) of 9.2%."

Technological trends in the smart grid, particularly digital twins, microgrid development, and electric vehicle (EV) integration, are evolving rapidly to improve grid resilience, efficiency, and sustainability. These technologies are converging to create a more dynamic, decentralised and intelligent power system that can handle the complexities of renewable energy and bidirectional energy flow.

Companies such as ABB Electrification are enhancing grid efficiency, resilience, and accelerating the energy transition through Enline's Digital Twin modelling and Dynamic Line Rating (DLR) to improve transmission and distribution networks. Hitachi Energy and GE Vernova are supporting microgrid growth through distribution automation, grid control software, and integration of distributed energy resources and storage.

EV integration is increasingly recognised as one of the key drivers in smart grid evolution, enabling a more flexible, resilient, and clean energy system. For instance, GNA Energy (India) launched GNAi, an AI-powered platform for grid optimisation and smart meter integration in 2026.

Shiledar adds: "Smart grid technologies are transforming the power sector by making electricity systems more adaptive, efficient, and sustainable. Smart meters and sensors enable real-time monitoring of power flows, helping utilities better balance supply and demand and reduce energy waste."

Utilities such as EDF are using Distributed Energy Resource Management Systems (DERMS) to integrate solar panels, wind farms, and battery storage more smoothly into the grid, mitigating issues like voltage spikes and frequency fluctuations. Another example is virtual power plants (VPPs), which aggregate resources like residential solar panels, EV batteries, and flexible industrial loads to act as a single controllable asset for grid operators. Xcel Energy's advanced VPP in collaboration with Itron and Tesla integrates residential battery systems, rooftop solar, EV chargers, and smart thermostats into Itron's IntelliFLEX DERMS platform, enabling the aggregation and dispatch of DERs during peak load to stabilise the grid.

In closing Shiledar says: "As renewable energy grows and electrification spreads through EVs, heat pumps, and more, the grid must evolve. Smart grid tools drive this evolution through automation, digital intelligence, and two-way communication. In essence, these solutions bolster energy security, cost efficiency, and ecological integrity, fostering a sustainable energy ecosystem."

For more information visit: www.globaldata.com

SF_6-free MV switchgear for Elgin Orchards

Schneider Electric, together with its partner Technoserve Medium Voltage, has implemented its RM AirSeT SF_6-free medium voltage (MV) switchgear at Elgin Orchards, one of South Africa's leading fruit producers, based in Grabouw in the Western Cape.

The Elgin Orchards project marks another important step in the continuing adoption of the globally recognised RM AirSeT and its pure-air switchgear technology in the South African marketplace.

The installation of the RM AirSeT switchgear forms part of Elgin Orchards' journey to establish sustainable and resilient operations. The switchgear replaces an existing Schneider Electric RM6 unit which, in line with the fruit producer's commitment to resource efficiency, has been moved to a new cold storage plant.

"At Elgin Orchards, sustainability is central to what we do," says Neil Reid. "Together with Schneider Electric and Technoserve Medium Voltage we've made a change that supports reliable, safe, and low-carbon energy."

Brighton Mwarehwa, Offer and Marketing Director for Power Systems at Schneider Electric says: "The RM AirSeT installation at Elgin Orchards eliminates the use of SF_6 and delivers improved reliability, plus cost savings of up to 20% over the system's lifecycle. It is a step towards responsible growth and energy resilience."

Towards greener operations

The RM AirSeT represents the next generation of sustainable switchgear, using pure air insulation and vacuum technology instead of sulphur hexafluoride (SF_6), a greenhouse gas with 24 300 times the global warming potential of CO_2.

By removing SF_6 entirely from the system, Elgin Orchards has achieved a measurable reduction in carbon footprint and eliminated associated regulatory risks. The new installation also ensures uninterrupted operations for its cold chain and processing facilities.

Evans Coetzee, General Manager at Technoserve MV comments: "The RM AirSeT offers reliability and future-ready flexibility. It is compact, robust, and digital-ready, providing Elgin Orchards with a durable and sustainable medium-voltage solution that's simple to install and maintain. The swap from RM6 to RM AirSeT was completed in a single day, minimising downtime."

He adds that the RM AirSeT delivers up to 10 000 switching cycles and offers integrated digital capabilities for real-time monitoring and diagnostics through Schneider's Easergy T300 platform. This makes it well suited to hybrid energy systems, frequent operation, and future smart grid integration.

Mwarehwa adds: "The Elgin Orchards project is an example of how sustainability and performance can function together. By replacing SF_6 with pure air, we are helping our customers transition towards cleaner, more resilient energy systems without compromising reliability or safety.

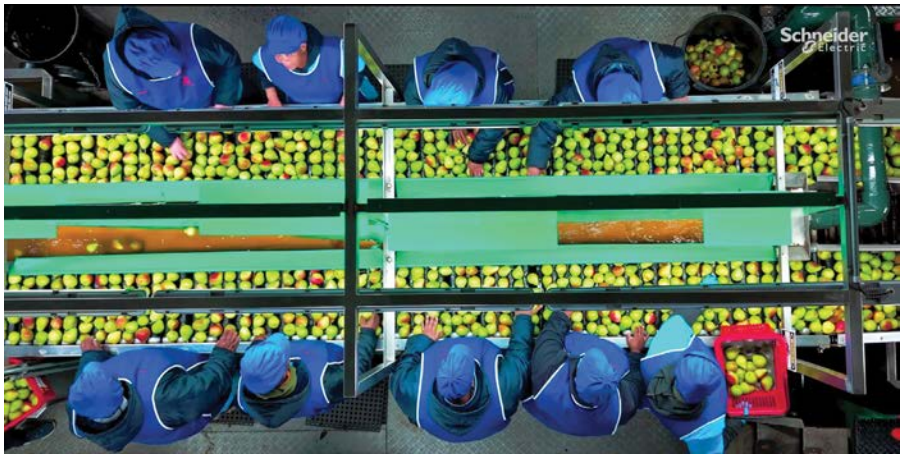
"The project demonstrates how innovation in electrical distribution can contribute to achieving climate goals while supporting South Africa's all-important agricultural sector."

The RM AirSeT last year earned global recognition, honoured by the World Economic Forum's[1] Alliance of CEO Climate Leaders as a Champion of the Scope 3 Downstream Solutions Challenge in the Sustainable Design category. This recognition underscores AirSeT's role in decarbonising electrical distribution systems and advancing net-zero ambitions worldwide.

Reference

[1] WEF Forum stories
https://www.weforum.org/stories/2025/09/4-winning-solutions-that-address-downstream-scope-3-emissions/

For more information visit: www.se.com



Elgin Orchards is one of South Africa's leading fruit producers, based in Grabouw in the Western Cape.

Transformers built for extreme conditions

South Africa-based Trafo Power Solutions is supplying 13 dry-type transformers for e-houses to strengthen the power infrastructure at a copper-gold project in Pakistan. Commissioned by one of the EPC contractors working on the project, the transformers are designed to meet the site's harsh, arid conditions.

The mining project is on one of the world's largest, undeveloped copper-gold reserves, located in the Chagai district of Balochistan, close to the borders of Afghanistan and Iran. The terrain is arid to semi-arid, characterised by desert, mountain ranges, sparse vegetation and regular dust storms.

David Claassen, Managing Director of Trafo Power Solutions, says the transformers have been designed to meet the challenges of this remote and demanding mining environment. "The range of dry-type transformers we are supplying to one of the engineering, procurement and construction contractors involved in this copper-gold project, now in its early works phase of development, include smaller isolation transformers rated at 5 kVA, lighting transformers of 75 kVA, and larger units of between 250 kVA and 1 000 kVA for power distribution functions," he explains.

Dry-type transformers provide mining operations with a robust and low-maintenance power solution suited to demanding industrial applications.

Although Trafo Power Solutions has designed the transformers for indoor operation in the e-houses, the high ambient temperatures of the site have been taken into account. The design therefore caters for daytime temperatures of over 50 degrees Celsius – with Class H insulation.

"To improve the turnaround time, we manufactured the enclosures in South Africa and – importantly – these could be flat-packed for easier logistical handling on route to the site," Claassen adds. "The dry-type transformers were shipped by our manufacturing partner TMC Transformers in Italy, directly to the site in Pakistan."

He highlights that although the manufacturing of the transformers takes place in Italy, Trafo Power Solutions conducts the factory acceptance testing with the customer.

The order also includes 18 neutral earth resistors (NERs) which are connected to the star point of the transformers to limit the earth fault current. "We are supplying a number of 690 V air-type NERs as well as 11 kV NERs which are rated at 300 amps for 10 seconds – also capable of operating in air temperatures of up to 50 degrees Celsius," Claassen says.

He points to the reliability of dry-type transformers and the limited maintenance they require as important benefits for users on remote sites such as this one in Pakistan. Unlike conventional oil-cooled transformers, where the oil needs regular testing and replacement, dry-type units are air-cooled and seldom require any active maintenance.

With its depth of experience in installing and commissioning its transformers and other electrical power solutions, Trafo Power Solutions supports the customer during these phases and provides technical support into the future.

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

Guardian of the grid

[Source: Doble]

Falcon 4 provides the system visibility that helps grid operators move from reactive response to predictive control.

Working in a substation, you know that problems rarely announce themselves. One day everything looks fine – the switchgear's sealed, the cables are solid, the load is steady – and then suddenly, you're dealing with an unplanned outage.

That failure didn't happen overnight. Somewhere inside the insulation, it is likely that partial discharges had been at work – tiny electrical breakdowns eroding the system's health, one pulse at a time.

A clear window into the network

Doble Engineering's Falcon 4 was built to give grid operators (asset managers, engineers and technicians) what they need: real-time visibility into the unseen. It continuously monitors medium-voltage assets – switchgears, cables, transformers, and motors – and captures every PD event as it happens.

Falcon 4 classifies signal sources by their pulse signatures. That means it can track the individual phenomena over time and perform an individual identification to distinguish between substation disturbances and partial discharge

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Smart grid solutions

At Enlit Africa 2026, held mid-May in Cape Town, ABB South Africa presented its advanced electrification technologies designed to strengthen grid resilience across the continent.

Enlit Africa is recognised as one of the continent's leading gatherings for the power and energy sector, bringing together utilities, regulators, technology providers and industry stakeholders. This year critical challenges such as grid reliability, infrastructure modernisation and the integration of renewable energy were in focus.

ABB's Electrification Distribution Solutions (ELDS) division showcased technologies designed to improve network visibility, operational efficiency and system resilience. As utilities across Africa contend with ageing infrastructure and increasing demand, the need for intelligent, digitally enabled grid solutions has become more urgent.

Among the solutions on display was ABB's SCADA panel, which enables real-time monitoring and control of electrical networks, giving operators greater visibility of the networks so they can respond quickly to faults or disruptions.

Additionally, ABB's UniGear portfolio and LeanGear medium-voltage switchgear engineered for reliability and reduced maintenance were on show. UniGear offers adaptability, allowing for sensors and advanced analytics to be incorporated into the switchgear to support predictive maintenance and enhance operational safety.

The company's Compact Secondary Substation is another solution – designed for rapid deployment in urban environments and industrial applications. It is a modular, space-efficient solution that integrates transformer, medium-voltage and low-voltage components into a single unit. It delivers reliable performance in harsh environments and provides for the integration of distributed energy resources, including renewables.

Together, these technologies reflect ABB's broader approach to enabling more flexible and resilient grids that can adapt to changing energy demands and, at the same time, maintain stability and performance. This is especially relevant in the African context, where expanding access to electricity needs to be balanced with the transition to cleaner energy systems.

Egon Worthmann, ELDS Division Manager at ABB South Africa.

"Across Africa, utilities are under increasing pressure to deliver reliable, flexible and sustainable power," says Egon Worthmann, Electrification Commercial Leader & ELDS Division Manager at ABB South Africa. "At Enlit Africa 2026, ABB took the opportunity to demonstrate how its smart electrification solutions enable a more resilient grid – one that can adapt to future energy demands and improve operational efficiency today."

With utilities and industry stakeholders seeking practical, scalable solutions to complex energy challenges, ABB is committed to supporting the development of robust, future-ready power infrastructure across the continent.

For more information visit: www.abb.com

ABB's UniGear enables predictive maintenance and improved safety with integrated sensors and analytics.

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signals affecting the asset insulation, providing the clarity needed to make decisions based on reality, not assumptions.

In practice, that translates into higher sensitivity to small defects, fewer false positives, and the ability to spot insulation degradation long before it becomes critical.

Built for the field

Site experiences and challenges have shaped the design of Falcon 4: it's fast to install, non-intrusive, and doesn't require shutdowns. Clamp on an HFCT sensor or mount the TEVs, and it's up and running – without taking the system out of service.

No complex calibration, no specialised training. Once connected, the unit configures itself, syncs, and starts streaming PD data to its onboard web interface or the user's SCADA system. Integration is seamless through IEC 61850, OPC-UA and MODBUS protocols.

It is practical, rugged, and made for the realities of the field.

Smarter maintenance

Condition-based maintenance is today's standard for high-reliability operations. Falcon 4 makes this attainable by providing continuous diagnostic coverage. Users are informed by an alarm when a PD activity is recognised, behaviour trends can be tracked over time, and data correlated across sites. That means maintenance calls are informed, rather than relying on guesswork. Falcon 4 helps substation engineers move from reactive response to predictive control.

Despite its compact form, Falcon 4 is a leading diagnostic instrument: 4 independent PD channels, 125 MSa/s sampling, 30 MHz bandwidth, and a built-in sync channel for precise phase correlation. It's engineered for accuracy, reliability, and repeatable results.

When you're managing critical power assets, confidence in your data is just as important as the data itself.

The Falcon 4 is not just another sensor box. It's designed to be an engineer's ally – a constant, intelligent observer that makes the usually invisible behaviour of equipment insulation systems visible, providing insight from the PD alarm to the raw data.

For anyone who's ever been blindsided by an unexpected fault, this kind of constant vigilance is worth its weight in uptime.

For more information visit: www.doble.com

Volunteering can be a step towards career progress

George Asamani, Managing Director, Project Management Institute, Sub-Saharan Africa, says volunteering is often framed as an act of goodwill rather than a pathway to professional growth. He suggests that this view misses an important point. Here he highlights how, in many cases, volunteering is one of the most effective ways to build capability, credibility, and leadership. Although as a practice it remains widely misunderstood, particularly in emerging markets, he argues that it deserves to be reconsidered.

Across Africa, the disconnect between education and employability remains a persistent concern. According to the African Development Bank, 10 to 12 million young Africans enter the job market each year, yet employers continue to cite gaps in experience, problem-solving skills, and leadership readiness. The issue is not a lack of talent, but a lack of exposure.

Traditional career paths, where progress depends on one's level within an organisation, do not always provide the range of experience needed in a fast-changing economy.

Volunteering, when approached with intention, can help close this gap. It puts people in situations where they are given responsibility. This is evident across global professional communities, including PMI, where just under 18 000 volunteers contribute to initiatives that shape practice and build capability. In many ways, it mirrors the pressures of formal roles, without the delays that usually come with waiting for such opportunities. This is particularly relevant for early and mid-career professionals.

In traditional settings, the opportunity to lead is often something people have to wait for. It usually comes with senior roles, titles, and years of experience, rather than readiness or potential. In volunteer environments, however, people may step into leadership early. Managing projects, working with teams, engaging stakeholders, and dealing with challenges are part of the day-to-day experience. This creates faster personal growth, which is hard to achieve in more rigid organisational structures.

George Asamani, Project Management Institute, Sub-Saharan Africa.

The absence of financial compensation is often cited as a deterrent. In many contexts, where financial pressure is real, this concern is valid and understandable. But it also reflects a narrow view of value. The benefits of volunteering may not be immediate, but they are significant. It builds experience that sets the individual apart, creates networks that open doors, and can show an ability to lead and deliver. Over time, these advantages grow and compound.

Volunteering also helps build a different kind of professional network, one that is less transactional and more lasting. The relationships are built on shared purpose rather than immediate gain. In markets where professional systems are still developing, such networks can offer mentorship, support, and opportunities that might otherwise be out of reach.

There is also a broader point to consider. As African economies become more connected to the global system, it is important not only to follow standards but to help shape them. Many of these standards are developed through collaboration, often by professionals contributing their expertise rather than through formal roles. Taking part in these processes allows individuals to go beyond their immediate organisations and engage in wider professional conversations.

Of course, not all volunteering is created equal. The value lies not only in the act, but in the quality of the experience. Roles that demand accountability, offer exposure to diverse perspectives, and involve measurable outcomes, contribute most meaningfully to personal and professional growth. Approached in this way, volunteering becomes less about giving time and more about making deliberate investments in one's development.

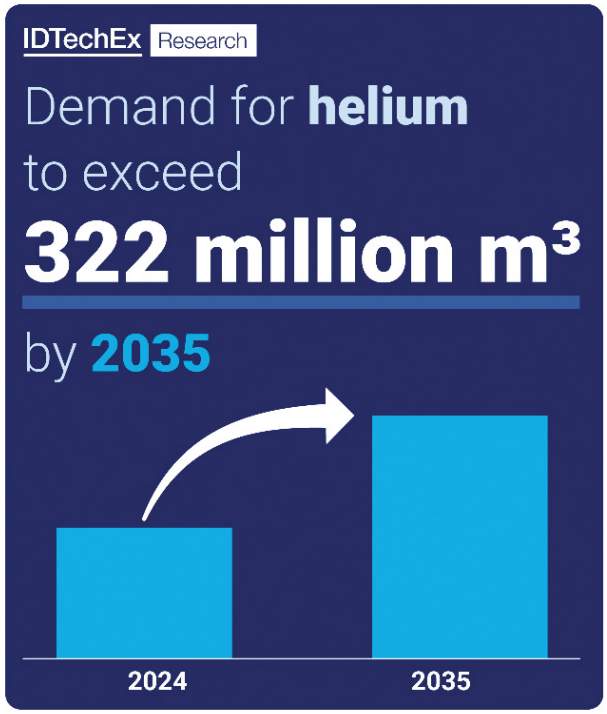
In an environment where experience is generally the most significant barrier to progress, volunteering offers the individual a practical way to overcome that. It allows professionals to build a track record, test their abilities, and expand their horizons in ways that formal roles may not immediately permit.

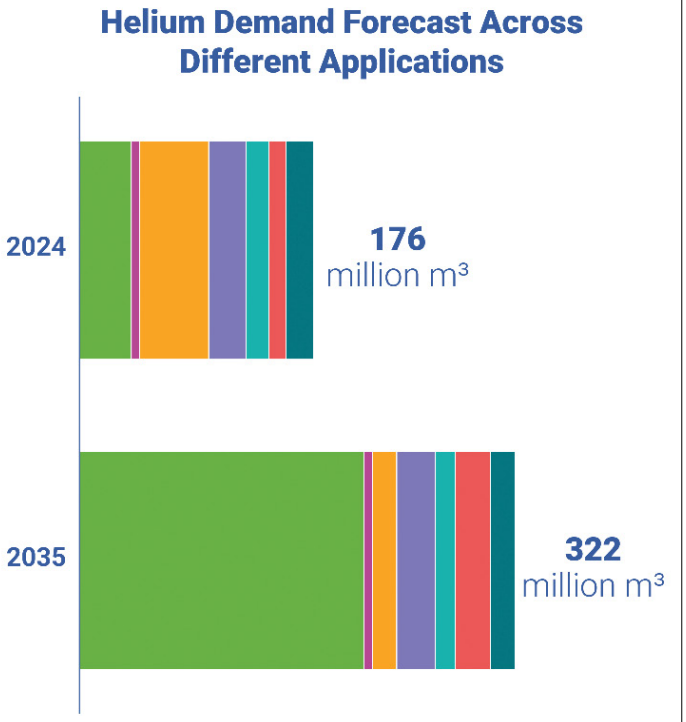
The wider implication is equally important. If more professionals engage in meaningful volunteer work, the cumulative effect is a stronger, more capable workforce, one that is better equipped to navigate complexity and drive project success.

We need to reconsider volunteering – across Africa – as one of the most accessible ways to build the experience the workforce needs.

For more information visit: www.pmi.org

Middle East tensions chokehold global helium supply





(Source: Helium for Semiconductors and Beyond 2025-2035: Market, Trends, and Forecasts)

IDTechEx forecasts the overall growth in helium demand across different applications to nearly double by 2035.

With the ongoing crisis in the Middle East and the blockade of the Strait of Hormuz paralysing a major transport route for global energy, the repercussions go beyond oil and gas, extending to the world's helium supply, with downstream impact on industries such as semiconductor manufacturing that are critically reliant on helium.

Helium is a finite resource that plays a critical role across several industries, including semiconductor manufacturing, medical imaging, aerospace engineering, chemicals and pharmaceuticals, fibre optics, particle physics, scientific balloons, and many more, with limited or no available alternatives in some cases.

In a new report released by market intelligence firm IDTechEx, Dr Shababa Selim looks at the critical role of helium in the semiconductor industry, Qatar's position in the helium supply chain (Qatar produces a third of the world's helium supply) and what this means for semiconductor manufacturing.

Semiconductor manufacturing relies on helium

Sophisticated semiconductor products can have over a billion transistors etched onto silicon die the size of a fingernail. Realising this complexity requires multiple steps in the manufacturing line to control processes precisely at the atomic level, across wafers that can be 12 inches in diameter.

Many chemicals and gases are critical to the semiconductor manufacturing process. Helium is one of them owing to its cryogenic properties, exceptional thermal conductivity, chemical inertness, small size, and high diffusivity, with no direct substitutes. It is used throughout the manufacturing line and is essential to the operation of fabrication facilities.

In its report *Helium for Semiconductors and Beyond 2025-2035: Market, Trends, and Forecasts*[1], IDTechEx forecasts helium demand for semiconductor manufacturing to increase more than five-fold by 2035.

For instance, within the manufacturing line, helium is essential as a carrier gas for deposition processes, as a dilutant in plasma etching, as well as wafer cooling to minimise warpage under thermal stress. It is essential for extreme ultraviolet (EUV) lithography in sub-5nm chip manufacturing, critical for AI applications, to cool wafers and tools. Separately, in factory operations, helium gas is used in leak and safety testing of pipelines and equipment, as well as ultra-clean atmospheres required for manufacturing processes.

Qatar's position in the helium trade

Globally, known helium reserves are mainly in Qatar, the USA, Algeria, Russia, Canada, and China, with Qatar having the largest reserves (>10 000 million m^3). Qatar is one of the main suppliers, together with the US and Russia, and being the second largest producer, it supplies over a third of the world's helium supply.

How helium is produced also matters, because it is generally produced as a by-product of natural gas processing, where helium is present at very small quantities (typically 0.3 to 0.5% depending on the reserve). Separating helium from natural gas requires a series of processing steps such as cryogenic separation for nitrogen and helium rejection, membrane and pressure swing adsorption (PSA), and further cryogenic liquefaction for transportation. This is all capital intensive, so it makes sense to produce helium only if the

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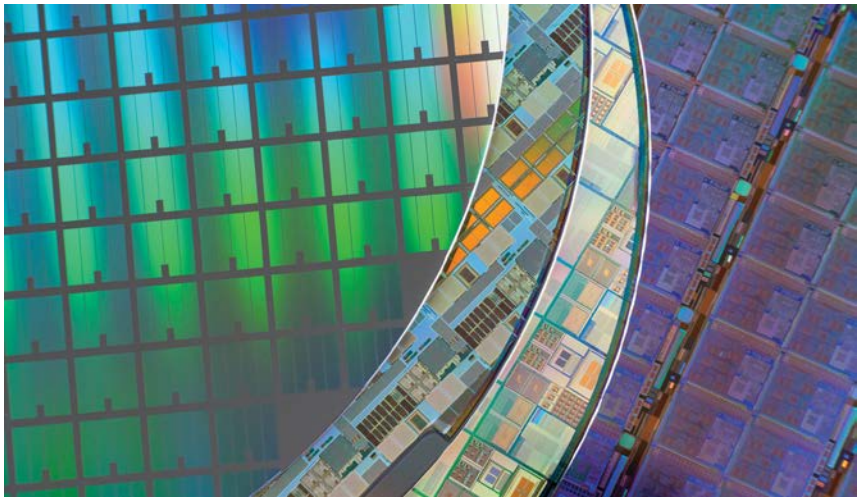
facilities are processing huge amounts of natural gas. Hence Qatar's Ras Laffan facility is a critical facility, due to its scale of operation.

Qatar and Russia are also important players because both have been focused on expanding production of helium. With Qatar's Ras Laffan taking the hit and shut down, this is already having an impact on helium pricing and supply. Even if facilities restart now (even partially), there will be a backlog, and its implications will be felt across the value chain.



Semiconductors are used in the production of microchips, or integrated circuits, a sector facing growing demand for ever more sophisticated chips.

For the semiconductor industry

Under normal circumstances, helium is a gas that leaks very easily, leaking from helium storage containers at a rate of ~1% per day according to industry experts, so it is difficult to store or maintain substantial inventory. (It is used for leak testing for that reason.) This means semiconductor fabs (fabrication plants) are reliant on a stable supply. Supply disruptions can slow production, and significant delays can result in facility shutdowns in extreme cases.

Fabs like TSMC usually have a few months of inventory and use helium recycling systems, but whether fabs can see through current supply disruptions will depend on how long the disruptions last. If they continue for several months, this will have massive implications for the semiconductor industry, particularly with the growing demand for ever more sophisticated chips for AI and HPC that require sub-5nm nodes.

Additionally, it is important to look at regions where semiconductor manufacturing giants are located. Countries that have diversified their sourcing of helium have a stronger position. For example, Taiwan reportedly sources ~two thirds of its helium from Qatar and the US, and the balance from other sources. On the other hand, South Korea reportedly sourced ~65% of its helium from Qatar in 2025, which leaves local semiconductor manufacturers there vulnerable to supply chain challenges. Thus, players such as Samsung and SK Hynix have reportedly secured long-term supply agreements with players such as Linde and Air Products that source a large share of their helium from the US.

Other ways of sourcing helium

While helium as a by-product of natural gas is the primary method of helium production, in countries such as the US and Canada, there are geological hotspots where helium concentrations in reserves can be present at concentrations ranging from 0.3 to 10%. This opens opportunities for smaller players to enter the field. IDTechEx reports that low-capex separation systems, such as membrane and PSA technologies, can be used to upgrade and purify the helium acquired from these sources, with players adopting PSA, membrane, or a hybrid PSA + membrane system depending on the separation objective. From insights gained through interviews with key technology developers such as Generon and UGS, IDTechEx's report provides comprehensive market analysis of these technologies, with product benchmarks and case studies.

The outlook

If these challenges persist, IDTechEx suggests that there may be increased adoption of conservation efforts or helium recycling in semiconductor manufacturing. A major success story in this regard has been in the use of helium for MRI scanners, where modern MRI systems have seen technology improvements introducing closed loop systems to recirculate the helium to avoid helium refills.

Apart from the current supply crisis, there have been four pronounced helium shortages over the last 20 or so years, impacting market availability and the price of helium. Hence, industries critically reliant on helium usually have contingency measures in place, such as diverse supply sources to safeguard against short-term disruptions. However, persistent market volatility may drive industries to increasingly diversify their helium supply chains so they are not reliant primarily on one country but take a more balanced approach including Qatar, Russia, and the US.

In its report, *Helium Market 2025-2035: Applications, Alternatives, and Reclamation*, IDTechEx provides key market insights into the production and supply of helium, the major applications, outlook, and trends in how industries are adapting to cope with chronic supply challenges with helium conservation methods (such as reclamation technologies) or adopting substitutes where possible.

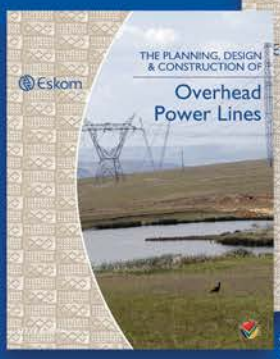
Reference:

[1] https://www.idtechex.com/en/research-report/helium-for-semiconductors/1025

For more information visit: www.IDTechEx.com

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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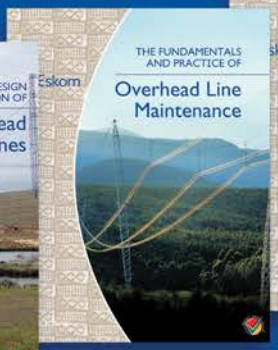

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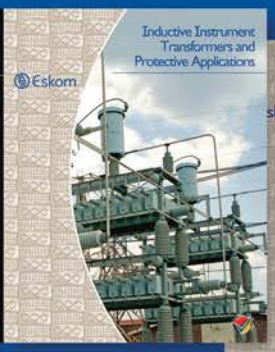

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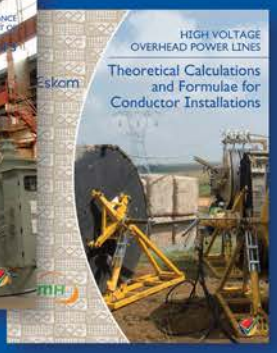

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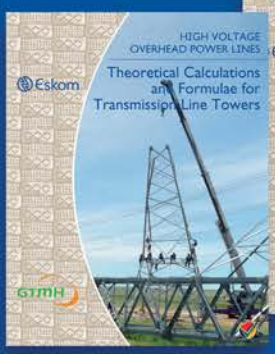

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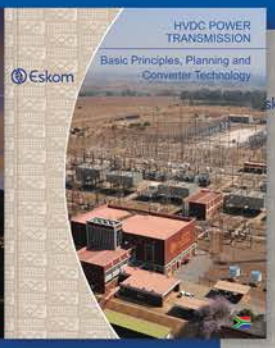

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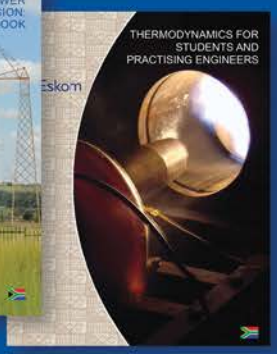

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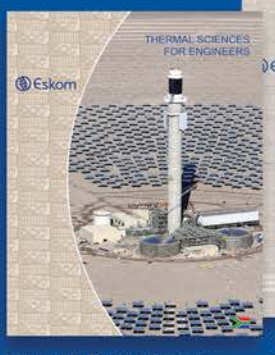

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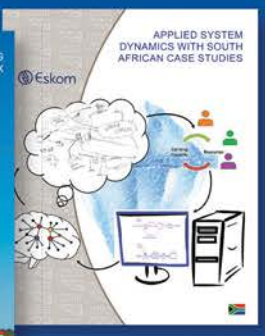

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