

FEATURES:

Industry 4.0 + IIoT

Energy management + energy efficiency

Measurement + instrumentation

Safety of plant, equipment + people

10/2025

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With over 40 years of expertise, ElectroMechanica, working with Delta Electronics, helps manufacturers transition to smarter plant automation in ways that are practical, scalable, and sustainable.

(Read more on page 3.)

Editor: Leigh Darroll

Design & Layout: Katlego Montsho

Advertising Manager:

Paul Engelbrecht

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Technical Editorial Consultant: Ian Jandrell

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In Industry 4.0 everything needs to work together

This month, *Electricity + Control* is packed with information to assist you as you journey towards more efficient and safer systems in your plant.

We feature: Industry 4.0 + IIoT, Energy management + energy efficiency, Measurement + instrumentation, Safety of plant, equipment + people. What is particularly interesting is how these topics are interconnected. Consider the impact of Industry 4.0 on your measurement and control strategies, how the strategies influence plant safety, and the increasingly important aspect of environmental management, and how all these factors contribute to optimising energy usage across the plant.

The message is clear: the days of imagining your plant to be designed, managed and controlled in separate silos are gone. And if they are not yet gone on your plant, now is the time to begin that journey.

One of the reasons the silos ever existed was the competence focus of those responsible for the respective silos – and that remains true. But what is needed is the ability to peer over the silo wall and properly engage in the other areas.

For instance, I fondly recall days gone by when the ‘heavy current’ engineers and technicians really had little to do with the control and instrumentation folk – and the closest interactions occurred when it became important to figure out whose fault something was ...

Those were the days when we ‘weighed current’ – forgetting that the fundamentals remain the same and it is only the context that changes.

On a personal note, I also recall many discussions around earthing, bonding and grounding – with the situation seeming to be: “It’s my earth so leave it alone”, which of course can never be true!

There are, nonetheless, good reasons for this – with certain earth conductors being essential to ensure the correct operation of protection and so on, or to provide the reference point for an electronic system.

But, if I digress for a moment, there

were many cases where earth conductors (notwithstanding the reference point for all plant systems being the plant ...) were even different colours and the earth bars were in different cubicles and should never even see each other. And often, if one needed to interconnect these various ‘earths’ for obvious technical reasons, it was best to do it in a way that was not obvious – so as not to frighten folk, even as their plant performance improved!

The subtext to all of this is that even as plant operations become more technical and complex, there is an overarching need for all plant personnel to be fully aware of a multitude of aspects of those operations. This speaks to a broad-based technical appreciation of plant operations and the various systems – and how they impact each other.

It also emphasises the need for continuing education – being sure to learn something each day – and to take the lead in encouraging more junior personnel to do the same.

Education and training are not the things you do to start your career – they are the very essence of maintaining your career. And, after all, learning is always fun.

So, the single message based around the inter-relationship between the topics we cover in this edition is always to be open to learning about ‘the other side’. Be open to understanding the energy supply system, and the control system – and how parameters are measured and what they are used for.

In my experience, it is often the folk who are not the closest to a specific part of the plant that come up with great ideas to improve operations. This should be encouraged and welcomed – understanding that a plant is not a playground where anything can be done, but rather where collaborative thought and planning can optimise every aspect of your operation.

Ian

Ian Jandrell

PrEng IntPE(SA), BSc(Eng) GDE PhD,
FSAEE FSAIE SMIEEE



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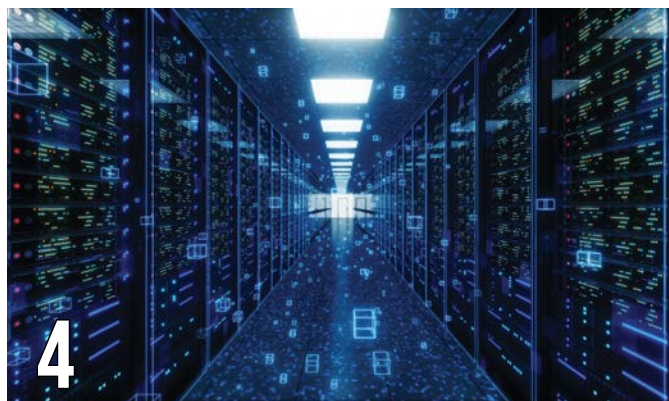
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Scope for South Africa's transformer manufacturing industry

Unlocking the smart factory

A practical roadmap for South African manufacturers

South Africa's manufacturing sector stands at a crossroads. Global competitors are embracing Industry 4.0, yet many local operations remain tied to outdated equipment and processes. The result is higher costs, lower efficiency, and shrinking competitiveness. For the sector to thrive, smart automation is not a luxury – it is a necessity.

At ElectroMechanica (EM), together with Delta Electronics, we know transformation is not about technology for its own sake. It is about solving real problems: labour shortages, rising operational costs, and downtime that slows production. With over 40 years of expertise, we help manufacturers transition to automation in ways that are practical, scalable, and sustainable.

People at the centre

The future of manufacturing depends on people and technology working together. Upskilling is as critical as upgrading. Cobots, for example, can safely handle repetitive tasks, reducing fatigue and safety risks, while training programmes give workers the confidence to integrate smart systems into their daily operations. This balance of innovation and empowerment builds resilience across the industry.

Smarter operations, stronger growth

Predictive analytics now allows manufacturers to move from reactive maintenance to proactive performance. Remote monitoring ensures factories can boost efficiency without disruptive overhauls. And modular automation solutions integrate seamlessly with legacy systems, making digital transformation more accessible than ever.

Securing the connected factory

As factories become more connected, cybersecurity must be

embedded from the start. EM and Delta's solutions are designed with data integrity and protection in mind, ensuring continuity and trust in an increasingly digital environment.

The way forward

Smart automation is not simply a technical upgrade. It is a strategic choice to unlock growth, empower people, and build a resilient manufacturing future. With proven technology and industry know-how, EM and Delta Electronics are ready to partner with South Africa's manufacturers on this journey.

The future is here. The question is: will you lead it?

For more information contact ElectroMechanica.

Tel: +27 (0)11 249 5099

Visit: www.em.co.za



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ElectroMechanica and Delta Electronics help manufacturers transition to automation in ways that are practical, scalable, and sustainable.



Prenesh Padayachee, SEACOM.

Enabling AI-ready connectivity in Africa

Prenesh Padayachee, Group Chief Digital Infrastructure Officer at SEACOM

Africa's digital future hinges on laying more fibre and building smarter networks. As artificial intelligence reshapes how businesses consume data, the demands on our infrastructure are evolving at an unprecedented pace. At SEACOM, we are designing a network that scales, adapts, and anticipates. One that is AI-ready.

Over the past quarter, our team has delivered critical upgrades across subsea and terrestrial infrastructure. These improvements are not incremental. They represent a strategic pivot towards elastic bandwidth, multi-terabit scalability, and an infrastructure model built for AI's real-world requirements – from inference bursts to training throughput.

Connecting Mombasa to Mtunzini – and beyond

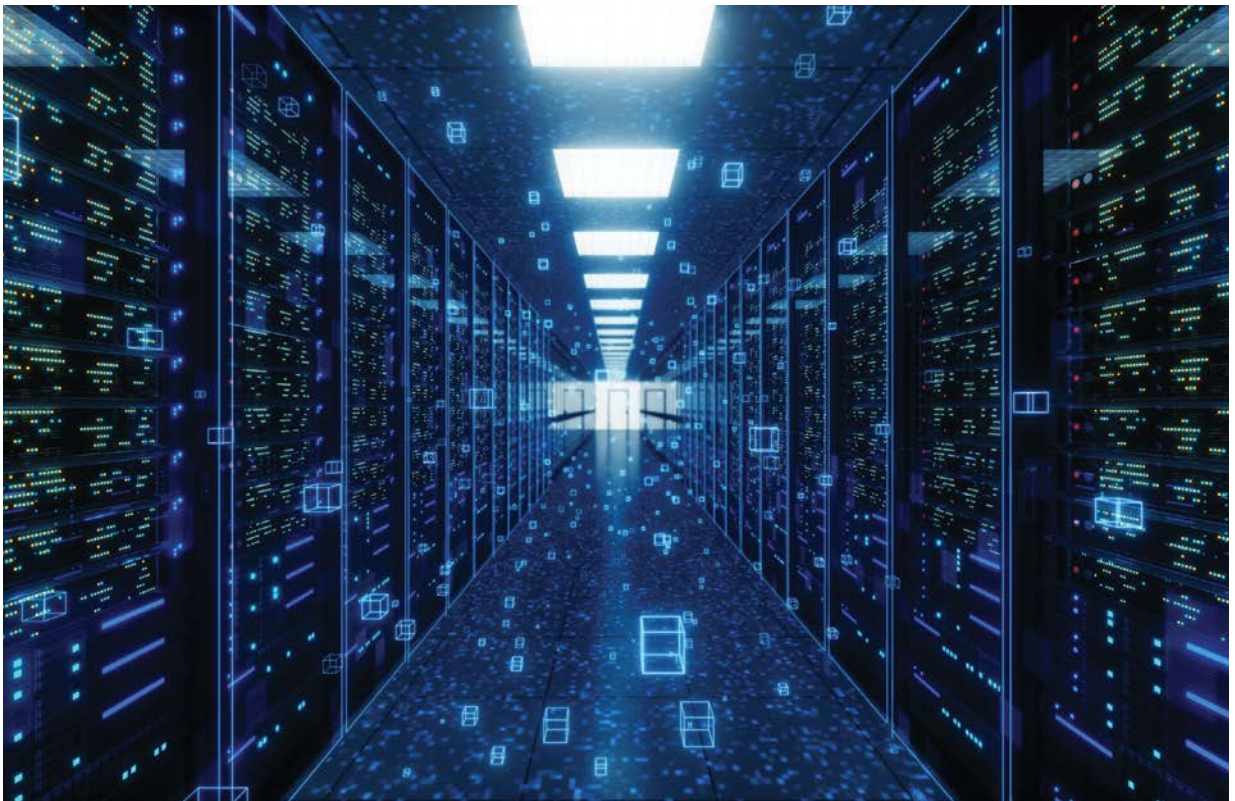
Let us start with the subsea foundation. We have significantly upgraded capacity on two major routes: the omnibus route, which connects Mombasa to Mtunzini via several coastal countries, and the express route, which runs directly from Mombasa to Mtunzini.

Both have been scaled into the multi-terabit range, to meet rising regional demand and to support the rapid growth of data flowing between East and Southern Africa, encompassing bandwidth and meeting the need for uncompromising resilience and readiness.

As geopolitical instability in the Red Sea intensifies, with a number of vessels reportedly attacked in recent weeks, there is a real risk that subsea cables in the region could face ongoing disruptions. Our southern capacity expansion ensures that should the Red Sea corridor become impassable, data traffic from East Africa can reroute seamlessly through South Africa and exit via the Equiano cable to Europe.

But subsea connectivity is only part of the story. In Kenya, we recently lit up new dark fibre routes between Nairobi and Mombasa, offering a high-capacity terrestrial corridor between the landing station and Kenya's economic core. This route includes two different paths and, crucially, solar-powered repeater stations in areas without access to grid electricity. That means the entire chain (from equipment to cooling) runs on renewable energy. As well as being 'green' the system is practical. In regions where utility power is unreliable or unavailable, energy independence is the only way to ensure uptime.

Phase two of this build will extend capacity from Nairobi to Kampala in Uganda, creating an end-to-end SEACOM-managed



SEACOM is designing subsea and inland connectivity to carry escalating AI traffic today and into the future.

route from subsea landing to the landlocked capital. It ensures control and scalability across critical corridors.

These upgrades are tightly aligned with where hyperscalers are concentrating their infrastructure: South Africa, Kenya, and Nigeria. SEACOM's investment in connecting all new data centres in Kenya means we now offer dc-to-dc connectivity on-net, enabling customers to operate across iColo (Kenya), Raxio (Uganda), and Teraco (South Africa) without relying on third parties.

The hyperscaler for hyperscalers

What makes this infrastructure 'AI-ready'? It starts with how we provision and manage capacity. Large Language Models (LLMs) and training datasets demand consistent, long-duration bandwidth. In contrast, inference workloads – which power real-time responses in AI applications – generate short, high-capacity bursts of data. A network built for AI must be able to handle both. That's where elastic provisioning comes in.

We moved away from traditional models, where clients purchase fixed capacity. Instead, we are pioneering an elastic bandwidth model: clients gain access to a larger pipe. They can adjust their usage dynamically on an hourly, daily, or even minute-by-minute basis. It is fast, flexible, and designed for modern workloads. However, this model isn't easy. You need infrastructure that can expand capacity at speed. That's where our OnNet model shines:

- We own and light our own fibre
- Lease dark fibre and light it with our own equipment
- Purchase spectrum on third-party fibre and control both endpoints.

This layered strategy enables us to control scale, performance, and cost. It allows us to increase capacity rapidly without relying on third-party capital expenditure cycles.

Outpacing the AI curve

AI is accelerating faster than telecommunications have ever done. Traditional fibre and transmission upgrades follow

seven-year planning cycles. AI chipsets? They iterate every 12 to 14 months. That mismatch creates an urgent need for networks that can keep pace with the rapid development of AI.

If we consider spectrum usage, not long ago, 50 GHz of spectrum could deliver 10 Gbps. Today, with modern technology, the same spectrum yields 400 Gbps – and soon will provide speeds of 800 Gbps to 1.6 Tbps. Building a network that can evolve in step with these advances, SEACOM is ensuring it meets today's demands – and is ready for what comes next.

Being AI-ready is about carrying AI traffic and about applying AI to run the network. We are designing systems that will enable application-aware networking. That means the infrastructure will know what kind of traffic is being sent and automatically adapt latency, capacity, or prioritisation to suit the application. A video stream requires a specific type of service. A digital twin simulation needs another.

We are also exploring programmatic, AI-driven management of pricing, routing, and traffic shaping. This is part of a broader industry shift towards autonomous networks, and SEACOM is helping lead the way. Through the TM Forum, a global body focused on telco innovation, SEACOM chairs two working groups focused on AI in networking and autonomous infrastructure. We're in conversation with industry giants like Microsoft, helping shape the frameworks and standards that will define the next era of digital infrastructure.

Enablers, not sellers

SEACOM is not trying to become an AI company. We don't build models. We're not developing end-user AI products. What we do is provide the infrastructure foundation – the bandwidth, the resilience, the intelligence – that makes AI possible.

We may sell an AI product. But we will sell the building blocks to help our customers become AI-enabled. That means: high-capacity subsea links; elastic, renewable-powered terrestrial routes; data centre neutrality and independence. And that means applying AI inside our own network, to make it smarter, faster, and more adaptable. SEACOM is a trusted enabler of Africa's AI future.

For more information visit: <https://seacom.co.za/>

Industry 4.0 + IIoT: Products + services

AI-powered engineering in 100 use cases

USA based Altair, a leader in computational intelligence, has released an eBook highlighting 100 AI-powered engineering use cases, which demonstrate how artificial intelligence (AI) is transforming the product development lifecycle across industries.

Designed as a reference and a roadmap, the eBook offers organisations the chance to explore proven strategies for digital transformation and AI adoption. With insights on how to use AI to cut costs, accelerate timelines, and innovate faster, the eBook provides practical inspiration for how organisations can start or scale their own AI-powered engineering initiatives.

"AI has become essential in product development and engineering. At Altair we have integrated AI across our tools and workflows to bring AI capabilities directly to our customers," said Sam Mahalingam, Chief Technology Officer. "The real-world use cases in this eBook demonstrate how our

customers are applying AI to enhance their productivity, solve today's toughest challenges, and improve business outcomes. We are proud to empower companies with accessible tools that help transform data into strategic advantage."

The 100 use cases address a wide range of industries including automotive, heavy equipment, healthcare, energy, aerospace and defence, and more. Each use case illustrates how AI can deliver results, whether it's predicting battery lifespan, optimising aerodynamic performance, or enabling real-time digital twins. The eBook can be accessed from the Altair website to view the different use cases.



The new eBook highlights various organisations applying AI across the product lifecycle.

Supporting smart infrastructure in South Africa

Wherever there are people, there is infrastructure. From the electricity that powers our cities to the clean water that serves our communities, infrastructure shapes our daily lives and determines our quality of life. Yet, it is often only



Veron Maharaj, ABB Electrification.

noticed when something goes wrong. Veron Maharaj of ABB Electrification makes the point that as South Africa endeavours to deal with the challenges of rapid urbanisation, climate change, and resource scarcity, it is clear that its infrastructure must evolve to become smarter, more resilient, and sustainable, to meet the needs of today and tomorrow.

“At ABB Electrification, we believe the infrastructure of the future must do more than support daily operations; it must anticipate them. With over 130 years’ experience in electrification and a presence in more than 100 countries, including South Africa, ABB is committed to building intelligent systems that connect and optimise infrastructure across sectors,” Maharaj says. “We are reimagining how airports operate, how ports manage energy, how cities move people, and how utilities deliver critical services, using digital technologies to improve efficiency, reliability, and sustainability.”

He highlights that as the world transitions to meet the climate targets outlined in the Paris Agreement it is estimated that a sum of \$13.5 trillion needs to be invested in energy efficiency and low-carbon technologies by 2030. As well as investment, Maharaj emphasises that this shift requires innovation. This is where ABB is delivering smart, connected solutions that reduce environmental impact and enhance performance.

“Our work spans critical sectors where infrastructure challenges are complex and growing, particularly in South Africa.

“In water management, we support utilities grappling

with the pressures of rising urban demand and significant water losses, with some areas losing up to 30% of water through leaks.

“ABB’s advanced solutions are used in optimising water distribution networks, addressing the ongoing challenges posed by South Africa’s water scarcity and ageing infrastructure.

“In land transportation, we enable smarter mobility solutions that balance traffic safety, energy efficiency, and environmental impact. And in the ports sector, we provide the technologies needed to increase throughput and automate container handling, at the same time reducing carbon emissions in a space where 90% of global trade takes place.”

He points also to the rapidly evolving telecommunications industry where constantly increasing customer expectations raise the need for resilient, scalable infrastructure. ABB is enabling telecom operators to deploy robust digital solutions that keep people connected wherever they are. “We want to be at the forefront of this digital migration happening in South Africa and on the continent,” Maharaj says.

“A key differentiator for ABB is our ability to combine global expertise with local delivery. Our team of 53 000 professionals, working across 200 manufacturing sites globally, brings deep local knowledge and expertise to every project, ensuring that our solutions are customised to meet locally specific needs while maintaining global best practices.”

In its Ability™ platform, ABB integrates cutting-edge technologies such as edge computing, cloud connectivity, analytics, artificial intelligence, and cybersecurity into infrastructure management. This integrated platform empowers customers with real-time insights and predictive capabilities, driving efficiency and sustainability. In South Africa it is used in key sectors such as energy, water, and transportation, playing a part in the country’s ongoing digital transformation.

Another growing focus area for ABB is e-mobility, which is slowly gaining traction in South Africa as infrastructure develops. With road transport reported to be responsible for more than 75% of transport-related CO₂ emissions globally, and passenger cars accounting for 60%, electric mobility is essential in the transition to net-zero. ABB is contributing to this shift with charging solutions for various applications, from residential EV chargers to high-power highway stations and fleet-scale electrification for buses and trucks.

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Among other infrastructure sectors, ABB supports water utilities by providing advanced solutions to optimise water distribution networks.

Scalable, prefabricated infrastructure for data centres



Vertiv™ OneCore delivers flexible, faster-to-deploy infrastructure to accelerate high-performance data centre buildouts.

Vertiv recently announced the global availability of Vertiv™ OneCore, a scalable, prefabricated solution that integrates Vertiv's proven power, thermal, and IT infrastructure technologies into a single, factory-assembled system. Designed to accelerate high-density data centre deployments, Vertiv OneCore simplifies project execution by reducing on-site complexity, compressing timelines, and offering scalability from 5 to 50 MW. The solution is now available globally for a range of deployments, including enterprise, colocation, sovereign, and 'neocloud' environments.

Vertiv OneCore offers a unified, 'slab-up' turnkey approach that streamlines the process, from design to installation and ready for operation, under a single point of contact. The flexible building design leverages proven, prefabricated building blocks, including whitespace fit-outs like Vertiv™ SmartRun, housed within a steel shell. This simplifies logistics, minimises on-site labour and complexity, and supports consistent quality, cost, and schedule outcomes. Vertiv™ Unify provides integrated system visibility and centralised management.

"Vertiv OneCore is our answer to the need for reducing complexity and enabling speed in building data centre capacity at scale," said Viktor Petik, Senior Vice President of infrastructure solutions at Vertiv. "We know the challenge is not just designing for today's needs but building an adaptable foundation for the future. This solution standardises key components and provides the flexibility to scale and evolve, expand easily, and integrate new technologies as business and IT requirements change"

Vertiv OneCore is ideal for data centres with mixed loads or extremely high rack densities. Its modular electrical and mechanical designs support parallel manufacturing to enable compressed

timelines and reduce costs. This approach is flexible and free from rigid size limitations, enabling customised configurations that maximise usable whitespace and improve airflow for environmental control.

Key features

- Scalable power capacity supports 5 to 50 MW in a single block to meet growing energy demands for AI and high-density deployments.
- High flexibility in rack density, configurable for 96 to 944 racks, supports low to extremely high densities and enables tailored designs based on IT requirements.
- Integrated thermal and power systems deliver energy-efficient, space-saving cooling and power infrastructure with Vertiv's proven technologies, including a broad range of liquid cooling and advanced heat rejection systems, scalable power management and uninterruptible power supply (UPS) systems.
- Enabling simpler maintenance, the electrical and thermal systems are designed for availability and system resilience during maintenance or upgrades.
- Optimised site and environmental performance, the solution operates in temperatures from -20°C to 55°C, supporting robust performance in diverse global climates.
- Advanced redundancy Includes redundant configuration options for both Primary and Secondary Fluid Networks, as well as options for distributed electrical redundancy.
- Broad voltage compatibility makes the system compatible with 11 to 35 kV medium voltage and 400 V to 480 V 3-phase ac power input, meeting diverse regional standards.
- Comprehensive service and support, backed by Vertiv's global service organisation, means customers gain access to expert-led commissioning, proactive maintenance programmes, and rapid response capabilities to support long-term performance, availability, and operational efficiency across the full data centre lifecycle.

Vertiv OneCore can also support customers' sustainability goals through increased efficiency, reduced power requirements, and a flexible design that can adapt to evolving technology standards.



Viktor Petik, SVP Infrastructure Solutions at Vertiv.

Continued from page 6

Maharaj notes that electric transportation, when combined with renewable energy, has the potential to reduce emissions and improve air quality significantly in many South African cities. He says this transition is as much a technological imperative as a societal one, as it addresses the country's pressing challenges of air pollution and traffic congestion. "Cleaner transport means healthier cities, reduced noise pollution, and more liveable communities, especially in urban centres like Johannesburg and Cape Town where pollution levels are a growing concern."

From ABB's perspective, the future of infrastructure in South Africa is one where systems are seamlessly integrated, intelligently managed, and environmentally

responsible. It is a future where connectivity drives efficiency in sectors such as energy, transportation, and water, where digital tools enable predictive maintenance to avoid system failures, and where electrification paves the way for a carbon-neutral South Africa, contributing to the country's climate goals and sustainable development.

Maharaj says, "At ABB Electrification, we are proud to be shaping this future. Through our partnerships, technology, and drive for progress, we are helping businesses, industries, and governments to design and deliver infrastructure that meets the demands of today and safeguards the possibilities of tomorrow."

For more information visit: new.abb.com

Africa's largest standalone data centre



The total JB4 facility comprises 14 data halls with a floor area of 17 000 m².

Teraco recently announced the completion of its JB4 Bredell Campus data centre expansion in Ekurhuleni, east of Johannesburg. The 30 MW addition expands JB4 to being the largest standalone data centre built in Africa, with 80 000 m² of building structure, serviced by 80 MW of utility power supply servicing 50 MW of critical IT power load.

The new expansion at JB4 comprises six data halls, incorporates new design enhancements and, in another African first, each hall supports 5 MW of allocated critical IT power load. The new data halls are fully liquid-to-liquid cooling enabled, allowing for high-density air-cooled cloud deployments and direct-to-chip cooling for denser AI workloads.

JB4 is designed with a keen focus on sustainability. It incorporates, for instance, a state-of-the-art closed-loop chilled water system that provides free air cooling, coupled with AI-enabled technology to configure data hall cooling in real time, based on IT load and load dispersion. This achieves industry-leading Power Usage Effectiveness (PUE), significantly reducing energy consumption and using zero water during ongoing cooling – an important

feature on a continent facing water scarcity and unreliable supply.

The JB4 expansion is built in line with global hyperscale requirements and international compliance standards, adding to Teraco's existing portfolio of ISO 9001, ISO 27001, ISO 50001, ISO 14001, ISO 45001, PCI-DSS, and ISAE3402 certified data centre facilities.

It contributes significantly to the South African and sub-Saharan African data centre footprint, following the recent completion of Teraco's new hyperscale JB5 Isando facility, which adds another 30 MW of critical IT power load to Teraco's Isando Campus in Ekurhuleni.

Jan Hnizdo, Teraco CEO, says the company is well positioned to continue its strong growth with sustained demand from enterprises and hyperscale clients for hybrid cloud and cloud deployments.

"South Africa has become the technology and data centre hub for sub-Saharan Africa, acting as a springboard for cloud, AI and content provision into Africa. Significant global investments in undersea cables, such as Equiano and 2Africa, further strengthen this position, enabling global cloud providers to service the South African market as well as the rest of the sub-Saharan African region.

"Teraco is dedicated to expanding its capacity across key hubs. We ensure our clients have the flexibility to scale and leverage digital transformation across the region. We continue to make significant investments in ICT infrastructure and have established Africa's largest data centre platform. We are proud to offer open-access interconnection and deliver world-class data centre solutions to all our clients," he says.

Teraco's data centres provide access to a wide range of network service providers, regional IXPs, content delivery networks, cloud service provider on-ramps, and peering at the NAPAfrica internet exchange. Its growing data centre platform currently stands at 189 MW of critical power load which includes the Isando Campus: 70 MW, Bredell Campus: 64 MW, Cape Town Campus: 53 MW, and Durban: 2 MW.

Sustainability is a key element of Industry 4.0



The energy centre room at Teraco's recently completed JB4 facility at its Bredell campus in Isando, east of Johannesburg.

Leading data centre operator, Teraco, recently released its fourth annual sustainability report, a reflection of its ongoing efforts to embed environmental and social responsibility across every aspect of its business.

Teraco recognises the significant energy requirements of its facilities and reiterates its commitment to minimising its environmental impact. Through renewable energy programmes, next-generation

cooling systems, and optimised power infrastructure, the company is investing in leading-edge technologies to improve energy efficiency and sustainability.

Achievements from the past year

- Teraco started construction on a 120 MW solar PV project, set to begin operations in 2026
- Signed its first Power Purchase Agreement (PPA) under its renewable wind energy procurement programme
- Continues to protect scarce natural resources using zero water cooling solutions
- Achieved an average annual Power Usage Effectiveness (PUE) of 1.47 in 2024, setting benchmarks for operational efficiency
- Expanded its rooftop solar investments to a total commitment of more than 10 MW by December 2026
- Retained its ISO 50001 and ISO 14001 certifications and achieved ISO 45001 Health and Safety Management certification.

Additionally, Teraco confirms that it is on track to supply 50% of its total energy consumption from clean sources by 2027 and to achieve 100% clean energy usage by 2035.

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New software generates automated analogue IC tests digitally

Siemens Digital Industries Software has introduced Tessent™ AnalogTest software – an innovative solution that reduces pattern generation time for analogue circuit tests from months to days. The solution enables testing of analogue circuitry in integrated circuits (ICs) up to 100 times faster than traditional manual methods.

Analogue circuit testing has traditionally been a labour-intensive endeavour, requiring prolonged test coding and expensive mixed-signal test equipment. Working in tandem with Siemens' market-proven Tessent DefectSim technology, the new Tessent AnalogTest software helps to shorten test coding time for analogue circuitry in ICs markedly by automatically generating minimal-impact design-for-test (DFT) circuitry and digital test patterns for nearly any analogue circuit block. The tests run in less than a millisecond on almost any tester, and defect coverage can be verified in simulation up to 1 000 x faster than in specification-based tests.

The introduction of Tessent AnalogTest marks the first automated DFT solution for analogue circuitry in ICs, delivering digital vectors for testing and computing test coverage efficiently before tape-out to silicon production. The solution leverages digital automated test equipment (ATE) for the development of analogue circuitry to reduce costs and enhance productivity, compared to using more expensive mixed-signal testers. This acceleration allows IC designers to achieve and verify high (>90%) IEEE P2427-based defect coverage in a matter of hours for individual circuit blocks, setting new speed benchmarks and significantly reducing time-to-market.

"This pioneering software offers rapid test outcomes and delivers higher analogue defect coverage in tests up to 100 times faster than tests using conventional methods," said Ankur Gupta, Senior Vice President and General Manager, Digital Design Creation Platform, Siemens Digital Industries Software. "Tessent AnalogTest software represents a big step forward in addressing key quality and cost challenges associated with analogue circuit testing, enabling our customers to streamline processes and reduce overall test costs."

Long-time Tessent DefectSim customer, onsemi, has used Tessent AnalogTest for a taped-out design. Using this tool, onsemi was able to achieve more than 95% analogue defect coverage and better than 100x test time improvement compared to using traditional test methods.

"The biggest challenge in achieving DPPB-level quality in analogue and mixed-signal products is the lack of structured Design-for-Test and Test Generation methodologies for analogue circuits. Tessent AnalogTest is a tool that makes it practical to generate analogue DFT solutions and associated tests automatically," said Steven Gray, Senior Vice President, New Product Development, onsemi. "Through our collaboration with Siemens as an early partner, we are optimistic that this methodology will result in shorter development times, much faster tests, and better quality, similar to how scan improved DFT and test for digital circuits."

The software extends its structural test generation capabilities by producing simulation testbenches from specification-based tests, using the intuitive high-level ICL and PDL test descriptions as specified by IEEE P1687.2, which is the analogue extension of the widely used digital JTAG standard. These tests can verify the analogue test flow and defect coverage for algorithmic trimming, top-up parametric tests, or ISO 26262 functional safety metrics. Additionally, embedding the scan tests can further enhance these metrics.

Tessent AnalogTest is in use by early partners and will be generally available in December 2025.



The new Tessent™ AnalogTest software enables much faster testing of analogue circuitry in integrated circuits than traditional manual methods.

Continued from page 8

Water efficiency

Operating in Africa, where water scarcity is a critical concern, Teraco continues to set global benchmarks for water usage efficiency. Through smarter design, technology, and operational practices, its data centres used just 0.05 litres per kWh in 2024 – that is less than a quarter cup of water per IT kWh.

Responsible waste management

The company aims to achieve zero waste to landfill by 2028. Through comprehensive recycling initiatives and partnerships with local programmes, it is progressing towards this target and reducing its environmental footprint.

Investing in communities

Seeing sustainability as more than environmental stewardship to include positive social impact, in 2024,

Teraco invested R46.3 million in education, digital inclusion, and skills development programmes. Investments extend from the Teraco Data Centre Academy to the Tomorrow Trust, the South African Broadband Education Networks (SABEN), and bursaries and scholarships awarded to talented individuals within the Teraco community.

By empowering future generations, the company is helping to close the digital divide and foster long-term economic growth.

Looking ahead

Teraco continues to evolve, embracing innovative technologies and industry-leading practices that strengthen its environmental and social impact. With transparency and through its ambitious goals and strategic partnerships it is driving change across the data centre industry.

Holding sustainability central to the way it operates, the company is shaping a responsible, resilient, and sustainable digital future.



Danie Möller of Mulilo.

Balancing climate goals and grid realities in South Africa

Taking a closer look at South Africa's energy transition Danie Möller, Chief EPC Officer at Mulilo, highlights the obstacles, possibilities and priorities, recognising that balancing climate goals with grid realities is tougher than it looks.

In the energy sector, progress is not linear. Infrastructure built decades ago, although innovative for its time, demands re-engineering in today's more populated and environmentally conscious world.

Historically, power infrastructure has always been about the needs of the people. Environmental concerns were few and far between. But now we have global climate goals that must be pursued. While these targets are welcomed, we cannot overlook the consideration that our grid capacity must serve all South Africans – alongside the urgent need for sustainable energy reform. That's why the South African government has conceptualised and planned the Just Energy Transition (JET).

As a policy, the JET helps us decarbonise our energy system in a way that also protects livelihoods, supports economic development, and ensures no one is left behind. It's about balancing climate goals with social and energy availability realities on the ground.

To support this, the government recently introduced new regulations under the Climate Change Act, establishing mandatory carbon budgets for major emitters and stricter 2031-2035 Nationally Determined Contribution (NDC) targets, raising the stakes for a transition that balances technology, grid stability, and compliance.

With these regulations in place, the aim is to build a cleaner system while keeping the grid stable and the lights on. Quite doable with the right technology stack.

No single technology can do it all

Even the cleanest, most promising solution does not operate in a vacuum. Renewables are a good example: they are variable by nature. We can't rely on them alone to power an entire economy – not yet anyway.

That's where technologies like battery energy storage systems (BESS) have a significant role to play. BESS gives us the ability to smooth out short-term fluctuations, stabilise voltages, and make renewables more dispatchable. We are now starting to see battery systems support the grid by providing immediate reserve capacity. The next step for BESS is to begin offering grid-forming functions which, traditionally, only fossil-fuel-based rotating power plants could provide.

Grid-forming technology differs from grid following as it actively stabilises the network by injecting synthetic inertia, which replicates the rotating mass of traditional thermal generators, helping to smooth out unusual electrical swings following network faults. The functions of grid forming technology include helping to restore an entire grid following a system-wide collapse.

This contrasts starkly with the more traditional grid-following technology in current wind and solar plants, which usually disconnect and isolate themselves following a network event. This further destabilises the network and limits the number of plants that can be connected to the grid safely.



[Source: Mulilo]

Mulilo aims to bring 5 GW of renewable energy and battery energy storage projects into construction and operation by 2028.



[Source: Mulilo]

Mulilo currently operates 420 MW of wind and solar projects, with a further 667 MW in construction, about 1 500 MW nearing Financial Close, and more planned.

We also need transition fuels. South Africa's strategic location along shipping routes and its rich reserves of platinum group metals make a green hydrogen economy potentially promising, although the technology is still complex and in the early stages of commercialisation.

Natural gas may not be the end goal, but right now, it could play a critical transition role in keeping the system flexible and responsive by replacing costly diesel in open-cycle gas turbine peaking plants. In time, we may see hydrogen step into that space and South Africa playing a leading role, but it is still early days.

Nuclear power and hydropower also play a part in the energy transition. I have always believed in building systems with redundancy. When one part is under strain, another can provide cover. But that points to a fundamental problem we face.

You can't deliver clean energy on a weak grid

The current grid was not designed for the flow of energy we are seeing today. Although the private sector can move quickly, many new generation projects are stalled due to insufficient grid capacity.

We have dozens of fully permitted projects in the Northern Cape, a region that has among the highest yields globally. Hence, the projects offer the cheapest energy available, but all are currently on hold due to a lack of grid capacity. As well as the Northern Cape and Western Cape, other provinces are also affected, with several projects across bid windows still in limbo due to grid constraints.

Government has acknowledged the issue and has taken steps towards a solution but fixing the grid requires more than partial upgrades leveraged off individual IPP projects. It calls for the rethinking of how we plan and prioritise transmission at a national level.

The private sector is doing some heavy lifting

Much of the current momentum comes from the private sector. IPPs like Mulilo are building new renewable energy projects and transmission substations, and mining companies, among others, are investing in renewables to meet net-zero targets. Rooftop solar installed by households is already shaving gigawatts off daytime demand on the national utility supply, although this momentum has slowed as load shedding

pressures ease. With the right feed-in frameworks, residential generation could become a valuable balancing tool in the years ahead.

Government is also moving forward, having seen to the NTCSA being established, and progressing Section 34 determinations for over 1164 km of new 400 kV transmission lines across the Northern Cape, North West, and Gauteng. Initiatives like the Integrated Transmission Planning programme, the finalised renewable energy masterplan (SAREM), World Bank funding support, and a National Treasury credit guarantee vehicle are unlocking private investment to strengthen the grid.

Getting these projects up and running remains a challenge, and bureaucracy can frustrate progress. Yet both public and private sectors are showing resilience, driven by people committed to being part of the solution.

People in the transition

At Mulilo, we have worked on projects near old coal communities. We have spoken to people who have built their lives around those industries and jobs. So, we don't take it lightly when we talk about phasing out fossil fuels. It's more than an engineering decision; it involves people. That's why I believe in the JET. In theory and in practice. If we don't bring all the people in the country along with us, we will fail, no matter how clean our megawatts are. Retraining workers with new skills, community investment, and inclusive procurement are essential to the success of South Africa's energy transition.

Lighting up the future

It's not hard to see we still have a long way to go and many hurdles ahead of us (and some unseen, no doubt). The climate goalposts may move, but progress can always be made – if we pull together. I've seen firsthand what can happen when projects get the green light, partners pull together, and government helps to open the right doors. I believe we can build an energy system that is clean, stable, and for the benefit of all South Africans. It won't happen overnight. However, with the right investment, a shared commitment, and a lot of grit, it will happen.

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

Power solutions for industry across Africa

Trafo Power Solutions turned eight this year. Growing locally, developing its capabilities and extending its reach into Africa and abroad, Trafo Power Solutions represents another South African success story. Leigh Darroll spoke to Managing Director, David Claassen, about the trends Trafo sees emerging across Africa and the key factors it considers when designing customised power solutions – often for remote sites and to endure tough working conditions.



David Claassen, Managing Director of Trafo Power Solutions.

Claassen says the Trafo Power Solutions team has around 20 years' experience in working across Africa and this is an advantage in understanding the demands of different projects, different sites and regions, and delivering customised solutions to order. The challenges encountered may be similar – relating primarily to infrastructure, logistics and skills – but each country and each project presents particular variations and specific requirements.

A focus on efficiency

One of the clear trends that Trafo Power Solutions is seeing is the growing focus on efficiency. Customers want to see projects executed efficiently, with procurement streamlined and a minimum number of suppliers involved. This consolidates responsibilities and reduces costs. "Whether we are dealing with EPCM (engineering, procurement and construction management) consultants, or with the end users directly, they are looking for a suite of solutions from one solution provider. Certainly, this is the case in the sectors we work in, providing power solutions for mining sites, for infrastructure and utilities projects in water, wastewater management, and energy, and we are seeing growing demand from new data centres. This approach has clear benefits in terms of simplifying contracting procedures and focusing responsibility, and these continue from supply through operations and maintenance."

Claassen notes this as a distinguishing feature of the African market. "In more developed regions, like the US and the EU," he says, "there is stronger focus on specialisation – and the markets operate drawing on a spread of specialist suppliers rather than sourcing comprehensive solutions more directly through one supplier."

Trafo Power Solutions' history in the field of engineered electrical solutions is mainly in low voltage (LV) and medium voltage

(MV) systems and interfacing equipment. Claassen emphasises that the company is more than a product supplier. It engineers power solutions that are designed to optimise efficiencies and minimise losses. "We focus on total cost of ownership rather than only upfront capital expenditure – and customers increasingly recognise the value of this longer-term view and the payback it delivers," he says.

Trafo Power Solutions works mainly with the private sector. This is where the demand is. In mining for example, it is dealing with Australian, Canadian and South African mining houses. And in other sectors mainly with South African EPCM consultants and construction contractors.

Working across Africa it has developed a network of partners over the years, in-country companies that have an operational understanding of local realities, to support projects in different parts of the continent.

"In our partners we look for an alignment of company culture, compatibility in terms of ethics and operating principles and a clear commitment to service and support. Trafo Power Solutions' team members are always available to provide support from



A dry-type transformer solution from Trafo Power Solutions with integrated control and protection,



Cooling system designed by Trafo Power Solutions for a modular substation to maintain optimal temperature control and safe operation of electrical equipment.

South Africa when needed. We also provide training on our products and systems and contribute to upskilling local businesses, sharing our expertise,” Claassen adds.

Beyond dry-type transformers to electrical power solutions

Trafo Power Solutions began its business with a focus on providing dry type transformers as an alternative to conventional oil transformers to the South African and Southern African market. Claassen is a strong proponent of dry-type transformers and the science behind them which delivers valuable benefits – most notably in minimal maintenance demands, safety in eliminating the risk of fire, and environmental benefits in excluding the risk of oil leakage contaminating the site. All these factors also contribute to reduced costs over the operating life of the transformer.

Today, Trafo Power Solutions supplies solutions that include mini substations and e-houses – which incorporate dry-type transformers, the switchgear and auxiliary equipment, appropriate cooling systems and the structured containers. The company continues to work closely with its partner TMC, based in Italy and a leading global supplier of custom-engineered dry-type transformers. All other elements are manufactured and assembled in South Africa and shipped to site. Claassen notes that there are some projects where it is more efficient to ship the transformers to site from Italy with the balance of equipment supplied from South Africa; this depends on the geographic location. For all projects Trafo teams are always on site to supervise the installation and commissioning of equipment supplied.

Plus factors

“A key point of difference that Trafo Power Solutions holds in the market is the way we understand each application,” Claassen says. “We take the time upfront to understand the specific requirements: the load, how power is used, the site environment.

“We often engineer solutions for extreme environments – to operate in high ambient temperatures and high humidity, on sites where there are high dust levels, sometimes high salinity and the risk of corrosion. We have also designed solutions to



A dry-type transformer installation equipped with an On-Load Tap Changer to allow precise voltage regulation and continuous adjustment under load conditions.

operate in sub-zero temperatures, at -40°C at an altitude of 4 000 m above sea level. That was for a gold mine in Kyrgyzstan in Central Asia.

“We are constantly challenging our own processes in terms of product engineering and optimisation and project management. Projects may take three months, or two years. You need to manage the process as efficiently as possible.”

He acknowledges that there are always challenges along the way. “Our commitment to our clients is always to deliver a good experience for the customer. The confirmation of a job well done comes with the next order – and Trafo Power Solutions is winning repeat business. We are recognised for working to the highest standards of responsibility and integrity. If something goes wrong, we are not looking for scapegoats; we focus on finding workable solutions.”

Claassen cites just one example. “It was during the December shut-down period a year or so ago, and we had three 3 000 kVA substations on route to a mine site in northern DRC. The truck fell over on its way, and the transformers were damaged. We were on site within days to repair the transformers, testing and commissioning them to operate as they had been designed to operate.

“Every project has its lessons,” he says. “We gather these through in-house project reviews, to carry forward for the benefit of future projects.”

Regarding logistics and the challenges it raises, Claassen says one learns from experience. Trafo Power Solutions works with trusted partners to manage this aspect of each project. Regarding the



An order of dry-type transformers housed in IP23-rated enclosures providing protection for reliable performance in demanding environments.

administration and bureaucratic demands for each project, these vary with different countries, and Trafo Power Solutions has the skills and capacity in-house to deal with these.

Regarding the power solutions it supplies, Claassen says the technology itself is tried and tested. There may be small gains to be made, depending on the application, but it is the fine-tuning of the design to serve the specific requirements of the application that makes the difference in performance and longevity.

Accommodating renewable energy

He notes that there is certainly an increase in demand in renewable energy projects in Africa, as there is in South Africa as well as abroad. And this raises new challenges. Claassen says in designing transformers for renewable energy plants, or for projects or applications using renewable energy, the demands are completely different from those that pertain to transformers operating in conventional coal-fired electricity transmission and distribution systems. “You are dealing with high non-linear loads because of the inverters used, an erratic load profile, and extensive harmonics, among other things.

“We are fortunate to be working with our partner TMC, which has become one of the global leaders in engineering dry-type transformers to operate with renewable energy sys-

tems.” He highlights that TMC has recently opened a manufacturing base in the US to serve the fast-growing market there as power suppliers shift to using renewable sources and companies across the board are turning to renewable energy supplies. “We have learnt a lot from TMC in this regard,” Claassen says.

Challenging projects

Commenting on some of the most challenging projects it has encountered in its work, Claassen refers to a project in Nigeria which required power solutions for three data centres on three different sites. “We designed and supplied the specialised transformers required, plus medium voltage switchgear. The challenges arose in the logistics, in the particular bureaucratic demands of shipping equipment into the country, and in the weather, navigating rough roads in the rainy season. We also find in Nigeria a different skills level and this is a factor we will address with future projects,” he says.

He also mentions a new mega-project that Trafo Power Solutions has recently been awarded in Zambia. This includes transformers for applications extending from power systems to lighting. It comes off the back of past work done for the same customer. We will learn more about this project going forward.

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

Energy management + energy efficiency: Products + services

Containerised distribution board for hybrid renewable energy project



All cabling has been carefully routed to minimise interference and allow for easy maintenance access.

South African electrical enclosure specialist, Power Process Systems (PPS), has successfully completed the design, fabrication, and commissioning of a 4 000 A containerised distribution board for a wind/PV solar hybrid renewable energy project on a site in the Western Cape. The project, finalised in August 2025, confirms PPS’s capabilities in delivering modular, safe, and scalable power solutions for industrial, renewable, and hybrid energy applications.

The prefabricated unit integrates advanced switchgear, auxiliary panels, and control systems within a fully insulated steel container. The system features ABB SACE moulded case circuit breakers (MCCBs) for dependable overcurrent and short-circuit protection, heavy-duty copper busbars for efficient power transfer, and a dual power supply with

mechanical interlocking to ensure safe and flexible operation. All cabling has been carefully routed and segregated to minimise interference, simplify maintenance, and reduce mechanical stress.

Safety was central to the design. The unit includes a dedicated external air-conditioning system for thermal regulation, fire protection equipment, danger signage, and emergency exit doors with push-bar mechanisms. The whole installation complies with international electrical safety standards, giving operators confidence in the equipment and ensuring its reliability under demanding load conditions.

“The 4 000 A containerised distribution board demonstrates our ability to combine robust engineering with modular flexibility,” says Bongani Mzimela, Sales Representative at PPS. “Prefabricating, testing, and commissioning the unit off-site, we delivered a plug-and-play solution that integrates into hybrid grid and renewable installations. This facilitates fast deployment and supports long-term reliability and scalability for our clients.”

The completed solution reduces on-site construction time, ensures strict quality control, and offers the flexibility to scale or redeploy as operational requirements change. Its transportability and modular design make it ideal for hybrid power sites, renewable energy facilities, and industrial distribution projects.

PPS is a trusted partner in advanced electrical engineering solutions, delivering high-performance distribution, control, and modular power systems across industrial, mining, and renewable energy sectors. “This Western Cape project highlights PPS’s continued commitment to innovation, technical expertise, and future-ready energy solutions,” says Mzimela.

Smart energy management for energy intensive sectors

Richard von Moltke - General Manager at Static Power, a division of Actom

Energy prices are rising worldwide, putting real pressure on businesses, especially those in energy-intensive sectors like mining, manufacturing, and large-scale industrial operations. For these companies, energy is a critical part of daily operations – and finding ways to reduce consumption without compromising productivity is essential.

Expanding generation capacity or not

Expanding electricity generation capacity to meet demand might seem like the only solution, but it's not the first step nor the only solution. A smarter, more sustainable approach is to focus on how, when, and where energy is used. By shifting to intelligent energy management strategies, businesses can optimise consumption, reduce costs, support their sustainability goals, and shield operations from ongoing energy market volatility. As part of any energy security or energy savings initiative, understanding and optimising the existing consumption or load profile, should be the first step.

If energy generation expansion is considered, like adding solar photovoltaic (PV) generation, it is imperative first to optimise the existing energy load profile and then base the expansion requirement on the smaller load profile. This approach can save a significant amount in capital expenditure for any proposed expansion project and in some cases may negate the need for immediate expansion.

There are various optimising options to consider, depending on the characteristics and size of the load. Once the existing load profile is optimised, organisations can take the next step towards the expansion of energy sources.

A fit-for-purpose combination

At the core of smarter energy consumption strategies is a combination of battery energy storage systems, solar PV, diesel- or gas-fuelled generators, utility supply and a high-quality energy management system, controlling the various energy sources optimally. By adding battery energy storage to form a micro-grid, this combination immediately provides the opportunity for other cost-of-energy saving mechanisms, such as peak shaving, energy arbitrage and importantly, energy security.

In energy arbitrage, battery energy storage systems act as an energy bank, storing electricity when rates are low, often overnight or during off-peak (low tariff) hours, or from excess solar PV energy generation, and then supplying that energy to operations during peak demand (high tariff)

times when electricity is more expensive. This means companies can reduce their total demand from the grid during high tariff times, which directly cuts down on higher-cost energy charges.

These energy demands are measured and billed in the standard kWh usage as well as the kVA demand costs, and both should always be considered. By understanding the kVA peak demand of its load profile and using the battery energy storage system to reduce and limit this peak demand from the utility, a company can achieve substantial demand savings, which form a significant part of any industrial energy user's energy bill.

Lately, due to increased utility charges for energy, and the reduction in cost for battery energy storage systems, the business case for adding battery energy storage for large power users has improved, even without the use of solar PV.

However, storing and discharging energy is not as simple as it sounds. It requires careful selection of equipment with a sophisticated energy and battery management system that monitors the health of the battery system at battery and cell levels, predicts its energy needs, and ensures the system operates efficiently. Such a system continuously analyses the energy demand and supply, to and from the various integrated energy sources and loads.

Tailored solutions

No two businesses are the same, especially in sectors like mining and manufacturing where operations can be unpredictable. Machines must



Understanding how, when, and where energy is used is the first step, before additional generation capacity and hybrid systems are considered.

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be turned on and off, shifts change, and production schedules vary, all causing fluctuations in power demand. A one-size-fits-all energy solution will not cut it here. Through deep analysis of the load profiles and operational requirements, energy solution providers can design customised systems that respond to the unique energy consumption patterns for each site. These systems take account of identified specific periods when energy usage spikes and target those for load shifting or battery use.

However, it is important to understand that not all equipment is equal, and not all equipment will work in every application. Careful selection is key, and this includes the primary power equipment as well as the control equipment. It is also important to ensure that the selected equipment will be supported for the next 10 or more years.

AI, weather data and proactive energy use

It is exciting to consider how these systems will mature soon. Some larger micro-grid installations are now incorporating weather stations directly into their energy management systems, so they can monitor local weather conditions in real time. Soon they will be able to use forecasts to inform decisions about energy use and storage requirements. When a sunny day is forecast, a system with solar power integration would opt to store less battery energy overnight, knowing it can rely on solar generation during the day. Conversely, if a cloudy day or stormy weather is expected, the system can

conserve battery charge to ensure backup power is available when needed.

Taking a step further, artificial intelligence (AI) will enable these energy management systems to make smarter predictions and decisions autonomously. AI will be able to analyse complex data patterns, including weather forecasts, historical consumption profiles, and tariff changes, to optimise when to store or use battery energy and which loads to switch off temporarily to prevent depletion of backup power.

Gaining a competitive edge

As well as helping to reduce energy costs, proactive energy management is about achieving operational resilience. Through the careful balancing of the battery state of charge and load shifting or peak shaving in response to real-time data from load analysis, companies can maintain uninterrupted operations and make the most of cost-saving opportunities.

As this technology continues to advance, the integration of weather data and AI will only make such solutions more powerful, enabling businesses to anticipate their energy needs and adapt their operations proactively. In energy-heavy industries, the ability to manage power smartly can make the difference between business continuity and businesses falling behind.

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

Energy management + energy efficiency: Products + services

PQRS is expanding its services

PQRS was founded by Carel Ballack in 2014 as a training academy focusing on solar photovoltaic technologies, systems, and installation skills. It has evolved into a specialist consulting partner for businesses seeking reliable, efficient, and future-ready energy systems. With deep technical expertise in power quality, solar PV system design, energy audits, and compliance reporting, PQRS helps clients uncover hidden inefficiencies, prevent costly downtime, and ensure every project meets the highest engineering standards.

For developers, facilities managers, or business owners, partnering with PQRS offers access to accurate diagnostics, practical solutions, and unbiased advice, backed by years of hands-on industry experience. From complex energy saving challenges to precision power quality corrections, PQRS delivers insight that directly improves performance and reduces operational costs.

New services available from PQRS include:

- Power quality assessments (including harmonics and power factor)
- Energy audits and efficiency retrofits
- Solar PV system design for commercial and industrial applications

- Glint and glare compliance reports
- Technical advisory services
- Training for energy professionals & EPCs.

Whether you're facing unexplained failures, designing a new solar system, or looking to optimise operations and maintenance costs, PQRS is on hand to assist with deep technical insight, not generic advice. The first step is an assessment of your power challenges so you can prevent them becoming expensive problems.



While it continues to provide training on solar PV installations, PQRS also offers a range of technical energy management services.

Managing steam plants on multi-user sites

In an ideal world, a single steam user has consistent load demand and operates continuously. However, reality is rarely this simple – and managing a dynamic steam plant operation serving multiple users requires strong technical skills, good communication and close attention to optimise results. This is the experienced view of AES Commercial Director, Dennis Williams.



Left: AES boilers on a multi user site. Right: Dashboard of the AES remote monitoring system for a multi-user site.

Variations, including time and duration of use, steam draw profiles (either constant or batch, intermittent, staged), different steam pressure requirements, direct or indirect steam use and condensate return differences impact on operations. These factors are especially important to note when training steam plant operators, working with different boiler technologies and fuels, and managing consistent steam pressure supply. The potential use of accumulators and steam pressure control valves must also be considered.

Further factors to be taken into account include: optimising efficiency of steam generation (boiler load balancing, fuel trims, emission management due to load changes), managing changes to steam and condensate return reticulation systems (including startup / shutdown of lines, production from one or multiple steam users), specific water treatment requirements due to variations in direct / indirect steam use and the impact of reduced condensate return from steam users.

Measuring and monitoring

Williams highlights that AES's Remote Monitoring System (RMS) gathers steam generation plant data and records critical operational monitoring parameters including steam pressure (per boiler and header pressure), steam flow (total), steam loads per boiler, flue gas CO₂ per boiler, stack temperature per boiler, overall feedwater temperature and quality, and other measures that impact on operations. "This data is essential to monitor boiler efficiency and steam quality," he says.

"Other critical measurements at reticulation and usage points include steam pressure, steam pressure control systems (let-down stations and the like), the condensate recovery system, particularly in terms of quality of condensate such as pH, total dissolved solids (TDS) and hardness or potential contamination through product leakage into the steam or condensate space," he adds.

As well as minimising steam use to meet energy require-

ments, the focus is on maximising the percentage and quality of condensate return to save water and recover heat.

Process mapping

Understanding the process comes first when setting out to achieve efficient, optimal steam generation and thermal energy supply across a multi-use site, Williams notes. "This is critical in order to determine the energy flows required in terms of timing, tonnages, pressures, variability profiles and condensate return generated. These factors form an overall operational 'map' of the variation in demand and load on the steam plant.

"AES then determines the best operational strategy including when to start which assets, specific boilers' load profiles at specific times, and the management of risk in the event of equipment challenges or breakdowns. Site-specific operating procedures (SSOPs) are optimised based on the configuration of the plant and user requirements," he adds.

He also emphasises that throughout the process, communication is key. "From the start, it is important to set realistic client expectations," he says. "With AES's hyper-focus on steam generation, there are fewer opportunities to point fingers. The boiler house has historically been blamed for many process disruptions, but the data required to understand the root causes of issues was not always accessible. Today, AES works with service level agreements that provide clear, measurable deliverables."

Multi-use with multiple boilers

It is far more complex to operate a multi-use site with multiple (duty) boilers, than with a single boiler. "So many factors under the control of the steam plant operator (AES) and the steam user (the client) must be coordinated. On a single user site, although the same operational requirements and levers apply, the task is inherently simpler. The demand input is less intensive, and any potential operational issues have less impact on the generation plant," Williams explains.

Additionally, Process Safety Management in a multi-user environment requires consistent practices across multiple boilers. "We must

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ensure safe operation for multiple boiler plants (pressure vessels), multiple combustion devices, more hot surfaces, more maintenance (at heights and/or in enclosed spaces) and variations on these factors if different boiler designs, fuels or combustion systems are used. A strong management system is therefore essential, covering permissions, task planning, risk review and procedure set-up."

On multi-user sites, there is also greater variability when it comes to pipework, valves, systems and operating procedures: "Start-up and shut-down of steam and condensate lines to particular units which are being brought into service or taken out of service must be safely managed.

"This involves heating of lines, condensate removal to pre-

vent steam line water hammer as well as system lock-out to prevent steam burns and pressure release risks when restarting systems. Processes with different steam pressure requirements must be operated and maintained. Over-pressurisation of steam use systems downstream can have significant safety impacts," Williams highlights.

He says, "Multi-user sites are challenging. They demand clear and precise communications, tried-and-tested technical skills, and experience to ensure the successful integration of steam generation, reticulation and use."

For more information visit: www.aes-africa.com



AES biomass boiler at a multi-user site using three fuel types.

Energy management + energy efficiency: Products + services

Advanced temperature control to enhance industrial efficiency



Neels van der Walt, Head of Business Development, Iritron.

South African electrical, control and instrumentation specialist Iritron supplies modular smart thyristor drives to the local and international mining, minerals and metals market and has recently introduced the latest leading innovations in temperature control technology.

Head of Business Development at Iritron, Neels van der Walt says, "These drives combined with advanced Proportional-Integral-Derivative (PID) control will change the way large industries manage their heating processes, reducing costs and extending equipment lifespan."

PID control offers superior temperature control compared

to on-off systems by reducing temperature fluctuations and improving overall system stability and efficiency. This is achieved through a combination of proportional, integral and derivative control actions, allowing for more precise and consistent temperature control.

"PID control holds a number of benefits for the end-user, including precise temperature control, stability, adaptability and energy efficiency," adds van der Walt. "By combining these benefits, end-users will realise stable and consistent temperature, even in the presence of process disturbances or changes in the system. That means reduced deviations, preventing overshoot and undershoot, as well as longer lifespans for equipment as a result of reduced thermal stress," he highlights.

PID controllers can also respond quickly to changes in

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Damlaagte advances renewable energy for Sasol, Air Liquide

The Damlaagte PV Facility (Damlaagte) formally began commercial operation on 23 August 2025, marking the start of a 20-year operational period for this 97.5-megawatt (MW) site.

Located near Parys in the Free State, Damlaagte connects to the Eskom grid and will provide about 270 million kilowatt hours (kWh) of clean electricity in its first year of operation. The facility is owned by Mainstream Renewable Power, uBuzwe Energy (Pty) Ltd, and the Thembelihle Trust. The plant, built and operated by Mainstream Renewable Power (Mainstream), is the first renewable energy project to supply power under a landmark joint procurement programme initiated by its strategic partners, Air Liquide and Sasol.

The renewable energy from Damlaagte will be supplied to the Secunda site where Air Liquide owns and operates the world's largest oxygen production facility, having acquired it from Sasol in 2020. The project forms part of the joint Air Liquide and Sasol initiative to procure a total of nearly 700 MW of renewable power for these operations. The programme is a key enabler for both companies to achieve their decarbonisation goals.

"The Damlaagte PV Facility coming online marks another great accomplishment for us in our journey towards lower carbon intensity in our operations," said Simon Baloyi, President and Chief Executive Officer of Sasol. "This year, we have achieved several milestones in our renewable energy plan, including securing an additional 160 MW, bringing our total renewable energy secured in South Africa to more than 900 MW. We are well on track to meet our 2030 renewable energy target of up to 2 GW."

Nicolas Poirot, CEO, Africa, Middle East & India (AMEI) for Air Liquide, said: "Damlaagte reaching commercial operation is a major milestone for the decarbonisation of our operations in Secunda, the world's largest oxygen production site. It is a significant step towards our goal of reducing CO₂ emissions from the Secunda operations by 30% to 40% by 2031, and a demonstration of our global commitment to decarbonisation."

Energy policy and supply are not only about technology but also have a strong influence on economic growth and socio-economic



The Damlaagte solar PV facility located near Parys in the Free State is now in commercial operation.

development. Construction of Damlaagte started in November 2023 and close to 2 000 people were employed on the project, coming from nearby communities including Tumahole, Schonkenville, and Vredefort. Damlaagte and its partners, Power China Maanda, LeadEPC, and Tractionel Holdings, used the services of local businesses where applicable and established a skills development programme through which more than 100 people were trained.

"uBuzwe, a member of the Kholosani Group of Companies, is an infrastructure investment company with a portfolio that includes 17 renewable energy assets. uBuzwe has experience in the solar, solar thermal and wind power generation sectors and currently generates over a 1 000 GWh per year of clean energy. We drive solutions for the development and improvement of critical infrastructure projects across South Africa," says Indiran Pillay, uBuzwe Director.

Hein Reyneke, Mainstream's General Manager for Africa, says, "We are proud to partner with Sasol and Air Liquide, delivering an efficient and cost-effective solution to their decarbonisation needs. As one of the most successful developers of renewable energy in South Africa, Mainstream is well positioned to participate as a partner in private PPAs. Power purchase agreements are key to unlocking the country's energy constraints, as they can make a significant contribution to increasing energy security and overcoming load shedding challenges quickly and cost-effectively. Mainstream is at the forefront of the energy transition."

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the process, bringing the temperature back to the setpoint more efficiently, he says.

Building on these advantages, modular smart thyristor drives enable the practical implementation of PID temperature control in industrial heating. "The drives use burst firing," van der Walt explains, "a method that switches thyristors on and off in complete ac cycles, to control power delivery efficiently, and reduce harmonics and electromagnetic interference at the same time."

This contrasts with wave chopping techniques, which can introduce harmful harmonics. "In transformers, harmonic currents cause increased eddy current losses in the transformer's core and windings, leading to higher temperatures and energy losses," says van der Walt.

Modern smart thyristor drives also feature zero-voltage switching, which further reduces electromagnetic interference, improving overall system reliability. "Their modular design offers flexible configuration options through software. Some controllers can maintain a constant voltage, current or power output despite fluctuations in the

input voltage or load characteristics," van der Walt notes.

This adaptability ensures consistent energy delivery and optimal temperature control.

Another significant advance is the integration of digital communication capabilities. Leading thyristor drives provide real-time diagnostic data, including element health, load failures, power consumption, voltage, current and power factor. They also support standard industrial interfaces such as Modbus TCP, PROFINET and DeviceNet, among others.

Perhaps most notably, smart thyristor drives enable dynamic or predictive load balancing across heating zones or processes. By communicating digitally with each other, the drives distribute power to different loads in such a way that stable power consumption is achieved, eliminating peak demand spikes. "This technology can lead to huge savings in maximum demand charges for users," adds van der Walt.

"As modern manufacturing and mining industries increasingly focus on energy efficiency and process optimisation to support sustainability and carbon reduction, the adoption of modular smart thyristor drives combined with PID control is a step forward and will make a positive impact," he states.

Comtest celebrates its top-performing channel partners



Comtest CEO, Barend Niemand, welcomed channel partners from around the country to the celebratory event.

In August, Comtest, together with Fluke, celebrated its top-performing channel partners, recognising excellence among its stakeholders. The annual gathering, held this year at Emperor's Palace in Gauteng, delivered plenty of energy, excitement, and entertainment. Comtest also shared its latest product line-up with all present.

Barend Niemand, Comtest Group CEO, said Comtest is embracing change and aims to become a South African market leader. "Our mission is clear," he said. "We're all about service excellence – from customer support to warehousing, the accounts team, and of course our sales crew."

He emphasised that teamwork and high ethical standards are the ingredients to achieving these goals. "When we work

together and stay true to our values, everyone wins – customers, suppliers, employees, and shareholders."

The results reflect this commitment. Since 2022 Comtest has been surpassing records, and projections for the 2025 year are set to again outpace South Africa's GDP growth. Niemand gave a special shoutout to Brolin Moonsamy (Fluke South Africa) and Kristo Engelbrecht (Fluke Africa) for their ongoing support.

Looking ahead to 2026, Comtest plans to focus on business partners who share its vision – partners that see Comtest as a trusted ally and want to make a real impact in their own markets and grow together. These are the partners who go the extra mile for end-users, embracing Comtest's 'Go-to-Market' model.

Guests also had a first view of Fluke's latest technologies, including the Fluke 2052/2062 advanced wire tracers, the Fluke iSee Mobile Thermal Camera, the SB140 Sound Beacon for leak detection in non-pressurised vessels, particularly in the motor and aviation Industries, and the 729 PRO Pressure Calibrator – just a few highlights from a line-up loaded with innovation.

After presenting the Comtest awards to its top-performing channel partners across different regions and overall, Niemand also applauded 'the A Team' – Comtest's sales team who have visited over 2 000 end-users, run demos and training sessions, commissioned advanced diagnostic tools and hosted Technology Days for channel partners and customers.

For more information www.comtest.co.za

Precision and versatility for automated actuation

With its latest product generation, valve specialist GEMÜ is bringing to the market significant innovations geared to meet the requirements of modern process automation. Through its LEAP programme – 'Lean, Effective, Agile, Platformised' – GEMÜ is introducing a range of products that offer modular design and versatility and are based on state-of-the-art manufacturing methods. In addition to three new valves and an innovative electrical position indicator, the GEMÜ 44A0 automation module is one of the highlights of this product generation.

With the new GEMÜ 44A0 multi-functional valve actuation, GEMÜ presents a future-ready solution for modern process automation. The innovative automation module combines two functions in a single device for the first time: a combi switchbox and position control – for maximum versatility and efficient plant design.

GEMÜ 44A0 is available in two versions and is suitable for simple open/close applications and for precise position control systems in sophisticated processes. The desired function is already stipulated at the time of ordering, and this ensures optimal adaptation to the respective application.

Compact, high-performance and cross-linked

GEMÜ 44A0 is compact with a robust construction that enables space-saving installation and hygienically-compatible cleaning. Contactless, non-wearing position detection and a mechanical and electronic position indicator ensure maximum process reliability.

Easy to operate

With the self-initialisation function, fast mounting and digital support via the GEMÜ app, commissioning is made easier. In use, integrated sensors enable condition monitoring and predictive maintenance, which help to reduce system downtime and optimise maintenance intervals.

Added value

With only one device type for two applications, GEMÜ 44A0 reduces the number of variants, simplifies plant design and reduces storage and administration costs. At the same time, users benefit from greater process reliability, reduced maintenance requirements and increased efficiency.

With the GEMÜ 44A0, the company is adding a high-performance automation solution to its new product generation – for greater efficiency and ease of use in the processing industry.



The GEMÜ 44A0 provides multi-functional valve actuation.

Red Dot Design Award for ifm flow meter



The ifm team celebrates its Red Dot Design Award for the SM Foodmag magnetic-inductive flow meter.

When the Red Dot Design Awards for 2025 were presented in July, ifm's SM Foodmag magnetic-inductive flow meter was recognised as a winning industrial design. The sensor, designed for the food industry, offers a reduced set-up time and an easy-to-read graphic display.

The demands of the food and beverage industry are high. In the plants, strict hygiene standards and harsh operating conditions apply to ensure product quality and consumer safety. The SM Foodmag hygienic flow meter was specially developed for use in this industry and sets new standards for streamlined installation, clear measurement display, and easy maintenance. With its intuitive design, the sensor can be put into operation in less than 20 minutes: a status LED and the large full graphic display form the basis for this. ifm also paid particular attention to the shape and surface characteristics of the sensor to enable easy cleaning. The complete package impressed the jury of the Red Dot Design Award, which saw the SM Foodmag receiving a prestigious quality seal this year.

The Red Dot Design Award is one of the most highly regarded prizes for industrial design. The 'red dot' has been awarded since 1954, and since 2001 with an English name

due to increasing internationalisation. ifm has won other successes in the past, having received several previous awards. Products from the Essen-based automation company have been honoured in 2014, 2016, 2018, 2020, 2023 and 2024, with the PQ Cube pressure sensor for pneumatic applications being the latest winner. Only recently, ifm was honoured with the iF Design Award for the PQ Cube and the moneo Track & Trace software.

Convincing workmanship and user guidance

"The SM Foodmag impresses with its excellent workmanship and intuitive user guidance, which significantly simplifies installation and process monitoring," says the Red Dot jury in its statement. This is a reflection of the fact that, at ifm, design is considered from the start of the development process. Martin Schmidt, Senior Industrial Designer Industrial Design & Innovation Strategy at ifm, says, "The purist design and the focus on conveying information via the display and LEDs are striking and concise features." The SM Foodmag thus joins other products such as the TCC Transmitter and the SU ultrasonic sensor in terms of design.



reddot winner 2025

In the food industry, the SM Foodmag is an ideal choice for precise flow measurement in a range of media

Various applications

Within the food industry, the SM Foodmag is an ideal choice for precise flow measurement across a range of media: in dairies, for example, for measuring milk, cream and yoghurt, or in breweries for measuring water, mash, wort and beer. The sensor always delivers with accuracy and reliability.

For more information visit: www.ifm.com/za/en



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One interface for all applications, another Red Dot winner



The Red Dot Award winning Blue HMI is the central user interface for all weighing and inspection applications using Minebea Intec technologies.

The advanced Blue HMI user interface from Minebea Intec, a leading global manufacturer of industrial weighing and inspection technologies, has been honoured with a prestigious Red Dot Award in the Interface & User Experience Design Category. The internationally recognised award honours outstanding product design that combines functionality, innovation and aesthetics in a distinctive way.

For dynamic check-weighing, static weighing or recipe management – Blue HMI is the central user interface for all weighing and inspection applications using Minebea Intec technologies. Developed for demanding industries such as the food and beverage industry, pharmaceutical and chemical industries, it combines intuitive operation, ergonomic design and smart features in a user interface that supports processes efficiently.

“With Blue HMI, we have created a user interface that is technologically state-of-the-art and at the same time reflects our vision of efficiency, clarity and user-friendliness,” says Dr Thorsten Vollborn, Head of Product Management & Academy, at Minebea Intec. “Winning the Red Dot Award confirms that our development team has successfully combined functionality and design and has mastered the technical challenge of creating a solution for a wide range of applications globally.”

Since its launch in May 2024, Blue HMI from Minebea Intec has established itself, initially with check-weighers that are already in use worldwide. The user interface has since been extended to other solutions so that today most of all weighing and inspection systems are equipped with Blue HMI. For customers, the added value is clear. Those that initially use a check-weigher and later add silo level measurement with Minebea Intec load cells and weight indicators to their production, will continue to benefit from the familiar Blue HMI interface, with minimal training and the same high level of user-friendliness.

“With Blue HMI, we offer our customers a standardised, intuitive and future-ready user interface. This reduces training times, minimises operating errors and noticeably increases efficiency in day-to-day production,” adds Vollborn.

Optimising processes

With clearly structured menus, standardised workflows, full HD visualisations and responsive layouts, Blue HMI minimises operating errors and makes daily work easier. Whether permanently installed units such as the MiNexx® series of weight indicators or portable displays in robust, stainless steel housings for check-weighers, the user interface offers ease of use and meets the highest hygiene standards.

The Red Dot jury particularly praised the successful combination of functional clarity and aesthetic design.

Why IP ratings matter for electrical safety

Safety of electrical systems is always a priority, especially in challenging and hazardous environments where dust, moisture, and mechanical wear are everyday realities. Choosing the correct IP – Ingress Protection – rated electrical equipment is a fundamental technical consideration and a crucial safety measure that can help prevent short circuits, equipment failure, and electrical fires.

Yet many users of electrical products remain unaware of what IP ratings indicate. Tristan Blades, Technical Projects Manager at Pratley highlights that despite their importance, IP ratings are often misunderstood or overlooked. “Understanding these ratings is essential to ensuring operational performance and personnel safety,” he says.

What Is an IP rating?

An IP rating is an internationally recognised standard that classifies the degree of protection an electrical enclosure offers against the ingress of solid objects (like dust) and liquids (such as water). The rating is represented by two digits. For example, in the rating IP68, the first digit refers to protection against solids (0 to 6), and the second refers to protection against liquids (0 to 9). The higher the number, the greater the protection.

In critical sectors such as mining, petrochemicals, manufacturing, and others, where dust and moisture exposure are routine, the appropriate IP rating is a primary safety requirement. Failure to choose the correct specification can result in unsafe conditions, system malfunctions, and costly downtime.

Proper protection prevents hazards

IP-rated enclosures act as a barrier, shielding live electrical components from contaminants that could lead to dangerous outcomes. “Ingress of dust or water into an electrical enclosure can lead to short circuits or corrosion, which significantly increases the risk of fire or system failure,” explains Blades. “Ensuring the right level of protection from the outset is essential.”

Incorrect or substandard IP ratings are particularly problematic in hazardous environments, where a minor fault could escalate into a critical safety incident. Equipment that fails under these conditions puts workers and infrastructure at risk.



Pratley's flame-proof Envirobox with IP rating on the lid.

Beyond compliance

Pratley takes ingress protection a step further. All Pratley IP-rated products – including its extensive range of cable glands and junction boxes – are subjected to third-party testing and in-house validation at its advanced testing facility. “We do not stop at meeting the minimum requirements – we aim to exceed them,” Blades notes.

Many of Pratley's products are rated IP66/68, which means they are completely dust-tight (IP6X), resist high-pressure water jets (IPX6), and can withstand continuous immersion in water up to two metres deep (IPX8). This dual rating provides versatility and ensures resilience across diverse environments.

Pratley's range of cable glands includes compression glands for unarmoured cable, and Ex e and Ex d glands for both armoured and unarmoured installations, each engineered for uncompromising performance in hazardous areas.

Long-term safety and maintenance

Robust design is critical and long-term safety depends on durability and maintenance. Sealing components, particularly rubber gaskets, can degrade over time due to heat, UV exposure, and environmental stress. Pratley addresses this issue by formulating its own high-performance rubber seals in-house to maximise longevity and maintain protection levels over the product's lifecycle.

Providing further support for long-term performance, Pratley offers replacement gaskets for its junction boxes and cable glands. “This allows customers to maintain the IP integrity of their installations without having to replace the entire unit,” says Blades. “It is a practical, cost-effective solution that aligns with our philosophy of delivering lasting value.”

Protection in every installation

For dusty workshops, exposed outdoor applications, submersed environments, or other challenging sites, selecting the correct IP-rated enclosure is essential for protecting people and systems. “Our IP-rated termination products are designed to meet the demands of extreme conditions and ensure long-term safety,” says Blades. “It's why engineers and contractors across the country trust Pratley.”

He adds, “Selecting the appropriate IP rating should never be an afterthought. It is a safety imperative. Our technical sales specialists are always available to help customers identify the right product for their specific application.”

For more information visit: www.pratleyelectrical.com



Rectangular Envirobox with polycarbonate lid, also showing the IP rating.



Tristan Blades,
Technical Projects
Manager at Pratley.

The safety risks of using uncertified electrical products

Recent raids by the South African Police Service's Anti-Counterfeit and Illicit Trade Unit and the National Regulator for Compulsory Specifications (NRCS) reportedly uncovered thousands of rands' worth of non-compliant electrical goods. Yet this represents only a fraction of the broader threat facing the sector; a Tax Justice South Africa survey shows 78% of industry leaders are concerned about the surge in non-compliant products being sold.

Cheap imports raise high-risk consequences

Khensani Ndobe, International Export Sales Executive at CBI-electric: low voltage says, "Non-compliant versions of products designed to safeguard electrical installations are increasingly being sold through established South African e-commerce sites and international platforms. These include circuit breakers that fail, earth leakage devices that don't trip when they should, and safety switches that provide no safety at all."

She cautions that while installers might be tempted to save money by buying from these platforms, the hidden costs can be catastrophic. "All electrical products connected to mains electricity must meet national safety standards and have a valid Letter of Authority (LOA) from the NRCS, issued to the manufacturer, importer, or distributor. However, many products sold online bypass this essential compliance requirement, so, wherever they are used, the installations are not protected, putting users at risk of burns, electrical shocks, fires, and in some cases fatalities."

Adding to the concern, many of these non-compliant products do not carry genuine certification marks such as those from the SABS (South African Bureau of Standards), UL (Underwriters Laboratories), VDE (*Verband der Elektrotechnik*), and CCC (China Compulsory Certificate). "These marks indicate that a product has undergone rigorous independent safety testing," says Ndobe. "Without genuine certification, there's no assurance of safety or reliability."

Beyond the safety implications, Ndobe warns that installing non-compliant electrical goods carries high cost consequences too.

"Those who use uncertified components risk costly lawsuits, fines, or jail time, and the potential loss of their professional reputation."

She adds that such products also threaten South Africa's local manufacturing industry, draining revenue from legitimate companies, eroding consumer trust, and forcing reputable businesses to reduce operations or cut jobs.

A global problem with local repercussions

"This issue isn't unique to South Africa," Ndobe notes. "The global counterfeit electrical goods market is estimated to amount to some \$250 billion (R4 500 billion) annually, with online commerce creating channels that deliver unsafe products to end-users without proper safety checks."

A UK investigation^[1] found that all plug-in devices tested from popular online marketplaces failed basic safety standards. The tested devices not only failed to perform as advertised but also presented serious safety hazards, including poor soldering, excessive lead levels, and general non-compliance with safety regulations. "Non-compliant products like these pose direct risks of fire and electrocution if they are used in homes or businesses," Ndobe warns.

She also highlights that online platforms often remove dangerous products once they have been identified and reported. "This means that by the time listings are removed, the items are already in use."

To protect themselves and their clients, Ndobe advises all electrical installers to source products only from reputable local suppliers who supply and stock certified, standards-compliant, locally manufactured goods. "By sourcing compliant electrical products, installers avoid legal penalties and, most importantly, meet their duty of care to the people they serve."

"Every non-compliant product installed presents high safety risks. Installers need to choose compliant products, to choose safety over savings, reputation over risk, and lives over livelihoods," she concludes.

Reference

[1] <https://internationalfireandsafetyjournal.com/unsafe-plug-in-energy-saving-devices-sold-online-fail-uk-electrical-safety-tests/>



Khensani Ndobe, CBI-electric: low voltage.



Electrical safety is critical; installers always need to ensure they are working with certified, compliant electrical products.

Preparing for PDS implementation on mines

Level 9 vehicle intervention for collision avoidance has been mandatory on South African mines since 2022, yet the effective rollout of proximity detection systems (PDS) remains slower than expected. CEO of Booyco Electronics, Anton Lourens says this is not due to technical limitations but more often relates to operational readiness on site.

The Level 9 requirements mandate engineering controls on trackless mining machines (TMMs) to slow down or stop the vehicles automatically, preventing machine-to-pedestrian and machine-to-machine collisions. While PDS technology has advanced considerably to meet these requirements, Lourens says a real challenge lies in how mines prepare to integrate it.

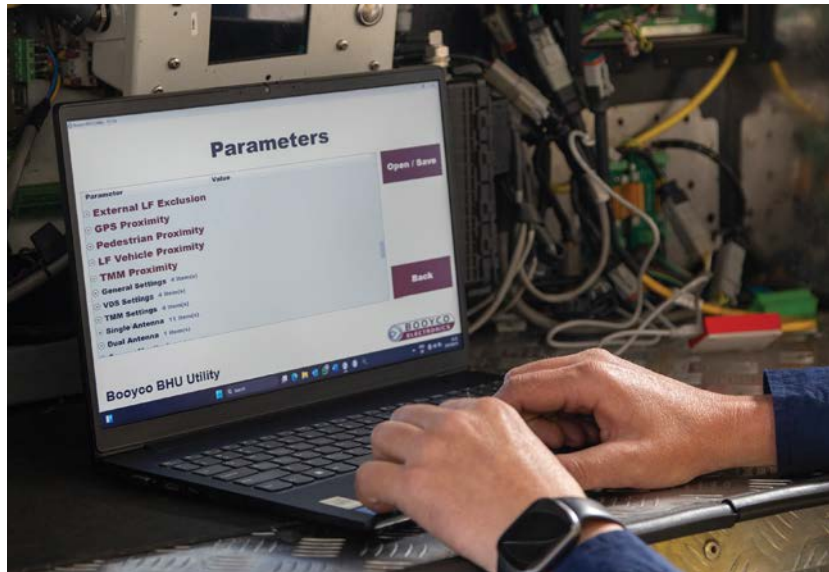
“Many mine sites are not ready to operationalise PDS in their daily activities, safety systems or workflows. Successful adoption requires coordinated involvement from all stakeholders, including the mine’s management, operators and departments, regulators, technology suppliers and TMM OEMs.”

Detailed risk assessments are an essential step for mines to identify and mitigate significant hazards, specifically around TMMs, and Lourens notes that PDS is a valuable tool in this process of mitigation. It can provide helpful information, but he emphasises that its implementation must be systematic and aligned to the broader risk framework.

The choice of PDS technology will depend on the specific environment and on identified risks – whether underground or surface, hard rock or coal – but it is important that, when it is introduced, the technology should not create any unintended risks to other operational systems, particularly production.

Traffic management

A critical starting point, Lourens says, includes the mine’s



Successful implementation of Level 9 systems depends on thorough risk assessment and alignment with the mine’s traffic management plan.

traffic management plan. Reducing vehicle-pedestrian interaction lowers risk and minimises production disruption. Continuous analysis of incident hotspots can guide traffic flow adjustments and sometimes operational plans may need to be revised. Once traffic patterns are optimised, PDS can be deployed to align with the traffic flows. A misalignment raises the risk of frustrating operators, creating ‘PDS fatigue’ from excessive warnings, and that can lead to alerts being ignored.

Commitment, collaboration and communication

Operational readiness requires full leadership commitment and cross-functional collaboration. While PDS suppliers often deal with engineering teams, Lourens points out that production, finance and human resources also need to be engaged. Finance teams need to weigh capital and maintenance costs against safety and efficiency benefits; HR has to oversee operator training, and production needs to understand the operational implications.

He warns though that change management is neither quick nor easy. It requires active communication across the mining ecosystem, ensuring that everyone understands the function and value of PDS. “The introduction of any new system must be accompanied by a change in behaviour, otherwise nothing will improve,” he says. He also highlights that the introduction of PDS technology differs from the introduction of mechanical equipment in that some PDS technology operates invisibly, through radio frequencies. “This makes early engagement of personnel, clear communication and thorough training essential.”

From induction and operator instruction to ongoing best practice reinforcement, Lourens says mines will benefit from taking a structured, inclusive approach when they adopt PDS. This will support the mine to achieve the full safety benefits envisaged by the Level 9 regulations.



Level 9 vehicle intervention technology is designed to slow or stop machines automatically, reducing the risk of collisions in mining environments.

Missing person locator system advances mine safety

Becker Mining South Africa has enhanced its Missing Person Locator system, a powerful module integrated into its comprehensive SmartFlow™ digital mine visualisation and management platform and designed to raise the level of emergency preparedness and personnel safety in mining operations worldwide.

The Missing Person Locator module represents a significant advance in real-time tracking technology, enabling rapid location and response to underground emergencies. With capabilities extending from surface to underground environments, the system empowers mining operations with precision tracking, historical

traceability, and automated evacuation protocols.

Safety is a priority for Becker Mining and this technology provides mining companies with actionable intelligence during critical situations. Combining cutting-edge wireless technologies with a user-friendly interface, the enhanced locator module is based on the understanding that in such situations, every second counts.

Key features

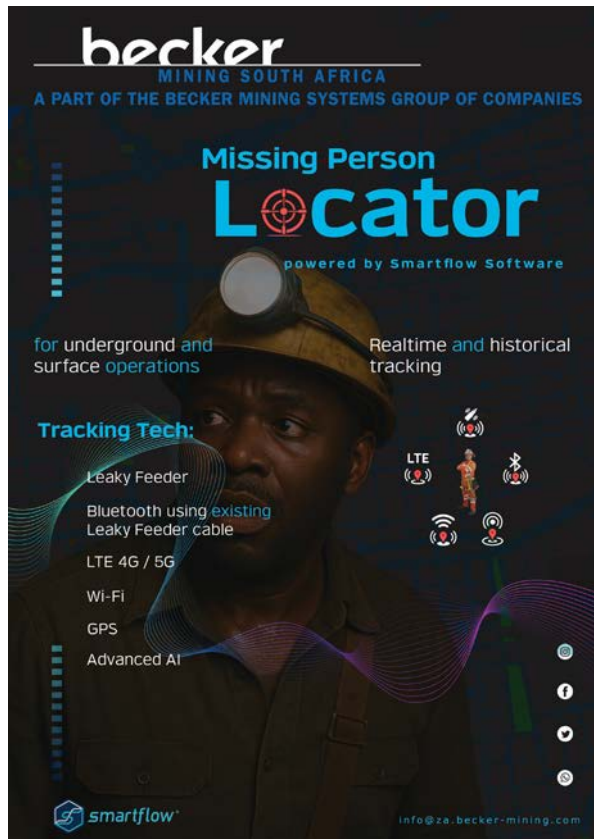
- Real-time tracking and location: Tracks personnel and mobile equipment with support for man-down detection and full evacuation management
- Multi-network integration: Compatible with VHF, UHF, Wi-Fi, LTE, and other wireless systems, ensuring continuous coverage across vast and complex mining environments
- 3D viewer interface: Provides intuitive, real-time visualisations of personnel location and movement through advanced graphics motion technology
- Surface mapping: Uses GPS and integrates with Google Maps and satellite imagery for seamless surface tracking, including mine-specific overlays
- Access control integration: Syncs with HR systems to manage and monitor workforce movement securely
- Historical traceability: Maintains logs and supports customised reporting for incident investigation and safety audits.

One of the standout aspects of the software is that it integrates with Becker's Leaky Feeder Technology, allowing LTE, Bluetooth, RF Tagging, and remote diagnostics to operate seamlessly in underground workings. This connectivity, combined with Wi-Fi and GPS for surface operations, makes it one of the most comprehensive tracking systems available today.

Seamless system integration

As part of the SmartFlow suite, the Missing Person Locator module interconnects with other operational systems such as environmental monitoring, power reticulation, conveyor systems, and telemetry with industry standard open communication protocols. This ensures a holistic view of mining operations to support safety.

Becker Mining Systems has deployed this module globally across operations in South Africa, Chile, Australia, and North America, setting a new standard for underground safety technology.



Becker Mining South Africa has enhanced its Missing Person Locator system with real-time tracking technology, enabling rapid location and response to underground emergencies.

Certification update for lithium-ion battery fire safety equipment

SafeQuip confirms that its Lith-Ex range of fire extinguishers is the only certified lithium-ion battery fire extinguisher range in South Africa.

The Lith-Ex range holds full SANS 1910:2022 approval, together with NTA 8133:2021 (KIWA/POOO55865) certification. In addition, the nine-litre, six- two- and one-litre models are KITEMARK™ approved, confirming their compliance with rigorous international standards for performance and safety.

SafeQuip's Lith-Ex range stands alone in the South African market, offering users the assurance that it meets the highest levels of independent verification required to address the specific risks of lithium-ion battery fires. SafeQuip is committed to providing and maintaining long-term fire safety solutions that meet all regulations.

With the widespread use of lithium-ion batteries in domestic,

commercial and industrial settings, it is essential to have an effective, fully certified extinguisher on hand.



The Lith-Ex range of 9 L, 6 L, 2 L and 1 L portable fire extinguishers are KITEMARK™ approved.

A call for action against substandard cable dumping

South Africa's key industries including mining, construction, solar power generation and manufacturing are facing an escalating threat from the influx of substandard imported power cables. These poor quality cables are jeopardising safety, employment and the economic viability of the local cable manufacturing industry. The risk of job losses is increasing as the market is being flooded with non-regulated imports.

Calls are growing for decisive action from the authorities to protect the industry, urging the South African Revenue Service (SARS), dtic and trade unions to investigate potential dumping, and drawing parallels with the action taken in June 2025 imposing anti-dumping duties on tyres entering the South African market from Vietnam, Thailand and Cambodia.

Tertius Ness, Chief Operating Officer at South Ocean Electric Wire (SOEW), a JSE-listed subsidiary of South Ocean Holdings, says: "The problem is twofold. Without intervention, the reliance on untested imports could deepen, threatening the resilience of South Africa's industrial base as well as local power cable manufacturing jobs. Stakeholders must demand transparency. Imports must also adhere to local regulations and material specifications to safeguard the country's critical industrial sectors.

"The mining industry, for example, faces risks as unreliable cables compromise extraction and processing equipment, potentially disrupting production. Construction projects are also under threat, including those supporting the solar boom due to substandard imports bypassing tests such as thermal endurance and UV resistance," he adds.

Ness notes that the solar sector, a beacon of renewable energy growth, is particularly at risk, as faulty cables reduce photovoltaic system efficiency and lifespan, well below the expected 15

years. Industrial facilities, dependent on stable power grids, also face disruptions, where the use of cables with inferior PVC insulation can result in downtime and costly repairs. He adds that the power cable industry, as a whole, is under threat.

Jobs in the cable manufacturing sector are under huge pressure. As cheap imports flood the market, they undermine local producers like SOEW, and they often fail SANS standards. This means the products degrade under South Africa's harsh climate with its high heat, high levels of ultraviolet radiation and, in some areas, high humidity.

"Cable degradation leads to arcing, overheating and efficiency losses, threatening operations, whether in mining, on construction sites, industrial power grids, or manufacturing facilities," Ness says. A 2024 warehouse explosion in KZN, which caused millions of rands in damages, was traced to a cable unable to handle its electrical load. This points to the critical safety need for industries to use certified and durable wiring.

Ness emphasises that high-conductivity copper conductors and suitable insulation materials, used in locally produced cables, meet rigorous local standards, offering the assurance of safety. "Furthermore, local manufacturing reduces import dependency and supports South African jobs, aligning with national economic goals.

"The economic toll of cable dumping is significant," Ness adds. "Substandard power cables, often imported at prices below sustainable levels, erode the competitiveness of local manufacturers. The predominance of power cable imports has slashed jobs and tax revenue.

He also makes the point that the costs of replacing failed cables and repairing damages far outweigh any initial savings and says, "South Africa's key industries are central to the economy, and the local power cable manufacturing industry is a core supplier for them."



Tertius Ness, South Ocean Electric Wire Chief Operating Officer.

Passive fire protection for lithium-ion batteries

As lithium-ion batteries are increasingly widely used, the risk of lithium-ion battery fires has inspired the development of a breakthrough passive fire protection solution. Developed in Germany and now available in South Africa, distributed by PyroBrand, this new technology, dubbed PyroBubbles®, represents a major step forward in fire safety.

The engineered extinguishing and insulating material, developed by the Genius Group in Germany, has been proven to suppress and contain thermal runaway events in Li-ion batteries without the need for active intervention.

Michael van Niekerk, CEO of ASP Fire in South Africa notes: "Li-ion battery fires are unlike conventional fires. They burn hotter, longer, and often reignite, posing a significant challenge to standard firefighting methods. With PyroBubbles now available locally, South Africa joins the global vanguard in adopting smarter, more effective fire prevention strategies."

The proprietary material, comprised of lightweight, non-combustible glass granules, creates an inert envelope around battery cells or modules. This passive envelope suppresses flames, absorbs heat, and reduces the release of toxic gases. Certified to the highest European and South African standards, including SANS 11820 for non-combustibility, this fire-rated material performs under extreme conditions, with thermal stability up to 1 050°C.

Clyde Becker, Director of PyroBrand, says: "More than fire protection, this is about risk mitigation, environmental safety, and long-term resilience. The material has been rigorously tested by independent South African laboratories, confirming its ability to adsorb over 85% of the toxic vapours released during a battery thermal event. It is a game-changer for logistics, storage, and industrial safety."

The material is also used in Genius Boxes – specialised UN-certified containers for the safe storage and transport of Li-ion batteries, including those that are damaged or defective. These ready-to-use boxes are lined internally with the insulating granules, providing a secure and self-extinguishing environment in the event of a fire.

Ideal for battery manufacturers, logistics providers, EV fleet operators, and facilities housing energy storage systems, the passive protection system is already in use across Europe and will serve the South African market for Li-ion fire safety solutions well.

"In a world increasingly reliant on battery technology, our fire protection strategies must evolve," adds van Niekerk.

"At ASP Fire, we are committed to providing our clients with advanced, certified, and environmentally responsible solutions."



The Genius Lio-Guard XS Box, a basic fire-safe plastic container for lithium-ion batteries.

Advanced technology and tested procedures support safe demolition

A leading specialist in its field, Jet Demolition is an early adopter of the latest technology in the industry, prioritising safety in all its operations. “Technological advances play an important role in mitigating risk, in high-hazard environments as well as in our day-to-day operations,” says SHE Manager, Marthinus Botha.

For example, the OilQuick system adopted by Jet Demolition allows it to change attachment types rapidly, without the need for personnel to remove and reinstall pins. And another example, remote-controlled applications allow high-risk structures to be toppled without human intervention at the demolition face. “This is a major advance in the interest of safety that cannot be matched by any other conventional demolition applications,” says Botha.

The company places safety, as a business imperative, at the forefront of its operations. This means mechanising demolition procedures wherever practically possible, and supplementing mechanisation efforts with modern technological tools. “We are early adopters of these systems in South Africa because they improve the safety profile of the works significantly and improve efficiencies too.”

In the demolition industry, safety is a driving force for change as the industry evolves and adapts to using safer practices. “It is fundamental to our operations and all that we do. We are constantly seeking new ways to improve safety,” Botha says.

A project cannot begin until a fundamental understanding of the work defines the most appropriate approach. The method decided on must stand up to analysis and be robust enough to provide a substantial degree of certainty in respect of safety during execution. Project planning is critical in ensuring the safety of Jet Demolition’s own teams and safety of the public, the client, and interfacing project stakeholders.

However, Botha adds it would be irresponsible to assess safety from the perspective of protocol alone. “Safety needs to be ingrained in ways of working and can only be achieved fully with the right attitude, relevant experience, and respect for rules and processes designed to keep you and your team safe.”

In this regard, Jet Demolition develops and maintains strict protocols based on experience, industry standards, best practices, and lessons learnt - and more importantly, it subscribes to an underlying emphasis on ensuring that safety is at the core of all its operations.

“We have good working relationships with our clients and industry peers, many of which are multinational organisations that share common safety goals and principles. We are thus often challenged to improve our systems, processes, and procedures to align with evolving best practices. On a more granular level, we invite our team members to participate actively in safety matters in the workplace, ensuring that the processes we put in place are practical, relevant, and achievable,” notes Botha.

Team members undergo regular refresher training, but a true appreciation for safety is gained on site. Experience is hard earned, and sensitisation to demolition risks is more important than formal training. Every Jet Demolition site is also supplemented with full-time on-site production and safety-management personnel, who help ensure that all potential risks are identified, suitably mitigated, and understood by all.

“Our team members have a deep understanding and appreciation for demolition and are involved on site with continuous risk management. When unforeseen circumstances arise, our teams understand that the best approach is often to stop and reassess. Projects often present unexpected challenges and it is the teams’ discipline and responsibility that ensure those risks are appropriately reassessed and addressed,” Botha adds.

Safety is a matter not only of compliance but also of personal responsibility. It is the ‘human factor’ that is the most challenging aspect of safety in any workplace. “Cultivating a sense of responsibility and respect for safety practices is the single biggest challenge to be overcome, and can only be achieved through leading by example, discipline, and challenging the norm,” Botha concludes.



Jet Demolition sees safety as a core business priority, for its staff and in all its operations.

In cybersecurity, visibility is what matters

John McLoughlin, CEO, J2 Software

Without full visibility into your IT systems, your organisation is largely blind to cyberattacks until it's too late. Without full visibility into your systems, you often won't know there's a problem until it's staring you in the face, or until the ransomware demand arrives.

Recent high-profile breaches in different parts of the world prove this point. For example, in June 2024 South Africa's National Health Laboratory Service was hit by a ransomware attack that stole 1.2 terabytes of patient data and crippled labs amid the wider public health crisis. Similarly, in the UK, the Russian-linked Qilin gang brought London NHS labs to a

standstill, exfiltrating 400 GB of sensitive patient records onto the dark web. These cases show that hackers are now audaciously targeting critical services, and a single breach can paralyse entire services or sectors.

The core concern is that most organisations will not know an attack is happening until the demand letter arrives or the system outage makes headlines. It is often loyal, well-meaning

employees – not inside 'evil geniuses' – who open the door to hackers. Recent studies confirm that most breaches involve human error.

Most workers believe they could spot a phishing email, yet many admit they have fallen for a scam. In practice, if an employee unknowingly clicks 'the wrong link' or installs a seemingly safe update, these missteps give cybercriminals a foot in the door. Attackers don't need sophisticated entry routes, just one slip-up.

Although sophisticated AI does now make those mistakes easier. Security experts warn that "AI has elevated phishing into a highly personalised threat," enabling hackers to craft emails that mimic legitimate sources – including nuances such as tone and grammar. Deepfake audio and video are already being used to dupe staff via WhatsApp and phone calls.

For business leaders, the implication is stark. If you lack real-time insight into your network and data, you cannot act until an attacker has already infiltrated the system. Without visibility and the capability to understand intent, you will only know something has been going on when your name is shining in the lights of breach notifications.

The old approach of building higher walls around a network is obsolete. Would be intruders need to be detected and

stopped at the perimeter, before they penetrate the fence.

Effective cyber resilience

At J2 Software, our mission is to give businesses that critical visibility into their IT systems, to stop the intentional intruder at the fence, before they are inside the house. With a centralised security platform and 24/7 monitoring, threats stand out immediately, they cannot lurk undetected.

Good security is not a luxury. What matters is not the size of your cybersecurity budget – but having the right tools and processes in place. Effective cyber resilience is about preparation and speed: acting immediately the moment an alert arises, rather than scrambling in crisis mode.

Managed cyber-resilience services are essential for businesses of all sizes, from sole proprietors to large enterprises. The need for robust protection has grown as cyber threats become more frequent and sophisticated. No organisation is too small to be targeted.

The most effective approaches are affordable and practical, focusing on three key principles:

- Low cost, ensuring that security is not treated as a luxury but a necessity even for businesses with modest budgets
- Low risk, with frameworks and controls that integrate into existing systems without disrupting daily operations
- Accessibility, offering scalable solutions that can be tailored to the specific needs of any organisation, from startups to government agencies.

At the core is real-time visibility, enabling teams to detect and respond to threats before they escalate. This visibility makes the difference between catching a potential intrusion at the perimeter or only discovering it once the damage has been done.

With these safeguards in place, businesses gain control. Visibility gives you the ability to respond. Seeing threats early means you can stop them quickly and keep your organisation running smoothly. Cyber resilience isn't measured by how much you spend, but by how effectively you protect what matters. Effective cybersecurity will give your team and customers confidence in your operations.

For more information visit: [J2 Software](#)



J2 Software CEO John McLoughlin.

Trade schools – offering teenagers a pathway into the workshop

Kevin Buret, Head of Campus, NewGen Trade Schools

South Africa has an urgent problem hiding in plain sight. Our economy requires around 30 000 newly qualified artisans each year to keep infrastructure, construction and industry running, yet the country consistently produces far fewer than that. The Department of Higher Education and Training has acknowledged that this shortfall is one of the biggest barriers to delivering on the goals of the National Development Plan. Employers across mining, energy, construction and manufacturing regularly highlight the lack of skilled artisans as one of their greatest constraints. Without enough artisans, projects stall, infrastructure weakens, job creation slows (and unemployment escalates).

At the same time, thousands of young South Africans between the ages of 15 and 19 are leaving mainstream schooling or drifting through it with limited prospects. Many are labelled as struggling learners or find themselves in environments that do not suit their talents. For these young people, the existing Technical and Vocational Education and Training (TVET) system is often difficult to access and not always designed with their needs in mind. The result is another generation at risk of joining the country's already alarming youth unemployment figures.



Kevin Buret, NewGen Trade Schools.

These two challenges are deeply connected: on one side, an economy in desperate need of skilled tradespeople, on the other, a group of young people searching for a pathway into meaningful work. Bringing them together through a different kind of schooling may be one of the most effective ways of closing the gap.

A trade-focused school designed specifically for this younger age group offers a practical and age-appropriate environment that can change the trajectory of learners and help supply the skills the economy needs.

Instead of following the traditional college route, learners in these schools spend three months in a classroom phase where most of the training is practical rather than theoretical. This is followed by a 33-month apprenticeship with vetted employers, ensuring that what is learned is immediately applied in real workplaces. By the end of the programme, learners can graduate with an NQF Level 4 qualification and a Red Seal trade certificate, which places them among the country's most employable artisans.

Because these schools cater only to teenagers, the learning environment is safer and more supportive than mixed-age colleges. Young people often find it easier to thrive when

surrounded by peers in a similar stage of life. Furthermore, life skills and personal development form part of the training, which means learners leave not only with technical knowledge but with a stronger sense of confidence and responsibility.

A critical feature of this model is the way apprenticeships are managed. Partnerships with industry mean placements are not left to chance. Employers are involved from the beginning, and learners are supported through digital performance monitoring that provides real-time information on progress. This reduces the risk for companies, gives trainers better oversight, and ensures quality is consistent across different workplaces.

Beyond the structural benefits, these schools also help to shift how trades are perceived. For too long, becoming an artisan has been seen as a fallback option, yet the reality is very different. Electricians, plumbers, welders and mechanics are in demand today, and their skills will remain critical into the future as South Africa expands its infrastructure and moves towards greener technologies. In a world where many jobs face disruption from artificial intelligence and automation, trades remain among the 'future-proof' careers available. They are also entrepreneurial in nature, giving young people the possibility of running their own businesses in the future.

Accessibility is another strength. Entry requirements are designed to be more open than those for many TVET colleges, making it possible for learners who may have struggled in academic subjects to pursue a recognised qualification. Practical aptitude is valued alongside classroom achievement, creating opportunities for young people who might otherwise be excluded from the labour market.

The country's shortfall in artisans will not resolve itself. It requires collaboration between educators, industry, policymakers and communities. Trade schools focused on young people are not the only solution, but they represent a pragmatic and scalable model that can help accelerate progress. Government can support these schools through bursaries and policy recognition. Employers can expand partnerships to create more apprenticeship placements and benefit from the reduced risk that structured monitoring provides. Schools and parents can help to change the conversation by presenting trades not as a lesser option but as a respected and rewarding career path.

South Africa needs to recognise that without enough artisans the economy cannot grow at the pace it needs to, and without alternative pathways for the youth to enter the workplace, the risk of unemployment and exclusion deepens. By reimagining how we prepare young people for trades, and by building systems that take them from the classroom into the workplace with the right support, we can strengthen both our communities and our economy. The solution may not be hidden at all, but waiting in the workshop.

For more information visit: <https://newgentradeschools.co.za/>

Hydrogen and helium: small molecules, big technologies

Eve Pope, Senior Technology Analyst at IDTechEx

From the natural gas that underpins power generation to the carbon dioxide emissions driving the climate crisis, there is no denying gases have a significant impact on modern life. The two lightest gases – hydrogen and helium – may be made up of small molecules, but they have a big role to play in the technological innovations of the future. Key application areas include mobility, power generation, and semiconductor manufacturing.

Hydrogen power

Hydrogen is an energy carrier that could replace fossil fuels to power the future. Fuel cells can convert hydrogen gas into electricity through a chemical reaction with oxygen. Because solid oxide fuel cells have a long operating lifetime and fuel flexibility, they are well-suited to the continuous power generation required for sustainable data centres, for one example. As the AI boom continues, some data centres are already using solid oxide fuel cells running on natural gas, with plans to transition to low-carbon hydrogen once economics and infrastructure can make this commercially feasible.

For cars, fuel cell electric vehicles can also be powered by the reactions between stored hydrogen and oxygen in the air. Markets for fuel cell electric vehicles will depend on national investments in green hydrogen projects and rollouts of hydrogen refuelling stations.

Industrial decarbonisation in iron and steel

For iron and steel, natural gas direct reduced iron (DRI) production using shaft furnaces is already a mature production methodology. Hydrogen-based DRI (H_2 -DRI) processes represent the next logical evolution towards greener steel production. Midrex and Energiron DRI shaft furnace plants have successfully demonstrated the use of hydrogen or hydrogen-rich gases, as evidenced in projects like HYBRIT by SSAB in Sweden, and HBIS Group in China.

The success of hydrogen-based green steel production will depend largely on the availability of green and blue hydrogen and supporting infrastructure. IDTechEx's report *Green Steel 2025-2035: Technologies, Players, Markets, Forecasts* estimates that by 2035, 46 million tonnes of steel will be produced using

hydrogen enabled production technologies.

Hydrogen isotopes for nuclear fusion

Even the heavier isotopes of hydrogen have a role to play. Deuterium and tritium are essential fuels for nuclear fusion technologies, hoped to provide energy-dense continuous sources of green energy with no risk of meltdown. Another IDTechEx report: *Fusion Energy Market 2025-2045: Technologies, Players, Timelines*, shows that commercial fusion companies have raised over US\$9 billion to date, and an increasing number of governments see fusion as the modern day 'space race'. Players are pursuing different reactor designs and fuels, leading to various materials opportunities and supply chain challenges.

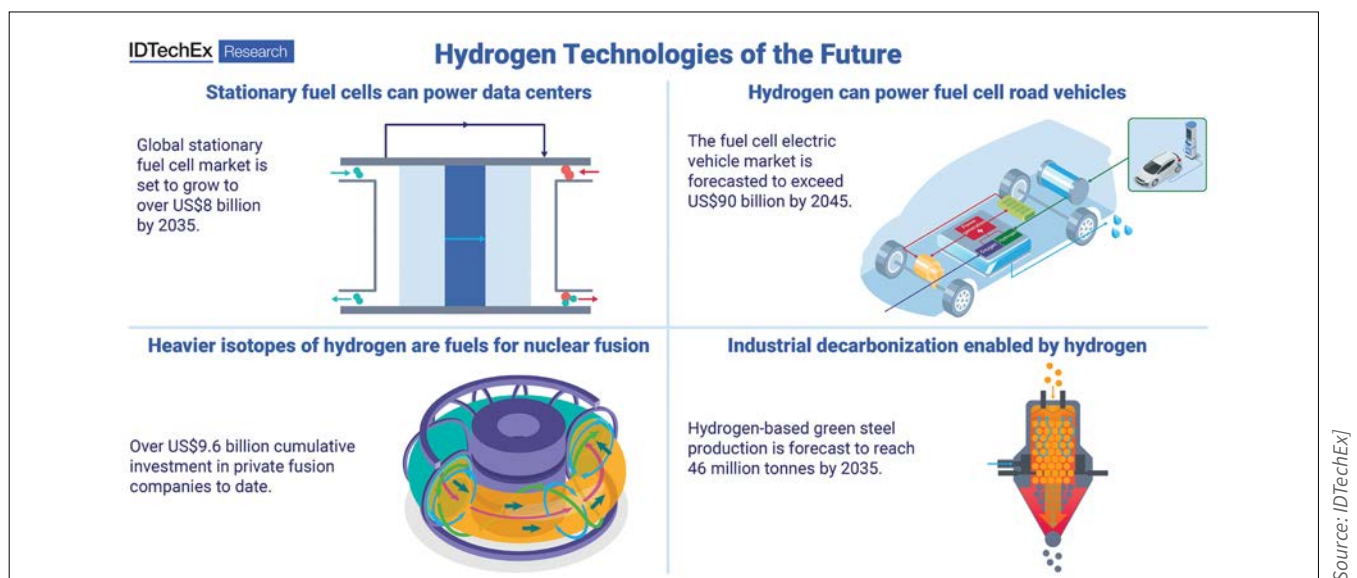
Helium in semiconductor manufacturing

Due to its cooling and inert properties, helium is widely used in manufacturing processes. It is crucial for thermal management during semiconductor production. As semiconductor manufacturing advances towards smaller nodes (essential for AI, autonomous vehicles, and the like), reliance on helium will continue to grow. Helium is a finite resource, so technologies for helium production and helium substitutes, covered in IDTechEx's *Helium for Semiconductors and Beyond 2025-2035: Market, Trends and Forecasts*, report will become increasingly important.

Materials key to hydrogen and helium production

From the ion exchange membranes in electrolyzers for green hydrogen generation to the gas separation membranes used in helium and hydrogen production, the applications explored in this article represent significant opportunities for chemicals and materials companies. For green hydrogen, materials are needed for components such as catalysts, electrodes, porous transport layers, gas diffusion layers, bipolar plates, and gaskets. Innovations include new catalysts with less iridium content to cut costs. For gas separation membranes, the development of new palladium-alloy metallic membranes could unlock ultra-pure H_2 separation.

For more information visit: www.IDTechEx.com/Research/Energy.



The power of hydrogen: in stationary fuel cells, fuel cells for road vehicles, isotopes for nuclear fusion, and industrial decarbonisation.

Scope for South Africa's transformer manufacturing industry

Mervyn Naidoo, Group CEO of ACTOM, highlights that South Africa's energy transition, in line with similar efforts by other countries around the world, is accelerating the demand for power transformers, as nations upgrade and expand their power grids to meet rising energy needs. At the same time, this worldwide shift towards renewable energy exposes a critical infrastructure gap – in the severe shortage of transformers.



Mervyn Naidoo, Group CEO of ACTOM.

As countries push to expand generation capacity and decarbonise their grids, the demand for transformers, essential for transmission and distribution, has surged beyond current global supply capabilities.

Unlike legacy power plants reliant on fossil fuels, power plants using renewable sources such as solar and wind are often geographically dispersed, located far from existing grid infrastructure. This has created an urgent need for new transmission lines and substations, driving up demand for transformers at a pace manufacturers are struggling to meet.

Factory slowdowns, supply chain bottlenecks and procurement delays during the Covid-19 pandemic have

left manufacturers with limited capacity to ramp up production. The result is a global constraint that continues to ripple across infrastructure planning and execution.

Delaying grid upgrades

The current shortage of transformers is delaying grid upgrades, stalling renewable energy project rollouts and deterring investment in new generation capacity. Without the ability to connect new plants to national grids, the achievement of energy security and decarbonisation goals is at risk.

However, the global shortage of transformers is also a consequence of systemic uncertainty in infrastructure demand and fragmented procurement practices. Although energy transition goals and transmission development plans signal the long-term need, the absence of firm, bankable orders has stifled investment in manufacturing capacity.

Procurement cycles in South Africa and other markets have often been *ad hoc* and reactive, leading to uncertainty in multi-year demand. This lack of visibility hinders manufacturers, particularly in transformer production, where high overheads require consistent throughput. Without sustained loading, factories struggle with under-recoveries, idle resources and financial strain.

Yet, Naidoo points out that the global transformer shortage presents a strategic opening for South African manufacturers. As international markets face long lead times – up to four years in Europe – and constrained supply, South Africa can position itself as a reliable alternative, especially if local firms can commit to competitive delivery windows of 12 to 18 months. Additionally, government could introduce aggressive export incentive programmes, similar to those implemented by many foreign

countries. These initiatives could help mitigate the impact of US tariffs, positioning South Africa as an attractive and competitive source for transformers in the global market.

Re-entering global supply chains

The country has a chance to re-enter global supply chains with agility. South Africa's industrial base and engineering expertise position it well, but unlocking this opportunity also needs coordinated action, such as policy support for bankable capacity expansion, procurement reform for demand visibility, and targeted skills development to meet global standards.

Strategic procurement is crucial to reducing transformer lead times and enhancing grid reliability. By transitioning from reactive to proactive planning, manufacturers can stock critical components in advance, shortening production timelines and enabling quicker delivery. This approach turns procurement into a strategic enabler rather than just a cost centre.

Growing locally

At home, localisation enhances these benefits by enabling quicker repairs for transformers and components. With local manufacturing, repair turnaround times are reduced, avoiding lengthy overseas shipping times and costs. Shipping a failed large transformer to an international factory of origin and returning it to South Africa can cost as much as R40 million per transformer. Localisation enables reduced downtime and ensures continuity of supply.

Beyond logistics and cost, local manufacturing allows for better monitoring and support by domestic technical teams, improving product reliability and availability. This creates a more responsive energy infrastructure. In contrast, imported products often lack local servicing support, leading to delays and increased risks for operators.

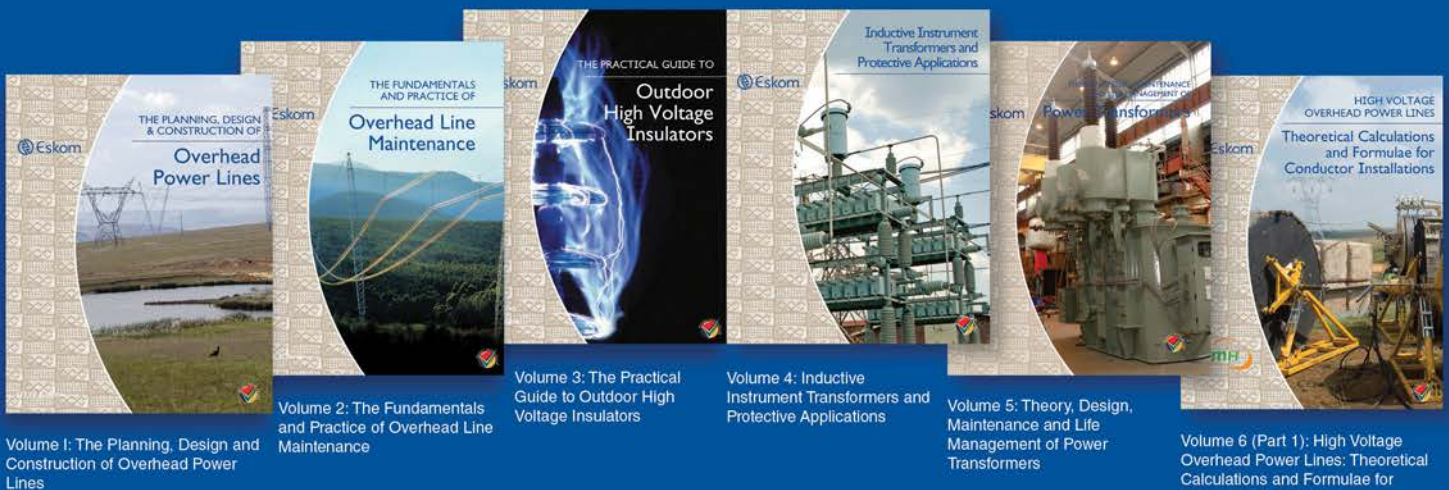
The global economic landscape is shifting, with nations increasingly prioritising domestic economic participation. This rise in protectionism signals a clear message that countries are recalibrating to secure their own industrial futures. South Africa must respond with equal strategic intent.

With rising tariffs threatening our export competitiveness, particularly in sectors like transformer manufacturing, we face the risk of job losses and economic contraction. The solution lies in leveraging these shifts to build a resilient, self-sustaining industrial base.

We need to embrace the 'SA Inc' mindset and, more broadly, an 'Africa Inc' vision. By investing in local supply chains, maximising domestic procurement and building regional manufacturing ecosystems, we can unlock economic growth, create jobs and reduce dependency on volatile global markets.

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

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 accrued by Eskom over the years, as a guide and legacy and to serve as a source of reliable, reputable and highly technical information.



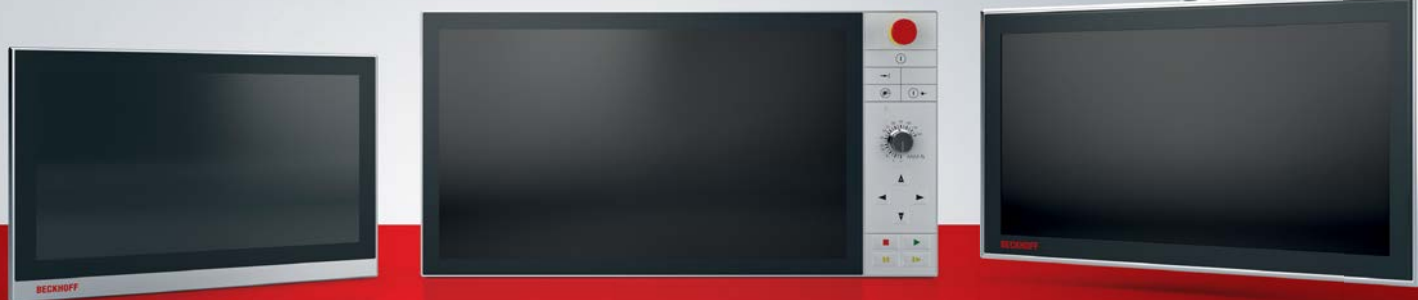
Based on the success of the Eskom Power Series and the Eskom Leadership & Management Series, the Professional Development Series was created. It aims at developing various professions within South Africa so that large state-owned enterprises and the private sector can grow and facilitate job creation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

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



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

Multi-touch panels for all applications



The Beckhoff multi-touch Panel portfolio offers the right device for every application and performance requirement. Different display diagonals and protection classes can be combined with different connection types, from the slim CP-Link 4 control panel to the panel PC with an Intel® Core™ i7 CPU at the heart of the central control system. If the scalability of the standard portfolio is not sufficient, Beckhoff multi-touch Panels can have a custom logo or customized push button extension added to them from a minimum order quantity of 1. Beckhoff multi-touch Panels also provide the ideal basis for creating an entirely customer-specific design.

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