

Sustainable energy generation? We are powering a greener future.

FEATURES:

Industry 4.0 + IIoT
Renewable energy + industrial sustainability
Measurement + instrumentation
Transformers, substations + the grid



The energy sector needs smart solutions. For a future with fewer emissions and greater efficiency, precise measurement technologies make renewable energy more sustainable and economically viable. Our advanced level and pressure instrumentation optimises your processes, boosts profitability, and conserves resources.

Everything is possible. With VEGA.

WELCOME TO THE FUTURE OF SERVICE AND REPAIR

OPENING SOON!

This 17 000m² state-of-the-art service and repair facility will allow for an expansion of our service and repair capabilities encompassing product repairs, fabrication, light engineering and motor rewinding and repairs.

This R380-million investment into the economy will also house our expanded training centre, the DriveAcademy®, providing crucial skills and training to the South African workforce.

SEW EURODRIVE



INNOVATIVE CAPABILITIES



SEW-EURODRIVE's service and repair centre's capabilities includes sandblasting, spray painting, oil recycling, product stripping and load-testing.



We have introduced the in-house manufacturing of baseplates and guards, drop-in solutions, light engineering and 3D scanning.



Our motor repairs division will allow for motor assembly and rewinding, curing burnout ovens and rotor balancing



DRIVING SERVICE AND REPAIR. DRIVING AFRICA. DRIVING THE WORLD



As Africa moves towards increasing renewable energy, ensuring the reliability and affordability of power supply remains always important. VEGA assists in this space – offering practical, reliable solutions in specialised measuring instruments that help keep energy flowing smoothly.

(Read more on page 3.)

Editor: Leigh Darroll

Design & Layout: Katlego Montsho

Circulation: Karen Smith

Technical Editorial Consultant: Ian Jandrell

Publisher: Wilhelm du Plessis

Managing Director: Karen Grant



Total audited circulation
Quarter 4 (October-December) 2025: 7 176

Published monthly by:

Crown Publications (Pty) Ltd

Cnr Theunis and Sovereign Sts,

Bedford Gardens, PO Box 140,

Bedfordview 2008

Printed by: Tandym Print

Telephone: +27 (0) 11 622 4770

E-mail: ec@crowm.co.za; admin@crowm.co.za

Website: www.crown.co.za/electricity-control

CROSS PLATFORM CONTENT INTEGRATION:

* Electricity+Control Magazine * Online Edition

* Weekly e-Newsletter * Website * LinkedIn



Electricity+Control is supported by



The views expressed in this publication are not necessarily those of the publisher, the editor, SAAEs, SAE, CESA or the Copper Development Association Africa

Considering sustainability

One of the issues we examine in this edition is sustainability – sustainable energy and, in relation to that, industrial sustainability.

It cannot go by without comment that it was precisely the non-sustainability of our coal-fired generation fleet that led to the proliferation of photovoltaic and wind energy generation in this country.

Many would argue that these technologies do offer a more sustainable future – and there is some truth in that – at least as far as harvesting natural forms of energy (wind and sunlight) as the fuel of the process as it were.

Now, without being facetious, there is nothing quite like a crisis to focus the mind and get one well on the way to developing innovative solutions to problems. It does strike me that as a country we are well-known for innovation – and it could well be that we are able to provide an increasing number of those crisis moments to get the creative juices flowing.

This also makes one sit back and think about real sustainability. There are many examples of initiatives that seem to speak about sustainability – but are probably more in the smoke and mirrors category.

However, consider this: the more we research and investigate alternatives to pretty much everything we do, the more we will be able to create a truly sustainable future.

There has been much argument about the recycling of, for example, batteries and even photovoltaic cells. And this can be done.

Once we have used a fossil fuel, all we have left basically is carbon and some other stuff – and it's

not good stuff.

Which brings into focus the option of nuclear bulk energy generation. Without a doubt it is comparable to, if not better than, many newer and greener technologies. Certainly, full life-cycle emissions of a nuclear plant are comparable to a wind energy plant and better than a solar photovoltaic plant.

Nuclear is, of course, a bit trickier to build. And we may well find ourselves mining the fuel on another planet – which is not necessarily a bad thing – though it may not happen in our lifetimes... However, compact modular nuclear solutions are becoming increasingly available and are certainly a worthy contender for localised quality power provision.

The message of this comment is simply that we moved the dial on more sustainable energy solutions not because we wanted to, or really thought it was a grand and essential idea: we manoeuvred ourselves into that space by pure necessity, and now there is no turning back.

So, in a way, we became leaders in the rapid deployment of grid-based alternative energy solutions as well as square kilometres of roof-top solar – for electricity generation as well as water heating.

These are solutions to be replicated and built upon. And as time goes by, we will see better and better technologies emerging, making these options more attractive and offering to ensure a genuinely sustainable future.

Ian

Ian Jandrell

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



For Paul Engelbrecht

As we publish this March edition, we share with you the very sad news that Paul Engelbrecht, formerly Advertising Manager for *Electricity + Control*, passed away at the end of February, following a heart attack. This has come as a great shock to all of us at Crown Publications and will no doubt come as shock to many of you who have interacted with Paul over the past few years.

We knew Paul only briefly, in the greater scale of time. He joined Crown Publications early in 2024 and quickly found his stride – connecting with people widely across the industry. He worked with focus, pushing through the challenges presented by the fast-changing environment of electricity and smart technologies and a tough economy. His race is run, far sooner than any of us might have expected.

Our sympathies are with his family, especially his young children, and his wider circle of friends and colleagues.

Karen Grant
Managing Director

Karen Grant

CONTENTS

FEATURES

INDUSTRY 4.0 + IIOT

- 4 Forces shaping data centre design and operations
Vertiv
- 6 Liquid cooling in African data centres – a turning point in design
Leon Kleyn and Floris van der Walt, WSP in Africa
- 8 Products + services

RENEWABLE ENERGY + INDUSTRIAL SUSTAINABILITY

- 10 Renewables and nuclear to meet a greater share of the power mix
International Energy Agency
- 12 Dynamic control of industrial solar plants and energy storage
Stefan Ziegler, Beckhoff Automation
- 14 Five energy market realities in 2026
David McDonald, SolarAfrica
- 16 Wheeling is a critical enabler in South Africa's electricity supply
Wayne Cowie, EXSA
- 18 Battery energy storage takes centre stage
Nigel Sun, Sungrow Sub-Saharan Africa
- 11 Products + services

MEASUREMENT + INSTRUMENTATION

- 20 Products + services
Including news from ifm, Comtest and Minebea Intec

TRANSFORMERS, SUBSTATIONS + THE GRID

- 22 Global utilities set out USD 1 trillion investment plans
International Renewable Energy Agency
- 24 Products + services
Including news from ABB, ACTOM, Trafo Power Solutions, Legrand, and WEG Africa



REGULARS

- 1 Comment
Considering sustainability
- 3 Cover article
Instrumentation – enhancing efficiency in the energy sector
- 29 Engineering the future
South Africa's electricity sector – what to expect in 2026
- 31 Write @ the back
Africa's energy paradox: cheap technology, costly finance

Instrumentation – enhancing efficiency in the energy sector

As Africa moves towards increasing renewable energy, ensuring the reliability and affordability of power supply remains always important. Energy companies today face the dual challenge of keeping costs under control and meeting strict regulatory standards. At the same time, they need to use resources wisely and adopt modern approaches to energy storage. VEGA assists in this space – offering practical, reliable solutions in specialised measuring instruments supported by deep industry know-how, all tailored to help keep energy flowing smoothly.

VEGA's dedication to quality is clear in the precision of its measurement instruments. The devices are designed to deliver accurate data, even when operating in tough environments: extreme temperatures or exposure to harsh chemicals. They're built to last and ready for the digital world, simple to connect to modern, smart energy management systems.

Around the globe, VEGA is helping energy providers work more efficiently, reduce downtime, conserve valuable resources, and maintain safer workplaces. Its advanced level and pressure sensors are essential tools in power plants, wind farms, and energy distribution networks. For example, VEGA's technology supports reliable hydrogen production, helps coal powered plants meet strict standards and ensures wind turbines, whether on land or offshore, operate at peak performance. In solar power, VEGA sensors keep thermal plants running safely at high pressures and temperatures. VEGA's maintenance-free sensors make it possible to run geographically remote hydropower facilities in a straightforward way. Wood pellet production and biogas plants also benefit from tailored solutions that keep operations running smoothly.

Meeting industry's needs

One of the distinguishing attributes of VEGA sensors is how easy they are to install and use. The VEGAPULS 6X radar sensor can measure distances up to 120 metres with pinpoint accuracy (± 1 mm), and the VEGAPULS C 21 offers a rugged, cable-connected option that works over a distance of up to 20 metres and is supplied with explosion protection. The range includes compact and wireless models, like the VEGAPULS 31 and VEGAPULS Air 41, to suit different setups, and the VEGAPULS C 23 extends measurement capabilities up to 30 metres.

For detecting specific levels, whether in liquids or solids, VEGA offers vibrating switches, such as the VEGASWING and VEGAVIB



VEGA sensors serve wide-ranging applications in the energy sector, including in wind and solar energy plants.

series. These are designed to handle a range of densities and are available also in high-temperature versions for the most demanding jobs.

VEGA's pressure transmitters, including the VEGABAR 28, 38, 81, 82, and 83, feature tough ceramic or metallic measuring cells. They offer helpful features like on-site displays, intuitive controls and chemical seals for use with aggressive substances.

The product lineup also includes radiometric sensors like the MINITRAC 31 for measuring density and the WEIGHTRAC 31 for tracking mass flow and throughput, expanding the ways to monitor and control processes.

Beyond hardware

VEGA's support goes beyond hardware. The company's interconnected solutions help customers streamline operations and reduce costs without sacrificing quality. Online tools make managing processes simpler, and wireless adjustment using Bluetooth means users can configure and check instruments remotely, even in hard-to-reach or hazardous areas, with the VEGA Tools app. The myVEGA platform gives users easy access to instrument drawings, documentation and order details, making it simple to stay on top of equipment.

Additionally, the VEGA Inventory System takes the guesswork out of stock management. By fitting containers, tanks, or silos with VEGA instruments, customers are notified automatically when it's time to restock. The service software also enables users to review current measurements and past consumption data, so they can make better decisions and avoid unnecessary downtime.

VEGA provides a comprehensive suite of measurement and control solutions designed to help energy companies operate more efficiently, safely and sustainably – no matter what changes or challenges lie ahead.

For more information contact VEGA

Tel: +27 (0)11 795 3249

Email: info.za@vega.com

Website: www.vega.com





Scott Armul, Vertiv.

Forces shaping data centre design and operations

Early this year, Vertiv released its Frontiers report, which shows that data centre innovation is continuing to be shaped by macro forces and technology trends related to AI. The report^[1] draws on expertise from across the organisation and details the technology trends driving current and future innovation, from powering up for AI, to digital twins, to adaptive liquid cooling.

Vertiv Chief Product and Technology Officer, Scott Armul said: “The data centre industry is continuing to evolve how it designs, builds, operates and services data centres, responding to the density and speed of deployment demands of AI factories. We see cross-technology forces, including densification, driving transformative trends such as higher voltage dc power architectures and advanced liquid cooling, which are important to deliver the gigawatt scaling critical for AI innovation. On-site energy generation and digital twin technology are also expected to help in advancing the scale and speed of AI adoption.”

The Vertiv *Frontiers* report builds on and expands the company’s previous annual Data Centre Trends predictions (2025). It identifies macro forces driving data centre innovation:

- Extreme densification – accelerated by AI and HPC workloads
- Gigawatt scaling at speed – data centres are now being deployed rapidly and at unprecedented scale
- Data centre as a unit of compute – the AI era requires facilities to be built and operated as a single system
- Silicon diversification – data centre infrastructure must adapt to an increasing range of chips and compute.

The report details how these macro forces have in turn shaped five key trends impacting specific areas of data centre development.

Powering up for AI

Most existing data centres still rely on hybrid ac/dc power distribution from the grid to the IT racks, which includes three to

four conversion stages and some inefficiencies. This approach is under strain as power densities increase, largely driven by AI workloads. The shift to higher voltage dc architectures enables significant reductions in current, size of conductors, and the number of conversion stages, centralising power conversion at the room level. Hybrid ac and dc systems are pervasive, but as full dc standards and equipment mature, and rack densities continue to increase, higher voltage dc is likely to become more prevalent. On-site generation and microgrids, will also drive adoption of higher voltage dc systems.

Distributed AI

The billions of dollars invested into AI data centres to date to support large language models (LLMs) have been aimed at supporting widespread adoption of AI tools by consumers and businesses. Vertiv recognises that AI is becoming increasingly critical to businesses but how, and from where, those inference services are delivered will depend on the specific requirements and conditions of the organisation. Although this will impact all types of businesses, highly regulated industries, such as finance, defence, and healthcare, among others, may need to maintain private or hybrid AI environments with on-premises data centres, due to data residency, security, or latency requirements. Flexible, scalable, high-density power and liquid cooling systems could enable capacity through new builds or retrofitting of existing facilities.

Energy autonomy accelerates

Short-term on-site energy generation capacity has been essential for most standalone data centres for decades, to support resilience. However, widespread power availability challenges are creating conditions to adopt extended energy autonomy, especially for AI data centres. Investment in on-site power generation, via natural gas turbines and other technologies, has several intrinsic benefits but is primarily driven by the need to address power availability challenges. Technology strategies such as Bring Your Own Power (and Cooling) are likely to be part of ongoing energy autonomy plans.

Digital twin-driven design and operations

With increasingly dense AI workloads and more powerful GPUs comes a demand to deploy complex AI factories with speed. Using AI-based tools, data centres can be mapped and specified virtually, via digital twins, and the IT and critical digital infrastructure



The Vertiv™ Frontiers report outlines key trends leading the development of next-generation high-density data centres.

can be integrated, often as prefabricated modular designs, and deployed as units of compute, reducing time-to-token^[2] by up to 50%. This approach will be important to achieving efficient gigawatt-scale buildouts for future AI advances.

Adaptive, resilient liquid cooling

AI workloads and infrastructure have accelerated the adoption of liquid cooling. And conversely, AI can be used to further refine and optimise liquid cooling solutions. Liquid cooling

has become mission-critical for a growing number of operators and AI could provide ways to enhance its capabilities. AI, together with additional monitoring and control systems, has the potential to make liquid cooling systems smarter and more robust by predicting potential failures and managing fluid and components effectively. This trend should lead to increasing reliability and uptime for high-value hardware and associated data workloads.

For more information visit: www.vertiv.com

References

[1] Vertiv™ Frontiers report: <https://www.vertiv.com/frontiers>

[2] Nvidia defines ‘tokens’ as units of data processed by AI models during training and inference, enabling prediction, generation and reasoning. In data centres – particularly those focused on AI and Large Language Models – Time to First Token (TTFT) measures the latency between when a user submits a prompt and when the AI begins to generate the first character (or token) of its response. It is essentially the ‘reaction time’ of the AI system, and is a critical metric for user experience because it determines whether a chatbot feels instantaneous or sluggish.

Industry 4.0 + IIoT: Products + services

Global SCADA systems for lochpe-Maxion

South Africa based Adroit Technologies has been appointed by lochpe-Maxion, parent company of one of the world’s largest wheel manufacturers and producers of structural components in the Americas, as its global SCADA (supervisory control and data acquisition) partner. The partnership will standardise operational visibility, reliability, and control across 34 manufacturing facilities worldwide. It marks a major milestone in Maxion’s digital transformation strategy to unify data integration, cybersecurity, and performance management across continents.

“Since deploying Adroit Technologies’ SCADA solution globally, we have connected 15 plants, giving specialists real-time visibility to improve processes and products,” says Esteban Remezc, Chief Information Officer (CIO) at lochpe-Maxion. “This is a gamechanger. Having a unified system across sites enables us to accelerate problem-solving, reduce downtime, and improve quality.”

Esteban notes that the system allows early detection of process deviations and asset behaviour changes, enabling remedial action before major failures occur. “This proactive approach has significantly reduced unplanned downtime and emergency maintenance costs. The ability to plan production and avoid disruptions is a direct result of the intelligent tools and close collaboration we have developed with Adroit Technologies.”

Johan Nieuwenhuizen, Sales Director and co-CEO at Adroit Technologies, says the appointment underscores Adroit’s long-standing reputation as a trusted global partner in industrial automation, SCADA, IIoT, and OT cybersecurity. “We have established our reputation over more than three decades as a partner in industrial digital transformation,” he says.

Esteban adds that Maxion’s evolution with SCADA systems had reached a point where “simply collecting data on the shopfloor was no longer enough. We needed a partner who could help us unlock the full potential of that data across all levels of the organisation. Adroit Technologies stood out for the technical capabilities it provides, such as advanced visualisation, security, and integration, as well as its collaborative spirit.”

From the start, Adroit Technologies demonstrated a deep understanding of Maxion’s needs and a commitment to building a long-term strategic partnership. “That drive, trust, and alignment



From left: Esteban Remezc, CIO at lochpe-Maxion, Johan Nieuwenhuizen, Sales Director and co-CEO, Adroit Technologies, Hugo Pienaar, Director of Digital Services, Adroit Technologies.

were key in selecting them as our global SCADA partner,” notes Esteban.

With over 35 000 licences deployed across six continents, Adroit Technologies has proven its ability to deliver scalable, secure, and future-ready SCADA solutions in complex industrial environments. “lochpe-Maxion required a global partner capable of unifying diverse systems, ensuring cybersecurity compliance and long-term reliability,” Nieuwenhuizen highlights.

lochpe-Maxion’s objective was to consolidate multiple heterogeneous control systems into a single, standardised SCADA architecture that delivers real-time and historical data aggregation across its global operations. Adroit Technologies met this requirement through protocol-agnostic integration supporting more than 100 industrial drivers, including OPC UA, MQTT, Modbus, and BACnet.

Built around Adroit Technologies’ SCADA solution and the Adroit Edge Gateway software, the solution enables data collection and exchange with enterprise MES and ERP systems, unifying information flows and supporting centralised operational oversight. This architecture provides a secure and flexible foundation for advanced analytics, predictive maintenance, and continuous improvement across all plants.

“The system provides real-time visibility into plant operations, ensuring everyone is aligned, informed, and empowered to act,” says Esteban. “We have shifted from a fragmented and reactive reality to a proactive, integrated mindset that enables real-time monitoring, early deviation detection, and predictive insights. It allows us to understand each bit of data generated by our equipment and processes.”

For more information visit: <https://adroitscada.com/#>



Built around Adroit Technologies’ SCADA solution and the Adroit Edge Gateway software, the solution enables data collection, analysis and integration, unifying operational oversight.

Liquid cooling in African data centres – a turning point in design

As artificial intelligence becomes more deeply embedded in how organisations operate, the infrastructure to support these digital tools is undergoing a major shift. Data centre capacity needs to increase rapidly to power AI processes. And this raises technical challenges in data centre cooling systems. Leon Kleyn, Technical Director: Mechanical, and Floris van der Walt, Senior Mechanical Engineer, at WSP in Africa, look at the rise of liquid cooling – as a response to market demand and an opportunity for Africa’s growing digital ecosystem.



The African data centre market is growing quickly: research places estimated market value at USD 1.94 billion in 2025 and it is expected to reach USD 3.85 billion by 2030^[1].

The fast increasing demand for high density computing data centres is driving the evolution of cooling systems, seeing liquid cooling assume a central role. Liquid cooling is a technology long understood but only now gaining traction in large-scale data centre environments.



Why liquid cooling, now?

The current relevance of liquid cooling is a direct result of the explosion of AI workloads. Traditional computing relied on CPUs (central processing units) that processed tasks sequentially. AI, however, depends on GPUs (graphic processing units) that process multiple tasks in parallel, which significantly increases energy use and, in turn, heat generation.

“We are reaching the limit of what traditional air-cooling systems can do, in terms of performance,” says van der Walt. “Liquid cooling provides three to four times the cooling capacity of air, so it becomes the next viable option.”

Although liquid cooling is not new, it has historically not been used due to its relatively high costs, perceived risks and complexity. Now, rising heat loads have pushed technology providers and data centre operators towards solutions that can handle greater heat rejection safely and efficiently.

Managing risks and technical complexity

The biggest concern is leakage – the risk of liquid coming into contact with expensive electronic equipment. “Leaks are one of the biggest risks,” says van der Walt. “You need strategies to detect and mitigate them.”

Another challenge lies in protecting the quality of the cooling fluid. The cooling systems use extremely fine cold-plate channels – at microscopic dimensions – which are highly sensitive to contaminants. Minerals or impurities in potable water can block the channels, which makes ordinary water unsuitable for use in these systems.

Kleyn notes: “Liquid cooling systems typically use demineralised water, rather than standard filtration.”

Beyond demineralisation, engineers also need to prevent scaling and biological growth. This can be achieved by introducing a propylene glycol mixture that stabilises the fluid and inhibits biofilm formation. As van der Walt puts it, fluid treatment forms “a whole new industry on its own”, requiring collaboration between water-treatment specialists, cooling-system manufacturers, and engineers.

Efficiency and environmental considerations

Liquid cooling offers clear efficiency advantages. “It is more efficient than normal air cooling,” says Kleyn, explaining that the engineered liquid rejects heat more effectively than air, lowering the system’s energy use.

In water-scarce regions like South Africa, the issue of water consumption and efficient usage is a primary concern. “Liquid cooling does not mean significant water use,” Kleyn clarifies. “The system is a closed loop, filled once at commissioning and not requiring additional water during normal operation.”

“There shouldn’t be any water consumption in a liquid cooling system,” van der Walt emphasises. “If the data centre registers high water consumption, it means there’s a leak.”

The fluid may over time need re-treatment or replacement, although Kleyn confirms this happens infrequently and usually only with technology changes.

Opportunities and challenges for Africa

Africa’s climate, with high ambient temperatures in most regions, does not restrict the use of liquid cooling. The systems are more than capable of performing optimally under various ambient temperatures. The main challenges facing the adoption of liquid cooling on the continent relate to manufacturing capacity, supply chains and specialised skills.

Because Africa does not manufacture coolant distribution units (CDUs) locally, operators fall into global supply queues. This can lead to project delays as larger international projects take precedence in supply chains.

In addition, van der Walt notes that liquid-cooled systems are not as forgiving as air-cooled systems. Performance deviations need to be detected and corrected immediately, and this requires specialised skills. On a positive note, this creates significant opportunities for upskilling Africa’s young workforce. Technical development for operations and maintenance staff is critical to ensure the systems operate optimally.”

Kleyn says liquid cooling is implemented only where needed.

From Top: Leon Kleyn and Floris van der Walt of WSP in Africa.

“Operators will try to use air cooling as much as possible. This is largely because of cost and complexity in the technical requirements for liquid cooling. Demand for liquid cooling is driven by the adoption of GPU-based data processing systems, particularly by AI-focused operators and global service providers expanding into Africa, to improve performance for local users.”

When an operator is ready to shift to GPU-based systems, liquid cooling can be implemented in new facilities or in upgrades of existing facilities. According to Kleyn and van der Walt, new builds are easier, but conversions are feasible. Industrial-type buildings with generous volumes and structural flexibility can also accommodate liquid cooled designs if there is sufficient power to the site.

As AI adoption accelerates across the continent, liquid cooling will increasingly shape the next generation of data centres in Africa. While the technology introduces new layers of complexity, it also offers significant efficiency gains and positions operators to meet the rising demands of a digital, interconnected and latency-sensitive marketplace.

“It yields significant benefits for operators, the environment and the end user,” says van der Walt. As liquid cooling shifts



The exponential increase in AI workloads is forcing data centres to increase computing power, in turn raising energy use, heat generation, and the need for more efficient cooling.

from being an emerging trend to a strategic necessity, operators of legacy infrastructure and new build data centres across the continent will need to adapt.

References

[1] <https://www.mordorintelligence.com/industry-reports/africa-data-center-market>

For more information visit: www.wsp.com

Industry 4.0 + IIoT: Products + services

Digital network enables autonomous drilling at Sentinel Mine

Sedna Africa has successfully delivered and commissioned the digital network infrastructure enabling autonomous drilling at First Quantum Minerals’ Sentinel Mine in Kalumbila, marking a major advance for smart mining in Zambia.

The project forms part of First Quantum’s broader strategy to modernise operations, improve safety and increase productivity as the company works towards its long-term copper production targets. Sedna Africa was responsible for supplying, installing and commissioning the Rajant Corporation wireless network, which provides the resilient, high-performance connectivity required to support autonomous drilling operations.

The network underpins the drill automation system deployed at Sentinel, enabling mobility, low latency communication, high-capacity data transfer and remote operation in a demanding and dynamic open-pit mining environment. The solution was implemented in collaboration with First Quantum subsidiary Trident Mining and global drill automation specialist Flanders Inc.

Following successful trials on three drill rigs, the system has demonstrated measurable improvements in drilling accuracy, efficiency and operational safety. Advanced GPS and laser-guided positioning have improved drill precision and blast outcomes, and automation has increased the number of holes drilled by more than 30%. Operators can now oversee drilling activities remotely, reducing exposure to high-risk environments.

Sedna Africa Managing Director, Anton Fester said the project reflects the importance of robust digital foundations in enabling advanced mining technologies. “From a technology perspective, autonomous drilling is only possible when the underlying network is reliable, resilient and built for harsh operating conditions.”

Commenting further, Fester said: “Our role was to design

and deploy a kinetic mesh network that allows the systems to operate continuously and safely. To achieve this, the Rajant Hawk radios are used to establish the kinetic mesh, together with the Sedna Mobile Highsite Solution to ensure reliable ancillary services, creating a fit-for-purpose solution. The project demonstrates how designing and implementing the optimal digital infrastructure enables automation to perform as intended, delivering real operational value on site.”

“As mining operations move towards greater autonomy and digitalisation, resilient connectivity becomes the foundation for everything that follows. At Sentinel Mine, Rajant’s Kinetic Mesh® network delivers continuous, mobile, and self-healing connectivity that autonomous drilling operations rely on to perform safely and consistently.

By maintaining real-time communications across moving equipment and dynamic mine environments, we enabled our customer to operate with greater precision, uptime, and confidence. Delivered in partnership with Sedna Africa, this project shows how the right wireless infrastructure translates directly into safer operations and measurable productivity gains,” says Rinus Pretorius, Africa Sales Director, Rajant Corporation.

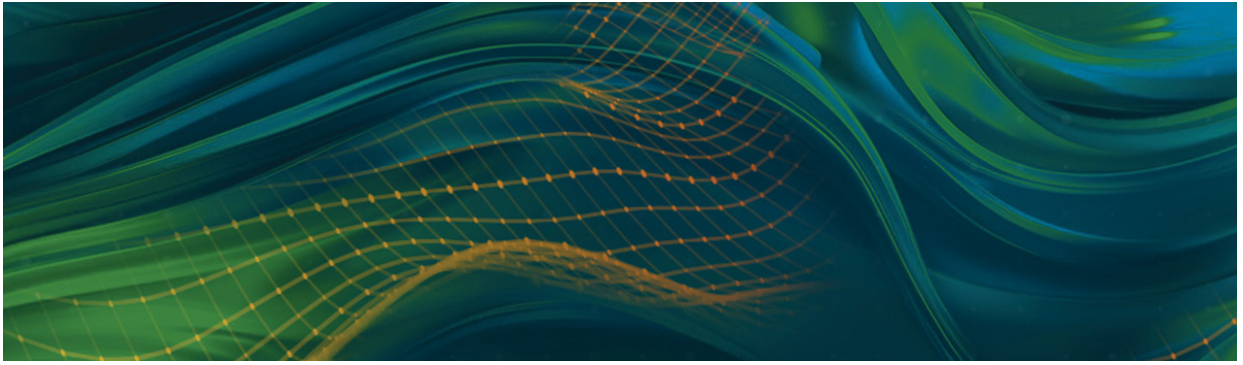
The project reinforces Sedna Africa’s role as a key enabler of digital transformation in the mining sector, delivering proven connectivity solutions that support safer, more efficient and more sustainable mining operations across the continent.

For more information visit: <https://sedna.africa>



Sedna Africa is a leading systems integrator delivering mission-critical connectivity and industrial digital solutions across diverse sectors.

Delivering design and simulation at scale



Hyperworks® 2026 enables faster, more confident design decisions at scale.

Altair, a global leader in computational intelligence and now part of leading technology company, Siemens, has released its HyperWorks® 2026 software incorporating the latest updates. With significant advances in AI, high-performance computing (HPC), and multiphysics integration, HyperWorks 2026 enables engineering teams to accelerate innovation and improve product performance across industries using comprehensive computer-aided engineering (CAE) design and simulation.

“HyperWorks 2026 demonstrates how Altair and Siemens are driving the future of simulation and empowering engineers to design smarter, faster, and with greater confidence in real-world outcomes by bringing AI, automation, and multiphysics into a unified ecosystem,” said Sam Mahalingam, Chief Technology Officer, Altair, and Executive Vice President, Siemens Digital Industries Software. “Following the acquisition by Siemens last year, our commitment is to create a complete AI-powered portfolio of product lifecycle intelligence software and further enhance the digital twin.”

In use at JetZero

JetZero is a pioneering aviation startup focusing on the future of ultra-efficient air travel. It is collaborating with Siemens on the development and production of its blended wing aircraft. With this innovative all-wing design, JetZero aims to improve fuel efficiency by up to 50%, reduce noise, and advance the industry towards zero carbon emissions. Key to the fast pace of its development schedule is gaining engineering insights faster than can be done using conventional high fidelity computational fluid dynamics (CFD), with FlightStream, part of the HyperWorks suite.

John Vassberg, Chief Design Officer at JetZero explains: “JetZero is pioneering the next step change in the aerospace industry and, to accomplish that at the scale the industry is demanding, we need a toolset that allows us to work at pace and gain accurate insights early in design – which FlightStream does. It is easy for our engineering team to use, it does not require the traditional high-performance computing resources of high-fidelity CFD, it gets us answers fast and without heavy resource demands. This is critical for companies like JetZero that need to iterate faster than before.”

HyperWorks 2026 introduces six key innovations.

AI-powered design and simulation

Geometric deep learning, generative algorithms and GPU-accelerated reduced order modelling (ROM) enable near-real-

time predictions and faster validation. Physics-based AI models can be deployed in secure, browser-based environments, producing results up to 1 000x faster than traditional solver simulations. Expanded support for vectors and smoothed-particle hydrodynamics (SPH) broadens domain coverage.

Enterprise-scale pre-processing and model assembly

Engineers can simulate large, complex assemblies with speed and fluidity, shortening build and validation cycles. Enhanced navigation, batch meshing, and connector management streamline pre-processing and direct data management integration helps ensure consistency across teams.

Integrated multiphysics simulation

Unified solvers and domain coupling allow engineers to analyse complex interactions – such as thermal-fluid or electromagnetic-structural systems – with greater fidelity. New workflows support e-motor optimisation, battery safety studies, and high-temperature analysis, and co-simulation standards enhance digital continuity. Electromagnetic simulations run up to 40% faster and propagation modelling up to 20x faster with radar and electromagnetic compatibility (EMC) analysis expanded for next-generation applications.

Automation, collaboration and connectivity

Expanded Python and API support, intuitive no-code workflow tools, and cloud integration promote digital continuity. Enhanced visualisation and plotting tools simplify result interpretation and sharing, and seamless interoperability with third-party software strengthens digital twin fidelity.

Realistic particle, fluid, and material behaviour

New modelling approaches capture bulk flow, impact behaviour, and high-temperature effects with greater realism. Python-based automation accelerates discrete element method (DEM) workflows and coupled solvers enable advanced studies of battery safety and material response.

Intuitive design and motion exploration

A more unified workspace transforms how engineers explore motion and refine geometry. Real-time updates across multi-window views reduce setup time, flexible implicit modelling and direct surface editing remove geometry barriers to creativity. With clear side-by-side comparisons, teams can make faster, more confident decisions.

For more information visit: <https://altair.com/>

AI-enabled technology to improve infrastructure resilience

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

Power grids, rail networks, manufacturing facilities, and other critical assets are in many cases decades old and are under pressure from rising demand, extreme weather, and aging components. Failures within these systems can lead to severe cascading impacts, including widespread blackouts, safety incidents, environmental damage, and significant economic losses. Combining Hitachi Energy's expertise in managing critical infrastructure with Microsoft's advanced artificial intelligence and data capabilities, the collaboration enables operators to transition from reactive problem-solving to proactive, comprehensive, data-driven asset lifecycle management – addressing issues before they occur.

Hitachi Energy is reinventing its Ellipse Enterprise Asset Management (EAM) with Microsoft Dynamics 365, Microsoft Fabric, Microsoft 365 Copilot, and Microsoft Foundry – creating a unified solution to manage data, analytics, and business operations. This builds on the strategic alliance between Hitachi, Ltd. and Microsoft Corp. announced in June 2024, which established plans to embed Microsoft technologies into Hitachi's Lumada solutions. The further announcement on 28 January 2026, brings that collaboration to the energy sector, and leverages Ellipse's 40 years of EAM expertise with Microsoft's advanced technology and capabilities.

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

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

The solution leverages a combination of Microsoft's advanced digital solutions to integrate critical datasets supporting asset operations and providing clear visibility of equipment across entire networks. It can recommend the best time for maintenance based on supply chain, HR, and financial data, helping organisations operate and plan investments more efficiently. This means more reliable services, safer operations, and fewer emergency repairs, which are often the most expensive and disruptive.

The value of integration

Traditionally, EAMs (Enterprise Asset Management systems) and supporting systems, like ERPs (Enterprise Resource Planning systems) and CRMs (Customer Relationship Management systems), operate independently, making data silos. EAM

data focuses on asset lifecycle management but can be strengthened when combined with supporting data, like financials, procurement, and workforce planning, often found in an ERP or CRM system. This separation typically leads to inefficiencies, data duplication, and limited visibility. By integrating these systems, with Microsoft's Agentic business applications, utilities gain:

- End-to-end visibility – a 'single source of truth' for assets, financials, and operations enables better decision-making and compliance
- Optimised asset management – real-time data flow between EAM and ERP systems for accurate budgeting, forecasting, and resource allocation
- Improved reliability and resilience – predictive maintenance powered by integrated data reduces downtime and extends asset life
- Streamlined processes – unified workflows eliminate redundancies, accelerate work orders, and improve customer service
- Regulatory and sustainability alignment – integrated reporting supports environmental, social and governance (ESG) goals and regulatory compliance.

The Hitachi Energy solution will be delivered through the company's network of system integrators, including Hitachi Solutions, a global systems integrator within the Hitachi Group, as the foundational advisor and partner to implementation design. Hitachi Solutions' recent recognition as Microsoft Dynamics 365 (Finance) Partner of the Year, along with its extensive experience delivering large-scale global digital transformations, will help accelerate adoption and provide consistent, high-quality outcomes for end users.

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

Driving digital transformation

For customers, this integration can become the strategic enabler of their digital transformation priorities. It will empower organisations to move from reactive to proactive operations, leverage advanced analytics, deliver value to customers and help control costs.

For more information visit: www.hitachienergy.com



Hitachi Energy is reinventing its Ellipse Enterprise Asset Management system with Microsoft technologies.

Renewables and nuclear to meet a greater share of the power mix

In its latest report, Electricity 2026, released in February 2026, the International Energy Agency (IEA) sees global electricity demand set to grow strongly through to 2030, underscoring the need for investments in grids and flexibility. According to the report, global power demand is set to grow by more than 3.5% per year on average over the rest of this decade, with electricity generation from renewables, natural gas and nuclear all expanding to meet the market.

Electricity 2026 is this year's IEA report on global electricity systems and markets. It provides in-depth analysis of recent trends and policy developments, and includes forecasts for electricity demand, supply and carbon dioxide (CO₂) emissions over the five-year period through 2030.

According to the report, electricity demand over this period is on course to grow at least 2.5 times as fast as overall energy demand as the 'Age of Electricity' takes hold. This is driven by rising industrial use of electricity, the continued uptake of electric vehicles, higher air conditioning use and the expansion of data centres and AI. Although emerging and developing economies continue to be the main engines of growth in electricity demand, consumption from advanced economies is also rising after 15 years of stagnation – contributing to a fifth of the total increase in power demand through 2030.

The report states that global electricity generation from renewables – boosted by record deployment of solar PV – is now progressively overtaking generation from coal, after drawing more or less level with it in 2025, based on the latest available data. Nuclear power output also rises to a new record. The momentum behind low-emissions sources of generation continues to 2030, by which time renewables and nuclear are together set to generate 50% of global electricity, up from 42% today.

Natural gas-fired output is also set to grow through 2030, supported by rising electricity demand in the United States and the continuing shift from oil to gas for power in the Middle East. Coal fired generation is forecast to lose ground globally, returning to 2021 levels by the end of the decade, as renewables expand. As a result, global CO₂ emissions from electricity generation are expected to remain roughly flat between now and 2030.

The report emphasises that these trends – growing demand, an increasingly weather-dependent mix of power generation sources, and evolving electricity consumption patterns and technologies – require a rapid and efficient expansion of electricity grids and system flexibility. Today, more than 2 500 gigawatts worth of projects – encompassing renewables, storage, and projects with large loads, such as data centres – are currently stalled in connection queues worldwide.



The latest IEA report on the electricity sector globally forecasts the share of renewables and nuclear in the world's power mix to rise to 50% by the end of this decade, with growth of natural gas, too.

New analysis in the report finds that as the expansion of grids advances, deploying grid-enhancing technologies and implementing regulatory reforms that enable more flexible grid connections and usage could allow for the integration of up to 1 600 gigawatts of queued projects in the near term. Together, these measures would allow the grid to be used more efficiently and unlock substantial capacity.

“At a moment of significant uncertainty across energy markets, one certainty is that global electricity demand is growing much more strongly than it did over the past decade. In this Age of Electricity, the increase in global power consumption through 2030 is set to be equivalent to adding more than two European Unions,” said IEA Director of Energy Markets and Security, Keisuke Sadamori. “Meeting this demand will require annual investment in grids to rise by 50% by 2030. Expanding flexibility will also be crucial as power networks continue to evolve – so will a strong focus on security and resilience.”

The report notes that installations of utility-scale battery storage have risen sharply, providing an important source of short-term flexibility. Markets such as California, Germany, Texas, South Australia and the United Kingdom have all seen strong growth in utility-scale battery capacity deployment in recent years.

Electricity 2026 also notes that the affordability of electricity remains a key and growing concern. Household electricity prices in many countries have risen faster than incomes since 2019. Elevated prices are putting pressure on industries and businesses too. As

a result, policymakers are focusing on policies, market designs and regulations that deliver not just additional investment but also greater flexibility and efficiency across all parts of the power system, including demand, supply and the use of infrastructure.

The report suggests that greater efforts are needed to improve the security and resilience of power systems around the world, which face

rising risks associated with ageing infrastructure, extreme weather events, cyberthreats and other emerging vulnerabilities. Modernising how systems operate, as well as strengthening the physical protection of critical infrastructure, will be essential to countering these threats.

For more information visit: www.iea.org

Products + services

IFC funding boost for solar power in SA



Representatives from Candi Solar and the IFC at the signing of the funding agreement.

Towards the end of last year, Candi Solar, a clean energy company specialising in distributed solar solutions for commercial and industrial (C&I) businesses, secured USD 58.5 million in funding led by the International Finance Corporation (IFC), a member of the World Bank Group.

This syndicated debt funding facility – the company’s largest round to date – brings Candi’s total capital raised to over USD 200 million and positions it firmly in the league of trusted, institutional-grade clean energy providers.

The funding will be directed specifically to accelerating commercial and industrial solar projects across South Africa, as well as in India, offering businesses access to more stable, affordable, and cleaner power.

Candi’s portfolio has more than doubled to 220+ MWp in just 18 months, driven by 85 MWp of open-access projects in India and flagship sites in South Africa, including solar installations at Ngwenya Lodge and at Kings Park Stadium HQ. Candi also powers leading corporations such as IFF (International Flavors & Fragrances SA), Toyota and Pick n Pay, demonstrating the strength of its model across manufacturing, retail, and commercial real estate.

A vote of confidence

The IFC’s investment reinforces Candi’s role as a trusted partner for businesses on their net-zero journey.

The investment comprises:

- * USD 6.5 million from the Canada-IFC Blended Climate Finance Platform
- * Up to USD 42 million equivalent for IFC’s own account (composed of rand, rupees, and US dollars) a portion of which is supported by IFC’s Managed Co-lending Portfolio Programme (MCP)
- * A concessional loan of up to USD 10 million (mixed local rand and rupees) from IFC acting in its capacity as the implementing entity of the Climate Investment Funds’ Clean Technology Fund.

“This is the largest funding facility we have closed,” said Bruno Raus, Director of Candi Solar. “It propels us into our next phase of growth and strengthens our ambition to be the leading distributed energy partner in India, South Africa, and beyond. IFC’s involvement is catalytic – it builds confidence among global investors and enables us to access larger pools of capital to scale faster in the years ahead.”

By blending concessional and commercial components, the IFC-led multicurrency facility (including local currencies), which will support Candi’s growth across key regions for distributed generation, is structured to absorb early-stage financial, operational, and performance risks while maintaining strict ESG and governance standards. This financing structure will support Candi’s next phase of growth and mobilise other global capital to an asset class once considered too risky.

“This facility validates our results-based model and its ability to deliver reliable returns,” said KJ Mahoney, Head of Capital Structuring at Candi Solar. “IFC’s involvement demonstrates that distributed solar can meet the highest standards of performance, governance, and impact, paving the way for global investors to support this sector at scale.”

“At IFC, we see distributed solar as a powerful lever for accelerating energy access and efficiency in emerging markets,” said Cláudia Conceição, IFC Regional Director for Southern Africa. “Our partnership with Candi Solar demonstrates how innovative financing models can unlock private capital at scale – supporting small and medium-sized businesses to create jobs, reduce energy costs, and strengthen operational resilience.”

Beyond megawatts

The facility will directly finance nearly 200 MWp of new projects, with a broader impact on:

- * Sustainability – advancing clean energy adoption across key industrial clusters to lower emissions
- * Resilience – strengthening grid stability for businesses and communities facing power volatility
- * Employment and supply chains – creating jobs and building local industrial capacity
- * Affordability – giving companies predictable energy costs and long-term competitiveness.

Through 2026 Candi Solar aims to expand its contracted portfolio beyond 400 MWp across India and South Africa, deepening its performance-linked product suite, including energy storage solutions. Candi’s evolution reflects the bigger global shift, demonstrating that distributed solar in emerging markets is proven, investable, and central to the world’s clean energy transition.

For more information visit: www.candi.solar/

Dynamic control of industrial solar plants and energy storage

Spanish Group Power Electronics has demonstrated its comprehensive expertise in sustainable energy supply in over 3 000 solar and energy storage projects with a total installed capacity of 120 GW. To control its modular systems, the company relies on open, high-performance Beckhoff control technology: powerful embedded PCs combined with TwinCAT enable flexible scaling and dynamic load changes of 330 MW within 110 ms. Stefan Ziegler of Beckhoff Automation reports on this application.

Based in Lliria near Valencia, Power Electronics specialises in inverters for utility and battery storage systems and is a leading manufacturer of solar inverters for photovoltaic systems around the

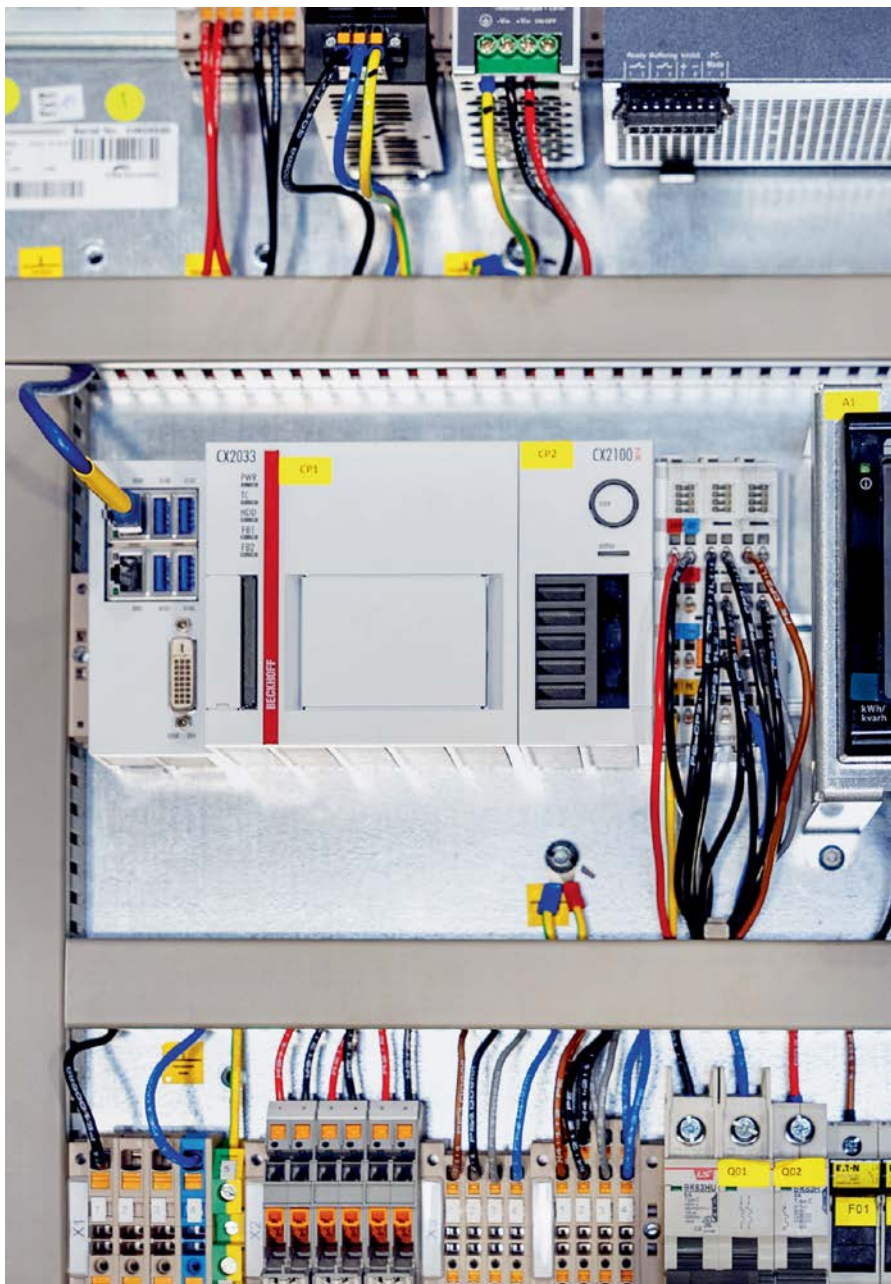
world. Founded in 1987, the company is represented in 36 countries and has implemented more than 3 000 solar and energy storage projects with 120 GW of installed capacity (ac), preventing the release of almost

120 million tonnes of CO₂. In addition to the production of solar, battery, and hybrid inverters, Power Electronics supplies its own control system for plants – with the battery controller interface (BCI) and power plant controller (PPC) as core elements.

A plant consists of many individual power blocks with solar and/or battery modules, each of which is monitored and controlled by a BCI that uses PC-based control. A power block contains an inverter for the solar modules and – if battery storage is also used – a dc/dc converter. The inverter converts the direct voltage of the solar modules into alternating voltage to supply either the grid or the batteries bidirectionally, depending on demand. The central PPC is responsible for the higher-level control and coordination of all power blocks in a plant according to the grid operator's requirements.

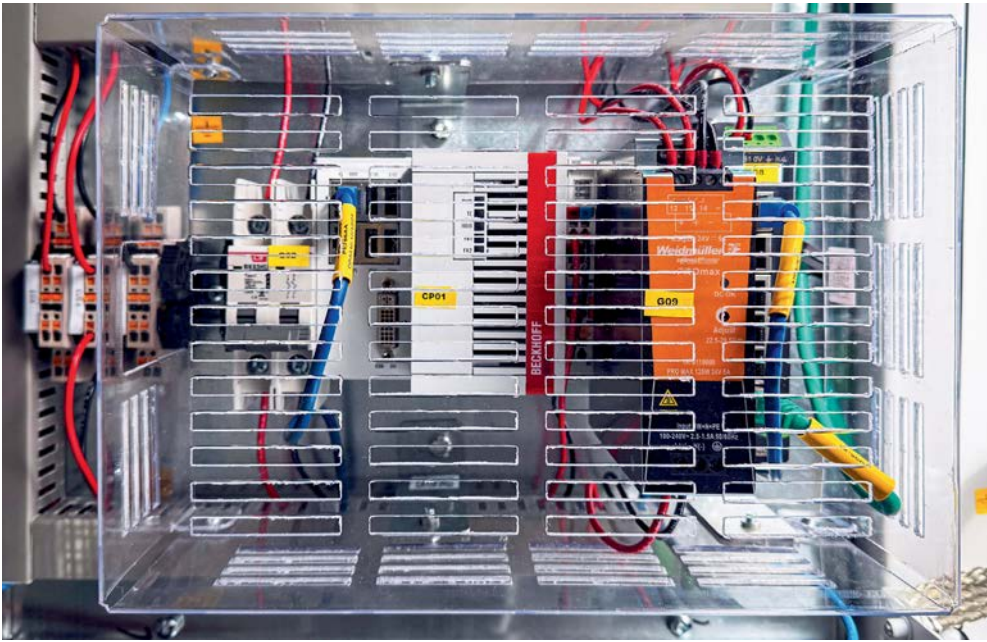
Higher economic efficiency through dynamic control

With its decades of expertise, the company complies with the demanding energy supplier regulations which vary around the world and, among other things, define how plants need to behave in order to ensure the stability of energy grids during certain events. "If a plant also meets even stricter requirements in terms of response times, it can provide what are known as



© Power Electronics

CX2033 Embedded PCs with AMD Ryzen™ processors are used for the power plant controllers (PPCs) and the individual power blocks are controlled via TwinCAT and ADS.



In its solar and battery storage projects, Power Electronics benefits from the openness and broad scalability of Beckhoff's control hardware and software, and uses CX5120 Embedded PCs, for example, for the battery controller interfaces.

support services,” says David Dobón, Applications Engineering Manager at Power Electronics, emphasising the importance of high-performance control technology. The advantage for the operators is that they can sell the energy fed into the grid at a higher price point.

“Initially, we were able to switch our systems from consuming 150 MW of power to delivering 180 MW in 130 ms, for example. Now we can do that in as little as 110 ms,” adds Agustin Cano, Team Leader Control Systems at Power Electronics. Such short switching times require a fast and sophisticated automation system, which Power Electronics implements using hardware and software from Beckhoff. It can thus control all three power block variants: solar, battery, and hybrid.

The challenge of hybrid power blocks

“The most sophisticated scenario arises when the inverter of a BCI manages solar modules and batteries at the same time,” says Hector Ortega, Team Leader Software at Power Electronics. These hybrid power blocks then function as small autonomous solar plants and must essentially manage themselves to maintain an energy balance.

Power Electronics uses Beckhoff CX series Embedded PCs with TwinCAT 3 PLC (TC1200) to control the various battery controller interfaces. “Depending on the configuration of a power block, a CX5120 or CX5240 Embedded PC with an Intel Atom® processor is used, for example,” explains Javier Menchén, Technical Support at Beckhoff Spain. The BCIs communicate with the inverters, batteries, and other components via Modbus TCP and execute sophisticated control algorithms with very short cycle times.

TwinCAT 3 PLC HMI Web (TF1810) is also installed as a visualisation system on the embedded PCs of the controls. This enables service personnel to access the parameters of the connected devices directly on site or remotely via a web interface.

Future functional enhancements and software optimisations are expected to require additional computing power. In this case, performance can easily be adjusted by switching to

a CX5330 Embedded PC with two CPU cores. Miquel Coca, involved in sales at Beckhoff Spain, comments: “Beckhoff regularly expands its portfolio of industrial PCs and embedded PCs with more powerful variants, at the same time ensuring the long-term availability and easy scalability of its control computers.”

Battery storage as a dynamic control reserve

The PPC monitors and controls multiple BCIs and is responsible for coordinating all power blocks in a plant as a key element. Here, Power Electronics relies on a CX2033 Embedded PC with an AMD Ryzen™ processor. “In one project, we have already

coordinated 160 BCIs with the embedded PC and have not yet come close to its power reserve,” says David Dobón. The PPC records and processes the information from each BCI via the ADS communication protocol and provides them with the operating setpoints. “ADS is very fast, it's flexible, and enables communication via the plant's Ethernet network,” says Miquel Coca. Expansions are also planned for the PCC software, with a CX2043 Embedded PC featuring four CPU cores set to be used in future.

Openness facilitates system integration

“The use of a control PC with an open operating system enables the integration of .Net code, which is a major advantage for us,” says Hector Ortega, highlighting an important feature of PC-based control from Beckhoff. This enabled Power Electronics to implement the DNP3 telecontrol protocol used by many energy suppliers for communication between the higher-level SCADA system and the substations. In addition, .Net is used to manage the databases and develop the visualisation.

“The TwinCAT real-time task management, together with the powerful embedded PCs, is essential in ensuring the short response times of the solar plants and battery storage systems,” notes Agustin Cano. What's more, the diagnostic tools provided by TwinCAT are especially helpful for monitoring the execution time of each task across all cores and cycles. The compatibility of the hardware and software was another criterion for choosing Beckhoff as a supplier. Furthermore, cooperation between the teams at Power Electronics and Beckhoff in clarifying technical issues was quick, smooth, and efficient.

For more information visit: www.beckhoff.com

Five energy market realities in 2026



David McDonald, CEO at SolarAfrica

In South Africa's business board rooms today, the energy conversation is generally filled with optimism, big ideas and some bold timelines. On the ground, we know the market moves in its own time, and in a more practical way. The realities shaping 2026 are already playing out in how projects are financed, how municipalities procure power, and how businesses think about energy risk. Here are five energy market realities that will inform how we, as an industry, operate in 2026.

David McDonald, SolarAfrica.

The wholesale market still hinges on Eskom

Over the past year, there has been a great deal of talk around the South African Wholesale Electricity Market (SAWEM). And while it might sound like we're about to press play, the reality is that without the participation of all stakeholders, a wholesale market won't function. Currently, Eskom supports the concept of an open market, although it appears still to be hedging its bets by building and controlling its own virtual wheeling platform. Private offtakers and independent power producers (IPPs) will continue to align themselves – at least in the short term – with the state-owned entity because it's where bankability exists.

This is significant because key stakeholders such as developers, customers and banks are watching and responding to what exists today. Projects are being financed and built using Eskom-approved structures, and nobody is holding projects back waiting for a market that may or may not arrive on schedule.

I believe a wholesale market is in the best interests of South Africa's energy landscape, and it will play a role in future. But in 2026, most private power activity continues to sit outside that debate.

Municipalities buying power directly – the path of least resistance

2025 proved that wheeling is viable at scale and offers a lot of advantages, yet many municipalities are choosing a more straightforward route: buying power directly from IPPs.

In the Western Cape, the Swartland and George municipalities are two examples of municipalities that have recently stated their intention to source electricity directly from power producers. In KwaZulu-Natal, eThekweni Municipality was the first SA metro to secure ministerial approval to buy significant capacity from IPPs.

For these municipalities, wheeling brings administrative and financial complexity, where direct procurement – in contrast – is easier to implement and increasingly easier to finance. Moreover, changes to Eskom's Electricity Supply Agreement have made these structures more rigorous and, in some cases, more challenging for municipalities.

As a result, we expect the market to become even more fragmented in 2026.

Energy decisions move out of operations onto the balance sheet

In 2026, energy is no longer treated as solely an operational cost. For many large users, it now moves onto the balance sheet



SunCentral is one of the country's largest solar initiatives designed specifically for one-to-many bilateral wheeling.

and into the risk management function.

Electricity is one of the few major costs businesses can fix over a long period, which is why energy conversations are increasingly happening with finance and risk teams (not only the sustainability and engineering people).

We see this clearly in industries such as mining. Electricity is seen as one of mining's biggest input costs and, in some cases, uncertainty around future pricing is delaying capital investment. While things like commodity pricing and market volatility cannot be controlled, a mine does have control over its energy strategy, which is where partners that can structure blended energy solutions have an increasingly valuable role to play in 2026.

Fixed and capacity charges change the landscape

As self-generation increases, municipalities and Eskom are increasingly reliant on fixed and capacity charges to protect revenue. This changes the landscape significantly. In future, it is likely that capacity charges will increase at a faster rate than consumption charges.

For 2026, this means we can expect major players in the energy industry, like SolarAfrica, to get smarter about managing peak demand and capacity exposure in a bid to reduce costs for their customers. Battery energy storage, hybrid supply models, diversified energy stacks and the ability to supply power outside standard solar hours will become more prevalent.

Wheeling works – financing is catching up

In 2025, we showed that wheeling works. In the case of SolarAfrica's SunCentral, first power is expected to come online later this year. SunCentral is one of the country's largest solar initiatives designed specifically for one-to-many bilateral wheeling. However, in 2026 we're seeing more traders enter the energy trading pool, more offtakers and more complex structures. These are putting pressure on banks that are still geared for simpler, single-buyer deals. Reaching financial close on these projects is already taking longer than developers would like, and this trend is set to continue.

However, this won't be the case forever: as more multi-offtaker projects come online, banks will have access to better data, so risk will become easier to price. For now, we expect the length and rigidity of the financial close process to persist for developers.

Founded in 2011, SolarAfrica provides a suite of capex-free green energy solutions to the commercial and industrial sectors in Southern Africa. This includes on-site solutions such as solar energy and battery storage together with virtual solutions like wheeling, trading and aggregation. SolarAfrica partners with businesses in South Africa seeking an energy solution that provides power security, cost savings and carbon reduction – building towards long-term sustainability.

For more information visit: www.solarafrica.com

Products + services

Turbines supplied to two new Western Cape wind farms

Nordex Energy South Africa (NESA) has supplied 33 Nordex Delta 4000 N163/5X turbines for the Zen and Bergriver wind projects in the Western Cape. With a combined capacity of 194 MW, both wind farms are now in construction, with commissioning scheduled for mid-2027. Zen (100 MW) and Bergriver (94 MW), located between Gouda and Saron, are expected to generate about 580 GWh of renewable electricity annually once operational, supporting corporate and industrial customers through an energy trading platform.

Robert Timmers, Managing Director of Nordex Energy South Africa, said, "We are delighted to strengthen Nordex's footprint in South Africa with the supply of 33 Delta 4000 turbines for the Zen and Bergriver wind farms. The contract includes maintenance of the turbines and the projects are strategically important to our continued growth in the Western Cape, significantly expanding the Nordex installed base and reinforcing our commitment to the country's renewable energy transition."

With these additional projects, NESA's total installed capacity reaches 1921 MW across all wind farm facilities, including those under construction, with 525 turbines installed locally to date. These include existing operational assets such as the 138 MW Gouda facility, alongside current developments.

The wind farms will be owned by ACCIONA Energía, which holds 51% of the projects, with the remaining 49% held by a joint venture between H1 Capital and Chariot Limited, both of which specialise in renewable energy development and investment.

Once operational, the electricity generated by Zen and Bergriver wind farms is expected to displace an estimated 600 000 tonnes of CO₂ emissions annually.

Timmers added, "This further underlines the increasing role of private renewable energy procurement in South Africa's evolving energy landscape and the importance of decarbonised power solutions across the economy."

Etana Energy, the trading partner, will offtake all electricity generated by the Zen and Bergriver wind farms under a 20-year power purchase agreement, supplying renewable power to a portfolio of commercial and industrial customers, including Growthpoint, the V&A Waterfront in Cape Town, Tharisa Minerals, Petra Diamonds and Autocast.

"Evolving private demand for renewable power is transforming South Africa's energy landscape, with offtakers increasingly securing clean electricity through energy traders," concluded Timmers.

ACCIONA Energía is leading the build-out, while Nordex will deliver the turbine technology and assume operations and maintenance after commissioning.

For more information visit: www.nordex-online.com



Turbines like these are being supplied to the Zen and Bergriver wind farms where construction is under way.

Wheeling is a critical enabler in SA's electricity supply

Wayne Cowie, CEO at EXSA

As more South African municipalities start to roll out frameworks that support private energy wheeling, this once-niche mechanism is set to become a cornerstone of the country's decentralised energy future. Due to constrained grid infrastructure, ageing coal plants and mounting pressure to transition to cleaner power, energy wheeling offers a practical, scalable way to connect independent generators with energy-hungry users.



Wayne Cowie, EXSA.

Energy wheeling, which entails using existing transmission and grid infrastructure to deliver energy from an independent energy generator to an end-user, offers a technical solution that is gaining momentum as a market enabler. We need to look at how we can remove the remaining barriers to make it work at scale.

The imperative for energy alternatives

Although load shedding has abated for now, South Africa needs alternative energy sources to stimulate economic growth sustainably. Coal currently provides almost 75% of the nation's power, but most Eskom coal plants have reached or exceeded the standard 30 to 40 years' lifecycle. As Eskom continues its efforts to extend the design life of plants within its generation fleet to facilitate a phased decommissioning process, there will come a time when the ageing plants are no longer viable for upgrades. When these plants are shut down, a potentially significant energy gap will emerge if alternative supply is not well established.

Coupled with this, mounting international calls for the transition to cleaner energy will increasingly put pressure on trade and industry to reduce fossil fuel usage, with the imposition of penalties, tariffs and taxes.

Timing is also a concern. Where traditional energy sources, such as nuclear and coal, can take upwards of 10 years to build, renewable energy sources can be up and running more quickly, with large-scale utility solar project construction

timelines of around 18 months and large-scale wind projects around 24 months.

And there is a substantial pipeline of renewable energy projects waiting on financing to be built. This is where wheeling is playing a critical role.

Facilitating private investment in the renewable energy market

For independent power producers (IPPs), a key enabler for a project is whether there is a committed buyer for the power that will be produced. Wheeling provides another route to market for IPPs. Energy traders like Energy Exchange of Southern Africa (EXSA) typically enter into long-term agreements with multiple IPPs to bulk-buy power that they then onsell. Thus they assume certain risks on behalf of the end consumer and provide another route to market for generators.

For energy users looking to access wind or solar power, contracting directly with an energy producer can be a complex contractual and administrative undertaking. Most large-scale solar or wind projects have long-term contracting requirements of 15 to 20 years, with substantial guarantees required to enable project financing, and this can be challenging for corporates. Such contracts may also involve complex metering, reconciliation and settlement processes, which are not typically a core competency of corporate energy users. Additionally, businesses may require several contracts with different IPPs to ensure the right energy mix of wind and solar to meet their needs.

Wheeling enables large energy users to access wind and solar IPPs indirectly. It offers a middle path, taking the onerous administration, contracting complexity and risk away from end consumers and unlocking financing for IPPs at the same time.

As well as providing accessibility in the market, wheeling is attractive for other reasons too.

First, wind and solar are currently the cheapest form of new energy generation globally. Wheeling can provide cost saving benefits for companies, taking advantage of the economies of scale inherent in utility-scale renewable energy projects.

Second, companies can secure renewable energy certificates, certifying that their energy is procured from green sources. This is particularly important for companies with international footprints and will become an increasingly attractive benefit as sustainability targets and reporting

requirements evolve.

Further, accessing electricity via wheeling provides price certainty for companies. In an environment where electricity tariffs have long been increasing well above inflation, wheeling contracts generally escalate pricing on a CPI basis. This allows companies to lock in their renewable energy costs at CPI for the duration of the contract.

Roadblocks to be cleared

Although there is a substantial pipeline of renewable energy projects to be added to the grid, and hence extensive potential for wheeling, the sector faces some challenges.

As well as the broad grid constraints, which are well documented and widely known, the infancy of the energy wheeling model in South Africa poses its own stumbling blocks. Many municipalities do not yet have approved wheeling frameworks in place. This means potential offtakers cannot be accessed in those areas. Encouragingly, virtual wheeling, launched by Eskom in 2025, is designed to remove some of these constraints but is not yet accessible to private energy traders.

Regulations and compliance directives are evolving as we move towards a competitive electricity market targeted for launch in April 2026. The momentum is encouraging, and it will require extensive efforts from all industry participants to keep pace.

Energy Exchange of Southern Africa (EXSA) is a market-leading provider of grid-connected renewable energy to South African corporate and industrial customers. The company is committed to accelerating South Africa's energy transition by delivering affordable, sustainable, and flexible energy solutions.

With a NERSA trading licence issued in 2022, EXSA enables businesses to procure renewable energy and green credits under customised contracting terms. It empowers customers to achieve their Net Zero ambitions and, at the same time, benefit from the cost savings associated with accessing lower-cost renewable energy. By providing a predictable electricity price path, EXSA helps mitigate the impact of rising and volatile electricity costs.

For more information visit www.exsa.io

Products + services

Renewable energy supports cost stability and decarbonisation for mining group

Following the announcement of its second renewable energy supply agreement with energy aggregator and trader NOA Group Trading (NOA), Pan African Resources (Pan African, the company or the group) anticipates further substantial cost savings and long-term energy supply stability, unlocking operational efficiencies. This latest agreement will facilitate renewable energy penetration of potentially 70% of the group's total electricity load.

Subsequent to the initial agreement announced in August 2025, Pan African, a dual JSE- and LSE-listed gold producer with operations in South Africa and Australia, has secured an additional renewable energy allocation to deliver an overall total allocation of around 389 GWh per annum.

The energy supply agreement meets a substantial portion of the group's total electricity requirements and is expected to deliver significant savings. The company's Barberton Mines, Evander Mines and Mogale Tailings Retreatment (MTR) operations, located in Mpumalanga and Gauteng, will be supplied directly under the agreement.

"In a sector where energy risk impacts cost, competitiveness and operational continuity, Pan African required a solution that supports our current needs and our longer-term growth and decarbonisation objectives. NOA worked closely with our team to develop a flexible solution and conclude this agreement in just one month. Their ability to move quickly without compromising quality makes them the right partner to deliver renewable energy at scale," said Cobus Loots, CEO of Pan African Resources.

The transaction includes the provision of verified International Renewable Energy Certificates (I-RECs), enabling Pan African to accelerate its decarbonisation strategy and report tangible emissions reductions. The solution is also designed to enhance cost control and protect margins for the company, operating in a sector that is energy-intensive and highly sensitive to electricity



NOA Group Trading and listed gold producer, Pan African Resources, have signed a further renewable energy supply agreement.

price volatility and supply risk.

"For large energy users competing in global markets, access to competitively priced, reliable energy is fundamental to long-term sustainability. In gold mining, electricity is a major operating cost and a key driver of margin pressure. Competitive electricity pricing is therefore essential to managing our all-in sustaining costs and maintaining global competitiveness as a South African producer. This renewable energy supply agreement strengthens our cost stability, supports decarbonisation and reduces our exposure to ongoing tariff volatility," Loots added.

NOA has secured several major energy supply agreements in the mining sector in the past 12 months, reflecting growing demand for reliable, cost-effective renewable energy solutions as the industry transitions towards lower-carbon operations.

Karel Cornelissen, CEO of NOA Group commented: "This agreement reflects a pragmatic approach – delivering a scalable, bankable solution and supporting Pan African's decarbonisation obligations."

For more information visit: <https://noagroup.africa/>

Battery energy storage takes centre stage

Looking at the energy sector in 2026 and beyond, Nigel Sun, Head of Sungrow Sub-Saharan Africa, says for mines, manufacturing plants and other industrial sites, several factors are making battery energy storage systems (BESS) essential for them to remain competitive, secure reliable power and maximise profits.

This reflects a fundamental market shift. As renewable energy proliferates globally, BESS has become the key technology that transforms intermittent solar and wind into reliable business power. For commercial enterprises, this means BESS delivers triple value: it ensures operational continuity despite grid instability, reduces energy costs through strategic storage and deployment, and has the potential to generate additional revenue through selling excess power during peak pricing periods. Sun's view is that companies delaying adoption concede these advantages to competitors.

The foundation for this transformation was laid in 2025, a watershed year for renewable energy and grid infrastructure reform. Global momentum accelerated as grid modernisation initiatives gained traction, regulatory frameworks evolved to accommodate distributed energy resources and financing mechanisms matured to support large-scale deployments. This convergence of influencing factors created the conditions for rapid BESS adoption. In 2026 businesses inherit this momentum, benefiting from proven technologies, established supply chains and clear implementation pathways.

Sun says, "Businesses that strategically deploy BESS in 2026 will be managing their energy costs and securing competitive advantages through enhanced reliability, operational flexibility and revenue optimisation."

Key trends defining BESS adoption in 2026

At its first South African C&I Summit in November last year, Sungrow brought together some 200 industry leaders to share with them the innovations reshaping business energy strategy. Four trends were presented as particularly critical for business decision-making.

Modular scalability eliminates over-investment

AC-coupled solutions now provide scalable capacity from 257 kWh to 514 kWh, allowing businesses to expand as needed without wasteful initial investment. These systems integrate with existing solar installations, delivering high round-trip efficiency and supporting single-phase unbalanced loads without requiring isolation transformers. This translates into lower installation costs and faster deployment timelines. These are critical factors for finance directors evaluating capital allocation.

Long-duration storage transforms operational independence

DC-coupled solutions now enable multi-hour or multi-day independent operation, positioning BESS as a real grid alternative, more than only backup. These systems support multiple layout options and allow for greater solar capacity to achieve higher energy yield. The modular designs offer



Nigel Sun, Sungrow, Sub-Saharan Africa.

extended-duration storage that can be tailored to evolving business needs, whether a manufacturing plant requires continuous overnight operation or a retail centre needs weekend coverage during maintenance periods.

AI integration supports profitability

Artificial Intelligence (AI) is extending its reach into BESS, making it smarter and potentially enabling increased profitability. AI in BESS can predict failures, optimise operations based on pricing and demand, and, where practical, it can automatically sell excess energy during peak periods to gain additional revenue. Advanced thermal management reduces auxiliary power consumption, directly improving operational margins. Factory pre-commissioning speeds up installation and system readiness, allowing businesses to achieve earlier returns on their energy investment.

Safety innovations address risk concerns

Modern systems feature multi-layer protection covering prevention, detection, suppression and isolation. Patented pressure-relief structures enhance safety and advanced thermal runaway detection systems provide early warnings. Innovations like these address previous concerns around lithium-ion batteries and ensure stable performance under various operating conditions, meeting increasingly stringent insurance and regulatory requirements.

A fundamental market shift

Global trends support swift action. Investments in renewable energy continue to increase, and this surge in investment

explains why BESS adoption is becoming essential for businesses. As renewables grow globally, storage becomes the key technology required to stabilise grids and ensure reliable power. Without storage, intermittent solar and wind generation creates instability; with it, renewables become dependable providers of baseload power. South Africa has an advantage here, with more than 2 500 hours of sunshine in many regions annually. Making use of this resource, paired with proven BESS technology, South African businesses can take the lead.

In Sun's opinion, battery energy storage has moved from being an emerging technology to become a business imperative. Companies integrating BESS in 2026 will take control of their energy future, moving beyond grid instability and rising costs. "The foundation is in place, the technology delivers, and early adopters are already realising returns," he says.

"The solutions available today are designed to meet current power challenges and to equip companies with systems that grow alongside their operational needs," Sun adds.

Sungrow, a global leader in renewable energy technology, has pioneered sustainable power solutions for over 28 years. As of December 2024, Sungrow has installed 740 GW of power electronic converters worldwide. The company is recognised as the world's No. 1 on PV inverter shipments (S&P Global Commodity Insights) and the world's most bankable energy storage company (Bloomberg NEF). Its solutions power clean energy projects in over 180 countries, supported by a network of 520 service outlets, guaranteeing customer support.

For more information visit: <https://sa.sungrowpower.com/>

Products + services

Smarter, safer energy storage solutions

From factories and schools to commercial sites and island microgrids, Growatt's WIT Series C&I Energy Storage Solutions have become a trusted choice for cleaner, more economical, and more resilient power.

At the core of Growatt's WIT Series is a unified design philosophy: to enable businesses to use energy more intelligently, safely, and economically – across any scenario or system architecture. From maximising solar usage to supporting complex microgrids, WIT solutions combine flexible configurations, intelligent control, and industry-leading safety features in one integrated system.

With multiple smart operating modes, the WIT Series uses solar self-consumption, optimises time-of-use tariffs, manages peak demand, and ensures reliable backup power. Whether integrated into an existing PV system through ac coupling or deployed in a new project with dc coupling, WIT coordinates solar, storage, and the grid. In hybrid microgrids with PV, storage, and diesel generators, it prioritises clean energy to reduce generator runtime and maintains stable 24/7 power for critical loads.

Each system features multi-layer protection, real-time monitoring, and advanced temperature control for consistent performance in demanding environments. Combined with Growatt's 24/7 smart cloud service, remote diagnostics, and over-the-air updates, customers have a system that stays secure, intelligent, and easy to maintain.

Backed by Growatt's whole-system approach – covering inverter, battery, BMS, EMS, and service – the WIT Series delivers a unified, robust energy solution built for long-term stability and confidence.

Growatt's WIT solutions are trusted by commercial, industrial, nonprofit, and community users across APAC, Europe, the Americas, and MEA – powering schools, farms, factories, and many other sites where reliable energy matters. The WIT Series delivers an energy storage system with advanced safety, smart digitalisation, full-system integration, and strong global service support. As global energy transitions accelerate, Growatt is committed to empowering businesses worldwide with reliable, intelligent, and sustainable storage solutions.

For more information visit: <https://en.growatt.com>



Growatt's energy storage solutions are sized to serve diverse commercial installations.

Monitoring complex electrical signals



The Siglent SDS2000X HD series is a next-generation oscilloscope, providing 16 times the signal resolution of a traditional 8-bit oscilloscope.

As digital speeds and device complexity continue to increase, signals under test are becoming more complex, and engineers face greater challenges in identifying and isolating anomalies in their devices.

Test tools for such applications require wide dynamic range measurements to look at minimal signals in the presence of relatively large amplitudes. The new high-resolution SDS2000X HD series of oscilloscopes from Siglent, represented locally by Comtest, are available in bandwidths of 100, 200, and 350 MHz. They are based on a new 2 GSa/s, 12-bit ADC front end that features a low noise floor, providing more signal detail and enabling engineers to obtain more accurate waveform measurements.

The vertical resolution of an oscilloscope refers to the ratio of the highest input signal the oscilloscope can handle to the smallest signal amplitude it can detect. With higher resolution measurements, waveform details become more visible, quantisation noise is reduced, and measurement accuracy improves.

The Siglent SDS2000X HD series is a next-generation

oscilloscope featuring a 12-bit ADC and a low-noise front-end, providing 16 times the signal resolution of a traditional 8-bit oscilloscope. The SDS2000X HD series displays signals with greater detail, makes more precise measurements, offers higher voltage offsets, and provides better accuracy than traditional 8-bit oscilloscopes.

The new oscilloscopes also include several time-saving features. They include deep memory with a maximum record length of 200 Mpts/ch and display four analogue channels and an optional 16 digital channels for mixed signal analysis. They employ Siglent's SPO technology with a maximum waveform capture rate of up to 100 000 wfm/s (up to 500 000 wfm/s in Sequence mode), 256-level intensity grading display function, plus a colour temperature display mode.

SDS2000X HD oscilloscopes also employ an innovative digital trigger system with high sensitivity and low jitter. The trigger system supports multiple powerful triggering modes, including serial bus triggering. An array of measurement and math capabilities, options for a 25-MHz arbitrary waveform generator, and serial decoding are additional features.

The Siglent SDS2000X HD 12-bit oscilloscope suits the work of power supply designers, medical device engineers, or use on systems where accuracy and resolution are critical.

Siglent Technologies is China's leading manufacturer of test and measurement instrumentation.

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

High-speed checkweighers for efficient detergent production

To provide the highest precision in a small space, Minebea Intec, together with its local partner EAST, has developed a checkweigher for Unilever Egypt that is precisely tailored to the requirements of detergent production.

High cycle rates meet complex packaging processes in industrial detergent production. In addition to product quality, there is a strong focus on compliance with legal requirements – in terms of fill quantity control, for example, as well as traceability and product safety. Checkweighers serve a central function in this context: they check whether the weight of each individual package is within defined tolerances, reliably eject products with incorrect weights, and document deviations. Thus they contribute to process reliability and quality assurance. High speeds and limited space place particular demands on the weighing technology used. These factors also had to be considered in



The checkweigher checks the weight of the carton packaging reliably and accurately at very high line speeds to ensure consistent product quality and compliance with legal requirements.

this project at Unilever Egypt.

Precise weighing at high line speeds

As part of the joint project with its local partner company EAST, Minebea Intec integrated the Flexus highspeed checkweigher into an existing production line for packaging detergents at

the factory. The scales are specially designed for industrial applications with high throughput and can handle up to 600 packs per minute – with consistently high measuring accuracy. With its compact, modular design, the Flexus® could easily be integrated into the existing line. The hygienic design with stainless steel housing (IP54, optional IP65) also meets the requirements for cleaning and robustness in daily operation. In addition, the Flexus checkweigher fulfils key industry standards such as MID and 21 CFR Part 11, and this qualifies it for use in regulated industrial areas.

Controlled processes for reliable production results

The project at Unilever Egypt illustrates the role that precise checkweighers play in modern detergent production: They ensure compliance with fill quantities, enable traceability and contribute to process stability, even at high line speeds. The successful implementation shows how technological solutions can be integrated precisely into existing production environments with the support of experienced partners – delivering benefits for quality, efficiency and safety in ongoing operations.

Beshoy Kamel, Engineer at EAST commented on the project: "Close cooperation with Minebea Intec enabled us to meet the high requirements of Unilever Egypt precisely. The compact design of the Flexus checkweigher meant we could integrate the system quickly into the existing line, significantly increasing efficiency, quality, and process reliability for the customer."

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

Monitoring analogue process values

Everywhere in industry, electronic sensors are used to detect process values such as temperature, pressure or flow.

Process value monitoring often takes place directly in the sensor. However, sometimes separate monitoring devices are required – for example, if two measured values are to be offset against each other and the resulting value is to be monitored.

Evaluating measured values

The evaluation unit from ifm, which is designed for monitoring, analysis and offsetting two process values, is ideal for determining differential values in pressure, flow, level or temperature. It has various operating modes and two analogue sensors can be connected to the unit.

This means two switching points can be assigned to a measured signal, or a limit value can be assigned to two measured values. The two measured signals can be scaled and linked with each other using mathematical functions such as addition or subtraction.

The process value calculated in this way can be monitored with up to two switching points and can be output as an analogue signal (4...20 mA).

Measured values can be transmitted digitally to a higher-level controller via IO-Link. The device's extensive parameter setting is

also conveniently carried out via IO-Link.

A clearly visible OLED display shows the values and parameter settings.

Application cases

As an example, in an application case providing for differential pressure measurement on filters in an industrial plant, two

pressure sensors measure the pressure before and after the filter. If the filter becomes clogged over time, the differential pressure increases.

In another application case, the ifm evaluation unit is used to monitor pressure measurement in a fermentation tank. In addition to the hydrostatic pressure at the bottom of the tank, the pressure of the gas above the medium, which increases as a result of fermentation, is measured. This measure is subtracted from the hydrostatic pressure to determine the level.

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



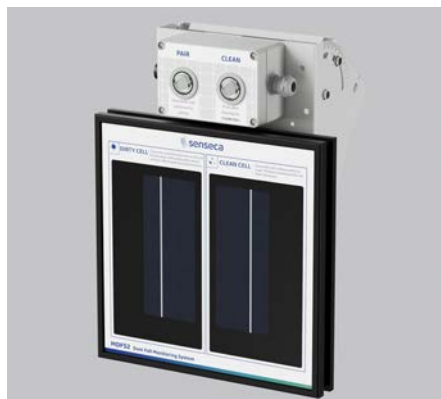
The ifm evaluation unit can be used to determine differential values in pressure, flow, level or temperature.

Keeping solar panels clean

Keeping solar panels clean is an important factor in ensuring they function effectively. Dust, dirt and other debris can block the sunlight that solar panels use to deliver power. Dirty solar panels can lead to a reduction in performance of up to 25% and accumulated dust can potentially cause hot spots that damage cells.

To assist in the quick monitoring of solar panels for dirt, Senseca has introduced a Dust Fall Monitoring System (MDFS). Used at solar photovoltaic farms and other commercial installations, it is designed to alert control centre operators at photovoltaic solar farms when the panels need to be cleaned.

“The MDFS can easily be added to the solar panel control system,” says Jan Grobler, Managing Director of Senseca South Africa. “It compares the radiation collected by two-compensated reference cells with outputs either in voltage (Model MDFS2) or Modbus protocol (Model MDFS2-S). One cell (the clean cell) must always be kept clean, and the other cell selected to be monitored by the system (the dirty cell) is cleaned at the same time as the PV panels.



The MDFS is designed to assist in keeping solar panels clean, free of dust and debris.

“The device enables quick identification of dirty solar panels so any drop in the performance of the pan-

els can be rectified in good time,” says Grobler.

The MDFS is compact, lightweight and easy to install. It can be used in two ways.

In Basic Mode, when manually comparing the clean and dirty cell readings, the operator can decide when cleaning is needed. In this mode, the control box is not required.

In Advanced Mode, with the optional control box, the system automatically calculates the soiling attenuation rate (%) of the PV panels. This value can be used directly to decide if cleaning is necessary and to provide confirmation when cleaning and other maintenance tasks have been performed.

The MDFS system provides five data channels: sun elevation, clean solar cell rad, dirty solar cell rad, MDFS status and attenuation.

Both the MDFS2 and MDFS2-S offer a measurement range of 0 to 1400 W/m², operating in temperatures from -20°C to +60°C and warning, pairing instruction via digital outputs. The MDFS2 offers a measurement error of +/-2.1% and the MDFS2-S a +/-2.2% measurement error.

The Data Acquisition System (DAS) model METEODATA-4000 collects the solar radiation gathered by the clean and dirty reference cells and additional information regarding tasks performed at the field monitored by the control box. This data is used in the calculation of attenuation due to soiling. The data collected by the DAS is recorded in a SQL Server installed in a Data Collection Centre, where it is accessible to be displayed and exported to Excel files.

“The MDFS is a welcome addition to the Senseca product range of environmental monitoring instrumentation. It will assist in ensuring PV farms and large commercial solar panel installations are always running optimally,” says Grobler.

For more information visit: www.senseca.com

Global utilities set out USD 1 trillion grid investment plans

Following COP30 in Belém, Brazil, in November last year, IRENA (the International Renewable Energy Agency) noted five key takeaways – all geared to accelerate progress towards tripling renewable output and doubling energy efficiency globally by 2030, in line with the UAE Consensus. It further highlighted the announcement by global utilities, members of the Utilities for Net Zero Alliance (UNEZA), on their increased energy transition investment commitments, by more than 25% to almost USD 150 billion annually, with a major focus on grids.



[Source: IRENA]

In Belém, global utilities announced upgraded energy transition investment plans that reflect a shift towards power grids and networks and an intention to increase capital available to support power system development in emerging economies.

IRENA noted the following as key takeaways from COP30.

Implementation took centre stage, but ambition gaps persist

At COP30, implementation was front and centre, with a strong focus on how to advance existing commitments. Parties reaffirmed the central role of Nationally Determined Contributions (NDCs) in guiding the transition.

The trends in energy sector commitments in NDC 3.0s reflect a growing alignment with the UAE Consensus goals, which countries are increasingly integrating into national plans, emphasising renewable deployment and low-carbon technologies.

Grids and flexibility were recognised as essential pillars of the transition

With the aim to translate commitments into action, COP30 witnessed a strong push of the Climate Action Agenda, inspired to foster engagement by businesses, investors, and civil society through scaling the many initiatives already in motion.

The importance of building enabling infrastructure for the energy transition gained further prominence, with discussions underscoring the need for expanded, modernised and flexible grids to accommodate and encourage higher shares of renewable power generation.

The global financing gap remains wide

Discussions at COP30 repeatedly highlighted the persistent misalignment between the pace of renewable deployment and the scale of finance available, particularly in emerging markets and developing economies where investment flows remain well below the levels required for a 1.5°C-consistent pathway.

Supply-chain resilience gained recognition

Renewable-energy supply chains, spanning manufacturing, critical minerals, components and logistics, are increasingly recognised as central to the success of the global energy transition. Persistent vulnerabilities and concentration risks need to be addressed to support a secure and sustainable scale up of renewables.

Skills and workforce development remain key enablers of a just transition

The COP30 outcome reaffirms equity, intergenerational fairness

and international cooperation as core principles and calls on countries, subnational authorities, civil society and the private sector to accelerate action.

These references are consistent with IRENA's recognition that workforce development, skills, social protection and inclusive policy frameworks are key enablers of a just and equitable energy transition that leaves no one behind.

Investing in grids, storage and new transmission corridors

Looking specifically at grids and flexibility, IRENA states that substantial additional investment will be required, with USD 791 to 912 billion needed per year to 2030, including around USD 670 billion annually to strengthen electricity grids so new cost-effective renewable capacity can be effectively used while secure and reliable system operation is maintained.

In this context, in Belém, global utilities announced upgraded annual investment plans that will see their energy transition spend rise to USD 148 billion per year, up from previously stated ambitions of USD 117 billion. The plans revealed by members of the Utilities for Net Zero Alliance (UNEZA)^[1] at COP30, will see a group of the world's leading utilities mobilise more than USD 1 trillion in energy transition investments to 2030.

The investment commitments include a significant shift towards power grids and networks, with the world's leading utilities set to spend around USD 1.24 on grids and storage for every dollar spent on renewable generation. The group will deliver tens of thousands of kilometres of new and upgraded grid infrastructure, and battery storage, as they aim to more than triple their combined renewable energy capacity by 2030 compared with 2023 levels. Members will invest USD 66 billion per year in renewables, and USD 82 billion in grids and storage.

The announcement was made at a high-level ministerial meeting on grids in Belém, where governments and multilateral

development banks (MDBs) also backed new grid financing principles endorsed by the COP30 Presidency, presented by the Green Grids Initiative^[2] and supported by UNEZA. Developed through consultation with leading banks, the principles are designed to increase the pool of capital available to grids in emerging economies, from climate and development finance institutions.

The governments, institutions and banks that have confirmed their backing for the Climate Finance Principles for Green Grids, include the African Development Bank, British International Investment, East African Development Bank, Inter-American Development Bank, Climate Bonds Initiative, Institutional Investors Group for Climate Change, Asia Investor Group on Climate Change, German Agency for International Cooperation (GIZ), Global Renewables Alliance, Grid Works, Climate High-Level Champions and the UK Government.

In a letter to heads of MDBs prior to this announcement, COP30 CEO, Ana Toni, said: “Delivering on global goals for tripling renewable energy and doubling energy efficiency by 2030 will only be possible if grids keep pace. Through the principles [the Climate Finance Principles for Green Grids] and the UNEZA partnership, we [COP30] are turning global commitments into practical delivery, linking finance, policy, and implementation to build the resilient power systems that will enable a clean-energy future.”

UNEZA was established under the UAE’s COP28 Presidency to address bottlenecks in power system transformation. The alliance is co-chaired by founding member TAQA (the Abu Dhabi national energy company) and the UK’s SSE (formerly Scottish and Southern Energy) and operates under the guidance of the International Renewable Energy Agency (IRENA) and the Climate High-Level Champions.

Jasim Husain Thabet, Group Chief Executive Officer of TAQA, founder and co-chair of UNEZA, commented: “UNEZA was established at COP28 as a platform for cooperation and decisive energy transition action from the global utilities community. This announcement reflects that we deliver against our promises and underscores the magnitude of our intent. Utilities worldwide are mobilising substantial investments that are aligned with the need for a more resilient and sustainable energy system. We are standing up to deliver the most significant infrastructure upgrade of our lifetime – a power system fit for the 21st century – and fulfilling the pledges made at COP28 and COP29.

Martin Pibworth, Chief Executive of SSE and co-chair of UNEZA, said: “The world is long on commitments and short on implementation, and we therefore welcome the Brazilian Presidency’s focus on closing this gap at COP30. This is where the global utilities community is making a real difference, turning policy into progress by delivering critical electricity infrastructure on the ground, and we are delighted to be setting out these increased investment commitments by UNEZA members today. Last year, UNEZA members built enough new grids to stretch from Belém to New Zealand, and enough new renewables capacity to meet half the peak demand of India. This is real progress in the energy transition which is so critical to the future of our planet. We now look forward to delivering this next step change in delivery.”

Francesco La Camera, IRENA Director General, added: “Grids are now the biggest roadblock to the energy transition, especially in emerging and developing countries where resilient infrastructure underpins climate action, sustainable growth, and energy security. To make COP30 in Belém a turning point, we must go beyond just building more lines. We need a systemic rethink, to create secure, affordable, and reliable power systems fit for the future. Through the Global Coalition for Energy Planning and UNEZA, IRENA supports building ecosystems where regulators, utilities, planners, and ministries work together to deliver the speed, certainty, and bankability investors need.”

At the ministerial meeting, UNEZA also announced a series of ‘delivery mechanisms’ to further accelerate investment in grid modernisation. Together, these initiatives address system bottlenecks that limit the pace of the energy transition – including supply chain challenges and capital flows.

The mechanisms include:

- Pooled procurement – aggregating demand across utilities to achieve economies of scale, lower equipment costs, and strengthen supply chains, starting with small island developing states
- Unlocking stranded gigawatts – implementing data-driven planning, flexible grid access agreements, and new regulatory frameworks to reduce congestion and connect renewable capacity currently stalled by infrastructure gaps
- Investment Trust Fund – launching consultations on a global fund to mobilise long-term capital for grid and renewable-energy infrastructure, leveraging UNEZA’s robust project pipeline to lower the cost of capital and attract institutional investors.

Earlier, UNEZA announced a new partnership with the Global Clean Power Alliance (GCPA) led by the UK government, specifically to address supply chain challenges affecting the power sector globally. GCPA confirmed UNEZA as its key supply chain mission delivery partner, bringing 12 ambitious governments together with 70 of the world’s leading utilities and power sector companies, to build more resilient power sector supply chains.

References

[1] UNEZA – Utilities for Net Zero Alliance: <https://www.utilitiesfornetzero.org/>

[2] The Climate Finance for Green Grids Principles: <https://greengridsinitiative.net/climate-finance-principles/>

For more information visit: www.irena.org/



The need for investment in power transmission grids and flexibility was recognised as a priority at the 2025 Climate Change Conference, COP30.

A new level of reliability in MV switchgear



Testing and commissioning a UniGear Digital switchgear installation.

ABB's UniGear Digital switchgear offers a new level of reliability in medium-voltage switchgear, combining ABB's globally trusted UniGear platform with digital sensing, advanced protection relays and full IEC compliance. With real-time monitoring, improved accuracy, and built-in self-supervision, UniGear Digital helps utilities and industry reduce outages, enhance safety and meet international performance standards.

Electricity + Control put some questions to Jan van Zyl, Product Line Manager Primary Switchgear at ABB Electrification Distribution Solutions, ABB South Africa, to learn more about the digital switchgear and the advantages it offers.

Van Zyl explains that the solution consists of two layers. First, advanced sensor technology is built directly into the switchgear, replacing conventional instrument transformers. Second, a data and analytics layer captures information from the switchgear and makes it available via on-site servers or secure cloud platforms.

The digital monitoring and control system includes both hardware and software. The sensors, communication devices, and data infrastructure work together with analytics software and dashboards to provide full visibility of asset performance and condition. Dashboards are built in and views are customisable – customers can adapt the interface and data outputs to suit their operational and reporting requirements.

Van Zyl says the system can be supplied as part of a new installation or retrofitted to existing equipment, dependent on certain technical requirements. For example, digital current and voltage sensors can be installed on existing switchgear and, although some technical considerations need to be addressed to ensure reliable operation, full replacement is not always required.

The platform is designed for easy integration into existing power management networks, but it can also operate as a standalone system if required.

Local installations

ABB has already established several local installations, in mining, industry, commercial buildings, and other sectors. "We cannot disclose specific customer names, but the technology has been well received," van Zyl says. He points to the key benefits for customers:

- * Improved safety
- * Flexible system design allowing for future load expansion
- * Smaller footprint and reduced substation size
- * Reduced copper wiring
- * Shorter project lead times
- * Lower carbon footprint
- * Better asset visibility and maintenance planning
- * Optimised production and plant uptime.

He adds that in the mining sector, UniGear Digital switchgear with condition monitoring is now being adopted at scale. It is also in use in petrochemical plants where safety and reliability are critical – and in critical infrastructure environments where uptime and asset visibility are essential.

Interestingly, mining has become one of the leading adopters of the technology. In the past, van Zyl says, petrochemicals companies were the early movers, but mining companies now want real-time visibility into asset health, performance, and maintenance requirements so they can optimise production and investment decisions.

The importance of condition monitoring

Customers want to understand the real condition of their assets before spending maintenance budget. Instead of replacing equipment blindly, with digital insights they can see exactly where possible unsafe conditions are, what assets need attention, and when intervention is actually required. This allows them to ensure continuous safe operation, optimise production, reduce unnecessary maintenance costs, and improve plant uptime and efficiency.

Van Zyl notes that some customers prefer to analyse the data themselves and others choose a service agreement with ABB, where ABB analyses the data, provides reports, and recommends actions.

He also says the system can be simple or very sophisticated, depending on the customer's needs.

Designed for flexibility

The UniGear Digital solution is designed to be flexible. Customers may not know their future load requirements at the time of installation. With the built-in sensor technology, the system can accommodate growth without requiring hardware changes.

This is especially valuable in renewable energy and infrastructure projects, for example, where load profiles often change over time.

Key success factors

In closing van Zyl highlights the key factors that support UniGear's success: the quality and robustness of the equipment and ABB's technology leadership.

ABB invests substantially in R&D, in the advance of smart solutions like sensor technology and condition monitoring, and many other technologies. He emphasises that as a company, ABB controls the quality of its products and continues to develop new capabilities. "Reliability is critical, and we do not release technology that is not proven," he says.

For more information visit: www.abb.com/africa

SA-designed mobile substation for an Australian mine



Partial discharge testing is conducted to verify the integrity of the insulation system and confirm the dry-type transformers' compliance with performance and safety standards.

South Africa-based Trafo Power Solutions has recently supplied a turnkey mobile transformer solution to an Australian mining customer. Managing Director, David Claassen, says this success is underpinned by Trafo Power Solutions' depth of experience across industries, combined with its in-house design expertise and a responsive approach to business, which is opening doors for it to grow its export markets.

Claassen says the company designed and supplied a robust skid-mounted transformer solution for the opencast mine in Queensland. The turnkey substation project allows the customer to step up its generated power supply from 400 V to 6.6 kV, with the mobile substation able to move with the customer's generator set around the mine site.

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

He adds that it was important to take into account the high vibration levels presented by such mobility when specifying the components to be included in the design, with rigid mounting for strength and the use of anti-vibration equipment.

Meeting the region's specific standards was also an important aspect of the contract. "The design needed to be within the requirements of Australia's national standards and specifications. We have extensive experience with this standards framework from our work there with other customers," he says. "Further, the customer wanted certain equipment that is common in the Australian market specified, as this would be an important consideration in ensuring adequate technical after-sales support."

This demonstrates the flexibility in Trafo Power Solutions' design process, Claassen highlights. It can accommodate

and meet any national standards – and incorporate customer preferences for certain locally sourced equipment. This was especially relevant in the low voltage aspects of the design, such as protection relays and monitoring systems.

"We are not rigid in the options we consider and can easily adapt to customers' choices that best suit their preferences and local market availability," he says.

Claassen adds that inspections and witness testing remain a core priority in fulfilling export orders, in spite of the customer's physical distance from the country of design and manufacture. He says the Covid-19 pandemic encouraged the development of various communication technologies which the company now uses to ensure the customer's involvement in the technical aspects of the contract.

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

The contract indicates the company's growing success in the international market, he says, as well as in its journey from being a transformer supplier to becoming a turnkey electrical power solutions provider. Having initially carved a niche for itself in dry-type transformer applications in Africa, Trafo Power Solutions is evolving rapidly on the strength of its design and engineering capability and its in-depth technical understanding of various aspects of electrical projects.

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











Single, Trefoil Quad Cable Cleats

- Designed to restrain single, trefoil or quad cables onto ladder tray or strut systems.
- Corrosion resistant non-magnetic 316 Stainless Steel.
- UV Resistant LSOH Polymeric Liners.
- Wide range 13mm to 128mm.
- Accessible clamping bolt allows easy tightening with a single tool.
- Open hinge system allows easy positioning of cables.
- Resistance to mechanical forces up to 180 kA.
- Tested and Certified to IEC 61914.



sales@ccgcablegland.co.za
info@ccgcablegland.co.za
 011 3942020



www.ccgblegland.co.za

Reliable MV switchgear – essential to critical infrastructure

Many sectors across South Africa and the broader Southern African region depend on mission-critical facilities to deliver uninterrupted services. Hospitals, data centres, and large industrial operations cannot afford downtime, and their performance relies on stable and resilient medium voltage (MV) electrical systems. Ensuring these facilities operate smoothly, without disruption, requires equipment that can support changing energy demands, tolerate grid instability, and offer strong protection and monitoring capabilities.

Meeting the demands of mission-critical environments

A mission-critical facility is defined by its need for maximum uptime and minimal room for error. Rhett Kelly, Design and Development Manager at ACTOM MV Switchgear, explains the role of MV switchgear in the electrical network: “It provides the switching capability needed for operational flexibility and protects upstream equipment by interrupting downstream faults and isolating them from the healthy network. Monitoring and protection systems ensure operators have full real-time visibility of network conditions both on site and remotely via SCADA (supervisory control and data acquisition) systems.”

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

Engineering reliability through robust design

Reliability in MV systems is achieved through the technology used and its durability. It is important for switchgear to employ modern maintenance-free interruption technologies and durable operating mechanisms that have been tested by internationally recognised facilities for extended electrical and mechanical endurance, that is, they should be classified as E2 and M2, respectively, in accordance with IEC 62271-100. This testing confirms that resilient electrical and mechanical performance can be expected over long periods, reducing maintenance requirements and supporting continuous operation.

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

Service support during outages

Beyond the physical equipment, long-term support plays an instrumental role in maintaining supply continuity. Avrielle

Cape, After sales Manager at ACTOM MV Switchgear, highlights the importance of rapid response capability.

“Effective outage management requires established rapid-response protocols, qualified technical personnel, and local availability of critical spares, to ensure minimal service interruption. Network operators and switchgear service providers typically maintain 24-hour support capabilities and implement structured maintenance schedules and/or condition-based maintenance to identify and address potential failure points before they escalate.

Services Manager, Marius Lombard says, “It is important to work with a company that operates a dedicated services division with regional branches. Providing customers with real 24/7 technical support and access to specialists in the maintenance, inspection, and lifecycle management of MV switchgear installations is essential. Proactive and condition-based maintenance strategies enable early identification of wear, degradation, and operational risks before they turn towards costly failures. By combining field expertise, structured maintenance programmes, and access to OEM-level technical resources, a services division plays a critical role in safeguarding network reliability and extending the asset life of customer s’ installations.”

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

Using technology to enhance resilience

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

The future of energy

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

Reliable MV infrastructure underpins the performance of South Africa’s most essential facilities. As energy systems evolve and digitalisation accelerates, investment in durable, well-supported switchgear remains fundamental.

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



ACTOM offers a range of switchgear solutions with various configurations, insulation technologies, and busbar options, all designed to meet the needs of high-reliability environments.

Industrial substations – faster and smarter

Consider a familiar scenario. A multi-million-rand mine modernisation project was on schedule: haul roads graded, crushers installed, and processing plant foundations poured. But the substation construction hit a bottleneck. Coordination gaps, procurement delays, and safety issues caused setbacks. The weather didn't help either. What was meant to happen last week became next month's problem. Equipment remained unpowered, commissioning schedules slipped, and temporary measures put a strain on budgets.

At mines, process plants, and manufacturing facilities, substations form part of core infrastructure, managing the power supply to critical equipment such as the motors driving conveyors, pumps, and processing machinery.

During construction, substations often emerge as late-stage bottlenecks that stall otherwise well-managed projects. When diverse teams converge – from design houses and consulting engineers to equipment vendors and construction crews – risk of confusion and delay rises sharply. Misaligned technical standards, fragmented communication, and procurement holdups ripple through to testing and commissioning, amplifying risk and operational strain.

Gerhardt van Rooyen, Projects Manager at WEG Africa, notes that these problems usually escalate during the construction and commissioning phases.

"Typically, on-site construction begins with a brick-and-mortar substation building. Once completed, all the equipment is installed, followed by extensive interconnecting cabling and testing. It's at this stage that delays tend to set in. Various disciplines need access at the same time, schedules overlap, and frustrations inevitably start to build," says van Rooyen.

A streamlined approach

The WEG E-house offers a smoother alternative to this conventional approach.

E-houses are modular, prefabricated units manufactured and fully tested at WEG's South African facilities. Each E-house is designed, assembled, fitted with equipment sourced from WEG and other vendors, and tested to the client's and International Electrotechnical Commission (IEC) benchmarks. Once completed, the E-house is shipped to the site for rapid installation and commissioning, significantly shortening project timelines.

WEG has helped numerous projects avoid the typical bottlenecks by supplying modular, factory-built substations. In one recent project, the WEG E-house team reduced substation

construction, deployment, and commissioning to under a year; not just for one substation but seven, including a central control room powering a complete gold concentrator plant.

A startup mindset

E-house innovation helped create the momentum, but it's what WEG describes as its entrepreneurial mindset towards solving clients' challenges that makes the difference.

"Multiple contractors all trying to work in the same space can create complete chaos. E-houses relieve the customer of that pressure.

They provide a one-stop integrated solution. We take on all the risks as a single contractor," says Tyrone Willemse, Senior Manager at WEG Africa.

He adds that skilled design, manufacturing, procurement, and logistics teams are important, but the real differentiator is in the team's can-do approach: "It's important to have an entrepreneurial spirit when delivering new concepts like fully integrated E-houses. We treat ourselves like a startup. We take nothing for granted. We're always learning, and there's no job too big or too small for any of us."

Professionalism, risk awareness, and adaptability are key to a successful substation project, beginning long before construction. Through its collaboration with site owners, consulting engineers, and design houses WEG defines specifications, standards, and procurement requirements early in the project lifecycle. When the substation phase begins, contractors step into the client's world, taking full ownership and responsibility.

Engineering reliability

E-houses represent a progressive step forward from traditional substation models, significantly reducing delays in construction, deployment, and testing. Despite inevitable challenges, the team behind WEG's E-houses remains committed to delivering substations to specification, efficiently, guided by a startup spirit of ownership and innovation.

"You're only as good as your last job – we never forget that," concludes Willemse.

For more information visit: www.weg.net



As modular, prefabricated units, each E-house is designed, assembled, equipped and fully tested to clients' and IEC benchmarks – enabling fast installation and commissioning on site.

**HIGH VOLTAGE
CABLES UP TO 132kV
SANS/IEC 60840 & NRS 077**

ABERDARE
A MEMBER OF HENG TONG GROUP
ENLIGHTENING THE FUTURE

**MV XLPE
CROSS LINKED
POLYETHYLENE CABLES**




www.aberdare.co.za

Power distribution for modern infrastructure

Legrand has expanded its critical power portfolio with integrated solutions designed for reliable, efficient, safe and flexible power distribution in diverse applications, including commercial buildings, healthcare facilities, data centres and industrial sites.

As demand for dependable electrical infrastructure increases, Legrand focuses on delivering stable power distribution, addressing space constraints, operational continuity and energy efficiency.

The company's critical power solutions combine modular distribution design with high-efficiency upstream equipment, enabling designers and operators to adapt systems efficiently as operational requirements change.

Track busways

A central system in critical power is the latest generation Legrand Data Centre Track Busway technology, which addresses the operational pressures facing today's high-density, AI-intensive computing environments.

The Data Centre Track Busway system – engineered for reliability, safety and long-term efficiency – comprises modular, monitored power distribution infrastructure that supports scalable, fault-resilient data centre operations.

Stand-out features of the Legrand Track Busway include advanced safety features, rapid tool-free installation, integrated intelligent monitoring and cost-efficiency.

The system is designed to replace traditional cabling with a compact, expandable power rail that enables rapid configuration changes and branch expansion without interrupting supply. The flat profile design and compact installation clearances optimise overhead space, while supporting A and B busway configurations.

Legrand's Track Busway, with current ratings from 160 A to 800 A, incorporates hot-swappable power meters at end feeds and tap-off boxes, allowing real-time monitoring of voltage, current, power, energy and joint temperatures. The meters support standard communication protocols, enabling integration into data centre infrastructure management platforms to provide operators with detailed visibility of rack-level power consumption.

Eco-friendly transformers

Legrand's Green T.HE cast resin transformers are designed to reduce energy losses, minimise environmental impact, and optimise performance under demanding conditions. The transformers comply with stringent eco-design requirements and are engineered to achieve reduced no-load losses, so reducing energy consumption and associated emissions. The dry-type cast resin construction eliminates oil, reduces fire risk, and enables installation in sensitive environments.

Legrand Green T.HE transformers are available across a broad power range and various insulation classes, with configurations suitable for medium-voltage distribution up to 36 kV. The design incorporates reinforced insulation, high-performance magnetic cores and low partial discharge levels to extend service life and improve operational reliability. Environmental, climatic and fire behaviour classifications allow for the transformers to operate safely in high humidity, low temperature and increased fire-risk conditions.

Distribution boards

Distribution boards form the basis of electrical installation in every facility, ensuring optimum efficiency and safety. Legrand's modular power distribution enclosures – designed to the highest quality, safety and environmental standards – provide dependable operation, flexibility and ease of installation.

Legrand XL3 4000 and XL3 6300 enclosures are available in various dimensions, providing flexibility for precise configuration. The modular enclosures can be joined side-by-side or back-to-back and each panel can be replaced by a door if required for installation.

This optimised distribution system offers easy assembly, eliminates the need to create special connections upstream and enables time savings in installation as appliances can simply be connected on pre-assembled units.

Trunking supports, wire guide rings and cable tie bars facilitate wiring and, for enhanced convenience, all side walls and top and bottom plates can be assembled after wiring.

Support services

Legrand specialists advise on critical power projects in diverse industries throughout Southern Africa, offering comprehensive solutions, from planning to installation. The company is committed to working closely with customers to ensure sustainability, energy efficiency and optimum performance of equipment for every installation.

The South African business has entered into service agreements with strategic partners, enabling the team to offer direct installation and after-sales services. Legrand specialists work closely with partners to provide in-house designs, specifications and critical power solutions, ensuring suitable products are selected for every installation.

The Legrand team of highly skilled engineers and technicians, in Cape Town, Johannesburg and Durban, also offers services in Botswana, Namibia and Zambia. A dependable after-sales service, with a dedicated service support line, includes Tier 3 support to datacentres.

Legrand's environmentally responsible approach to constantly changing project requirements is enhanced through the company's support services and solutions plan. This initiative enhances ongoing technological developments of the company's product portfolio, in terms of energy efficiency, quality power supply, safety and aesthetics.

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



Legrand's Green T.HE cast resin transformers are designed to reduce energy losses, minimise environmental impact, and optimise performance.

South Africa's electricity sector – what to expect in 2026

Mzukisi Kota, Mlungisi Mahlangu, Jason van der Poel (Partners), Kiera Bracher, Sabeeha Loonat and Junaid Nyker (Associates) at Webber Wentzel



The authors, from left: Mzukisi Kota, Mlungisi Mahlangu, Jason van der Poel (Partners).

2025 presented key trends signalling a fundamental reset in South Africa's electricity sector, and 2026 is the year in which many of these reforms are expected to begin taking practical effect. With market rules nearing finalisation, infrastructure procurement advancing and new technologies gaining prominence, 2026 will test how well the sector can move from preparation to implementation.

ERAA: moving towards a competitive electricity market

The Electricity Regulation Amendment Act 38 of 2024 (ERAA) came into force on 1 January 2025, marking the formal start of South Africa's shift from a vertically integrated monopoly to a competitive, multi-market electricity sector. The act establishes the Transmission System Operator (TSO) which will have responsibility for system operation, market operation and transmission operation, and be the central purchasing authority. This represents the most significant structural reform in the sector since Eskom's inception a hundred years ago. The ERAA expands NERSA's regulatory mandate, introduces broader ministerial discretion on new capacity determinations, and opens a pathway for willing-buyer-willing-seller arrangements through competitive trading. However, some ambiguities around tariff approvals and the definition of 'direct supply agreements' create early interpretive challenges.

2025 served as the structural turning point enabling South Africa's transition towards a competitive electricity market.

2025 also revealed critical institutional tensions around municipal roles, tariff oversight, and ministerial discretion. SALGA's concerns over municipal reticulation led to the delay on certain ERAA definitions, and potential litigation remains on the horizon.

Market Code to unlock competitive electricity trading

The latest draft of the Market Code, published in July 2025, contains draft operational rules for the South African Wholesale Electricity Market (SAWEM) to be administered by the Market Operator within the TSO. It defines the roles of Parties, Balance Responsible Parties, and Market Participants, and establishes the framework for Day-Ahead, Intraday, Reserve, and Balancing markets. The five-year transition timeline targets a market start

date of April 2026, with full operation by 2031. Final approval of the Market Code is expected early in 2026, enabling SAWEM's planned April 2026 launch and allowing participants to begin formal market registration and onboarding. There is a possibility that the launch may be delayed, and private sector participants are likely only to be admitted as functional market participants in years to come.

Transmission regulations and new infrastructure

A major breakthrough in 2025 was the publication of the Transmission Regulations on 31 October, providing long-awaited clarity on how new transmission capacity will be procured under ministerial determinations. The regulations formalise a build-operate-transfer model, introduce value-for-money transmission service agreements and provide a clear methodology for how private transmission infrastructure developers will recover their costs. This regulatory step is critical to breaking state monopoly on grid infrastructure and enabling private sector investment in grid expansion – a necessity given the 14 500 kilometres of new high-voltage lines identified as needed in the next ten years, in the Transmission Development Plan, and the 1 164 kilometres of new lines already determined for procurement through the first phase of the Independent Transmission Infrastructure Procurement Programme, for which an RFP is expected in the third quarter of 2026.

The Gas Independent Power Producer Procurement Programme

After many delays and what seemed to be a false start, the Gas IPPPP appears to have been resuscitated and is set to be one of the more significant events in the energy market in 2026.

The Gas IPPPP was initially launched by government in December 2023 and has been largely stalled over the past two years. The Department of Electricity and Energy has made key revisions to the Request for Proposals and relaunched the procurement process in October 2025, with a submission deadline of 29 May 2026. The revisions address some of the key issues identified by the market as hurdles to the likely bankability of projects and significantly increased the likelihood of a viable anchor for the entry of imported LNG into the South African market. Interestingly, while it is widely accepted that this procurement is a key enabler for the import of gas and the construction of the required infrastructure, the participation of domestic gas resources is not excluded, and this could enable some commercialisation of domestic gas opportunities over time.

Continued on page 30



And from left: Kiera Bracher, Sabeeha Loonat and Junaid Nyker (Associates) at Webber Wentzel.

Continued from page 29

Eskom challenges NERSA's new wave of trading licences

The private electricity trading landscape shifted significantly in 2025 as the National Energy Regulator of South Africa (NERSA) granted a new wave of trading and import/export licences, signalling rapid liberalisation in the sector. Eskom responded by launching a judicial review to set aside five of these licences, arguing that NERSA was reshaping national energy policy without clear trading rules or adequate consultation. Although Eskom had raised no objections to similar licences issued over the past decade, it insisted that the absence of defined rules created regulatory uncertainty and risked 'upending' the existing distribution framework.

Following ministerial pressure and NERSA's decision to accelerate the publication of trading rules, Eskom has stayed its court action while participating in the rule-making process. The dispute has highlighted deep tensions around market reform, Eskom's future role, and fears of customer 'cherry-picking' by electricity traders. The draft Trading Rules published by NERSA on 27 October 2025 for comment were formally withdrawn on 29 October 2025 and they remain withdrawn pending further consultation.

Battery energy storage systems

Within the transformed electricity regulatory landscape introduced by the ERAA coming into force, battery energy storage systems (BESS) have emerged as essential strategic assets for market participants, offering critical risk mitigation and diversified revenue generation capabilities. The Market Code will impose significant financial penalties on Balance Responsible Parties for deviations between forecasted and actual energy production and consumption. BESS can smooth the output of intermittent renewable energy generation, ensure compliance, and effectively convert a potential penalty liability into a predictable operational cost. BESS also enables power producers to sell dispatchable renewable energy, transforming intermittent generation into baseload supply, and to deliver energy according to offtaker demand profiles rather than renewable resource availability patterns, commanding premium pricing in power purchase agreements.

The government is on its third bid window in its Battery Energy Storage IPP Procurement Programme. As South Africa progresses towards May 2031, market participants need to recognise

BESS not as a future technology but as a present necessity for competitive success in the transformed electricity sector.

Prospective projects in offshore wind

In 2025, South Africa's offshore wind sector saw foundational work being done and preparatory initiatives, even as formal regulatory guidance remains pending. The DEE has indicated its intention to publish an offshore wind guideline to cover key areas, but the release has been delayed.

Through 2026, government's focus is expected to shift from preparatory activities to the formalisation and implementation of offshore wind projects. Key developments may include the expected launch of the DEE's offshore wind guideline, strategic investor interest, and pioneering project announcements. South Africa's offshore wind resources present significant growth potential.

M&A and strategic partnerships

As South Africa's electricity market shifts into competitive mode, 2026 may be a year of deal-making and portfolio realignment across the energy value chain. We expect to see increased activity in mergers, acquisitions and strategic joint ventures, as international investors and regional platforms look for scalable entry points. At the same time, established players are reassessing their portfolios, rebalancing asset mix, reallocating capital, and recalibrating exposure to new market risks. The centre of gravity is likely to be in cross border transactions, the consolidation of operating renewable portfolios, and restructuring to accommodate competitive trading and market price exposure. Sophisticated empowerment and governance structures will remain integral to deal execution, reflecting South Africa's transformation agenda. For market participants, success will depend on navigating multi-jurisdictional complexity, aligning regulatory risk with transaction structures, and deploying capital efficiently in a rapidly liberalising electricity sector.

For more information visit: www.webberwentzel.com

Africa's energy paradox: cheap technology, costly finance

Dr Rahmat Poudineh, Head of the Electricity Research Programme, Oxford Institute for Energy Studies (OIES) is among the distinguished speakers at the Africa Energy Indaba – happening 3 to 5 March 2026 in Cape Town. In this article, Dr Poudineh outlines what causes the high cost of capital and emphasises that this is what is hobbling Africa's transition to sustainable energy.

Two identical solar plants: one in Spain, one in Kenya. Same panels, similar sun, similar engineering. Yet one produces cheap electricity and the other struggles to deliver affordable power.

The difference is not in technology, labour, or resource endowment. It is in the cost of capital.

Across sub-Saharan Africa (SSA), electrification and power-sector decarbonisation are often framed as technology or resource challenges. In reality, they are finance-architecture challenges. Costs for solar and wind energy have fallen dramatically worldwide, but the cost of money required to build, connect, and operate electricity systems in SSA remains persistently high. This financing premium affects not only renewable generation projects, but also the grids, distribution networks, and utilities that determine whether electricity becomes affordable, reliable, and widely accessible.

This distinction matters. In SSA, the cost of capital problem is not primarily a renewables problem – it is an electricity system problem.

A common misunderstanding: renewables are capital-intensive

A widely accepted narrative is that renewables are especially sensitive to financing costs because they are capital-intensive and fuel-free. This is true in principle. However, focusing only on generation economics misses the central issue in SSA.

The International Energy Agency (IEA) has repeatedly highlighted that Africa receives a disproportionately small share of global energy investment^[1] relative to its population and needs, and that financing costs are a critical barrier to scaling clean energy^[2]. But the obstacle is not only the financing of solar or wind farms – it is the financing of entire electricity systems that struggle with weak balance sheets, currency risk, and under-investment in networks.

As a result, even where renewable generation is technically and economically attractive, electricity remains expensive and unreliable for end users.

Cheap renewable technology does not mean cheap electricity

Generation costs (LCOE/ levelised cost of energy) constitute only one component of delivered electricity prices. In many SSA countries, the dominant cost drivers are high transmission and distribution losses, weak revenue collection, under-investment in grid infrastructure, currency risk embedded in power purchase agreements, and sovereign and offtaker risk priced into tariffs.

Analysis by the World Bank shows that many African utilities do not recover their operating and capital costs^[3], with significant losses stemming from poor collection rates and technical inefficiencies. A subsequent study confirms that both revenue-side problems and cost-side inefficiencies drive poor utility financial performance^[4] across the region.

These weaknesses translate directly into higher perceived risk for investors. Developers price this risk into required returns.



Dr Rahmat Poudineh, Oxford Institute for Energy Studies.

Lenders shorten tenors or increase margins. The result: even low-cost renewable generation does not translate into low-cost electricity for consumers.

This is the core paradox: it's why SSA can have cheap renewable energy sources and expensive electricity at the same time.

An electrification problem

Electrification is fundamentally a distribution and network investment challenge. It requires expanding and reinforcing grids, financing transformers, substations, and meters, funding connections for new customers, and maintaining reliable supply. This requires long-tenor low-cost capital. Yet the institutions responsible for these investments – distribution companies and utilities – are often financially fragile.

High financing costs therefore constrain electrification directly. Utilities cannot borrow cheaply to expand networks. Governments face fiscal limits in providing guarantees. Mini-grids and off-grid systems can help but often require high tariffs unless concessional finance reduces their cost of capital.

This dynamic also creates investment bias. Developers prefer commercial and industrial customers (mines, telecom towers, data centres) with hard-currency revenues and strong payment discipline. Capital flows towards self-supply solutions and away from mass electrification.

And a decarbonisation problem

Many SSA systems rely on diesel and heavy fuel oil generation. In principle, these could be displaced by solar, wind, storage, and grid upgrades at lower system cost and with lower emissions.

In practice, these projects require long-term finance backed by credible offtakers. When utilities are weak and currency risk is high, investors demand high returns or avoid projects altogether. Governments must then provide guarantees that strain already limited fiscal space.

Hence, the region remains locked into expensive, carbon-intensive

Continued on page 32



Many African countries face high financing costs as a result of high risk considerations, hindering the expansion of renewable energy and electrification.

Continued from page 31

thermal generation, not because renewables are costly, but because financing clean alternatives is risky.

Inside the SSA risk premium

Financing costs for renewable power projects vary widely across countries. IRENA documents substantial differences in weighted average cost of capital across markets, with many African countries facing significantly higher financing costs than OECD markets^[5].

Several factors drive this premium:

- * offtaker risk (utilities with poor cost recovery and weak balance sheets)
- * currency risk (local-currency revenues versus hard-currency costs)
- * sovereign risk (debt stress limiting government guarantees)
- * shallow capital markets (limited long-tenor local-currency finance)
- * and policy and contract risk (concerns about enforcement and predictability).

The Climate Policy Initiative highlights currency mismatch as a particularly important constraint, arguing that FX risk management is central to unlocking private capital for climate investment in EMDEs^[6].

Three broad schools of thought have emerged in the policy debate:

Perspective	Prescription	Limitation
Fix utilities first	Improve governance, reduce losses, reform tariffs	Takes years; investment delayed
De-risk with guarantees and MDB* tools	Use public balance sheets to cut WACC*** now	Fiscal space and contingent liabilities
Solve FX** risk	Local-currency finance, hedging facilities	Requires scale and global support

- * Multilateral development banks
- ** Foreign exchange risk
- *** Weighted average cost of capital

The IEA argues that reducing cost of capital in EMDEs could unlock large investment gains and significantly lower the cost of clean energy deployment^[7]. But in SSA, the effectiveness of these tools depends critically on addressing utility fundamentals and currency risk alongside project-level de-risking.

Key insight for policymakers and industry

Sub-Saharan Africa does not primarily face a renewables financing problem. It faces an electricity system financing problem. Until the cost of capital for grids, utilities, and local-currency infrastructure declines, electrification and decarbonisation will remain slower and more expensive than they should be – regardless of how cheap solar panels or wind turbines become.

As collective energy sector reforms, tariff reform, utility governance, FX risk solutions, and credible contracting frameworks create climate policy and electrification policy at the same time.

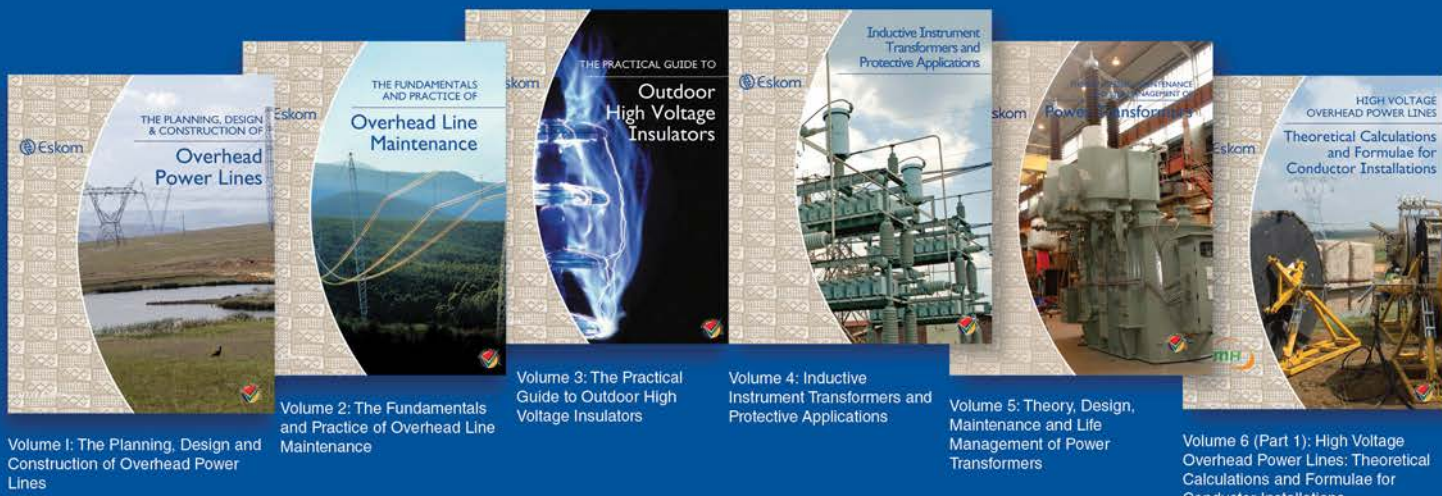
The bridge between electrification and decarbonisation in SSA is the cost of capital.

References:

[1] https://www.iea.org/reports/financing-clean-energy-in-africa?utm_
 [2] https://www.iea.org/reports/reducing-the-cost-of-capital?utm_
 [3] <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099092923144024459>
 [4] <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099912211102516982>
 [5] <https://www.irena.org/Publications/2023/May/The-cost-of-financing-for-renewable-power>
 [6] https://www.climatepolicyinitiative.org/publication/managing-currency-risk-to-catalyze-climate-finance/?utm_
 [7] https://www.iea.org/reports/reducing-the-cost-of-capital?utm_

For more information visit www.africaenergyindaba.com.

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.



Volume 1: The Planning, Design and Construction of Overhead Power Lines

Volume 2: The Fundamentals and Practice of Overhead Line Maintenance

Volume 3: The Practical Guide to Outdoor High Voltage Insulators

Volume 4: Inductive Instrument Transformers and Protective Applications

Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers

Volume 6 (Part 1): High Voltage Overhead Power Lines: Theoretical Calculations and Formulae for Conductor Installations



Volume 6 (Part 2): High Voltage Overhead Power Lines: Theoretical Calculations and Formulae for Transmission Line Towers

Volume 7: Corona in Transmission Systems: Theory, Design and Performance

Volume 8: Power Quality in Electrical Power Systems: A Holistic Approach

Volume 9 (Part 1): HVDC Power Transmission: Basic Principles, Planning and Converter Technology

Volume 9 (Part 2): HVDC Power Transmission: Lines Book

Volume 10: Thermodynamics for Students and Practising Engineers



Volume 11: Thermal Sciences for Engineers

Volume 12: Basic Engineering Toolbox

Volume 13: Applied System Dynamics with South African Case Studies

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



Volume 1: Mentorship and Coaching

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



Volume 1: Procurement Management Key Concepts and Practices

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

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



Continuous online vibration monitoring on submersible/ Immersible pumps in wastewater pumping stations.

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

With ifm's remote monitoring solution you can visualize the condition of your submersible pumps and diagnose issues before they become serious problems. It combines ifm's VSE proven diagnostic technology which uses task specific submersible accelerometers. Data from this system is directly coupled to ifm's analytic software to identify pumping issues which in turn provide current data and warnings via email or text.