

FEATURES:

Control systems + automation

Renewable energy + industrial sustainability

Measurement + instrumentation

Transformers, substations + the grid

03/2025

# THE REVOLUTION IN RADIOMETRY



LoopSeries  
LB 430

**MECOSA** 

Tel. +27 11 257-6100 [www.mecosa.co.za](http://www.mecosa.co.za)

Official Berthold Partner

Berthold is the worldwide leading supplier  
of radiometric measurement systems.

[www.berthold.com](http://www.berthold.com)

 **BERTHOLD**

ELECTRICITY + CONTROL

CROWN  
PUBLICATIONS

# Simplifying your process

As market leaders in the automation and packaging industry, SEW-EURODRIVE offers you expert advice and access to qualified mechatronic and electrical engineers to partner with on your unique projects and requirements.

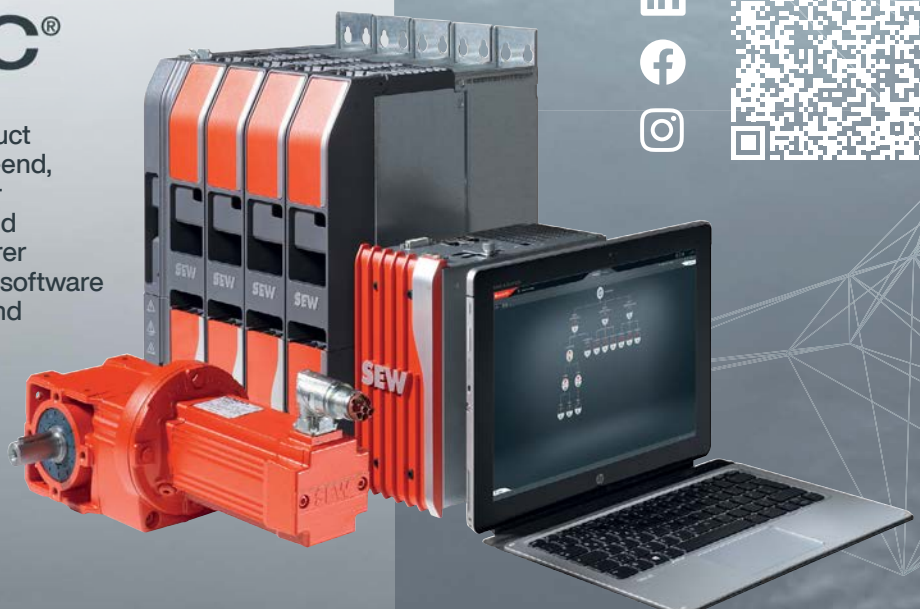


VISIT US AT STAND D36  
FROM 11 - 14 MARCH 2025



The latest in our electronics product offerings, MOVI-C® is the end-to-end, modular and scalable solution for automation tasks. This end-to-end solution from a single manufacturer can cover all of your needs - from software for planning, startup, operation and diagnostics software, electronic control and monitoring devices.

Step into the next generation.







The LoopSeries LB 430 Smart Detector from Berthold Technologies – available locally through Mecosa – sets new standards for accuracy, efficiency, and ease of use in industrial measurement.

(Read more on page 3.)

**Editor:** Leigh Darroll

**Design & Layout:** Katlego Montsho

**Advertising Manager:**

Paul Engelbrecht

**Circulation:** Karen Smith

**Editorial Technical Director:** Ian Jandrell

**Publisher:** Wilhelm du Plessis

**Managing Director:** Karen Grant



Audited circulation Quarter 4 (Oct-Dec) 2024  
Total print and e-editions 9 678

**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@crown.co.za; admin@crown.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, SAEe, CESA or the Copper Development Association Africa

## Managing vulnerabilities in distribution networks

As we move into 2025 there is little doubt that load shedding has been managed well – but of course we appreciate how very constrained the network is. Essentially, the spinning reserves are limited, and Eskom is doing all it can to provide continuous power.

This is commendable, but strain on the system must be managed, and sometimes the enthusiasm to keep the lights on may well strain the plant a little too much. Clearly, load shedding is not yet a thing of the past, but we do need to acknowledge the remarkable effort being put in by so many people to ensure a return to normality. Nonetheless, we must always be prepared.

One aspect that we tend to overlook relates to the distribution networks. Generation has been one challenge, and we are aware of the need to upgrade our transmission networks. Plans are being developed to do just that.

But we need to consider distribution similarly. Distribution networks, like our generation and transmission systems, require maintenance – and are aging.

Many distribution networks are operated within the municipalities – and to some extent those long periods of load shedding may have reduced the stress and strain on them – but they are largely up and running at full capacity again.

However, there have been some significant system failures in distribution networks that have left parts of the country in darkness for days. This is not an issue that can be resolved overnight.

It is distribution networks that bear the brunt of overloading, in certain cases due to

theft of electricity. And we are aware of some of the significant debts owed by municipalities to Eskom (more than R100 billion was the last reported sum outstanding). All these issues place enormous pressure on the distribution networks, and one is left wondering whether all the necessary maintenance, testing and checking is up to date, or attended to at all, in some areas.

In addition, distribution networks – comprising the cables, transformers, substations, protection equipment and the like – are vulnerable to vandalism. In many cases theft of system components is relatively easy during periods of load shedding – and in some instances the damage is not detected (or even detectable) until the system fails on start-up.

We should keep in mind too that many of our large industries run their own distribution networks, and any of the issues raised above are equally pertinent in these environments.

Therefore, do not lose sight of the need to ensure that the networks on your plant are fully maintained, tested and operational.

It would be such a pity if, once we have reliable generation again, we find our local networks failing due to maintenance not being fully up to speed when we need these networks most.

*Ian*

Ian Jandrell

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



# CONTENTS

## FEATURES

### CONTROL SYSTEMS + AUTOMATION

- 4** Flexible, automated production of fertiliser from slurry  
*Stefan Ziegler, Beckhoff Automation*
- 6** Products + services

### RENEWABLE ENERGY + INDUSTRIAL SUSTAINABILITY

- 10** Flipping the switch: Is decarbonisation possible for Africa?  
*Paul van Zijl, Starsight Energy*
- 12** A new era for nuclear energy  
*The International Energy Agency*
- 13** NECSA on a path of stabilisation and growth  
*Leigh Darroll, Electricity + Control*
- 14** Products, services + projects

### MEASUREMENT + INSTRUMENTATION

- 19** Best practice in measuring PV circuit performance  
*Comtest, for Fluke*
- 21** Products + services

### TRANSFORMERS, SUBSTATIONS + THE GRID

- 22** Grid management systems: securing the power supply  
*Herman Mare, ACTOM*
- 24** Weatherproof power: dry-type transformers built for the outdoors  
*Trafo Power Solutions*
- 26** The digital revolution in transformer substations  
*EPlan*
- 29** Products + services



## REGULARS

- 1** Comment  
*Managing vulnerabilities in distribution networks*
- 3** Cover article  
*A new era in measurement technology*
- 30** Reskilling, upskilling + training  
*Training partnership for inclusive growth in renewable energy*  
*IIE engineering degrees fully accredited by ECSA*
- 31** Write @ the back  
*Transforming the electricity market in South Africa*

# A new era in measurement technology

Meet the LoopSeries LB 430 Smart Detector from Berthold Technologies!

Industrial measurement has reached a new level with the launch of the LoopSeries LB 430 system. This advanced device sets new standards for accuracy, efficiency, and ease of use. Designed with advanced technology, the LB 430 offers innovative features that make it a standout choice in its field.

## Breakthrough technology

One of the most remarkable aspects of the LoopSeries LB 430 is its revolutionary power solution. By integrating advanced silicon photomultipliers, this device is fully powered via the 4-20 mA current loop: eliminating the need for additional field wiring. This “Loop Powered” capability significantly reduces installation complexity and costs, making it an attractive choice for industrial applications where efficiency is paramount.

The device also comes with upgraded hardware and software, ensuring smooth operation and top-level performance with minimal effort.

## Key features

**Detector type:** The LB 430 is currently available as a point detector with a 50 x 50 mm NaI crystal for high-precision detection.

**Safety options:** Choose between standard and ATEX-certified models, available in flameproof or intrinsically safe designs.

**Customisable design:** The housing is available in aluminium or stainless steel (316L) with four cable entry options (M20 x 1.5 or ½”



*A key benefit is that the device is fully powered via the 4-20 mA current loop: no need for additional field wiring.*

NPT threading).

**Smart software:** Comes preloaded with applications for level and density measurements, plus built-in switching functions.

**Handles high temperatures:** An optional water-cooling system supports operations above 60°C, making it ideal for extreme environments.

**Future upgrades:** A detachable field display will be available in 2025 for easier access to readings.

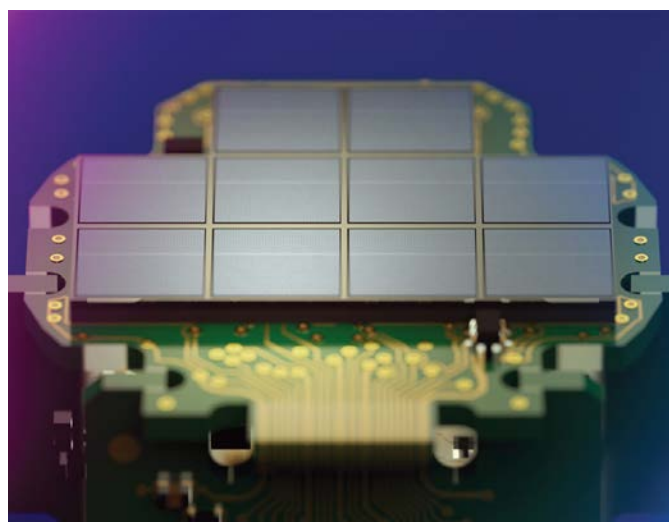
## A smart investment

The LoopSeries LB 430 is a major advance in measurement technology, offering improved accuracy, durability, and an easy installation process. With its innovative power system, strong build, and advanced software, this detector is set to raise industry standards.

## Stay ahead with the LB 430

Be part of the future of measurement technology. To learn more about the LB 430 and how it can benefit your business, contact us today or visit our website.

MECOSA (Pty) Ltd is the sole business partner for BERTHOLD TECHNOLOGIES in Southern Africa and has cooperated with Berthold for more than 40 years.



*With upgraded hardware and software, the LoopSeries LB 430 technology ensures smooth operation and top-level performance.*

**For more information contact MECOSA (Pty) Ltd.**  
**Tel: +27 (0)11 257 6100**  
**Email: [measure@mecosa.co.za](mailto:measure@mecosa.co.za)**  
**Visit: [www.mecosa.co.za](http://www.mecosa.co.za) or [www.berthold.com/en](http://www.berthold.com/en)**



# Flexible, automated production of fertiliser from slurry

Stefan Ziegler, Beckhoff Automation

*On a farm in the USA, valuable ammonia is extracted from slurry in a large fermenter and processed into ammonium sulphate. NSI Byosis has transformed this complex process into a modular system concept that can be adapted to different operating scales and organic raw materials. This modular approach requires an automation solution with flexible scalability in both hardware and software, which this Dutch company has found in PC-based control from Beckhoff.*

**B**iogas is produced by bacteria during the fermentation of organic waste, sewage sludge, and slurry. One resulting byproduct is ammonia, which is toxic to the bacteria and must be removed from the reactors. “We extract the ammonia from the slurry stream and convert it into ammonium sulphate, which can then be spread on fields as fertiliser,” explains Dylan Veelers, Project Engineer at NSI Byosis. The ByoFlex systems from NSI Byosis BV, located in the Dutch town of Raalte, are commonly used alongside biogas plants, waste and sewage treatment plants, and are also installed in industrial environments.

A large Byosis system was recently installed for an agricultural business in the USA. The dimensions reflect the size of the operation and quantity of slurry: each line of the modular system comprises a 3 x 12 m frame with three polypropylene towers. “With a capacity of up to 40 m<sup>3</sup> per hour, more than 70% of the ammonia is extracted and converted into valuable fertiliser,” says Veelers.

## TwinCAT replaces graphical engineering tool

Veelers joined Byosis in 2021. Reinoud van Bennekum, Sales Engineer at Beckhoff Netherlands, notes: “At that point, the company was looking for a new control platform to replace the previous graphical programming system.”

“The initial tests with a C6017 ultra-compact Industrial PC demonstrated that we could make significant progress in standardising automation technology with PC-based control – especially with TwinCAT as a development environment,” Veelers comments. Programming with TwinCAT is more straightforward, more intuitive, and open. As EtherCAT had already been used in previous projects, fully switching to PC-based control from Beckhoff was simply the next logical step.

Since then, Byosis has been automating the ByoFlex systems with a C6025 ultra-compact Industrial PC. The company uses its three configurable Ethernet ports to read out flow meters and pH transmitters via EtherNet/IP. “The advantage for our customers is that we support any Ethernet-based communication,” van Bennekum highlights. Byosis adds another Ethernet interface via a CU8880 USB-to-LAN adapter.

The browser-based system visualisation is implemented with TwinCAT HMI and runs on a CP2921 multi-touch control panel. This means technicians can access the systems remotely from any location as required. The system used for commissioning, diagnostics, and service can be supplemented with Teamviewer, OpenVPN, or Anydesk to suit the customer’s preferences. A PC-based platform makes all this very easy to implement, according to Veelers, who is impressed by more than just the technology, “The Beckhoff experts also provide quick and



*Whether it's 5 m<sup>3</sup> or 40 m<sup>3</sup>, Byosis automates the systems for ammonia extraction from slurry and other organic materials with PC-based control from Beckhoff.*

© Byosis



© Beckhoff

The control architecture is identical for all system sizes: a C6025 ultra-compact Industrial PC (right) controls the entire process; depending on the system size, the skids are scaled via an 8-way CU1128 EtherCAT junction (centre) and 2-port EP1122 EtherCAT junctions (hot connect) with an IP67 protection rating.

efficient support and service.”

Van Bennekum sees his role mainly in providing support and advice. “The customer retains full knowledge of the processes every step of the way. We provide the support and training our customers need to plan and program their systems effectively.” Veelers adds: “A few days of training often saves weeks in practice.”

### The system determines the topology

Byosis structures the control architecture with an 8-port CU1128 junction, in line with the modular design of the systems. Comprehensive EtherCAT diagnostics ensure a transparent network by displaying the entire hardware configuration at the push of a button. “Another great feature is hot connect,” comments Veelers. With a decentralised 2-port EP1122 EtherCAT junction, individual EtherCAT segments can be easily disconnected on site to address and resolve system faults. The other parts of the system can continue to extract ammonia, allowing the bacteria in the reactors to produce biogas without disruption.

The wide range of I/O modules from Beckhoff is used to connect the various sensors for measuring pressure, temperature, pH level, and flow: in addition to EtherCAT Terminals in the control cabinet, EtherCAT Box modules with an IP67 protection rating are used, for IO-Link communication, for example. As the process is energy-intensive, the system’s energy consumption is determined using SCT series current transformers and EL3443

power measurement terminals. This allows users to check whether the consumption matches the target.

### One industrial PC for all system sizes

By switching to PC-based control, Byosis has specified a control configuration for all system sizes and developed a single P&ID (piping and instrumentation diagram), ranging from the entry-level demo model at 5 m<sup>3</sup> to the scalable standard systems at 10, 20, or 40 m<sup>3</sup>. Van Bennekum comments: “With EtherCAT as the fastest fieldbus system and PC-based control, we can keep pace with developments at Byosis at all times.”

For more information visit: [www.beckhoff.com/process](http://www.beckhoff.com/process)



© Beckhoff

Reinoud van Bennekum of Beckhoff Netherlands (left) and Dylan Veelers of Byosis (right) pictured with the central control cabinet with a CP2921 multi-touch control panel.



© Beckhoff

The current consumption of the system is recorded with SCT2311 ring-type current transformers and used to analyse the energy consumption via an EL3443 EtherCAT power measurement terminal.



### AATF 2025 – showcasing the future of automation



*AATF 2025 presents a comprehensive platform for industrial automation and technology bringing together key players in this field.*

Registration is open for the Africa Automation Technology Fair (AATF2025), happening from 6 to 8 May 2025 at the Gallagher Convention Centre, Johannesburg.

AATF 2025 presents a comprehensive platform for industrial automation and technology, where leaders, innovators, and decision makers come together to shape the future in this field.

It offers visitors the opportunity to explore real-world solutions to the challenges facing the African market and to engage in discussions with the developers and suppliers.

Industry coverage extends from manufacturing and healthcare to agriculture, energy, and transportation.

Cutting-edge automation solutions tailored to these diverse industries are presented under one roof.

Visitors will have the chance to meet international and local exhibitors, speakers, and others attending and to open opportunities for cross-border business with industry professionals from Africa and beyond.

Top-tier exhibitors, from well-established companies to disruptive start-ups, will showcase groundbreaking technology and solutions that can transform business.

AATF will also present a programme of keynote sessions, expert-led seminars, and hands-on technical demonstrations, offering attendees valuable insights and knowledge-sharing opportunities for professionals at all levels.

There will be a series of networking events, panel discussions, and interactive workshops enabling visitors to connect with influential decision makers, industry leaders, and potential collaborators at the fair.

**For more information visit:**

**[www.africaautomationtechnologyfair.com](http://www.africaautomationtechnologyfair.com)**

### Manufacturing solutions to serve growing demand for staple foods

Bühler Southern Africa supplies manufacturing equipment, solutions and services to various industry sectors including the mining and power industries, as well as the fast-moving consumer goods (FMCG), food and feed production sectors, and manufacturers of advanced materials.

MD Marco Sutter says opportunities in strengthening local supply chains, especially within food processing and agribusiness, will be the main focus for the company in 2025. “The African market remains key, with ongoing growth in the staple foods like maize as well as rice and pulses, driven by increasing demand for locally produced, high-quality food products.” In addition, the mining and infrastructure sectors present opportunities to deploy innovative technologies that enhance operational efficiency and reduce environmental impact.

The African market is essential to Bühler’s growth strategy. With a young and rapidly growing population, the continent offers significant opportunities to build resilient food systems and manufacturing hubs. “Our focus is on delivering tailored solutions that address local challenges as well as enabling scalability and sustainability. Meeting the needs of this market also aligns with Bühler’s mission to feed the world sustainably,” says Sutter.

Sustainability remains core to Bühler’s vision. In 2025, it plans to enhance its green supply chain initiatives by localising more manufacturing processes, so reducing transportation-related emissions. “Collaborating closely with our partners, we remain committed to achieving carbon-neutral production by 2030 and continuously improving the energy efficiency of our solutions. Aligned with our sustainability goals, we aim to reduce energy, water, and waste in our customers’ value chains by 50% by 2025 and decrease greenhouse gas emissions in our own operations by 60% by 2030,” says Sutter.

He acknowledges that last year was a challenging year,

shaped by various external factors. Elections across many African countries brought a degree of uncertainty, and rising steel prices, increased transport costs, and limited access to foreign exchange in several regions presented significant hurdles. “Despite these challenges, Bühler remained resilient, focusing on innovation and customer-centric solutions,” he adds.

The company saw steady demand in the food and beverage sector, particularly in the staple foods markets and grain storage, as the need for efficient and sustainable food systems continues to grow. In the mining sector it saw strong demand driven by the need for material handling solutions and an increasing focus on energy-efficient technologies. “Looking ahead, we aim to strengthen local supply chains and drive sustainable practices to support our customers and communities effectively,” Sutter says.

Bühler also embarked on various upgrades at its Johannesburg facility last year. Francois Knoetze, Head of Manufacturing, says these included installing First in First out (FIFO) racking to improve stock use, new compressors to ensure better energy efficiency in compressed air production, and new welding machines. Knoetze points out that Bühler’s customers will benefit from the increased throughput and shorter lead times for delivery enabled by the upgrades.

Continuing to spend up to 5% of turnover on research and development a year, Bühler aims to develop innovative technologies, machines, and services for the food, feed, agriculture and mobility industries. This differentiates it in the market, delivering high performance, productivity, reliability, and improved sustainability.



*Marco Sutter, MD, Bühler Southern Africa.*



## Formulation software for efficient pharmaceutical production

Minebea Intec, a leading global manufacturer of weighing and inspection technologies, developed ProRecipe XTR as a formulation software solution particularly for companies in the pharmaceutical industry. The solution combines scales and software into a powerful unit to map manual dosing processes and fulfils the requirements for precision and process reliability, plus regulations in terms of GxP (good practice guidelines for quality), for example. This benefits production companies with demanding recipes, as well as system integrators that want to expand their portfolio with an effective recipe management system.

Minebea Intec outlines a typical production scenario. The production hall is filled with a concentrated atmosphere. All the raw materials for the upcoming order are ready. An employee takes a quick look at the screen: the exact quantities for the next batch have already been calculated. A targeted scan of the label of the first raw material immediately opens a clear weighing screen. The employee batches the material precisely, until the colour changes on the screen: the target quantity has been reached.

Using the ProRecipe XTR software solution from Minebea Intec, the process runs smoothly – from exact weighing of the ingredients to automatic documentation. What used to be laboriously recorded on paper, and error-prone, is now a digitally controlled and documented process that improves data integrity.

“With ProRecipe XTR, we enable our customers to digitalise their production processes and to make them significantly safer and more efficient,” says Lars-Henrik Bierwirth, Global Product Manager at Minebea Intec. “Providing complete traceability and precise control of all process parameters, we are setting new standards in production safety.”

### Efficiency and precision

ProRecipe XTR ensures precise dosing and transparently documents all steps – from small batches to complex multi-component recipes. A typical application example is in the production of pharmaceuticals, where numerous ingredients have to be processed in different quantities. Here, ProRecipe XTR ensures each ingredient is batched exactly and weighing errors are avoided.

The interface to existing ERP systems means order and batch data can be transferred automatically. Once dosing is complete, ProRecipe XTR returns the weighing data and consumption quantities directly. This saves time, minimises input errors, and ensures an always up-to-date stock overview.

In regulated industries like the pharmaceutical industry, where the highest standards of data integrity and GxP compliance apply, ProRecipe XTR offers an optimal solution. The software was developed in accordance with the recommendations of GAMP5 (good automated manufacturing practices) and offers comprehensive reporting and audit trail functions that fulfil the requirements for computerised systems in accordance with the FDA (US Food & Drug Administration).

“For reasons of data integrity, our customers in the pharmaceutical sector often want to record the entire manufacturing process digitally, not just the dosing steps. With ProRecipe XTR, we make this possible with

digital manufacturing instructions that can be integrated directly into recipes,” explains Bierwirth.

A pharmaceutical manufacturer that processes different active ingredients in small batches can thus ensure that each ingredient precisely meets the specifications and that the entire production process remains fully traceable – a decisive advantage for safety and efficiency in the industry. “With ProRecipe XTR, our customers minimise the risk of process errors and guarantee that all batches are consistently produced to the same standards and specifications,” Bierwirth adds.

In the pharmaceutical industry, where there are often long lead times for the implementation of IT projects, ProRecipe XTR offers the necessary flexibility with its modular licence system. Bierwirth highlights that the solution is scalable, so both small and large companies can benefit. He also notes that the user friendliness and adaptability of ProRecipe XTR make it suitable for any production environment.

### The interplay of hardware and software

One thing is crucial for the successful use of ProRecipe XTR: high-quality weighing solutions. And this is Minebea Intec’s field. The company offers a broad portfolio of durable, accurate load cells, industrial scales and electronic weighing systems that can be seamlessly integrated into ProRecipe XTR. The comprehensive services – from software and weighing solutions to commissioning and qualification – are provided from a single source. Where necessary, Minebea Intec provides support with individual adaptations to offer customised solutions for specific requirements.

The smooth interaction of hardware and software brings structure and precision to every process step, from batch recording to the complete documentation of all ingredients. The intuitive operation of ProRecipe XTR means users always have an overview, even with complex recipe processes, and are guided through the process step by step. This creates a focused working atmosphere in which the operator can concentrate fully on batching and the software takes care of the rest.



*ProRecipe XTR combines accurate weighing scales and software to map dosing processes, especially suitable for the high precision requirements in the pharmaceutical industry.*

### Next generation DCS – redefining process control

To meet the challenges of the modern processing industry, Valmet last year launched the newest generation of its distributed control system as DNAe, incorporating cutting edge cybersecurity, user interface, data storage and management, and other advanced features.

The evolution of the first distributed control systems (DCS) can be traced back to the 1980s and 1990s. During this period, leading DCS developers introduced their systems and, over decades, continued to enhance and modernise their offerings through iterative design and development processes. This approach essentially involves building on the foundations laid by earlier systems.

However, over the past few years the requirements for a DCS have changed substantially. The primary purpose of a distributed control system is to connect field devices to process controls, but developments in digitalisation have pushed DCS towards higher levels of connectivity and automation. Today, DCS are increasingly web-based systems that must be able to share information securely with back-office IT systems, provide more autonomous operations, and still offer high availability.

The processing industry has also gone through a significant transformation. With the widespread exodus of long-time operators to retirement, the DCS today needs to be more automated, easy to configure, and intuitive to operate, even for less well-trained operators. DCS must also accommodate remote work and maintenance.

Recognising that the iterative process has limits and that the needs of the industry were changing, Valmet, as a leading provider of automation solutions decided to rewrite its DNA – the DCS it had originally introduced to the market in 2000. In its approach, it sought to apply modern development programming languages and tools from the ground up, as well as agile software development, a method of developing software that involves breaking the process down into smaller parts and frequently testing the software.

The new upgrade is further informed by the company's extensive experience and background in providing automation

systems for pulp mills, paper machines, energy production, marine and process industries worldwide. A global supplier of process technologies, services, and automation solutions with headquarters in Espoo, Finland, Valmet has over 220 years of history in the industrial sector.

Valmet DNAe is a fully web-based process control system which the company says was “completely redesigned from the start”. Although the primary drivers were enhancing cybersecurity, streamlining the user interface and configuration tools, and advanced data management, reporting, and analysis, no aspect of the DCS was left untouched.

“Valmet DNAe comes with a new cybersecure system architecture, updated user interface, control software and hardware, and engineering and analytics tools, all of which are designed to help processors improve efficiency, productivity, sustainability, and safety of their operations,” says Petri Tiihonen, Product Manager, Platform R&D at Valmet. Tiihonen, who started as an engineer in 1995 and moved to development in 2004, believes Valmet DNAe is the first system designed “from scratch” since the 1990s.

#### Cybersecure by design

Within the hierarchy of priorities, perhaps the most important was addressing cybersecurity with the most advanced tools available on the market. A DCS must provide open and secure connectivity at all levels, as well as between OT (Operational Technology) and IT (Information Technology) systems. This poses a significant challenge, and securing the system requires sophisticated cybersecurity.

Valmet approached the task by adopting the philosophy of ‘security by design’. This emphasises the value of incorporating security measures from the start of the product development cycle, rather than adding them later in response to threats.

“We have taken cybersecurity measures into account from the very first line of code,” says Tiihonen.

At the core of the Valmet DNAe Distributed Control System is the Trusted Information Framework (TIF), which serves as the backbone for communication and data management. Built on the TIF foundation, Valmet DNAe architecture is cybersecure by design, and it includes measures such as role-based access

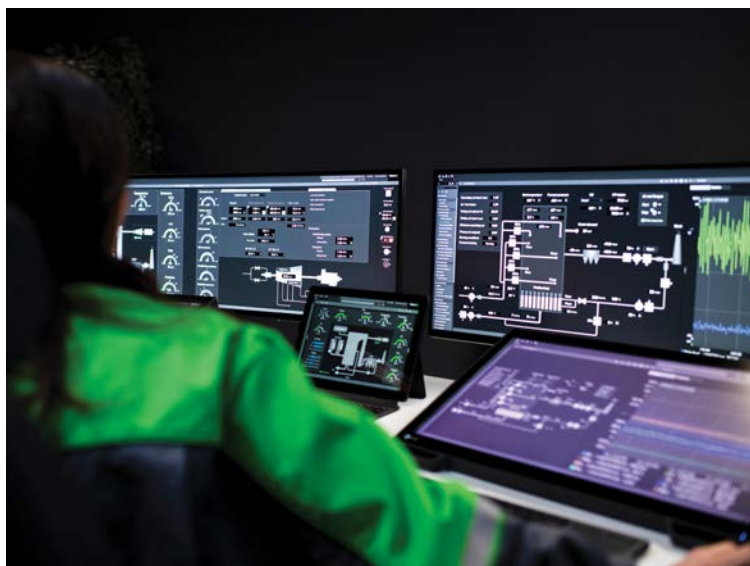
control, authentication, encryption, endpoint protection, and comprehensive audit trails. IT security integration helps security teams stay alert to potential threats, and the Valmet DNAe system also enables intrusion detection to be implemented.

Valmet DNAe cybersecurity is externally certified according to ISO 27001 and IEC 62443 standards. The development process has been validated with Security Development Lifecycle Assurance (SDLA) certification, ensuring that security considerations are integrated into every stage of the system lifecycle.

#### Improved UX

Another focus for the Valmet design team was improving the user experience, or UX, of the DCS. The need to provide an easy-to-use, intuitive, and insightful interface that requires less operator training is only increasing as processors face a

*Continued on page 9*



*Features like secure information sharing, remote access, and intuitive controls are now essential.*



## Introducing the fail-safe virtual PLC

Fail-safe functionalities are essential in automation. To meet these requirements in a virtual environment, Siemens has introduced the Simatic S7-1500V F, a fail-safe version of the virtual PLC (vPLC). This enables the execution of fail-safe applications on a vPLC in an industrial edge environment. It allows for the migration of fault-tolerant applications into the virtual world, contributing to the protection of machine operators without the need for dedicated hardware.

Cybersecurity is another important aspect: the fail-safe vPLC ensures system integrity with high-security levels and standard security for authentication and access control.

The SIMATIC S7-1500V is an entirely virtual PLC. It is based on the functions and operation of the SIMATIC S7-1500 PLC and independent of its hardware. The virtual PLC can be downloaded as an Edge app and integrated directly into the IT environment. This allows for untapped potential offered by digitalisation to be used. The virtual PLC opens the way to software-defined automation. Users can continue to rely on familiar processes and tools – and benefit from IT mechanisms.

### Integration in Industrial Edge

As a hardware-independent controller, the virtual PLC is provided and deployed entirely via Industrial Edge. First, the SIMATIC S7-1500V is downloaded as an Edge app from the Marketplace via the Industrial Edge Hub. The customer can then access it in Industrial Edge Management and deploy it in the application using Industrial Edge Runtime.

### The controller for adaptable production

The virtual PLC represents another step forward in digital transformation. Adding to the SIMATIC portfolio, the controller allows for a more flexible and modular design of production

plants. As part of Industrial Operations X, SIMATIC S7-1500V supports users on the way to a highly adaptable production process.

### More flexibility

The virtual PLC is hardware-independent, which means users can access the controller and all functions of the SIMATIC S7-1500 PLC via a mobile device – flexibly, from anywhere. In addition, users can increase or decrease the number of instances used, according to demand. Therefore, they pay only for as many controllers as they currently need.

### Seamless integration

The virtual controller is completely compatible with TIA Portal. Users can rely on familiar tools and build on projects already created in TIA Portal. This integration also allows for the use of OT solutions that the user has previously employed in an IT environment, benefitting from their advantages without giving up familiar structures.

### Increased efficiency

Because the virtual PLC is integrated into Industrial Edge, it allows the user to operate applications centrally and automate process steps in a datacentric and software-based way. With the integrated IT mechanisms, users can also optimise entire workflows and costs with the SIMATIC S7-1500V PLC.

**For more information visit: [www.siemens.com](http://www.siemens.com)**



*Siemens' Simatic S7-1500V F – the hardware-independent virtual controller.*

*Continued from page 8*

significant wave of retirements.

Seasoned professionals retiring from the workforce are leaving a knowledge gap that new hires in the same role struggle to fill. Attracting new recruits and keeping them can be difficult, adding to the pressure to optimise and do more with less. Smaller and smaller teams need to be able to run processes in larger, more complex operations.

“Process automation, in general, and the products and systems that serve the industry need to meet the requirements and expectations of the modern workforce. Therefore, the UX must also meet the challenges the entire industry is facing,” Tiihonen notes, adding that this includes facilitating remote maintenance, predictive maintenance, and support on mobile devices.

“A well-designed user interface connects the operators and other users to the automation system,” says Tiihonen. “The user interface should provide the most relevant information for each user role and enable them to monitor all relevant current and historical process data.”

### Improved data management and analysis

Data management and analysis are also critical for processors, and the DCS must be flexible enough to run on servers on premises, at the edge, or in the cloud. The platform must be scalable and allow

for redundancy of data storage.

For this, Valmet selected new technologies that allow for easy redundancy of the data storage using clustering, which refers to the use of multiple interconnected servers that work together as a single system to provide higher availability, fault tolerance, and scalability. If one node fails, others can continue functioning without data loss or downtime.

The architecture of Valmet DNAe DCS connects the OT and IT domains, leveraging the latest technologies for secure data exchange and integration. Its data management capabilities give operators real-time insights into plant operations and asset performance management, enabling informed decision making.

### A clear upgrade path

In line with Valmet's lifetime systems compatibility promise, existing process automation customers can also benefit from the latest technology.

“It has always been in our DNA to respect the installed base so that the customers have a clear pathway to upgrade their existing systems,” says Tiihonen.

“It is very important to us that customers running on the DNA DCS should be able to upgrade gradually to Valmet DNAe, even though the technology is totally new.”

# Flipping the switch: is decarbonisation possible for Africa?

*Paul van Zijl, Group CEO at Starsight Energy, believes it is. Acknowledging that the path to decarbonisation in Africa presents significant challenges – and opportunities – he maintains that we must apply a contextual lens and move away from all-or-nothing thinking, adopting a holistic, phased and sustainable approach to the continent's changing energy mix.*

**I**n my view the global imperative to 'decarbonise' – the shift from fossil fuels such as coal, natural gas or oil to carbon-free and renewable energy sources – has been more of a stumble than a sprint in Africa.

But, as always, context is important. In Africa, other pressing socio-economic needs often – understandably – take priority, and that limits available funding; a lack of infrastructure hampers development; and vested interests slow progress. All these factors have contributed to Africa's relatively slow transition, for which it has been (often unfairly) criticised.

The irony is that although Africa is far from being the leading perpetrator behind the world's current carbon status – the continent is estimated to contribute less than 4% to global greenhouse gas emissions, making it one of the lowest emitters in the world – it is one of the regions most vulnerable to the effects of climate change.

Africa's temperature increases surpass the global average, and multi-year droughts in some parts of the continent juxtaposed with severe flooding in others are increasingly the norm. Without targeted intervention, an estimated 118 million Africans living in extreme poverty will face increased exposure to droughts, floods, and extreme heat in the coming years,

further straining poverty alleviation efforts and economic growth.

African countries are estimated to lose between 2 and 5% of their gross domestic product (GDP) annually and allocate up to 9% of their budgets to respond to climate extremes, according to the World Meteorological Organisation's (WMO) *State of the Climate in Africa 2023* report. In sub-Saharan Africa, adaptation costs are projected to reach USD 30 to 50 billion by 2030, amounting to some 2 to 3% of the region's GDP. Yet, Africa is estimated to receive only around 3% of global climate finance.

## Balancing funding to meet development priorities

African countries, in general, do not have the same funding capabilities as the developed world, and priorities differ. Poverty alleviation and economic participation/upliftment are at the top of the list for most African governments, and this means the limited funding available needs to be allocated accordingly. In addition, recent conversations have highlighted the higher cost of debt for African nations, when compared to other sovereign issuances in emerging markets.

Despite these significant challenges, Africa has a lot in its



*Despite the challenges it faces, Africa has a lot in its favour in terms of renewable energy resources and the economic opportunities the energy transition presents.*





*Africa has the advantage of abundant solar, wind and other renewable energy resources which can serve socio-economic development as well as the drive to decarbonisation.*

favour. The continent is largely unburdened by the need to decarbonise an 'old economy', which is what most western regions face, and it is blessed with immense renewable energy potential. Strategically harnessing these assets could fast-track climate action and unlock significant economic opportunities for the continent.

To get there, however, we need to change our perspective from believing that fossil fuels are the only road to job creation, political power and economic growth. It need not be 'either/or' but rather, 'and'. We must aim for more choice, less reliance on one energy type, and greater sustainability.

### A measured pace

Eradicating fossil fuels will not happen overnight; the losses from flipping the switch prematurely would be too great. Rather, our focus should be on what can be added to the energy mix, and the steps we can take to reduce our carbon footprint. If we look at natural gas, for example, generally viewed as the 'least' of the fossil fuel evils, natural gas and renewable energy can be complementary as part of a balanced energy strategy, especially during the transition to a low-carbon future.

We've seen, in real-time, major oil and gas companies drilling more and backtracking on their renewable energy targets and efforts. Yet, when natural gas, a by-product of oil drilling, is captured and used as fuel, it is combusted more efficiently, producing lower carbon dioxide (CO<sub>2</sub>) emissions compared to coal or oil. However, it is important to ensure it is properly handled, as gas flaring or venting has a seriously negative environmental impact.

A significant change in the energy context is that the common excuse dismissing renewable energy as 'too expensive' has lost its weight. The build cost of renewable energy has reduced substantially over recent years while the trend in grid supplied electricity prices in most countries has climbed. Globally, fuel prices have been highly volatile, with prices escalating on the back of political upheaval in the Middle East and Ukraine / Russia. And when compared to traditional power tariffs in countries like South Africa, annual renewable energy escalations are negligible.

The battle is no longer between clean energy and cheap energy; it is now significantly more affordable to go the renewable route.

### Renewable energy is the continent's real sunrise sector

The South African renewable energy industry is proving to be a case study for the rest of the continent. It has seen substantial involvement from the private sector, which has led to significant capital investment to maintain and improve infrastructure.

It is creating jobs in metropolitan and rural areas. One example is Starsight Energy's SunCentral solar farm development in De Aar, in the Northern Cape, where operations will create more than 460 permanent and contract jobs. Innovations in renewable energy are saving South African businesses substantial amounts of money, with solutions such as on-site solar, electricity wheeling, energy trading and aggregation helping make the switch to green energy possible – and profitable – in the commercial and industrial sectors.

With the rise of independent power producers (IPPs), African governments don't have to drive the transition on their own. Each sector has a critical role to play – and success breeds more success.

At this time in Africa, where the challenges of climate change intersect with the opportunity to redefine its energy future, the path to decarbonisation should be neither a sprint nor a stumble – it must be a deliberate, phased journey involving the collective effort of all stakeholders.

By embracing a balanced energy mix, encouraging innovation, and leveraging deregulation, Africa can transition to a low-carbon future without compromising its socio-economic priorities. Renewable energy is not only an environmental imperative – it is an economic opportunity, a job creator, and a cornerstone for sustainable development.

*For more information visit: [www.starsightenergy.com](http://www.starsightenergy.com)*

### Breaking ground on SunCentral

Independent power producer, SolarAfrica Energy, now merged with Starsight Energy, broke ground on SunCentral, its first utility-scale solar farm, in June 2024. Phase 1 of the project will establish around 342 MW in generation capacity. Phases 2 and 3 will take total generation capacity to 1 GW – making this one of the largest projects of its kind in the country.

SunCentral aims to provide power on a one-to-many basis, so more South African businesses can access cheaper, cleaner energy via wheeling, and this will contribute to driving economic growth in the commercial and industrial sectors.

# A new era for nuclear energy

*A new report published by the International Energy Agency (IEA) indicates that renewed momentum behind nuclear energy could open a new era for the development of new nuclear power stations, providing a secure and clean power source, as demand for electricity grows strongly around the world. However, the IEA cautions that costs, project overruns and financing will need to be addressed.*

The IEA report, *The Path to a New Era for Nuclear Energy*, shows the fresh impetus for nuclear energy in the form of new policies, projects, investments and technological advances, such as small modular reactors (SMRs). It provides a comprehensive assessment of the current situation, identifying the major challenges that need to be addressed to build on the current momentum and enable a new era to take hold. This includes insights on how to finance new nuclear projects and ensure reliable and diversified supply chains for building and fuelling them.

“It’s clear today that the strong comeback for nuclear en-

ergy that the IEA predicted several years ago is well under way, with nuclear set to generate a record level of electricity in 2025,” said IEA Executive Director Fatih Birol. “In addition, more than 70 gigawatts of new nuclear capacity is under construction globally, one of the highest levels in the last 30 years, and more than 40 coun-

tries around the world have plans to expand the role of nuclear energy in their energy systems. SMRs in particular offer exciting growth potential. However, governments and industry still need to overcome some significant hurdles on the path to a new era for nuclear energy, starting with delivering new projects on time and on budget – but also in terms of financing and supply chains.”

As the world’s second largest source of low-emissions electricity after hydropower, nuclear power today produces just under 10% of global electricity supply. The increasing use of electricity – to power everything from industry and air conditioning to electric vehicles and data centres, linked to the rise of artificial intelligence – is accelerating the growth in demand for power, which is set to rise six times as fast as overall energy consumption in the coming decades, based on today’s policy settings. New generation capacity will be needed from a range of technologies to keep pace with the rapid demand growth, including technologies that can provide firm and flexible output – such as nuclear.

Most of the existing nuclear power fleet today is in advanced economies, but many of those plants were built decades ago. The global map for nuclear is changing, with the majority of projects under construction in China, which is on course to overtake the United States and Europe in installed nuclear capacity by 2030. Russia is also a major player in nuclear technology. Of the 52 reactors, worldwide, on which construction started since 2017, 25 are of Chinese design and 23

are of Russian design. The report shows that the production and enrichment of uranium, the fuel used in nuclear reactors, are similarly highly concentrated geographically.

“Today, more than 99% of the enrichment capacity takes place in four supplier countries, with Russia accounting for 40% of global capacity, the single largest share,” Dr Birol said. “Highly concentrated markets for nuclear technologies, as well as for uranium production and enrichment, represent a risk factor for the future and underscore the need for greater diversity in supply chains.”

## New nuclear technologies

The report also notes that innovations in nuclear technologies are helping to drive the momentum behind new projects. Small modular reactors, which are smaller-scale nuclear power plants that are quicker to build with greater scope for cost reductions, are drawing increasing interest from the private sector. The report highlights how the introduction of SMRs could lead to lower financing costs. It indicates that, with the right support, SMR installations could reach 80 GW by 2040, accounting for 10% of overall nuclear capacity globally. However, the success of the technology and speed of adoption will hinge on the industry’s ability to bring down costs by 2040, to a level similar to those of large-scale hydropower and offshore wind projects.

A new era for nuclear energy will require a lot of investment. The report suggests that in a rapid growth scenario for nuclear, annual investment would need to double to USD 120 billion already by 2030. Given the scale of the infrastructure investment required, the rollout of new nuclear projects cannot rely exclusively on public finances. IEA analysis shows that ensuring the predictability of future cash flows is key to bringing down financing costs and attracting private capital to the nuclear sector. The report highlights that the private sector is increasingly viewing nuclear energy as an investible energy source with the promise of firm, competitive, clean power that can serve energy-intensive operations 24/7. Notably, big names in the technology sector are signing power purchase agreements with developers to provide electricity for data centres and artificial intelligence.

To take advantage of the opportunities that nuclear power offers, governments need to be prepared to provide the strategic vision alongside stable regulatory frameworks that will give the private sector confidence to invest. The report details how incentives and public finance more broadly can unlock the investment needed to deliver greater clean and reliable power from nuclear.

For more information visit: [www.iea.org](http://www.iea.org)



More than 70 gigawatts of new nuclear capacity is under construction globally.



# NECSA on a path of stabilisation and growth

Leigh Darroll, Editor, Electricity + Control

*The Nuclear Energy Corporation of South Africa, NECSA, recently hosted a media roundtable where Group Chief Executive Officer, Loyiso Tyabashe outlined the corporation's strategy to ensure it continues to operate as a sustainable entity. This five-year strategy, approved by the NECSA Board in 2021, seeks to halt the decline that the corporation had seen through the preceding years and orient it to focus on using its specialised knowledge, capabilities and strengths in the nuclear energy sphere.*

Tyabashe briefly summarised the institution's history highlighting that, having been established in the 1940s it has been in existence, under various names, for 76 years. He also noted that South Africa was one of the founding members of the International Atomic Energy Agency (IAEA) in the 1950s and recalled that, at the time, the primary focus was on "atoms for peace".

South Africa commissioned its SAFARI 1<sup>[1]</sup> nuclear research reactor in the 1960s and saw the development of the Koeberg nuclear power station in the 1980s – with Unit 1 commissioned in 1984 and Unit 2 in 1985.

The country also, in the past, manufactured nuclear fuel for the Necsa reactor, and for Koeberg. This capability has fallen away but there are plans for it to be resuscitated, he said.

With this brief history, Tyabashe made the point that South Africa has a rich history in nuclear research and technology and is well respected among its international peers within the IAEA.

Necsa incorporates two subsidiary companies which extend the research work done by the organisation into commercial applications. NTP – or Nuclear Technology Products – produces radioisotopes which are used in medical and industrial applications. Pelchem is a world leader in fluorochemical production, a manufacturer and supplier of commodity and speciality chemicals such as hydrogen fluoride, hydrofluoric acid, fluoride salts, fluorine gas, fluorine gas mixtures and a range of speciality fluoride materials to South African and international customers. It is mainly through these subsidiaries that the Necsa Group derives its revenue, from local and international markets.

The group also incorporates Necsa Laboratories, the Necsa Learning Academy and manages a range of services and support functions –from research and innovation to advanced manufacturing and reactor operations.

It is a state-owned entity, reporting to the Minister of Electricity and Energy, and is mandated to develop, use and manage nuclear technology for national and regional socio-economic development through applied R&D, the commercial application of nuclear and associated technology, and contributing to the development of skills in science and technology.

The long-term strategy of the Necsa Group is based on its core research and technology development mandate to ensure its sustainability and growth while meeting the nuclear-related needs of South Africa.

The strategy aligns Necsa's work with specific related SDGs among the United Nations Sustainable Development Goals, which are important in the international agenda: SDG 3 for good health and wellbeing, SDG 7 for affordable and clean energy, SDG 8 for decent work and economic growth, SDG 9 for industry innovation

and infrastructure, and SDG 13 for climate action. It is aligned also with the goals of the Africa Union's Agenda 2063, and at home, with South Africa's NDP, the Nuclear Energy Act of 1999, and the country's Energy Action Plan as it evolves to the next level.

## High impact projects

Tyabashe shared six high impact projects, outlined below, which are core to the implementation of Necsa's strategy and support the corporation's stabilisation and growth going forward.

- Re-establishing front-end fuel supply for nuclear reactors in South Africa.
- Positioning the corporation to support nuclear power generation, leading with small modular reactors (SMRs) and the potential resuscitation of South Africa's pebble-bed modular reactor (PBMR) research and development programme. Necsa will this year adopt this programme from Eskom, where it was initially established, so it will be appropriately housed as a nuclear research project.
- Consolidating neutron source generation, which includes preparing for the potential life expansion of the SAFARI 1 reactor (officially licensed to operate until 2030), to enable continuing neutron research and industrial applications, and importantly, investment in a new multi-purpose reactor (MPR) and expanding neutron applications. Preliminary work for the construction of a new MPR at Necsa's Pelindaba site has already been completed and it has received funding from government to proceed with detailed design engineering for the project, anticipating approval from the National Nuclear Regulator to allow construction to begin this year.
- Increasing its footprint for radioisotope production and services, diversifying its products to extend its reach in pharmaceutical and industrial markets.
- Stabilising its fluorochemical operations business (Pelchem) to raise its beneficiation capabilities with low volume and high value solutions.
- Capacitating and strengthening skills development as a service offering. This will see the further expansion of training and skills development partnerships already established by the Necsa Learning Academy (NLA) and the commercialisation of the NLA as



NECSA Group Chief Executive Officer, Loyiso Tyabashe, speaking at the media roundtable.

*Continued on page 14*

### Renewable energy in SA in 2025



Alberto Gambacorta,  
Executive Vice President:  
Sub-Saharan Africa, Scatec.

Looking at the opportunities South Africa's renewable energy sector presents, Alberto Gambacorta, Executive Vice President: Sub-Saharan Africa, at Scatec, highlights some key pointers on how renewable energy will shape the country this year and into the future.

At this time, he notes, South Africa has the potential to drive economic growth, environmental sustainability, and energy security through renewable energy. It can move forward from the years of power shortages and reliance on coal that have hindered progress, and advances in clean energy offer a solution.

Independent power producers (IPPs) like Scatec are leading this transformation, developing, building, and operating renewable energy projects that will help transition South Africa towards a sustainable future.

#### **Growth in solar and wind energy**

With improved technology, solar panels and wind turbines are becoming more efficient and cost-effective. Large-scale solar and wind projects are expanding rapidly, reducing dependence on coal. Hybrid systems – combining solar with batteries – are already delivering reliable, affordable energy to homes and industries.

Scatec has been at the forefront of this field, bringing projects like the utility-scale Kenhardt solar and battery facility online and demonstrating that renewable energy can power South Africa reliably.

#### **Advances in energy storage**

Renewable energy must be available around the clock, and battery energy storage systems (BESS) make that possible. As storage technology improves, costs decrease, and adoption grows. Scatec has already deployed large-scale battery solutions that help to stabilise the grid and unlock additional renewable capacity. Expanding energy storage will mean fewer power outages, greater grid reliability, and a smoother transition to a green economy.

#### **Green hydrogen on the rise**

Green hydrogen, produced using renewable energy, is gaining traction as an alternative fuel for industries like steel and chemical production. The supply focus will likely be on North Africa initially, but South Africa and Namibia are exploring opportunities.

#### **Decentralised energy systems**

With recent legislative changes, businesses and communities can now generate and manage their own power. This shift reduces pressure on the national grid and fosters competition among IPPs, driving down costs and increasing reliability. Scatec's projects empower industries to secure their own energy supply, ensuring more stable and affordable electricity.

South Africa has the opportunity to lead the continent in renewable energy innovation, Gambacorta says. By embracing clean energy, the country can ensure a more resilient, sustainable future with sufficient power to accelerate economic growth and with a reduced environmental impact. The transition is happening, and Scatec is proud to be part of it.



The Kenhardt project in the Northern Cape, totalling 540 MW solar and 225 MW/1 140 MWh of battery storage, is one of the world's largest hybrid solar and battery storage facilities.

*Continued from page 13*

a nuclear training centre of excellence. This will support more partnerships with academic and vocational training institutions, as well as growing the skills base for Necsa, the energy sector, and industry more broadly.

Progress on these strategic projects has already seen the organisation return to a more stable footing and regain its commercial income streams – to position it as a sustainable

entity that can continue to contribute to South Africa's socio-economic growth and development into the future.

#### **Note:**

[1] The "SAFARI" reactor is an abbreviation for the South African Fundamental Atomic Research Installation reactor.

For more information visit: [www.necsa.co.za](http://www.necsa.co.za)

## MMC secures renewable energy supply

Manganese Metal Company (MMC), a key player in the global manganese industry, has entered into an energy supply agreement with the NOA Group to secure an estimated 70% of its electricity from renewable sources. This deal, which leverages NOA's portfolio of wind and solar photovoltaic facilities with a combined capacity of 86 MW, underscores MMC's commitment to sustainability and alignment with global decarbonisation efforts. As the custodian of the world's largest manganese reserves, South Africa plays a central role in producing high-purity manganese metal and manganese sulphate monohydrate for battery electric vehicles.

Karel Cornelissen, CEO of NOA Group, commented: "The Master Energy Supply Agreement supports MMC's strategy to minimise its environmental impact by securing clean, renewable energy in line with the decarbonisation goals of its global customer base."

The agreement effectively decouples the generation of renewable energy from the point of consumption through NOA's aggregation model and trading platform. Unlike many bilateral agreements that are tied to individual generation facilities, this model offers greater flexibility, efficiency, and certainty in energy supply, according to NOA, as the energy is supplied from its portfolio of generation facilities.

Under the 20-year agreement, NOA will provide a renewable energy profile equating to 245 GWh per year, facilitated by Eskom's wheeling framework. By sourcing energy from multiple generation facilities across the country, NOA ensures increased reliability of renewable energy delivery. This approach optimises generation profiles by leveraging diverse geographic and resource-specific characteristics.

In response to growing pressures to adopt environmentally friendly energy sources, mining and other industrial sectors are increasingly turning to energy aggregators for sustainable solutions. As much as they require a reliable energy supply these sectors also need to reduce their carbon footprints, to meet regulatory standards and corporate sustainability goals.

Bernard Swanepoel, Executive Chairman of MMC, said: "This landmark agreement with the NOA Group marks a significant step in MMC's sustainability journey, ensuring a reliable and renewable energy supply that aligns with our commitment to decarbonisation and environmental stewardship, and reinforcing our role as the largest global supplier of high purity, selenium free (99.9% Mn) manganese metal. It will also enable our high purity manganese sulphate monohydrate product to be credited with industry-leading low carbon emission intensity."

As the sole non-Chinese producer of refined manganese metal, MMC is consolidating its position as a leading western supplier of high-purity manganese variants, which are needed for battery production. Additionally, through its commitment to renewable energy solutions, enhanced water conservation measures, and improved waste recycling processes, MMC is demonstrating its environmental stewardship and its continuing pursuit of net-zero emissions.



*Under the 20-year agreement, NOA will provide renewable energy equating to some 245 GWh per year to MMC.*

"Driven by the growing emphasis on environmental sustainability, mining and other industrial sectors are taking proactive strides towards adopting clean energy solutions. By partnering with energy aggregators, like NOA, these industries are securing material long-term energy savings and significantly reducing their carbon footprints. This positive shift aligns with regulatory standards and corporate sustainability goals and supports the transition to a more sustainable future in South Africa," Cornelissen said.

### Licensed to trade

In a recent statement the NOA Group announced that its trading subsidiary, NOA Group Trading (Pty) Ltd (NOA Trading), has been awarded its long-anticipated trading licence by the National Energy Regulator of South Africa (NERSA). The approval was granted at NERSA's Executive Committee Meeting on 31 January 2025.

The licence greenlights the implementation of NOA Trading's innovative business model and energy aggregation offering, designed to aggregate energy from geographically dispersed renewable generation facilities and supply it to customers across the country.

This model supports the deployment of renewable energy projects in high-yield areas, maximising generation potential and improving energy security, while meeting a critical need for clean energy and cost savings for NOA's customers. It steps towards increased competition providing customer choice, as envisaged in the Electricity Regulation Amendment (ERA) Act.

The first agreements concluded under NOA Trading's new licence are two Generator Power Purchase Agreements (GPPA) for 140 MW and 94.5 MW wind projects. Under these long-term agreements, NOA Trading will purchase power from the wind farm and supply a portfolio of large and small customers through various, flexible energy supply arrangements.

By enabling trading entities to procure additional energy from new generation facilities, this model helps Eskom reduce generation costs while contributing to grid strengthening, transmission, and distribution development. These benefits are further supported by self-build agreements between independent power producers (IPPs) and the state utility.

"NOA Trading is now positioned to serve a national customer base, aggregating demand across the electricity supply sector. In line with the ERA Act, traders are licensed without geographic limitations. This signals a transition to a more open, competitive, and liberalised energy market – consistent with global regulations, including EU legislation, where trading activities are not restricted to specific locations or customer groups," Cornelissen noted.



### A decade of progress in sustainable energy in SA

At the end of 2024, marking a decade of progress in the renewable energy sector in South Africa and southern Africa since it established its office in Johannesburg, Enel Green Power reported on its achievements to date and ongoing planned projects.

The company entered the market more than 10 years ago, after the introduction of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and subsequently established a local office in Johannesburg. Since then, it has developed, built and continues to operate over 1.2 GW of renewable energy capacity, which accounts for 20% of the country's renewable energy capacity.

Renewable energy is a key element in climate change mitigation and Enel Green Power looks at renewable energy in this light, not only as a source of electricity but also as a central aspect of countering climate change and promoting sustainability.

Through its work Enel contributes to power generation in South Africa directly and indirectly. Its renewable energy capacity helps to sustain electricity supply, to reduce the carbon footprint of power generation and to lower electricity costs. The company has developed local skills and offers sustainable, innovative solutions for businesses, including customised power purchase agreements (PPAs) for organisations in the commercial and industrial market.

The company is currently building the 330 MW Impofu wind power project in the Eastern Cape, a cluster of three wind farms set to connect to the grid in 2026. Beyond South Africa, it has also developed and operates the 35 MW Ngonye solar power project in Zambia.

#### Creating shared value

Enel is committed to creating shared value for local communities in South Africa, having invested about R4.5 billion into various projects in communities close to its projects. Its community initiatives focus on enterprise development and upskilling to create sustainable businesses that benefit the community economically and enhance the wellbeing of the people in the community.

"Creating shared value with local communities is a priority," said Manuele Battisti, Enel Country Manager for Southern Africa. "We are committed to ensuring that our projects create opportunities for growth and development."

EGP actively supports a range of community activities that demonstrate its commitment, fostering a collaborative approach towards sustainable development. These include a bursary programme to support gifted students identified in host communities; health and wellness centres, enhancing healthcare access in host communities; and an after-school programme supporting positive child development by providing a safe environment for children, to nurture their social, emotional, cognitive, and academic skills through fun, play-based learning and providing nutritious meals.

Enel's CSV (creating shared value) initiatives are designed to empower individuals and promote wellbeing within the communities in which it operates.

#### Looking ahead

The company's focus remains on driving the energy transition and supporting the growing renewable energy sector with an emphasis on creating value and leveraging partnerships to enhance the deployment of investment.

Over the next decade, Enel Green Power South Africa plans to double its operational capacity, targeting an additional 1.2 GW by 2027 with continuing investments in wind and solar energy as well as battery energy storage systems.

The organisation recognises the critical role of renewable energy in addressing climate change, focusing on generating electricity with a minimal carbon footprint and promoting electrification.

Battisti emphasised: "Linking renewable energy generation with efficient energy use is essential in minimising our carbon footprint. Our ongoing efforts to promote energy efficiency and reduce overall consumption underscore our commitment to mitigating the impacts of climate change."

He noted too, "We are grateful for the continued support of our stakeholders and communities. As we navigate the future, we remain resolute in our mission to harness renewable energy as a catalyst for positive change."

#### Under construction – the Impofu project

Enel Green Power South Africa began construction on the Impofu project, a cluster of three wind farms in the Eastern Cape, in March 2024. The wind farms – Impofu East, Impofu West, and Impofu North – will provide renewable energy to Air Liquide Large Industries South Africa (Air Liquide) and Sasol South Africa (Sasol) and are scheduled to become operational in 2026.

Together, the wind farms will include 57 turbines, eight high voltage substations, plus 120 km of 132 kV high voltage overhead power lines. They will generate up to 330 MW of renewable energy which will be wheeled via the national grid, in terms of a wheeling framework agreement with Eskom, to Sasol's Secunda site in Mpumalanga where Air Liquide operates its large-scale oxygen production facility.



Manuele Battisti, Country Manager for Enel Southern Africa.

## New MD for Nordex Energy SA

At the start of this year, the Nordex Group announced the appointment of Robert Timmers as the new Managing Director for Nordex Energy South Africa (NESA). With over a decade of experience in the wind energy sector, Timmers returns to South Africa after successfully leading Nordex Australia as Managing Director, where he oversaw the supply and commissioning of a landmark 1 GW wind farm project – the largest wind farm in the southern hemisphere.

He returns at a time when NESA is managing construction of projects set to deliver 631 MW in the Eastern and Northern Cape, as well as its already operational plants which have a combined capacity of 1.1 GW.

Although the local market faces recognised challenges, such as limited resources to support the growing pipeline of wind energy projects, including shortages of police escorts, crane and transport equipment, and a small pool of experienced installation contractors, Timmers sees these complexities as opportunities for strategic optimisation. Innovations like site-specific tower designs and concrete hybrid technologies can reduce travel distances and enhance project economics, and advances such as self-hoisting crane technology address crane shortages.

He notes too, that Nordex's robust local training initiatives are key to developing and strengthening South Africa's talent pool, ensuring a sustainable future for the wind energy industry.

"Returning home to South Africa is a professional and a personal milestone for me," said Timmers. "I am excited to contribute to the country's growing economy as it transitions to a clean energy future. South Africa is at a pivotal moment in its renewable energy journey, and I look forward to leveraging Nordex's global expertise to unlock new opportunities for sustainable energy growth."

Timmers's tenure in Australia, over eight years, confirmed his reputation as a leader in managing large-scale renewable

energy projects. Under his guidance, Nordex's Australian operations delivered strategic innovations and optimisations, positioning the company as a key player in one of the world's most dynamic renewable energy markets.

Reflecting on global trends in wind energy, he outlined his vision for South Africa's renewable energy sector, saying, "With wind projects globally increasing in size and complexity, I see an opportunity to leverage the experience gained in our Australian projects, where project-specific optimisations dramatically increased value for customers. Our expertise in supporting Balance of Plant (BOP) optimisation, site-specific tower designs, and collaborative electrical and layout optimisations will stand us in good stead for tackling the new wave of larger, more complex projects in South Africa."

Javier Ojanguren, Nordex Energy Vice President - Spain, APAC & Africa, said: "As South Africa accelerates its clean energy ambitions, Robert's leadership will consolidate Nordex Energy South Africa's role as a trusted renewable energy partner, delivering value-driven solutions and driving innovation to meet the country's growing energy demands."

Timmers, who previously contributed to the successful construction of one of South Africa's largest wind farms in Gouda, Western Cape, brings extensive expertise in financial management, operations, and strategic planning to Nordex Energy South Africa. Combined with his Postgraduate Diploma in Accounting and Bachelor of Business Science in Accounting and Finance from the University of Cape Town, his proven leadership capabilities equip him to drive the company's growth in a fast-evolving energy market, fostering innovation and developing local talent at the same time.



*Robert Timmers, Managing Director, Nordex Energy South Africa.*

## Innovative cable guidance for wind turbines

The reliability of energy and data cables has the potential to increase the economic efficiency of wind turbines. With the TRM triflex Rotation Module (TRM), igus has introduced a new type of cable guide that reliably protects cables in flexible energy chains made of high-performance plastic when the nacelles rotate by up to 1 800°. The compact system is the result of a design study and can be pre-fitted and customised to individual applications.

Wind turbines are often located in remote areas, making maintenance work expensive – especially for offshore turbines. It is therefore important to limit the risk of failure in all components of the systems. This also places high demands on the installation of the numerous cables that supply the generator, gearbox and control systems in the nacelle with power and data from the ground.

"As the nacelles of wind turbines are constantly moving to align themselves optimally with the wind, the cables are exposed to heavy loads over time. A cable break is extremely disruptive in this environment and usually requires an

expensive and time-consuming repair," says Michael Berteit, Sales Manager Engineering Projects and Installation Service at igus. "We developed the TRM in a design study. It is an innovative and compact cable guidance system that safely guides the cables and reliably protects them when the nacelle rotates. This increases the reliability of wind turbines and thus their economic efficiency." The pre-series version of the new module was introduced to the market in October last year.

### **Rotary movements of up to 1 800°**

The TRM system is located in the upper tower end of the wind turbine, directly under the nacelle. Inside, five triflex energy chains run parallel to each other, carrying energy and data cables. The e-chains can move in three dimensions and have flexible chain links made of high-performance plastic that form a ring-shaped structure. This allows the triflex to perform a rotational movement around a central axis.

"When the nacelle rotates, the upper part of the TRM moves in synchronisation with the energy chain. A movable support structure

*Continued on page 18*

### A Southern Africa Chapter for FutureCoal



*Mike Teke, Group CEO of Seriti Resources, will serve as the inaugural Chairman of the Southern Africa Chapter of FutureCoal.*

*[Photo credit: Seriti Resources]*

FutureCoal in February 2025 launched a Southern Africa Chapter, with Seriti Resources Group Chief Executive Officer Mike Teke serving as its inaugural Chairman. The chapter comprises the top four African coal nations: South Africa, Mozambique, Zimbabwe, and Botswana. These nations collectively hold 150 billion tonnes of coal reserves, placing them among the world's top coal-rich countries.

The regional initiative will build on FutureCoal's global advocacy efforts, which champion sustainable transformation across the entire coal value chain. It will unite industry leaders, governments, and international partners to ensure consistent and clear policies and strategies that enhance the responsible and sustainable use of coal in critical sectors such as power, heavy industry, critical minerals, and hydrogen.

"Launching the inaugural FutureCoal Chapter in Southern

Africa is a testament to our commitment and leadership in uniting the value chain and reshaping coal's future, regionally and internationally," stated Mike Teke.

The chapter, which already comprises 13 members from across the region, is underpinned by FutureCoal's Sustainable Coal Stewardship (SCS) stance. The SCS roadmap emphasises innovation and technologies that modernise the value chain to achieve mutually beneficial economic and environmental outcomes that serve national and global ambitions.

Teke added: "We now have a chance to follow the beat of our drum. We are nations blessed with a valuable resource, and we will be stronger together. I am calling on more of my peers across coal enterprises to publicly join this alliance that leads a pragmatic and realistic discussion on coal's inclusion in the future economy

"If we are to truly support our communities and foster their prosperity, we must recognise that the responsibility lies with us to drive this transformation so we can achieve the best for our nations and our continent."

Despite coal's crucial role in modern life and its contribution to poverty alleviation, many remain unaware of these facts and lack an understanding of how policies that exclude coal can leave a nation more vulnerable or falling behind.

Michelle Manook, CEO of FutureCoal, highlighted, "FutureCoal's SCS roadmap serves as the foundation to reverse this trend by facilitating responsible policy and investment decisions that support modernisation and transformation. The Southern Africa Chapter members, led by Chairman Mike Teke, are commendable for their proactive approach. Our shared goal is prosperity for all. This is not about choosing one path over another; it is about empowering regions to chart their own course and foster their responsible growth."

*Continued from page 17*

inside the system ensures that the energy chain always maintains its bend radius and is always securely positioned," Berteit explains. With this controlled guidance, the cables can perform rotational movements of up to 1 800° without tangling or kinking. "This enables the operators to turn the nacelle up to five times around its own axis in one direction without being forced to work quickly against the wind. Hence, it keeps the alignment of the system safe and energy efficient."

#### **Pre-fitting saves assembly time**

Another goal for igus was to save space and installation time for users of the new cable guidance system. "We have designed the module to be compact. With an external diameter of just 1 300 mm and an installation height of less than 1m, it requires only minimal space around the rotary axis," says Berteit.

In addition, users can conveniently equip the system with the required cables on land or receive it fully harnessed from igus. Here, igus offers cables from the chainflex range. They permanently withstand torsional loads, function reliably under adverse environmental influences such as large temperature fluctuations and thus further increase the reliability of wind turbines.

"With the pre-fitted rotating energy supply, the assembly time on site at the plant, which is often associated with very high costs, can be reduced by up to 50%," Berteit highlights.



*Innovative cable guidance from igus allows for reliable rotary movement of power and data cables in nacelles of up to 1 800° and helps to minimise the risk of cable failure in wind turbines.*



# Best practice in measuring PV circuit performance

*Here Comtest, master distributor for Fluke for Southern Africa, shares Fluke's guidelines for best practice in measuring and analysing PV circuit performance in solar photovoltaic panels and arrays.*



*Environmental conditions, reflective light and other factors can influence the accuracy of irradiance measurement significantly.*

Fluke highlights that irrespective of the test method used, it is essential to know the plane of array irradiance and cell temperature to evaluate PV circuit performance. Attention should be given to environmental conditions to ensure that the I-V curves<sup>[1]</sup> can be interpreted accurately, as rapid changes in the irradiance or cell temperature can introduce errors in I-V curve tests. The use of appropriate sensor types and test methods, like the Fluke Solmetric PVA 15i-V curve tracer, will deliver reliable results.

## Environmental conditions for testing

Optimal performance tests are conducted under stable weather conditions with irradiance above 700 W/m<sup>2</sup>. This is particularly important when establishing a performance baseline at commissioning or recommissioning and is relevant for troubleshooting. The standard test condition irradiance is 1 000 W/m<sup>2</sup>, and the closer the field test conditions are to standard test conditions, the more accurate the interpretation of I-V curves will be. Good test conditions will most likely occur during the four-hour window around solar noon.

## Irradiance measurements and their impact

Irradiance measurement errors can affect photovoltaic performance testing significantly. For instance, a small error margin in irradiance can overshadow the accuracy of even high-quality I-V curve tracers like the Fluke Solmetric PVA -1500. Fast-moving clouds near the sun and high-elevation

cirrus clouds are particularly problematic. One of the benefits of using I-V curve tracers for performance test measurements is that the user can save critical environmental data along with the I-V data. This eliminates the risk of manual data entry errors that can cause trouble later and minimises the possibility of errors associated with rapid changes in test conditions.

## Choosing a suitable sensor

True pyranometers are not a good option for I-V curve testing, as they have a wide, flat spectral response that differs from that of crystalline and thin-film module technologies. Handheld irradiance sensors likewise are not a good choice, as it can be difficult to orient them reliably and repeatedly in the plane of the array. Handheld irradiance sensors may also have an angular response that differs substantially from fielded PV modules. Angular response is significant early and late in the day and on days when cloud cover scatters a significant amount of sunlight. Under

these test conditions, the array and the sensor must have an equally wide sky view.

## Reflective light influence

It is important to ensure that irradiance sensors are not influenced by strong optical reflections, as these can lead to inaccurate readings. If the irradiance sensor picks up significantly more reflected light than the PV modules under test, the model will overpredict Isc (short-circuit current), and the module will appear to be underperforming. Under certain circumstances, sunlight reflected from metal surfaces can greatly exaggerate the irradiance reading. This can usually be remedied by changing the sensor mounting location.

## Temperature measurements in photovoltaic systems

Although PV module performance is less sensitive to temperature varia-



*For accurate array performance measurements, the irradiance sensor must be mounted in the plane of the array and the sensor's spectral response should match that of the PV modules. The wireless unit shown here contains a spectrally corrected silicon photodiode irradiance sensor. It also measures backside temperature and module tilt.*

tions than irradiance, this is still a significant factor. Light-gauge thermocouples are preferred for measuring cell temperature under varying conditions. Positioning the thermocouple correctly is essential for accurate readings.

As array and module edges tend to run cool, the thermocouple should be positioned between the corner and the centre of a module, located away from the cooler array perimeter. This practice aims to select a sensor attachment point that approximates the average backside temperature. The tip of the thermocouple must make good contact with the back of the PV module, as air gaps interrupt heat transfer, resulting in low-temperature read-

ings. When moving the thermocouple between identical array sections, it should be placed at the same relative location each time to avoid introducing artificial temperature variations.

**Note:**

[1] The I-V curve – the current-voltage characteristic curve – is a graphical representation of measured current (I) and power as a function of voltage (V). I-V curve tracing is integral to the evaluation of PV module performance and diagnosis of degradation in power output. An I-V curve tracer can be used as an efficient alternative to the combined use of a digital multimeter, clamp meter, and irradiance meter to measure current and voltage.

For more information visit: [www.comtest.co.za](http://www.comtest.co.za)

### Comtest celebrates 20 years in business

The Comtest Group of Companies, established in 2005, is celebrating 20 years of successful trading in the Southern African test and measurement, communications, equipment, solutions, and specialised systems markets.

In 2005, Comtest was appointed the Master Distributor for Fluke for Southern Africa. Over the ensuing years it garnered numerous corporate awards and developed alliances with other manufacturers. It also forged alliances with more leading international test and measurement companies so that today, Comtest represents: Beha-Amprobe, BK Precision, Fluke, Fluke Calibration, IET Labs, Franklin, Meriam, Microsemi, Midtronics, Pico Technologies, and Radian Research.

In November 2010, Comtest acquired Instrotech (established in 1981). Instrotech is a supplier of high-quality process control instrumentation and industrial electronics and a leading producer of weighing electronics, signal conditioners, process calibrators, and digital display units with sales worldwide. Instrotech also imports instrumentation with distribution rights for a number of

reputable international partners and leading brand products, including: Elis, Keller, Kobold, LR-Cal LTR, Michell Instruments, Monitran, Optris, Siko, Scanon, Selet, Semnix, Sensor Tech, and Vishay VPG Transducers.

remarking on Comtest's 20th year in business, Barend Niemand, Comtest Group CEO, says, "It's been a wonderfully exciting ride from the start! I can hardly believe we are in our 20th year – 20 years of innovation, hard work and achievement. The Comtest team's dedication and perseverance has resulted in growth and success. Above all, our commitment to quality and customer satisfaction has brought us to this milestone. I want to thank our suppliers, industry and customers for their ongoing support,



*Celebrating the company's 20 years in business, Comtest Group CEO Barend Niemand recognised the input of all staff, saying, "I want to thank each and every member of staff for their contribution to Comtest's success."*

making this possible.

"On a personal note," he added, "I am truly privileged to have worked alongside my executive team, including Jannie Dirks, Sales Director; Eduard Arnold, Financial Director; Pieter Deyssel, Technical Director; and Hugh du Plessis, R&D Director. My management style is 'open door' and participative, where staff are included in decision-making and their input and ideas are welcome. Comtest people are encouraged to self-manage and foster teamwork.

"I want to thank each and every member of staff for their contribution to Comtest's success," Niemand said. "These innovative people have continuously reinvented themselves to develop new strategies to meet the challenges of ever-changing markets. The future holds exciting promise as we continue to trade actively throughout Southern Africa, with an eye on generating more export sales to Europe and beyond."

Comtest also aims to add new products to its manufactured range and acquire new companies that align with its core business focus.

For more information visit: [www.comtest.co.za](http://www.comtest.co.za)



*A selection of Fluke measurement instruments, Comtest's anchor brand.*

## Metrology compliance in oil and gas

To assist with compliance verification in the oil and gas sector, remote monitoring specialist Omniflex partnered with calibration experts Kalibra OGC Services to provide the Maxiflex flow computer systems, including pulse integrity modules used for calibrating master metering systems. These systems were integrated into two test rigs designed and manufactured in Durban, South Africa to be used at facilities in Angola and Nigeria.

Kalibra OGC Services, accredited to ISO 17025:2017 for the calibration of prover loops, designed the system to automate an already approved calibration rig used to calibrate prover loops using the Master Meter Method. Omniflex now offers the Maxiflex 4 Pulse Integrity (4PI) Module and Maxiflex Meter Prover Module which significantly enhance calibration accuracy, repeatability and reliability. This in turn ensures the calibration rig's equipment sits within acceptable limits and maintains adherence to international quality standards.

The Maxiflex Meter Method's automated system removes the potential for human error by ensuring consistent and precise measurements, operating at a high flow rate and so reducing the time required to calibrate prover loops, increasing efficiency.

The Meter Prover Module performs pulse interpolation to verify the master meter according to the Manual of Petroleum Measurement Standards. It accepts four detector switch inputs from a prover loop and receives pulses from a flow meter, performing pulse interpolation calculations in real time.

The Maxiflex 4PI monitors can accept inputs from up to four oil and gas turbine flow meters to detect and correct errors, enabling accurate totalisation and output. The prover loop is calibrated using the master meter method, which is integral

to the calibration process, to ensure measurements are precise and reliable.

The calibration process adheres to requirements set out in ISO/IEC 17025:2017, OIML D36 and OIML R117. Thus, the process is rigorous, reliable and meets international standards for accuracy and reliability.

"We were impressed with the accuracy of the Maxiflex system during our in-house testing and verification of our portable test rigs," said Warrick Riley, Kalibra Technical Director. "The Maxiflex system is suitable for ensuring that the measurements recorded using the designed procedures are in accordance with the relevant guidelines and standards. This system also assists in meeting the required uncertainty of measurement (UOM), providing precision and reliability."



*Omniflex's Maxiflex systems enable accurate calibration to support required measurement accuracy.*

Ian Loudon, International Marketing and Sales Manager at Omniflex said, "Our equipment can be used with different types of meter prover. That may be volumetric, using a tank of liquid, or by measuring weight – it depends on the technique the customer wants to use."

By following the guidelines, Kalibra OGC Services guarantees that all measurements are accurate and compliant with regulatory requirements. Omniflex's equipment complies with ISO 6551, providing for accurate measurement of petroleum products needed for financial and regulatory processes.

## Powerful software for improved relay testing

Doble RTS™ (RTS) is a leading protection testing software system to improve the testing of relays and manage test records. The RTS software is distinguished by the process consistency it delivers with power and flexibility – and automation enables unmatched efficiency, accuracy and productivity

Users can apply their established test philosophy and maintain company test and inspection standards in RTS test



*Doble RTS relay testing software provides process consistency which enables teams to share and understand test results across power systems.*

routines. The test routines can be used with a variety of test sets in the customer's equipment fleet. Administrative features enable users to share routines across the workforce and manage updates. Routines and test results are organised consistently in a secure database that simplifies reporting and eliminates cumbersome, error-prone file handling.

Whether testing electromechanical or microprocessor-based relays, performing steady-state, dynamic, or end-to-end system tests, RTS offers a straightforward, consistent user experience no matter which of the supported relay test sets are used. RTS also provides best-in-class user convenience for testing IEC 61850 GOOSE (generic, object oriented substation events) and sampled values using Doble F8200 and F8300 Power System Simulators.

RTS software includes a database for customers' use that contains test routines for more than 600 popular relay models. These routines can be used as a starting point to assist users in establishing their own customised RTS routines for their preferred testing programme.

Numerous tools like the PRC Data Control and other modules in the user interface allow for routines to be adapted to test and track maintenance on batteries, current transformers, potential/voltage transformers, transducers, and other secondary devices and power system components.



# Grid management systems: securing the power supply

*Grid management systems are the linchpin of modern Transmission and Distribution networks, ensuring their reliable and efficient operation. As sophisticated systems, they leverage advanced smart grid technologies and SCADA systems to optimise grid performance and enhance overall system resilience, both essential as South Africa transitions towards a cleaner energy mix. Herman Mare, General Manager at ACTOM, shares a closer look at the power of intelligent grid management.*

## The core components

To understand the intricacies of grid management, it is helpful to unpack the core components: supervisory control and data acquisition (SCADA) systems, energy management systems, outage management systems and wide area management systems.

The SCADA systems serve as the central nervous system of Transmission and Distribution (T&D) networks, collecting real-time data from various intelligent electronic devices (IEDs) and remote terminal units (RTUs) across the grid. This data, encompassing voltage, current, and other critical parameters, is transmitted to control centres, enabling operators to monitor and control the network in real time. SCADA systems empower operators to make informed decisions, such as reconfiguring the network to isolate faults or



SCADA systems, alongside energy management systems, outage management systems and wide area management systems, are core to smart grid technologies.

optimise power flow.

Traditionally, power generation was centralised, and grid management was relatively straightforward. However, the integration of Distributed Energy Resources (DERs), such as solar and wind power, has necessitated the use of advanced Energy Management Systems (EMS), which play an indispensable role in balancing supply and demand, optimising power flow, and ensuring grid stability.

Outage Management Systems (OMS) facilitate efficient planning and execution of maintenance, minimising disruptions to power supply. By analysing network data, OMS can be used to identify optimal maintenance schedules, coordinate resource allocation, and implement strategies to minimise outage durations.

Wide Area Management Systems (WAMS) provide a comprehensive view of the entire power system, enabling real-time monitoring of dynamic conditions. By detecting and analysing system disturbances, WAMS can trigger automated responses to mitigate potential issues, such as cascading failures.

## Smart grid technologies

Smart grid technologies, characterised by the integration of digital communication and automation, significantly enhance the reliability and responsiveness of T&D networks. These

technologies enable a higher level of monitoring and greater control, as real-time data collection and analysis allow for swift responses to disturbances, contributing to improved grid stability. Automated responses to system events, such as fault isolation and network reconfiguration, can minimise the impact of disruptions. This improves grid resilience. The use of smart grid technologies in managing distributed energy resources facilitates their integration into the grid, optimising their operation and contributing to a cleaner energy future.

Grid management systems also support proactive maintenance strategies and asset management by analysing historical data and identifying potential equipment failures. This predictive approach enables timely maintenance interventions, reducing operational costs and extending the lifespan of critical infrastructure assets.

## The power of intelligent management

The successful implementation of grid management systems offers numerous benefits, including improved reliability, enhanced efficiency as well as increased sustainability and improved customer satisfaction. Faster response times to disturbances and proactive maintenance reduce the frequency and duration of outages, improving the reliability of T&D networks. Optimised power flow and efficient use of resources lead to cost savings and reduced energy losses. The integration of renewable energy sources and energy efficiency measures contribute to a more sustainable energy future, and a reliable power supply and efficient customer service enhance the end-user experience.

## Balancing innovation and security

Recognising that smart grid management systems offer significant advantages, challenges remain, such as cybersecurity threats, data privacy concerns, and the complexity of integrating diverse energy sources. As grid management systems become increasingly interconnected and reliant on digital technologies, they are vulnerable to cyberattacks. Hackers could potentially disrupt power supply, steal sensitive data, or take control of critical infrastructure.

To mitigate these risks, it is essential that utilities implement robust cybersecurity measures, including strong encryption, firewalls, intrusion detection systems, and regular security audits.

The increasing integration of renewable energy sources, such as solar and wind power, adds complexity to grid management. These sources are intermittent and

unpredictable, requiring advanced forecasting and control techniques. Grid management systems need to be able to accommodate this variability and ensure grid stability.

### **Sustainability in transmission and distribution**

Grid management systems will continue to play an increasingly critical role in ensuring the stability, reliability, and sustainability of T&D networks, as we work to reduce South Africa's reliance on fossil fuels and transition to cleaner energy. Providing real-time visibility, enabling efficient control, and facilitating proactive maintenance, these systems are essential

to ensuring the reliability and resilience of power delivery.

As the energy landscape continues to evolve, with increasing penetration of renewable energy sources and wider use of electric vehicles, the importance of advanced grid management will only grow. By embracing leading technologies and data-driven approaches, utilities and power producers can optimise grid operations, reduce costs, and enhance the overall customer experience.

For more information visit: [www.actom.co.za](http://www.actom.co.za)

## **Transformers, substations + the grid: Products + services**

### **Managing the costs of modernising utility networks**

Modernising power networks through digitisation and innovative technologies, such as artificial intelligence (AI) and machine learning (ML), is essential for utilities and municipalities to improve efficiency and manage the growing complexities of energy distribution.

Nishan Baijnath, Systems Architect, Power Systems at Schneider Electric makes the point that a key element of this transformation is using advanced software, which serves as the backbone for integrating AI and ML into utility operations. However, the financial investment required for such a shift often poses a challenge.

He suggests that by shifting from Capital Expenditure (CAPEX) models to Operational Expenditure (OPEX) frameworks, utilities can distribute costs over time through subscription-based payments for software, so reducing the need for large upfront investments. This transition facilitates the gradual integration of advanced technologies into their operations, enhancing grid efficiency and reliability.

Large electrical utilities typically invest in enterprise-level software like Supervisory Control and Data Acquisition (SCADA), Advanced Distribution Management Systems (ADMS) and Outage Management Systems (OMS) to operate their networks. Historically, this software has been provided through perpetual licences, where the utility would pay an upfront fee and own the licence indefinitely, similar to the way in which Microsoft Office used to be sold.

#### **Significant CAPEX**

However, the perpetual licence model required significant CAPEX upfront from the utilities to purchase and maintain the software systems. The perpetual licence models usually include maintenance and support contracts with the software vendors, adding to the ongoing OPEX for the utility.

The upfront cost for deploying a typical OMS system can start around R25 million, depending on the level of implementation. This does not include the additional costs for maintenance and support contracts, or the associated hardware costs required to run the software. The significant capital investment required for such enterprise software systems is not easily manageable for municipalities and other

utility providers to pay upfront.

Over recent years, the software industry has moved towards a subscription-based model, where customers no longer own the platform, but rather 'rent' or subscribe to the use of the platform for a certain duration. The ADMS, OMS and SCADA applications that utilities use have similarly shifted towards this subscription-based or Software-as-a-Service (SaaS) model, rather than the traditional perpetual licence model.

Beyond the financial considerations of software deployment, the subscription-based model is also key to facilitating the modernisation of utility networks. For example, an ADMS generates a lot of real-time data about the network and, to leverage this data and apply ML and AI analytics, utilities with on-premises software solutions need to push the data to the cloud.

#### **Easier to analyse**

However, with a SaaS model, the data already resides in the cloud, making it easier to apply AI and ML to analyse network behaviour and conditions. The cloud-based SaaS approach enables utilities to more readily leverage advanced analytics and insights to better inform their operational decisions and improve network management.

Additionally, by leveraging the OPEX model and cloud-based platforms, utilities can gain access to innovative capabilities around energy trading and management, as they can invest in solutions that enable them to trade energy based on time-of-day usage patterns.

This allows utilities to optimise when they produce, generate, consume or store energy, leveraging the flexibility and insights provided by the platform. The OPEX model supports this type of innovation and flexibility around energy management and trading, which was more difficult to achieve with traditional capital-intensive, on-premises software deployments.

The move from CAPEX to OPEX models impacts utilities' balance sheets by reducing the high expenditure associated with capital-intensive projects. The OPEX model, through SaaS, can help a utility's finance team better manage its cash flow and reduce the reliance on an internal IT team to maintain and support enterprise software systems.

This allows the utility to focus more on its core operations of keeping the lights on, rather than having to dedicate resources to maintaining the software systems.

# Weatherproof power: dry-type transformers built for the outdoors

*As industries increasingly adopt dry-type transformers, Trafo Power Solutions reports that the demand for their use in challenging outdoor environments has surged. These robust transformers, equipped with appropriate ingress protection, are now tailored to meet the specific needs of diverse external applications, offering safety and efficiency in harsh conditions.*

**D**avid Claassen, Managing Director of Trafo Power Solutions, speaking to *Electricity & Control*, highlights the growing adoption of dry-type transformers across African markets and various industry sectors. The company, in collaboration with its Italy-based technology partner TMC Transformers, specialises in providing tailored electrical power solutions which often incorporate dry-type transformers.

“Initially, dry-type transformers were used primarily in indoor applications where safety and proximity to people or sensitive environments were paramount considerations,” Claassen explains. “However, their advantages, including lower installation costs and minimal maintenance, are driving their adoption for outdoor installations and demanding environments.”

## Protection against environmental variations

A key consideration for outdoor use is protecting transformers from water and dust ingress. With custom-designed enclosures, Trafo Power Solutions ensures that its dry-type transformers can operate reliably in extreme environments. These include applications in underground or surface mines, for example, where fine dust is present, or in areas exposed to heavy rainfall and condensation risks.

Claassen says for such applications the enclosures are engineered to meet specific ingress protection (IP) ratings appropriate to the application.

“The challenge lies in achieving the right IP rating and ensuring, at the same time, that the transformer remains adequately cooled, and the enclosure fits within the space limits specified by the customer,” Claassen says. “Even outdoor setups often have limited space, so efficient enclosure design is crucial.”

The IP rating refers to the size of the solid objects – from

a human hand to a speck of dust – that are kept out of the enclosure, as well as the extent to which liquids are precluded from entering it. The first number of the two-digit IP rating refers to solid objects or particles, and the second refers to liquids.

If an enclosure has a low IP rating for solids of 1, for example, it will keep out only solid objects greater than 50 mm in size – about the width of a human hand. At level 3, the enclosure would protect the transformer against a solid object larger than 2.5 mm in width, like a screwdriver. At level 5 the enclosure would be ‘dust protected’ limiting dust ingress, and at level 6 it would be ‘dust tight’ – excluding ingress of dust.

Applied to liquids, the rating stipulates that a level 1 enclosure would provide protection only against drops of water that fall vertically onto it. Level 3 would provide protection against sprays of water up to 60 degrees from the vertical, for three minutes. Towards the upper end of the scale, level 6 refers to an enclosure that protects the transformer from heavy seas, or from water projected in powerful jets.

“Trafo Power Solutions is among the few local providers that can deliver dry-type transformers in enclosures rated up to IP66,” Claassen notes. “By designing the transformer and its enclosure simultaneously, we ensure optimal performance and integration.”

## Efficient cooling and adaptation to climatic conditions

Trafo Power Solutions’ enclosures typically employ natural cooling, relying on optimised airflow based on the transformer’s insulation class and temperature rise. For transformers requiring enhanced cooling, forced air systems or closed-loop designs can be implemented. In highly demanding applications, water cooling systems are used to



Left: Dry-type transformer production line. Right: The transformer compartment of a dry-type mini substation supplied by Trafo Power Solutions.



dissipate heat more effectively.

The company also addresses extreme temperature conditions. For instance, in climates where sub-zero temperatures pose risks of condensation, additional heating facilities are incorporated into the design of the enclosure.

“Condensation is a key concern in intermittent operations where significant overnight temperature drops occur,” Claassen explains. “Our designs mitigate this risk, ensuring reliable performance even in such challenging environments.”

### Tailored solutions

Working closely with TMC Transformers, Trafo Power Solutions leverages advanced engineering and manufacturing standards to create tailored electrical power solutions for its customers. Each design is customised to meet local environmental conditions, whether for mining, industrial or renewable energy applications.

“Our holistic approach ensures that every transformer and its enclosure work seamlessly together, meeting the most stringent safety, efficiency and durability requirements,” says Claassen.

Dry-type transformers, with their versatility and safety,



*A dry-type transformer supplied by Trafo Power Solutions in IP65 rated enclosure.*

continue to redefine the possibilities for outdoor applications. With the right IP-rated enclosures and innovative cooling solutions, dry-type transformers can deliver reliable and sustainable performance in the most challenging environments.

*For more information visit: [www.trafo.co.za](http://www.trafo.co.za)*

## Transformers, substations + the grid: Products + services

### Technology solutions for Ugandan substations

Last year, ABB delivered solutions for three substations in Uganda run by the country's leading utility, Umeme Limited (UMEME). The utility manages and operates the state-owned and leased electricity distribution network assets.

“We have been working in Uganda since 2005 to strengthen the country's power distribution network, providing electricity to commercial and residential establishments,” said Gunasekaran Thevar, Managing Director East Africa for ABB Energy Industries. “These new projects strengthen our support for Uganda's utility sector.”

The projects are part of a broader initiative to improve the country's electrical infrastructure and power distribution network, in order to ensure robust power infrastructure to



*ABB's substation technologies are helping to deliver a reliable and efficient power supply in Uganda.*

support continuing economic growth. The ABB-built substations will help address current capacity constraints and enable a more reliable power supply.

One of the projects involved the upgrade of the 33/11 kV substation in Hoima, in the Bunyoro region, with gas insulated switchgear, a substation SCADA system and a dc charger system. Bunyoro's oil industry is centred around the Albertine Basin in Uganda, which holds significant oil and gas deposits. These draw attention and investment and are driving various infrastructural developments.

Thevar commented: “The upgraded Hoima substation will support Bunyoro's developing oil industry. We completed the project in a short timeframe, airlifting the ABB switchgear and installing it at the substation to meet customer requirements efficiently.”

ABB has also built the Jinja and Matugga substations to meet regional power needs.

UMEME recognises that an efficient power distribution network supports growth, development and improved living standards. ABB's solutions at the three substations will enhance reliability and productivity in the distribution network, reducing power outages and allowing businesses and households to operate smoothly. An uninterrupted electricity supply will also contribute to improving quality of life, attracting further investment, facilitating technological advances and boosting economic growth.

Selestino Babungi, Managing Director of UMEME, said: “ABB has been a key partner in supporting our utility sector. The substations powered by ABB's solutions will help us provide electricity to surrounding areas and uplift Uganda's overall economic activity.”

*For more information visit: [www.abb.com](http://www.abb.com)*

# The digital revolution in transformer substations

*The energy sector is under a lot of pressure. In Germany, as in South Africa, and in most countries around the world, distribution grid operators need to adapt their grid infrastructure to meet the needs of the energy transition. Here, Eplan shares the case of collaborative work it is doing using digital twin engineering to modernise substations.*



*The energy transition means grid operators, globally, need to adapt their grid infrastructure.*

**B**y 2030, some 80% of electricity is expected to be generated from renewable sources. A pilot project at *naturenergie netze GmbH* in Germany is demonstrating how transformer substations can be modernised more quickly. Working in collaboration with software suppliers Eplan and entegra, this southern German distribution grid operator is now working, for the first time, on a digital twin that will speed up the planning and further development of transformer substations significantly.

For decades, energy has been distributed in one direction – from continuously operating coal and nuclear power stations to transformer substations, and from there (once the voltage has been stepped down several times) to end consumers. To use a road traffic analogy, this quiet ‘one-way street’ has become a busy city-centre road network. Today, the energy mix changes hourly with the wind and the weather, so the familiar reliable baseload is no longer operating alone. In addition, wind farm and solar system operators feed in energy decentrally, at medium- and low-voltage levels, so power grids now work in two directions. Heat pumps and electric vehicle charging stations mean higher consumption, and the long-familiar load profiles that peak in the early evening are not as consistent as they once were. However, the quality of the supply and the 50 Hz frequency still have to be guaranteed at all times.

Grid operators are facing an enormous task – they need to

make their grids fit to meet these complex requirements. For *naturenergie netze*, this involves new construction work as well as modernising a number of existing transformer substations. The plants need to be adapted to suit the increasing demand for electricity, and the bigger challenge is that they need to be adapted to cope with a much higher level of flexibility in terms of energy sources and flows and the precise control of electricity.

## A digital twin

*naturenergie netze* was quick to address these challenges and is currently working on a pilot project as it modernises one of its systems. The grid operator is using a digital concept to plan and configure its conversion of the Rheinfelden transformer substation. The new approach applies even to the preliminary work. Rainer Beck, a grid development coordinator, explains: “Before we start planning, we create a digital twin of the transformer substation, that is, a virtual representation with all the data for both the live components (the primary technology) and the control level (the secondary technology) and, of course, for the buildings and all the peripherals. We then plan the conversion on the basis of this digital twin.”

Another challenge is that the primary and secondary technologies are planned using different CAD software tools. In this pilot project, this issue was resolved through collaboration.





Left: When modernising secondary technology, naturenergie netze relies on 3D software from Eplan. Right: New start at the transformer substation: “The digital twin forms the basis for our planning,” says Rainer Beck from naturenergie netze.

As members of the VDE ETG ‘Digital twins for electrical energy systems’ task force, two leading suppliers – entegra with its primtech software solution for the primary technology and Eplan for the secondary technology – had prepared for precisely what *naturenergie netze* needed for the preliminary planning stage: combining primary and secondary technologies in a single model.

### Major efficiency gains

entegra and Eplan were looking for an innovative distribution grid operator with a suitable pilot project to get involved as the third party in the collaboration. Contact with *naturenergie netze* came at the right time – and especially because the pilot project was a complex one.

Rainer Beck highlights that the aim of the project is to renew all the secondary technology in an existing, highly complex transformer substation – and during ongoing operations. “It would normally take two to three years to plan and implement the modernisation, but the new planning methodology will really speed things up,” he says.

Others involved in the project agree. Matthias Schuy, Business Development Manager at entegra, notes: “What we are doing here – integrating a transformer substation’s primary and secondary technology into one digital twin – has never been done before but promises major benefits.”

Beck adds: “Essentially, we need to prove that the one-off investment will pay off quickly. After the first project phase – the preliminary planning – we see considerable time savings during the actual conversion of the transformer substations. What’s more, that will apply to every project.”

### One model for all users

During the first stage of the project, the transformer substation was scanned, photos were taken of the rating plates, and the primary technology data generated was compared with the data from the asset management system. The result was a valid, functional primtech 3D model of the transformer substation. In a fully automated process, the datasets created in primtech were then exported to Eplan via an interface and used as the basis for planning the secondary technology in Eplan. The data from the secondary technology was then integrated into the digital twin.

This work is almost complete. By documenting the scenario as it currently stands, the basis has been provided for replacing the transformer substation’s secondary technology efficiently. “This is an important step. All the data is verified. We basically follow the ‘single source of truth’ principle. The data in the original systems is left untouched and linked to the digital twin. This prevents redundancies that could prove problematic in the future,” explains Jan Oliver Kammesheidt, Global Vertical Market Manager Energy at Eplan.

In terms of the architecture of the combined data model, the parties involved – very much in keeping with the twin approach – have created a special infrastructure. “There’s no leading system – instead, there are different perspectives of one and the same model. The digital twin opens a window to the systems – for example, from primtech to Eplan or SAP. The digital twin therefore fulfils one of its main functions – offering centralised access to all relevant information for the transformer substation,” Schuy notes.

### Standardising secondary technology

This collaboration involving the three parties – entegra, Eplan and the distribution grid operator – was made possible, or at least made easier,

# MV XLPE CABLE

CROSS LINKED POLYETHELENE (XLPE) CABLES

A MEMBER OF HENG TONG GROUP  
ENLIGHTENING THE FUTURE

1 Corobrik Street, Meadowdale Gauteng  
PO Box 1679, Edenvale, Gauteng, 1610, South Africa  
Tel +27 (0) 11 396 8000 | Fax +27 (0) 11 396 8013  
info@aberdare.co.za | [www.aberdare.co.za](http://www.aberdare.co.za)





Rainer Beck, natureenergie netze, says: "After the preliminary planning stage, we see considerable time savings during the actual conversion of the transformer substations. And, that applies to every project."



Matthias Schuy, entegra: "Digitally combining primary and secondary technology is unique – and it promises major benefits."



Jan Oliver Kammesheidt, Eplan: "The industry needs to standardise. We are delighted to have found an innovative partner in natureenergie netze."



Simon Rümmele, natureenergie netze: "With Eplan, we can drive forward the standardisation and more efficient engineering of the secondary technology."



entegra and Eplan are working together to develop a 'project blueprint'. This will help to ensure that grids can be expanded in future with high efficiency.

by a decision taken two years ago. That was when *natureenergie netze* started using the Eplan Electric P8 and Eplan Pro Panel software solutions to plan its secondary technology, that is, its control technology. Simon Rümmele, who is a grid development project leader, was responsible for this and is still in charge today. "With Eplan, we can drive forward the standardisation and more efficient engineering of the secondary technology – as well as end-to-end planning that we can also use during the operation phase for preventive maintenance and overhauls," he says.

### Lessons from mechanical engineering

The project is demonstrating that users in the electricity industry are benefitting from experience and solutions from mechanical engineering. In that sector – one in which Eplan has been active for decades – standardisation and 'industrialisation' of panel building and switchgear manufacturing equipment is firmly established. In taking this step for transformer substations, there is still a lot of catching up to do – but it needs to be done. "Until now, transformer substations have been planned on a case-by-case basis and built as one-offs. However, this makes it difficult to judge the need for modernisation and new-builds that is arising as a result of the energy transition. The sector needs to standardise much more than it has in the past. We are providing support for that and we are delighted to have found an innovative partner in *natureenergie netze*," says Kammesheidt. "With the joint digital twin for primary and secondary technology, we are speeding up the process considerably and making it more reliable, too," he adds.

### Strong partners for the conversion

Rümmele says this is precisely what *natureenergie netze* is aiming to achieve. "We need to digitalise more, because we believe this will open up opportunities and make things easier in the future. That's why we are trying out the latest technologies and planning further pilot projects at our transformer substation in Rheinfelden. Additionally, with Rittal, the sister company of Eplan, we have a strong partner on board for converting the 'hardware', that is, all the enclosure technology," he says.

*natureenergie netze* has also been planning standardisation for some time now – and the joint digital twin created by entegra and Eplan will provide the basis for this, too. Rainer Beck says, "We can envisage using two standard concepts and buildings in the 110 kV range and creating variants on the basis of these. We are also working on this with the primary suppliers which will further cut down the time and planning required. And this is key, because we're going to be forced to adapt most of our transformer substations to comply with the new requirements. The digital twin and the preliminary work being carried out by entegra and Eplan will help us with that. Through partnership and collaboration, we are developing an innovative solution that will help us develop our grids and make them fit for the future efficiently."

It is not only *natureenergie netze* that will benefit from the project. Kammesheidt notes: "Unlike the mechanical engineering sector, grid operators openly share information, because they are not competing with each other. There is already a lot of interest. I am convinced that many grid operators will be able to take what we are doing here and in the VDE task force and use it to plan and implement their own conversion and new-build projects fast."

For more information visit: [www.eplan-software.com/](http://www.eplan-software.com/)



## Protecting the grid



*With this acquisition, TE Connectivity offers power infrastructure owners and builders expanded product lines for grid reliability, safety and performance.*

Extreme weather events seem to be an increasingly common phenomenon – threatening grids and utilities around the world, and the businesses and communities they serve.

Known for engineering reliable, resilient, and innovative connection and protection solutions for utilities and the power sector, TE Connectivity's energy business recently acquired grounding and lightning protection specialist, Harger. This enables TE to offer its customers an expanded portfolio of grid protection solutions.

TE Connectivity is a world leader in connectors and sensors, and Harger is an American leader in lightning protection and grounding solutions for IEEE markets. Grounding solutions are the cornerstone of grid reliability, they enhance the safety and functionality of the entire electrical system and, in solar farms, they form a critical component of the electrical balance of system (EBoS). With this strategic acquisition, TE's energy business unit serves customers with a broader portfolio for grid reliability and connectivity solutions in renewable power, utilities, and industrial applications.

"Harger is an attractive addition to the TE portfolio because of its market reputation and strong customer service. I am pleased to welcome the talented Harger team to TE and create our new engineering and manufacturing competence centre for lightning protection and grounding solutions," said Bart Otten, Senior Vice President and General Manager of TE's energy business unit. "Adding Harger to our portfolio enhances the value we bring to our customers as one connectivity partner. This acquisition marks a further step in our strategic vision to be the partner of choice for innovating sustainable energy networks that keep the power on."

"For 64 years, Harger has been an expert in lightning protection and grounding solutions and services, ensuring the reliability of the power grid infrastructure in North America," said Mark Harger, steward of the company and son of the founder. "Under TE, customers will benefit from service

continuity and ongoing investment in new product development. I am excited for the future of the Harger business."

### Single & Trefoil Cable Cleats

- Used to restrain single and trefoil cables onto cable 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.

☎ 011 3942020 ✉ [info@ccgcablegland.co.za](mailto:info@ccgcablegland.co.za)

🌐 [www.ccgablegland.co.za](http://www.ccgablegland.co.za)

# Training partnership for inclusive growth in renewable energy

According to the United Nations, South Africa's renewable energy sector could create over 20 000 jobs annually, reflecting a global trend where investments in renewables generate three times more employment than they would in the fossil fuel industry. The Energy and Water Sector Education and Training Authority (EWSETA), in partnership with Veer Energy, is working to ensure these employment opportunities are accessible to all through the Veer Energy Programme. This is an initiative that empowers unemployed youth and learners with disabilities to build meaningful careers in renewable energy.

The 15-month programme in Electrical Network Control offers a structured learnership that combines theoretical knowledge with hands-on training in renewable energy technologies. The programme addresses critical skills shortages in the green economy and champions inclusivity, transforming lives and building pathways to financial independence.

"This partnership is a testament to our commitment to creating opportunities for individuals who are often excluded from the job market," said Robyn Vilakazi, EWSETA's Executive for Skills Development and Quality Assurance. "By equipping participants with the skills they need to thrive, we are driving meaningful change and unlocking potential in South Africa's renewable energy sector."

The Veer Energy Programme has already made a life-changing impact on its participants. As just one of the participants, Themba Ndlovu, a graduate of the programme, shared his inspiring journey.

"Before joining the programme, I felt overlooked in the job market. Today, I have a stable job and the confidence to dream bigger. Working at Veer Energy has been life-changing, and I'm proud to contribute to a greener future."

Of the 50 programme participants, 10 were people with

disabilities. Of the 22 participants who secured permanent employment with Veer Energy, four were people with disabilities. Vilakazi says, "We've seen how stable employment has brought financial security to many participants, uplifting individuals and entire families." For EWSETA, inclusivity is a moral imperative and is essential to creating a stronger, more equitable workforce. By empowering underrepresented groups, the programme is addressing inequalities and contributing to achieving South Africa's broader socio-economic goals.

The initiative aligns with the South African government's National Development Plan 2030 and global efforts such as the United Nations Sustainable Development Goals, particularly SDG 7 (affordable and clean energy) and SDG 8 (decent work and economic growth), which prioritises inclusivity and skills development as drivers of economic growth. The renewable energy sector, a cornerstone of the country's green economy, holds multiple and wide-ranging opportunities for employment and entrepreneurship. The Veer Energy Programme contributes to ensuring that no one is left behind. "This initiative exemplifies how inclusivity drives economic and social progress," Vilakazi added. "At the EWSETA, we remain committed to transforming lives and driving economic empowerment because we understand that when we empower underrepresented groups, we strengthen the renewable energy sector and open doors to a better future for all."

EWSETA's Veer Energy Programme is a bright example of how public-private partnerships can tackle pressing social and economic challenges. By combining EWSETA's expertise with Veer Energy's innovation, the programme is setting the standard for inclusivity and excellence in skills development.

For more information visit: [www.ewseta.org.za](http://www.ewseta.org.za)



Louise Wiseman, Managing Director of The IIE's Varsity College, Vega & IIE MSA.

## IIE engineering degrees fully accredited by ECSA

The Independent Institute of Education (The IIE), one of South Africa's leading private higher education institutions and a division of JSE-listed ADvTECH, has received full accreditation from the Engineering Council of South Africa (ECSA) for the degree courses it provides in engineering. It is the first private higher education provider in the country to be recognised in this manner by ECSA, the professional authority.

All engineering degrees offered in South Africa must be approved by ECSA. The IIE has been offering ECSA endorsed Bachelor of Engineering (BEng) degrees since 2018. During the initial development stages and in the first years of the IIE's offering these degrees, ECSA conducted site visits and reviews of the degrees, to ensure that the qualifications adhere to best practice and to national and international standards for engineering. The IIE has now been awarded full accreditation from ECSA for its BEng Degrees in Electrical and Electronic Engineering and in Mechanical Engineering. "This is a significant milestone for The IIE as it becomes the first private higher education institution in Africa

to receive full accreditation for its engineering degrees under the international Washington Accord," says Louise Wiseman, Managing Director of The IIE's Varsity College, Vega and IIE MSA.

Private higher education institutions in South Africa may not, at present, call themselves private universities due to historical criteria. However, the Department of Higher Education and Training is in the process of finalising criteria for institutions with the aim of ensuring that qualifying private higher education institutions may rightly be recognised as private universities (as opposed to state funded public universities). "This recognition from ECSA re-affirms that The IIE is uniquely positioned in the private sector to provide the highest quality of academic excellence and ensure our qualifications and students are deservedly recognised – in line with their peers in public universities – in the industry and the workplace," Wiseman says.

For more information visit: [www.iie.ac.za/](http://www.iie.ac.za/)



# Transforming the electricity market in South Africa

Jason van der Poel, Partner, Emma Bleeker & Kiera Bracher, Associates at Webber Wentzel

On 1 January 2025, the Electricity Regulation Amendment Act 38 of 2024 (ERAA) came into effect, following extensive stakeholder engagement and multiple draft iterations. The ERAA is intended to guide continuing change in the South African electricity sector, including the shift from Eskom's historically vertically integrated monopoly to the establishment of the Transmission System Operator SOC Limited (TSO) and the introduction of an open-market platform that enables competitive trading of electricity. The legislative team in government displayed a high degree of responsiveness to industry feedback and, as a result, this new law has been largely welcomed by stakeholders.

Here we share a high-level outline of three key changes that anyone looking to participate in and capitalise on the South African electricity sector should be aware of. We also flag some provisions of the ERAA that seemingly contradict the open and competitive market it intends to create.

## The Transmission System Operator

Perhaps the most significant shift expected in the reformed electricity market introduced by the ERAA is the formation of the TSO, which follows from the unbundling of Eskom that began in 2019. The TSO is intended to act as a system operator, market operator, transmitter, and central purchasing agency, establishing an open-market platform that facilitates competitive trading of electricity. In 2024, Eskom hosted a series of public consultations on a draft market code, during which the new rules for the operation of South Africa's new open and competitive electricity market were thoroughly canvassed.

However, some provisions of the ERAA seem to contradict the legislatively mandated purpose of the TSO directly. For example, the National Energy Regulator of South Africa (NERSA) has the power to "set and approve prices and tariffs" under the ERAA, except in relation to "direct supply agreements". Power purchase agreements between generators and traders (as customers) do not fall within the ambit of "direct supply agreements." Section 15(4) of the ERAA states that "a licensee may charge customers tariffs which have not been set or approved by NERSA when the applicable tariff is charged pursuant to a direct supply agreement or arises as an outcome of a competitive market."

This creates a situation where a willing buyer-willing seller relationship between a generator and a trader (as a customer) could be stalled without NERSA setting or approving the applicable tariff, due to the restrictive definition of direct supply agreements. This language undermines the open and competitive market that the ERAA aims to establish.

## Reticulation and municipalities

The South African Local Government Association (SALGA) has been among the most vocal opponents of the ERAA, due to what it regards as putting the function of municipalities, within the electricity sector, into crisis. As a result of the criticisms levied by SALGA, the definitions of "reticulation," (effectively distribution) and "distribution power systems" have not come into effect along with the rest of the ERAA. These definitions will come into effect at a date determined by the President through proclamation in the Gazette. SALGA's primary concern revolves around the claim that

the ERAA undermines municipalities' right to reticulate electricity within their areas. However, while Schedule 4B of the Constitution grants municipalities the right to reticulate electricity, it is not explicitly clear whether this right is exclusive.

The nature of municipalities' right to reticulate is an issue to be determined by the courts. In addition to legislative interpretation, the courts will, we hope, be alive to the fact that half of South Africa's distribution grid is owned and operated by municipalities, which means their role in the market is important. However, municipal debt to Eskom currently sits at over ZAR 95 billion and continues to grow, and this could potentially frustrate the transformation Eskom needs to undergo. SALGA has threatened litigation over the ERAA, and the sooner clarity is provided on this issue, the better for all involved.

## The role of the minister

The Minister of Mineral Resources and Energy (which we assume to refer to the new Minister of Electricity and Energy) (the Minister) is afforded broad discretionary powers under the ERAA. According to section 34 of the ERAA, the Minister is entitled to make a determination for new or additional capacity if there is a "failure of a market," "an emergency," or "for purposes of ensuring the security of energy supply in the national interest." Included in the provision is the power of the Minister to deviate from the Integrated Resource Plan (IRP), which serves as the national roadmap for meeting South Africa's energy needs. Reasons for deviating from the IRP should be few and far between, but, instead, the trigger events for a Ministerial deviation in the ERAA are undefined and broad in scope. Judicial intervention may eventually be needed to give greater certainty as to what the trigger events entail and to limit the far-reaching discretion afforded to the Minister.

Just as important as what has been included in the ERAA is what has been taken out. Under the previous Act, new generation capacity under section 34 was required to be established through a fair, equitable, transparent, competitive, and cost-effective tender process. However, no such requirement exists under the ERAA. Furthermore, section 34 empowers the Minister to make determinations regarding additional electricity, new generation capacity, and electricity transmission infrastructure, "after consultation" with NERSA and the Minister of Finance. Under South African law, "after consultation" means that prior consultation is required, but that it is not necessary to reach an agreement before a decision is taken. "In consultation" would require consensus. These changes afford the Minister more freedom under the new legislation and seem contrary, in principle, to the competitive market the ERAA aims to facilitate and encourage.

The Minister is authorised to grant Ministerial deviations in respect of activities that require a licence. Licence applications must be submitted through NERSA, including evidence of IRP compliance or reasons for any deviation from the Ministerial approval. Section 10(2)(g) of the ERAA retains this provision, despite concerns about the impracticality of obtaining Ministerial deviations. Fortunately, projects exempted from the legal requirement for a generation licence under Schedule 2 of the ERAA do not require a Ministerial deviation, avoiding this potential obstacle. However, for licensed activities, the result could be a

bureaucratic deadlock, which is at odds with the creation of “an open market platform that allows for competitive electricity trading”.

The ERAA heralds a bold new era for the South African electricity market and is to be welcomed. Stakeholders in South Africa’s electricity market may need to rely on the country’s judicial system to limit government power and provide clarity on certain issues arising from the ERAA. The challenges outlined above are not exhaustive, and more are likely to emerge as stakeholders navigate the new legislative landscape.

### The electricity market over the next six years

In a further note, Jason van der Poel, Partner, Danielle van der Vaart, Senior Associate & Kiera Bracher, Associate, outline key aspects of the competitive, multi-market electricity trading platform that the ERAA intends to establish. They look at the Market Code (MC) and market role players, the meaning of multi-market platforms and some of the prevailing market concerns around the changes to the South African electricity sector.

### The Market Code and role players

The ERAA establishes the Transmission System Operator SOC Limited (TSO), which is responsible for developing the MC. The MC governs short-term power exchanges in a competitive electricity market. This represents a shift from competition for the market to competition within the market. The MC proposes a five-year transition period, with a target commencement date of April 2026. If all goes according to plan, there will be a fully operational competitive electricity market by May 2031.

The MC defines three primary market players.

- A Party: any signatory to the MC, including anyone using the Eskom grid.
- A Balance Responsible Party (BRP): anyone who, in addition to adhering to the MC, consumes or generates power in South Africa, and submits forecasts a day ahead. The default is for generators and consumers to be balance responsible.
- A Market Participant: those trading through multi-market platforms, which is an additional choice while still being subject to the MC and balancing.

The development of the MC is ongoing. Comments on the first draft were due by 29 October 2024, and a revised draft is expected in early 2025. Both the MC and ERAA will adapt continually to market changes and challenges. The first draft outlines foundational rules for South Africa’s transition to a competitive electricity market, allowing stakeholders to make decisions that capitalise on available opportunities.

### The multi-market model

A competitive electricity market refers to trading platforms managed by the Market Operator within the TSO. The Market Operator ensures fair and transparent financial settlements between buyers and sellers, balancing electricity production and consumption through four platforms: the Day-Ahead Market, the Intraday Market, the Day-Ahead Reserve Market, and the Balancing Market.

- Day-Ahead Market: Consumers submit their predicted hourly consumption levels as demand orders and

generators offer available capacity to the Market Operator, which then matches generator bids and consumer demand for the next day on an hourly basis. This is where the most energy will be traded. The System Operator then formulates dispatch instructions for the next day, relying on order volumes that have been recalculated to include network constraints.

- Intraday Market: This market functions in the same way as the Day-Ahead Market, balancing production and consumption throughout the day with frequent reconciliations, allowing intraday adjustments.
- Day-Ahead Reserve Market: This platform allows generators to provide reserves and consumers to reduce consumption to assist the System Operator with the operation of the grid a day ahead. Generators and consumers are compensated at higher rates for availability and dispatchability.
- Balancing Market: The System Operator consolidates forecasted and actual electricity production and consumption. A BRP is held responsible for any imbalances caused due to the difference between real and scheduled supply or demand through balancing costs. There will be a penalty payment applicable, to incentivise accurate forecasting, which contributes to a balanced system.

These markets will work together to maintain a balanced and efficient electricity system. The multimarket is not obligatory and existing power purchase agreements (PPAs) will not be affected. Trading on the Day-Ahead or Intraday Markets is voluntary and can also be used to supplement existing PPAs or sell additional energy.

### Market concerns

A key focus for stakeholders is how South Africa’s electricity market will transition to a competitive trading market. Central to this will be the vesting contracts between Eskom generators and the Central Purchasing Agency (CPA), a critical function of the TSO role. These contracts hedge fixed capital, operation, and maintenance costs throughout a plant’s lifetime and will gradually transition energy and reserve capacity prices to market prices over five years. Each year, the hedged volume will be reduced by 20%, ensuring that, by the end of the transition period, market participants will be dealing with the market price. The hedge price will not be a flat rate that ignores the market completely, it will instead follow the market but provide protection from market price fluctuations. Eskom generators will be the BRP for all the power they generate.

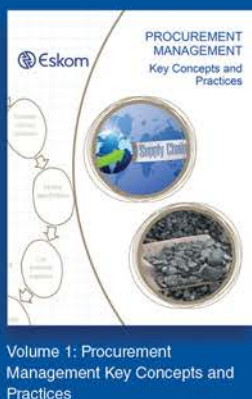
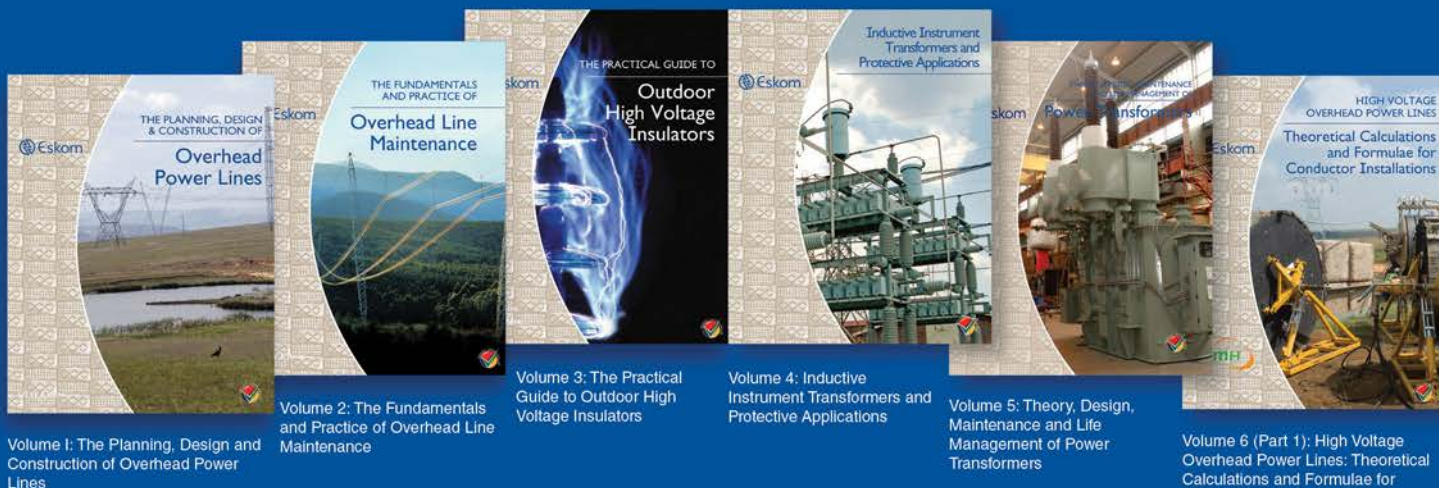
The legacy contracts between Eskom and independent power producers as part of the Renewable Energy Independent Procurement Programme (REIPPPP) are protected by the CPA becoming the financially responsible party. The CPA will participate in the Day-Ahead Market on behalf of generators, acting as a price-taker and spreading legacy charges among consumers. As market prices rise, legacy charges will decrease because the CPA will be able to recover more. Spreading legacy charges among consumers is an acknowledgment of the key role the REIPPPP has played in developing the South African electricity market.

This points to an exciting transition for South Africa’s electricity sector. Properly implemented, the MC will assist in achieving greater energy security and affordability, which will help to drive economic growth.

For more information visit: [www.webberwentzel.com](http://www.webberwentzel.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.



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

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



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



# THINK

# ifm-LINK

 IO-Link



*The game changer  
No more blind spots in the digital process*



ifm – close to you!

[www.ifm.com/za](http://www.ifm.com/za)