

FEATURES:

- Industry 4.0 + IIoT
- Energy management + the industrial environment
- Measurement + instrumentation
- Transformers, substations + cables

06/2023

SAFEGUARD YOUR ASSETS,
ANYWHERE, ANYTIME!

iritron
an **ecogroup** company

ELECTRICITY + CONTROL

CROWN
PUBLICATIONS

WEG MOTION FLEET MANAGEMENT

More connectivity and digitization to
**improve your industrial
fleet performance**

Developed to simplify and speed up the operation, maintenance and management of industrial plants, the WEG Motion Fleet Management is the ideal solution for monitoring and increasing the uptime of your industrial drive fleet.

Based on cloud computing technology, the performance of assets can be monitored at any time, from any part of the world.

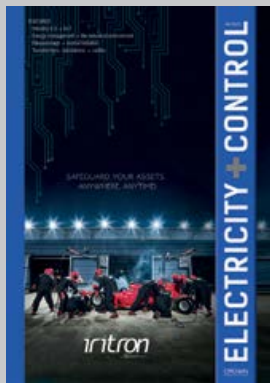
The WEG Motion Fleet Management allows checking the operating status of low and medium voltage motors and drives (VSDs and soft-starters), gearboxes, gearmotors, compressors and other assets installed in any type of industry or facility.

Driving efficiency and sustainability.



ZEST
WEG Group





Modern remote monitoring solutions are designed to provide real-time data on equipment performance and maintenance needs, enabling proactive maintenance to reduce downtime and improve overall asset performance.

(Read more on page 3.)

Editor: Leigh Darroll

Design & Layout: Darryl James

Advertising Manager:

Heidi Jandrell

Circulation: Karen Smith

Editorial Technical Director: Ian Jandrell

Publisher: Karen Grant

Deputy Publisher: Wilhelm du Plessis



Audited circulation Quarter 1 (Jan-Mar) 2023
Total print and e-editions 13 440

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@crow.co.za; admin@crow.co.za

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

CROSS PLATFORM CONTENT INTEGRATION:

* Electricity+Control Magazine * Online Edition

* Weekly e-Newsletter * Website * LinkedIn



Electricity+Control is supported by



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

Encouraging young learners

I write this comment as we prepare for the Regeneron International Science and Engineering Fair (ISEF), which is being convened this year in Dallas.

There are a number of reasons I am pleased to be able to report on this.

The first and most obvious one is, this year, we will have the almost 2 000 pre-college learners from around the world on site. We are also expecting around 1 000 judges to be on hand to assess the projects over the next few days.

Secondly, we again have a delegation of excellent South African young scientists competing at these international finals in Dallas. Make no mistake, the South African finalists more than hold their own on this spectacular international stage.

The affiliated South African fair is the Eskom Expo for Young Scientists. The annual Eskom Expo has taken science to every corner of the nation – and beyond. It has promoted the importance of the STEMI subjects (science, technology, engineering, mathematics, and innovation) in activities well beyond the classroom. Indeed, it is these extra-curricular commitments that really drive learners to understand the importance of STEMI.

The challenge, of course, is how to achieve those same levels of interest, excitement and excellence in the average school and to impact all South African learners. We fare far less favourably on that front.

Thirdly, the ISEF reminds me that so many of the activities that drive a true love for science and engineering subjects rely on volunteers. I am fully aware that many folk reading this Comment are involved in such volunteer activities. The Eskom Expo relies on their involvement, and the Regeneron ISEF relies on it similarly.

But allow me to challenge all of you to offer the opportunity to young learners to understand what our industry is all about, to learn what your company is all about.

Reach out to local schools, and perhaps consider creating opportunities for the children of the employees of your company.

We need far more youngsters interested in our industry. The world will be made a better place by offering them encouragement. You can also use the opportunity to emphasise that the problems we face will not be solved by accountants, lawyers, or even politicians...

They will be solved by us, and those we encourage.

Ian

Ian Jandrell



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

Young SA scientists competing at the Regeneron ISEF

A group of six outstanding young scientists from South Africa travelled to Dallas, Texas in the USA, in May, to showcase their scientific brilliance on the global stage at the Regeneron International Science and Engineering Fair (ISEF).

These exceptional individuals won the opportunity to represent the country following their successful entries in the Eskom Expo International Science Fair (ISF) held in December 2022.

The participating learners

Brandon de Greef, Grade 12 at Crawford International Ruimsig, in Johannesburg, will present his research project entitled: 'Evaluation of powdered insulators for High Voltage Applications'.

Keitumetse Sebatilelo, Grade 11 at Carleton Jones High School in Merafong, Gauteng South, will present her research project on 'Predicting the likelihood and

severity of sinkholes occurring in Khutsong from underground water pipes'.

Enzo Blignaut, Grade 10 at Paul Roos Gimnasium in Stellenbosch, will share his research on 'The impact of land use type and distance downstream on the general river health and water quality in the Eerste River, Western Cape, South Africa'.

Matthew Witbooy, Grade 12 at Curro Durbanville in Stellenbosch, will present his research on 'Land use effects on soil quality in Philippi, Western Cape, South Africa'.

Tyla Shepstone, Grade 10 at Somerset College in Stellenbosch, will present her research project, 'Smart system for hazardous gas and heat detection and an alert system for households'.

Yu Tang (Milo) Shan, Grade 12 at St John's College in Johannesburg, will present his research project, 'Soil Moisture Artificially Intelligent Regression in Domestic Garden Environment to Conserve Water'.

CONTENTS

FEATURES

INDUSTRY 4.0 + IIOT

- 4 Transitioning to a digital future
Leigh Darroll, Electricity + Control
- 6 Robots assist in automated palletising system
Yaskawa Southern Africa

- 7 Products + services

ENERGY MANAGEMENT + THE INDUSTRIAL ENVIRONMENT

- 12 Battery energy storage will support grid access
SAWEA

- 13 Products + services

MEASUREMENT + INSTRUMENTATION

- 19 Products + services

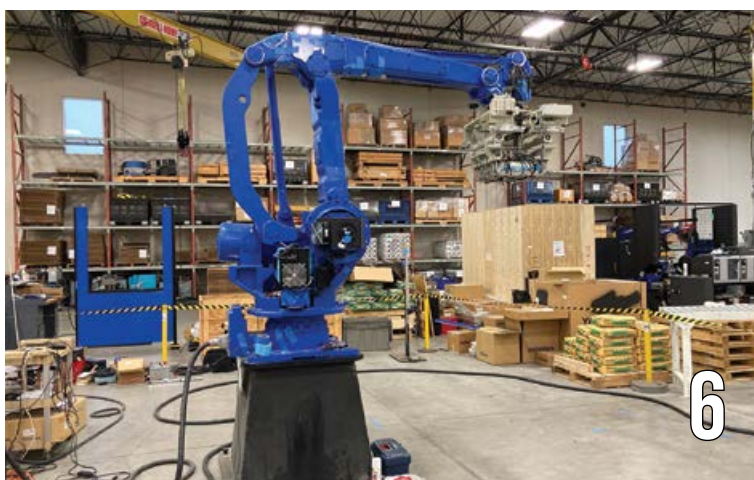
TRANSFORMERS, SUBSTATIONS + CABLES

- 22 Specialised transformers for mine's 40 MW solar plant
Zest WEG

- 24 Products + services

REGULARS

- 1 Comment
Encouraging young learners
- 3 Cover article
Remote asset monitoring – improving ROI through production efficiency
- 29 Reskilling, upskilling + training
Skills programme for women in the Just Energy Transition
- 30 Cybersecurity
Threat hunting should form part of the strategy
- 31 Engineering the future
Demand for electric cars is booming
- 32 Write @ the back
e-Micro mobility: it starts in Rosebank, Johannesburg



Remote asset monitoring – improving ROI through production efficiency

Management guru Peter Drucker famously said, “If you can’t measure it, you can’t manage it.” This adage is nowhere more important than when dealing with monitoring of industrial equipment aimed at continually improving production efficiency – resulting in an increased return on investment through the intelligent management of plant operations and maintenance.

The manner in which industrial equipment is monitored and managed has significantly changed over the years. According to the MarketsandMarkets report: *Remote Monitoring Market for Industrial Equipment – Global Forecast to 2024*, the global market for remote monitoring and control systems in industrial automation was valued at \$7.68 billion in 2019 and is projected to reach \$12.84 billion by 2025. This projected growth indicates the importance and value placed on remote monitoring.

Modern remote monitoring solutions are designed to provide real-time data on equipment performance and maintenance needs, enabling proactive maintenance to reduce downtime and improve overall asset performance. These solutions offer real-time data monitoring of, for example, heating element health and impedance, kW, kWh, V, A, PF, Thyristor status, and other process sensor values. Operators and engineers can trend and historize this information, making it possible to visualise equipment performance over time. Alarm notification options, including SMS and email notifications, allow instant response to potential issues. Regarding data visualisation, dashboarding is web-based and accessible from large overhead displays, desktop screens, or mobile devices. To enable remote connection requires a network connection (TCP/IP or Wi-Fi) and internet access. A suitable 3G / 4G / LTE solution can connect the outermost remote sites if an internet connection is unavailable.

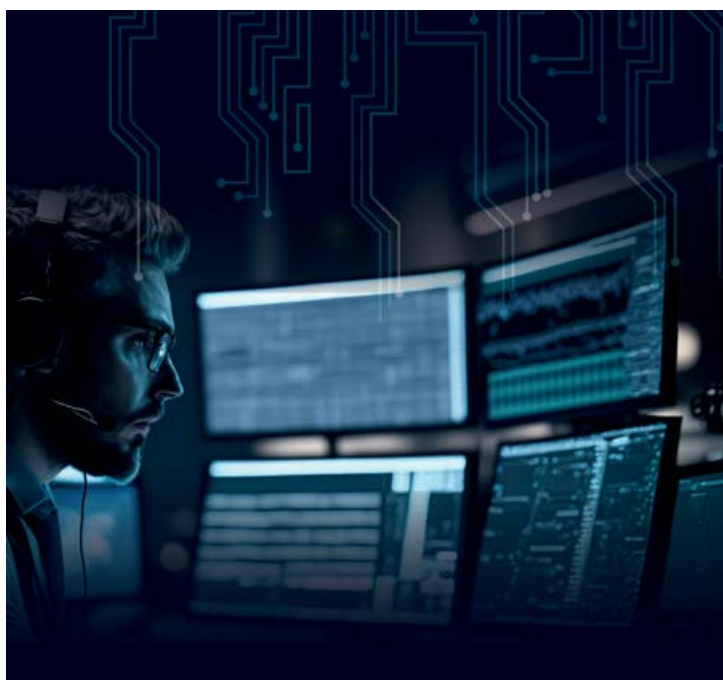
Remote monitoring solutions offer numerous benefits for industrial equipment management resulting in increased production efficiency and cost savings. Additionally, the solution can significantly reduce maintenance costs as technicians can access real-time data on equipment issues, reducing the need for on-site visits. Furthermore, remote monitoring offers increased safety benefits as equipment malfunctions can be detected early on, reducing the risk of safety incidents. Solutions can be on-premises or cloud-based making it possible to implement remote monitoring even in areas with limited network connectivity.

A remote monitoring solution can be provided by original equipment manufacturers (OEMs) to clients as an additional value add, or OEMs can use the solution to provide a monitoring service to clients. All that is required

on a remote site is a network connection.

Remote monitoring solutions have become essential for asset monitoring and management. With the latest technology and real-time data monitoring capabilities, remote monitoring enables users to make informed decisions and take proactive measures to improve equipment effectiveness, reduce maintenance costs, and improve overall safety. The increasing adoption of remote monitoring solutions is expected to continue in the coming years, further driving the growth of the remote monitoring market.

Iritron is a Level 2 B-BBEE empowered engineering, integration and manufacturing company providing solutions in the fields of electrical, instrumentation and control systems and decision support systems. We have extensive local and international engineering expertise and a proven track record across various industries. □



Remote monitoring solutions have become essential for asset monitoring and management.

For more information contact:

Gerhard Greeff, Divisional Manager PM&C, Iritron.

Mobile: 082 654 0290

Email: Gerhard.greeff@iritron.co.za

Visit: www.iritron.co.za

Transitioning to a digital future



Claudio Ranaudo, SVP
Digital Industries at
Siemens, Sub-Sahara
Africa.

Claudio Ranaudo took up the position of Senior Vice President Digital Industries at Siemens, Sub-Sahara Africa, towards the end of 2021. With more than 15 years' experience within Siemens internationally, Claudio has handled various roles and portfolios, including water, oil and gas, industrial automation, and the energy business. Prior to coming to South Africa, he was the Digital Industries Head of Siemens in Qatar and Oman as well as leading Business Development for the Middle East region. Leigh Darroll spoke to him at the recent Africa Automation Technology Fair.

Considering his international experience, the first question was how South African industry compares in terms of automation and digitalisation. Ranaudo says South Africa presents a mixed picture. "In some sectors, like mining and minerals, the automotive industry and food and beverage industry, we see a very high standard of automation and IIoT applications. In others, across general manufacturing for example, there are gaps in application, skills and knowledge. This presents opportunities and we recognise great potential to grow and extend the use of digital technologies as well as, importantly, the skills base – through knowledge sharing and skills training programmes.

"Extending our digital capability is not just for customers. We believe that skills, education and developing the right skill set, including engineering and soft skills, will be the key for success. This is a core focus for Siemens internationally. Developing an enabling digital ecosystem is front and centre in Siemens' capacity development programmes."

For instance, Siemens South Africa has designed a program that will connect female mentors from around the world with the 600 young women in Africa participating in the

African Girls Can Code Initiative (AGCCI). This partnership will upskill over 600 young African women in readiness for digital skills of the future. It is just one of several focused education and training programmes that Siemens supports in South Africa and the continent.

Key industry sectors

For Siemens Digital Industries in sub-Saharan Africa, key focus areas are in utilities and infrastructure, specifically in water and wastewater management, at national and municipal government levels, as well as the mining and minerals processing industries, and pharmaceuticals.

Water and wastewater management are critical utilities services and, in these sectors, Siemens is developing valuable automation technologies and digital tools that support operational efficiencies and better infrastructure maintenance. With the need for skills training in South Africa and other African countries, particularly in infrastructure, Siemens is doing the development work which is supported by the German government and a range of suppliers.

In mining and minerals processing, the company works with most of South Africa's leading mining houses, at sites in the country as well as across the continent.

In the pharmaceuticals sector, Ranaudo highlights that when Covid 19 struck, Siemens was instrumental in helping establish the first vaccine manufacturers in SA and on the continent. "We collaborated with key vaccine manufacturers to enable our technology for the manufacturing of the vaccines." He adds that post the pandemic, these companies are now producing a wider range of vaccines that serve South Africa and other African countries such as Rwanda, Senegal, and Ghana.

Challenges and opportunities

Ranaudo notes that the challenges industry faces here are well recognised, as are the obstacles to foreign investment in South Africa. "All investors look for political stability, reliable, established infrastructure in terms of power and water, employable people, and an environment supportive of business." He adds that South Africa still holds the advantage of its geographical location: "It is well positioned, between two oceans and offering access into Africa. Generally, it offers a hospitable environment; it is a very liveable place. It has a large workforce and a



The water supply works at Thune Dam, Botswana, one of the infrastructure projects Siemens was involved in recently.



Monitoring water levels and water flow at Thune Dam.

predominantly young population, keen to be trained to new skills. It presents significant opportunities.”

A history in SA

Ranaudo also highlights that Siemens has been present in South Africa for more than 160 years. It was the fourth country the company invested in, after Germany, the UK and Russia. It was Siemens that set up the first telegraph system between Cape Town and Simonstown. “As Siemens, we are proud to be in South Africa,” he says, “and we see ourselves first as a South African company offering a German brand, rather than a German company operating in South Africa.” Siemens South Africa is a Level 1 BBBEE company and has a well-established footprint locally, with national offices. Across sub-Saharan Africa, it has regional offices in Kenya, Tanzania and Ghana. “Siemens is recognised as the leader in automation internationally and we bring value to our customers the world over,” says Ranaudo.

Digitalisation and sustainability

Sustainability, as a critical global challenge, is also a core focus for Siemens, internally and for the industries and customers it serves. Digital Industries – and the digitalisation of industry – are central to this, aimed at improving efficiencies in industrial operations and performance and the more efficient use of resources: materials, energy, water. “The implementation of digital systems and technologies enables our customers to be more sustainable,” says Ranaudo. “If, for a simple example, you are using an energy-efficient drive that consumes 100 Watts rather than one that consumes 1 000 Watts of electricity to perform the same task – you are improving a plant’s energy efficiency.

“Digitalised process control systems that are web based, as we have launched here today, provide for remote monitoring of operations and plant maintenance. This also supports efficiencies, reducing time and costs and emissions associated with travel – particularly for remote sites as in mining and infrastructure.

“We are also seeing new efficiencies emerging, for example, in vertical farming. Here, the land footprint (and impact) is reduced and the compact scale of production achieves significant efficiencies in water and energy consumption, as well as in infrastructure.

“In water utilities and infrastructure, new digital technologies



can also play a valuable role – monitoring pipelines from national bulk supply systems to local distribution networks and managing water leaks, for instance, to reduce wastage.”

Ranaudo adds that Siemens drives sustainability because it recognises its responsibility to society, and to future generations. “Education, building skills and training people is as much a part of this as the digital technologies we design and implement to improve efficiencies in industrial operations.”

Collaboration

Early in the digital revolution Siemens recognised the need for an ecosystem of expertise. “We recognised that we can’t do it alone,” Ranaudo says. “We work with multiple players, experts in their own fields, whether that is cybersecurity, cloud services, system integration, all have their strengths and particular areas of expertise. We work with selected partners to optimise the systems and service for the end customer. If a customer wants to digitalise and accelerate its transformation – Siemens has the know-how and experience to draw allied expertise together to complement its own systems and technologies, hardware and software, to meet the customer’s needs. We offer customers one source for advice, guidance and implementation.”

Looking ahead

Digitalisation is clearly a continuing driver in industry and the development of new technologies is accelerating. AI, machine learning, the metaverse, all play into and can support sustainability. Importantly too, in Ranaudo’s view, much as the world has seen a pull back to localisation of production in some respects, globalisation is continuing apace and will become again a dominant theme going forward. “South African companies need to recognise that we are competing on a global stage – and will be increasingly exposed to global competition. We need to position ourselves globally. If we take just one example, line builders like the South African company Jendemark, operating in the automotive sector, are selling into global markets using Siemens technologies. We are operating in a globalised world, and we need to think and operate at a global level.” □

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

Robots assist in automated palletising system

When Yaskawa Southern Africa was contacted about a new automation project for multinational Danone at its Boksburg facility, east of Johannesburg, the industrial robotics manufacturer teamed up with one of its preferred suppliers, Tectra Automation, a division of Bosch Rexroth, to offer the company a turnkey solution. Addressing Danone's need for a fully automated palletising system, the solution provides the required lifting capacity and speed, with support from Yaskawa's PL 190 palletising robots.

“Previously at this facility, all the palletising was done by hand, which is labour-intensive and carries an increased risk of injury to workers and potential downtime,” says Hannes Crouse, Sales Manager at Yaskawa Southern Africa. “Manually loading pallets can cause injury because workers sometimes have to manoeuvre into awkward postures to move objects around.”

The installation of an automated palletising system enables manufacturers to simplify the palletising process and, at the same time, increase reliability, accuracy and repeatability. Robots play a role in supporting the accuracy and flexibility of the automated system, reduce the risk of injury by overcoming ergonomic problems, and reduce the risk of downtime.

The challenge

Due to the size and complexity of the new palletising system, it had to be installed and commissioned in phases.

“Large, complicated projects will always have their own challenges,” says Jaco de Beer, System Engineering Manager at Tectra Automation. “We worked closely

with Yaskawa to resolve various technical issues – from cycle times to finding solutions to the constraints of very limited space, in both width and height. Additionally, working with various SKUs (stock keeping unit codes) makes the automation process more complex. For example, some products may need to be rotated on the infeed side before they reach the robot. And we needed to ensure the entire system meets strict European safety standards.”

At the start, Yaskawa and Tectra Automation had to plan around multiple pallet patterns, a challenging endeavour for any large-scale automation project. The way goods are packed is not always ‘robot-friendly’, as robots prefer to pick up as much as possible in one cycle to make the system cost-effective. In order to get the cycle times right, the team worked consistently closely with Danone. Ini-

tially Yaskawa was requested to supply nine robots, but by refining the cycle plans, it managed to bring that number down to seven.

The solution

To tackle the project in the most pragmatic way, the teams at Yaskawa and Tectra opted for a three-phase approach, with three different cells making up the system. These included a palletising cell with the Yaskawa PL 190 robots on the inside, two de-stackers, and a stretch wrapper. The PL 190 is the successor to Yaskawa's NPL 160, with improvements in faster motion, the ability to handle bigger payloads, and a sleeker design, which suited the existing space limits. As more space became available on the floor, the teams were able to install a new cell in the area and commission it, before running the product through it and beginning the testing phases.

Yaskawa's deliverables included the robot base and a robot with a gripper attached for each of the robots. Additionally, two robotic technicians specialised in programming applications worked closely with Tectra Automation and others assisted with the mechanical installation. With the setting of parameters and programming of precise movements, the individual automation tools are adapted to deliver a customised turnkey solution.

The two de-stackers constitute another key element of the system. “A de-stacker holds a stack of empty pallets and feeds the system one pallet at a time to a ready location for the robot, which requests it via a signal,” Crouse explains. “For that, we also used automatic carts, which are controlled, along with the entire system, with industrial Wi-Fi communication.”

De Beer adds: “When the system pulls a pallet, there will be one empty pallet on standby at the robot station and another that the robot is palletising. When the current pallet being palletised is full, it will automatically eject onto another cart system that takes it to a wrapper. It's then automatically wrapped and ejected once more, loaded onto the cart again and moved through to logistics.”

The result

Danone's new palletising system consists of seven robots with two de-stackers in the middle. Special slip sheets are

Yaskawa's PL 190 robots provide faster motion and can handle bigger payloads than the previous model.



used between a set number of boxes to provide stability to the pallets which automatic carts collect and move from one stage to the next via a rail system.

The system was designed to handle a maximum throughput and the robotic palletising cells achieve an efficiency of 98%. "It is now fully automated," says Crouse. "From where it starts, units are palletised, stacked, wrapped, and sent to logistics for transport. It provides for stable production."

Operators can now be trained at a higher level to manage parameters and keep an overview of the system while the heavy lifting is handled by the robots. Manufacturers adopting the automation route understand that the future is about maintaining efficiency, quality and reliability. This, in turn, leads to higher profit margins.

With automation solutions at this scale, the foundation for a continuing partnership is established. Specialists from contractors like Yaskawa and Tectra Automation provide training for all operators and technicians prior to the hand-over process and continue to support the system well after project completion. □



The robots in production at the Yaskawa factory.

For more information visit: <https://www.yaskawa.za.com/>

INDUSTRY 4.0 + IIOT : PRODUCTS + SERVICES

A new benchmark in process control systems

Siemens has launched version 4.0 of its SIMATIC PCS neo control system, which promises to accelerate digital transformation and optimise plant processing efficiencies. The system is designed to prepare plants for the future, helping to facilitate collaboration and to alleviate shared industry challenges such as modular automation, scalability, interoperability, integration, and lifecycle management.

Rowan Dickason, Vice President for the Process Automation Business Unit at Siemens, says, "This state-of-the-art control system is more sustainable than the previous version and embraces globalisation with its fully fledged web-based platform. The new control system encompasses a re-thinking of process automation technology, to include digitalisation, interoperability, collaboration, and agility. It integrates seamlessly with existing systems and allows multiple processes to happen simultaneously. It is the future of process automation and we believe it will be a game-changer going forward."

The system supports all aspects of the Module Type Package (MTP) standard, allowing for easy integration which can be achieved independently of the respective device manufacturer. This supports a 'plug and produce' methodology and enables workflow improvements that reduce the required engineering further.

Efficiency is core to all Siemens' designs. The new Simatic S7-4100 automation system defines a new generation of controllers for the process industry, with the first release available exclusively for the Simatic PCS neo. The new controller is 30% smaller than the previous model, with extended communication capabilities. It also reduces energy consumption by up to 50%.

Importantly in the South African context, it is robust, maintenance-free, and no batteries are required to buffer system data in the event of a power failure. Dickason adds, "The controller is the 'brain' of the process plant. Our Simatic S7-4100 controller takes this to a new level of performance."

In addition to the SIMATIC PCS neo v4.0, Siemens is releasing its fully integrated SIMATIC CN 4100 communication gateway. This facilitates a simple and secure data exchange with SIMATIC PCS neo, playing the role of a convenient data switch. That means data from the plant can be fed simultaneously from the plant to the controller and the process control system. Supported protocols include Modbus TCP and OPC UA, with more planned.

Dickason says, "We designed these systems to streamline process control, simplify engineering and increase security."

"For process industries, the new control system can be used for individual process modules or world-scale plants. It is the first completely web-based system that enables location-independent engineering and process control. Users can access the data anywhere, anytime, which marks a new paradigm in the process automation environment. It is in line with Siemens' philosophy to focus on innovative technology with purpose. We're consistently seeking smart ways to maximise value creation. SIMATIC PCS neo does that."

**For more information contact Siemens South Africa.
Visit: www.siemens.co.za**



The new SIMATIC PCS neo control system v4.0 is designed to facilitate collaboration and alleviate challenges in the process industries.

AIoT solutions for mining

Bosch Rexroth Smart Mine (Smart Mine) has joined the Bosch Rexroth Africa Group, offering innovative Artificial Intelligence of Things (AIoT) solutions to the mining industry. These include Smart Conveyor, Stop-Start Retrofit, Smart Inspection, and Smart Lockout, all of which are aimed at optimising mining operations and promoting sustainable business practices.

Jonas Corali, General Manager of Smart Mine, is responsible for driving the mission and vision of the company. Eddie Kleingeld is the Regional Sales and Business Development Engineer, and Rodrigo Conte, Project Manager. The team also includes field engineers: Sifiso Shange, Themba Nyathi and Tshanduko Matshusa. Themba and Tshanduko are both graduates of the Yes4Youth Programme, the government-business collaboration that seeks to reduce youth unemployment in South Africa.

Smart Mine is committed to delivering cutting edge solutions to the mining industry, to drive growth across the African continent. The company previously operated primarily in Brazil and Chile in South America until it landed its first South African deal in 2019. It later joined the Robert Bosch brand and is now a fully-fledged South African company, under Tectra Automation in the Bosch Rexroth Africa Group. Corali says, "Our mission is to provide AIoT mining solutions that promote sustainability, future readiness, and business growth through digital transformation. Our solutions have already shown significant return on investment for Smart Mine and our clients.

"Safety and efficiency are top priorities in mining and our innovative solutions can help businesses achieve streamlined processes," Corali continues. "Smart Conveyor, for instance, serves to monitor idler rollers, using cloud-based temperature sensors to identify potential problem areas along the conveyor belts. The alarm sys-



Bosch Rexroth Smart Mine offers a range of smart technologies which simplify monitoring and support worker safety.

tem eliminates the need for manual problem identification and provides instant location detection. The solution helps reduce unplanned maintenance, increasing asset availability in the mining operation," Corali says.

Smart Conveyor is a scalable conveyor belt monitoring system, allowing for up to 5 000 sensors per kilometre. It is currently used in three mining locations in South Africa and is also suitable for use in other industries such as cement, logistics, sugar and paper.

Another technology, the Smart Mine Stop-Start Retrofit solution is designed for use on heavy-duty mining equipment: where it detects lack of motion, it stops the engine. It thus plays a role in reducing CO₂ emissions, supporting a mine's decarbonisation goals.

Two other solutions offered by the company are Smart Inspection and Smart Lockout which, respectively, facilitate the streamlining of inspection processes and provide a safer environment for workers by preventing the accidental startup of machinery during maintenance work.

For more information contact Bosch Rexroth SA.

Tel: +27 (0)11 979 4630

Visit: www.boschrexroth.africa

Using chatbot technology in TwinCAT engineering

Beckhoff has developed the TwinCAT Chat Client for the TwinCAT XAE engineering environment. This makes it possible to use Large Language Models (LLMs), such as ChatGPT from OpenAI, conveniently in the development of a TwinCAT project – enabling increased productivity in control programming. It also opens up the potential to optimise direct support.

Large Language Models are created based on a neural network and trained with a lot of texts. Over recent years, LLMs have become widely used – in a host of tasks, including as the basis for chatbots or language translation tools.

The TwinCAT Chat Client, which Beckhoff presented at Hannover Messe this year, en-

ables AI-supported engineering to automate tasks such as the creation or addition of function block code, as well as code optimisation, documentation, and restructuring (refactoring). Implemented in TwinCAT XAE, it enables the client to connect to the host cloud of the respective LLM (Microsoft Azure™ in the case of ChatGPT), provides a user interface, and provides communication to the PLC development environment via the Automation Interface. This is available via a corresponding chat window in Visual Studio, where the LLM functionality has been optimised especially for TwinCAT 3 users – it is extensively supplemented with TwinCAT-specific content.

For more information contact Beckhoff Automation.

Tel: +27 (0)11 795 2898

Email: danep@beckhoff.co.za

Visit: www.beckhoff.com/en-za/

The TwinCAT Chat Client opens a new world of chatbot possibilities for control engineering.



Smart and easy wiring with IO-Link

ifm recently assisted an original equipment manufacturer operating in the food and beverage sector to switch from working with an automation concept based on parallel wiring to a smart wiring system using IO-Link solutions – so enabling it to achieve higher efficiency, lower costs, more flexibility and, at the same time, standardisation.

The challenge

The company supplies customised plants for various production processes. In the food and beverage industry, plants must comply with strict guidelines such as the 3-A Sanitary Standards and the EHEDG (the European Hygienic Engineering and Design Group) standards. In compliance with these guidelines, production plants are designed hygienically to ensure maximum product safety.

For OEMs that manufacture many individual machines to meet specific customer requirements, the versatility and ease of installation of the automation components they use is a decisive competitive advantage. However, customisations that go beyond general market requirements present manufacturers with numerous challenges in their projects. Efficiency, short commissioning times, plant safety and reliability are essential. For this OEM, the automation concept it had previously used, based on parallel wiring, no longer met these requirements due to low flexibility and high installation costs.

The solution

By using IO-Link products from ifm, the company manages to ensure higher efficiency, lower costs and more flexibility, and, at the same time can work in a standardised way. The ifm sales team analysed the situation on

site and developed a network architecture adapted to the customer's requirements. The IO-Link master plays a central role in this because it provides for simple and quick adaptation of the wiring to different machine types, which reduces both the installation and wiring costs. With its IP69K protection rating, the IO-Link master can be used directly in the field; local junction boxes are not required.

Digital communication via standard cables without shielding means that fewer cables are needed than before; this also facilitates cleaning. The plug and play principle makes installation fast and simple. An M12 connection guarantees secure and correct wiring and eliminates potential sources of error.

Furthermore, there is no need to scale analogue signals, analogue input cards are no longer required, and the control element becomes leaner. In addition to optimising the network architecture, ifm's experts offer customers training in the use of IO-Link to make the change-over to digital technology easier.

Results

In this case, ifm assisted the company in preparing for Industry 4.0 with IO-Link products. This delivers measurable cost savings of up to 30% per machine type, with a 30% cost reduction in instrumentation; it reduces installation and commissioning time by 60% and provides for a return on investment (ROI) within one year.

For more information contact ifm South Africa.

Tel: +27 (0)12 450 0400

E-mail: info.za@ifm.com, visit: www.ifm.com



With the IO-Link wiring system, ifm enabled its customer, an OEM manufacturer in the food and beverage sector, to achieve many benefits.

Unlocking value from data

Today's digital technologies create vast quantities of data which offers opportunities to improve processes and performance. However, much of the data goes unused. The average plant reportedly uses only 20% of the data it generates. Charles Blackbeard, Business Development Manager, ABB Ability Digital Solutions, suggests that the successful companies of the future will be those that can capitalise on their data quickly, efficiently, cost-effectively and across the enterprise through an effective data analytics strategy that encompasses site, edge and the cloud.

Data, technology and digital capability need to be brought together to build rapidly deployable analytics and AI/ML applications, to increase productivity and decrease costs and, in turn, improve sustainability as well as safety compliance.

Blackbeard says clients can unlock the value of contextualised data through IIoT and industrial AI. Here, a prebuilt, industry standards based, cognitive data model can provide actionable insights, enabling an enterprise to achieve optimal performance, asset integrity, energy

efficiency, sustainability and safety.

However, bringing together multiple data sources to assist customers to make better informed business decisions is sometimes easier said than done. The challenge lies in finding a way to manage and analyse huge volumes of data stored in disparate networks that could be either on the premises or in the cloud. Done successfully, this enables improved productivity and optimum use of plants and assets, process improvements and cost savings.

The ABB Ability™ Genix Industrial Analytics and AI Suite is a scalable suite. It combines an advanced analytics platform and prebuilt easy-to-use applications, with ABB's implementation expertise. The suite connects, collects and contextualises data from operational, IT and engineering systems. It enables clients to unlock value from their data, to drive better business results.

For more information contact ABB.

Visit: new.abb.com/process-automation/



ABB's Ability™ Genix Industrial Analytics and AI Suite is modular and scalable to suit different applications.

Connecting robot accessories to an industrial network

Robots need accessories to work efficiently. HMS Networks' ready-made Anybus products offer one of the easiest ways to connect the accessories to factory networks – as recently demonstrated at RSP (Robot System Products).

The number of industrial robots operating in factories worldwide continues to rise. To use robots efficiently and maximise productivity, companies attach accessories to the robots to enable them to perform different tasks.

RSP specialises in developing, producing and installing the required robot accessories. When RSP started to develop a new range of tool changers, it needed to meet customers' expectations and provide a tool changer capable of connecting to the factory networks. However, developing the required networking technology is a complicated task which is outside of RSP's expertise. HMS assisted with an Anybus communication interface which is embedded into the tool changer, enabling connectivity with the factory's network, and allowing RSP to remain focused on making world-leading robot accessories.

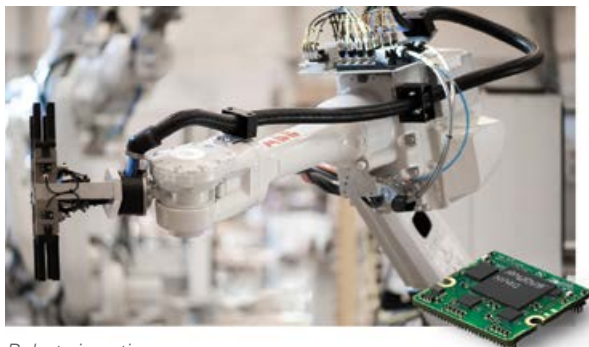
RSP makes industrial robot accessories which are used in factories worldwide. "Our strength lies in the specialised knowledge gained from working with industrial robotics for almost 20 years," says Henrik Hofström, Marketing Manager at the company. "This specialised knowledge enables us to make robust, versatile industrial robot accessories that help our customers improve robot flexibility and increase productivity."

One of RSP's main product ranges is its tool changers. A tool changer is attached to a robot and enables the robot to change the tool quickly and safely.

The challenge

The requirements for smart and connected industry affect every step in the automation process. Hence, when RSP was developing its Moduflex series, a new line of tool changers specially designed to carry heavy payloads, it needed to provide a modern tool changer that could connect to automation networks.

However, as Mats Thunell, Senior Engineer at RSP notes, "We're experts in robotics, not industrial networking. We want to remain focused on robotics, so we didn't want to invest the time and money to develop an in-house networking solution as that's outside our area of expertise."



Robots in action.



Henrik Hofström of RSP and Samuel Alexandersson of HMS.

Fortunately, we found a good solution with Anybus that allows both companies to focus on what they're good at, robotics for us and networking for Anybus."

RSP's networking requirements

Robots need to move freely within the factory, so robot accessories must be as compact and cable-free as possible. To maintain the tool changer's compact form, RSP preferred to embed the networking technology within the tool changer. It also needed a data communication interface that would allow for easy and reliable connectivity to any factory system, irrespective of the network protocol.

The Anybus CompactCom matched all the networking requirements. RSP chose the Anybus CompactCom B40 to maintain the tool changer's compact size and avoid extra cables. It is attached to the tool changer's printed circuit board (PCB).

There's a CompactCom for any major Fieldbus or Industrial Ethernet, and it's easy to swap one CompactCom for another CompactCom. This enables RSP to connect to any factory system, irrespective of the network protocol. As Henrik Hofström observes, this opens the possibility for us to expand into new markets. "We've started with PROFINET, but we can target new markets as there's an Anybus CompactCom for all major networks."

Easy and reliable

Anybus CompactCom is ready-made and easy to install, reducing the time to market for new products. The award-winning Anybus NP40 industrial network processor ensures that the CompactCom meets demanding performance, reliability and security requirements.

"We would not have been able to develop the Moduflex series this easily without the Anybus CompactCom," says Hofström. "It provides reliable industrial network communication and is easy to use."

HMS Networks is represented in South Africa by IDX Online.

For more information contact IDX Online.

Tel: +27 (0)11 548 9960

Email: sales@idxonline.com, visit: www.idxonline.com

The benefits of moving to the cloud

Cloud provides businesses with unparalleled safety, expansive storage capabilities, and other benefits, according to Carey van Vlaanderen, Chief Executive Officer at ESET Southern Africa. However, she says, a number of South African businesses have delayed the move from on-premises to cloud – often for all the wrong reasons.

"The prospect of migrating business-related data to the cloud can, understandably, feel overwhelming for IT decision-makers. Cost and security concerns, as well as worries about the time required to migrate to the cloud, are often cited as reasons for delaying the move," says van Vlaanderen.

She notes though, that one of the biggest myths about moving to the cloud is that it is only suitable for large enterprises. The truth is that one of the biggest advantages of cloud is that it offers flexible scalability. Unlike traditional on-premises solutions, cloud resources can easily be scaled up or down depending on an organisation's requirements. This means that businesses can quickly adapt to changes in demand without having to invest in expensive new hardware or software. This flexibility is especially beneficial for startups, SMEs, and any business looking to manage budgets more effectively.

By moving to the cloud, organisations can lower the

total cost of ownership and save valuable time and resources to focus on growing their businesses. Subscription-based cloud security also provides the added benefit of a simplified product offering and pricing, enabling businesses to choose a solution that best matches their needs.

Despite the clear benefits of moving to the cloud, many businesses are still unsure about whether their data is secure. Van Vlaanderen notes though, that by using the cloud, organisations can mitigate the risks associated with server theft, fire, or natural disasters. In the event of a worst-case scenario, cloud-based businesses can resume their operations relatively quickly as their data can be accessed from any location with an internet connection.

Breaches and cybercrime are recognised as an ever-present reality. However, with an ESET cloud-based solution, businesses of any size can benefit from continuous vulnerability management that includes firmware, operating system, and application patching, as well as endpoint protection, working proactively to prevent malicious attacks before they can cause damage.

For more information contact ESET Southern Africa.

Visit: www.eset.com/za



Carey van Vlaanderen, CEO at ESET Southern Africa.

pnGate PA - Gateways for multi-protocol process control

Direct PROFIBUS PA Segment Integration into Modbus TCP Control Systems
 Re-use of Existing Power Conditioners in Technology Upgrade Projects
 No PROFIBUS DP Intermediate Segment required
 Prepared for Integration in Standard Engineering and Plant Asset Management Tools

<https://industrial.softing.com/products/gateways.html>

mobLink Power - Industrial USB and Bluetooth Modems

Mobile Interface with integrated power supply for HART, Foundation Fieldbus, PROFIBUS PA field devices

- Multi protocol operation
- Provision of power supply for the field devices
- Compatible with FDI, FDT Frame Applications and major Engineering Tools
- Unlimited run time

<https://industrial.softing.com/products/usb-and-bluetooth-modems.html>

Sensoquip Technologies is a supplier of Electrical, Control, Instrumentation and Automation Products, as well as the Official Distributor of all Softing Industrial Products in Southern Africa and surrounding countries.

Visit our website www.sensoquip.com for more information



Niveshen Govender,
CEO, SAWEA.

Battery energy storage will support grid access

The inaugural Energy Storage Independent Power Producer Procurement Programme (ESIPPPP) conference was held in mid-May 2023 – and a bid submission date set for the first week of July this year. Only then will the preferred bidders for some 500 MW of battery energy storage in the Northern Cape be confirmed. This utility-scale storage forms an essential component to unlocking this ‘green zone’ to the wind sector.

Commenting on this development, Niveshen Govender, CEO of SAWEA said, “The need for additional grid capacity in the Cape region cannot be overemphasised. This is clearly evident in the fact that there are, as yet, no operational wind projects outside the Cape region and this is where our best wind resources are. At present, we are aware of just under 3 GW of wind projects being developed in other provinces – with the expectation that most of them are being developed for the private sector.”

With the procurement of 513 MW of battery energy storage, it is reported that the transmission system will be able to add about 2 GWh across five key points in the Northern Cape. Eskom specifically selected the substation sites for the project with a view to unlocking renewables capacity in the grid-constrained province, in addition to the storage projects being able to offer ancillary services.

“The previous failure to secure preferred-bidder status for any wind projects in Bid Window 6 of the REIPPPP, owing to grid constraints in the Cape provinces, clearly demonstrates the urgency for added grid capacity – and the value of energy storage to unlocking new wind power generation to feed into our country’s energy supply,” Govender said.

“We have consistently called on government to explore

options that will strengthen or expand the grid infrastructure build as quickly and efficiently as possible using mechanisms of self-build or public-private partnerships. As stated in Eskom’s Transmission Development Plan, new renewable energy generation capacity of between 4 GW and 5 GW must be built and connected to the grid annually.”

Speaking at the ESIPPPP Conference, Head of the Department of Mineral Resources and Energy’s Independent Power Producer Office (IPPO), Bernard Magoro, indicated that, in terms of Ministerial determinations published by Minister Gwede Mantashe in line with the country’s energy roadmap (IRP2019), the IPPO has been mandated to procure 28.5 GW of new generation capacity by 2030, predominantly from wind and solar PV.

Furthermore, in his Budget Vote speech in Parliament, also presented in mid-May, Minister Mantashe highlighted that new public procurement rounds, Bid Windows 7 and 8, will be opened, respectively, during Q2 and Q4 of 2023, collectively providing for 10 GW of renewable energy.

“Public procurement of this magnitude should be weighed against the value of a consistent pipeline of smaller consecutive bid windows. In particular, we would like to see the various stakeholders considering what the best option is to ensure the biggest impact, balanced between new generation capacity and socio-economic benefit,” Govender commented.

To ensure success in the public procurement programme, SAWEA calls for a coordinated approach, encompassing various aspects that include: regulatory and technical solutions to support the co-location of wind, solar PV and battery energy storage systems, streamlined environmental processes with concessions applied equally, as well as practical and realistic forecasting requirements, and simultaneously ensuring grid access and continuous development.

Mantashe also indicated in his Budget Vote speech that the country can expect to see requests for proposals for additional battery storage procurement, with a capacity totalling 1 230 MW, issued across the second and fourth quarters of the financial year. (Government’s financial year runs from 1 April to 31 March.)

Battery energy storage sites

The ESIPPPP RFP includes the following substation sites,



One of the first wind farms established in South Africa – at Jeffreys Bay, Eastern Cape.

as selected by Eskom: Aggeneis, 77 MW, at a minimum installed energy rating of 308 MWh; Ferrum, 103 MW, at a minimum installed energy rating of 412 MWh; Garona, 153 MW, at a minimum installed energy rating of 612 MWh; Mookodi, 77 MW, at a minimum installed energy rating of

308 MWh; and Nieuwehoop, 103 MW, at a minimum installed energy rating of 412 MWh. □

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

ENERGY MANAGEMENT + THE INDUSTRIAL ENVIRONMENT : PRODUCTS + SERVICES

Technical paper supports South Africa's energy transition

Siemens Energy, introducing its recently released technical paper: *Fuelling South Africa's Energy Transition*, says, the world, and especially South Africa with its reliance on coal-fired power generation, needs a more diversified energy mix and a major expansion of renewable, green energy together with corresponding infrastructures and storage capacities.

It recognises climate change as real and an existential threat to the planet and humankind. We are seeing the consequences in droughts, fires and floods around the world, and we are experiencing the warmest years since weather records began. As the Intergovernmental Panel on Climate Change states in its 2022 report, "To limit global warming to 1.5 degrees Celsius, greenhouse gas emissions must be reduced by 45% from 2019 levels by 2030." This requires nothing less than a complete transformation of the global energy system.

The technical paper provides an overview of the key technologies that will enable the energy transition in South Africa, step by step and with a clear direction.

Reiterating what we all know well, Siemens Energy says, South Africa has been experiencing one of the worst energy crises in the region for years, affecting millions of people across the country. Its ageing coal-powered electrical stations are not coping with increased energy demand. This leads to daily rolling power cuts – loadshedding – used to reduce the energy demand on the system by switching off energy distribution on a rotational basis. 2022 has, to date, been the worst year for loadshedding, recording 205 days. 2023 looks likely to push that record higher. However, South Africa is rich in sources of wind and solar and urgently requires the implementation of renewable, sustainable, and affordable energy solutions to supplement a just energy transition.

By implementing the right frameworks to incentivise green industry growth, tens of thousands of high skilled, long term and sustainable jobs can be created. This has been confirmed through research undertaken by IRENA, the International Renewable Energy Agency.

The long-term phase out of coal is an important first step to accelerate the transition. Combined cycle power plants (CCPP) offer a suitable technology to support this phase out. Switching to natural gas as a transitional fuel and opening the road to renewable hydrogen-based power generation will reduce CO₂ emissions significantly and create room for new entrepreneurial startup enterprises. If every coal power plant in operation today in



Siemens Energy South Africa has released a technical paper providing an overview of the technologies that will enable the energy transition in South Africa.

South Africa were converted to modern combined-cycle power plants, emissions in the electricity sector could be at least halved. What is more, green hydrogen can be used in Siemens Energy's gas turbines as a sustainable fuel, replacing natural gas. At present, Siemens Energy can co-fire up to 75% hydrogen in some selected gas turbines and is planning for 100% hydrogen for the whole fleet by 2030, that is within seven years.

South Africa is recognised as one of the 'sweet spots' on the planet where hydrogen can be produced economically. Due to its geographically beneficial location, and once the in-country ramp-up of green hydrogen production is established, South Africa could become an export powerhouse for green hydrogen and associated products.

Siemens Energy's technologies provide a backbone of affordable, reliable, and sustainable energy systems, but business, government and society need to work together to create a new and sustainable energy landscape for South Africa. Global partnerships are needed to balance the energy trilemma, in the face of geopolitical crises and in managing the energy transition and achieving net-zero climate targets.

With more than 150 years of operating in South Africa, Siemens Energy is ready to assist in the country's energy transformation journey. Its Broad-Based Black Economic Empowerment (BBBEE) status of Level 1, now for the second consecutive year following the company's move to operating separately from Siemens AG, endorses its aims of energising society, supporting employees, local communities and societies where it works.

The full technical paper can be downloaded from the website.

For more information visit:
www.siemens-energy.com/mea/en

Automotive supplier moves to solar

Yanfeng, a leading global supplier of automotive components, has reached another milestone in its sustainability journey in bringing the power of solar energy to its plants in South Africa. The company uses renewable energy at all its locations in Europe – some of which are already operating with 100% green energy – and now will supplement its operations in South Africa with sustainable and emission-free solar energy generation. This has positioned Yanfeng at the forefront of alternative energy in its industry, as it is the only supplier in the AIDC's (Automotive Industry Development Centre's) Automotive Supplier Park in Pretoria, and the East London Industrial Development Zone Supplier Park, that makes use of renewable energy. With this, the company is taking a further step towards resource-saving production and contributing to the reduction of CO₂ emissions.

The new photovoltaic (PV) systems are operating at both sites and will produce a combined 2 843 019 kWh of electricity in the first year. Each plant took about three months to complete, with a total of 3 510 solar panels installed on the roofs of the production halls to convert sunlight into sustainable and cost-saving electricity.

Many sectors are facing major challenges with the transition to a low-carbon economy. The automotive sector in particular faces operational and economic challenges in transforming production plants into net-zero emissions operations. At Yanfeng in South Africa, with its commitment to sustainability, 100% of the solar energy generated by the PV systems is used to power its production plants, helping it to prevent emissions of some 2 559 tons of CO₂ annually – and, at the same time, reduce its monthly costs and increase efficiencies.

"With this change to renewable energy we can make



Solar panels installed on the roof of Yanfeng's plant in Rosslyn, Pretoria.

our production processes more environmentally friendly and save resources," says Simon Pella, Senior Manager Procurement at Yanfeng. "Energy and emissions savings at our locations are an important measure for us in achieving our sustainability targets and our goal to reach net-zero emissions production at our plants by 2030."

The solar energy systems were funded by SolarAfrica, which will also operate, maintain and monitor the systems going forward. CEO of SolarAfrica, David McDonald said, "From the outset of these projects, Yanfeng's focus was on reducing its CO₂ emissions and SolarAfrica is proud to partner with the company to make its journey towards sustainability a success. It's inspiring to see a global company like Yanfeng invest in world-class facilities in South Africa, contributing to our country's green economy and supporting job creation in the automotive industry."

All Yanfeng's European plants were converted to renewable energy by the beginning of 2022. With this new PV system, the company has reached a further milestone on its way to converting its two plants in South Africa to net-zero emissions production.

For more information contact visit: www.yanfeng.com



*Gregor Küpper,
Managing Director
of SOLARWORLD
Africa.*

High performance solar panels

SOLARWORLD Africa, a leading provider of solar energy solutions in southern Africa, recently formalised a partnership with Risen Energy, a solar panel manufacturer, based in China, and known for producing some of the most efficient and durable solar panels in the world.

Well suited to the African climate, the Risen Energy Hyper-ion HJT solar modules are designed to operate at high temperatures and – in Johannesburg for example – generate 5.61% more electricity per year compared to a standard mono PERC module.

With close to 40 years' experience on the continent, SOLARWORLD has pioneered the use of renewable energy solutions across southern and sub-Saharan Africa. Gregor Küpper, Managing Director of SOLARWORLD Africa says, "We understand the better performance of hetero-junction cell technology and the benefits of partnering with well-known companies like Risen Energy to import its panels to Southern Africa. The

solar modules perform exceptionally well."

The Hyper-ion HJT solar panel is one of the newest products from Risen Energy. This innovative technology combines heterojunction cells with a high-efficiency passivated emitter rear cell (PERC) structure, resulting in a solar panel providing an unmatched level of efficiency and performance. The Hyper-ion HJT solar panel has an efficiency rating of up to 22.3%, which means it is can generate more electricity from the same amount of sunlight compared to other solar panels.

The solar panel also has a high tolerance to shading, and a longer lifespan than many other solar panels on the market.

"The product warranty for the Hyper-ion HJT solar panels is 12 years, but the long-term efficiency and durability of the panels ensures that customers will benefit from solar energy for many years beyond the warranty period," says Küpper.

**For more information contact SOLARWORLD Africa.
Visit: www.solarworld.co.za**

Time to back up your power supply

We are past the days of wondering whether we should invest in power backup systems for our homes and businesses. It is a given. Here, REVOV, a supplier of battery backup power solutions, sets out the basics everyone should know.

Walking through a suburb during a power cut, we still hear the drone of petrol and diesel generators. In the past, when people purchased power backup, generators were considered a viable option based on their initial cost and what was perceived to be a fit-for-purpose solution.

However, internal combustion engines are not the long-term viable solution for a planet in deep trouble. Additionally, with increasing fuel prices, running generators for long periods of time is expensive.

Advances in battery and solar technology mean there is a backup solution for every requirement, from small uninterrupted power supply systems to larger battery backup and solar installations.

What is the best option for a household? (The same considerations apply to business premises.) Start with determining the power requirements of your home and what you can and can't do without during loadshedding. The peak power draw of the site must be considered when buying or building a battery backup system. For example, an energy-efficient home may have an average power draw of only 1 kW. However, there may be an appliance that requires a spike of energy to start up, such as the compressor in a fridge. A good installer will consider all these aspects and often may advise a 3 kW inverter rather than a 2 kW inverter in the above scenario.

The next question to consider, once what needs to be backed up has been identified, is the budget.

A common UPS (uninterrupted power supply) device sold in various retail outlets is the typical 'trolley' UPS system. Whether the system uses lithium or lead acid batteries, most cannot be safely connected to the distribution board (DB) of a house. This type of UPS will supply power for a few dedicated plugs that are connected to the UPS directly. The system does not use the existing wiring system of the house.

In other instances, where a bigger system is required, a larger wall-mounted system can be connected to the house's DB board. When there is a loss of grid power, the systems in the house continue to operate as normal, drawing power from the batteries. Although this is more expensive than a trolley system, it is far more powerful and more convenient.

Those are battery-only backup systems. With regard to including solar power, there are options.

The grid tie in option consists of a solar PV installation and a grid-tie inverter, with no battery. While this option is less expensive as there are no batteries involved, it is reliant on the grid. When the grid fails, the site will no longer have power. This is used to reduce electricity cost but does not work as a backup solution.



A hybrid or off-grid system consists of a battery, an inverter and PV installation and can be specified to meet the user's requirements and budget.

The other main solar option is a hybrid or off-grid system, which is what most people consider a full installation. This consists of a battery, an inverter and PV installation. This system can be specified to meet the user's requirements and budget. For example, if the user lives in an area with many grid outages but good sunlight and has a home with low energy requirements at night, they may choose to spend more on the solar element and the inverter, and less on a battery.

It is almost universally accepted today that lithium-iron (LiFe) batteries provide better value than lead acid batteries for static storage applications, as the cost of ownership and replacement is much lower over time. 2nd LiFe battery technology provides a further, affordable, almost carbon-neutral alternative that delivers comparative performance to 1st LiFe batteries.

Although an inverter may be less costly than the battery component of a system, care should be taken in choosing which inverter to use. Support, local or otherwise, must be considered. If the inverter were to fail, outside of the potential hazards and consequences, the site would likely be offline or have aspects of it offline until the problem is fixed.

The inverter dictates the output waveform (pure sine versus modified), the power output, the solar input (in case a built-in MPPT or charge controller is being used, as is often the case), the battery compatibility as well as many aspects of the solar PV design. It is crucial that prospective purchasers work with reputable and experienced installers that have a solid track record.

REVOV is a South African company, with offices in Johannesburg, Cape Town and Durban, that supplies lithium-iron-phosphate (LiFePO₄) batteries, as well as LiFe batteries and 2nd LiFe batteries. It offers solutions scalable to meet residential, commercial and utility-level needs.

For more information contact REVOV.

Tel: +27 (0)10 035 6061

Visit: www.revov.co.za



Dwibin Thomas,
Schneider Electric.

Utility-scale battery storage: addressing the baseload challenge

Utility-scale battery storage is growing fast, with the US Energy Information Administration (EIA) estimating it will reach 30 gigawatts (GW) by 2025. This remarkable growth in battery storage capacity is outpacing even the early growth of the US's utility-scale solar capacity.

Dwibin Thomas, Cluster Automation Leader at Schneider Electric, says it is a clear indication that utility-scale battery storage is becoming the storage method of choice for developed countries such as the US. The benefit is that battery storage adds stability to variable renewable energy sources.

Renewable energy sources like wind and solar are intermittent and provide electricity only in the right circumstances, when the wind is blowing and the sun shining. Batteries overcome this problem of intermittency by storing additional energy produced by renewables, to provide a stable baseload when energy resources such as the grid, solar or wind are not available.

In South Africa, utility-scale batteries offer a suitable stable storage solution particularly as more independent power producers enter the market, providing renewable energy to increase available supply and alleviate strain on the traditional grid.

Storage solutions such as lithium-ion batteries are essential as part of the energy mix as the development of renewable energy generation plants increases. Battery storage mitigates intra-day and short-term imbalances in power generation to support grid stability.

Looking at the practical application of utility-scale storage, Thomas says it works on a similar principle as a domestic system where a renewable energy source charges the batteries and the energy is stored for use at nights and/or when the normal supply is offline, or supply is unstable.

Utility-scale battery storage, like any residential system, requires an energy management system (EMS) to provide insight into daily usage, provision, supply and other factors. It consists of hardware and software com-



Combined with renewable energy generation, battery energy storage provides the stability of supply required to meet baseload demand.

ponents and may be more or less sophisticated to meet requirements. The hardware includes battery modules, battery racks, protection devices and inverters which convert the direct current (dc) of the battery into the alternating current (ac) of the coupled power grid.

The key software components are the energy management system (EMS), the battery management system (BMS) and a supervisory control and data acquisition system (SCADA).

The EMS acts as a higher-level operating system that integrates to external systems and manages the response to changes in demand and supply. The function of the BMS is to monitor the performance data of the battery modules and to regulate their charging and discharging. The SCADA controls and monitors all the processes of the battery system in real-time while collecting data on the system's performance, such as voltage, current, and temperature, and provides alerts if there are any issues.

Thomas highlights a critically important benefit of battery storage – in that it can provide power to the grid in a matter of seconds, allowing for a seamless switchover between distributed energy resources and providing the stable supply users need.

For more information contact Schneider Electric.
Visit: www.se.com

Data loggers support energy efficiency

Supplier of monitoring and control equipment, Euca Technologies, offers energy data loggers to support energy monitoring and management for businesses in South Africa.

The country's continuing energy supply issues and rising energy costs affect the smooth operation of businesses and the facilities in which they work. The use of data loggers can help in identifying opportunities for energy saving, especially for those businesses that are using solar energy or electricity supplied or supplemented by on-site generators.

Peter van Zyl, Sales Director at Euca Technologies, emphasises the importance of monitoring energy consumption for businesses. By doing this, business owners and managers

can evaluate their energy management performance and implement new measures to improve energy efficiency.

Euca Technologies offers the Onset UX120-00M, a four-channel analogue data logger, to assist businesses and help save time and frustration for many business owners in South Africa.

The device can measure and monitor temperature, ac current and voltage, dc current and voltage, gauge and differential pressure, kilowatt consumption, compressed air flow, and more. Energy consumption data loggers can help businesses verify and improve energy efficiency in their day-to-day usage by testing, measuring and analysing data in particular areas of high consumption.

For more information contact Euca Technologies.
Tel: +27 (0)12 362 3271
Email: peter@euca.co.za, visit: www.euca.co.za

The Onset
UX120-006M
energy monitor
is available
from Euca
Technologies.



Recycling wind turbine blades

Earlier this year, just ahead of the release of its 2022 Sustainability Report, the Nordex Group announced that it is participating, as one of 18 partners, in a sustainability project funded by the European Union, to drive the recycling of high-value materials from wind turbine rotor blades.

Currently, 85 to 95% of a Nordex wind turbine is already recyclable. For many of the materials used, there are established recycling processes for environmentally friendly disposal – especially for steel and concrete, which make up the largest share of a wind turbine in the tower and foundation.

Turbine rotor blades consist of a combination of different materials including wood, various metals, adhesives, paints and composites. The composites are glass-fibre-reinforced plastics and carbon-fibre-reinforced plastics. At the end of their life, rotor blades are more challenging to recycle due to the heterogeneity of the material and the strong adhesion between the fibres and polymers. Recycling processes for these materials are not yet fully established, and reuse of recycled materials is not widespread.

As reported over the past few years, the Nordex Group has reduced the carbon footprint of its wind turbines. "In

line with our group's Sustainability Strategy 2025, ambitious goals have been set, including offering the market a fully recyclable blade within the next decade, with the target set for 2032," said Nordex Energy South Africa's Managing Director, Compton Saunders.

In order to reach this goal, Nordex has conducted and participated in a number of research and development projects, one of which is the European-funded 'Wind turbine blades End of Life through Open HUBs for circular materials in sustainable business models', or EoLO-HUBS for short.

The overall objective of the EoLO-HUBS project is to demonstrate and validate a set of innovative composite material recycling technologies which will provide answers to the three main areas in end-of-life wind farm recycling: Decommissioning and pre-treatment of wind turbine blades; sustainable fibre reclamation processes addressing two alternative routes – low carbon pyrolysis and green chemistry solvolysis; and upgrading processes for the recovered fibres addressing mainly glass fibres as well as carbon fibres.

For more information contact Nordex Energy South Africa.

Visit: www.nordex-online.com/en/south-africa/



The Nordex Group is working with 17 partners in the EU's wind turbine blade recycling initiative.



GIVE OUR PLANET A 2ND LIFE

REVVOV Battery Backup



CUBE
All-In-One Backup System



CUBE 800
All-In-One Backup System

FREEDOM FROM DEPENDENCE

revov.co.za



Evaluating the site-specific wind resource

MEASNET, the International Network for Harmonised and Recognised Measurements in Wind Energy, has released an updated issue of its guideline: *Evaluation of Site-Specific Wind Conditions*. The document represents the state-of-the-art of guide for measurements of the wind resource and site assessments in the wind energy sector.

The guideline introduces new requirements and improvements in the description of measurement methods and covers wind resource and site assessment evaluations. It is aligned with IEC61400 (International Electrotechnical Commission) standards, as MEASNET liaises with ISO/IEC in several working groups.

The *Evaluation of Site-Specific Wind Conditions* sets out the MEASNET procedure agreed on by the organisation's members to be mutually used and accepted. It is considered internationally to be the most complete and accepted procedure on which a common interpretation and understanding has been exercised in accordance with the MEASNET Quality Evaluation Programme, based on the objective of continuously improving quality, traceability, and comparability.

The requirements for the performance of wind measurements and their evaluation are now up to date according to the developments of the ISO/IEC standards. Given the increasing relevance of site assessments in terrain with rough, non-homogeneous conditions, an approach has been developed to implement these assessments within representative terrains.

In addition, the requirements for the procedures and documentation of the long-term analyses are specified in more detail, such as the presentation of bias error expressions and the trend analyses of reference data.

An improved appendix is dedicated to requirements for the use of remote sensing devices, as they are increasingly used for evaluation of site-specific wind conditions. Alongside the editorial adjustments, the guideline includes a glossary to define its most relevant terms at a glance.

The new guideline document can be downloaded free of charge from the MEASNET website.

For more information visit:
www.measnet.com/documents

The new guideline sets out the updated procedure for evaluating site-specific wind conditions.

(Image: © Measnet)

An automation solution for renewable energy plants

Emerson, a global leader in technology and software, will provide advanced automation solutions to help ensure the safety and reliability of New Zealand's first large-scale solar photovoltaic (PV) power project. Emerson's renewable power generation expertise will assist the solar energy company, Lodestone Energy, to complete its two 23-MW plants at Kaitaia and Edgumbe – an important step in supporting New Zealand's goal to achieve carbon neutrality by 2050.

Solar PV technology has become one of the fastest growing renewable energy technologies. But generating and delivering solar PV power efficiently requires precise orchestration, integrating a variety of third-party systems with automation and control technology to provide operators with intuitive functionality and comprehensive system visibility. Emerson's advanced automation architecture will combine powerful control software and technologies with enterprise data solutions to provide an integrated, scalable control solution to maximise output and profitability and simultaneously to support grid stability.



Lodestone Energy selected Emerson's automation and control technology for New Zealand's first large-scale solar PV plant.

"New Zealand's goal of achieving carbon neutrality by 2050 is an ambitious endeavour that will need many sources of renewable power generation to be brought online safely and quickly," said Peter Apperley, General Manager of Engineering at Lodestone Energy. "Emerson's expertise in automation software for power generation and sustainability will help us build a world-class facility more quickly. It will also assist us in integrating the new plant into the national grid to drive efficient operation over the lifecycle of the plant."

Lodestone will use Emerson's Ovation™ distributed control system and new OCR3000 controller to provide comprehensive control and minimise the impact of variability and intermittency in solar PV power generation. The same technologies will also make it easier for operators to respond quickly to grid frequency events. Ovation enterprise data solutions will provide secure monitoring of solar PV operations from the control room or mobile devices, measuring, monitoring and reporting key performance indicators to increase visibility of plant operations.

Lodestone's solar PV project requires multiple interfaces to third-party systems, including inverters, high voltage switchboards, weather stations, site security systems and grid authority remote terminal units. Ovation will serve as a process orchestration tool to connect these devices and provide fast and intuitive visibility for operators.

For more information contact Emerson.
Visit: www.emerson.com

Multifunction solar tool kit

Fluke, locally represented by Comtest, is a global leader in manufacturing compact, professional electronic test and measurement tools and software. Fluke's Solar Multifunction Tester SMFT-1000, the latest addition to its expanding line of solar tools, is now available locally from Comtest. The SMFT-1000 offers up-to-date hardware measurement capabilities with Fluke TruTest® Solar Software integration, simplifying data collection and reporting with a single device.

The kit is designed for PV professionals, providing the tools needed for PV installation, commissioning, inspection, and maintenance testing in line with IEC 62446-1 standards. With Fluke's TruTest™ software, measurement data from solar site installation and commissioning testing can be imported, organised and analysed for reporting, easily, without the technician needing to take a laptop onto site.

Key features

- Industry-standard measurements: IEC-compliant Category 1 and 2 Test Regime measurement capabilities include protective earth resistance (Rpe), voltage on open circuit (Voc), short-circuit current (Isc), polarity test, insulating resistance, and 1 kV I-V curve tracing capabilities.
- User-friendly interface: The intuitive interface provides immediate access to the tool dashboard and on-screen automated data analysis.
- Integrated analysis software: Fluke TruTest® Solar Software compiles data measured with the SMFT-1000 into IEC formatted reports, enabling technicians to create project, site, and client categories to access data quickly and complete

tasks on time, with minimal training required.

"With the handheld capabilities of the SMFT-1000, operators and technicians working on PV installations will be able to optimise panel performance with one comprehensive tool," said Allison Wyatt, Fluke's Global Product Marketing Manager. "Equipped with seamless hardware-to-software integration, this latest addition to our solar product portfolio will enable technicians to manage their systems efficiently, accurately and safely."

The complete package can cut installation time by up to 20% and documentation time by up to 50%. The increased 1 kV I-V Curve tracing capability allows users to service larger PV systems, centralising results across tools. The individual client, project, and site data filing feature helps operations and maintenance teams recover measurements from past projects and across multiple clients, to inform improved optimisation of existing processes.

The SMFT-1000 adds to the Fluke portfolio of test tools designed for the solar energy industry. Fluke tools operate reliably in extreme environments – dusty, wet, cold, and hot – as often apply in solar installations, and are tested to survive drops that can occur in fieldwork. In addition, Fluke tools are designed to keep workers safe in potentially dangerous electrical environments, meeting or exceeding all recommended safety standards.

For more information contact Comtest.

Tel: +27 (0)10 595 1821

Email: sales@comtest.co.za

Visit: www.comtest.co.za



Fluke's Solar Multifunction Tester 1000 simplifies data collection and reporting in one device.

High-precision radar sensing at 122 GHz

Turck Banner has extended its T30R series of radar sensors with a new long-range model. This sensor can accurately recognise and measure targets up to 25 metres away, a 10-metre increase over previous models. The extended range is useful for applications such as determining the volume of items in long truck trailers, the amount of liquid in large tanks, or the quantity of non-grain dry goods in tall silos. T30R sensors continue to provide the established features and benefits of the series, especially in outdoor environments subject to rain, fog, moisture, and changes in light and temperature.

Different radar frequencies affect not only the range of the sensor but also what materials it can detect. 24 GHz radar has a long range and is unaffected by ambient weather like heavy rain. However, its detection capability is limited to stronger radar targets. 122 GHz radar provides greatly increased accuracy and can detect a much wider range of materials compared to 24 GHz radar.

The T30R operates at 122 GHz with two independent, adjustable sensing zones, which enable higher-precision measurements with a narrow or wide beam pattern up to 15 metres away. Making use of the higher operating frequency, it detects a wider range of targets than traditional 24 GHz radar sensors, including high-dielectric materials such as metal, and lower-dielectric materials such as wood, rock, or organic material.

The T30R-1515, in both Standard and Near Range versions, offers precise measurement and ignores objects outside of a region of interest. This makes it suitable for vehicle detection, tank-level monitoring, and positioning feedback.

The Banner Radar Configuration Software and Pro-Kit with Converter Cable allow for easy setup and configuration of range, sensitivity and output.

For more information contact Turck Banner.

Tel: +27 (0)11 453 2468

Email: sales@turckbanner.co.za

Visit: www.turckbanner.co.za



The T30R-1515 is compact and rugged with an IP67 protection rating.



IO-Link is an important communication protocol for complex measuring tasks in factory automation.

Radar sensors to make factory automation easier

With VEGAPULS 42, VEGA brings its extensive experience in radar measurement technology to factory automation. Equipped with IO-Link and versatile hygienic adapters, the new level sensor meets the key requirements of modern industry: performing complex measuring tasks faster as well as being simple to use and cost-effective.

The new radar level sensor is designed especially for highly automated processes with stringent hygiene demands and capable of following fast level changes. With VEGAPULS 42, the instrumentation specialist completes its IO-Link portfolio, which includes the VEGAPOINT and VEGABAR solutions for level measurement, point level switching and pressure measurement.

Radar reduced to the essentials

As various automation technologies in factory environments are increasingly converging, VEGA's IO-Link portfolio offers optimal solutions for applications that extend beyond the boundaries of primary processes. VEGA Product Manager Marvin Moser says, "We have carefully integrated cutting-edge technology into all the main functions of this sensor. And, at the same time, we have consistently refrained from 'over-designing' the sensor. It has been stripped of everything that would make it unnecessarily expensive or technically over-complex."

VEGAPULS 42 is designed specifically to operate over medium measuring distances of up to 15 metres and in temperatures up to a maximum of 150°C. The instrument is geared to circulation systems in production, dosing processes and downstream processes, like those found in conveying and filling systems. It ensures a smooth-running process wherever a level changes quickly and requires continuous monitoring. The design is focused only on what is necessary: VEGAPULS 42 is intended for all standard applications where more functions would only make things more complicated.

A lead in radar know-how

It is often said, in referring to the merging of process and

factory automation: 'If you can do the one, you can do the other'. However, as VEGA sees it, the two areas are so different from each other that it is easier for the measurement technology of process automation to establish itself in factory automation than the other way around.

VEGA is today recognised as the world market leader in radar level instrumentation. With more than 30 years in the field, the company is applying the experience and knowledge it has gained to factory automation solutions. Accordingly, VEGAPULS 42 is based on what it sees as the best radar chip currently available on the market – with the widest dynamic range, which offers optimal performance and application versatility.

VEGA designed the chip in-house and to ensure it would be able to monitor current operating states in a highly efficient and cost-optimised way, every design element was critically examined for its usefulness. The same principle applied to the IO-Link communication technology, which is common in factory automation, enabling bidirectional data transmission together with extensive diagnostics and parameterisation. For the IO-Link VEGAPULS 42 sensor, this means maximum signal quality at minimal cost and complexity.

Radar suits various processes

With the range of instruments in its IO-Link portfolio, VEGA adds the advantages of radar measurement technology to a variety of processes in factory automation, with a focus on hygiene-critical industries like food and pharmaceuticals. Radar is the right choice for continuous, non-contact level measurement because, unlike ultrasonic sensors, it is not influenced by the process and ambient operating conditions. Use of the most reliable, cost-effective measurement technology supports reliable and cost-effective factory automation.

For more information contact VEGA.

Tel: +27 (0)11 795 3249

Email: info.za@vega.com

Visit: www.vega.com

Smart sensors

'Smart in sensing' – for the WIKA Group, this is the focus of its corporate strategy for the coming years. Introduced recently at Hannover Messe, this focus takes in the megatrends of digitalisation, decarbonisation and demographic change, which pose major challenges for many industry sectors. At the same time, however, they offer promising growth potential such as in the networking of systems and processes, the expansion of renewable energies, sustainable mobility solutions and secure supplies of food and medicine.

On this path, as the strategy conveys,

WIKA supports its customers with high-precision and smart sensing technology. "Sensors are the senses of digitalisation," says CEO, Alexander Wiegand. "Smart in sensing reflects our technological expertise as well as WIKA's innovative strength as a world market leader in measurement technology. WIKA perceives the global market needs of tomorrow 'with all senses' and develops pioneering products, solutions and services that contribute to the success of its customers."

For more information contact WIKA Instruments.

Tel +27 (0)11 621 0000

Email: sales.za@wika.com

Visit: www.wika.co.za

Wika has announced 'Smart in sensing' as its strategic focus going forward.



Water conductivity meters to ensure process water quality

Water conductivity meters are essential for ensuring the quality of water used in industrial processes. In many cases, water is a critical component of the production process, and any impurities or contaminants can cause significant issues such as corrosion, scaling, and product quality problems. Prei Instrumentation, a South African company, specialises in high-quality water conductivity meters which are used in several industries to ensure the process water meets the required standards.

Prei Instrumentation's water conductivity meters are designed to measure the electrical conductivity of water. This measurement is directly related to the level of ions, or charged particles, in the water. Water with a higher concentration of ions will conduct electricity better than water with fewer ions. Therefore, by measuring the electrical conductivity of water, the meters can provide an accurate indication of the level of dissolved solids and other impurities present in the water.

Among the key benefits of the water conductivity meters are the high level of accuracy they deliver and their reliability. The meters are calibrated to provide precise measurements across various conductivity levels and are designed to operate consistently in harsh industrial environments. This reliability is crucial for ensuring the water used in industrial processes meets the required standards and does not cause issues or defects in the final product.

Another benefit of the water conductivity meters is that they are easy to use and maintain. They are designed to be user friendly, with clear displays and simple controls. With their robust construction and durable components

to withstand the rigours of industrial use, they require minimal maintenance. These factors also help to ensure the meters are used consistently and correctly, which is essential for accurate and reliable measurements.

Prei Instrumentation's water conductivity meters are used mainly in the food and beverage, pharmaceuticals, and power generation industries. In the food and beverage industry, water conductivity meters ensure the water used in production is free from contaminants and meets the required standards for taste and safety. In the pharmaceuticals industry, the meters serve to ensure the water used in drug production is free from impurities that could affect the efficacy or safety of the final product. And in the power generation industry, they serve to ensure the water used in boilers and cooling systems is free from contaminants that can cause corrosion or scaling.

In addition to ensuring the quality of water used in industrial processes, water conductivity meters can help to improve process efficiencies. By providing accurate and reliable water conductivity measurements, the meters help identify issues with water quality before they cause problems. For example, if water conductivity in a cooling system starts to increase, this could indicate scaling or fouling. Identifying this issue early means operators can investigate and take corrective action before the problem becomes more severe. This helps to minimise downtime and maintenance costs.

For more information contact Prei Instrumentation.

Visit: <https://prei.co.za>

Level sensors in networked beer tanks

The Internet of Things (IoT) starts with a sensor. From industrial to commercial to home automation applications, the IoT offers 'smart' solutions that help make life easier, improve and streamline processes, and receive information that was previously unavailable, or difficult to acquire, in good time. Smart solutions are highly individualised to the respective application, but always begin with an object and a sensor.

A level measurement sensor with a remote transmitter offers a practical means of monitoring level and fill applications and identifying hazards. In pubs, for instance, an emptying beer tank could be potentially hazardous! In this example application, two Keller pressure sensors work at the core of the solution to measure the liquid level in the tank and send a warning message to the brewery – by e-mail via the GSM-2* remote transmitter, the mobile phone network, and the internet. The brewery sends an automatic order proposal to the landlord, who simply has to confirm the order.

This automated, smart, M2M (machine-to-machine) solution reduces stress for pub landlords and saves brewery drivers from emergency weekend deliveries. It



Level sensors in beer tanks monitor level and fill and can be networked to the brewery's order and supply systems.

ensures accurate order entries and supports optimised delivery logistics, and landlords have a continuous supply of fresh beer for their customers.

Keller is represented in South Africa by Instrotech.

For more information contact Instrotech.

Tel: +27 (0)10 595 1831

Email: sales@instrotech.co.za

Visit: www.instrotech.co.za



Rynard Potgieter, Sales Manager for Transformers at Zest WEG.

Specialised transformers for mine's 40 MW solar plant

Mining companies in South Africa have been among the first movers to take advantage of more relaxed regulations that allow for private production of renewable energy, and Zest WEG is supporting them.

In a recent solar energy development, where an underground gold mine has installed the 40 MW first phase of an embedded generation plant, Zest WEG has supplied its specially designed inverter transformers. Rynard Potgieter, Sales Manager for Transformers at Zest WEG, says the company supplied 10 transformers, each with a capacity of 5 MVA.

"Our transformers will allow the stepping up of a dual input of 690 V current to a 11 kV output," says Potgieter. "The transformers are located after an inverter phase, which converts the direct current (dc) from the photovoltaic cells into alternating current (ac)."

This high ac voltage reduces the electrical losses as the current is transmitted to the substation. Potgieter explains the innovative design that has been applied to the dual input, single output configuration. Rather than installing two inverter-transformer combinations, the transformers have been designed with two inputs from the string inverters.



A view into the PV transformer shows some of its key components.



The MV and LV terminal boxes of the 5 MVA PV transformers.

"This helped keep costs down, as one transformer is fed by a number of string inverters through the dual input," he says. "This means the customer saves on the number of ring main units (RMUs) needed, as well as the number of transformers. Considerable economies are also achieved on infrastructure, such as skids or plinths, and the footprint of the equipment installation can be smaller."

Returning to the recent solar plant project at the mine, Potgieter highlights that Zest WEG worked closely with the customer from the start of the system design.

"This early-stage collaboration enabled us to understand and provide input on which aspects were critical and where there were opportunities for improvement," he says. He highlights adequate cooling as one of the key factors to be accommodated in the transformer design.

"We ensure that our radiator design provides sufficient cooling capacity, even if ambient temperatures rise higher than forecast," he says. "In the southern African region, we generally work to the temperature of 40° Celsius – or 45° Celsius in some areas like the Northern Cape and Mozambique."

With the onset of global warming, however, there is a growing expectation that this upper level will rise. In the contract for the mine's PV plant, therefore, the cooling capacity on the transformers was designed to deal with temperatures up to 50°C.

Using ester oil as a coolant

Potgieter highlights another innovation introduced in this project – in the use of ester oil as a coolant. Although hy-

drocarbon oil is usually the standard medium used for cooling transformers, there has been growing interest in ester oil, which is made from sources that are not hazardous to the environment.

"Ester oil is considerably more expensive, but it does not carry the risk of contaminating land or water if it is spilt," he says. "It also has the significant advantage of being able to withstand higher temperatures without breaking down."

A further benefit is that it is not generally flammable, so there is little chance of it contributing to an explosion or fire in or around the transformer. Ester oil also retains heat better than normal oil, he adds. This is a plus factor as it moderates the temperature of the windings in an inverter transformer, so they are closer to operating temperature when they are reactivated at the start of the day.

Managing harmonics

"When dealing with electricity from PV cells on a solar plant, another important element to consider in the transformer design is the harmonics of the incoming current," Potgieter notes. "Harmonics are generated when the current is converted from dc to ac – and the transformer must filter the harmonics so that the current going to the substation is clean."

This requires an analysis of the harmonics that are likely to come through the system. He cites examples where high harmonics have not been adequately factored into the design, leading transformers to overheat and fail.

Collaborative design

He says the design of the WEG transformers is conducted collaboratively between the South African specialists and the WEG design office in Brazil. The company's sophisticated design software allows various specifications to be prioritised, funnelling down the design options for the engineers.

"Our design engineers can then sit around a table with the information from the customer, to identify the best solution for the specific site conditions and the customer's requirements," he says. "We then work further with the customer to focus the options – to achieve a technically compliant design that is cost-effective within the project budget."

Following the international collaboration between Zest WEG and its Brazilian counterparts, the design can be taken forward and implemented by the expert South African team. The final design is checked again by engineers in the WEG head office to make certain that all parameters have been met. After that, it



The WEG photovoltaic solution: the company supplied 10 x 5 MVA, 11 000/600-600 V transformers with ester oil as the coolant.



The LV termination side of WEG transformers is designed for maximum safety and reliability.

moves into the manufacturing phase at one of Zest WEG's South African transformer facilities.

"This process of collaborative design development to WEG's global standards and our local manufacturing expertise give us the confidence to offer a standard three-year warranty on our transformers, including those for solar PV applications," Potgieter says. □

For more information visit: www.zestweg.com

HV / MV / LV CABLES & OVERHEAD CONDUCTORS

ABERDARE

A MEMBER OF HENGTON GROUP

PILG



XLPE



BELLS & MAINS



HV



RUBBER



ACSR



DC



AIRDAC



GENERAL WIRE



ABC






1 Corobrik Street, Meadowdale, Gauteng | Tel +27 (0)11 396 8000 | Fax +27 (0)11 396 8013
enquiries@aberdare.co.za | www.aberdare.co.za



The skid substations are transported on low-bed trailers to the mining sites where they can be quickly energised.

Local partnership to deliver skid substations

ArmCoil Afrika, a local manufacturer of medium voltage (MV) ac motors and transformers, and Schneider Electric have partnered to provide a skid mobile substation product line to supply the operations of a large mining conglomerate in South Africa.

Together, the companies have already completed two skid substations (SKID 961

and SKID 979) and the third and fourth units are in the manufacturing process. The prefabricated substations are assembled on self-supporting transformer skids, providing an easy-to-transport design that can be quickly energised.

ArmCoil is the main manufacturing contractor, providing the MV solutions as well as super structure enclosures for the skid substations and Schneider Electric is the preferred low voltage (LV) and MV switchgear partner providing equipment that includes the company's Prem-Set Solid Shielded Insulated System (SSIS) switchgear.

Frank Flint, Commercial Manager at ArmCoil says, "This is an exciting project for ArmCoil. As a small, family-owned business it is fantastic to be contracted to a global mining leader and to partner with a renowned multinational like Schneider Electric, to manufacture the skid substation products."

"Together Schneider Electric and ArmCoil are combining their strengths to produce skid substations based on industry best practices, from design to installation. It is a win-win scenario for the mine and for our partnership," adds Cecil Maartens, FS Segment BD & Channel Sales Manager.

Looking at the practical application of the substations, they are transported by trucks to the various mining pits where mining equipment can then be plugged into the skid. Generally, the substations are used to power drilling rigs and electrical excavators which are then used to fill the trucks with rocks, rubble and ore which is transported for processing.

The manufacturing process for the skid substations is in line with ISO standards which require that equipment should be continually improved to enhance operations and operational safety.

"The skid substations are now in their third iteration and with each new unit we enhance the operations based on the feedback we receive from the mine and our own learnings. It is a dynamic and collaborative process," Flint says.

"Our combined strengths allow us to build an improved skid. This is an exciting partnership that sees engineers from both teams coming together to build units that meet the mine's mobile substation needs," Maartens adds.

Following SKID 961, the SKID 979 substation featured the following enhancements:

- The super enclosure is made with clear view materials that allow improved visibility into the units
- The addition of a roof which improves the unit's robustness in inhospitable environments near the mining pits
- The newest version of Schneider Electric's auto recloser.

The SKID substation project is expected to continue through another three years with two to three units to be delivered each year.

For more information contact ArmCoil.

Visit: www.armcoil.co.za

SIL 2 rated contact repeater for long distance signal delivery

Remote monitoring specialist Omniflex has launched the Omniterm FCX, a fibre optic switch contact signal repeater unit which transmits a switch contact status signal bidirectionally over a distance of up to 20 km. The first with a safety integrity level (SIL) 2 rating, the FCX will reassure system designers that they can build it into safety critical systems. The unit uses fail-safe 1002 architecture and is ideal for the controlled, emergency shutdown of electrical substations and other safety-critical applications.

The transceiver is compatible with either 850 nm multi-mode or 1310 nm single mode fibre optic cabling; the latter can send switch contact signals over a range of 20 km. The FCX is powered from a 10 to 30 Vdc power supply and the device can operate in an environment with ambient temperatures from 0 to 60°C.

"Getting switch contact signals point-to-point can be critical," says David Celine, Managing Director of Omniflex. "When an operator hits an emergency stop button, they need to be confident that the system will shut down as designed. If someone is in danger at an industrial power station, the risk of signal failure has to be mitigated to an acceptable level.

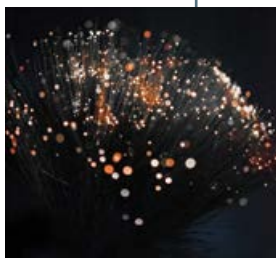
"This FCX is also a bidirectional transceiver, so it combines the transmission and reception capabilities into one device, eliminating the need for separate modules. One module is placed at either end of a duplex fibre optic link and when the contact on the first is closed, the other module is energised replicating the contact signal."

For more information contact Omniflex.

Tel: +27 (0)31 207 7466

Email: sales@omniflex.com, visit: www.omniflex.com

The new switch contact signal repeater for fibre optic cabling is ideal for the controlled, emergency shutdown of electrical substations.



New partnership sees local assembly of GIS switchgear

ABB has recently formalised its partnership with one of the leading energy sector service providers, Eya Bantu, which is using its newest manufacturing facility in Gqeberha, Eastern Cape, to assemble ABB's 33 kV gas insulated switchgear (GIS) ZX series. The partnership brings the benefits of ABB's global experience, expertise and manufacturing excellence to the local facility.

In the past, customers have had to incur costs to carry out in-person inspection at an ABB feeder factory in Europe. This also meant customers could not have direct access for inspections during the execution of their projects and the manufacturing process of the specific products required.

"These are some of the issues we have overcome with the new partnership with Eya Bantu," says Avi Ramdhin, Product Marketing Director, ABB South Africa. "There is a perception that quality products traditionally only came out of the European Union countries. However, we are proving that in today's world, local quality, processes and manufacturing facilities are evolving and are of a global standard."

Duplicating ABB's 'feeder factory' concept in South Africa is a major coup for the country and ABB's customer base. "We have brought global experts in to assess

the local factory and assist us to ensure it meets the global standards," says Ramdhin.

Traditionally, switchgear had to be imported fully from either Germany or the Czech Republic. Now, however, only 40% comes from these locations and the Gqeberha facility at present supplies 60% of the local requirement.

"The main reasons for the partnership are to better serve our customers in terms of flexibility and lead times, and to enable Eya Bantu to leverage the international brand of ABB," Ramdhin adds.

He notes too that ABB, in turn, is making a significant contribution to boosting the local economy and fulfilling its own Environmental, Social and Governance (ESG) objectives as a corporate company. At its new factory, Eya Bantu has additionally contributed to combatting unemployment in the region by employing a full contingent of wiremen, test engineers, installers and commissioning engineers.

For more information visit: go.abb/electrification



ABB's 33 kV GIS switchgear is now 60% locally assembled, to global standards, by Eya Bantu.



TRANS ELECTRON

SPECIALISING:

- Transformer Manufacturing
- Voltage Stabilizers and Regulators
- Electrical Panels and Accessories
- Water Pumps
- LV Switchgear

CONTACT

Sharland Street, Driehoek, Germiston
PO Box 19208, Fisherhill, 1408
Email: info@transelectron.com
Tel: +27 (0) 86 111 5075, +27 (0) 11 873 1016
Web: www.transelectron.com

Distributors of :

LSIS

CHINT
CHINT ELECTRICAL

Good reasons for growing use of modular substations

Recognising the short lead times and reduced cost of installing substations in a modular format, many sectors are choosing this option over the brick-and-mortar structures traditionally used to house substations. According to David Claassen, Managing Director of Trafo Power Solutions, which designs and supplies modular substations fitted with dry-type transformers, the reasons are not hard to find.

Modular substations are fast becoming the preferred format in applications ranging from industrial sites to data centres to mining and the oil and gas sector, delivering benefits such as quick deployment, lower installation costs and more flexibility.

"The trend towards modular substations is now well established in many sectors," says Claassen. "There are many different options and designs, from substations installed in shipping containers to others supplied in larger or more specifically purpose-designed E-houses."

Standard shipping containers – in either 20-foot or 40-foot configurations – provide an economical and safety-compliant format for substations that need to be transported over land or by sea. Claassen notes that the dimensions facilitate cost-effective logistics, and generally ensure quicker availability of on-board space when arrangements need to be made for shipping on container vessels. The containerised substation concept was where the idea of modular substations originated, as it allows for the units to be moved easily.

"More recently, we have seen the concept develop into much larger substation sizes – but the benefits remain," he says. "These can generally be constructed quite simply with structural steel with fire-rated insulation to enhance the safety rating of the installation."

Compared to constructing a conventional brick-and-mortar building on site, with all the related civils work required, the modular option quickly shows a range of benefits. Especially in remote locations, any building work can become complex, costly and time-consuming. The



Modular substations reduce the need for on-site work, reduce project time and save money. This modular substation was custom engineered for a data centre application.

costs include transporting various building materials to site over long distances, as well as finding and employing scarce skills and supervision.

"This traditional route also involves taking all the electrical components to site – and then installing, testing and commissioning them in conditions that are often less than ideal," Claassen adds. "By contrast, a modular substation can be constructed for the most part in a fully equipped factory, which is more conducive to quality and speed."

Once the modular substations are shipped to site, there is minimal work to be done before they can be commissioned and put to work. Modular substations can also be designed with state-of-the-art technology for improved reliability, easier maintenance and reduced running costs.

Claassen highlights that dry-type transformers add considerable value to the modular substation concept, as these can be installed inside a container or e-house. He explains that the safety levels intrinsic to dry-type transformers mean they do not need a separate enclosure outside the modular structure.

"The dry-type transformer is simply another aspect of the electrical arrangement in a substation that can be readily modularised," he says. "For safety and other reasons, an oil-filled transformer would still need its own infrastructure due to the risk of fire, explosion or oil spills."

He highlights that this is counteractive to the modular philosophy which makes this substation format so popular. By using a dry-type transformer, however, the need for a separate transformer bay, fire protection and suppression facilities, and outside cabling, can be avoided. With a dry-type transformer inside the substation, there is also a reduction in the overall footprint.



The use of dry-type transformers in a modular substation offers additional advantages.

**For more information contact Trafo Power Solutions.
Visit: www.trafo.co.za**

LV, MV and HV cables to order online

Well-known cable manufacturer, Aberdare, has launched an e-commerce trading platform – the first in the cables industry. It makes Aberdare's full range of low, medium and high voltage cables available online. With this development the company is keeping pace with an increasingly digital world and the aim is to make it easier for customers to order online, anywhere at any time.

Speaking at the launch of the new trading platform, in April at the company's head office in Meadowdale east of Johannesburg, Mishack Matla, Aberdare's Marketing, Sales and Distribution Executive Director, highlighted that the full cable range also includes its 132 kV cables. These are produced at Aberdare's high voltage manufacturing line in Gqeberha in the Eastern Cape. The new line, opened in 2019, was built with a substantial investment from Chinese parent company Hengtong.

Matla noted too, that Aberdare's fiberoptic cables are available on the e-commerce platform.

"Importantly," he said, "this new online facility enables us to serve not only the SA market but also neighbouring countries to deliver their cable requirements. It offers an alternative ordering platform to existing customers and opens up access to a wider market in neighbouring countries and further afield."

The e-commerce platform will enable customers to search for the products they need, to check pricing, availability and lead times, and to track their orders through the Aberdare system – all in real time. Customers will also be able to view and download invoices and statements (current and historical) and proof of delivery documents.

Matla added that the company plans to make test certificates and product technical information available as part of the solution in due course.

The e-commerce purchasing facility is immediately available to customers – they simply need to register on the site and can then use it to place and track their orders going forward.

For more information contact Aberdare Cables.

Tel: +27 (0)11 396 8000

Email: info@aberdare.co.za

Visit: www.aberdare.co.za



Well-known manufacturer of LV, MV and HV cables, Aberdare has launched an e-commerce platform.



The leading supplier of power products in Southern Africa.

Your preferred partner in HV and power quality equipment.
Installations, commissioning, service and maintenance.

HIGH VOLTAGE EQUIPMENT

A division of ACTOM (Pty) Ltd



Your One-Stop Global Energy Supply Partner

ACTOM

2 Magnet Road | Knights | 1413 | PO Box 13024 | Knights | 1413
Tel: +27 (0) 11 820 5363 | Email: Daniel.De-Bruyn@actom.co.za | www.actom.co.za

Local production of vacuum interrupters for US company

ACTOM MV Switchgear is manufacturing vacuum interrupters (VIs) for a new product launched in the US market. This is in terms of a partnership agreement signed with a US switchgear manufacturer.

"The US company, which specialises in the manufacture of high voltage switchgear and automation products for transmission and distribution systems, has developed a novel switchgear product range incorporating vacuum interrupter technology. It approached us due to our well-established reputation as a manufacturer of high-quality VIs. Another factor in our favour, with regard to the partnership agreement, was that we do not supply VIs to any of their competitors or suppliers," says Rhett Kelly, MV Switchgear's Design & Development Manager.

MV Switchgear's Vacuum Interrupters South Africa (VISA) plant is the only VI manufacturing facility in the southern hemisphere and has been in operation for over 30 years. The partnership agreement with the US company marks the first time the plant has embarked on large-scale manufacturing of VIs for another switchgear manufacturer as, to date, it has manufactured VIs primarily for its own products.

In terms of the agreement, signed in May 2020, MV Switchgear undertook to build prototype VIs and various VI parts in accordance with the US company's designs, as part of the technology development process, and thereafter to manufacture the VIs for full-scale production.

Kelly says, "We began manufacturing the units last year, with capacity for up to 20 000 VIs per year. The agreement calls for us to make VI parts as well as manufacture and assemble the VIs. Having proven to the US company our ability to make the parts required, we could begin full production."

The VIs are of a different design configuration to that of the VIs MV Switchgear manufactures for its own products. The differences make for much more compact VIs, about an eighth of the size of MV Switchgear's existing product, and the new units have a much higher voltage rating of 27 kV, compared to 12 kV, as well as unique vapour and bellows shield designs. They are manufactured to meet tight tolerances and using specialised non-conventional materials.

"We have had to expand our quality management



Danie Hanekom (right), Manager of the VI plant, and John Schultz, former Manager of the plant, in front of a braze furnace.

system and controls in order to meet the US company's stringent requirements," Kelly adds.

To enable MV Switchgear to meet the volumes required, the US company invested a substantial amount of money for ACTOM to upgrade its existing VISA plant. Some of this went into refurbishing and upgrading an existing second braze furnace that had been out of service for several years, as just one operating braze furnace has been sufficient to serve MV Switchgear's internal production requirements. The balance of the investment went into establishing a semi-automated VI test facility in the plant to manage the testing of the increased volumes of units to be produced.

The custom-designed testing programme includes power frequency voltage withstand testing, high voltage conditioning of the contacts, power frequency arc conditioning, resistance measurement, pressure measurement using a magnetron, and X-ray emission testing.

The braze furnace refurbishment was completed at the beginning of 2021 and the installation and commissioning of the semi-automated test facility was completed in August 2022, enabling full production to proceed.

For more information contact ACTOM MV Switchgear.

Tel: +27 (0)11 820 5111

Visit: www.actomswitchgear.co.za



We specialise in the design, engineering & supply of **dry-type transformers, dry-type miniature substations and custom-built modular substations.**

TRAFO
POWER SOLUTIONS



Connect with us to find out more:
[/company/trafopowersolutions](https://www.linkedin.com/company/trafopowersolutions)

www.trafo.co.za

Skills programme for women in the Just Energy Transition

In April, the Energy and Water Sector Education and Training Authority (EWSETA) and Power Africa, a US government initiative coordinated by USAID, launched the Electrical Engineering in Renewable Energy (RE) Specialisation Skills Development Programme, in Standerton, Mpumalanga. With this specialised skills programme, the partnership between EWSETA and Power Africa aims to contribute to the inclusive participation of women in the Just Energy Transition (JET).

To support a more productive, competitive and sustainable economy, EWSETA focuses on equipping the country's workforce with the skills and knowledge needed to thrive in the new economic landscape where decarbonisation is a major driver in upskilling the workforce.

The newly launched programme supports 100 young, unemployed women learners, and 15 Technical and Vocational Education and Training (TVET) college lecturers from Gert Sibande, Nkangala and Ehlanzeni, to undergo training towards achieving a National Certificate: Electrical Engineering: Renewable Energy, NQF Level 3.

It is envisaged that on completion of the training programme, the participating women will have gained valuable RE-related skills and will have greater access to employment and career opportunities in the renewable energy sector. The inclusion of TVET college lecturers is a key component to the programme's sustainability as these lecturers will be capacitated on the course curriculum so that they, in turn, can train future cohorts of learners to equip them with knowledge of today's new renewable energy technologies.

"As part of our strategy to implement learning programmes and initiatives that benefit the sector in the long run, partnerships remain our key delivery mechanism for relevant, new skills development," says Mpho Mookapele, CEO of EWSETA. "Our response to the JET stands on three pillars: upskilling/reskilling the current workforce, strengthening and capacitating the Post School Education and Training (PSET) system, and ensuring that inclusive economic participation is realised among the most vulnerable members of communities – being youth and women. This programme is a testament to how collaboration between committed partners can ensure that no one is left behind in the country's energy transition."

To meet its Paris Agreement commitments, South Africa is working on several mitigation measures to reduce its greenhouse gas emissions and achieve its low-carbon development imperatives. Access to electricity is a major concern for South Africa and this programme aligns well with the country's aims to transform the electricity sector to achieve long-term energy security.

David Thompson, Acting Coordinator for Power Africa said at the launch: "The scale of South Africa's Just Energy Transition presents the scope to redistribute resources and opportunities, opening up the potential for better pathways for women in the renewable energy sector. I want to



The new RE skills training programme supports the inclusive participation of women in the Just Energy Transition.

recognise the women here today for being at the forefront of this transition."

Data obtained from the industry indicates that the current workforce in the energy sector is still predominately male, specifically at mid-level and senior management. The new skills training programme is aimed at ensuring women's economic inclusion and equal participation in the JET.

Additionally, the move to upskill and capacitate this first cohort of women with this qualification will have a significant impact on the regional economy of Mpumalanga as new green technologies are being introduced to complement existing economic activities and opening new areas of opportunity.

"Given the need for the JET, proactive measures like this will ensure Mpumalanga can integrate RE technologies into its green economy strategy and has a workforce capacitated to respond with relevant skills," says Mookapele.

"In addition, women who are currently employed in the energy and other sectors will be able to upskill and adapt to these new green technologies."

The RE sector offers more than just upskilling and reskilling – it offers opportunities for investors, financiers, developers, component manufacturers, and suppliers. TVET colleges in Mpumalanga must not be left behind as the province embarks on decarbonisation initiatives, including reskilling and upskilling coal-fired power plant employees. TVET colleges are well placed to provide the new skills training required for the future clean energy generation workforce. The opportunities emerging require semi-skilled and skilled workers and artisans as well as entrepreneurs in the RE sector.

"With this partnership and programme we aim to forge an optimistic future for Mpumalanga's women in the RE sector," concludes Mookapele.

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



Simeon Tassev, Galix Networking.

Threat hunting should form part of the strategy

Ransomware remains one of the top cyberthreats facing businesses in South Africa and globally, causing financial, reputational and collateral damage. Simeon Tassev, MD & QSA at Galix Networking, points out that there is too, a growing trend towards cyber extortion, where data encrypted for ransomware purposes is leaked to the public, or in some cases, used against individuals. Backup and recovery, while they remain essential, are no longer sufficient to protect businesses adequately against this threat. Tassev says a more proactive approach is becoming essential, including threat hunts, which proactively search networks for cyberthreats that may have gone undetected.

The threat of cyberattack is real and growing, and the likelihood of businesses being attacked is increasing daily. South Africa is reported to be the second most targeted country in Africa and ransomware is among the top five cyberthreats. Public sector institutions, infrastructure and large organisations are generally targeted, but smaller business operations are similarly vulnerable.

Changing angles

As well as becoming more frequent and more sophisticated, ransomware attacks have shifted away from only encrypting the data – to hold it to ransom. The modus operandi has changed from denying data availability to disclosing data that has been stolen. This can have a number of repercussions, including extortion of individuals based on stolen data, reputational damage resulting from leaked information, as well as compliance breaches and fines.

It also means the approach of having a backup and restoring from a clean copy of data is no longer an adequate

approach to mitigating risk. Once data has been stolen, there is no way to get it back, even if a business has another copy of the data with which it can reset to continue operations. A more proactive approach to threat prevention and detection has become critical, and threat hunts have evolved as part of this strategy.

Seek and find

Threat hunts are automated tools that proactively search for security risks on the internet, the dark web and within an organisation's network. Where threat detection systems will identify known threats, threat hunting looks for threats that are as yet unknown and undetected. When potential threats are identified an alert can be triggered so they can be investigated further, and the appropriate action taken.

These technologies make use of intelligent software that combines next-generation technologies like big data processing, artificial intelligence and machine learning, with human intelligence, to complement existing security solutions, add another layer into the security mix, and drive an enhanced security posture.

Prevention first

In today's world, responding after a ransomware attack can be too late. While it remains essential, always, to have backup and the ability to recover from a clean copy of data, this is no longer sufficient to mitigate the threat of ransomware. Proactive prevention is the best approach. There are many tools available to assist with this, including threat hunting, which helps organisations stay a step ahead and mitigate the growing risk from cybercrime.

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

Reducing cybersecurity risk to critical infrastructure

Over 800 cybersecurity delegates attended ABB's Ransomware OT Defense Summit in April 2023, organised in partnership with the global technology advisory board Industry IoT. The event focused on strategies to reduce the risk of ransomware attacks and identify security threats to critical infrastructure.

The World Economic Forum's Global Cybersecurity Outlook 2022 indicates that 80% of cybersecurity leaders believe ransomware is a dangerous and evolving threat – with 50% indicating it is one of their greatest concerns regarding cyber threats.

Ragnar Schierholz, Global Cybersecurity Portfolio Manager at ABB said, "The likelihood of being attacked is no longer a matter of 'if' but 'when'. Being complacent when it comes to cybersecurity can be as dangerous as an attack itself, and not being prepared is no longer an option."

During the event, ABB launched its 'Defense in Depth' playbook which includes a recommended risk reduction roadmap for customers and outlines strategies that leverage multiple se-

curity measures and defensive mechanisms to protect systems and data from vulnerabilities.

"Defense in depth is a tried and tested strategy that can be universally applied to reduce cyber risk," said Joseph Catanese, Cybersecurity Practice Lead at ABB and author of the playbook. "We have created a guide that shares examples of best practice, with a focus on reducing the surface area of vulnerability."

The efficacy of the defense in depth methodology has been widely acknowledged. The National Institute of Technology (NIST) recommends using it from the start of system development through to the design of security and privacy architectures. The International Society of Automation (ISA) refers to it as a superior approach to achieving security objectives.

"At the same time as enabling digitalisation, this methodology will help organisations find the best approach to industrial cybersecurity, to successfully reduce risk of cyberattacks, and

Continued on page 31

Demand for electric cars is booming

In its *Global Electric Vehicle Outlook 2023*, the International Energy Agency (IEA), notes that global sales of electric cars are set to surge to yet another record this year, expanding their share of the overall car market to close to one fifth and leading a major transformation of the auto industry that has implications for the energy sector, especially oil.

The new edition of the report shows that more than 10 million electric cars were sold worldwide in 2022 and that sales are expected to grow by another 35% this year to reach 14 million. This level of growth means electric cars' share of the overall car market has risen from around 4% in 2020 to 14% in 2022 and is set to increase further to 18% this year, based on the latest IEA projections.

"Electric vehicles are one of the driving forces in the new global energy economy rapidly emerging – and they are bringing about a historic transformation of the car manufacturing industry worldwide," said IEA Executive Director Fatih Birol. "The trends we are witnessing have significant implications for global oil demand. The internal combustion engine has gone unrivalled for over a century, but electric vehicles are changing the status quo. By 2030, they will avoid the need for at least 5 million barrels of oil a day. Cars are just the first wave; electric buses and trucks will follow soon."

The majority of electric car sales to date are concentrated in three markets: China, Europe and the United States. China is the frontrunner, with 60% of global electric car sales taking place there in 2022. Today, more than half of all electric cars on the road worldwide are in China. Europe and the United States, the second and third largest markets, both saw strong growth with sales increasing 15% and 55% respectively in 2022.

Ambitious policy programmes in major economies, such as the Fit for 55 package in the European Union and the Inflation Reduction Act in the United States, are expected to further increase market share for electric vehicles this decade and beyond. By 2030, the



Sales of electric cars are expected to leap by 35% this year, after a record-breaking 2022.

average share of electric cars in total sales across China, the EU and the United States is set to rise to around 60%.

The trends are also having positive knock-on effects for battery production and supply chains. The new report highlights that announced battery manufacturing projects would be more than enough to meet demand for electric vehicles to 2030 in the IEA's Net Zero Emissions by 2050 Scenario. However, manufacturing also remains highly concentrated, with China dominating the battery and component trade – and increasing its share of global electric car exports to more than 35% last year.

Other economies have announced policies to foster domestic industries that will improve their competitiveness in the EV market in years to come. The EU's Net Zero Industry Act aims for nearly 90% of annual battery demand to be met by domestic battery manufacturers. Similarly, the US Inflation Reduction Act places emphasis on strengthening domestic supply chains for EVs, batteries and minerals. Between August 2022, when the Inflation Reduction Act was passed, and March 2023, major EV and battery makers announced investments totalling at least USD 52 billion in EV supply chains in North America.

Despite a concentration of electric car sales and manufacturing in only a few big markets, there are signs of growth in other regions. Electric car sales more than tripled in India and Indonesia last year, albeit from a low base, and they more than doubled in Thailand. The share of electric cars in total sales rose to 3% in Thailand, and to 1.5% in India and Indonesia. A combination of effective policies and private sector investment is likely to increase these shares in future. In India, the government's USD 3.2 billion incentive programme, which has attracted investments worth USD 8.3 billion, is expected to increase battery manufacturing and EV rollout substantially in the coming years.

In emerging and developing economies, the most dynamic area of electric mobility is in two- or three-wheeler vehicles, which outnumber cars. For example, over half of India's three-wheeler registrations in 2022 were for electric vehicles, demonstrating their growing popularity. In many developing economies, two- or three-wheelers offer an affordable way to gain access to mobility, which means electrification of these vehicles is important to support sustainable development.

Continued from page 30

therefore downtime," said Curt Dukes, Executive Vice President and General Manager at the Centre for Internet Security (CIS).

ABB's summit brought together industrial cybersecurity experts and technology leaders from companies including IBM, Cisco, Boston Consulting Group, Johnson Matthey, BASF Digital Solutions, Norsk Hydro and Boliden.

"Our research shows we still have a lot of work to do to secure our modern connected society, but also that we can't do it all; so we need to choose wisely where we focus. It is clear that everyone has the same uncertainty and doubt around what we do not know, and about which doors and windows of their technology castle have been left open," said Derek Harp, Founder and Chairman of The Control System Cyber Security Association International (CS2AI). Harp attended the OT Defense Summit to release the second annual Control System Cyber Security Report.

For more information visit: <https://new.abb.com>

For more information visit: www.iea.org

e-Micro mobility: it starts in Rosebank, Johannesburg

Andile Skosana, CEO, CityConsolidator Africa

The world is fast moving into an era of sustainability that spans renewable power generation, e-mobility, green buildings, and sustainable consumption habits, among much more. As other countries lead the charge in transitioning to electric vehicles (EVs) and renewable energy, South Africa is battling a power crisis which makes the thought of EVs on a mass scale seem like a pipe dream.

Pipe dream or not, the revolution is coming and South Africa will have no choice but to keep up – to maintain its own competitiveness and for the health of our environment. The ideal would be a country, and cities, that are built around sustainability and e-mobility, and, we would strongly argue, e-micro mobility. The question is how do we get there?

We believe fervently in the power of policy to impact positively on society. CityConsolidator Africa is rooted in influencing good policy that is implemented well. This is how the Rosebank e-micro mobility Pilot Project was born. It is a small-scale public-private partnership that reaches down to the most granular level.

The project involves 15 electric delivery bikes working within the Rosebank Management District precinct in Johannesburg, sharing the same solar-powered charging kiosk that doubles as a battery-swapping centre to ensure continuity.

Answering key questions

The pilot project is designed to answer a number of questions: Why e-bikes? Why e-micro mobility? How does an electric bike ecosystem in a small part of a city work? Which elements could be replicated?

South Africa's roads are built for cars and trucks. It would be no exaggeration to state that they are unsafe for e-bikes – despite the proliferation of delivery bikes in our suburbs. However, this is where we are, not where we want to be. It should not be that one 75 kg person starts up a two-ton internal combustion vehicle to travel three kilometres to buy a litre of milk. Two-wheelers take up less space, they are more environmentally friendly, more manoeuvrable, more cost-effective – and quicker because of their convenience. Importantly, they can be seen as stepping-stones in mobility

– they are more inclusive in bringing more people into mobility generally. Introduced sustainably, an e-micro mobility ecosystem could make for friendlier streets.

Delivery bikes present a solid anchor point from which to enter the e-micro mobility discussion. Since the Covid pandemic, e-commerce has increased expo-

nentially and is expected to grow by 40% by 2025. This is one of the only growing segments in the South African economy now, yet there is policy silence around the use of delivery e-bikes in cities. Where should they park? What are the rules for training drivers? What are the standards and regulations required? None of these questions can be answered, yet these e-bikes could be integral to our suburban and inner-city lives. There needs to be rigorous thinking and planning to guide and influence policy for the sector so we can shape it to grow – and to deliver convenience to other parts of the city as well as the townships. The pilot project talks directly to this need.

If we can build a viable and safe e-micro mobility ecosystem for delivery bikes, the next step is to add commuter and personal recreational mobility to the same ecosystem.

A project like this cannot exist without massive buy-in. The private sector-led project already has the support of the Rosebank Management District, Transport Authority Gauteng, City of Johannesburg represented by Transport, Development and Planning, the JRA and the Smart Cities office. The Gauteng Department of Economic Development is interested in providing riders from Alexandra. The private sector has been equally welcoming with environmentally sound, second life, battery energy storage business REVOV participating, as well as SeeSayDo, SolidGreen, and Mzansi Aerospace Technologies as an accelerator; Evo Motors will be providing e-bikes and Green Riders will be providing e-bikes and training. The list of stakeholders grows daily.

The outcome will be an applied research case study that looks into the metrics of every aspect of the ecosystem and develops concept notes to influence policy. The performance of the pilot will generate insights into e-bike and rider performance, delivery metrics, carbon savings, and other factors. The concept notes will include a submission to support the Transport Authority Gauteng's 2030 Smart Mobility strategy, a concept note on a green mobility credentials ecosystem, another around a universal standard for a swappable battery ecosystem and a fourth specifically aimed at precinct infrastructure and management protocols for e-micro mobility.

The future is green. This we know. e-micro mobility provides South Africa with an opportunity to catapult its cities into the new world, where they are more sustainable, economically viable and more responsive to people's needs. Building a world-class African city remains the goal, and this can be achieved with a bottom-up approach that lays the foundation for scale, responsive policy and mass buy-in over time. This bottom-up approach might start small but can grow to make 'rands and sense', changing the face of our cities.

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



The e-Micro Mobility Pilot Project is a public-private partnership involving 15 electric delivery bikes working in Rosebank Management District.

TURCK**BANNER**

Properly Connected! Connectivity Solutions That Fit



Benefit from more than 115 000 Turck solutions for your applications in the Connectivity field

Make use of our extensive range of cables, junction boxes, field wireables and much more

To meet the demands of your application, we will not hesitate to create customer-specific connectivity solutions

Turck Banner (Pty) Ltd

130 Boeing Road East, Bedfordview, South Africa

+27 11 453 2468

sales@turckbanner.co.za

www.turckbanner.co.za



STAY CONNECTED, STAY SECURE
WITH REMOTE MONITORING!

iritron
-GmbH-