

FEATURES:

- Industry 4.0 + IIoT
- Energy management + the industrial environment
- Measurement + instrumentation
- Safety of plant maintenance, equipment + people

10/2024



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As EM celebrates 40 years of empowering industry, it is launching its latest catalogue of products designed to shape the future of electrification and automation.

(Read more on page 3.)

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Walk with those who know the way

I am reminded of the true interpretation of Einstein's theory of relativity – and it goes like this: The older you get, the shorter a year becomes as a proportion of your life. It therefore seems to rush by increasingly rapidly as the years go past.

When you are 20, a year is a mere 5% of your life – and therefore it seems rather long...

When you are 60, it is less than 2% of your life – and flashes by rather quickly...

It seems like yesterday that I crafted the Comment for the previous issue of *Electricity + Control*. And much has changed since then. But one thing that remains steady is that load shedding (per se) is still being admirably managed.

Now we need to brace ourselves for the failures of electrical distribution systems as well as water treatment and delivery networks – issues that are already becoming evident.

However, as I reflect on the topics for this month's edition, I am struck by the overwhelming integration of industry 4.0 and the Industrial Internet of Things into industry – and how pervasive these technologies have become.

Folk refer to this revolution by various names – but the most appropriate is to bundle it together as Digital Transformation: it implies a positive and transformative way of doing things. It implies better ways of intelligently measuring, monitoring, controlling and managing things – in all cases in the broadest sense.

It further speaks to the seamless integration across a variety of platforms – but with the potential risks of doing that.

Think back to hard-wired loops, analogue controllers, and the seeming mystery of tuning so many systems in a plant that we always hoped would work (at least until we'd moved on). It reminds me of the story of the white-coated fellow at the soft drinks factory – but I'll save that for another comment.

Now we face instead the immense challenge of data all over the place. Where

we want it and where we'd really rather not see it!

And we all agree that data on its own is worthless.

Modern industry requires – indeed is reliant on – the elevation of that data to real information. Real information is useful to the plant and the operating team and should allow you to plan, control and manage the way your plant runs far more efficiently and repeatably.

However – we also have many legacy systems installed in various plants around the country.

The transition from legacy to a digitally transformed system is a big step – indeed a continuing journey – and it is best to get sound advice on how to undertake this.

I remember fondly the angst when central control systems were slowly being replaced by distributed control systems. It almost felt like control was being lost. Of course, it was not – rather the intelligence of the system was being distributed, making the flow of data far more effective and the system more rugged.

Now we can encapsulate far more intelligence at the end of the line and transmit back only the information that has value. In this regard I recall the anxiety when wireless communication systems were first being introduced to industry: it felt as if privacy were likely to be compromised – and certainly there were risks. But these systems were based on technology and encryptions that were developed in times of international anguish – and they worked and were remarkably impenetrable.

And so it is today. The next steps to make your plant more efficient may well require big investment and, certainly, courage. Engage with those who have walked the path and learned the lessons.



Ian

Ian Jandrell

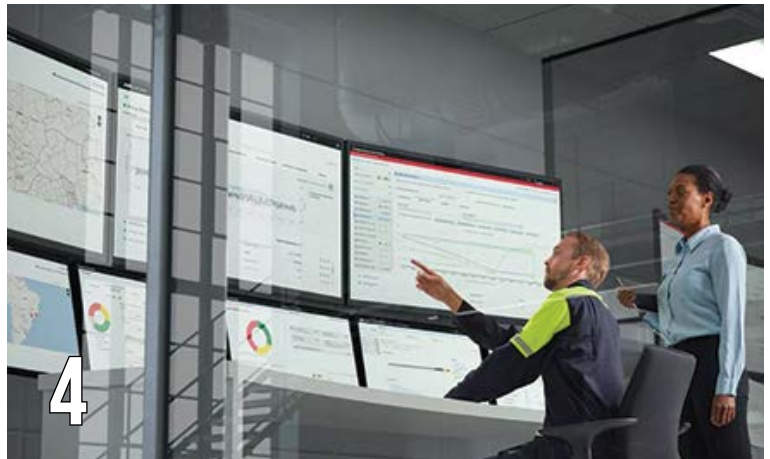
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40 years of innovation powering the future

As ElectroMechanica (EM) celebrates 40 years of empowering industry, we are excited to launch our latest catalogue – a collection of products designed to shape the future of electrification and automation. This reflects our ongoing commitment to delivering reliable, scalable, and forward-thinking solutions for today's industrial challenges.

A catalogue for the future

Our new catalogue features over 1 000 new products, each engineered to meet the evolving needs of modern industry. From advanced motor control systems to energy-efficient power distribution solutions, every item demonstrates our focus on performance, sustainability, and compliance with the latest industry standards.

In addition to technical specifications, the catalogue includes practical case studies that highlight real-world applications of our solutions. Each section is designed for easy navigation, allowing you to quickly find the products and services that meet your business needs.

New and updated products include state-of-the-art automation solutions, electric motors, and supervisory control systems. They offer scalability and efficiency, making them ideal for businesses looking to streamline operations and reduce energy costs. For example, our latest variable frequency drives and power quality systems integrate seamlessly with a wide range of industrial applications, ensuring optimal performance and reliability.

40 years of expertise

While the catalogue focuses on the future, it is built on a strong foundation of experience. For four decades, EM has been a trusted partner to industries worldwide, offering innovative solutions that solve real-world problems. From our beginnings in 1984 to becoming a leader in the electrification and automation space, our journey has been defined by collaboration, reliability, and continuous improvement. Our 40-year history is a testament to the trust our clients place in us. It is also a reminder that the solutions we provide today are informed by decades of expertise, making them more effective, durable, and aligned with the challenges industries face.

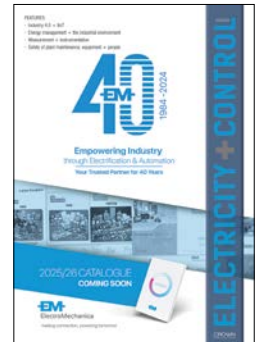
Looking ahead

As we approach the release of our latest catalogue, it's

time to consider how the right solutions can shape your business. Whether you're seeking to enhance efficiency, meet sustainability goals, or stay ahead of technological advances, this catalogue is designed with your future in mind.

At EM, we go beyond supplying products – we partner with you to engineer solutions from the ground up, tailored to your specific requirements. With 40 years of experience driving innovation, we're here to help you navigate the challenges and opportunities ahead, ensuring you have the tools and expertise needed to achieve operational excellence.

For 40 years, EM has focused on delivering solutions that help businesses thrive. Our new catalogue reflects that same dedication to quality and innovation, offering the tools to empower the industries of tomorrow. Explore the catalogue and discover how EM is continuing to shape the future of electrification and automation. □



ElectroMechanica opened its first premises 40 years ago.

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Integrated solutions drive efficiencies in mining

At Electra Mining Africa this year ABB presented solutions that serve diverse industry sectors and focused on current trends – from growing environmental, social and governance considerations to sustainability, the Just Energy Transition and energy efficiency. All these developments are driving an increased uptake in digitisation and automation as companies look to become more responsible and resilient. Speaking to Electricity + Control at the show, ABB's Martin van Zyl, Sales Manager, Process Automation highlighted advances in the mining industry – and other industries more broadly.

Van Zyl says all mining companies are moving forward with automation and control. When it comes to advancing to the next level from already established systems, they may be a bit more hesitant but generally in South Africa and southern African countries, mining companies, consultants, EPC professionals and end users are exceptionally open to progress. “Generally, too, they are quick to evaluate and implement new technologies, much faster than many international companies,” he notes. “If new sensors become available, for instance, or new equipment offering smarter insights or better information, many of our customers are willing to give it a try, prove the concept, and if it works well, they scale to wider implementation.”

He comments that this openness to exploring new possibilities is – in South Africa and among South Africa based mining houses – almost inherent in the industry's culture: “It is part of the South African spirit,” he says, “it's how we do things.”

Nonetheless, there are some companies that will ask for local references on implementation, others are fine with global references on sites similar to their own, before piloting a new system or technology. In some cases, South African or southern African mining companies are leaders in their field. EPC consultants are also generally positive, keen to move forward with innovative technologies that can deliver benefits to their own work and for their customers.

He did note some regional variations, in East and West African countries where different agencies are at play in supplying or implementing technologies and systems – and



The 800xA DCS enables companies to manage energy better, to manage costs, and to manage industrial processes efficiently.

not always in the long-term interests of the end-user. He cites examples where ABB South Africa has been called on to provide the local service and support that customers need and that long-distance suppliers cannot deliver. Van Zyl emphasises that all ABB's products and parts are specifically designed and supplied to maintain continuity through the typical 15- to 30-year life of a mine, when maintained correctly. “This is essential,” he says, “in ensuring products and technologies deliver the promised performance and can be efficiently maintained throughout their life cycle.”

Promises and drawbacks of digital technology

As industry moves ahead with digitisation and automation at many levels, realising the many benefits it can provide, one of the key concerns is the potential loss of jobs – especially in South Africa with already extremely high unemployment levels. A parallel concern is the critical requirement for new skills and skills training.

Van Zyl emphasises that automation solutions in mining are really about improving efficiencies, safety and performance – and specifically, consistency in performance.

Mining sites, like many industrial sites, operate 24/7 – and processes are dynamic. “We have passed the point of having a person adjust a valve manually when a control system can manage this adjustment automatically, as needed,” he says.

With regard to improving safety, he says, by way of example, “If we can get a robotic arm, with a jack hammer



ABB's flagship 800xA DCS provides for extended automation – handling energy management, power control, and process automation from one platform.



Van Zyl emphasises that automation solutions in mining are really about improving efficiencies, safety and performance.

attachment, say, to break up a rock that is blocking a chute, and that robotic arm is driven by the operator, it is much safer than having the operator bending over the chute and hammering away at the rock manually to enable the process to resume.”

However, considering the step up to digital solutions, he says we are definitely not yet at the point of autonomous operations. “Digital solutions are currently geared to empowering people. Digitalisation and AI solutions, which are developed from it, can support people to make better decisions at the right time.

“In my view, perhaps idealistically, I like to imagine that if I can make cost savings by improving efficiencies on the plant – I could return those savings to achieve my ESG goals, for example, building a renewable energy project which is built, owned, operated and maintained by the local community to supply energy to the mine. Then we have a recurring win-win cycle that could not have been conceived before, and it opens opportunities for new businesses to emerge and grow. Some mining companies are already doing this. It changes things at many levels, bringing new benefits all round.”

Van Zyl also makes the point that digitalisation and AI have a valuable role to play in capturing the expertise of seasoned plant engineers, mining engineers, and process specialists and building this into Operational and Management systems. In this way it can serve to empower a new generation of operators to use equipment smartly.

Driving decarbonisation

In terms of ESG considerations and the key environmental concern to reduce carbon emissions, aiming for net-zero, digitalisation and process automation can unquestionably make a positive difference.

Van Zyl points to ABB’s flagship 800xA distributed control system (DCS) – highlighting that it has been a global leader in DCS for over 25 years. The 800xA provides for extended automation – handling energy management, power control, and process automation from one platform. It can be configured simply to provide energy savings and

to enable active power control and comprehensive process control.

“As a DCS, 800xA enables companies to leverage what they have to manage energy better, to manage costs, and to manage industrial processes efficiently. Knowing when, how and how much energy specific equipment uses, or should use and is using – a motor, for instance – operations teams gain the insights to maintain optimum plant performance. Data gathered automatically via the control system will signal where excessive energy consumption needs to be investigated and adjustments made to manage the process more efficiently, manage energy usage and enhance productivity.”

Van Zyl highlights, for example, the Trolley Assist system, which is used in open pit mines and can make a huge difference in reducing diesel consumption (by up to 90%), where power supply, energy management and process control for electrically powered haul trucks are all handled by the 800xA distributed control system – providing a fully integrated control solution.

“And we can add to this,” he says, “integrating smart



The move towards the all-electric mine represents another step up from automation and control for mining operations and not all companies are ready for it.



ABB Ability™ eMine™ extends from the electrification of mining trucks to the entire mining process, including solutions for processes like hoisting, grinding, and materials handling.

solutions such as ventilation on demand. This technology determines where ventilation is needed, or not needed; it can monitor air quality in mine tunnels, for instance, using air quality sensors; it can track where there are more people working, or fewer people, or none at different levels of the mine and manage the ventilation system accordingly. This can deliver energy savings of up to 50%," van Zyl says. He adds that it can connect to other information systems such as access control or fire safety systems, collating all the relevant data to enhance the control of the ventilation system.

Van Zyl adds that ABB's 800xA DCS is widely used, not only in mining but similarly in power stations, water and wastewater facilities, data centres, the oil & gas sector and pulp & paper operations, among others. Smart solutions can be integrated into the process control environment to improve efficiencies. ABB also provides training, in house and on-site for customers.

Open standard protocols

The 800xA serves as a single multifunctional platform, but it also needs to interface with other technologies and devices in operation. There may be OEM applications that require a separate interface, or other digital solutions serving different functions within a plant and interfaces are typically needed to exchange data or provide specific information to the control system.

"A common example is the separation of operations management systems (OMS) from the control system. The OMS should be providing instructions, receiving information, providing insights and tools to empower the process team to make decisions related to short-interval-controls, quality monitoring, production reporting and delay accounting. These digital tools still require human interaction to make effective decisions in the context of the operation. The downstream control system, operating continuously, then receives the specific instructions to adjust, implement a new plan, make changes to parameters or even equipment, as the case may be. So, there is no room for 'proprietary' or 'invisible' control technologies today," van Zyl says. "Standard open industrial communication protocols

and interfaces must be used. Every system needs to interface with other systems – there should be no 'orphans' or 'ghosts' in a modern operation today."

The electrification of mining operations

Regarding the move towards the all-electric mine, van Zyl says this represents another step up from automation and control for mining operations and not all companies are ready for it.

ABB Ability™ eMine™ comprises electrification technologies that enable the all-electric mine, integrating digital applications and services to monitor and optimise energy usage. As outlined above, it extends from the electrification of mining trucks to the entire mining process, including solutions for processes like hoisting, grinding, and materials handling.

The ABB Ability™ portfolio includes specific digital systems developed to suit different industry sectors and meet different needs according to customers' priorities. Van Zyl notes some of the further common themes the technology is designed to address.

The optimisation of operations – restoring a mine site to its nameplate performance rating: this technology ensures that all PID control loops are working optimally and supported by advanced process control (APC), where possible and practical. Being able to identify when a specific process has drifted from its expected performance enables technical teams on site to remedy the issue quickly to restore performance.

Another aspect of performance optimisation takes a wider view of data sourced from the control system and other systems to provide context related to downtime incidents. This may include slow running for example, or quality concerns. It supports waste reduction and consistent production throughput.

Digitalisation also supports effective asset management. It's about using the data to better manage maintenance. As well as avoiding wasting money on too much unnecessary preventive maintenance, it helps to eliminate downtime by using data effectively to inform maintenance priorities. This paves the way to leveraging AI tools to take the next step to predictive maintenance – a software package and toolset that is also already available from ABB.

Van Zyl notes cybersecurity as another concern that needs deliberate consideration and action. For any industry operation or business, cyber-attacks are an ever-present risk; it is not a matter of if but when. He says cybersecurity is a high priority in all ABB applications.

In summary, he reiterates, "The main focus of digital solutions is to empower the people on site to make brilliant decisions, using their experience, supported by data and information – and, as far as possible, automate the downstream control of these decisions to deliver the expected results." □

For more information visit. www.abb.com

Data analytics, AI and ML demystified

Gerhard Greeff – Divisional Manager PM&C, Iritron
and Neels van der Walt – Business Development Manager, Iritron



Neels van der Walt, Iritron.



Gerard Greeff, Iritron.

In the past few years there has been an increase in the adoption and acceptance of artificial intelligence (AI), if one uses a wide definition: from simple spellcheck, predictive text, ‘Because you watched ...’ recommendation of shows, to complex machine learning and predictive models and simulations. However, in manufacturing, there are still a lot of sceptics who do not understand the basics of AI and do not see how it can be beneficial for their facility. Where companies do understand the basics and benefits, adoption is still slow as the next questions are often (as with anything new), where do we start and, do we have what it takes to begin?

So, what are data analytics, artificial intelligence (AI) and machine learning (ML)? Do they offer a magical solution? Does a company need a data scientist to be able to use these technologies? Where do you start with an analytics journey?

Here, we try to answer these questions and provide some guidance for the (easier) adoption of AI and ML in the manufacturing and processing industries.

The figure below depicts data analytics as a continuum ranging from Foundational analytics to Advanced analytics, and including Descriptive, Diagnostic, Predictive and Prescriptive analytics.

Descriptive analytics

Descriptive analytics forms the basis for all other analytics categories. Most companies already have Descriptive analytics in operation, as this answers the question of ‘what happened’. Software technologies supporting descriptive analytics include plant historians that can record a large number of plant parameters every time the values of the parameters change.

Time series data comprises a date and time stamp, and the process value. Time series data is used to find out and report what happened before and after a deviation occurred. Time series data also forms the basis for industrial AI and ML. Other technologies that enable descriptive analytics include Manufacturing Operations Management (MOM) systems and data tracking, for example: transactional records on material and product movement throughout the manufacturing value chain, the related quality samples and their results, plant throughput compared to the plan and reasons for plant downtime for a specified period, and more. MOM technologies typically include comprehensive reporting to be able to answer the ‘what happened’ question.

Diagnostic analytics

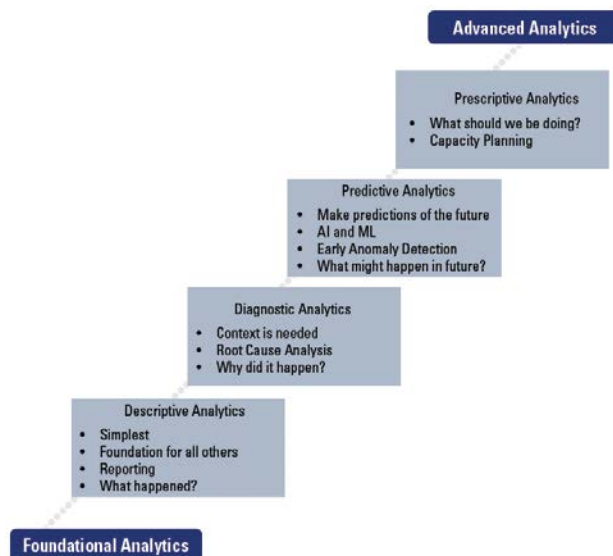
The next step in the continuum is Diagnostic analytics and this answers the question ‘why did it happen?’. Addition-

al context is usually needed to answer this question. Root cause analysis tools bundled together with plant historians allow for the analysis of data by trending various process variables together and viewing the values in relation to one another on the same time axis. This makes it possible for process engineers to investigate process anomalies, enabling them to understand why things happened in a certain way at a given moment in time.

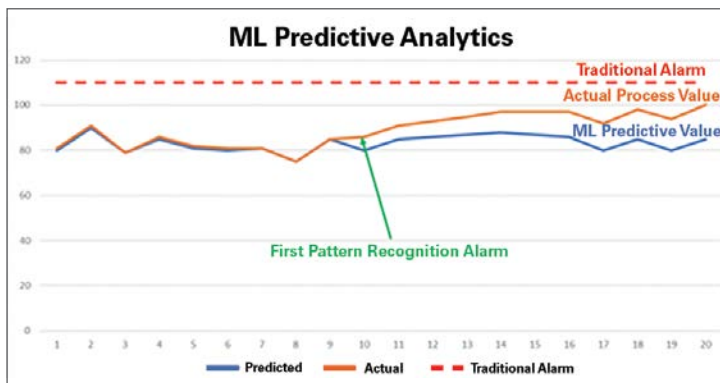
MOM systems are also powerful in providing context as they present time and transactional views related to production, inventory, quality, and maintenance. This context allows the user to gain a deeper understanding and insight into plant or facility performance. As a simple example: looking at production numbers together with shift information, allows the user to compare performance between, for instance, dayshift and nightshift. Other context categories may include product, plant, production line, quality, throughput, and seasons.

Predictive analytics

The next step in the continuum is Predictive analytics. Predictive analytics answers the question ‘What might happen in future?’. Predictive analytics is typically based on AI and ML technology and needs the same time series history data as introduced for descriptive analytics. Predictive analytics is ideally suited for processes or assets that are critical for production or quality, or assets that are capital intensive and critical for plant throughput. Commercial off-the-shelf AI and ML solutions do exist, so it is not necessary to understand complex mathematical models or to be a data sci-



The data analytics continuum.



Predictive analytics is ideally suited for assets or processes that are critical for production or product quality.

entist to use the technology. However, understanding the plant process and which process variables are important for production, quality and asset health is very important.

Cloud technology makes AI and ML much more affordable and viable than they were a decade ago. Cloud technology makes it more viable to increase processing power for short periods of time (during the data processing and model development phase) without the need to purchase the processing power infrastructure for on-site deployment. There are various OEM technology suppliers offering configurable Advanced Pattern Recognition (APR) and Early Anomaly Detection (AI and ML) systems in the industrial market space today.

Typically, a process or asset is modelled by using related process variables and historical time series data to find patterns related to different operating conditions. After modelling a process (based on historical patterns), the model is deployed and compared to what is happening in real time on the plant to predict when an anomaly might occur. These models can predict a potential future event long before traditional supervisory control and data acquisition (SCADA) type alarming will be triggered.

Predictive analytics aims to prevent costly breakdown or bad quality by identifying deviations and anomalies early, when timely intervention can still affect the outcome. For instance, if a machine is predicted to break down three weeks from now, a planned shutdown can be organised two weeks in advance, to prevent a costly breakdown and adverse plant conditions.

Prescriptive analytics

The last step is Prescriptive analytics. Prescriptive analytics answers the question 'What should we be doing?'. One technology that assists with this question is Finite Capacity Scheduling. If a production process consists of many steps and parallel and serial paths, devising the optimum schedule can be difficult, especially for large quantities of orders and stock keeping units (SKUs). It is important to take production capabilities, setup times, changeover times, the need for cleaning in process (CIP) and scheduled planned maintenance into consideration. Typical ERP (enterprise resource planning) and MRP (material requirements planning) systems find it difficult (or too expensive) to model

plants to a level of detail required to provide an effective schedule based on actual capacity and constraints as opposed to infinite capacity.

It also becomes important to know 'what happened' to orders that were supposed to be processed, as this directly impacts the schedule going forward. This illustrates again that the foundational analytics need to be in place to know what happened to planned orders before prescriptive analytics can be implemented successfully for planning into the future. Various MOM systems provide planning and scheduling tools, ranging from comprehensive finite capacity scheduling systems to more basic scheduling tools, but all tools aim to assist in answering the question of 'What should we be doing to make optimum use of our plant capacity?'

Scheduling can be done based on predetermined scenarios, such as maximising equipment use, minimum late orders or maximising profit, among others. Some of these may be mutually exclusive, but in some cases, two or more rules can be combined where one rule takes precedence, and the next rule is applied on the result of the first rule. For instance, if the first rule is 'minimum late orders', we can take that result and apply the 'maximise equipment use' rule to the result. If this is done the other way around, a different schedule is produced.

Another technology that can assist in answering the question 'What should we be doing?' involves smart KPIs and dashboards, in combination with high performance graphics. The dashboards and smart KPIs are aimed at highlighting any condition that develops that could negatively impact quality or production. In this way the technology guides the user to focus their attention and response (what should we be doing) on the issue or abnormal condition that needs to be resolved to maintain operational excellence.

The digital twin

The concept of a digital twin has gained ground over the past few years. This technology provides for a piece of equipment or a process, designed in digital form, to react the same way as would the physical equipment or process, given the same (digital) inputs. The digital twin of the physical system can be designed using first principles or by using historical data. Once the digital twin has been developed and proven to be accurate when run in parallel to the physical twin, it can be used not only to show 'what might happen in future' if no action is taken, but also to run different 'what if' scenarios to find the best 'what should we be doing' answer.

Above, we have provided a short explanation of data analytics, AI and ML. We have shown that they do not offer a magical solution – and a data scientist is not needed to start on the journey. We have outlined how plant operators can progress from the standard 'what happened' reporting to make use of the data available in the plant to answer the bigger question of 'what should we be doing?'. □

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

Digital technologies are transforming mining

According to Siemens' *Pictures of Transformation* report, 35% of mining jobs will be automated by 2035, 50% will require less human interaction, and the workforce will need significant reskilling. Against this backdrop of rapid technological change, at the recent Electra Mining Africa exhibition Siemens demonstrated its commitment to transforming the South African mining industry through innovative and sustainable technology solutions.

Electra Mining Africa brings together the mining, electrical, automation, manufacturing, power, and transport sectors at one trade show and is recognised as the largest event of its kind in southern Africa. It serves as a platform to share the latest innovations for the region's mining sector.

Sabine Dall'Omo CEO of Siemens Sub-Saharan Africa says, "Electra Mining Africa 2024 offered us an opportunity to showcase Siemens' cutting-edge technologies and integrated systems designed to address the evolving challenges in the mining sector. Our focus on innovation, sustainability, and digitalisation aligns with the current needs for a sustainable industrialisation pathway and job creation in the mining industry."

Innovative solutions to industry challenges

The report reveals that most mines are racing to meet their net zero targets by 2050. This is a monumental undertaking, requiring an overhaul of almost all methods and processes. Mines are going off-grid and generating their own power. In most cases, they are choosing hybrid power solutions, combining self-sustained solar plants supplemented by grid power. Several industry leaders are also exploring green hydrogen to replace diesel, and most have invested in battery storage for energy supply stability.

Dall'Omo noted, "In today's dynamic mining environment, organisations need to stay ahead of the curve. It's essential to implement solutions that optimise operations, reduce costs, and ensure compliance with international standards and at the same time prioritise sustainability and safety. Siemens' advanced technologies and integrated systems demonstrate how mining operations across sub-Saharan Africa can become more efficient, productive, cost competitive and sustainable."

At Electra Mining Africa, Siemens shared a range of its products and services.

- Digital twin technology: Siemens demonstrated how digital twin solutions can revolutionise mining operations, enabling companies to simulate and optimise processes before implementation. Experts predict that up to 40% of mines will use digital twin technology by 2040 to enhance safety, efficiency, and decision-making.
- Automation and robotics: The company also showcased its latest advances in automation, aligned with the *Pictures of Transformation* report prediction that 30 to 40% of machinery in mining will

be autonomous by 2040. These solutions help improve safety in harsh environments and increase operational efficiency.

- Renewable energy solutions: With the mining sector aiming to meet net zero targets by 2050, Siemens presented its range of renewable energy technologies and smart grid solutions. These support the industry's move towards self-generation and the goal of using renewable energy to eliminate 73% of Scope 1 and 2 emissions.
- Electrification solutions: The company demonstrated its comprehensive electrification portfolio focused on enhancing efficiency, reliability, and sustainability. The solutions shared included advanced power management systems, low and medium voltage switchgear, busbar trunking systems, and the latest digital services such as PSS®SINCAL for network modelling.

Siemens' modular platform concept prevents power outages, optimises energy consumption, and ensures seamless integration of various applications. By leveraging these solutions, mining operations can significantly reduce downtime and energy costs and safeguard critical equipment, enhancing overall power quality and reliability.

Transforming the everyday

A key focus in Siemens' participation was demonstrating how its technologies are transforming daily mining operations. "From real-time data monitoring and advanced analytics to automation and digital twin technology, we're enhancing operational efficiency, safety, and sustainability at every level of mining operations," says Dall'Omo.

These advances can mitigate risks, help manage resources more effectively, and enable compliance with the relevant legislation, all while promoting a safer and more secure mining environment.

Dall'Omo concludes, "In future, mining can be at the forefront of green industries in South Africa, but it requires concerted effort and innovation. Siemens is proud to be a front runner in this industrial transformation journey. We are working with our partners in the mining sector to provide the technologies and expertise needed to create a more sustainable, efficient, and prosperous industry for all South Africans."

For more information visit: www.siemens.com



Sabine Dall'Omo CEO of Siemens Sub-Saharan Africa.



Wesley Hood, Education and Social Impact Specialist, RS South Africa.

DesignSpark offers a wealth of resources

In its online DesignSpark platform, RS South Africa has created a comprehensive suite of resources and solutions to assist design engineers across industries.

From streamlined project management tools to a vibrant community platform, DesignSpark supports engineers of all skill levels to innovate, collaborate, and succeed in their endeavours.

Founded in 2010, today it comprises a global community of students, pro-creators, and professional design engineers, with 1.4 million members across 193 countries, and provides various design resources.

Wesley Hood, Education and Social Impact Specialist at RS South Africa says, "These resources include DesignSpark Mechanical, PCB and Circuit Simulator professional CAD software, and SolidWorks Electrical through an affiliate partner."

A wealth of learning materials are available, including tips, video tutorials, user guides, and grassroots education. The platform offers extensive 2D and 3D CAD part libraries and a Product Design Centre, offering parts intelligence on a billion MPN (manufacturer part number) parts and information including export compliance, lifecycle, and alternatives.

"This is all available on a free 'Explorer' subscription plan or for low-cost subscriptions within 'Creator' and 'Engineer' plans, where additional benefits are unlocked in the software," Hood adds.

DesignSpark also promotes responsible engineering and societal change through its Mission Responsible and Activist

Engineering programmes. Hood highlights that it invites engineers to engage in projects like the Environmental Sensor Development Kit (ESDK), an open-source project developed by DesignSpark.

Projects include 'The Interactive Air Quality Map' in Lagos and the 'Breathe Better Bear' initiative in Malta, supported by the Maltese government to educate and influence younger audiences about air quality issues.

DesignSpark supports small SMEs and OEM manufacturing companies with larger design teams across all industries, including healthcare, utilities, energy, communications, pharmaceutical, education, aerospace, defence, infrastructure, maintenance, and F&B. Tools like DesignSpark PCB allow engineers to create schematics and layouts for electronic circuits with extensive libraries and a high degree of customisation. DesignSpark Mechanical is a 3D CAD software that enables engineers to design mechanical components and assemblies, making it easy to use for quick prototyping and detailed design work.

The tools integrate well with other industry-standard software and services, which makes this a valuable platform for engineers at all stages of their careers.

"OEMs are using DesignSpark as a supporting tool chain for proof-of-concept designs, rapid prototyping, and R&D tools. Start-ups and SMEs use DesignSpark as a primary tool chain for proof-of-concept and end design, and as a knowledge-sharing platform," Hood comments.

Universities and students also leverage the platform for resources, design activities, and reputation building. Engineers can access comprehensive tutorials, webinars, FAQs, and technical news, helping to advance the design process and boost productivity.

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DesignSpark supports engineers, SMEs and OEM manufacturing companies across all industries.



Fuses and connectors for reliable circuit protection

Bel Fuse offers a wide range of fuses and communication connectors, crucial for industrial and consumer devices, which are available in South Africa via the online platform Transfer Multisort Elektronik (TME). With the rise of smart technology, the need for reliable circuit protection has become more important to prevent failures caused by electrical interference.

Fuses

Bel Fuse specialises in various fuse types, designed to meet different application needs.

Its miniature fuses include cylindrical fuses (5x20 mm, 6.3x32 mm) which provide overcurrent protection in cir-



Bel Fuse supplies various types of fuses, including miniature cylindrical fuses, PTC polymer fuses, and SMD fuses.

uits. Available in glass (with visible wire) and ceramic (filled with arc-quenching sand), the fuses are rated from 125 V to 1 kV ac, with breaking capacities up to 10 kA. They are easily replaceable and commonly used in consumer electronics.

PTC Polymer Fuses are self-resetting fuses used where occasional overcurrent is expected, such as in actuator controllers or household appliances. The fuses operate over a wide temperature range (-40°C to 85°C); they are available in THT and SMD formats, with current ratings from 40 mA to 3 A.

SMD fuses are surface-mount devices and include both PTC and safety fuses in popular sizes (1206, 2410). Designed for dc and ac circuits, they offer rated currents from 0.25 A to 100 A with breaking capacities up to 250 A for 350 V ac.

Connectors

Bel Fuse also offers a range of connectors designed for data transmission and communication applications.

The company provides USB 2.0 and 3.1 ports in single,

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“DesignSpark keeps pace with emerging technologies and industry trends such as IoT, AI, and advanced manufacturing techniques,” says Hood.

It boasts one of the largest global communities in this sector. “It offers members the opportunity to share ideas, projects, and solutions. Through forums they can ask questions of their peers to gain expert help and project inspiration from application-based projects and content.”

Hood points to several success stories. RanMarine, a small SME in the Netherlands dedicated to protecting water and ecosystems, uses DesignSpark Mechanical as a companion tool for its in-house design processes for new prototypes.

Shin-Etsu Polymer, a Japanese company and industry leader in PVC and semiconductor silicone products, uses DesignSpark Mechanical to create jigs for the manufacturing process, rapidly turning around designs for metal 3D printing.

Another example is Cognex, an American corporation specialising in machine vision systems. Over 35 of its engineering team members use DesignSpark tools as a supporting part of their tool chain, enabling them to collaborate effectively on design projects.

“DesignSpark continues to revolutionise engineering by providing cutting-edge tools, a supportive community, and educational resources, enabling engineers to innovate and succeed across various industries,” Hood says.

RS South Africa is part of the RS Group plc, a global provider of product and service solutions to industry.

For more information visit:
www.rs-online.com/designspark

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double, and combo variants (USB/RJ45). These through-hole (THT) mounted ports are ideal for devices with limited space and help combine multiple interfaces on one PCB.

A variety of RJ45 connectors are available, including plastic and shielded versions with integrated LEDs for signalling. Some models feature integrated isolation transformers, offering extra protection for network equipment. Additionally, some of the connectors support Power over Ethernet (PoE) and are compatible with Cat6 and Cat6a Ethernet cables. Bel Fuse also offers RJ45 plugs, including crimp-on and tool-free variants that ensure secure connections.

Bel Fuse’s products are known for their compliance with international standards, offering high quality and cost-effective solutions for a wide range of applications.

For more information visit: www.tme.eu



It also provides USB ports, and combined USB/RJ45 connectors.

Robotics transform roofing production

Harvey Roofing, a division of Macsteel (Pty) Ltd and a leading provider of roofing solutions, is working with industrial robotics manufacturer Yaskawa, to revolutionise its roof tile production process, using a unique prototype product and cutting-edge robotics solutions to enhance efficiency, quality, and sustainability.

To meet continuing demand for high-quality roofing materials, Harvey Roofing recognised the need for an innovative approach to upgrade its current manufacturing process. “After the successful rollout of our prototype product and securing funding for our business case, we approached various suppliers to make this a reality,” says Frikkie Erasmus, Business Unit Executive at Harvey Roofing Products. “Our choice for robotics came down to addressing safety concerns, increased efficiency and accuracy, as well as the extended lifespan of the robots.”

Harvey Roofing’s relationship with Yaskawa pre-dates this project. It previously implemented feeding robots for its roofing products, resulting in high efficiency and reduced scrap. Now, the roofing company aims to upgrade the production line of one of its most innovative products: Harvey EcoTile. Constructed from a mineral polymer composite, the EcoTile offers a sustainable option in an industry that has seen minimal improvement over a century. Harvey EcoTiles are lightweight, strong, weatherproof, paintable, and maintenance-free.

“Yaskawa sealed the deal with its applicable solutions, prompt response, reputation, and the positive existing relationship with Harvey Roofing,” says Erasmus. “We wanted to make the changes necessary for us to be competitive on the world stage when comparing cost per unit.” Following the successful extrusion of composite slabs, Yaskawa will handle the downstream elements, automating the production process from start to finish.

Overseeing the installation and setup were two technicians and one project leader from Yaskawa, working alongside Harvey Roofing’s own project leader and specialist. The relationship between the roof tile leader and robotics experts is in an exciting stage, with all committed to improving efficiency and plenty of room for further development to match demand. □



Yaskawa is working with Harvey Roofing, installing robotics solutions to increase production efficiency.

Battery energy storage in sustainable energy solutions



Ricardo Estefano Rosa (left) and Pervin Gurie (right) on the WEG stand at Electra Mining Africa 2024.

At Electra Mining Africa this year, Eduardo Werninghaus, CEO at WEG Africa, outlined the company's internal evolution over the past year, highlighting its strategic realignment focusing on sustainability – internally and in the solutions it offers the market. Werninghaus said WEG recognises the growing need for sustainability in all sectors of industry and at multiple levels.

In this context, looking specifically at sustainable energy, the company offers a range of technologies, including solar, wind, steam and battery

energy storage solutions, which means it can also offer customers various hybrid solutions to meet their needs. Leigh Darroll spoke to Pervin Gurie, Director of the Digital & Systems Division at WEG Africa, and Ricardo Estefano Rosa, from WEG's Brazilian head office where he leads the WEG team responsible for developing its Battery Energy Storage Systems (BESS) business, about the company's Battery Energy Storage Systems and the expertise WEG offers in this field.

As renewable energy development gains ground in South Africa, southern Africa and across the continent, we see the emergence of small-scale localised microgrids, mid-scale self-generation installations serving specific commercial or industrial facilities, and larger independent power plants, up to utility-scale, sited where renewable sources can be optimised. These decentralised, distributed energy sources call for new Energy Management Systems (EMS) designed to manage different energy sources in a coordinated way in order to optimise efficiencies and consumption and to control the interface and feed-in to the grid, where applicable.

Alongside the range of energy technologies it offers, and the related electrical equipment, WEG also has its own energy management systems – providing the digital monitoring and control technologies that extend from the power plant to the point of connection – all developed in-house.

Battery Energy Storage Systems, or BESS, are increas-



A BESS skid solution.

ingly recognised as a key element in renewable energy systems as they provide the flexibility and stability – two critical factors – to support consistent power supply, in independent power plants and particularly where those power plants feed into the national grid.

Gurie says that although the market for industrial and utility-scale BESS is relatively new in South and southern Africa, WEG has a number of projects in the pipeline, in the 12 MW to 30/34 MW range. He points out that WEG BESS systems are modular – and therefore scalable – and are custom engineered to meet the needs of each project.

Developing a new technology

Estefano says WEG in Brazil began research and development of BESS in 2016 and, in 2018, it investigated the US market to understand the technologies in use there. Globally, the renewable energy sector has grown significantly since then, technologies have advanced, and the cost of batteries continues to fall. The company now supplies a well-established and still growing renewable energy sector in Brazil and other Latin American countries such as Colombia and Mexico. He adds that WEG in South Africa



WEG BESS solutions are custom engineered to meet the needs of each project; above is a BESS containerised solution.



WEG BESS providing support to the first Brazilian H₂ plant (300 kW/600 kWh).

has everything needed to make BESS locally, including the engineering skills and experience, and it can call on the Brazil office for engineering support if it is needed.

With its long history in designing, developing and installing electrical systems and equipment, WEG produces all the elements – from the start button to the motors, to the transformers, substations, monitoring and control technologies, software and automation systems, and more – to deliver integrated solutions to the end user. Furthermore, the company has been present in Africa for the more than 40 years and understands the variances and specifics of electrical requirements and operational logistics in different countries to meet local needs.

Estefano highlights that in Brazil, WEG has supplied a mining company with transportable BESS. These carry 2.5 MW modules and can be moved to wherever they are needed on the site.

Gurie adds that this kind of solution would serve well in the African market, to supply power to remote sites, and particularly to adapt to the different frequencies of power supply in different countries.

In Brazil, Estefano says BESS is referred to as the “Swiss army knife” in sustainable energy systems – “because of the multiple functions it offers for energy management and control. It is recognised as a helpful, complementary technology,” Estefano notes. “For behind the meter renewable energy systems, BESS provides stability. For distributed power generation systems – especially over long distances – battery energy storage provides the bridge between the generation plant/s and the transmission grid. And because battery energy storage systems provide the flexibility and stability that the grid needs, they make the use of renewable energy sustainable. They provide a level of control that accommodates the variabilities of the weather,” he says.

Gurie emphasises the importance of battery management systems and energy management systems in providing engineered solutions for distributed energy sources. “We need to understand and integrate the feed in from different energy sources and manage the timing for best use, as well as controlling voltage and frequency. Voltage,



A BESS mobile solution (1 MW/1 MWh).



WEG BESS providing frequency regulation and ancillary services (5 MW/16 MWh).

current, and of course temperature and other factors all need to be monitored over time, to ensure a stable supply system,” he says.

As the energy transition unfolds and the demand for sustainable energy systems and battery energy storage solutions continues to grow across Africa, WEG is set to play a leading role. □

For more information visit: www.weg.net

Energy storage solutions key to the energy transition

Richard von Moltke, General Manager at Static Power, a division of ACTOM, says as South Africa progresses its energy transition – needing to meet rising demand and, at the same time, reduce emissions – energy storage is key, enabling the integration of renewable energy and promising stable grids.

However, in considering the energy transition and the role of energy storage, von Moltke emphasises that it is important to differentiate between ‘in-front-of-the-meter’ and ‘behind-the-meter’ systems. These distinct segments raise different timelines, approaches and resource pools, and both are equally important for the country’s energy transition.

Behind-the-meter (BTM) systems are typically smaller and usually fall into the private sector space – in residential, commercial, and industrial systems. These systems are quicker and easier (although still complex) to install and could have a faster impact on South Africa’s energy transition. The impact of distributed systems has already been seen over the past three years with the steep increase in solar PV installations, mainly by small businesses and residential users.

In-front-of-the-meter (FTM) systems are bigger utility-scale projects that will be driven by Eskom or other power utilities or independent power producers (IPPs) and Eskom together. These are typically long-term projects and solutions that may take four to six years to complete.

While both are important, behind-the-meter solutions provide immediate relief to the country’s energy constraints. In-front-of-the-meter projects are key to meeting the country’s mid- to longer-term energy transition targets and reducing emissions. These larger projects will enhance

the wider use of grid infrastructure and over time assist in reducing South Africa’s reliance on coal power stations.

Energy goals

Energy storage is key to South Africa achieving its energy goals. Although the country has great renewable energy sources, von Moltke highlights that the renewable energy generation profile does not align with the load profile.

Hence, we need energy storage solutions to store energy during peak renewables generation times, when there is lower demand. Excess energy produced during peak generation periods and stored in energy storage systems can then be dispatched during high-demand periods to support a more efficient and stable energy network.

However, the other challenge the country currently faces is that in areas with the highest solar irradiance, where solar PV projects are most economical, and similarly in those areas with the highest wind resource and the best locations for wind farms, there are grid capacity constraints and, at present, very few energy storage solutions. Projects are under way to establish large battery energy storage systems in strategic locations to ensure that excess energy is not lost, but these projects take time.

Energy storage is a crucial part of a sustainable electricity network, von Moltke reiterates, and although technology is likely to evolve and change going forward, some sort of storage system must be part of the long-term solution for the country’s energy transition.

He notes that various factors have contributed to the slow adoption of energy storage in South Africa. With the rapid advance of technology over the past few years, it has been difficult for investors to align with and invest in a specific technology and solution for local production without knowing whether it will still be viable in a few years’ time. An inadequate regulatory framework has added to uncertainties in the industry.

Moving forward

A long stretch of loadshedding forced the country to transition quickly to accepting energy storage solutions in behind-the-meter applications. However, the uptake in commercial and industrial sectors has been more hesitant because, depending on the type of



Energy storage is a crucial part of a sustainable electricity network.

load and the number of hours of backup they need, the return on investment for businesses can be between five and eight years, with solar PV included.

Encouragingly, von Moltke notes that more customers are starting to better understand all the benefits of energy storage. Along with the maturing of solutions and the energy environment, he suggests that various measures can be implemented to accelerate energy storage adoption in South Africa. For example, a significant driver is the tax relief provided through Section 12B of the Income Tax Act, which offers favourable tax incentives to consumers that invest in renewable energy, specifically for systems coupled to solar PV installations. It will be beneficial if this relief is extended past the end date of 28 February 2025 and expanded to include battery energy storage systems with or without being coupled to solar PV systems.

Additionally, proper financial structures and frameworks

should be developed by all utilities for IPPs to sell excess energy back into the grid. From residential, commercial, and industrial perspectives, this would also make the adoption of energy storage solutions easier. Further, energy wheeling and trading through municipal infrastructure, which is already happening in some municipalities that have proper fee structures and frameworks in place, could be implemented more widely.

Beyond securing a stable power supply, energy storage solutions provide a range of other benefits which the market needs to understand to make informed decisions, von Moltke says. He says prospective customers should work with an experienced partner that is qualified to provide them with the best advice and technical solutions for their needs. □

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

ENERGY MANAGEMENT + THE INDUSTRIAL ENVIRONMENT : PRODUCTS + SERVICES

High performance in a small, new package

BMG – which celebrates 50 years in business this year – recently released the new Danfoss iC2-Micro Drive to the African market. This advanced system is designed with new features which allow for easy replacement of the VLT® Micro Drive FC 51.

“The versatile iC2-Micro Drive delivers superior motor control and mechanical brake performance, is more intelligent and powerful than its predecessor and is easier to use, install and commission,” says David Dyce, Business Unit Manager: Electronics, BMG. “With reduced complexity and greater functionality, the iC2-Micro Drive offers improved performance and energy efficiency over the VLT Micro Drive FC 51. It provides a seamless retrofit for existing applications and for complex tasks.

“The compact unit, with a small footprint and side-by-side mounting, can be installed in tight spaces and it can withstand a wider range of operating temperatures, making it suitable for safe use in harsh environments. The drives – available in a power range for 1-phase of 200 to 240 V ac: 0.37 to 2.2 kW and for 3-phase of 380 to 480 V ac: 0.37 to 22 kW – can operate reliably at full load for ambient temperatures up to 50°C. In addition, the drives are equipped with coated circuit boards as standard and controlled airflow movement to reduce the possibility of corrosive contaminants reaching the electronic circuitry. The fan system has built in on/off control to reduce noise and save energy. The fan is also removable to simplify drive maintenance.”

Dyce highlights another key feature of the iC2-Micro Drive in the integrated PID controller that enables users to programme closed loop functions directly into the drive, improving its speed and process control capability. Advanced control algorithms and digital signal processing ensure more precise control over motor speed and torque, resulting in improved efficiency of the system and

reduced energy consumption.

“We recommend iC2-Micro Drives to our customers where they need to upgrade existing drives, or when they are selecting drives for a new project,” he says.

Other new features include torque open loop control, locked motor detection and permanent magnet motor control. With PM motor compatibility, the micro drive system provides efficient permanent magnet motor control in open loop under VVC+ through the full power range and is available in two versions, with or without the RFI filter.

Integrated energy efficiency features, including an automatic energy optimiser and sleep mode, can reduce energy consumption by up to 30%. In addition, the iC2-Micro Drive incorporates new safety features, including enhanced overcurrent protection and short circuit detection, which protect the motor and drive from damage in the event of a fault.

The iC2-Micro Drive is supplied standard with a user-friendly interface with display and keypad. The local control panel also has a standard potentiometer for local speed adjustment. The drive is fitted with spring type I/O terminals for simple external control wiring. It can be quickly and easily installed and configured.

BMG's range of Danfoss drives, designed to save energy, optimise process control and improve productivity, serves many sectors, including processing, mining and minerals, industrial HVAC, marine and water, as well as chemical, oil and gas industries.

For more information visit: www.bmgworld.net



With reduced complexity and greater functionality, the iC2-Micro Drive offers improved performance and energy efficiency.



The REVVOV PRISM is a compact, server-mounted, all-in-one system with pre-programmed settings to assist fast installation. The units contain all the necessary wiring and correct fusing, making them quick to install.

Battery backup remains essential for secure power supply

Lance Dickerson, co-founder and MD of Revov, says although South Africa has now seen 170 days without loadshedding (at the time of writing) the disruption of load reduction still plagues some communities around the country. This is implemented particularly in high density areas where the distribution system is vulnerable, often where it has been inadequately maintained, or where there is a high level of illegal connections and the risk of overloading the system is high.

The National Energy Regulator of SA (Nersa) defines load reduction in this way: "Emergency load reduction may take the form of load shedding (time-based interruption of supply to customers on a rotational basis), mandatory load curtailment (self-reduction by customers in response to an instruction given by the system operator), load limiting (a limit placed on the current or power consumed by a customer, typically enabled by smart meter technology), or customer load switching (remote switching of customer circuits for specific appliances, typically enabled by smart meter technology or ripple control technology).

Providing more clarity on the reasons for load reduction, Eskom explains on its website: "Load reduction is a long-established process that Eskom uses in specific areas when there is sufficient electricity available, but a transformer's integrity is at risk due to overloading, whereas load shedding is used when the national grid is constrained and there is not sufficient capacity to generate electricity to meet demand. It is also a proactive measure that Eskom uses to protect human life, equipment worth millions of rands and people's livelihoods. Overloading of transformers is recorded mainly during peak hours between 05:00 and 07:00 in the morning and 17:00 to 19:00 in the evening."

Thus, load reduction is intended to be protective, Dickerson notes, adding further that the City of Johannesburg earlier this year announced it would be

implementing rotational load reduction in some areas to prevent its grid from collapse.

He says the state of the distribution network in Johannesburg is frighteningly close to collapse, with teams of technicians working full time trying to reconnect communities. Although this is the case in many parts of the country, some worse off than Johannesburg, he emphasises that Johannesburg is the economic hub of the country.

At the time of the announcement, a glance at the City of Johannesburg's load reduction schedule showed 88 suburbs, were affected, typically in two-hour blocks. Dickerson points to clear patterns in the areas: "One can colour in a map showing where the infrastructure is on the verge of collapse," he says.

"We know this situation can be fixed with the right political will and public-private cooperation, but until we reach that point, households and businesses need to do what they can to secure the continuity of their power supply. They still need to be investing in uninterrupted power supply (UPS) systems, and in solar installations, ensuring they are built with sufficient backup capacity.

"Low voltage and high voltage battery backup systems are still, in 2024, the only sure way businesses – from small retailers to large manufacturing, mining, construction and other operations – can secure their power supply, to continue to drive industry and the economy forward.

"This is where it's important to understand that not all batteries are equal," Dickerson notes. "Lithium iron phosphate batteries, especially those built with EV battery cells and referred to as 2nd LiFe batteries, have proven they have the right chemistry and safety profile, they are robust enough to handle harsh operating conditions, and their charge and discharge rates are aligned with the South African energy environment."

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

Intelligent energy recovery for maximum efficiency



With the AX8820, energy can be efficiently fed back into the grid and a database can be generated to optimise machine efficiency.

The AX8820 universal regenerative unit from Beckhoff is used to feed regenerative energy back into the grid. It is suitable for use with the AX8000 multi-axis servo system, AX5000 digital compact servo drives, and third-party devices. The energy is regenerated sinusoidally, preventing the grid distortions that are common with block-shaped regeneration.

The AX8820 regenerative unit is designed for a nominal supply voltage of 400 to 480 V ac, nominal output of 7 kW, and a maximum dc link voltage of 848 V dc. For effective energy management, the regenerative energy is initially stored in the dc link. The AX8820 only starts feeding power back into the grid just before the overvoltage threshold of the connected devices is reached. Several

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Systems engineering for energy efficient data centres

Data centres have become major power consumers and power management companies involved in designing energy systems for them need to focus on optimising energy efficiency comprehensively.

In this regard, Eaton has introduced what it refers to as the 'Power of Six': a set of six principles that form the foundation of its systematic approach to data centre design. With this approach, it takes account of South Africa's power infrastructure environment and seeks to advance the development of "self-aware and self-optimised data centres".

Jaco du Plooy, Product Marketing Manager at Eaton Africa, explains how, using its systems engineering approach, Eaton can de-risk the design, reduce complexity, and optimise the performance of data centres. The approach includes a digital layer, such as Eaton's Brightlayer Data Centres suite, to manage complex ecosystems of IT and OT assets and provide full system visibility.

Design of critical power system components

The first principle focuses on understanding the characteristics, behaviours, and impacts of critical components in power systems. By doing so, performance can be optimised, energy efficiency enhanced, and IT needs effectively met. This involves using data analytics in the operational phase to improve efficiency, maximise usage, and anticipate problems. As the first principle, it is fundamental.

Asset management and condition-based monitoring

This points to the need to incorporate a digital layer into power management systems to enable asset monitoring and management and provide for proactive measures to increase lifespan and optimise performance. Continuous monitoring and maintenance support optimum efficiency and identify potential risks. With the further use of digital

twinning, AI, and machine learning, performance can be optimised from the design stage, potential equipment issues can be identified and energy efficiency tracked by monitoring consumption.

System design

This third principle encourages a broader system design approach, considering interdependencies beyond the power train. Properly integrated components minimise energy wastage and ensure efficient use of high-power loads like cooling, reducing demand on the power train. A well-designed, integrated system reduces component failure, optimises usage, and prolongs lifespan, contributing to operational and sustainability goals. Improved communication between system components can reduce data latency and optimise system performance.

Energy efficiency

A systems engineering approach helps achieve sustainability goals and reduce operational costs by minimising power losses and optimising system efficiency. Selecting the right equipment, using copper busbars in low voltage systems, for instance, can significantly improve efficiency. The digital software platform should monitor and manage energy efficiency and prevent power distribution losses. Systems engineering enables significant energy savings and drives overall system performance.

Integration with renewables

It is essential to integrate renewable energy sources into the power ecosystem. Properly done, this provides resilient and reliable power, reducing the likelihood of outages. The reduced rotating mass and inertia in renewables affect power flow quality, with less frequency control and more volatility. Managing the variability of supply and ensuring grid stability requires a comprehensive approach, considering the impacts on harmonics and voltage fluctuations from inverter-based power sources.

Flexible and dynamic design

A flexible and dynamic design approach accommodates changing demands and emerging technologies like AI. Staying adaptable ensures solutions remain relevant and effective in rapidly evolving environments. Eaton's products address the challenges of variable loads due to fluctuations in demand and generation, optimising system operation, voltage levels, and power losses.

"To achieve self-aware and self-optimised data centres, the industry must shift towards systems-based design. Embracing a set of principles and adopting a systems mindset is constructive and the Power of Six, as a guideline, enables this. It drives operational value and delivers intelligent, actionable insights from the data. Adapting to evolving power and environmental demands requires a new way of thinking," says du Plooy. □



Jaco du Plooy, Product Marketing Manager at Eaton Africa.

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AX8820 regenerative units can be operated in parallel to adapt the regenerative power optimally to the needs of the machine.

No communication via EtherCAT is required to carry out energy recovery. However, extended parameterisation – to adapt the voltage levels to the connected devices, for example – can be done via EtherCAT. With the help of the extended diagnostics via EtherCAT, the current regenerative energy can also be analysed. The online data can be used to record the timing of the machine processes. This means an investigation can be conducted to see whether the efficiency of the machine can be increased by staggering the machine processes.

For more information visit: www.beckhoff.com



Ener-G-Africa is now producing larger 550 W and 275 W solar panels and its Paarl factory.

Larger solar panels now manufactured locally

Ener-G-Africa (EGA) has expanded its operations, relocating to a new, larger manufacturing hub in Paarl in the Western Cape. Its new facility includes a cutting-edge solar assembly line, newly commissioned and capable of producing TÜV

certified 550 W and 275 W solar panels, alongside the 20 W, 50 W, and 360 W panels already produced. The panels are designed to serve the South African market and demand for exports across Africa.

The 550 W and 275 W panels, as showcased at the Solar & Storage Live event in Cape Town at the end of August, will be available from October 2024.

EGA offers a comprehensive range of solar energy products for off-grid smaller-scale installations in the region. These solutions are tailored for local and export markets, including countries such as Angola, Botswana, Ghana, Kenya, Malawi, Mozambique, Namibia, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe.

Andre Moolman, CEO of EGA, highlights the company's commitment to advancing solar technology in Africa. "Our investment in state-of-the-art German technology allows us to produce advanced and reliable solar panels specifically designed for the African environment.

"We are equally dedicated to training, upskilling, and employing women and young people from local communities in our solar assembly and manufacturing processes" he says. "Additionally, by integrating automation in

key areas, we ensure top quality control and cost efficiency. This approach empowers individuals and makes high-grade solar products more affordable and accessible across Africa."

Dave Lello, Chief Business Development Officer at EGA, emphasised the importance of the company's new panels. "With our modules being manufactured locally, we have been able to adapt our design specifically for the requirements of the African market, particularly the 275 W panels.

"No other manufacturer currently makes 275 W panels configured like this. They have been designed for flexibility, while maintaining the voltage output of larger panels in order to integrate with most standard industry inverters," says Lello. "They are specifically tailored to offer higher capacity in a smaller area," he adds.

These innovations from EGA extend to integrating different panel types within the same system. "The flexibility of our 550 W and 275 W panels allows for combined use within the same string, optimising performance for various configurations, including east-west orientations which are beneficial to maximising energy use throughout the day," Lello explains.

All EGA panels are manufactured in South Africa under internationally recognised certification by TÜV NORD and according to ISO and IEC standards.

The solar panels are sold with a 12-year limited product warranty and a 25-year limited performance warranty. Local production reduces lead times and ensures that customers and installation partners across Africa benefit from reliable support services. □

AI power and cooling solutions for data centres

As artificial intelligence (AI) and high-performance compute (HPC) continue to disrupt the data centre landscape, NYSE-listed Vertiv, a global provider of critical digital infrastructure and continuity solutions, has introduced a new portfolio of high-density data centre infrastructure solutions to support the higher power and cooling requirements of AI. Now available across Europe, Middle East and Africa (EMEA), Vertiv™ 360AI is designed to accelerate AI deployments of any scale, with designs ranging from rack solutions for test pilots and Edge AI, to full data centres for AI model training.

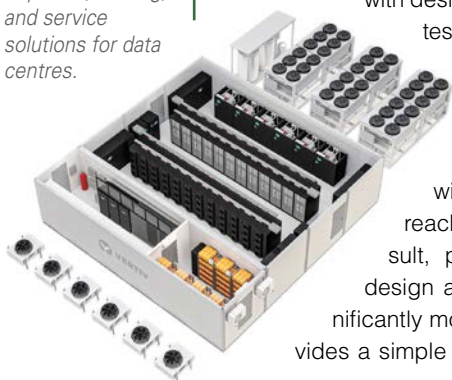
AI and accelerated computing are driving unprecedented demand for power and cooling, with rack densities anticipated to reach up to 500 kW per rack. As a result, power and cooling infrastructure design and deployment has become significantly more complicated. Vertiv 360AI provides a simple way to power and cool AI, with a

complete portfolio of power, cooling, and service solutions that solve the complex challenges arising from the AI revolution. Vertiv 360AI solutions include validated designs and pre-engineered solutions to provide the benefit of Vertiv's expertise and eliminate design cycles.

"After the successful launch in North America, we are pleased to bring the new Vertiv 360AI portfolio to EMEA and boost our customers' AI plans," said Karsten Winther, President for EMEA at Vertiv. "Our solutions provide a streamlined approach for scalable AI infrastructure, addressing the evolving challenges posed by high-performance computing. Vertiv 360AI is designed to help accelerate retrofits of air-cooled edge and enterprise data centres, as well as the greenfield development of hyperscale projects."

Vertiv™ 360AI also offers prefabricated modular solutions to enable customers to deploy AI without disturbing existing workloads and without consuming floor-space. Initial Vertiv 360AI solutions can power and cool over 130 kW per rack, and include designs optimised for retrofits. □

Vertiv 360AI provides a portfolio of power, cooling, and service solutions for data centres.



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Solar power lifts sustainability in abalone farming

Aqunion, a leader in the global abalone farming industry and a subsidiary of the Sea Harvest Group, has embraced a sustainable future powered by solar energy, with a solution implemented by Sustainable Power Solutions (SPS). Aqunion is set to establish a new benchmark in sustainable aquaculture, demonstrating how advanced energy solutions can significantly cut costs and emissions.

Like other businesses in South Africa, Aqunion, which is recognised for its advanced abalone farming techniques, faced the challenges of rising costs of electricity and frequent loadshedding. “Our operations need a constant and reliable power supply to maintain the best conditions for our high-value abalone, and we’ve implemented numerous steps to improve energy efficiencies,” says CEO, Rowan Yearsley. “SPS offered us a comprehensive solar and battery energy storage solution that aligned with our goals of reducing operational costs and improving our sustainability.”

SPS, an asset management company specialising in renewable energy systems, provided a tailor-made solution to meet Aqunion’s needs. “Our approach focuses on creating a microgrid which leverages the synergy between solar power and energy storage to deliver reliability and cost efficiency,” says Johan Wolmarans, Senior Energy Storage Specialist at SPS. The setup includes a battery-based energy storage system designed to deliver up to



SPS has installed a solar PV plant with battery energy storage for leading abalone farming company Aqunion.

four hours of backup power and a solar array capable of supplying about 22% of Aqunion’s required annual energy.

“This solution helps Aqunion during peak operational times and significantly reduces its reliance on diesel generators, reducing the associated emissions,” adds Charles Neethling, Business Development Manager at SPS.

Construction of the solar system began in November 2023 and is currently in the testing and commissioning phase, nearing completion. The installation of the solar panels, carefully placed over existing abalone tanks, required custom engineering to withstand the corrosive environment close to salt water. Aqunion selected SPS as its preferred solution provider after a competitive tender process, as it offered a technologically robust solution and a Power Purchase Agreement that did not need any upfront capital investment by Aqunion. □

SA renewable energy developer attracts French investment

Global asset management company Mirova, headquartered in Paris, is investing USD 15 million in long-term debt financing with SolarAfrica, which will allow the South African renewable energy developer to continue its commercial and industrial activities and expand its utility-scale projects.

Founded in 2011 with a vision to become South Africa’s leading renewable energy enabler, SolarAfrica combines its financial and technical expertise to offer energy solutions designed to reduce electricity costs, provide energy security and improve its customers’ carbon footprint. Starting as one of the only companies in South Africa specialising in Power Purchase Agreements (PPAs), SolarAfrica has expanded its energy offering



Since it was established in 2011, SolarAfrica has delivered more than 204 renewable energy projects.

from on-site solar and battery solutions to virtual solutions such as wheeling and electricity trading. Each solution is tailored to empower commercial and industrial (C&I) businesses with clean, reliable energy solutions that ensure long-term sustainability.

Over a decade after its establishment, SolarAfrica has grown significantly, having delivered and financed more than 204 projects which have collectively saved CO₂e of more than 295 000 tonnes, according to its own calculations. In 2023, the company merged with Starsight Energy – a leading pan-African clean energy solutions provider – to create a powerhouse spanning eastern, southern and western Africa.

Mirova, as a global asset management company and an affiliate of Natixis Investment Managers, is dedicated to sustainable investing. It has been active in the energy transition infrastructure sector for 20 years and has financed more than 1 000 projects for a total of over 7.3 GW of potential generation capacity across 48 countries.

Through its Gigaton strategy Mirova aims to accelerate clean energy access and climate action in emerging markets. Its USD 15 million investment in long-term debt financing with SolarAfrica will enable SolarAfrica to continue its C&I activities and expand the size of its utility-scale projects. □

Level measurement in fast fill and drain cycles

Keeping a power generation plant running smoothly requires reliable measurement solutions. Level measurement can present challenges and raise escalating maintenance needs – especially in applications where there are rapid level changes, or where a solidifying mixture makes traditional methods inadequate.

One of VEGA's loyal customers was facing such a situation, struggling with level measurement in its ash sump. The existing instrument, while effective, was damaged, due to the harsh environment and communication gaps between teams during maintenance activities.

VEGA's External Sales Engineer, Reino Aspesberger, understood the need for a maintenance-free solution. The VEGAPULS 6X, with its narrow beam angle, offered the solution.

- Built to last: The VEGAPULS 6X does not come into contact with the liquid, so the risk of damage from the abrasive ash mixture and maintenance activities is eliminated.
- Fast response: Rapid fill and drain cycles and limited space were specific considerations in this application and the VEGAPULS 6X provides the quick response time and narrow beam angle needed.
- Space saving design: The unit's compact design enables an easy fit, without any obstructions to pipes or grid.
- Superior cybersecurity: VEGA takes data security seriously, offering top-notch cybersecurity features.

More than reducing maintenance demands, VEGA radar sensors are known for their easy calibration and consistent, reliable readings, which worked especially well in the ash sump as it fills and drains in minutes. The VEGAPULS 6X is versatile and adaptable, with a plastic horn antenna and mounting strap for easy installation.

VEGA aims to go beyond being a sup-

plier, to establish close connections with its customers and deliver value in outstanding post-sales support. The team is committed to identifying the ideal solution for each need.

Meet Reino Aspesberger

Reino Aspesberger is a process engineer and the brains behind some of the most innovative solutions in the energy and power generation spheres at VEGA. He started his career as an instrumentation artisan at a leading South African petrochemical company. He has a wealth of experience and a hands-on approach to problem-solving. Aspesberger's inspiration comes from his dad. "My dad is not only my best friend, but his unwavering support is my greatest motivator. Hearing him say 'I'm proud of you' fuels my drive to overcome any challenge," Aspesberger says.

He lives by the motto: 'Learn one new thing every day. In a year, you've learned 365 new things!'

For more information visit: www.vega.com



VEGA External Sales Engineer, Reino Aspesberger.



VEGAPULS X6 provides reliable level measurement in the challenging application of monitoring an ash sump in a power generation plant.

New single-use pinch valve

Valve specialist GEMÜ has introduced a new single-use pinch valve to its product range in this sector.

The new motorised GEMÜ Q51 pinch valve is distinguished by its compact design, and consequently its small footprint in the plant. With its motorised actuator, the new pinch valve can also be used in environments where compressed air is not available. It expands the GEMÜ product range in the sector of single-use pinch valves, in actuator size 0 for tube inside diameters of 1/8" and 1/4" and tube outside diameters of 1/4", 3/8", 7/16" and 1/2".

For single-use pinch valves, the tube is inserted into a

secured retainer. The medium inside the tube can be regulated and controlled by compressing the tube. The compressor of all GEMÜ pinch valves has a specially developed contour which minimises the stress on the tubes and increases the service life. This is also the case for the GEMÜ Q51. It is suitable for single-use applications where the focus is on a compact design and a simplified plant design, and where cross contamination must be avoided. □



The new GEMÜ Q51 pinch valve.

Sensor connection via IO-Link and Bluetooth mesh



The Bluetooth base station and Bluetooth adapters can be used to set up a Bluetooth mesh connecting up to 50 IO-Link devices.



In many cases, implementing Industry 4.0 applications in existing plants used to require extensive additional cabling involving high costs and effort. An elegant alternative to this is available in Bluetooth mesh, one of the Bluetooth components from ifm. It provides for the Y-path connection to IIoT to become wireless.

With the EIO344 IO-Link Bluetooth adapter and the EIO404 Bluetooth base station, ifm offers a solution to make sensor data available wirelessly for IIoT applications. These two accessories put an end to all interference with the control technology and the need for additional cables. The Bluetooth adapter which transmits the data to the base station via Bluetooth is integrated into the system between the IO-Link sensor and the existing line, thus forming a wireless Y-path. These new devices support a point-to-point connection, for example to the moneo|blue app, and the configuration of a mesh network. This networking offers two key advantages. Up to 50 IO-Link devices can be connected to a base station.

All that is needed to do this is a single adapter within the range of the base station. From the base station, the data is transferred to the relevant moneo application via Ethernet.

Ideal for brownfield applications

The new components for connecting IO-Link sensors via a Bluetooth mesh enable implementation of IIoT applications even in existing plants at low cost. Wear monitoring, predictive maintenance or energy efficiency applications can be realised without having to lay additional cables. Another advantage with the Bluetooth mesh technology, is that large systems no longer pose a problem; the maximum Bluetooth range of around 20 metres only needs to be maintained to the next Bluetooth adapter. The Bluetooth adapter configuration – the so-called pairing – can be done easily on a smartphone using the moneo|blue app. Alternatively, moneo configure can be used.

For more information visit: www.ifm.com

Environmental sensor for specific applications

ENVIROsense, a new environmental temperature, relative humidity and, optionally, barometric pressure transmitter is now available from Senseca, a specialist in the design and manufacture of monitoring and measurement instrumentation.

“With all three measurement criteria in one device, ENVIROsense has been specifically designed for use in meteorological and renewable energy applications, HVAC, clean rooms, for OEMs and plant environments,” said Jan Grobler, Managing Director of Senseca South Africa.

“ENVIROsense offers multiple applications, long life, advanced measurement technology and a compatibility with any Modbus-RTU master device. It is already a market leader in the field of environmental monitoring instrumentation, and it is competitively priced,” Grobler added.

The device offers a resolution of RH 0.01%, a temperature measurement of plus/minus 0.1°C with plus/minus 0.1% of the measured value and a pressure measurement of plus/minus 0.5 hPa typical at T = 25°C and 0.1 hPa (500 to 1 100 hPa) at T = full range. Two optional additional 0...1 V, 0...5 V or 0...10 V (depending on the model) analogue outputs for temperature and relative humidity or dew point, with configurable

temperature and humidity ranges, are also available.

ENVIROsense provides calculated humidity quantities such as: dew point, wet bulb temperature, absolute humidity, mixing ratio, specific enthalpy, water vapour partial pressure, specific humidity, frost point temperature, saturation vapour pressure above water, and saturation vapour pressure above ice.

With a rugged ø14 mm compact housing in PBT, it also offers an optional protection shield from solar radiation for outdoor applications.

The transmitter is supplied factory-calibrated in multiple points for relative humidity and ready for use. It can be supplied, if required, with an ISO/IEC 17025 calibration certificate.

Alternative models differ depending on the presence or absence of the optional barometric sensor and analogue outputs, the different power supply voltage range and the different application fields.

To maintain high accuracy measurements, the filter must be cleaned periodically. This simple process requires the filter to be unscrewed from the body of the transmitter and brush washed under running water. It should then be dried and screwed back into the transmitter body.

“As an all-in-one device, offering multiple measurement functions, we believe the ENVIROsense transmitter will be well received in those specialised industries where it can enhance the high accuracy standards required. Its advanced technology makes it a leader in environmental measurement and monitoring instrumentation,” said Grobler. □



The ENVIROsense can measure environmental temperature, relative humidity and, optionally, barometric pressure.

Thermal imaging cameras reveal a mine of information

Teledyne FLIR, a world leader in the design and manufacture of thermal imaging cameras and sensors, showcased its latest innovations for the mining industry at Electra Mining Africa this year. It also shared solutions for utilities and manufacturing, with a special focus on condition monitoring and early fire detection equipment.

Visitors to the stand learned how they can limit downtime, improve efficiency and enhance safety using FLIR cameras – which see thermal overload in mining industry operations before it becomes critical. Outstanding image clarity supports easy hot-spot detection to prevent unscheduled downtime and improve site safety.

As an application example, mines rely on high voltage electric power for ore extraction, transportation and processing. FLIR thermal imaging cameras are powerful inspection tools which can be used to monitor the transformers that feed watering systems, refrigeration systems, mobile climate control systems and substations, on the surface and underground. They are also suitable for use in many explosive atmospheres.

At Electra Mining 2024, Teledyne FLIR displayed innovations to serve this demanding sector, such as its aluminium IP67-rated protective housings. With housing models available for FLIR A400/ A500/ A700 thermal imaging cameras and FLIR A50/A70 compact smart sensor cameras, the accuracy of a camera within the protective housing remains within standard specifications due to FLIR's proprietary radiometric formulas.

FLIR also showed its R&D kits based on its A50/A70 fixed-mount thermal cameras. These kits are an optimal option for engineers who need a complete understanding of a system's thermal profile or need defensible thermal data to support critical decisions.

For condition monitoring and early fire detection, FLIR A500f/ A700f advanced smart sensor thermal cameras offer a solution. These provide built-in on-camera analytics and alarm capabilities and combine top quality thermal imaging with edge computing and IIoT capabilities.

Other thermal imaging cameras to suit a range of applications and budgets are also available. The FLIR ExPro series, for example, offers up to 320 × 240 thermal resolution and vibrant imagery supported by FLIR's patented MSX® (Multi-Spectral Dynamic Imaging). Another technology of note – FLIR Si series acoustic imaging cameras are suitable for industries looking to achieve fast detection of issues such as compressed air leaks, vacuum system leaks or electrical partial discharge in high voltage systems. Models from the FLIR ONE series of thermal imaging cameras for iOS® or Android™ smartphones were also on show at Electra Mining Africa. □



Teledyne FLIR exhibited some of its thermal imaging cameras, sensors and solutions used in mining, utilities and manufacturing.



Simplification of the water quality measurement

Water analysis panel – Multi-parameter measuring system for water quality monitoring

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Streamlining alarm management

Users around the globe and across industries know DeltaV™ AgileOps helps drive operational excellence with safer, sustainable, and more profitable operations.

Monitoring multiple systems and avoiding operator overload and incidents that can cause shutdowns is challenging. DeltaV™ AgileOps offers a solution to make this easier, with user-friendly dashboards, analytics, alarm management, and cross-enterprise data.

It enables operations teams to:

- Gain insights with performance analytics – AgileOps monitors alarm and event metrics across the unit, site, or enterprise – and beyond Emerson product lines.
- Improve alarms and safety management – AgileOps enables updates to alarm configuration, reduces nuisance alarms, monitors and reports on safety instrumented function (SIF) health and use.
- Track integrity with safety system integration – AgileOps monitors bypasses and interlocks to determine if the safety system is operating normally, operating in a degraded state, or if a safety function is active.

Emerson shares the case study of a North American oil producer that is using DeltaV™ AgileOps to improve efficiency in operations and engineering. The customer uses DeltaV AgileOps for analytics and alarm management. The team has already seen these notable improvements, among others:

- Initiation, approval, and execution of alarm-change requests in hours rather than days.
- KPI reports are automatically generated and emailed to the team for efficient review.
- A significant reduction in standing alarms and alarms per hour.

“Using DeltaV AgileOps, we’ve streamlined our alarm management, have more ownership from operations, and have enabled engineers to focus on other areas. Our team can easily audit database alarm settings against the control system to ensure compliance to approved values,” says the Lead, Plant Automation Engineering.

The oil producer operates in one of the largest, highest quality oil sands deposits of North America, targeting gross production of over 200K barrels per day.

The challenge

To meet its production goals, the company operates two oil sands plants that include four DeltaV control system zones, a safety instrumented system (SIS), and 43K hardwired I/O. Having no database for alarm management and to follow company standards, process alarm limits were defined in the P&ID (piping & instrumentation diagram) documents. Difficulties arose because each alarm change required a P&ID redline, an engineering stamp, and all tasks related to the management of change (MOC) database and documentation. The team could not audit the P&ID alarm settings against the live



DeltaV™ AgileOps helps streamline the monitoring of complex alarm systems in oil production.

system or review all alarm settings in one place. On-site operations and engineering managed over 200K DeltaV alarms critical to safety and production. As a result, the engineering team spent considerable time confirming the accuracy of alarm information, which made alarm management labour intensive and inefficient. The company recognised that it needed a method to manage alarms that would reduce the workload and help the team identify nuisance alarms.

The solution

Working with Emerson and Emerson’s impact partner Spartan Controls, the oil company decided to move alarm management away from the P&ID and toward a master alarm database. Discussions laid the groundwork to implement the DeltaV AgileOps Database across all four control system zones via an OPC (open platform communication) connection. The alarm management database, part of AgileOps, enabled the team to transfer all alarms and the alarm-change approvals to operations, with critical priority alarms still needing engineer approval. With the new alarm process, operations can initiate and approve alarm-change requests, reducing execution time to a few hours rather than a couple of days. With more ownership and participation from operations in alarm management, the engineering team can resolve issues more quickly. For example, if a tank level is set to alarm at 70%, engineers might consider moving it to 75%. If they determine the move is safe, they do not need to revise the P&ID and follow time-consuming and unnecessary processes to make the change. Instead, they can revise the setpoint easily from a DeltaV system interface. As a result the engineering team can focus on other key areas and be more productive.

AgileOps also provides Performance Analytics, a key performance indicator (KPI) tool, that helps build reports, for example, to track nuisance alarms. KPI reports and actionable information are sent by AgileOps Performance Analytics daily to stakeholders via email. A dedicated team can address the top nuisance alarms each week.

“Our team can easily audit AgileOps Database alarm settings against the control system to ensure compliance to approved values,” says the Lead of Plant Automation Engineering. □

Safer testing of HV equipment

Doble's M7100 is the only test set with two dual-function high voltage leads for source and measurement and it delivers a complete set of measurements fast. Compared to a single-lead system, the M7100 patented design improves technicians' safety significantly by reducing ladder trips by as much as two-thirds and simplifying lead placement.

The M7100 automates multiple high voltage tests that previously had to be performed using several pieces of equipment, cutting down typical testing time from around seven hours to one and a half hours. Reduced testing time means technicians can safely perform more commissioning, scheduled maintenance and diagnostic activities.

Features

- Patented dual-function high voltage lead design allows the user to switch between source and measurement – with both capabilities included in each HV lead
- Built-in low voltage/high current multi-frequency source
- True 4-terminal measurements
- Easy setup using either a colour or number to indicate the connection
- The only dual high voltage lead test set in the industry
- Standard two-year warranty and three-year calibration interval based on accuracy and reliability in the field.

G Matthew Kennedy in Off-Line Testing & Assessment at Doble Engineering Company expands on the benefits of the M7100 HV Asset Analyser in an online blog. He emphasises that this is the first and only test set to have two dual-function 12 kV source and measure leads. These are used for tests that require a high voltage source, with the most common use being power factor (PF) testing. Because of Doble's long history of innovation with Power Factor testing, this is often referred to as the "Doble Test", Kennedy says.

How has the M7100 evolved?

An HV test instrument uses a large lead with a hook or clamp on the end that can deliver up to 12 kV for power factor, tan-delta, knee points and excitation current tests. This same high voltage source is used to excite apparatus in support of other functions such as partial discharge, corona inspection and burden tests. The single-lead system is a versatile tool for many of the most important HV apparatus tests.

Doble's M7100 has added a second HV lead, and the ability to measure. Combined with advances in switching and measurement technology, this means users can use two leads to energise up to 12 kV independently or measure – effectively turning one, or both of the HV test leads into a measurement lead.



With two dual-function leads, the Doble M7100 provides for safer quicker testing of HV apparatus.

Two hooks are faster than one

Users can cut the time of doing a complete test on a transformer by up to two-thirds. Given the number of extensive tests most power companies conduct today, which require going up and down ladders and unhooking and hooking HV leads, a two HV-lead test instrument offers a substantial time-saving advantage because the ability to shift easily between sourcing and measuring allows for the measurement leads to stay in place.

Simplifying test procedures

It is becoming harder to maintain HV testing skills as the job becomes increasingly complex, requiring testing technicians and engineers to wear multiple hats. Traditional HV testing requires users to fully understand a variety of circuits, their configurations and idiosyncrasies in order to perform the tests correctly.

A two-lead system removes much of that hassle and learning curve. The automated M7100 means successful test completion simply requires an understanding of where to put the leads, as the test instrument will shift the circuit automatically. Additionally, the simple setup reduces most of the errors that may be made during lead placement and movement, which is where most mistakes tend to occur.

A safer alternative

The more a test technician must go up and down ladders or use a bucket truck, the greater the chance of injury. In a way similar to that in which three-phase LV test instruments (TTR, winding resistance) replaced single-phase test instruments, the M7100 can reduce the number of trips up and down the ladder, making it a much safer alternative to traditional, single HV-lead test instruments.

As well as being safer, taking advantage of the latest technology provides savings in time, money. □



Pratley's flameproof Ex d Envirobox® is certified safe for use in surface and underground mining applications.

Complete electrical termination solutions for mining

Local manufacturer Pratley offers complete electrical termination solutions for the mining industry. Marketing Director Eldon Kruger highlights that, as well as individual products, Pratley can supply entire lighting circuits for mines. A typical mine has light fittings every seven metres, and Pratley can provide all the terminals and cable glands pre-fitted for any circuit length.

"This is a systematic way to connect lighting on-site in a mining environment. It is done quite efficiently by installing a catenary cable and then attaching LED lights, which are now used for their energy efficiency. The cable glands are adaptable, and everything is integrated with the junction box," Kruger says.

A circuit breaker can be included to allow the lights to be switched off quickly if a new fitting needs to be installed. The mine can then return the light fitting to its workshop for repair so it can be used again. "The system offers mines a convenient and adaptable lighting solution," Kruger adds.

For the junction boxes, Pratley's Flameproof Ex d Envirobox®, which last year received the 'Technical Product Innovation' award from the South African Flameproof Association (SAFA), is ideal for hazardous mining environments.

Whereas all traditional direct-entry flameproof junction boxes are made from steel, cast iron or aluminium, the Envirobox® is made from a specially formulated, robust engineering polymer, unique to Pratley, and is completely corrosion resistant.

The material has exceptional mechanical properties such as strength, stiffness, creep, and dimensional stability and the junction box, consequently, can withstand 2 x 20-joule impact tests in a -40°C environment.

It has also been third-party tested to withstand an internal pressure of up to 4 000 kilopascals, and it is IP66/68 certified for continuous underwater depths of up to 300 m, confirming it is water- dust- and gastight. The lid and base incorporate an accurately machined flame-path.

The flameproof Ex d Envirobox® can be supplied with either 4 x M20 or M25 entries or smaller, on request. It can accommodate Pratley Ex d flameproof cable glands and accessories and is therefore particularly versatile. Each box is supplied as a standard four-way box with two flameproof blanking plugs.

The internal bosses are drilled and tapped to provide an earthing point for terminal mounting rails or earth lugs. These are electrically connected to the box entries providing complete earthing continuity.

Boxes can be fitted with an N35 terminal rail, a Pratley patented Cranked rail, an inverted Cranked rail, or Piggyback rails. Pratley Kwikblok® terminals and pre-cut lengths of cable with glands can also be factory fitted to customer requirements.

An optional external earthing point is available and is supplied with 4 x M6 nuts and washers as well as a M6 spring washer. The junction box has threaded mounting M5 holes and can accommodate an indexable mounting plate that can be purchased separately if required.

The flameproof Ex d Envirobox® is fully certified to SANS, EN and IECEx Standards, including ATEX for use in surface and underground mining applications (Ex db I/II B+H2 T6..T5 Mb Gb, Ex tb IIIC T85..T100 Db) in Zones 1, 2, 21 and 22 and an ambient temperature range of -40°C to +55°C.

For more information visit: www.pratleyelectrical.com



Desiree Hlubi, Brand Manager, Sisi Safety Wear.

PPE for women – safety with every step

As industries around the world increasingly recognise the importance of diversity and inclusion, more attention is being given to the need for tailored safety solutions for women. Sisi Safety Wear, a brand of BBF Safety and the Beier Group, is at the forefront of this field, championing the development of high-quality Personal Protective Equipment (PPE) designed specifically for women.

At Electra Mining Africa this year, Sisi showcased its range of PPE for women, which reflects its commitment to setting new standards in safety wear tailored to suit women's anatomical needs. Desiree Hlubi, Brand Manager for Sisi, made the point that PPE designed for women is about more than just meeting safety requirements; it's about enhancing morale, productivity,

and the overall wellbeing of female workers in demanding sectors such as mining, electrical, and manufacturing.

As well as providing PPE workwear tailored for women, Sisi focuses on footwear. Here, the expert input of specialist podiatrist, Dr Anette Thompson, and her insights regarding foot health play a critical role in shaping Sisi's product offerings. Dr Thompson explains that ill-fitting safety footwear can lead to significant health issues, from general discomfort to musculoskeletal problems, which in turn affect a worker's efficiency and overall health. She emphasises that footwear designed for the female form addresses these challenges, promoting better posture and reducing the risk of injuries.

At Electra Mining Africa, Hlubi and Thompson highlighted how safety gear designed for women is driving change across different industries, promoting a safer and more inclusive working environment for women and supporting a more productive workforce. □

A human-centric approach in implementing PDS

In the mining sector, the use of advanced technologies such as proximity detection systems (PDS) is key to enhancing safety and operational efficiency. However, people play the pivotal role in enabling effective implementation. Recognising this, Booyco Electronics has adopted a holistic approach in which it prioritises collaboration with end-users to ensure the systems function effectively and most importantly, are embraced by the workforce.

Anton Lourens, CEO of Booyco Electronics, says the implementation of proximity detection systems involves more than installing devices and software. "It requires a comprehensive understanding of the mining environment, the behaviours and routines of the workforce, and the specific safety challenges faced on site.

"Booyco Electronics has always recognised that the end-users – miners and site operators – are central to the systems' effectiveness. Focusing on the people and the role they play means ensuring that the PDS solution being implemented is not only technically sound but also practical and user-friendly," he says.

A significant aspect of Booyco Electronics' strategy involves training and education so that the workforce understands the technology and how it works and is keen to adopt it. Booyco Electronics conducts extensive training programmes for miners and site managers. The programmes are designed to enhance understanding, build competence and proficiency and foster acceptance. Through continual education and training, the company ensures that the workforce is equipped with the necessary skills and is motivated to use the PDS effectively.

Importantly, Lourens says, every mining site is unique, with its specific operational processes and safety challenges. Booyco Electronics customises its PDS solutions to meet the needs of each site. "This is achieved through collaborative assessment, tailored solutions and continuing feedback. By involving end-users in the implementation process, we ensure that the PDS solutions are implemented correctly, are technically robust and are aligned with the practical realities of the mining environment.

"It is also important to note that the adoption of PDS is not a one-time event but an ongoing process, and Booyco Electronics provides continuing support and maintenance to ensure the sustained effectiveness of the systems," he continues. "This includes regular updates, 24/7 support and periodic reviews. Maintaining a close partnership with end-users, our teams ensure that the PDS solutions remain effective and reliable over the long term." □



The adoption of PDS is not a one-time event but an ongoing process involving regular updates, 24/7 support and periodic reviews.



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Rhys Evans, Managing Director, ALCO-Safe.

Counselling services address addiction and employee wellness

ALCO-Safe, a leading provider of workplace drug and alcohol testing equipment, has expanded its services to include comprehensive employee wellness and addiction counselling programmes. This new initiative addresses the growing issue of drug and alcohol addiction in the workplace and society, particularly in South Africa.

A proactive approach

ALCO-Safe recognises that addiction is a complex issue and often stems from underlying stressors. The new programme goes beyond detecting substance abuse to offer proactive support to help employees identify and overcome addiction and create a healthier, more productive work environment.

Rhys Evans, Managing Director of ALCO-Safe, says, "We started this programme in June this year because we recognised a gap in support for employees struggling with addiction. Although our products help identify substance abuse, we believe a more holistic approach is needed. By offering counselling and wellness training, we want to help empower employees to address the root causes of addiction and build a healthier work environment."

ALCO-Safe offers training and counselling services. In Employee wellness awareness training, ALCO-Safe's team of trainers, experienced in addiction and workplace wellness, deliver interactive workshops to educate employees on the signs and symptoms of addiction and the dangers of substance abuse, empowering them to seek help for themselves or colleagues. The training also

explores common workplace stressors and provides healthy coping mechanisms.

For its counselling services, ALCO-Safe has partnered with qualified trauma and addiction counsellors to provide confidential individual and group counselling sessions to employees struggling with addiction. These sessions can address various issues, including alcohol and drug abuse, stress management, and workplace conflicts.

Benefits for employers and employees

With its employee wellness and addiction counselling services, ALCO-Safe creates a win-win situation for employers and employees. Companies benefit from a healthier and more productive workforce with reduced absenteeism and a lower risk of accidents. Employees benefit similarly.

ALCO-Safe's programmes also foster a supportive and caring work environment, demonstrating a commitment to employees' wellbeing. Employees, in turn, gain access to confidential and professional support, as well as valuable tools and resources to overcome addiction and build a healthier, more fulfilling work experience for themselves.

Addressing misconceptions

Evans emphasises that addiction can affect anyone, regardless of background or position. He says the company's programme aims to break down the stigma associated with addiction and encourage employees to seek help early. □

Safe motor control coordination

Adrian van Wyk, Managing Director at Referro Systems, says there is no need to reinvent motor control coordination when it's integrated into the system. He cautions against the risks of using untested components in motor control combinations.

"A motor control circuit is made up of basic interconnected components that achieve the required performance. The components will vary in size depending on the motor's power, but the operational principles stay the same. It is possible to design a high-performance motor control combination using a few basic components.

"However, combining type 1 with type 2 motor control elements without testing can have serious negative effects. If an untested combination is used, there is a high risk of causing damage in the motor control centre and there is also a risk of causing an arc flash, which could cause further damage and serious injury to plant personnel.

"Testing coordinated combinations is expensive, but it's essential to use tested combinations to reduce risk, meet international standards and ensure safe and efficient motor control combinations.

"A safer and more pragmatic approach is to use Rockwell Automation's Global short-circuit current ratings (SCCR) tool, which provides coordinated high-fault branch circuit solutions for motor starters, soft-starters, and variable speed drives. The one-line bill of materials provides coordinated high-fault SCCR ratings for all power devices used in the circuit, and saves customers the time and effort of determining these ratings. The data provided by the Global SCCR tool is based on compliance to IEC and UL standards, pinpointing combinations that have been tested with coordination tables from 0.5 kW to 600 kW at various voltages and fault levels. These also include South Africa's unique yet very common, mining motor control operational voltage of 525 V/ 550 V, which is not a global test voltage.

"There are specific products and variations of products that work together safely in a motor control circuit; these have been tested by Rockwell Automation and are available to the public," van Wyk says. □

It is essential to use tested combinations in motor control circuits, to ensure safety.



Fire blanket to suppress lithium-ion battery fires

SafeQuip recently launched its newly developed range of high-performance, multi-use lithium-ion battery fire blankets. The blankets are designed specifically to address fires involving devices with lithium-ion batteries and provide a crucial tool for safety in environments where such batteries are in use.

Developed by AVD Fire Ltd, the fire blankets are engineered to withstand extremely high temperatures in an oxidising atmosphere for prolonged periods. They are robust enough to provide protection against potential debris and shrapnel expelled during a battery fire, ensuring comprehensive safety.

Understanding lithium-ion battery fires

Lithium-ion batteries are widely used in various devices, from smartphones and laptops to electric vehicles and energy storage systems. While these batteries are generally safe, they can pose significant fire risks under certain conditions, if they are physically damaged, contain manufacturing defects, or are exposed to extreme temperatures, for example.

Lithium-ion battery fires are particularly challenging to control because they can burn at very high temperatures, often above 1 000°C, and have the potential for re-ignition after the initial flames have been extinguished.

Fire blankets

The principle behind the fire blanket – smothering the fire to cut off its oxygen supply – has been understood and used in various forms for many years. Fire blankets offer an effective and easy-to-use solution for various fires, making them a versatile tool for kitchens, garages, and workplaces. They are simple to use, leave no mess, and they are portable. However, not all fire blankets are the same, especially in dealing with lithium-ion battery fires.

Limited temperature resistance: ordinary fire blankets typically have a maximum temperature resistance of around 550°C, which is sufficient for many household fires, but falls short in dealing with higher-temperature fires like those involving lithium-ion batteries. In such a scenario, the blanket may not withstand the heat, potentially igniting or deteriorating, and thus becoming ineffective.

Material limitations: many ordinary fire blankets are made from woven fiberglass, which, although fire-resistant, may not be robust enough to deal with lithium-ion battery fires. The blankets may tear, disintegrate, or fail to suppress the fire adequately, leading to a spread rather than containment of the flames.

Durability and reusability: standard fire blankets are often designed for one-time use and may not withstand multiple deployments. The material can become brittle or damaged after the first use, reducing its effectiveness in subsequent applications.

Inadequate for specific types of fires: lithium-ion battery fires pose particular challenges that ordinary fire blankets are not equipped to handle. They can produce



The AVD Lith-Ex fire blanket is effective in containing the spread of the fire to prevent further damage and hazards.

explosive reactions and toxic gases.

Ease of use and accessibility: in emergency situations, the ease of deploying a fire blanket is critical. Some ordinary fire blankets are not user-friendly, requiring some effort to extract them from their packaging and to use them correctly. In a high-stress situation, like a lithium-ion battery fire, this can lead to delays and improper use.

Specialised features: advanced fire blankets designed for specific applications like lithium-ion battery fires often include features such as reinforced edges, handling loops, and eyelets for tethering. These features improve the usability and effectiveness of the blanket in various situations. Ordinary fire blankets, without these enhancements, may not perform as well in more demanding situations.

The AVD Fire range of blankets

The AVD Fire range of blankets is manufactured using fire-resistant technical fabrics based on the highest temperature-resistant silica glass fibres. The fibres are enhanced with flame deflection protection and abrasion resistance through various proprietary surface coatings. The non-flammable, vermiculite dispersion mineral-coated glass fabric is overlaid with a sacrificial protective silicone layer to provide optimal performance.

They also feature reinforced multi-layered edge lining for enhanced durability, eyelets for easy tethering or suspending, fire-resistant industrial stitching for added strength, and handling loops on all corners for convenient use. They are designed for multiple uses without compromising safety.

In terms of temperature resistance, the fire blankets show:

- No rupture of the fabric after several hours at 1 000°C
- No rupture of the fabric after 30 minutes at 1 200°C
- Fabric becomes brittle after 30 minutes at 1 300°C to 1 500°C.

Sometimes, it is not about extinguishing the fire but containing it, to prevent it from spreading. The specially designed AVD Lith-Ex blankets available from SafeQuip can withstand temperatures up to 1 400°C for extended periods, making them suitable for covering a burning lithium-ion battery and allowing it to burn safely underneath the blanket. The blankets contain the flames, control the burn, prevent flying debris escaping, and ensure the fire does not propagate to other areas. The AVD Lith-Ex fire blanket, together with the Lith-Ex fire extinguisher range, provides a simple and effective solution. □

Jobs of the future – new opportunities in wind energy

In South Africa's challenging economic landscape, the potential for job creation in the wind industry offers hope. According to the latest Quarterly Labour Force Survey released by Statistics South Africa (Stats SA) the official unemployment rate increased by 0.6% in the second quarter of 2024, reaching 33.5%, up from 32.9% in Q1 2024. Even more concerning is the expanded unemployment rate, which includes people who have given up looking for work. This increased by 0.7 percentage points to 42.6% in Q2 of 2024.

In a country with a population of around 63 million people, that means some 27 million people are unemployed and, according to Stats SA, only about 17 million people are in employment.

In the renewable energy sector, the wind industry stands out as a key player, promoting job opportunities, environmental sustainability and economic growth. In the first quarter of 2024, wind technology accounted for 4.9% of the electricity produced^[1] making it the leading renewable energy technology in South Africa's energy mix.

On the greater continent, Africa's manufacturing output is expected to grow by more than 6% annually until at least 2025, amplifying the need for a robust and sustainable energy supply.

South Africa is at the forefront of this transformation, accelerating its transition to a low-carbon future anchored by the South African Renewable Energy Master Plan (SAREM). Wind energy contributes significantly to alleviating the impact of climate change, boosting job creation and community development. The rapid expansion of the wind industry requires a diverse array of skills and roles.

Emerging positions required in the industry include engineers, project managers, environmental experts and data analysts.

Santosh Sookgrim, Senior Technical Advisor at the South

African Wind Energy Association (SAWEA), highlights the importance of a multifaceted talent pool. "The wind industry requires technical, policy, legal and environmental expertise across the full value chain. We are seeing an increasing need for professionals in monitoring and control systems, AI-based maintenance and data analysis."

To meet these evolving needs, the industry is actively expanding its talent pool. Initiatives such as SAWEA's Wind Industry Internship Programme are essential in attracting new graduates. Furthermore, the sector is tapping into related industries and upskilling workers through short courses and on-the-job training, as in SAWEA's Management Development Programme for Women in Renewable Energy, for example. Ensuring accessibility and opportunities for entry remain priorities to sustain the growth of the sector.

The wind industry's contribution to South Africa's economic and environmental goals is clear. As the country continues to embrace renewable energy, the job opportunities created by this sector will play a significant role in driving sustainable development and prosperity for future generations. Sookgrim explores these benefits further.

The economic impact of the wind industry in South Africa is substantial. Sookgrim notes that over the past decade, the sector has attracted investments exceeding R89 billion^[2], creating over 23 000 job-years and providing power equivalent to meeting the needs of over three million homes annually. Wind farms also contribute significantly to local communities, funding initiatives within a 50 km radius of their sites as part of the Renewable Energy Independent Power Producer Procurement (REIPPP) programme. These initiatives include educational support, food security programmes, healthcare services and community safety projects, fostering community development.

Technological advances are driving job creation in the wind sector. Innovations extend beyond turbine technology to include advanced monitoring and control systems, AI-driven maintenance, avifauna detection systems, and more. The data analysis and software development fields are growing in the industry. Additionally, the development of local manufacturing, such as Nordex's establishment of a concrete tower manufacturing facility in the Eastern Cape, underscores the sector's commitment to job creation and localisation.

Sookgrim emphasises: "The wind industry's future in South Africa is promising, with job growth projections closely tied to the sector's expansion. As the demand for renewable energy rises, so will the need for a skilled workforce."

References:

[1] According to Stellenbosch University's Centre for renewable & sustainable energy studies: <https://www.crses.sun.ac.za/sa-energy-stats/#:~:text=The%20majority%20of%20South%20Africa's,i.e.%2C%20mainly%20load%20shedding>.

[2] <https://www.ipp-projects.co.za/publications>

For more information visit: <https://sawea.org.za/>



The wind energy sector requires a multifaceted talent pool, including technical, policy, legal and environmental expertise across the full value chain.

Recognising how modern technology can change the world

The 2024 Millennium Technology Prize has been awarded to Professor Bantval Jayant Baliga of North Carolina State University, United States, for his innovation that has enabled the dramatic reduction worldwide in electrical energy and petrol consumption.

The €1 million global award for technology recognises Baliga's leadership in the invention, development, and commercialisation of the Insulated Gate Bipolar Transistor (IGBT). Since its development in the 1980s, the IGBT has been the most important semiconductor device for making electrical energy use and petrol consumption more efficient and less polluting though the past 40 years. The efficiency improvements and reductions of fossil fuels consumption and cost achieved by the IGBT revolutionised the power industry. The technology has reduced global carbon dioxide emissions by over 82 gigatons in the past 30 years. This is equivalent to offsetting carbon dioxide emissions by all human activity for three years, based on the average of the past 30 years' timeframe.

Professor Baliga's innovation enables the worldwide green transition and mitigation of global warming by making electrification and the use of renewable energy efficient and profitable. All wind and solar power installations use IGBT-based technology to convert the generated electricity into a form that is suitable for consumer and industrial applications. The IGBT is an essential technology in electric and hybrid-electric cars, as well as in most other electric motors in consumer and industrial use.

The IGBT technology is everywhere around us, all over the world, reducing energy consumption and making electricity use reliable: in medical diagnostic machines like X-Ray machines, CAT scanners and MRI units at the hospital, in microwave ovens and induction stoves in our kitchens, in air-conditioning and refrigeration for homes and buildings, and many other applications. The performance capacities of modern IGBT have expanded to the point that today IGBT-based power converters and inverters dominate nearly every major application with a power rating between 1 kW and 10 MW.

Professor Bantval Jayant Baliga, who was granted the title of Progress Energy Distinguished University Emeritus Professor earlier this month, said: "It is very exciting to have been selected for this great honour. I am happy that the Millennium Technology Prize will bring attention to my innovation, as the IGBT is an embedded technology, hidden from the eyes of society. It has enabled a vast array of products that have improved the comfort, convenience, and health of billions of people around the world, while reducing carbon dioxide emissions to mitigate global warming. Informing the public of this impactful innovation will illustrate how modern technology contributes to the betterment of humanity."

Forbes Magazine named Professor Baliga the man with the world's largest negative carbon footprint when he was inducted into the Inventors Hall of Fame in 2016.

Baliga and his team are currently working on two new

inventions for further improvement of efficiencies in the fields of solar power generation, electric vehicles, and power delivery for AI servers.

Baliga said: "My first recent invention, the Baliga Short-circuit Improvement Concept (BaSIC), is designed to eliminate the roadblock of poor short-circuit withstand time for silicon carbide power MOSFETs used in motor drives for industrial and electric vehicle applications. My second new invention, a Bi-Directional Field-Effect Transistor (BiDFET), enables the matrix converter for power electronic applications. Matrix converters offer unprecedented improvements in size, efficiency, and reliability when compared with existing voltage source inverters. This will have a revolutionary impact on power delivery and management, according to power electronics experts."

Professor Minna Palmroth, Chair of the Board of the Technology Academy Finland, the foundation awarding the prize, said: "The IGBT has already had and continues to have a major impact on supporting sustainability, improving living standards worldwide and mitigating environmental impact. The main solution to tackle global warming is electrification and moving to renewable energy. The IGBT is the key enabling technology in addressing these issues.

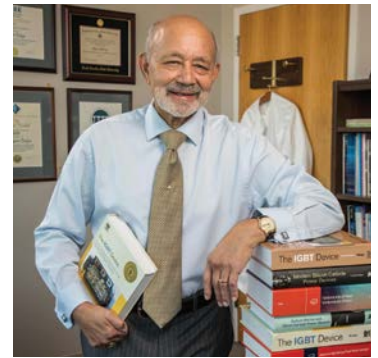
"I am particularly happy that the prize illuminates an innovation that is absolutely critical, has an enormous impact, but at the same time is not known to most people. I think it is a great way to emphasise the power of science and innovation."

Professor Päivi Törmä, Chair of the International Selection Committee of the Millennium Technology Prize, said: "Two thirds of the electricity in the world is used to run motors in consumer and industrial applications. Professor Baliga's innovation has allowed us to develop societies with electricity efficiently, while dramatically reducing energy consumption.

"Power electronics is a key enabling technology of any modern society in which the automation of processes and energy systems plays an ever-increasing role. For the last 40 years, and still today, the IGBT is the most important power semiconductor device."

The Millennium Technology Prize will be presented to Professor Bantval Jayant Baliga in Finland on 30 October in an Award Ceremony that also celebrates the 20th anniversary of the prize. The Millennium Technology Prize will be presented by its patron, the President of Finland. The Prize Ceremony will be streamed globally by the Finnish national broadcast company Yle.

For more information visit: <https://millenniumprize.org/>.



Professor Bantval Jayant Baliga.



Darryll Kilian, Partner and Principal Environmental Consultant at SRK Consulting.

Waste to energy to support baseload electricity supply

The concept of generating energy from waste is gaining traction in South Africa. In this field, Consulting engineering firm SRK was appointed by industry pioneer Bio2Watt Energy Holdings (BEH), as the independent environmental consultant to undertake the required environmental permitting processes for a new biogas plant near Pretoria.

Darryll Kilian, Partner and Principal Environmental Consultant at SRK Consulting, said this innovative project brings benefits in producing much-needed energy and, at the same time, reducing landfill requirements and greenhouse gas emissions. The BEH organic waste-to-energy biogas plant will be located on a five-hectare site at Sunderland Ridge, west of Centurion, and will generate baseload electricity for the national grid.

“The Sunderland Ridge biogas project is a great example of a project at the nexus of critical issues that face our society today, including how we manage our growing demand for energy, our increasing volumes of waste, and the reality of climate change – as well as food security,” said Kilian. “Operating as an energy producer, generating both electricity and gas, this facility will help the province deal with its landfill constraints, cut methane emissions and create natural fertiliser to promote organic agriculture.”

The plant will process organic waste from the agriculture and food sectors to produce biogas, which will be converted into electricity for the national grid. Some of the biogas will also be compressed and sold to an offtake customer. The other product of the process is digestate – a fertiliser containing all the nutrients and micronutrients necessary for modern farming.

A landfill alternative

A recent audit of landfill sites in Gauteng showed that the

province faces a serious challenge with its traditional waste disposal methods. The audit also found that there is very limited space remaining on existing landfill sites, and there are very few (close to none) suitable locations for new sites.

Natasha Moodley, Principal Environmental Consultant at SRK and part of the environmental team working on the BEH project, noted that it is a trailblazer in a game-changing global trend away from the traditional dumping of waste in landfill sites. “By diverting waste from a range of local sources, the plant will reduce the need for new landfills,” said Moodley. “This will make a valuable contribution to government’s mandate to reduce landfill development by 50% in the near future.

“Additionally, the conversion of methane to energy means a significant reduction in the volume of methane entering the atmosphere,” she said. “Methane’s impact in terms of climate change is up to 80 times that of carbon dioxide emissions, so the plant, in effect, pushes forward circular green economy efforts in Gauteng on an industrial scale.”

Problem solving with experience

According to Tamaryn Hale, also a Principal Environmental Consultant with SRK and involved in the project, the consultancy was contracted by BEH to conduct the environmental authorisation process, atmospheric emission licence and water use licence applications. Celebrating its 50th anniversary this year, SRK has considerable experience in these fields and it has gained new learnings from this project.

“One of the findings of the environmental impact assessment (EIA) was the presence of an extensive dolomitic belt underlying the proposed area of construction,” said Hale. “This required various adjustments to be made to the design and planning – with solutions being developed through collaboration with several specialists, including a dolomite specialist engineer, process engineers and civil engineers. The process was also facilitated by close working relationships between SRK, our client and the regulators.”

The opportunity to sell compressed gas also introduced the need for pipeline infrastructure, in turn triggering some additional environmental licensing requirements. The combination of significant developmental benefits offered by the project has spurred the interest of various stakeholders.

The Sunderland Ridge project is the third organic waste to energy initiative from BEH. Its first plant, in Bronkhorstspuit, Gauteng, has been operating for almost a decade and has contributed around 100 GWh to the national grid. Construction on a second plant, in Malmesbury in the Western Cape, is planned to start later this year, and is set to produce 9.8 MW.



The first Bio2Watt organic biogas plant operating in Bronkhorstspuit, Gauteng.

For more information visit www.srk.co.za



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