



The new pressure sensor for small pipes

Ideal solution for hygienic production plants



FEATURES:

- Industry 4.0 + IIoT
- Energy management + the industrial environment
- Sensors + switches
- Plant maintenance, test + measurement

ELECTRICITY + CONTROL

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Hygiene has top priority in many process-technical installations, such as in the food, beverage or pharmaceutical industries. ifm's new PM15 pressure sensor meets all requirements for approvals to industry-wide hygienic standards in such applications. (Read more on p3.)

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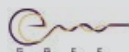
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And we still do not have a plan to address baseload

You may also be moving towards the view that 'enjoying' 2023 could turn out to be trickier than we anticipated ... I wrote this after a week of Stage 6 loadshedding – a stage that caused significant upset to the highest office in the country (as it now seems).

So, let's reflect on what is important.

Firstly, we can all focus on being more energy efficient in everything we do – at work and at home. That has a role to play for sure.

Secondly, we can reflect on the fact that the impact of loadshedding has been disastrous for the economy – yet much of the economy continues to run, nevertheless.

Thirdly, we can begin loudly to ask for, and expect concrete plans – and action – on what to do about the situation.

We all understand the problem: as a country, we missed the opportunity to expand our grid and our generation capacity when our long-term plans indicated it was necessary. Then we proceeded to expect availability of our generating plant at levels which were, simply, too ambitious.

It is now patently evident that we do not even have the grid capacity to evacuate all the potential renewable energy, even if we could get the plants built. The cost to build new grid capacity will be in the billions of rand, and it takes time.

And we still do not have a plan to address the baseload needs of the economy.

I was in a conversation the other day where we were reflecting on this situation and, quite frankly, you could not write this stuff. The knock-on impact of the severe electricity shortage will without doubt impact on more basic needs: water purification and delivery, and on food security.

What seems too incredible is that we have been in and out of this long-running loadshedding era for more than a decade – and in this time, little has been done,

really, to address the situation. There were moments when we flew too close to the sun, and it all looked good – but the fundamental issues of old plant not being attended to are evident for all to see.

It is becoming increasingly difficult to remain patient in this regard. Where is the plan? What action is being taken?

On the other side of the coin, many of those who can are simply opting to go off the grid. I fully understand that. But my worry is that these are the same people and organisations that can financially support the ailing national utility. With these entities leaving the grid (for their own survival), where will that leave the national operator?

Can we fix Eskom? Yes.

Of course privatisation of the plants might be first prize, but that is an impossible political ask.

The next best option may also present an unpalatable political situation – but would involve the formation of public private partnerships. However, the partners to the state would certainly want assurance about staff complements and the engagement of the necessary skilled personnel.

It is quite evident that we cannot fix Eskom with political interference. The next CEO will face all the same challenges that we now know well at the utility – and will need to be allowed and supported to do the job.

I would be most interested in hearing feedback from you on how you are managing the situation, in your personal lives, and at your places of work.

What is clear is that the longer we wait for a concrete plan, the less likely we will ever be to emerge from this crisis.

Ian

Ian Jandrell

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



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Translocation of eagles' nests for transmission grid upgrade



Robust G 1/2 pressure transmitter with hygienic approval for small pipes

The ifm PM15 pressure transmitter is a first in this category.

- An ideal solution for hygienic production plants or where clogging is a concern
- Maintenance-free PEEK sealing concept for G 1/2 fitting
- A robust, tried-and-tested ceramic measuring cell free from pressure transducer liquids
- Resistant to high-pressure cleaning with aggressive cleaning agents
- High temperature resistance and high protection rating (IP 67, IP 68, IP 69K)
- Approved to industry-wide hygienic standards, such as: FDA, EHEDG, EC1935 and 3A
- Integrated temperature measurement via IO-Link removes need for multiple instruments
- 4 to 20 mA and digital IO-Link communication without A/D or EMC losses.

Hygiene has top priority in many process-technical installations, in the food, beverage or pharmaceutical industries, for example. This also applies to sensor technology used in a multitude of applications. The new pressure sensor PM15 with a G 1/2 external thread sealing cone connection which meets the requirements for all approvals to industry-wide hygienic standards, is ideal for such applications.

Perfect for pressure and temperature monitoring

The PM15 is perfect for pressure and temperature monitoring in mixing, dosing and heat exchanger systems.

Cost savings are achieved by using the G1/2 sealing cone instead of the 1" connection with clamp fittings for pipe installations. It provides for elegant and simple installation on pipes, in particular smaller pipe sizes where compactness is critical.

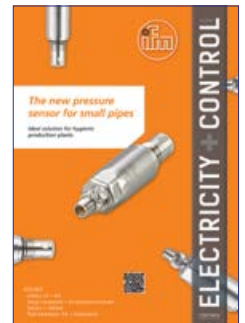
Ideal for hygienic production plants

The new PM15 pressure sensor is ideal for hygienic production plants or where clogging is a concern. It has

a unique flush sealing concept. This allows for the hygienic integration of small ceramic-capacitive measuring cells in small pipes, for example, in dosing and filling systems, which was not previously possible. With the G 1/2 thread, it can be installed without requiring expensive adapters. Flush fitting makes it possible to use viscous media and guarantees optimum results for CIP processes. For each sensor, a factory certificate is available for free download.

Maintenance-free and robust

On the process side, the sensor is maintenance-free because it has no elastomer seal. The flush and robust ceramic measuring cell is resistant to pressure and vacuum shocks and to impact by abrasive substances. The sensor can be used for viscous products that would typically clog pressure transmitters with small measuring ports. The final value of the measuring range is from 2.5 bar to 40 bar. The sensor is resistant to medium temperatures from -25°C to 125°C and up to 150°C for one hour.



The ifm PM15 pressure transmitter with hygienic approval for small pipes is a first in this category.

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Finding success in a post-pandemic world

Tessa Myers, Senior Vice President, intelligent devices, at Rockwell Automation here highlights three trends industry is adopting to power growth. Myers was one of the featured speakers in the 'Perspectives' thought-leadership session held ahead of Rockwell Automation's Automation Fair 2022 in November 2022.



Tessa Myers, SVP intelligent devices, Rockwell Automation.

The Covid-19 pandemic has impacted the way we live and work. Now, nearly three years on, industrial operations are facing new and different challenges as the world makes major shifts in the way people are working and expectations of consumers and stakeholders change rapidly.

The challenges all of us were experiencing prior to the pandemic, particularly the lack of access to skilled workers, have only become more pronounced over the past two years. When I started working, a lot of what we focused on was lean manufacturing. It was a wonderfully simple time for manufacturers. All of us had the playbook for what it took to drive improvements in our operations, but that is not the case at present.

Today the industrial sector faces not only a lack of skilled human resources for operations, but also new expectations from stakeholders who have different thoughts on what it means to be a responsible industrial company. There has been a rapid evolution in customer buying preferences. Customers want what they want, when they want it, and how they want it. It seems as if consumer preferences are moving at hyper speed.

At the same time as the pandemic may have accelerated expectations, it also opened opportunities and set examples of what can be accomplished by manufacturers. We saw successes such as the rapid production of vaccines and the acceleration in construction of new facilities in response

to needs for products such as masks during the pandemic. These indicated new ways to address the industrial environment post-pandemic.

We are living in a fast-changing workplace. The good news is we have never been better equipped or more enabled to succeed than we are today with the technology we must leverage. The companies that come out on top and realise their full potential are those focused on building agility, resilience and sustainability in their operations. We can work differently, and time gives us the opportunity to work better.

As I see it, there are three trends being adopted in industry to get there – to power growth for what's next. These trends include the transformation of production logistics to adapt quickly to changes in production needs, producing locally for rapid order fulfilment and embracing data-driven sustainability efforts.

Transforming production logistics

In the past, industry tended to deal with spikes in production demand by 'throwing people at the problem'. With the decline in workforce skills in the industrial sector, as in many others, that is not an option anymore.

As other speakers during this session have noted, we need to reconsider how goods move through the plant to be able to handle a wide variety of product with the least amount of work. This points to the technology required. For example, Rockwell Automation has developed technologies enabling hundreds of thousands of product configurations with thousands of flavours. In short, automation technology is ready to fill the void left by the absence of a suitably skilled and qualified human workforce.

Among the solutions available is independent cart technology, which is designed to change the way products move through plants. This technology has proven its capacity to boost customer efficiency and increase throughput by up to 50%.

Furthermore, in many cases, the barriers to integrating robotics on the plant floor have been lifted. We also see how unified robotics allow for one control platform for motion and robotics.

Historically, integrating robotics and other mechatronics into systems was quite arduous and time-consuming. It generally required very specialised skill sets and multiple hardware platforms. At Rockwell Automation, we have focused



The technologies needed to support industry in adapting to new ways of working and fast-changing market demands are available.

on building kinematic control into our logics controllers, and I am excited about the unified approach to systems design.

(Rockwell Automation has also formed a partnership with robotics company KMe Robotics. The two companies launched a unified robotics solution at the Automation Fair 2022.)

Producing locally

In order to stay competitive, companies are moving to be more local. They are gaining proximity to their customers and building resilience in their supply chains.

It is essential to maintain resilience and to pursue simplification in rapid asset deployment. We have been driving technology developments over the past few years that are enabling companies to deploy automation and process systems quickly in their facilities around the world.

The new FLEXHA 5000 I/O, for example, is a fully configurable input/output platform – any point can be discrete, analogue or HART connected – built for the requirements of process applications. It cuts programming time by 50%. Armor PowerFlex drives are another development – they require fewer manual connections and allow for faster installation.

Rockwell has also invested in digital engineering tools which enable customers to test, design, refine and improve every aspect of an automation design before moving into production. This has seen a reduction of 30% in system engineering time for electric vehicle battery manufacturer Hirata, for instance.

Data-driven sustainability

For all the talk around net-zero goals, less than 25% of all companies are on track to meet their sustainability goals, according to OMNIA Partners. Considering the requirements of stakeholders around sustainability, there is clearly a lot of work yet to be done. Help lies in the data.

It is important that sustainability efforts be data driven. At Rockwell Automation, we have been investing in our intelligent devices portfolio. We are not only enabling agility, rapid deployment, and new ways to automate equipment; we are investing in an infrastructure that will provide the data needed to drive resilience and sustainability by improving operations and processes.

The connectivity capability of devices across the entire portfolio is the core of digital transformation. Data starts at the devices, and it is critical to connect these data sources together to provide insights to all customers. This means an integrated system is critical, hardware and software working together, to drive true value.

The oil and gas industry is probably under the most pressure with regard to sustainability. Rockwell Automation recently worked with an oil producer in the Permian Basin of West Texas to assist it in reducing its greenhouse gas emissions by 50% by leveraging a connected device platform. This is a good example of industry working not only differently but also working better. □

For more information visit: www.rockwellautomation.com

INDUSTRY 4.0 + IIOT : PRODUCTS + SERVICES

Supporting new manufacturing for US semiconductor industry

Edwards, part of the Atlas Copco Group, has opened the doors to two new manufacturing facilities in Arizona and Massachusetts to support the fast-growing North American semiconductor market.

"We are increasing our presence in the US to be close to our customers, who are committing large investments in US semiconductor manufacturing," said Geert Follens, Business Area President Vacuum Technique. "Agile operations, increased capacity and local-for-local supply are essential to supporting our customers, and our Chandler and Haverhill investments will play a key role in the continued growth of safe, productive and environmentally sustainable chip manufacturing in North America."

The 200 000-square-foot facility in Chandler, Arizona, began operations in late November 2022 and provides remanufacturing and assembly of vacuum pumps and other equipment essential to meet the demand for new semiconductor fabrication requirements. It makes use of advanced automation and data solutions to disassemble, clean, inspect, repair, replace and reassemble pumps. About 200 new jobs will be created in the local area.

Another new facility, for cryopump manufacturing and R&D and located in Haverhill, north of Boston,

Massachusetts, began operations in mid-December. Around 280 roles will be transferred from current facilities in Chelmsford to Haverhill and an additional 60 roles are expected to be created, in skilled manufacturing, engineering and technology.

Environmental sustainability has been a key consideration in the construction of both facilities. The Chandler facility is certified to the Green Globes science-based building rating system and features water recycling, electric vehicle charging and solar panels to contribute to more sustainable manufacturing operations. The facility at Haverhill incorporates a high-efficiency HVAC system, solar panels and two underground water retention units to collect water to feed surrounding trees and landscaping.

In addition to the new facilities in Chandler and Haverhill, Atlas Copco recently announced an investment in a new dry pump manufacturing facility in Genesee County, New York, which is expected to generate around 600 jobs.

For more information visit: www.atlascopcogroup.com

Integrated digital solutions for a connected future

Charles Blackbeard, Business Development Manager, ABB Ability™ Digital Solutions says digitisation helps build safe, smart and sustainable operations for the future. "At ABB we build locally and support globally to increase knowledge. We also have the 'tribal knowledge' of operators who have been around processes and equipment for decades. Now we have a new generation coming in, so digitising that tribal knowledge is important to pass on the baton. We have global resources and expertise we can access for remote support for our South African and African operations and services."

The ABB Energy Industries Division works with customers in oil and gas, chemicals, pharmaceuticals and power and water across sub-Saharan Africa, providing a portfolio of digital solutions. The four main focus areas are: people, process, technology, and infrastructure.

Blackbeard highlights that one of the key trends emerging globally is increasingly sophisticated automation and the move towards reduced operator intervention. "In terms of processes, this is a cultural change within operating companies. It has also been a cultural change within ABB, leading us to develop more agile workflows by using digitisation, moving away from paper-based type operator rounds or maintenance activities and digitising these.

"Another key theme is the culture of DevOps, a new concept predominantly in the IT space. From technology testing we are moving into a so-called 'fail-fast' type of culture, deploying solutions at small scale and then scaling up for continuous improvement in processes and technology."

Technology is evolving from the automation layer towards enterprise-wide deployment, he says, encompassing IT, operational and engineering data. "This can be integrated in an automated way and contextualised by applying advanced applications on top of the data. It allows us to feed into some of the gains around process and efficiency improvements in terms of how facilities are operated and run."

He adds that ABB has advanced applications around artificial intelligence (AI) in its asset performance management and energy management solutions. It also has long proven technologies for advanced process control, where enterprise insight is now being brought into play to close that loop in process control and drive efficiencies. With these advanced applications, there is a trend towards more predictive and prescriptive asset performance strategies for customers.

Blackbeard says with regard to digital infrastructure, industry in general has been slow to adopt cloud technology. With cloud engineering and big data, ABB can provide better business insights to its customers and end users of its technologies.

"Looking at edge technology, we are now gathering

and integrating data from the operational level and combining it with IT and engineering data, allowing for significantly improved insights with the deployment of advanced applications. However, that data must also be brought to the cloud in a safe, secure and automated way.



Charles Blackbeard, ABB Ability™ Digital Solutions.

"A strong cybersecurity strategy is essential to ensure the data can be securely integrated and contextualised from the operational technology layer. This is one of ABB's particular strengths, especially through partnerships with companies such as Microsoft and IBM on some of their cyber solutions, to extract and secure the relevant data from the operational technology layer."

Further, ABB has evolved its customer approach to diversify opportunities and enable new business models: providing for customers to move towards software as a service (SaaS) for instance, or platform as a service (PaaS), to reduce the otherwise high capital investment sometimes required for new technologies or upgrades and to take advantage of cloud infrastructure. This enables customers to work on operational expenditure as opposed to large capital outlays, a trend that is favoured today.

Blackbeard notes the strong emphasis currently on security, from governments and companies looking to enforce stricter cyber practices. "We are having many discussions, combined with education and awareness-raising, about building the necessary infrastructure to enable tighter security.

"In every country we see that in order to deploy the latest cybersecurity technology, we are having to upgrade basic infrastructure. This, combined with the slow uptake of cloud solutions, and especially in transferring these solutions to the operational technology level, is a significant challenge."

He says the key is integrated digital solutions. In terms of total return on investment, companies can look to optimise processes and improve operational efficiencies. With the further integration of various digital solutions, customers can move towards autonomous operations. This will allow for unmanned operations in remote locations, for example. That obviously offers benefits in costs, safety of personnel and a reduced carbon footprint.

"Looking further ahead – although we are not yet seeing it on a significant scale – is the adoption of robotics for inspection and process operation support. Over time, robotics, automation and data will drive continuing digital transformation."

For more information visit:
www.go.abb/processautomation

Disruptive technologies to deal with disruption

The Covid-19 pandemic has accelerated the need for, and the move towards, increased digitalisation across industry. RS South Africa highlights some of the trends it has observed and solutions implemented that enable industry and businesses to adapt and progress.

Noting that Covid-19 has impacted and continues to impact many aspects of our lives, the company says the early months of the pandemic saw widespread factory closures across industry, and drastically restricted logistics globally. This meant downstream manufacturers soon found they were facing major supply chain disruptions. Many had to shift swiftly to using predominantly online sourcing and procurement services. Suppliers had to fast-track the expansion of their online sales and services. Transportation and logistics became a major challenge for everyone.

To tackle the challenges, virtually every aspect of business, throughout industry globally, required some form of additional digital, often disruptive technology. Clearly, businesses that had embraced digital transformation were better positioned to adapt. Since the start, RS South Africa has seen, and continues to see, a significant increase in B2B and B2C business, including eCommerce, not only from existing clients but also from new and occasional customers.

Managing Director for RS South Africa, Brian Andrew says RS was ready to respond quickly and decisively to the Covid-19 crisis in 2020. "In the main, the company provided continued support to customers worldwide, initially prioritising health and allied services and those working on supplying critical and essential equipment and infrastructure. Supply chain continuity was largely ensured, as the crisis management team was able to plan and act swiftly, shifting inventory around a global network of 14 distribution centres (DCs) to where it would be most needed. As a single point of service and support with a broad range of over 650 000 stocked electronic and industrial products and solutions, RS was able to continue to satisfy customer needs," Andrew says.

RS is a UK-based multinational company and is listed on the London Stock Exchange. The company's strong digital, omni-channel offering proved to be easily expandable to support increased online sales. Through communication and collaboration, purchasing staff were able to extend support for key customers in essential businesses. By encouraging a digital mindset, and connecting teams working remotely, while the DCs rapidly adjusted to operating with social distancing and appropriate PPE, employees were inspired to go the extra mile.

Andrew adds that the key drivers directing business adaptation are: changing customer expectations, the need for greater efficiency, and the realisation that data can be used to spot trends. "Ease of use, AI-based personalisation tools, and online real-time sales support have brought us repeat business. Many businesses have suffered financially due to Covid-19 and this has in-

creased the emphasis on improving efficiency," he says.

eProcurement is a key starting point, and demand is growing for tools such as RS PunchOut and RS PurchasingManager®. PunchOut is a tool that integrates into the customer's eProcurement system providing quick and easy access to products and purchasing information. PurchasingManager® is a free, web-based order management tool that provides a complementary workflow and spend management system. Customers have found that ease of use and process streamlining have produced significant benefits, in particular cutting costs and increasing staff efficiency.

RS also offers eOrdering and eInvoicing which are used extensively by some of SA's largest beverage and automotive manufacturers. These value-added solutions automate the procurement process for small and medium quantity orders for MRO (maintenance, repair and operations) products, helping to save valuable production time.

One of the main reasons for hesitation in the wider adoption of digital acceleration is the change it engenders in the workplace. The aim is to shift from manual to digital tasks, remove low-value repetitive jobs and improve employee productivity. Supporting people through this change requires a behavioural shift in re-educating employees throughout the company. The pandemic has demonstrated that dramatic changes in working practices (home working, for example) can be made with positive results for all. "The key is 'test and learn'. Make evolutionary, small changes in a structured way. Work with the people to see that the change is achieving the required effect," Andrew says. "For sure, digitalisation will cause disruption to processes, and major changes to culture and working practices," says Andrew, "but Covid-19 certainly presented us with a painful demonstration of how much greater the cost of disruption could be without it."

**For more information contact RS Components SA.
Visit: www.rsgroup.com or: www.rs-online.com**



Key drivers of increasing digitalisation in business include: changing customer expectations, the need for greater efficiency, and a recognition of the value of data.



Brian Andrew, Managing Director RS South Africa.



Secure connectivity supports grid modernisation

The TRO610 cellular router newly introduced to the market by Hitachi Energy provides state-of-the-art communications and cybersecurity, purpose-built to support industrial internet of things (IIoT) applications for utilities, smart cities, oil & gas, manufacturing, and mining operations. The TRO610 is part of Hitachi Energy's wireless communication portfolio of high availability, high reliability, high throughput, and low latency products for mission-critical industrial and utility operations.

As intelligent field devices extend across power distribution networks, the TRO610 provides for greater efficiency by enabling a wider range of edge compute applications. With advanced capabilities including edge computing and multiple secure connectivity options, the TRO610 lays the foundation for grid modernisation and future grid applications.

Massimo Danieli, Managing Director of the Grid Automation business unit at Hitachi Energy said: "Advanced connectivity options play a significant role as utilities and industries increasingly adopt new technology solutions, either on premises or via the cloud, to digitalise and improve operations in an environmentally sustainable way. The TRO610 increases asset and application visibility in the field, enabling greater grid stability, new customer services, and a reduced total cost of ownership."

Jim Frazer, Vice President, Smart Cities at leading technology research and advisory firm ARC Advisory Group added: "The compact and ruggedised form factor of the TRO610 allows for it to be used in communication to a wide range of existing and future 'smart city' services, including transportation, water, and wastewater management, energy transmission and distribution. The router's edge compute capability, state-of-the-art cybersecurity, Bluetooth® connectivity option, industry stand-

ards compliance, and always-on cellular connectivity make it ideal for public agency applications as well as utility, petrochemical, and discrete manufacturing ecosystems."

In line with the 3GPP1 (3rd Generation Partnership Project) specification, the TRO610 operates on public and private 3G, 4G, and 5G cellular networks across multiple frequencies, including CBRS (Citizens Broadband Radio Service), Anterix™, 410 MHz, and 450 MHz. The device is ideal for utility applications, particularly power distribution networks, through its compliance and certification for IEEE 1613 and IEC 61850 standards.

The TRO610 can be easily managed with Hitachi Energy's Supros unified network management and monitoring system. Supros simplifies installation with the low-touch deployment of wireless devices and remote terminal units (RTUs) and supports over-the-air firmware updates.

The device supports a host of smart city applications such as EV charging stations, environmental health monitoring, traffic management, and public safety. For electricity utilities, the TRO610 complements Hitachi Energy's solutions for battery storage monitoring, circuit breakers, reclosers, voltage monitors, secondary substation monitoring and more. It provides cellular connectivity to field area networks that underpin energy management applications and utilities' distribution network operations.

In industries like oil & gas and mining, the TRO610 enables remote monitoring of assets such as wellheads, storage tanks, pipeline infrastructure, sensors, mining vehicles, and other unmanned transportation in rural and remote areas and often harsh conditions.

For more information visit:

<https://www.hitachienergy.com>

The compact TRO610 industrial wireless router increases field asset and application visibility.

WIK A Group invests in LoRaWAN

The WIK A Group is investing in LORIOT AG, a leading IIoT company that enables long-range IIoT networks worldwide. LORIOT's core products are software for scalable, distributed, resilient operation of LoRaWAN® networks and end-to-end applications.

This strategic investment by WIK A will enable LORIOT's further expansion and acceleration of its growth as a leading

LoRaWAN network server provider. LORIOT will maintain a strong focus on innovation in the LPWAN market, introducing new services and setting new standards to enable extensive long-range IIoT deployments worldwide.

LORIOT and WIK A see this investment as the starting point for a strategic partnership with the common goal of supporting each other to address new markets and

speed up their expansion strategies.

Axel Kaltofen, WIK A Executive Vice President Process Instrumentation, will be a member of LORIOT's board of directors and will contribute to the key decisions of the company. Kaltofen says WIK A is looking forward to working with LORIOT to extend WIK A's IIoT solutions portfolio.

Julian Studer, CEO and founder of LORIOT says, "LORIOT is a young and profitable company with an excellent reputation. We've had steady growth since our inception and now is the time for us to take full advantage of the investment. For us the WIK A Group is the ideal strategic partner to help us achieve our potential and support our future expansion."

For more information contact WIK A Instruments.

Tel: +27 (0)11 621 0000

Email: sales.za@wika.com, visit: www.wika.co.za



The WIK A-LORIOT partnership will support the IIoT networking of sensors and process instruments and the growth of both companies.

Mines are recognising the value of digital systems

Weir Minerals Africa has noted a growing demand in the mining industry for digital integration – that is, for the technologies and systems that provide mines with data to develop strategic improvements in their operations. This is based on its ongoing interactions with mining customers.

“Customers recognise the need for real-time management of important operational parameters at their operations. Mines are moving away from broad assumptions made by people, to using data points to track key indicators that can make equipment more reliable,” says Tiisetso Masekwameng, General Manager - Communitation at Weir Minerals Africa.

The company's Synertrex® intelligent platform responds to this growing need for digital solutions. It provides mines with insights into the actual costs of running their plants, data to develop strategic improvements to mining operations and the opportunity to benchmark performance across every area of operations.

“Synertrex is a complete digital ecosystem that continually monitors the performance of equipment and integrates with the customer's distributed control system. This means advanced analytics are conveyed through a digital interface to give customers all the indicators measured, delivered to their devices accurately and in real time, even if they aren't at the mine,” says Masekwameng.

She explains that as part of the Synertrex® condition monitoring system, sensors are applied to processing equipment and the data they provide is captured and

continuously analysed. With detailed real-time insight into how their equipment is performing, customers can eliminate guesswork from their operational decisions. Information is displayed on a simple, easy to understand dashboard, which can be accessed via any device or integrated into existing operational systems. It conveys real-time fact-based insights into machine performance and health, remaining useful life and other key operational indicators.

“As mining companies redefine their investment strategies, the Synertrex intelligent platform can help customers transform their operations,” says Masekwameng. “This is because it also assesses the performance of machinery and indicates potential improvements, such as optimising the equipment's energy efficiency or throughput.

“The Synertrex intelligent platform also serves remote management of maintenance – from monitoring wear and tear, to scheduled servicing and repairs – to keep mining equipment at its most productive. Thus, it supports maximum equipment uptime and profitable operations for mining companies,” says Masekwameng.

**For more information contact Weir Minerals Africa.
Visit: www.minerals.weir**



The Synertrex monitoring room at Weir Minerals where data is analysed in real time.

Expanding the value of PDS via IoT

By leveraging developments in the IoT space, Proximity Detection System (PDS) technology is moving beyond its primary role of preventing accidents and expanding its functionalities for the mining industry. According to Anton Lourens, CEO of Booyco Electronics, PDS technology is proving to be of great value to the industry.

Over the years, PDS technology has ushered in a new era in mine safety management. Given the pace of development in the past two years, Lourens says PDS is advancing its value proposition beyond the avoidance of accidents on mine sites.

“To provide context, the PDS technology is increasingly part of the development of ‘digital twin’ simulations, where mines are analysing big data to understand their operations better. This has been a big developmental step over the past few years. Owing to the large amount of available operational information, it is now possible to see how machines interact and operate, allowing for proper traffic flow analysis and implementation of suitable traffic management plans,” says Lourens.

The PDS, he adds, has proven to be a relevant and important tool in the industry's quest for Zero Harm. Over and above its primary functions, the technology can now

be used as an evaluation tool, to identify incident hot-spots, review heatmaps, analyse traffic flow and inform traffic management plans.

Looking ahead, Lourens believes that PDS technology will continue to develop, particularly leveraging advances in areas such as the Internet of Things (IoT) and other technologies. In his view, no single technology will offer a total solution; integration of multiple technologies such as GPS (global positioning system), RF (radio frequency), cameras and radar, among others, will be key to providing the industry with the best possible tool to realise Zero Harm.

“By adding different technologies, the value proposition to the customer is expanding. The PDS is therefore transforming from being a legislated and often a ‘grudge’ purchase to a prized tool that offers significant value to the industry,” Lourens says.

**For more information contact Booyco Electronics.
Visit: www.booyco-electronics.com**



With additional, different technologies, the value of PDS to the customer is expanding.



The IoT Use Case network is an international community of technology and industry experts committed to sharing best practices learnt from implemented projects.

Getting started with the Internet of Things

Smart plastics specialist igus recently joined the Berlin-based IoT Use Case expert network. The Internet of Things has growth potential estimated in trillions of euros, but in Europe, as elsewhere, many industrial

companies have difficulty digitalising internal processes. As a new member of the Use Case expert network, igus here outlines the case of a bread factory where energy chains incorporating smart sensor systems are used, offering a route to getting started with IoT.

Monday morning in the bread factory: the packaging system suddenly breaks down. A minor component has failed, resulting in potentially long downtime and high repair costs. The most annoying thing about it is that a small investment in digitalisation and networking would have been enough to implement measures to warn the operator of the problem through the Internet of Things (IoT).

Smart condition monitoring is something that, despite its economic efficiency, few companies in Germany are implementing. This reluctance is confirmed in a survey by US market research company, International Data Corporation (IDC). Of 250 companies surveyed with over 100 employees, only 29% are working on IoT projects.

"To accelerate the pace of digitalisation, we joined the Berlin-based IoT Use Case network of experts in October 2022," says Richard Habering, head of the smart plastics business unit at igus. "By doing educational work with best practice examples, sharing expertise, and generating synergistic effects, we hope to make it easier for companies to get into the Internet of Things and enhance their future competitiveness."

Setting the right course

More than 80 industrial partners from more than 15 countries have now joined the community of technology and industry experts, including Microsoft, Siemens, and Schaeffler. "Only if we share best practices from our

projects and talk specifically about the value IoT adds will we be successful here," says IoT Use Case founder Madeleine Mickleit.

The experts share knowledge about the IoT and discuss how to improve the quality, security, and dissemination of IoT technology. Interested companies can read over 350 use cases and projects from the network, follow expert podcasts, and exchange ideas easily with like-minded companies.

The Internet of Things has enormous potential for the economy. Research indicates the increasing value potential in factory environments going forward. Habering says, "This makes it important for companies to set the right course for digitalisation now, so they do not fall behind in international competition."

Enriching the network with smart plastics expertise

Smart plastics are sensor systems that monitor the status of energy chains and cables, enabling technicians to plan maintenance work in a targeted manner and react early to impending component failures. Among the users – which can be found as use cases on the network website – is GHD Georg Hartmann Maschinenbau. The company has equipped a bread packaging machine with igus i.Sense CF.Q. In real time, the sensor system monitors the energy and data cables moving at high speed in the energy chains. Habering points out that: "i.Sense CF.Q's advanced technology detects impending cable breaks before they occur."

The igus smart plastics portfolio includes i.Sense TR.B, an intelligent condition monitoring system for 3D energy chains on industrial robots; the low-cost i.Sense EC.W service life sensor; and the latest i.Sense CF.D prototype for monitoring heavily used data cables.

For more information contact igus South Africa.

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E-Mail: ihewat@igus.net, visit: www.igus.co.za

Industry 4.0 innovation at The Smart Factory @ Wichita

Siemens Digital Industries Software recently opened its eXplore Live centre at The Smart Factory @ Wichita, an experience centre convened by Deloitte that marries an

ecosystem of world-leading organisations with business strategy and cutting-edge technology to demonstrate Industry 4.0. Located on the Innovation Campus of Wichita State University, in Kansas in the USA, The Smart Factory includes a fully operational production line and experiential labs for developing and exploring the

innovative capabilities of smart manufacturing.

A founding member of The Smart Factory @ Wichita, together with Deloitte and other ecosystem members, Siemens developed the eXplore Live space as a 3 000 square-foot area dedicated to hands-on learning opportunities for companies looking to modernise, reshore, localise, or regionalise their operations in North America. The eXplore Live space will enable Siemens to expand customer engagements at The Smart Factory @ Wichita with a showcase focused on design and optimisation using a closed loop digital twin. It will also enable exploration of industry digital threads, provide space for innovation workshops and co-creation, and help

Continued on page 11



eXplore Live at Deloitte's The Smart Factory @ Wichita helps companies experience the future of smart manufacturing.

Data centres benefit from multidisciplinary engineering services

Globally trusted infrastructure firm AECOM has been delivering data centre projects in Africa over the past decade and is seeing exponential growth in this sector locally. "We have global agreements with Tier 1 players establishing their own hyperscale data centres in South Africa," says Africa MD Darrin Green. "And we are seeing small edge data centres increasingly being established closer to demand," he adds.

Data centre developments benefit from the spectrum of professional services offered by a firm like AECOM due to their multidisciplinary nature, from requirements for upfront environmental investigations and permitting to the costing and procuring of land and all necessary approvals to get to the building stage, as well as the design.

When establishing in a new region, cloud services providers usually house their servers in colocation data centres. As their customer numbers increase, the providers invest in their own data centre campuses.

"The past few years have seen the focus shifting from established regions like Europe to newer locales such as South Africa," says Green. Elsewhere in Africa, where terrestrial fibre infrastructure is more limited, data centres are smaller and modular in nature and confined to fibre landing sites and larger cities.

Green says AECOM is working with various firms rolling out infrastructure across Africa, assisting them to navigate local permitting, logistics and power supply challenges. A shift to renewable power supply is high on the priority list. "We help clients to move away from diesel generators to renewables with battery energy storage and green hydrogen."

AECOM, globally, is probably one of the few almost completely multidisciplinary built-environment professional services companies. "I don't think any other firm has the breadth of services and expertise that we have," says Green, adding that consulting companies tend to focus either on niche or general services.

AECOM has capabilities in architecture, electrical, ICT, plumbing, structural and mechanical engineering, civils, cost management and control, quantity surveying, building fitout and control systems, geotechnical engineering and environmental and sustainability advisory services. "And we are strong in each of these disciplines," Green emphasises.

The company also has access to global expertise and best practice. "In the digital engineering space, for example, AECOM is at the forefront, globally. Everything is going digital and has been for some time. What counts is how you turn that into a practical service."

Green advocates an integrated approach as "making absolute sense" to drive efficiencies in cost and delivery and says a multidisciplinary approach is critical to large, complex infrastructure projects. AECOM has seen this in projects such as the Gibela Rail Consortium's Dunnottar factory, the new Heineken brewery in Mozambique and the refurbishment of the Heineken brewery in Sedibeng, Gauteng.

"One of AECOM's strengths is that we can pull in people from our global offices who have worked on a particular client's infrastructure elsewhere. They are aware of the lessons learnt and know what the clients want and need. Similarly, here in South Africa, we have skills and insights in areas of specialisation such that we are carrying out projects in Europe from South Africa for some major clients. This is one of the ways in which we bring all our services together for our own advantage as well as for our clients," says Green.

For more information contact AECOM.

Visit: www.aecom.com



Darrin Green, AECOM Africa MD.

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empower the next generation of engineers.

The Smart Factory @ Wichita's eXplore Live space joins Siemens' global eXplore Centre network: customer experience centres that, combined with a proven innovation methodology, help companies discover what's possible for a digital tomorrow, help define a vision for their organisation and design a roadmap for making it real.

"Our alliance with Deloitte, for over a decade, has been bringing together mutual customers to explore the future of manufacturing and industry 4.0," said Bob Jones, EVP, Global Sales & Customer Success, Siemens Digital Industries Software. "The opening of Siemens' eXplore Live space at The Smart Factory @ Wichita is the next progression of this relationship; bringing to life the concepts, ideas and practicalities of The Smart Factory, and enabling customers

in multiple industries to accelerate digital transformation and solve complex manufacturing challenges."

"As an industry leader in digitalisation and advanced simulation, Siemens is helping manufacturers quickly adopt state-of-the-art Industry 4.0 technologies through its end-to-end suite of solutions," said Stephen Laaper, Principal and Smart Manufacturing Leader, Deloitte Consulting LLP. "At the new Siemens eXplore Live space at The Smart Factory @ Wichita, visitors can experience the power of Deloitte's and Siemens' combined industry and digital transformation expertise to help accelerate the implementation of smart manufacturing solutions, solve complex challenges and engineer advantage."

For more information visit:

<https://www.sw.siemens.com>

Saving energy through measurement and monitoring

In this Beckhoff application report, Fabian Assion, Product Manager I/O at Beckhoff Automation, Germany, sets out the steps the company has taken and the hardware and software it has in use, to reduce energy consumption and carbon emissions successfully – and on a continuing basis – across its facilities.

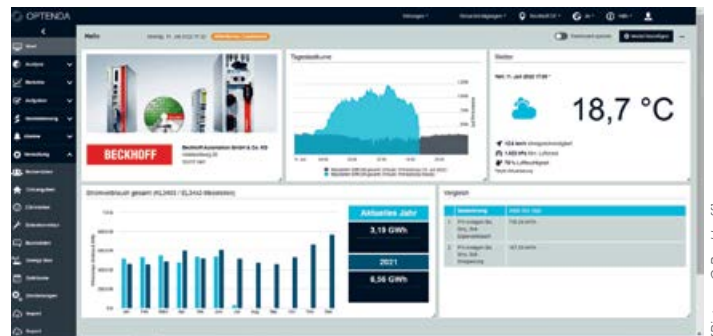
It pays to save energy. It is good for our environment, and it helps counteract the impact of massive price increases for primary energy sources. Every kilowatt hour of unused energy, every kilogram of unreleased CO₂ counts. It is with this in mind that Beckhoff, some years ago, set the wheels in motion across its production processes and facilities to achieve its goal of carbon neutrality.

In terms of action already taken, Beckhoff implemented a successful energy management system in 2016 and was certified by TÜV Süd in line with the ISO 50001 standard in the same year. The energy management system helps to reduce the company's costs and energy consumption steadily by continuously recording all relevant consumption. Analysing this information reveals potential for further measures to reduce energy consumption. In this way, as well as demonstrating its compliance with legal requirements, Beckhoff lives up to its responsibility for climate and environmental protection. Lower energy consumption automatically leads to a significant reduction in carbon emissions. This will be a major challenge for all companies going forward, as we look to achieve a climate-neutral economy.

Beckhoff has set itself ambitious goals:

- to improve energy-related performance by 0.5% annually
- to create climate-neutral sites for Beckhoff Automation GmbH & Co. KG by reducing and offsetting carbon emissions.

Johannes Beckhoff, who is responsible for general energy management in the energy team at Beckhoff, in addition to his role as XPlanar product manager, says,



The potential for improvement identified through energy management has led to significantly reduced energy consumption and thus reduced carbon emissions.

"We are committed to increasing the energy efficiency of our company." In concrete terms, the commitment means continuously improving energy-related performance (energy consumption in kWh per 1 000 euros of sales) and making greater use of renewable energy sources over the longer term. The energy-related performance ratio at Beckhoff Automation Germany in 2018 was 14.32 kWh/1 000 euros, and the company took steps to reduce this figure to 13.35 kWh/1 000 euros by 2021.

The share of 'gray energy' makes up less than 1% of the total energy demand (2021) within the Beckhoff Group in Germany (Beckhoff Germany, Smyczek, Fertig Motors). Of the 11 million kWh of green electricity used, Beckhoff already produces around 10% itself through its photovoltaic systems with an installed peak output of currently 1 081 kWp – and the trend is rising. In 2022, Hans Beckhoff announced the installation of further solar panels at the Verl site as the latest project. The aim is to install modules with



Beckhoff offers a range of products for energy monitoring, including SCT current transformers and the EL3433 EtherCAT power measurement terminal.



[Picture: © Beckhoff]

Compact embedded PCs and energy measurement terminals are used to record energy consumption in production processes.

a total output of 509 kWp over 170 solar carports. Plans for another PV plant with 650 kWp on a production building are also under way. Once the planned expansions are complete, the installed PV capacity will amount to 2 240 kWp at Beckhoff, Smyczek and Fertig Motors. Additionally, heating systems in existing buildings were partially renewed and expanded with ceiling heating panels, cooling panels and heat pumps, or completely converted to use district heating. Where possible, lighting is consistently converted to LED technology with a preference for demand-oriented, daylight-dependent control.

The measures implemented to date have been paying off for some time already. Evaluated in accordance with the internationally recognised GHG Protocol Corporate Accounting and Reporting Standard, the Beckhoff CO₂ figures fell substantially between 2019 and 2020, from 23.7 t CO₂e (CO₂ equivalent) per million euros of sales to 14.9, corresponding to a reduction of 37%. Only 13 763 t CO₂e were emitted in total, and Beckhoff offsets these unavoidable emissions via CO₂ certificates from myclimate gGmbH.

Anne Schaper, in charge of energy management at Beckhoff emphasises that: "The priority is to focus on avoiding carbon emissions in the first place, and then look at ways to continuously reduce them."

Energy data opens up optimisation potential

Energy monitoring plays a crucial role in reducing carbon emissions. Maintaining an awareness of the present situation is fundamental to achieving any goal. In this regard Beckhoff has, for many years, relied on software from the Stuttgart-based company Optenda.

"The first step in becoming aware of energy consumption and consequently being able to reduce it in a targeted way, is to measure it at as many loads as possible and then consolidate it centrally," says Johannes Beckhoff.

Since 2019, all processes related to DIN ISO 50001 have been supported by Optenda's Energy Monitor software at Beckhoff and Smyczek. The tool records the various energy flows at the company sites (electricity, heat, compressed air and nitrogen consumption) via PC-based control and an extensive range of measurement terminals and current sensors to make them transparent. The universal and

system-integrated energy measurement technology lays the foundation for maintaining an overview of key production figures and for comparing the target and actual state of systems and buildings directly within the control system. In this way, impending damage to or inappropriate use of the facilities can be detected at an early stage and potential for optimisation can be identified more easily.

In-house efficiency measures such as the control of lighting times and operating times for room air conditioning can be quantified with MWh savings through monitoring. For example, optimisation measures adopted in Beckhoff-owned production buildings have demonstrably saved 210 MWh/a.

Continuous monitoring of production consumption enables non-conformance issues, such as leaks in the compressed air network, to be identified and rectified at an early stage. Recording consumption at the production level makes it possible to quantify and monitor the energy consumption per product.

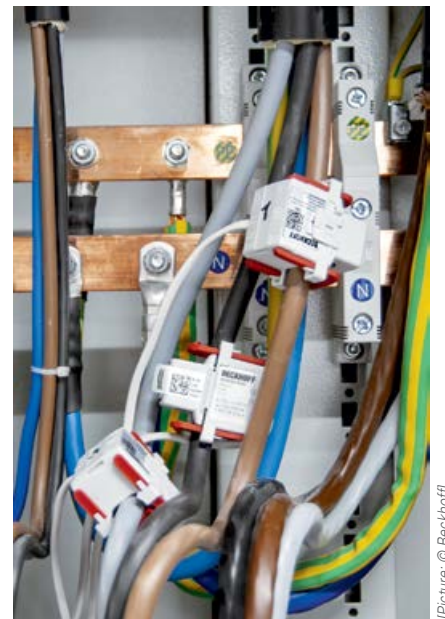
A complete measurement chain

Continuous data monitoring is typically associated with considerable expenditure, because additional sensors are often integrated at a later stage, usually at high cost and sometimes with the help of special components. However, with the power measurement terminals, current transformers, overcurrent protection terminals and power supply units from Beckhoff, this can be achieved with standard components and correspondingly low expenditure – even in the case of retrofits.

As an automation specialist, Beckhoff enables the merging of relevant power supply components to form a transparent complete system. Only a combined application such as this can provide a comprehensive overview of the energy supply, from individual machines through to production halls and office buildings.

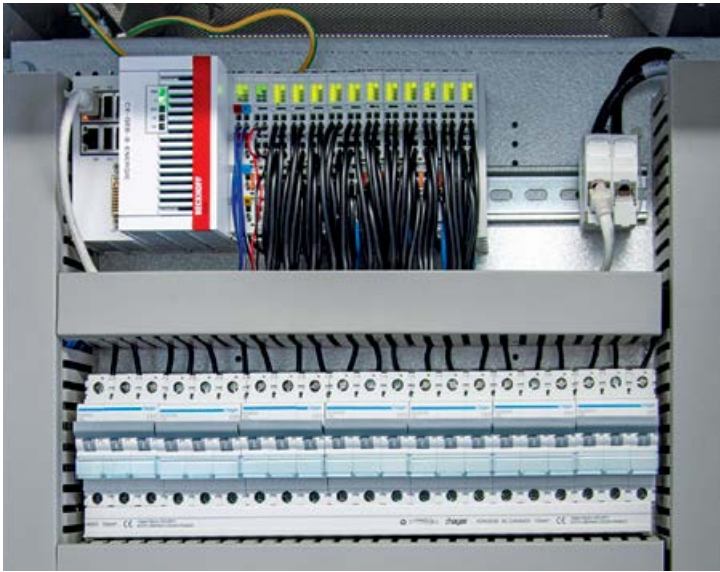
With the current transformers from the SCT series, Beckhoff has completed the power measurement chain that ranges from measuring the physical value to transmitting the captured data to the cloud. The broad portfolio of current transformers covers all relevant applications from 1 to 5 000 A. Users can select from two device types, each available in various designs and performance categories. They are scalable and thus suitable for a variety of applications. The SCT portfolio ranges from low-cost 3-phase transformer sets – including for building services – and standard industrial transformers for machine building, to solutions for test benches with particularly high accuracy requirements.

The concept of distributed power measurement offers a particularly



[Picture: © Beckhoff]

The split-core current transformers of the SCT series facilitate the retrofitting and integration of existing plants and buildings into a comprehensive energy management system.



[Picture: © Beckhoff]

With flexible communication options via OPC UA, embedded PCs form the backbone for recording consumption and effective countermeasures.

efficient and inexpensive way of obtaining precise power measurement data even in more complex systems. Its central element is the EL3446 6-channel current input terminal for up to 1 A ac/dc measurement current. It can be used to determine precise power values, even with spatially separated voltage and current measurement. A key feature is that all relevant electrical data from the supply grid, including real measured values for power, can be determined with the EL3446 as a current measurement terminal. However, the terminals receive the voltage values required for calculating the power data via EtherCAT from a separate EL3443 3-phase power measurement terminal, which only needs to be installed once per network and is precisely synchronised in time by the distributed clocks function in EtherCAT. This concept of distributed power measurement minimises the hardware and installation expenditure.

Greater transparency via OPC UA and PC-based control

TwinCAT 3 Building Automation offers a comprehensive package of function blocks for building automation. Communication via BACnet and OPC UA is integrated directly so the control system can be integrated into a management and operating level. The openness of PC-based control allowed Optenda to connect its Energy Monitor with the existing Beckhoff measurement infrastructure easily via OPC UA. "With more than 200 relevant data points, we soon noticed during the course of the project what a major advantage this is," says Dennis Ulke, Manager Sales and Business Development at Optenda.

For buildings and production halls, PC-based control links lighting, sun protection, window control, heating, ventilation and air conditioning on a central platform to achieve intelligent control of all technical systems. This reduces the number of individual physical data points and thus the risk of errors. In addition, all data is available in

one system, which is a basic prerequisite for successful energy monitoring. Functions such as sun protection, thermal automation and daylight-dependent lighting control contribute significantly to energy savings. Added to this are HVAC functions from the TwinCAT package, such as summer night cooling, summer compensation, backup operation and time schedules. With the help of the HVAC modules, further energy-saving possibilities can be exploited by the occupancy-dependent control of building systems.

Various Embedded PCs from the CX9020, CX5100 or CX7000 series form the control centre for energy monitoring. With its fanless ARM Cortex™-A8 processor (1 GHz clock frequency), the CX9020 Embedded PC is ideal for small to medium-sized projects in the field of building automation. The CX9020 can be used in conjunction with the TwinCAT 3 Lighting Solution for tasks such as operating the lighting of entire halls, and alongside TwinCAT 3 Building Automation for applications such as shading, lighting control and air conditioning for offices. The more powerful CX5100 Embedded PC is the optimal control platform for automating buildings with many data points. With this series, for example, more than 2 000 BACnet objects can be controlled and managed with ease. The CX7000 Embedded PC is designed for small standalone solutions in buildings, such as a compact ventilation or room automation system. With its eight integrated multi-functional inputs and four multi-functional outputs, it provides an inexpensive compact controller.

Savings potential quickly identified

Equipped with these components, Beckhoff could identify a substantial savings potential of 63 t CO₂ within a ventilation and air conditioning system in its own properties and facilities shortly after consumption monitoring began. The user-friendly interface of the Energy Monitor clearly visualised the analysis and initial optimisation potential as well as ensuring the corresponding control of results later.

"Three months after commissioning, potential savings of some 20 000 euros per year had been identified and steps implemented to achieve this – and sustainably, too, as these savings continue over time. If nothing had been done, the 20 000 euros in savings would have been a constantly recurring cost. With rising energy prices, this would have become increasingly expensive, so it is worth tracking down inefficiencies and eliminating them quickly. We are delighted that we can provide the ideal tool with our software," says Dennis Ulke.

The Energy Monitor software records electricity consumption as well as all relevant consumption data from other forms of energy, such as heat and compressed air. It can be used to reduce CO₂ emissions for the respective energy type just as quickly. This makes the whole balancing process, which is necessary to achieve carbon neutrality, considerably faster and easier, because efficient energy management means efficient carbon emissions management. □

For more information visit: www.beckhoff.com/en-za/

Renewable energy in SA, 2022 and looking ahead

2022 was a year of change for Enel Green Power South Africa (EGP South Africa). The South African division of the multinational renewable energy company completed a number of renewable energy projects, helping the country to meet its growing energy needs. Guided by the Country Manager, Manuele Battisti, in 2023 EGP will intensify its development activities, start construction on new projects and optimise operating activities as South Africa continues its energy transition journey.

The company's Soetwater wind farm located in a remote part of the Karoo Hoogland Local Municipality in the Northern Cape, achieved commercial operation in July 2022, marking a significant milestone for EGP South Africa. Adding 147 MW to the national grid, the Soetwater wind farm will be able to generate 585 GWh every year. For Enel Green Power South Africa, it brought total operational projects to 12 with a managed capacity of over 1.2 GW. With the projects now online the company's priority is to optimise each of the plants and improve efficiencies.

In the announcement of the outcome of Bid Window 6 of the Renewable Energy IPP Procurement Programme (REIPPPP), Enel Green Power South Africa was successfully appointed a preferred bidder for two of the five solar projects, to deliver a combined contracted capacity of 300 MW.

"The awarding of the Kutlwano and Boitumelo solar power plants will increase EGP South Africa's market share and capacity, and it consolidates the company's position as a leading independent power producer (IPP) in the South African renewables industry," says Battisti.

On the developmental side, there are two main avenues the company intends to explore going forward. The first entails its continued participation in the REIPPPP Programme, and in the second it will focus on increasing its client base amongst commercial and industrial (C&I) off-takers.

Expanding on the second aspect of the development agenda, Battisti says there are growing opportunities within the C&I market. "We are in advanced discussions to enter into bilateral power purchase agreements (PPAs). This will allow us to sell electricity directly to C&I customers around the country. With the group's global experience in private PPAs and its DNA as a large utility, Enel Green Power is setting benchmarks for private transactions in South Africa that can speed up the deployment of additional renewable energy."

Challenges

In 2022, the economic aftershocks of Covid-19 continued to reverberate throughout the industry and recent geopolitical conflicts have presented an additional set of obstacles. The pandemic and lockdowns severely hamstrung the construction of projects. Logistics and delays were commonplace during this period, making the supply and transportation of materials challenging.

"In the past, offers of validity from a supplier would be

valid for a month or two. Nowadays, because of the uncertainty and rapidly changing macroeconomic factors, validity offers last for sometimes less than a day. This increases the value of an industrial operator like Enel Green Power which links the needs of suppliers and clients and makes project planning effective," Battisti highlights.

Managing perceptions around renewable energy

There is empirical evidence confirming that renewable energy sources offer cheaper, quicker-to-deploy and more reliable energy alternatives, compared to the traditional energy sources, especially in countries such as South Africa where abundant wind and solar resources help meet the country's energy needs within a holistic approach.

"As a company that deals with renewable energy from every perspective, we believe we have a responsibility to raise public awareness and understanding about the importance of sustainability. Currently, renewables can be further supported to meet South Africa's energy needs by advancing technologies such as battery energy storage systems," Battisti continues.

The green economy also promises direct and indirect employment and skills training opportunities across the value chain. For example, at the peak of the construction of its Karusa and Soetwater wind farms, Enel Green Power had 1 160 employees on site, performing a host of services from general maintenance to alien vegetation management.

"Ensuring that South Africa has reliable energy will foster the economic growth that businesses and citizens are so keen to realise," he adds.

Looking to 2023

Battisti expects that the increasing cost of electricity supply and the need to reduce the carbon footprint for businesses and the country as whole, will likely increase commercial and industrial demand for renewable power from IPPs in 2023.

In the broader industry, there is a belief that the long-anticipated structural changes to the national power utility Eskom will take place and this will signify an important evolution of South Africa's energy market with the creation of new and additional competencies and jobs.

"As Enel Green Power, we believe the rainbow nation is greener than ever and we are united with South Africa in its Just Energy Transition journey. On this journey, we are committed to developing strong relationships with all stakeholders including consumers, partners, investors, institutions and local communities. Our goal remains consistent: to enable progress with sustainable energy," Battisti says.

For more information visit: <https://www.enelgreenpower.com/countries/africa/south-africa>



Manuele Battisti, Country Manager, Enel Green Power South Africa.



Dwibin Thomas,
Schneider
Electric.

A consistent architecture for power supply reliability

A power outage, defined as the loss of electrical supply in an end-user installation, can be extremely damaging, whether the electrical installation is in a factory, a hospital, an airport, a large industrial site, or a data centre.

With a view to managing that risk, Dwibin Thomas, Cluster Automation Leader at Schneider Electric, says power system resilience should be considered throughout the power system lifecycle – from the design phase of a project and through operational and modernisation phases.

The risks associated with power system failures should be evaluated, and the power system should be designed with the robustness to meet the assessed risk.

For mission-critical applications like data centres, healthcare, or nuclear power plants, the reliability requirements should be integrated during the early phase of the project. Steps include:

- Identifying critical loads and setting reliability targets
- Designing the power system according to reliability requirements
- Analysing system performance in terms of reliability.

Design for reliability

Looking more closely at the power system design, and depending on the reliability targets set, a consistent electrical architecture should be defined by setting adequate redundancies, selecting the topology, and specifying maintenance requirements if necessary.

To ensure a consistent architecture, the redundant equipment can be categorised by the following stages.

- 1st stage: electrical load redundancy
- 2nd stage: 1st stage + source redundancy (back-

up in case of grid blackout)

- 3rd stage: 2nd stage + power distribution redundancy (backup in case of failure to cable or switch-board).

When a very high reliability level is required, the common mode failure risks for redundant equipment should be identified and mitigated. These could have various causes and origins, such as natural disasters, human error – in design, installation or maintenance, or system installations such as cooling.

To operate the system most efficiently, effective maintenance procedures should be established based on the following:

- Monitoring of the state of the power system – to react quickly when a failure occurs
- Monitoring of critical devices – to detect any hidden failure and to ensure that critical equipment functions are ready to operate when required
- Planned maintenance programmes based on site conditions and the manufacturer's recommendations
- Respecting the manufacturer's maintenance contracts for critical equipment, to optimise intervention time and availability of the equipment.

Schneider Electric offers high availability and high reliability EcoStruxure Reference Designs for data centres, healthcare and hotels, and other applications. It has worked with more than 70 000 consulting companies and engineering firms that often require assistance relating to the prevention of downtime by design. The EcoStruxure Power Reference Designs can be downloaded from the Schneider Electric website.

For more information visit: www.se.com

Extending electrical education equipment beyond SADC

The ongoing collaboration between Schneider Electric and Amtec Techniquip, a leading provider of locally manufactured educational equipment in South Africa, has grown from strength-to-strength and will now extend beyond the SADC region to reach education institutions and facilities in Nigeria.

Funded by the Schneider Electric Foundation, since its inception three years ago, the partnership has accelerated access to electrical education and training by providing state-of-the-art training equipment to tertiary institutions. The equipment includes, for example, didactic benches, which bridge the gap between theory and practice and form

a valuable part of vocational training.

"We are pleased to now include Nigeria as part of our collaboration with Schneider Electric. The past three years have been rewarding and enabled Amtec Techniquip to extend its provision of engineering education equipment," says Roger Forte, Sales Director at the company.

"In Nigeria, there is also a real need for high-quality electrical and engineering training and education equipment. Through our partnership with Amtec Techniquip we hope to emulate the success of training institutions we have equipped in Southern Africa and provide students in Nigeria with equipment that will support and accelerate their studies as electricians and engineers," says DL Steyl, Project Manager – Access to Education, Sustainable Development & Academy at Schneider Electric.

For more information visit: www.se.com



The motor starter training kit forms part of Schneider Electric-Amtec Techniquip line-up of training equipment.

Lower prices push higher demand battery energy storage

As South African businesses are increasingly compelled to investigate alternative energy production and storage options to find a way around the continuing national power crisis, battery energy storage systems are emerging as a viable solution to operation-halting power supply issues.

According to research by professional services firm Deloitte, increased demand for battery storage technology has led to significant manufacturing economies of scale and lower average global prices of lithium-ion batteries – which fell by 80% between 2010 and 2017, from \$1 000/kWh to \$209/kWh.

The research report states: “The cost [of battery energy storage systems] has been dropping so quickly that decision-makers may have outdated notions about the price of systems, thinking that batteries still cost the same as they did a couple of years ago, or even six months ago.”

In the South African context, falling battery prices, the promise of enhancing solar power beyond its daytime capabilities, and the opportunity to mitigate the impact of persistent loadshedding have led to a swift and increasing uptake of battery energy storage solutions among commercial users.

Eskom CEO André de Ruyter has been a strong proponent of the benefits of battery energy storage technology, with the utility announcing in mid-2022 that it had given the go-ahead for the development of state energy storage projects designed to use large-scale utility batteries with a capacity of 1 440 MWh per day.

“Storage is one of the key initiatives to assist in addressing the country’s electricity challenges in the long term,” de Ruyter said in a statement at the time.

The Council for Scientific and Industrial Research (CSIR) has confirmed from its monitoring data that 2021 surpassed 2020, and 2022 surpassed 2021 as South Africa’s most intensive loadshedding year to date.

Creating a smart mini grid

Integrated battery solutions in effect create a smart mini grid, which enables businesses to operate independently of the national grid. Head of Engineering at SolarAfrica, Kobus Crauwcamp explains that they provide a level of grid autonomy by responding with the speed and flexibility required to keep real-time operations live.

“Businesses are losing money per minute due to power supply and storage constraints, and many have realised that not having constant access to reliable power is costing more over the long term than alternative options. Supply and service interruptions have a hugely detrimental impact on productivity and can cause irreparable reputational damage.

“Companies opting for battery energy storage solutions are unaffected by power outages and avoid future downtime, product wastage costs, penalties due to the late delivery of goods and potential damage to sensitive machinery from power cuts or dips,” he says.

Additionally, battery systems allow businesses to avoid peak-period energy tariffs by enabling the storage of energy generated during low-consumption periods, which can then be used during peak periods.

“A company can move power around to suit its needs,” says Crauwcamp. “And it can store renewable energy capacity for use at night-time or during periods of loadshedding.”

SolarAfrica offers customers the option of a capex-free fixed ten-year lease agreement on an energy storage solution, or direct purchase of the system outright.

Integrating energy production and storage

Companies are increasingly choosing to integrate alternative energy generation sources, such as solar PV or gas-to-power, with energy storage solutions.

Recognising the need for a one-stop-shop for industrial and commercial businesses looking to diversify their energy mix and transition from a reliance on state-supplied power, SolarAfrica in 2022 launched a landmark offering that takes clients 100% off-grid.

This move further supports the evolution of a South African energy system from a single-provider model to a more competitive domestic open market model – a stated goal of the country’s Integrated Energy Plan.

SolarAfrica designs customised, long-term and multi-technology energy plans for businesses seeking a solution that will provide power security, cost savings and reduced carbon emissions. The options include:

- Solar PPAs and roof rental solutions which require zero capital investment
- Biogas created from purpose-grown crops such as vetiver and spekboom
- Gas-to-power systems that can be integrated with solar PV
- Battery energy storage systems
- Wheeling agreements, which allow industrial and commercial clients to source sustainable power from a solar solution that is not physically installed at their premises
- Electricity trading, which allows businesses to purchase cheaper, greener electricity from a bundle of renewable energy sources
- Certified renewable energy certificates, which account for a business’ renewable electricity generation.



Using combined technologies, SolarAfrica offers customers the opportunity to move 100% off-grid.

For more information contact SolarAfrica.

Tel: +27 (0)12 881 4800

Visit: www.solarafrica.com



Lance Dickerson, MD,
REVOV.

Bridging loadshedding for telecoms operators

During one of the country's worst stretches of loadshedding, MTN's Corporate Affairs executive Jacqui O' Sullivan was quoted as saying that although mobile operators have battery backup systems at network towers, loadshedding at higher stages meant the batteries did not have enough time to recharge, so there needed to be a backup for the backup in the form of generators. (The same concern has been noted in other sectors too, such as water and wastewater management, and more.)

This is sobering and unfortunate, and the economic implications are huge. However, founders of REVOV, which manufactures lithium iron phosphate batteries, say there is a solution – for telecoms companies and others. Lance Dickerson, MD, and Felix von Bormann, CTO, see batteries as the environmentally preferable option for power backup. They say if the correct types of batteries in the correct configuration are used at the tower sites, they will have sufficient time to recharge, even during stage 6 loadshedding. This can fundamentally change the risk and costs currently being endured.

O'Sullivan said for MTN, their batteries provide six to 12 hours of capacity, depending on the site, and need 12 to 18 hours between bouts of loadshedding to recharge. At the same time, Vodacom announced it was piloting a project where it will source all its electricity from independent power producers in a bid to secure power supply.

It is important to note here that wheeling, or transferring power between sites, will need to be managed by Eskom, as it is the utility's transmission infrastructure that will be used – and like its generation plants, the transmission grid will also need a comprehensive overhaul and upgrade over the next decade. It is the localised transmission infrastructure that is especially important in ensuring sufficient battery backups can be maintained.

REVOV was established in 2016, and the two founders spent more than a decade prior to that in the international telecoms industry in designing, planning, implementing, and testing various ways to keep the towers running in various regions of Africa. The challenges were many, but the basic question remained: how do we keep towers running when generators are not an option and there is no electricity? Hence they developed their foundational understanding of the power of batteries and their application in telecoms specifically, and power backup generally.

Batteries work through chemistry and the traditional lead-acid technology has its limitations. For REVOV, lithium batteries are undoubtedly better batteries. The volatile nickel manganese cobalt (NMC) type of battery used in some smartphones and laptops has been known to ignite at higher temperatures. A newer battery chemistry – lithium iron phosphate – has emerged as the safest, most stable and longest lasting of storage battery chemistries. Beyond this, lithium iron phosphate

2nd LiFe batteries, which are built from the repurposed but fully functional cells of electric vehicle (EV) batteries, have the added benefit of inherent engineering for harsh operating conditions. Think of the heat and charge-discharge ratio in the use of an EV. LiFe, in the name 2nd LiFe, is derived from the symbols for lithium (Li) and iron (Fe) in the periodic table.

Dickerson and von Bormann consider 2nd LiFe batteries prime candidates for backup storage, either for renewable energy installations or uninterrupted power supply systems – and for telecom tower battery backup. China Telecoms, the largest telecoms operator in the world, uses 2nd LiFe batteries exclusively at all its new sites and is reportedly swapping out old sites to 2nd LiFe when required.

A recharge time equal to the discharge time

In a properly set up and configured 2nd LiFe lithium iron phosphate battery backup system, the time to recharge is identical to the time of discharge. This means if the battery has been used for four hours, it needs four hours to recharge to full, if it has been used for six hours, it needs six hours to recharge to full. Beyond this, the discharge curve is stable and, unlike that in lead acid batteries, does not plummet after a critical point. This makes 2nd LiFe batteries fundamentally different from lead-acid batteries, in performance, reliability and lifespan.

It also means they offer a solution as batteries that can be rapidly recharged in the hours between loadshedding in the higher stages. However, the transmission infrastructure also needs to deliver enough capacity, consistently, and obviously technical faults which can extend outages need to be minimised. Another key factor is the protective ac breaker size used at each site, which will determine the performance of the system during recharge periods.

In simple terms, assuming the sites already have remote generators of 10 kVA, for example, the following solution could be implemented. Noting that a generator cannot be run under capacity for extended periods of time, as much as it cannot be overworked for extended periods, both of which compromise the life of the machine, running a 10 kVA generator could split 7 kVA to charge batteries while 3 kVA powers the tower. As a stop-gap measure this prepares the site for the next power outage, as lithium iron phosphate performance enables a 1:1 discharge to charge ratio.

As we all face the energy crisis that threatens our economy, working together, bringing expertise from various sectors, South Africans can devise workable solutions. An understanding of different battery technologies should inform the best backup options for various applications.

For more information contact REVOV.

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

Strategic partnership for battery recycling

South African company Tabono Investments and US-based ACE Green Recycling have signed a term sheet to form a joint venture to build and operate two environmentally sustainable battery recycling facilities in South Africa. Through the joint venture, the companies aim to bring change to the management of South Africa's battery waste.

Tabono Investments, which operates in specialised sectors in Africa, has experience in mining, logistics and recycling, and ACE Green Recycling offers an innovative recycling platform for battery materials.

"Green energy is on the rise in South Africa," said Tabono co-founder Liran Assness, "and with it, lead-acid and lithium-ion battery usage."

The company's other co-founder Reon Barnard added, "With dedicated, environmentally friendly ways of recycling batteries, the world can use and reuse valuable materials like lead, lithium and cobalt, and power our future in a less harmful way."

The facilities will process and recycle lead-acid and lithium-ion batteries separately, using ACE's proprietary technology which creates zero Scope 1 emissions by operating without fossil fuel-based heating. Both recycling facilities will be greenfield projects to be developed and operated by the joint venture. Under the new structure, ACE will have 51% ownership and Tabono 49%.

"We are committed to ensuring emerging markets benefit from our clean battery recycling solutions," said Nishchay Chadha, ACE CEO and co-founder. "Combining our expertise with Tabono's, we will enable development of safe and sustainable closed-loop solutions for



From left, Reon Barnard and Liran Assness, co-founders, Tabono Investments.

battery materials in South Africa."

Once established, the joint venture will leverage each partner's strengths. ACE has developed a portfolio of proprietary technologies to recycle lead-acid and lithium-ion batteries and capture their valuable materials at market-leading recovery yields. Tabono brings to the joint venture its experience in the minerals and industrial services industries across Botswana, Mozambique, Tanzania and South Africa.

Earlier this year, Tabono Investments acquired a stake in Advanced Group, a risk management, mitigation and emergency response specialist established in the mining sector.

For more information visit:

www.tabonoinvestments.com

www.acegreenrecycling.com

Enabling a smart, flexible energy grid

Technology group Wärtsilä has signed a contract with EDF Renewables UK and Ireland to deliver a new grid-scale energy storage facility in Sundon, Bedfordshire, UK. The 50 MW / 100 MWh project, which will form part of a new Energy Superhub in the region, will help to support the UK in its transition to a decarbonised electricity system and its net zero future. Construction of the facility is expected to start in (the northern hemisphere's) spring 2023.

The new 50 MW / 100 MWh lithium-ion storage facility in Sundon will store enough electricity to power 100 000 homes for two hours (assuming full two-hour discharge of 50 MW and average annual domestic consumption of 3772 kWh) and will support electric vehicle (EV) charging and the electrification of public transport. The project will enable increased renewable energy integration and intermittency management, in addition to strengthening the resilience of the electricity system, automatically charging and discharging to balance supply and demand.

Matthew Boulton, Director of Storage and Private Wire



Wärtsilä's 50 MW/100 MWh energy storage solution for Sundon, UK will support the UK's transition to a decarbonised electricity system. © Wärtsilä Corporation.

at EDF Renewables, said: "There is no renewable future without a smart, flexible energy grid. That is why we are working with local councils to accelerate the rollout of Energy Superhubs, helping to unleash the potential of renewable energy and enable local people to reap the benefits of net zero through better access to low-carbon transport. We know the challenge ahead of us – we need more renewable energy and energy storage to back it

Continued on page 20

Battery energy storage and energy management solutions

ElectroMechanica (EM) and Freedom Won (FW) have formed a strategic alliance which will see them sharing their respective strengths to serve customers in the energy management and battery energy storage systems market.

EM, established in 1984, is a leading distributor of electrical switchgear and solutions for automation and energy management. FW, the first to market with lithium energy storage technology in 2010, is an original equipment manufacturer of battery energy storage systems. Both companies, headquartered in Johannesburg, South Africa, have operations in the SADC region and beyond. In addition to the newly formed strategic alliance, the two companies share a common group holding company.

Energy efficiency, storage and management are critical to navigating the energy crisis and transitioning to sustainable generation technologies. FW was one of the first companies globally to pioneer the engineering design and commercialisation of manufacturing and production of lithium-based energy storage systems. The company continues to be a leader in the energy storage industry, producing systems suitable for home, commercial and industrial applications. EM has a long-established service and partner network throughout the SADC region and has been delivering energy and power technologies to the market for decades with a focus on providing services to customers anywhere in the region within 24 hours.

Under the strategic alliance, EM will provide account management and selected engineering and field services to FW's customers. The intention is to provide technical services such as repairs and training from EM's branch network during 2023. FW has an established route to market with long-standing distribution and integration



Installation of a Freedom Won Lite battery.

partners with a strong offering in renewables and energy storage. EM will not be distributing or stocking FW's products as there is no need to add to the existing distribution network.

The primary purpose of the alliance is to serve the SADC market with the products and services needed to overcome the energy crisis and accelerate the transition to sustainable energy technologies. FW will continue to invest in engineering research and design resources to develop leading energy storage technologies. At the same time, EM, leveraging its extensive branch and service network throughout the Southern African Development Community, will service channel partners and end users with a complementary range of energy efficiency and energy management solutions.

For more information contact ElectroMechanica.

Tel: +27 (0)11 249 5099

Email: info@em.co.za

Visit: www.em.co.za

Or Freedom Won.

Tel: +27 (0)10 597 7794

Email: enquiries@freedomwon.co.za

Visit: www.freedomwon.co.za

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up. Our storage facility in Sundon marks a key milestone for the UK as we lay the foundation for net zero."

Wärtsilä will provide its proprietary GridSolv Quantum system and GEMS Digital Energy Platform, as well as the power conversion system and commissioning for the project. GEMS provides the data and insights to instruct trading parties and track performance for comprehensive asset management. The energy storage technology will enable balancing services for the UK grid, including electricity market trading and frequency response, with the capability to support local consumers such as EV charging stations during grid outages.

Jens Norrgård, Energy Business Director, Europe, at Wärtsilä Energy, said: "This contract strengthens Wärtsilä and EDF Renewables' partnership and demonstrates our joint commitment to supporting the UK's decarbonisation efforts. Net zero power systems can unlock significant reductions in emissions and costs, and the UK is pio-

neering this transition with world-leading renewable energy targets. Wärtsilä's energy storage technology is an important part of the mosaic of flexible capacity needed to balance renewable energy. Alongside our other projects, Sundon is delivering on our global ambition to create clean power systems."

Wärtsilä's installed energy storage technology base in the UK now exceeds 424 MWh. Previous projects with EDF Renewables (formerly Pivot Power) in Oxford and Kemsley in Kent were delivered in 2021, and two projects in Birmingham and Coventry are currently under construction. Wärtsilä has also delivered a number of other energy storage projects in the UK, including a 50 MW / 100 MWh project first site for SSE in Salisbury and an islanded-grid project to balance renewables in Lerwick, on the Shetland Islands.

For more information visit:

<https://www.wartsila.com/energy>

Modular power system for Midrand data centre site

Intelligent power management company, Eaton last year completed the installation of a modular power system at Africa Data Centres' 10 MW facility – its largest installation on the continent to date.

When Africa Data Centres – with its pan-African network of interconnected data centre facilities – extended its business to include data storage solutions, it required significant upgrades and improvements to expand the capacity of its legacy building in Johannesburg. The enhanced facilities had to meet data centre site requirements with supporting power solutions – all of which had to be configured to fit into a limited space and within a restricted on-site installation time.

Despite time and space constraints, and difficult operating conditions, Eaton delivered a customised configurable xModular power system that extended the electrical infrastructure of the facility without interfering with day-to-day operations. It provides a plug and play solution that is scalable, allowing for easy upgrades when required.

Tesh Durvasula, CEO of Africa Data Centres says, "Due to the nature of our business, on-site installation time had to be restricted and allowed only for final assembly and cable connections."

To address these requirements, Eaton built the modular units offsite at its manufacturing plant in Germiston, southeast of Johannesburg, and planned and managed the process of delivering the weighty units by road, using specialised trucks and air-suspension loading trailers. The units were lifted into place on site using specially hired 700 t cranes.

"Apart from the physical requirements, we expected the solution to be housed in a robust prefabricated structure and to offer stability and reliability under all environmental and power supply conditions. Adequate load handling capabilities were essential, as well as ease of operation and maintenance," Durvasula adds.

The solution was required to offer full integration of Eaton products into one system with an approach intended to protect the data centre from the repercussions of inconsistent power supply and the recurrent loadshedding that is ongoing in South Africa.

Eaton's fully integrated turnkey solution included the Power Xpert UX IEC withdrawable medium voltage switchgear, the Eaton Power Xpert 9395P UPS, and Eaton's lithium-ion battery combinations.

Armand van Niekerk, Data Centres Segment Lead for Africa at Eaton notes too, "As part of the solution we also installed Eaton's modular UPS as it is a self-contained system with a patented design, which allows for different levels of scalability and levels of redundancy that may not be provided by a more conventional UPS. It is easy to install, upgrade and reconfigure, saving considerable time and costs for businesses.

"The air-insulated Power Xpert UX IEC withdrawable medium voltage switchgear offers world-leading vacuum



Eaton delivered a customised configurable xModular power system to extend the electrical infrastructure of Africa Data Centres' 10 MW facility.

technology in a compact footprint and with arc flash classification, making it a safe, reliable, efficient choice as part of this solution. Additionally, the Eaton Power Xpert 9395P UPS offers complete isolation of output power from all input power anomalies to deliver 100% conditioned, perfect sine-wave output, even during severe power disturbances," van Niekerk says.

He adds that the Energy Saver System built into the installation improves efficiency levels by placing power modules on standby when double conversion is not required. The system can however switch to double conversion mode within milliseconds, if required.

Further benefits of the tailored modular system are that the Energy Saver System can function continuously at ambient temperatures of up to 40°C without de-rating, and the UPS is easily scalable, the number of power modules can be specified, and the layout can be chosen to suit the installation. In addition, more than 90% of materials used in its manufacture can be recycled, with the benefit of reducing their lifetime carbon impact.

"This is an easily adaptable design that can be duplicated and rolled out as a turnkey solution for other partners as required," says van Niekerk.

For more information visit: www.eaton.com



The modular units were built offsite, transported on specialised trucks and lifted into place on site using 700 t cranes.

Seven good reasons to use Ethernet-APL

As development of Ethernet Advanced Physical Layer, or Ethernet-APL, progresses and the benefits for the process industry become clearer, interest in and demand for the technology are growing. More users from around the world are approaching the experts at Pepperl+Fuchs with questions. Here P+F presents the answers to the most common questions – and thus seven good reasons why this technology should be included in today's process industry plants.

Which DCS manufacturers currently offer control systems with Ethernet-APL?

All of them already offer Ethernet-APL. With the FieldConnex® rail field switch from Pepperl+Fuchs, the connection into the field of the plant – and thus continuous communication can be easily realised – up to and including the selection of different protocols.

Which field device manufacturers already provide Ethernet-APL-capable field devices?

The first manufacturer to announce complete instrumentation with Ethernet-APL for 2022 was Endress+Hauser, and others followed.

What are the benefits for customers if they deploy Ethernet-APL?

This is the key question, particularly when comparing Ethernet-APL to 4-20 mA and HART. With universal, barrier-free network access to instrumentation at high speed, all the advantages we are familiar with from Ethernet applications in everyday life can be transferred to the requirements of the process industry. Benefits include:

- Better SOPs (standard operating procedures)
- Less maintenance
- Reduced risk of failure and malfunction
- Higher output
- Greater efficiency.

What are the features that enable these benefits?

A field network, in conjunction with PROFINET or Ethernet/IP and appropriate hardware and software, enables applications with fully automated workflows interacting with field instruments. Specifically, this means, for example, that systems can provide the following functions and applications:

- Automatic device detection
- Automatic upload and download of the instrument configuration
- Upload of the right DTM / EDD device drivers.



Customers can test Ethernet-APL in their own process plant environment.

Are there demo devices? How can we experience the technology live?

The easiest way for prospective customers to implement a test configuration with Ethernet-APL is in their own environment with the control system or controller they keep on hand for testing. From Pepperl+Fuchs we provide a switch and the expert support. The customer requests the field devices from their usual suppliers. They can then start testing immediately with a PROFINET controller and PROFIBUS PA field devices. However, before customers do this, the best route is to set the goals. Describe expectations of how the functions of a network infrastructure can make daily work easier and develop respective test scenarios. The NAMUR epics, which describe various use cases, also provide inspiration for this.

How can users protect Ethernet-APL networks against cyberattacks?

Cybersecurity requires a systemic approach. Engineers consider attack scenarios and the network's vulnerability in order to protect it from unwanted access and plan for appropriate security measures. For example, maintenance contractors on site may need access to specific areas and only for a limited time; access rights will be granted ac-



The Ethernet-APL rail field switch from FieldConnex®.

cordingly, on a limited basis. In principle, Ethernet APL networks are expandable for all protocols.

How does Ethernet-APL fit in with NAMUR Open Architecture?

NAMUR Open Architecture, or NOA, defines lateral access to secondary information of the field instrumentation, such as configuration, alarms and diagnostics. Lateral access is independent of and runs in parallel to the control system, so the control system remains unaffected and highly available in its configuration and thus process control.

NOA defines appropriate application scenarios for handling the instrumentation, such as:

- The simple commissioning of the field devices
- Automatic alignment of the plant documentation
- The simple exchange of instruments, or
- The ability to read out several variables from one device.

For this purpose, NAMUR defines OPC-UA as the preferred protocol for Ethernet-APL networks, as it is transmitted in parallel to the industrial protocol for plant control. Ethernet-APL is the data transmission link and physics that enable this parallel communication directly to the field device. □

For more information visit: www.pepperl-fuchs.com/southafrica/en

SENSORS + SWITCHES : PRODUCTS + SERVICES

New electrically operated solenoid valve

Valve specialist GEMÜ has introduced the new GEMÜ J70 electrically operated 2/2-way solenoid valve, optimising its existing solenoid valve product group.

The GEMÜ J70 electrically operated solenoid valve is suitable for applications with low flow rates in analysis, vacuum and dosing technology and enables precise dosing. The resistant plug diaphragm made of PTFE (TFM™) has a unique sealing concept. PD technology provides for a high degree of accuracy for customer-specific applications.

With the PD (plug diaphragm) technology, the media wetted area is separated from the actuator by a plug diaphragm made from modified PTFE. PTFE is composed of linear carbon chains which are surrounded by fluorine atoms. They spatially shield the carbon atoms and protect the molecules from chemical attack – even at higher temperatures.

The compact GEMÜ J70 solenoid valve has a space-saving design and features low wear and simple wear part replacement as well as good cleanability. The coil can be replaced without removing the valve body from the piping.

With CONEXO and a RFID chip, the GEMÜ J70 solenoid valve can be clearly identified, enabling efficient documentation of maintenance. In addition, the solenoid valve is variable and extendable and suitable for valve manifolds and multi-port valve blocks.

For more information visit:
www.gemu-group.com



The GEMÜ J70 electrically operated solenoid valve is suitable for applications with low flow rates in analysis, vacuum and dosing technology.



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Flow sensor with plain text display

Flow monitoring is critical in applications that demand reliable and reproducible surveillance of limit values and flow patterns. Flow sensors detect critical deviations of the flow rate in liquid and gaseous media – and being able to monitor the flow visually is just as important as the continuous output signal.

Turck Banner recently added the FS101 flow sensor to its line-up. The device will have the same look and feel as all other sensors in the FS+ fluid sensor family and is equally easy to run and commission. The four-digit 12-segment display on the device shows the current flow value clearly as a percentage of the setpoint.

The implemented IO-Link smart sensor profile simplifies the conversion of IO-Link flow sensors of other manufacturers to the FS+ devices as process data, parameters and functions are standardised.

Easy commissioning

The FS101 retains the Quick Teach and Delta Flow functions that simplify commissioning – as initially introduced in the FS100 with a bar graph display. Delta Flow ensures the teach-in is not performed until the warm-up phase of the temperature peak is completed and a constant flow is present. This eradicates a frequent source of errors in traditional parameterisation processes. Users also benefit from the device's trouble-free operation via capacitive touchpads. Turck Banner will continue to offer the earlier FS100 devices with a bar graph display.

Typical areas of application are the monitoring of cool-



The FS+ series of flow sensors now features the same plain text display as the other sensors of Turck Banner's Fluid+ family.



ing circuits in welding applications for example, protection against dry running of pumps, as well as flow monitoring in air ducts and air conditioning equipment. Because of the calorimetric mode used, the media temperature is also monitored.

The FS101 flow sensor provides for fast and easy commissioning, high reliability based on error-proof teach-in support with Delta Flow, and easy operation via the plain text display with capacitive touchpads.

For more information contact Turck Banner.

Tel: +27 (0)11 453 2468

Email: sales@turckbanner.co.za

Visit: www.turckbanner.co.za

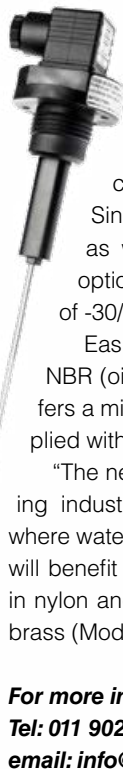
Adjustable level switch

Val.Co, a leader in the design and manufacture of process instrumentation, has launched the new Simple R1-M.B77 adjustable level control switch for monitoring liquids in industrial and civil environments.

Jan Grobler, Managing Director of GHM Messtechnik South Africa highlighted some of the features: "The Simple R1-M.B77 from Val.Co offers the customer a unique feature in that the rod, which comes in lengths of either one metre or 500 millimetres, can be shortened to the length required to suit the purpose. The level switch is new to the South African market, competitively priced and suitable for various level applications."

The operational principle is based on the drive of a micro-switch, which is located in the head of the instrument, as a result

The instrument operates based on the drive of a micro-switch as a result of the hydrostatic thrust exerted by the liquid on the float.



of the hydrostatic thrust exerted by the liquid on the float. The absence of moving parts offers maximum ruggedness and reduces the need for maintenance.

With an adjustable switching point and closed cell float, the instrument also offers a 3 A Single Pole Double Throw (SPDT) micro-switch as well as a Single Pole Single Throw (STST) option. It has an operating ambient temperature of -30/+55°C with a 90% relative humidity.

Easily mounted, threaded or flanged, it has an NBR (oil resistant rubber) flat sealing gasket and offers a minimum degree of protection of IP65. It is supplied with a DIN 43650-A plug.

"The new adjustable level switch will suit wide ranging industrial, domestic and agricultural applications where water/liquid level monitoring is crucial. Customers will benefit from its innovative design and it is available in nylon and fibreglass (Model R1-M) or stainless steel/brass (Model R1) versions," Grobler said.

For more information contact GHM Messtechnik SA.

Tel: 011 902 0158

email: info@ghm-sa.co.za

Tools and technologies to optimise plant performance

Rising energy costs and stricter legislation guiding sustainable practices are spurring companies to re-evaluate processes and seek new tools and technologies to reduce waste, optimise plant performance and overcome challenges in today's industrial environment.

Fluke, a global technology leader in the manufacture of compact, professional electronic test and measurement tools and software, and locally represented by Comtest, here shares the top three trends it sees enhancing operational efficiency in today's industrial environment.

Challenges posed to industrial operations managers by the pandemic have been superseded by the rising cost of energy, and the need to deliver on net zero ambitions. As the price of energy continues to increase, the need to reduce costs and deliver on shared sustainability goals intensifies for small-to-medium sized enterprises as much as large corporations.

Paul Feenstra, Vice President Fluke (Europe, Middle East & Asia) EMEA, says: "We are working with our customers to help drive new initiatives to improve operations, increase efficiencies, and take reliability to a new level."

Reducing energy costs

About 90% of all companies use compressed air in some aspect of their operation, such that it is often referred to as the fourth utility. Recent developments in industrial acoustic imaging technology have enabled the fast identification of leaks in compressed air systems used in industrial and manufacturing environments. Fluke's ii900 Industrial Acoustic Imager features an array of microphones, providing visualisation of sound within an expanded field of view and at a distance of up to 70 m. This enables maintenance teams to locate air leaks in compressed air systems visually, very quickly and accurately.

Beyond the improvement of rugged handheld tools, monitoring practices are also evolving with the use of internet-connected instruments. Analysis and data are captured on a cloud platform allowing operators to monitor the key performance indicators (KPIs) of compressed air systems including energy, electric power, flow, pressure and leakage flow. Fluke's LeakQ Report Generator creates detailed air compressor leak reports from images captured by the Fluke ii900 or the Fluke ii910 Precision Acoustic Imager and calculates the energy savings once the leaks are repaired.

Using data to deliver predictive maintenance

For generations, maintenance professionals have used preventive maintenance to avoid equipment failures and turned to reactive maintenance when assets fail. With the emergence of Industrial Internet of Things (IIoT) technologies, maintenance professionals can now connect tools,



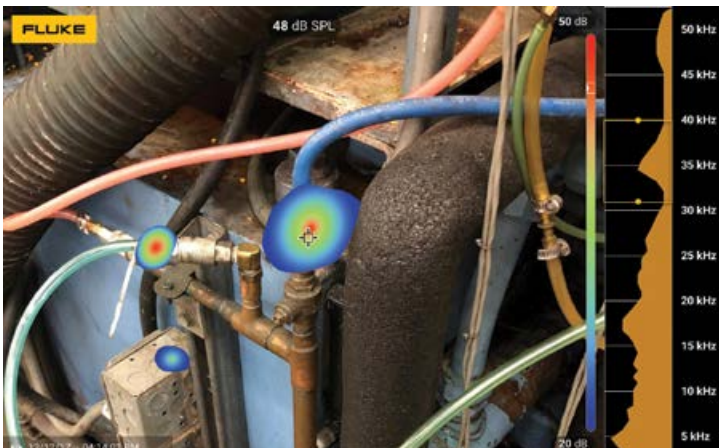
Fluke's ii910 Precision Acoustic Imager has dual uses – it serves to detect compressed air leaks and partial discharge.

software and sensors to collect, store and analyse multiple data sources in one place. The pandemic accelerated investment in technologies that make remote monitoring possible. The technology enables reliability and maintenance teams to meet uptime requirements, no matter how fluid on-site staffing might be. The trend for remote monitoring is expected to continue, with small-scale operations also turning to remote condition monitoring services.

Artificial intelligence (AI) and machine learning (ML) offer the promise to identify trends quickly and enable fast adaptation to changing operational conditions. Software equipped with prescriptive analytics is now meeting up with modern condition-monitoring hardware to spark a revolution in the use of AI and ML in maintenance operations. A new focus has emerged to pair the hardware and software with ML and AI algorithms. Companies, like Fluke, are working to combine technologies so the software can identify trends, recognise data patterns and make specific recommendations for equipment maintenance.

Digital SI integrating critical equipment measurement

There has been an accelerated uptake of digital measurement solutions for industrial applications. They can save time and money, as well as facilitating a shift towards predictive maintenance for systems. Although modern digital measurement devices are not typically fit-and-forget



Fluke's ii900 Industrial Acoustic Imager captures still and video images of compressed air leaks at a facility.

solutions, the increase in digital measurement solutions paves the way for verification technologies that can help to reduce the maintenance burden on personnel, without compromising on accuracy or reliability.

Digital SI (International System of Units), an initiative introduced as part of the industry 4.0 revolution, relates to the creation of a globalised system to transmit calibra-

tion certification information electronically. This is critical, as the exchange of data and the data itself form the basis of highly automated industrial processes. The system ensures measurement traceability from all calibrations performed and enables sharing of information in a paperless way. This facilitates the integration of measurements that can be performed using critical test equipment in an integrated factory, enhancing maintenance efficiency and plant efficiency.

"The tests the world has faced over the past 24 to 36 months are resulting in a growing awareness among top management that fundamental changes in maintenance best practice need to occur in order to protect the bottom line," Feenstra says.

"This is music to the ears of progressive industrial managers who have been advocating for investments to improve efficiencies and the reliability of systems. Now is the time for companies to adopt innovative technologies, tools, and processes to ensure they maintain a competitive edge and thrive in this new environment." □

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

PLANT MAINTENANCE, TEST + MEASUREMENT : PRODUCTS + SERVICES

Motor test systems and equipment

Phenix Technologies, a Doble Company, is a global market leader in motor test system design and manufacturing and maintains the engineering expertise and production capabilities to enable solutions for standard designs as well as engineered systems for custom applications. It continues to introduce innovations and new technologies to meet the demands of an everchanging industry.

Phenix Technologies works with clients to provide complete test system design and installation, from concept to commissioning, to meet their motor testing needs.

The company offers testing on all types of:

- Ac and dc motors



Phenix Technologies provides motor test system design, installation and commissioning for a wide range of motors, including high power motors.

- Traction motors
- Synchronous motors
- Induction motors
- Shunt-, compound-, and series-wound motors.

Phenix Technologies options for high power (300 to 2 500 kVA) motor testing include:

- Ac, dc, or ac/dc test systems
- Medium or low voltage input options
- Output power up to 10 000 kVA
- Configurations that allow testing of a 10 000 horsepower motor at full load and 50 000 horsepower at no load
- Manual operation, advanced control systems, fully automated testing, custom software solutions, database and report generation
- Precision voltage regulation with the Phenix column type variable transformer
- 'R2' design allows full voltage regulation without interruption, which means the motor does not slow down for tap changes
- Accurate voltage, current, power, Watts (including kiloWatt-hours), vibration, temperature, and speed measurement
- Commissioning and training to provide in-house operators with the information and resources they need for efficient and safe use of test equipment.

For more information visit: www2.doble.com

Demolition and decontamination of industrial plant

The work of demolishing and decontaminating an industrial plant extends from the removal of critically compromised steel structures and elements to the recovery of undamaged client assets and the demolition of plant buildings and offices. Jet Demolition also carries out clean-up operations to reduce hazardous contaminant levels on the demolished elements so they can be recycled and reused.

Contracts and Project Manager at the company, Kate Bester, says such projects represent some of the most demanding, time-sensitive and technically challenging projects undertaken by Jet Demolition. The scope of work ranges from the safe and controlled demolition of coal-fired boilers to product conveyors, steam turbines, transformers, silos, cooling towers and associated auxiliary equipment, in addition to the removal of hazardous materials.

The timeframe relates directly to the requirements of the project and the client, as well as critical attention to health and safety. With the safety of its personnel and all other persons involved being of utmost importance, Jet Demolition ensures its projects are highly mechanised. "These types of projects add to our diverse portfolio of work. With careful application of our experience, we offer our clients solutions that are economical, rapid and risk averse," Bester says.

The equipment used depends mainly on the site conditions. For example, state-of-the-art cold-cutting equipment allows workers to operate safely in the most volatile environments and without affecting the client's operational processes. Demolition plant and equipment range from a one-ton skidsteer loader to a 102-ton high-reach excavator, paired with suitable demolition shear, grapple, hammer or bucket as required.



Safe and controlled implosion of redundant cooling towers.

Full-time on-site production and safety management professionals oversee skilled operators and multi-skilled demolition workers. The operational teams are supplemented by Jet Demolition's in-house engineering and project management teams, supported by SHERQ, warehouse and workshop departments.

One of the main challenges posed by industrial demolition projects is having to accommodate live services that could be compromised within the demolition works area and the associated structural elements that must not be damaged.

Jet Demolition has been undertaking industrial demolition works since 1994 and offers in-house, full-range demolition services. The company supports the ongoing development of skills and equipment to meet the changing needs of the industry.

For more information contact Jet Demolition.

Tel: +27 (0)11 495 3800

Email: kate@jetdemolition.co.za

Visit: www.jetdemolition.co.za

Quality counts in condition monitoring

"At WearCheck, we take continuous quality improvement seriously. Our services are regularly audited by a range of agencies, including SANS (South African National Standards) and the SABS (South African Bureau of Standards)," says Prinda Narasi, WearCheck's Quality Administrator, who is behind the company's ongoing commitment to achieving and upholding major quality goals.

WearCheck is currently the only company on the African continent that has earned multiple quality confirmation certificates, which include ISO 9001:2015 and ISO 14001:2015 certification, and ISO/IEC 17025:2017 accreditation. These are audited regularly and the company has never failed to have an accreditation or certification renewed.

Narasi says, "We are proud of our dedication to top quality service – it gives our customers peace of mind, knowing that the laboratory results and analytics provided by WearCheck are scientifically accurate and would be replicated identically in any certified

laboratory, anywhere in the world."

ISO 14001 recognises environmental management to international standards; ISO 9001 recognises the integrated design, development and provision of condition monitoring services to international standards; and ISO/IEC 17025 is the international standard that sets out the general requirements for the competent, impartial, and consistent operation of laboratories.

Some customers insist on only using certified companies because they know that management systems are constantly assessed and improved. Further benefits for customers include improved quality and service, delivery on time, the right-first-time approach, minimised incidence of mistakes, improved reporting and communications, better quality products and services, and more reliable production scheduling and delivery.

For more information contact WearCheck.

Tel: +27 (0)31 700 5460

Email: marketing@wearcheck.co.za

Visit: www.wearcheck.co.za



Quality administrator at WearCheck, Prinda Narasi, drives the company's quality focused initiatives.

Online condition monitoring of transformers

In partnership with a leading local IT company, ACTOM Power Transformers has developed an online condition monitoring system for its transformers in the field.

Introduced to the market last year, the system monitors faults or irregularities in operating transformers on a real-time basis, enabling customers to take remedial action in good time to prevent or minimise damage.

Wilma Muller, Sales Manager at ACTOM Power Transformers says, "The system ensures that customers are kept constantly informed in real time about all key aspects of the condition of their transformers, including all the power-related factors such as voltage, current, load, power factor, harmonics and operating anomalies, as well as the temperatures of the winding and the oil, plus the ambient and hotspot temperatures.

"Our offer of condition monitoring equipment is combined with Power Transformers' monitoring service, monitoring the transformers on behalf of the customer, and included in the service level agreement is an annual visit to the customer's site. On alerts to possible problems, we consult with the customer on a way forward to address the problem. The most important aspect about monitoring the transformers is to detect and address a problem as soon as possible."

The service level agreement covers Power Transformers' provision of a yearly standard maintenance service for a minimum period of three years.

"During this period, we monitor the unit(s) and report on any operational anomalies, alarms and trips. As part of the service level agreement, we make annual visits to the customer's site to perform basic maintenance, including sampling and testing of oil. A report is submitted to the customer annually on the loading and operation of the transformer in that year," Muller adds.

The division also undertakes the retrofitting of the condition monitoring system to ACTOM power transformers previously acquired, where the owners and operators want to benefit from the advantages that the monitoring system and service level agreement package offers. "At

a later stage we will look at making the system available for use on non-ACTOM branded power transformers as well," Muller says.

To enable real-time condition monitoring, the system incorporates three key IT technologies:

- Internet of Things (IoT), which gives the transformers a 'voice', enabling them to communicate their health and status
- Cloud computing, which involves putting the information collected into a convenient place to make it available to other systems
- BI stack, comprising graphic tools, reporting tools and alerting tools and including a data exchange mechanism.

These technologies interface with the detection equipment already installed in the transformer, comprising protection equipment, alarms and trips, and with additional equipment attached or linked to the transformer to detect and communicate other key condition factors not already catered for within the transformer. These include a power analyser, an optional dissolved gas analyser and a cooler controller.

Power Transformers' online monitoring system, claimed to be unique in its field in terms of the scope and depth of its capabilities to detect and transmit anomalies in transformers as soon as they arise, so enabling prompt action to be taken to remedy them, was tested and proven in two pilot projects conducted by the development team at two PV solar plants in the Free State in 2021.

At the launch last year, the online monitoring system attracted a lot of interest and ACTOM Power Transformers is ready to serve the many owners and users of transformers that adopt the condition monitoring package offered.

For more information contact ACTOM Power Transformers.

Tel: +27 (0)11 824 2810

Visit: www.actom.co.za/power-transformers/



At the demonstration station at Electra Mining Africa 2022, Power Transformers Business Development Manager, Baldwin Hlongwani explains to a visitor how the condition monitoring system works.

Recognising top young scientists

The future looks bright for the ambitious young scientists who exhibited their ground-breaking research projects at the Eskom Expo International Science Fair (ISF), staged in December 2022, and took home a range of life-changing awards.

The top senior Eskom Expo ISF scientist, winning a R75 000 cash prize, was Yu Tang Shan from St John's College in Johannesburg, for his research project entitled: 'SMARter: Soil Moisture Artificially Intelligent'. The top junior Eskom Expo scientist, winning a R50 000 cash prize, was Minje Le Roux from Durbanville Primary School in Cape Town, for her research project entitled: 'Tricky Traffic'.

Brandon de Greef from Crawford International Ruimsig in Johannesburg was awarded the prestigious University of Pretoria/Professor Derek Gray Memorial Award for his research project: 'Powdered insulators for high voltage applications'. The award includes the Derek Gray Gold Medal, attendance at the Stockholm International Youth Science Seminar during Nobel Week, and a three-year study bursary in the sciences or engineering at the University of Pretoria, provided he meets the required criteria.

Overall, 253 of South Africa's top young researchers and innovators competed alongside 17 international young scientists from Brazil, Ghana, Kenya, Lesotho, Mexico, Mozambique, Turkey and Zimbabwe. All the projects were exhibited at the ISF from 7 to 9 December 2022, held as an in-person event for the first time in two years.

Title sponsor, Eskom, further invests in the country's youth through its sponsorship of 27 full-time bursaries for selected recipients to study electrical engineering at a South African university of their choice. The bursaries will be awarded to the learners provided they meet the required criteria when they receive their matric results.

Nthato Minyuku, Eskom Group Executive: Government and Regulatory Affairs, said at the ISF: "This was an exciting return to form for the Eskom Expo International Science Fair, after a physical absence of two years. We are inspired to see young scientists tackle issues that affect their communities, and their endeavours to develop various solutions, from creating sustainable energy-efficient homes, to improving infrastructure, to cost-effective green solutions. Eskom is proud to be part of the Expo, now for more than 20 years, as it provides greater exposure to science, technology, engineering, mathematics and innovation (STEMI) subjects and activities for learners from a young age. This is an important driver for transformation in our economy and the building of a better world for all."

Eskom Development Foundation Chief Executive Officer, Sumaya Nassiep, said: "Eskom Expo remains an important corporate social investment initiative for the foundation, as it is the only national initiative that aims to create a pipeline of young innovators using their STEMI learning and skills to serve across a range of industries. We were delighted to see that 153 of the 270 learners who participated this year are girls. Increased participation of girls in STEMI subjects is key to tackling local and global challenges, and it is important for Eskom Expo to continue supporting full and equal access and involvement in these science and technology oriented activities for women and girls."



The top senior Eskom Expo ISF scientist was Yu Tang Shan; the top junior Eskom Expo scientist was Minje Le Roux.



All the award winners at the Eskom Expo ISF 2022.

One of the sponsors, engineering and digital technology specialist Siemens, awarded nine lower quintile ranking schools in South Africa each with a Samsung public address system. The learners who won this prize for their schools, each received a trophy and a tablet computer. Siemens also awarded a study bursary to Ndivhuwo Malada, from Bokamoso Senior Secondary School in Limpopo.

Sabine Dall'Omo, CEO for Siemens Sub-Saharan Africa said: "We are happy to be back at the Eskom Expo for Young Scientists in person, after a two-year separation due to the pandemic. Siemens is proud to be a continuous supporter of the science fair, contributing to STEMI education in Africa, where it is much needed. STEMI-related skills will benefit the continent's growth and development by building capacity for a knowledgeable and skilled local STEMI workforce that will lead the way for Africa to reach global economic competitiveness. It will help to advance the continent in various fields including health, food production, infrastructure, environment and manufacturing. Our continued collaboration with the Eskom Expo consolidates our commitment to progressing the skills, development, and training of Africa's future engineers. We are proud of all the winners and to play a part in changing the lives of young Africans."

Other prizes awarded include the Meiring Naudé Award for the most inspiring project, which went to Dia Singh from St Dominics Newcastle High School in KwaZulu-Natal; and BABCOCK awarded laptops to Tumelo Ramokone (Capricorn region), Debrorah MasMaswanganyi (KwaZulu-Natal), Chevonne Erasmus and Joël Vinger (Stellenbosch), Sibusiso Titus (Gert Sibande region), Nina Breitenbach and Zongile Klaas (Cape Town), Sanelisiwe Ndlela (KwaZulu-Natal) and Dia Singh (KwaZulu-Natal).

For more information visit: <https://exposcience.co.za/2022>



Greg Day, Cybereason.

Cybersecurity in 2023

Greg Day, VP & EMEA Field CISO, Cybereason

In 2022, ransomware continued to reign and became one of the most common and dangerous threats facing healthcare organisations and software supply chains. The war in Ukraine created heightened concern over zero-day threats wreaking havoc for organisations worldwide. The cyber gang Conti, with Russian-linked ties, managed to disrupt financial operations throughout Costa Rica, and it seems there is no

end in sight to the activity of hacking group Lapus\$, which has shown itself to be a formidable threat actor.

What are the likely challenges in cybersecurity for 2023? This is what I expect we'll see in the year ahead.

Increased cloud credential attacks, unless...

The big shift to software as a service (SaaS) has fragmented more than a decade's worth of work to simplify and consolidate corporate Identity and Access Management (IAM) systems. What's more, many new SaaS applications do not integrate with organisations' existing single sign-on (SSO) solutions, yet organisations continue to accelerate adoption of new SaaS software, even without the security controls of SSO. Consequently, adversaries will increasingly focus on finding these weaker access points (new SaaS applications) to gain access to corporate and personal data, unless IT and security departments manage to get IAM back under control.

Deepfakes in blended attacks

In recent years, we have seen the increased success of blended attacks that combine, for example, social engineering tactics with malicious links. With end users becoming more aware of social engineering, we can expect more sophisticated attackers will increasingly turn to deepfakes to trick end users into clicking on malicious links, downloading infecting files, and the like. Deepfakes will likely become another common and core element of the blended attacks being used in the cybercrime chain.

The fifth generation of ransomware

A recent report by Cybereason found that 73% of organisations suffered at least one ransomware attack in 2022, compared to 55% in 2021. As the world reaches saturation of ransomware, adversaries will explore new methods to get money from the same victims. This will be the fifth generation of ransomware.

Lawmakers refocus regulation

Regulation comes with a long list of pros, cons, and everything in between, as we learned in the most recent report from the Cyber Defenders Council. In the coming year, regulation in the EU will have more of an emphasis on ensuring businesses have truly identified and remediated breaches. This regulatory focus will close the gap between

shutting the attack door in the immediate aftermath of an incident and understanding the attack's impact. In the US, regulatory bodies like the SEC are taking a different approach, one that focuses on enhancing cyber risk reporting and board-level governance.

Ransomware will test cloud storage access control

Cloud storage can give organisations a significant data protection advantage, along with more flexible recovery options. But as ransomware moves from the endpoint to target cloud-only spaces, it creates new risks for organisations, especially those that accelerated cloud adoption during the pandemic and may have lost sight of where sensitive data lives and who has access to it. This creates weaker credential management, leaving room for ransomware to infiltrate.

Cyberattacks will become transferable between smart devices

The typical cyberattack moves from hacker to device, but 2023 may bring the first cyberattack that jumps between smart devices, including smart cars. We have not seen the 'in-smart' environment replication yet, but with the pace of innovation, a smart car attack could be riding in the vehicle next to you.

Rising risk to national infrastructure

As both direct and indirect cyber warfare domains grow, so does the potential for a significant cyberattack on critical national infrastructure, most likely in an area such as the energy space. At present, I see this risk most in the EMEA region, but it's certainly top of mind among cybersecurity and national defence experts globally.

Burnout will impact cyber resilience

Security teams around the world have been working long hours from home, adapting their organisation's security posture to support all the shifts in key business systems. In an industry still facing a massive skills shortage, it would not be surprising if burnout impacts security teams' ability to maintain the round-the-clock coverage required to respond to a crisis in a timely way.

New strategies for supply chain threats

Security leaders will need to develop new strategies for supply chain threats. The standard due diligence and security assessments that CSOs have performed on third parties is no longer adequate, given the escalating frequency and impact of supply chain attacks. Regulations like the EU NIS Directive 2.0 and cyber insurance providers are forcing companies to conduct more frequent and dynamic assessments of their supply chain risk and to better control the access third parties have to their networks.

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

SU to become a leading research partner in green hydrogen

Stellenbosch University (SU) is set to become a leading research partner in initiatives to advance the use of green hydrogen as an energy source.

Towards the end of 2022, the university signed a Memorandum of Understanding (MoU) with Teesside University in England – this was during President Cyril Ramaphosa's state visit to the United Kingdom – and SU has allocated an initial R12 million towards establishing research expertise in the field.

The MoU sets out the research activities that will help South Africa with technology localisation and industrialisation using the hydrogen economy.

Professor Sampson Mampwheli, Director of the Centre for Renewable and Sustainable Energy Studies (CRSES) at SU, says, "The main focus is the production of green hydrogen, which is produced by electrolysis of water using renewable energy resources such as solar and wind energy.

"The research activities will include, among other aspects, hydrogen production technologies, hydrogen conversion technologies such as fuel cells and gas turbines, and techno-economic analysis of hydrogen projects such as the production of hydrogen for the export market. Focus will also be given to activities around South Africa's Hydrogen Valley, as proposed in the Hydrogen Society Roadmap approved by cabinet in 2022."

Mampwheli represented Professor Sibusiso Moyo, SU Deputy Vice-Chancellor: Research, Innovation and Postgraduate Studies, at the event, which was also attended by Dr Blade Nzimande, the South African Minister of Higher Education, Science and Technology, and other dignitaries of the South African Department of Science and Innovation.

Professor Steve Cummings, Pro Vice-Chancellor (Research and Innovation), represented Teesside University at the signing at the House of Lords.

Both the British and South African governments will make resources available for the operationalisation of the MoU, with a view to hydrogen technology localisation in line with the provision of South Africa's Hydrogen Society Roadmap. During President Ramaphosa's state visit to the UK, the British government pledged initial financial support in the form of grant funding, which will assist South Africa in operationalising its hydrogen development plans.

The ceremonial signing of the MoU was one of many ceremonies and agreements reached between South Africa and Britain during the state visit.

Professor Moyo added that she is pleased to work in collaboration with Teesside University and the university's regional and national partners on finding sustainable solutions to the energy crisis. "Through its Centre for Renewable and Sustainable Energy Studies, Stellenbosch University has established an impressive history of research on renewable energy. Research on green hydrogen will complement existing research on solar and wind energy – among other related research fields."

The two institutions will also collaborate with other institutions working in the hydrogen field in their respective



The signing of the MoU was attended by Prof Sampson Mampwheli of SU (seated second from right), SA Minister of Higher Education Dr Blade Nzimande (seated right) and other SA and UK dignitaries.

countries. Teesside University intends collaborating with Durham University and other institutions, and SU intends collaborating with institutions such as the Durban University of Technology, the Cape Peninsula University of Technology, North West University and the Universities of Cape Town, Venda and the Western Cape, as well as the Council for Scientific and Industrial Research (CSIR).

Professor Craig McGregor, Associate Professor in SU's Department of Mechanical and Mechatronic Engineering, says the development of green hydrogen technology has a high level of support within the university. "More than R12 million has been allocated to the Faculty of Engineering over the next three years to establish world class research in the field. The funding will cover the appointment of a part-time director, programme manager and three to four postdoctoral fellows, and a contribution to fund student and staff research projects. The research will be focused in three areas: firstly, new technology development, such as photocatalytic hydrogen production and hydrogen storage; secondly, technology intelligence and systems engineering that will study how best to apply the available hydrogen technologies within the southern African and global context; and finally, technology demonstration and deployment of technologies that have passed the technology intelligence stage.

The university will continue to explore and develop further sources of investment for the research.

For more information visit: www.sun.ac.za

Translocation of eagles' nests for transmission grid upgrade

As South Africa faces an energy crisis, the drive to get renewable energy projects off the ground brings with it the need for new transmission infrastructure and the upgrading of existing infrastructure. Where development encroaches on the natural environment human-wildlife interaction comes to the fore. In the network of South Africa's transmission grid, many bird species have found the pylon structures suitable for nesting platforms. Some of the country's iconic birds of prey build their nests on pylons. For the birds, this presents a risk of electrocution and a high risk of collision with conductor cables. The challenge is in finding ways to conserve avifaunal species and advance development at the same time.

Umoyilanga (Pty) Ltd. is a preferred bidder in the Department of Mineral Resources and Energy's (DMRE's) Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP). The hybrid project, which EDF Renewables is developing, comprises the Dassiesridge wind energy and battery storage facility in the Eastern Cape and the Avondale solar PV and battery storage facility in the Northern Cape. Together the facilities form the Umoyilanga project which will deliver 75 MW of baseload capacity to Eskom.

The Avondale Hybrid Solar Project is located about 30 km east of Upington. To connect Avondale to the national electricity grid, Eskom requires EDF Renewables to decommission and rebuild a 30 km section of the existing Gordonia-Garona 132 kV transmission line between the Avondale site and the Gordonia substation, on the eastern outskirts of Upington.

A basic assessment environmental process was undertaken to obtain Environmental Authorisation to upgrade the transmission line. Zutari, as the appointed Environmental Assessment Practitioner, commissioned an ornithologist to undertake an avifaunal impact assessment study to understand the risks and potential impacts for avifauna if the project were to be implemented. During the fieldwork, Dr Owen Davies from Arcus Consultancy Services South Africa (Pty) Ltd., an ERM Group company, identified two eagles' nests on the existing lattice pylons, one belonging to a Martial Eagle and the other to a Verreaux's (Black) Eagle. In the absence of suitable natural nesting locations, Martial Eagles frequently nest on lattice pylons. In contrast, Verreaux's Eagles usually prefer to nest on cliff faces. There are no cliff faces near the project site and this is likely why the eagles chose the pylons as nesting sites.

This posed a challenge to the project team as the existing lattice pylons had to be upgraded and replaced. A plan had to be made to find alternative nesting platforms for the birds, and the eagles' nests had to be moved before the start of construction.

In November 2021, the Department of Forestry, Fisheries and Environment (DFFE) granted Environmental Authorisation for the project to upgrade the transmission line, subject to the relocation of the two eagles' nests.

EDF Renewables collaborated with the Endangered Wildlife Trust (EWT) Birds of Prey Programme regarding the design and placement of alternative nesting platforms. Dr Gareth Tate from EWT provided recommendations for the alternative nesting structure design, based on the typical nesting structures built by the two species. In collaboration with Dr Davies, and after a site visit by the EWT, suitable locations for the nesting structures were selected, taking into account distance from the original nest location, position relative to the prevailing wind direction and surrounding rocky outcrops, as well as habitat suitability models provided by BirdLife South Africa.

Working with the design developed by the Zutari engineering team, two 15-metre-high nesting structures were built. They comprise a creosoted pole and a steel 'basket' with perching space at the top. In April 2022, Eskom took down the two existing nests from the pylons with guidance from EWT and relocated them to the new position. A rudimentary nest was rebuilt on the structures to lure the birds into continuing further nest construction.

In July 2022, the Verreaux's Eagle was spotted using the new nesting structure and in August 2022 a chick was seen inside the nest. To the team's knowledge, this is the first 'known' successful Verreaux's Eagle nest relocation in South Africa and monitoring the nest and the chick will be ongoing. The Martial Eagle is not expected to breed this season and monitoring of its new nest location will continue.

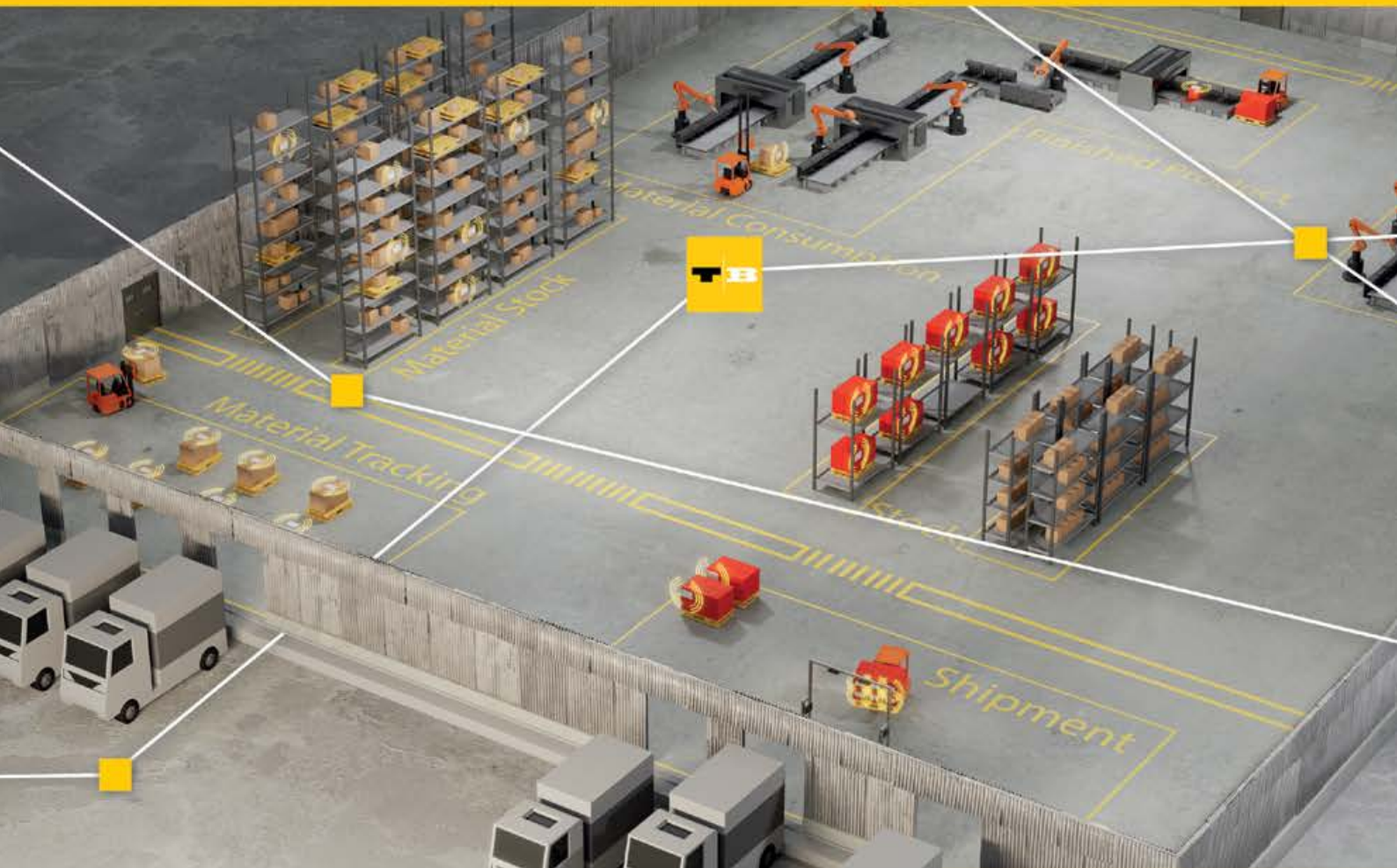
The successful relocation of the nests is an encouraging step in conserving these birds of prey as they often nest on lattice pylon structures and these will require upgrading throughout South Africa as older infrastructure needs to be replaced. In addition, the upgraded transmission line has been designed according to Eskom's bird-friendly standards, with bird flight diverters to be installed along sections identified by the bird specialist.

According to the EWT, Verreaux's Eagles are listed as locally vulnerable and Martial Eagles are a globally endangered species, with only an estimated 800 mature birds left in southern Africa. All breeding pairs must be protected, and nesting sites must be undisturbed. There has been little evidence around the potential impact or success of nest relocations. This project's success indicates that nest relocations can be successful when done appropriately. The project will provide a baseline reference for future nest structure designs, placement and relocations for all large eagles that nest on electrical infrastructure. It is recommended that raptor specialists are always contacted before eagles' nests are moved, and that nests should only be relocated in extreme cases such as this.

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



The Verreaux's Eagle has been seen using the new nest.

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