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

REDEFINING MEDIUM-VOLTAGE SWITCHGEAR MANAGEMENT:

ADVANCED CONDITION-BASED MONITORING SOLUTION

WIKA SENSeOR's groundbreaking CBM solution leverages cutting-edge sensor technologies and integrated IoT platform to enhance safety, efficiency, and longevity of medium-voltage switchgear.

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WIKA

Smart in sensing

08/2023

ELECTRICITY + CONTROL

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- Sensor switching
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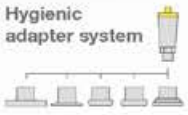

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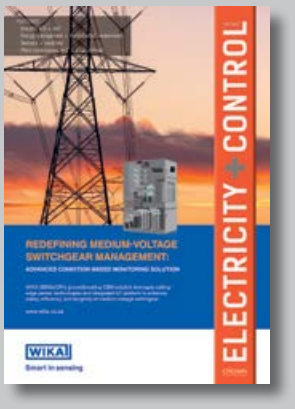

Advances in sensor technologies are reshaping maintenance strategies in power distribution networks. Wika is leveraging these advances to redefine MV switchgear management, condition monitoring and maintenance.
(Read more on page 3.)

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Keeping energy efficiency in focus

Do we see some glimmer of light at the end of the Eskom tunnel? Certainly, it has been quite hard of late to know what to do with all the electricity that has been flowing about… Almost feels like the 'old days' when trips were rare, and maintenance was planned and efficient.

Of course, the recent cold spell seemed to have caught us out a bit – but suddenly, there was electricity for far more hours in the day than we were used to.

Although there certainly was a spate of transformer explosions to keep us all alert. No doubt those were precipitated by the 'unplanned' overloading of the system and the strong need to keep it up and running.

Which, in turn, relates to the current core vulnerability of the system – and that is in the constraints on the ability to inject energy into the grid from all the renewables that could potentially come online. This critical issue is now well recognised and understood.

It reminds us of the order in which things need to be done. For example, if you are really keen on flooding the market with EVs, then best you have the charging network and capacity in place before you start.

Similarly, if you aim to build a huge number of large power plants, including renewable generating plants, then best you first design, build and commission a transmission network that can absorb the energy and ensure that it is useful to those on the grid.

All of this reminds us too, that industry will remain exposed for a while to come yet. And this implies the need to consider carefully how best to ensure continuity of our own plant during these trying times, which also reminds us of the need to be energy conscious, always.

I well recall the times when no one really took the need for energy-efficient devices seriously at all. The way the system worked then was the energy was cheap, it was stable and essentially guaranteed.

But all that has changed. If we were able to better manage the loads we need to power, we'd be in a far stronger position. Imagine a scenario where we could smartly manage our own plant – and imagine further that we could manage an entire suburb, area or even a province?

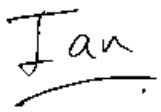
Consider how we could combine an energy management system with a smart energy system – and then optimise the way we use any on-site renewable energy source – or the trusty old standby (remember when that was the description used?) diesel generator farm.

The key thing here is to figure out how we can make lemonade from the lemons we have been given. There is an opportunity to capitalise on what Industry 4.0 offers to smartly reconfigure the way we run our plants.

But can we imagine a new order, where we manage what happens from one plant to the next – optimising how we manage and run the plant – where the emphasis is not on dealing with the lack of energy, but on optimising how we use the energy we have.

And with a real commitment to become increasingly efficient in how we do what we do.

No matter where our electricity supply comes from, energy efficiency is the key thing we must focus on. Energy is, without doubt, a critical input to any process – and an expensive one at that.



Ian Jandrell

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

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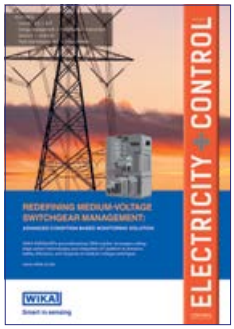
Redefining medium-voltage switchgear management:

Advanced condition-based monitoring solution



Stéphane Tourette, Business Development Director - WIKA Senseor

The management of medium-voltage switchgear is at the forefront of discussions concerning asset condition maintenance and operational safety. The main priorities are to maintain a high level of safety, reduce operating and maintenance costs, extend the service life of existing equipment, and achieve a robust, reliable installation. At the heart of this mission lies the development of a predictable maintenance and repair schedule.

Advances in sensor technologies have reshaped maintenance strategies in the distribution network asset health sector. More cost-effective than ever, sensors are now essential for monitoring the mechanical and electrical conditions of equipment, supporting proven diagnostic algorithms and facilitating integrated communications. These advances are essential for improving the predictability of maintenance and repairs.

To further leverage these advances, Wika has integrated the comprehensive WEgrid Solutions into its portfolio. This offering delivers a complete and customised solution for SF_6 gas-filled plants. The WEgrid product portfolio, consisting of everything from gas density monitoring to online monitoring, aligns with these advances and brings expert knowledge to ensure the proper operation of SF_6 gas-filled plants.

This innovative solution at WIKA SENSeOR not only incorporates these advances but enhances them and offers an unprecedented approach to condition-based monitoring (CBM) for medium-voltage switchgear. This approach is based on unconventional technologies, such as surface acoustic wave (SAW) sensors for temperature measurement and ultra-high frequency (UHF) sensors for partial discharge detection.

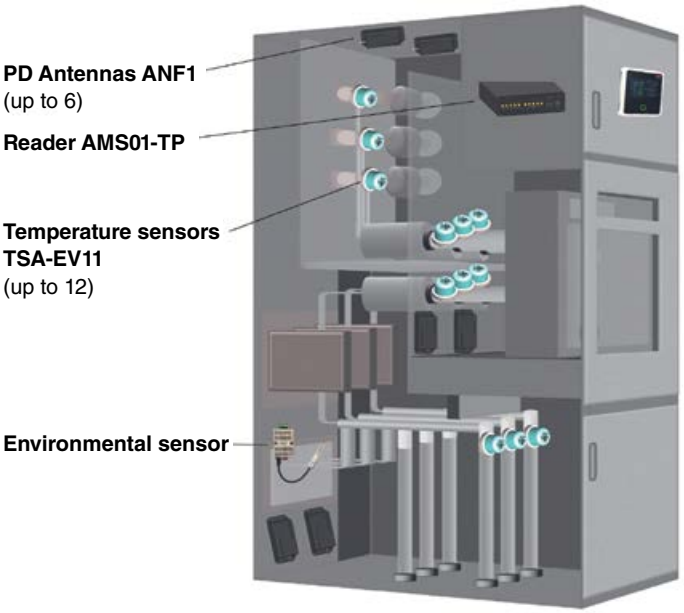
The distinctive features of SAW technology – its wireless operation and ability to function without a local power source – make it suitable for the harsh environments of medium-voltage switchgear installations. Real-time temperature monitoring provides early indications of increasing electrical losses or potential equipment failure, enabling proactive maintenance or load adjustment to prevent damage.

In addition, the monitoring of partial discharges, a common phenomenon due to insulation failure, is crucial to avoid catastrophic failure. By accurately detecting such discharges, Wika's solution enables operators to intervene quickly, avoiding costly repairs or prolonged downtime. The impact of humidity on switchgear is not negligible. Moisture build-up can lead to insulation failure and corrosion, directly affecting equipment life.

Furthermore, WEgrid Asset Protection, as part of the WEgrid solutions, complements operational safety measures. It provides maximum plant safety through digitised gas monitoring embedded in intelligent overall solutions, working in conjunction with Wika's CBM solution. The combination of high-quality products, adapted data transfer technology, and intelligent software ensures SF_6 gas monitoring is as simple and safe as possible, thus enhancing the predictability of maintenance. This blend of advanced monitoring technologies further enhances Wika's CBM solution. Together, they provide a comprehensive approach to ensuring the longevity and efficiency of equipment.

The integration capability of the CBM solution goes hand in hand with the growing trends in digital transformation. Whether as a standalone solution or as a retrofit add-on, the solution can be seamlessly integrated into an existing monitoring infrastructure. Combined with Wika's well-differentiated IoT platform, it enables efficient trend analysis and rapid situational awareness.

In conclusion, the combination of WIKA SENSeOR's CBM solution and the comprehensive WEgrid solutions marks a significant advance in the field of medium-voltage switchgear maintenance. Together, they capitalise on innovative sensor technologies and an integrated IoT platform to optimise maintenance predictability. These solutions contribute to an increase in equipment safety, efficiency, and longevity. In this age of technological advances, our solutions demonstrate how equipment failures can be effectively predicted and avoided, ensuring better asset management. □



WIKA SENSeOR's CBM solution incorporates sensor technology to advance medium-voltage switchgear maintenance.

For more information contact WIKA Instruments.
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Email: sales.za@wika.com
Visit: www.wika.co.za

Andrew Cruise, Routed.

Choosing a cloud provider that lifts your business

Cloud adoption is rapidly increasing in Africa, with no slowdown in sight. World Wide Worx research indicates that 69% of companies in eight African countries plan to increase their cloud spend in 2023. Andrew Cruise, Managing Director of Routed, local VMware Cloud Verified Provider and VMware Principal Partner, says this is due to a number of factors that started with the pandemic and the increase in working remotely.

"Now, loadshedding is further fuelling this shift," Cruise says. "Data centre colocation providers are obliged to offer a guarantee of continuous power to their tenants and can address power cuts more efficiently than a smaller enterprise's data centre or server room."

In choosing to move to the cloud, decision makers often need guidance in terms of what to look for in a provider – and Cruise emphasises that to ensure success, it's critical to choose the right provider. He highlights seven key factors to be considered.

Specialisation

Choosing to trust someone with their critical data, businesses should make sure the cloud provider is an expert in the field. The cloud provider should be a specialist with a dedicated, experienced, certified team. "If it's not the provider's sole focus, their ability to deliver a secure, well-performing product and to be available to support their customers will be diluted," says Cruise.

Data centre choice

Just as the cloud provider should be a specialist, it's important to make sure the provider uses a colocation facility that is also an expert in its field. Cruise urges decision makers to check up on the appropriate certifications and a proven track record of security, redundancy, and resilience across power (dual UPS, dual generators), CRAC (computer room air conditioning) and fire risk mitigation. "An open access, vendor-neutral site at one of the main peering points for internet connectivity is preferable, so that connectivity is not restricted or charged at a premium due to vendor lock-ins. For best performance and minimal latency, it should also be located in-country."

Just as the cloud provider should be a specialist, it's important to make sure the provider uses a colocation facility that is also an expert in its field.

Guarantees

With loadshedding continuing, a cloud provider's reliability is essential to ensure that its customers' business operations are not disrupted by system failures or downtime. "Look for a provider that offers a robust service level agreement (SLA), including uptime guarantees and penalties for failure to meet the SLA. A minimum n+1 redundancy should be a given, although n+2 or 2n is preferable," Cruise says.

Interface

For any business that relies on various software applications, it is essential to choose a cloud provider that can integrate with these applications seamlessly. "And, although there is a host of tools and features available from cloud providers these days, not every enterprise needs all the bells and whistles. Choose a provider that uses proven, reliable, easy-to-use management and orchestration tools," Cruise says. "Most enterprises don't need complicated, cutting-edge open-source software. Rather opt for a purpose-built, upgradeable and well-supported stack from a trusted vendor and ensure the provider offers APIs that allow for easy integration with other software applications," he adds.

Security

Data can be worth more than gold. Besides ensuring redundancy and fault tolerance measures as well as back-up and disaster recovery services, decision makers need to know how their business data will be protected. Will it be kept in a single instance only, snapshotted locally, or replicated across failure domains? What additional security options are available? "Make sure the cloud provider cares as much about your data as you do and has a proven track record of top-notch security," Cruise says.

Location

Global software and hardware vendors are starting to cater to the unique requirements of African markets, but none will understand these as well as a local vendor. The benefits of local providers include data sovereignty and POPIA

compliance, an understanding of fibre and undersea cable rollouts (and the importance of reliable internet connectivity in cloud services), and knowledge of the state of the cloud market in Africa and how it is evolving. Most important, says Cruise, is the availability of support. "Though some international providers also offer reliable support, interacting with people who are in the same country and speak the same language, in all senses, is a quicker route to good support."

Cost

Cost is a critical factor for businesses anywhere and in Africa, cost-efficiency is crucial for survival. However, choosing cheap over efficient, is not always wise, warns Cruise. "The cloud provider should offer competitive pricing models that align with your business needs and budget, as well as providing for scalability and respective pricing models. Costs will increase over time with changing economic pressures."

Carefully considering these criteria in evaluating potential cloud providers, businesses can select a provider that lifts their operations and shifts them towards a future of efficiency, scalability, and growth in the digital age. □

For more information visit: https://routed.co.za

Integrating data streams to optimise asset management

As organisations see greater volumes of data generated from their operations, they need to be able to leverage the data to generate more value and insight that helps operations and asset integrity managers 'do more, better'.

In this regard, Charles Blackbeard, Business Development Manager, ABB Ability™ Digital says significant value can be gained by integrating information from assets (IT systems), sensors (OT systems) and design (engineering) systems. In a manufacturing environment, most of these systems are running in multiple networks across different units. He notes too that sometimes the ownership of the data varies from plant to plant and is also dependent on the users' roles.

"Organisations need a centralised environment where they can integrate, validate, contextualise the cleaned data and make it accessible centrally. This is where the cloud presents great potential and can yield particular benefits," he says.

Consolidating data and deploying via the cloud opens up multiple solutions and application possibilities, including business, asset and sustainability solutions as well as solutions in planning and logistics, operation, supply chain, and advanced supervisory systems. In industry, it also serves to inform predictive, diagnostic, and prescriptive analytics applications. This means that previously siloed information is now available across the entire enterprise.

"Concerns about security are, of course, front of mind when the number of users across a system is increased, more devices are connected to the network, and more and more information is being stored in the cloud," says Blackbeard.

There are also a number of data and integration challenges to be considered in the prospective use of cloud solutions. These may include:

- Proprietary controls
- Multiple data formats
- A lack of contextual information
- Data quality issues
- Design for operations
- Differences across industry verticals
- Coupling to applications and
- Isolated networks.

However, he adds that there are some powerful risk mitigation strategies available. For example, deploying edge solutions – whether this is so-called 'lite edge' – for secured communication from edge to cloud, or 'heavy edge' – for deploying application at the source of data and enabling distributed computing, faster response time and cost optimisation.

He highlights several clear benefits to this approach.

- The use of an SaaS- (software as a service) based business model enables customers to focus on operational efficiency.
- It allows for the building of an integrated asset information model using operations, process control, assets and design systems based on a contextualisation engine.
- It empowers users by delivering solutions in particular focus areas in controls or process: for engineers, manufacturing system engineers, data engineers, integration engineers, and system architects.
- It enables hybrid deployment of containerised solutions, so reducing data round trips and supporting faster responses.
- Cost reductions can be achieved by distributing data processing between edge and cloud, filtering and aggregating high-volume data at the edge.
- Additionally, it builds operational resilience to unreliable networks by enabling the hosting of managed applications with data at the edge; data can be synchronised with the cloud when connectivity returns.

For more information visit. www.abb.com

Consolidating data and deploying via the cloud opens up multiple solutions and application possibilities.

A development ecosystem for TSN devices

Industrial Ethernet with Time-Sensitive Networking (TSN) functions is becoming widely accepted as the enabling network technology to support deterministic, convergent communications as the core of Industry 4.0 applications. Industrial automation device vendors offering competitive solutions that leverage TSN technology can benefit from the rapidly expanding development ecosystem.

The demand for industrial automation applications that use TSN for the deterministic transfer of multiple types of data traffic is growing. One of the key benefits is that it can support the merging of information technology (IT) and operational technology (OT) domains for smart operations.

This and other benefits of TSN are being acknowledged by end users as well as developers. To design TSN-compatible devices, vendors require suitable development tools. These may include items such as software stacks, microcontrollers, application specific integrated circuits (ASICs) or field programmable gate arrays (FPGAs). These enable the industrial automation products to use suitable connectivity standards and protocols to deliver TSN functions.

To support the creation of devices that embed innovative and competitive connectivity solutions, addressing market demands, suppliers of development tools have started to include new deployment alternatives within their portfolios. Peter Canty, Applications Manager at Analog Devices, which offers ASIC solutions, comments: “ADI is investing in TSN technology. We are working on a number of products, including embedded switching technology, so customers can leverage these products to simplify their installed embedded switching network by having real-time and non-real-time data co-existing within one switch.”

The benefits of TSN are being acknowledged by end users as well as developers.

Mark Hoopes, Director of Industrial and Automotive at Lattice Semiconductor, explains why the company launched FPGAs that incorporate key TSN standards. “Besides providing tools to enable users to program, we want to be able to provide connectivity solutions. This would become part of what we offer our customers to enable them to get their products to market faster. A key aspect is being able to use CC-Link IE TSN, incorporate it in the products and have flexible connectivity solutions based around that.”

Enabling suitable development tools

As the first open industrial Ethernet to combine gigabit bandwidth with TSN functions, CC-Link IE TSN has been adopted by leading development platform suppliers, such as NXP, which offers compatible microcontrollers and microprocessors. Christian Castel, Industrial Automation Marketing Manager at NXP, says, “CC-Link IE TSN is the first protocol that really implemented the different TSN values to an actual field application.”

Christian Bornschein, Marketing and Sales Director at port industrial automation, a company that offers industrial Ethernet stacks, comments similarly, “CC-Link IE TSN is a powerful technology to enable real-time communications for customers in the industry. You need to provide customers the appropriate tools to make a powerful development.”

To meet the needs of industrial automation and machine makers, development tools need to be shaped to offer the right capabilities, and to generate a broad ecosystem. David Modroño, Business Manager at FPGA IP core provider, SoC-e confirms this. “Our working relationship with CLPA started last year because some of our most important customers for industrial automation are using CC-Link IE TSN and, as their provider, we are expected to be really close to the technology, understand the environment and be able to provide the solutions they need.”

Similarly, for HMS, which offers CC-Link IE TSN compatible Anybus CompactCom embedded devices, streamlining the development process for automation specialists is key. Magnus Jansson, Product Marketing Director at Anybus - HMS, says: “The CompactCom CC-Link IE TSN is a complete communications solution for industrial equipment.

That means manufacturers of machines and devices do not really need to spend time figuring out how to make their product communicate on that network. With a CompactCom built into a product, this can connect to CC-Link IE TSN."

Driving interoperability

Another major requirement for automation vendors is interoperability, which empowers their TSN-compatible devices to communicate with solutions from other parties in order to help customers create effective and responsive systems. Leveraging an open network technology, such as CC-Link IE TSN, is therefore an asset. Mitsubishi Electric, which offers over 100 devices with TSN functions, decided to support this by offering multiple CC-Link IE TSN development tools.

Masaki Kawazoe, Director Commercial Marketing Factory Automation at Mitsubishi Electric, explains: "To increase the range of products available, one factor is how easy it is for vendors to develop them. That means we also support vendors who want to develop their CC-Link IE TSN compatible products. So, we have several kinds of devices to help vendors to support CC-Link IE TSN compatibility."

Michael Zapke, Industrial Lead at AMD, which produces FPGAs, adds: "We are exploring the opportunities for new solutions with CC-Link IE TSN. We have done our own TSN developments in the past and we also work with partner companies that are CLPA members with TSN know-how. Based on that, we want to create future products with CC-Link IE TSN."

Guaranteed performance

Quality-oriented device makers and development providers tend to invest in solutions that can be certified and the CLPA's conformance testing is highly regarded by industry players.

Keigo Kawasaki, Director of Industrial Automation at Renesas, which produces ASICs that support CC-Link IE TSN, says: "We are working closely with the CLPA and we are contributing to the expansion of CC-Link IE TSN network in the market. We are also producing devices. These have already passed the conformance test and our customers can use our products with confidence."

Michael Grabowski, Senior Product Marketing Manager at eSOL, notes: "eSOL joined the CLPA for two reasons. Firstly, to get all our CC-Link IE TSN software products certified, and secondly, maybe much more important, to participate in the active marketplace that the CLPA is driving. Our software development kits, SDKs, provide the source code for the protocol stack for simple application."

John Browett, General Manager at the CLPA Europe, says in conclusion: "CC-Link IE TSN is an enabling technology for Industry 4.0, and we are pleased to see major industry players acknowledge the opportunities offered by our network technology. The number of companies offering compatible development tools continues to increase, expanding the ecosystem for industrial automation vendors interested in adopting CC-Link IE TSN. This growth is beneficial for automation vendors, machine builders and end users, as they can take advantage of a variety of solutions to address their needs and advance their digital transformation." □

For more information visit: eu.cc-link.org

Real-time supply chain intelligence for electronics systems

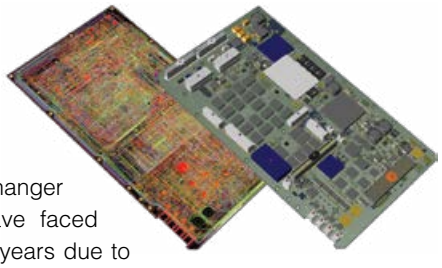
Siemens Digital Industries Software is integrating the Supplyframe™ Design-to-Source Intelligence platform with its Siemens Xcelerator portfolio of software and services to bring robust real-time supply chain intelligence to its comprehensive digital twin technology.

Starting with the incorporation of the Supplyframe Design-to-Source Intelligence platform with Siemens' Xpedition™ software for electronic systems design, the fully integrated solution, now available, facilitates supply chain resilience by providing real-time visibility into global component availability, demand, cost, compliance and associated parametric data at the point of design.

Combining Siemens' printed circuit board (PCB) design and analysis technologies with Supplyframe's market intelligence, the new solution can help customers reduce costs, increase agility, and make better, more informed component decisions at the point of design. By synchronising data from the product lifecycle management (PLM) and electronics computer aided design (ECAD) domains, it enables engineering organisations to streamline the selection, creation, and management of components during electronic systems design.

"This new solution is a game changer for our OEM customers, who have faced extraordinary challenges in recent years due to dynamic market forces," said AJ Incorvaia, Senior Vice President of Electronic Board Systems at Siemens Digital Industries Software. "Global supply chains have become increasingly unpredictable due to geopolitical developments, globally distributed organisations and suppliers, and ever-growing pressure to develop highly complex new products and bring them to market quickly. By leveraging the capabilities of Supplyframe's Design-to-Source Intelligence platform together with Siemens' Xpedition software for electronic systems design, we are equipping our customers with the tools and technologies to compete and thrive in the face of these challenges."

For more information visit:www.sw.siemens.com/en-US/



The integrated solution provides customers with real-time visibility into global component availability, demand, cost and compliance data.

Connectivity solutions for data centres

According to the Africa Data Centres Association, Africa needs 700 data centres, requiring a total of some 1 000 MW of energy to enable the rollout of digital services across the continent. Clive Maasch, General Manager at Tank Industries, points out that data centre development on the continent comes with a number of unique challenges including lack of access to reliable power and connectivity as well as shortfalls in local construction expertise.

Tank Industries is a leading distributor and manufacturer of cables, cable accessories and connectivity solutions for the power, telecommunications and data centre sectors, supplying the South African, African and international markets.

Powering the future

Maasch says that with sub-Saharan Africa having an electrification rate of only 46% (according to the International Renewable Energy Agency – IRENA), coupled with frequent outages in some countries, for new data centres to succeed they will need to establish their own energy generation sources. "Fortunately, the continent is rich in renewable resources including wind, solar, hydro, and geothermal energy. And at present, the costs of renewable energy technology are declining, making this a prudent investment and far more cost effective than running generators.

"Additionally, as data centres are today responsible for an estimated 3% of electricity consumption globally, and with this expected to intensify in the coming years, new projects will need to ensure energy efficiency and effective power usage," Maasch says. "This can reduce consumption, increase energy security and bring down carbon emissions substantially (by 98% according to some estimates) if combined with the use of renewable energy."

Bringing the continent up to high speed

Currently, Africa has an internet penetration reach of about 40%, compared to a 66% global average. Bridging the gap requires investment. Maasch cites a report by the World Bank which indicates that an investment of US$100 billion is needed to achieve universal, good-quality internet access. Of this, 80% would go to the rollout and maintenance of broadband networks which would require an estimated 250 000 new 4G base stations, at least 250 000 kilometres of fibre, and migration to 5G, which, in turn, will dramatically increase the need for data centres.

He notes that there are already positive shifts towards providing connectivity on the continent with Google bringing the Equiano Undersea Cable online and 5G licences being awarded to businesses such as Vodacom, MTN, Rain, Telkom, Cell C and Liquid Telecom, and more spectrum being auctioned this year. "But, as this progress is quite slow, data centre developers might opt for private 5G networks in future, as now being tested by Japanese IT firm Fujitsu."

Clive Maasch, General Manager, Tank Industries.

Construction on the continent

"Given that relatively few data centres have been built in Africa compared to numbers in the rest of the world, it's understandable that there may be a shortage of skills needed to build them," says Maasch. "This has led to the formation of partnerships between local companies and those abroad that have the experience and the necessary infrastructure to meet the continent's evolving IT needs."

However, he says, "Although there might be some challenges, having the right local partner that understands the intricacies of these and can provide the right solutions, will go a long way towards overcoming them and realising the benefits of data centre development for the continent and its people. Data centres create jobs and serve as an economic enabler for businesses by enhancing internet speeds and processing power. At the same time, they provide the foundation for the further digital economy to develop – this is expected to add another $180 billion to the continent's GDP by 2025."

For more information contact Tank Industries
Visit: www.tank.co.za.

PDS data can inform digital twin modelling

Long respected for its contribution to mine safety, proximity detection system (PDS) specialist Booyco Electronics has highlighted how PDS data can be leveraged to further improve safety as well as efficiency and productivity on mines.

"For many years our PDSs have enabled customers to collect data on the movements of their mobile trackless machinery and their personnel," says Graeme Jardine, Chief Sales Officer at Booyco Electronics. "As the mining sector embraces the power of the digital twin approach, the value of this data can be extended as it can now be used to model optimisation options virtually for a surface mine."

Modelling in this way allows the benefits of potential operational improvements on a mine to be evaluated in advance of implementing them. Jardine notes that changes to existing systems and processes can introduce risks and costs, so it is helpful for mines to pre-test options as far as possible – quantifying their potential benefits.

"Using a digital twin – the virtual equivalent of the machine in the field – mines can model a number of proposed scenarios and choose the optimal option for their

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EtherCAT – proven value over two decades

Ultra-fast EtherCAT, developed by Beckhoff and already used successfully for 20 years, has established itself as an open, global standard for real-time Ethernet communication.

Compatible and open EtherCAT technology has demonstrated its value in practice for 20 years. The communication system developed by Beckhoff and first introduced to the market at Hannover Messe 2003, has proven itself as a high-performance real-time Ethernet technology. EtherCAT has firmly established its place in the market, due to its continuity and technical development, and has become an open IEC standard. Today, EtherCAT offers the performance and innovation potential to handle the next 20 years of high-performance automation.

Beckhoff has always been recognised for high-performance control and the way it continually pushes performance limits in the world of automation. This is built on the principle of PC-based control technology, which makes it possible to exploit all the advantages of a PC – most notably including the high computing power – directly on the machine.

EtherCAT was developed so that the high performance of Ethernet PC interfaces, which were available as standard in the early 2000s, could have an optimal effect on machine automation. Fast-forward 20 years and this is as true as ever.

It's important to note though that the standard Ethernet protocol is designed for the transmission of large amounts of data and long data telegrams, not for the small units of information common in the machine environment, such as a 1-bit limit switch value or a 16-bit analogue value. This is where the EtherCAT principles have resulted in an ideal synthesis of both worlds to offer a number of major advantages:

- the standard Ethernet telegram is used so a special communication card in the master is not required
- with the development of the Fieldbus Memory Management Unit (FMMU), data processing is enabled in the telegram execution, resulting in maximum protocol efficiency without overloading the master
- the point-to-point connection adopted from Ethernet is crucial in ensuring optimum diagnostic possibilities for EtherCAT
- distributed clocks introduced a highly accurate and automatically synchronised system time, providing the basis for modern, time-slice-based control concepts
- as a complement to the well-thought-out technology, publication within the EtherCAT Technology Group (ETG) has equally contributed to its overall acceptance and success.

For more information contact Beckhoff Automation.
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Visit: https://www.beckhoff.com

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operation," he says. To illustrate this, he uses the example of how heat maps, created via the Booyco Electronics Asset Management System (BEAMS) software suite, may depict a scenario of haul trucks experiencing excessive standing time waiting to be loaded. The mine can use digital twin modelling to investigate the detailed implications and costs of diverting some trucks to an additional excavator or shovel. Quantifying costs and benefits more accurately, allows for an informed decision to be made, making the best use of available capital and resources – and positively impacting the bottom line.

For Booyco Electronics' customers, their years of data collected through PDS and the BEAMS software suite, which is a central information hub linking the proximity detection hardware products with monitoring devices, in a control room environment, for example, positions them well to advance with digital twin technology – as this data can now be used to populate a modelling system.

"The modelling process may require input of an extended period's worth of data before the results can be regarded as representative and meaningful," says Jardine. This means customers with a history of data already collected, will not have to wait months or years for data to be generated from scratch.

With an extensive footprint in the mining sector, Booyco Electronics can help customers harness technology for digital twin modelling.

As a leader in this field since 2006, Booyco Electronics can leverage its technology to harness the potential of digital twin modelling. "We have taken many mines through the process of applying PDS technology and are now well positioned to walk a similar journey with them to add value via digital twin technology," Jardine says.

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

An integrated portfolio for modular data centres

In its approach to modular data centres Eaton brings together the best of its hardware and technical capabilities plus a worldwide network of support and service for customers.

Leveraging one integrated product portfolio from a brand where safety is paramount, customers have the assurance of safe system compatibility and reduced risk. Rapid response times are standard and Eaton's international network of licensed, audited, certified partners means it can support and service its modular solutions in any location around the world.

Efficient planning and management of the so-called 'white spaces' in data centres, where IT equipment is located, and the 'grey spaces', which house the backend infrastructure that supports it, are critical for project success. Eaton's modular data centre solutions cover the full spectrum of white and grey space requirements, including customised options.

The portfolio extends from server racks, cooling and rack power distribution units to UPS and battery systems combined with low voltage power distribution. They can be installed in different non-ISO and ISO modular solutions and skid versions if required.

Prefabricated data halls and preconfigured, modular data rooms enable a faster, more flexible journey to operational readiness than is the case in commissioning a brick-and-mortar structure. Importantly, modular elements can be tailored to suit customer requirements based on Eaton technology that is designed to work together.

The company provides turnkey solutions from design and engineering to monitoring, preventive and corrective maintenance and support services.

The numbers relating to data volumes today are extraordinary. Some 180 zettabytes of data are forecast to be created, captured, copied and consumed globally by 2025 – up from 64.2 zettabytes in 2020. Plus, another one billion more mobile users and 30 billion more connected devices by the same year. In the age of Big Data, the data mountain is growing faster – as is the need for the right data centre infrastructure to store and manage it.

In its modular data centres, Eaton assists customers by providing a single source solution that meets their needs.

The 'traditional' approach to specifying and tendering components for data centres from multiple suppliers remains the best option for some applications. However, coordinating, assessing and implementing the options can be complex and time consuming.

Eaton's modular data centre solutions draw on its experience of supplying countless successful data centre projects worldwide, combining this insight with the company's cohesive, high-quality product range and service levels to bring customers a streamlined, single point of contact offering. It means Eaton can deliver new levels of data centre customisation, scalability, safety and overall value. This helps hyperscale and colocation enterprises, as well as smaller, owner-managed companies, to grow their businesses at a pace that is right for them.

For more information contact Eaton.
Visit: www.eaton.com/za/en-gb

Growing robotics skills in SA

Robotics is a growing industry and South African manufacturers are increasingly adopting automation into their production processes to remain competitive. Yaskawa's longstanding training academy offers its customers, as well as individuals looking to enter the industry, the opportunity to learn and upskill in various in-demand skills areas, including programming, operations, maintenance, safety, and robot troubleshooting.

The Yaskawa Training Academy offers training programmes in robotics and related in-demand skills.

"At the Yaskawa Southern Africa Training Academy, we offer a range of courses and training programmes designed to meet the needs of different skill levels, from beginners to advanced practitioners," says Leon Coetzer, Training Officer at Yaskawa. He adds that the staff of the training academy includes experienced engineers who are experts in their respective fields. Since the academy's inception in 2002, it has provided training for about 2 200 students.

For training on Yaskawa's robots, all students can expect a hands-on approach. In-person classes ensure the trainees gain the required knowledge and skills to operate and maintain the robots effectively. Coetzer highlights that with South Africa's skills shortage, fewer barriers to entry mean more opportunities to strengthen the country's workforce and reduce unemployment.

"We recommend that students who would like to participate in our training programmes should have a matric qualification, a good understanding of mathematics, or at least some mechanical or electrical background knowledge," Coetzer adds. "However, we welcome anyone willing to learn and participate in our training programmes, regardless of their educational background or previous experience. We believe anyone with the right attitude and willingness to learn can benefit from our training programmes

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Designing robotics solutions quickly

Ideally, a customer can decide on a suitable robot to handle a specific function, quickly. But the workplace for the new 'assistant' also needs to be designed appropriately. The Machine Planner on RBTX.com, the online marketplace for low-cost robotics, helps designers with complete automation solutions, from robotics to frames to conveyor belts to grippers to safety systems. Price and delivery time are calculated in real time.

Configuring a new robot workstation is usually a complex undertaking because there is more to it than just selecting a robot model. An automated production environment requires the right workplace design which often involves manipulating complex structures in CAD programs. It can be demanding and time-consuming. Firstly, offers need to be sourced from different suppliers via sales. Then the components need to be harmonised to work together. Besides the time it takes, it requires expertise on the part of the customer, who will be responsible for compatibility and function. The process can quickly run to weeks.

For small and medium-sized businesses in the trades or manufacturing industry in particular, this time would be better invested in their own products. With its Machine Planner on RBTX.com, igus® creates a simple solution to enable the quick configuration of robot workstations and machine frames with robotics and conveyor technology. The new free tool is integrated into the RBTX platform, the marketplace for low-cost robotics.

"Our new online configurator for cost-effective automation solutions makes inexpensive robotics accessible to everyone, because the user does not need any design knowledge. The Machine Planner takes over the engineering and combines the robotic components correctly. The tool can be called up easily with a browser," says Alexander Mühlens, Head of igus® Low Cost Automation Business Unit.

The new online tool from RBTX powered by igus® allows users to design robot working environments quickly and without CAD knowledge.

The Machine Planner provides a selection of different machines and application designs. Doors and back panels can be installed with "just a few clicks". The size can be individually adjusted. In addition to feed automation such as conveyor belts or spiral bowl conveyors in the work area, the configurator can be used to select robots from the RBTX marketplace, including accessories such as grippers and linear systems. The solution is fully configured within a minute without any CAD drawings or technical clarification required. A design library on the platform offers additional guidance.

The solution can be adapted to the user's individual requirements. Users benefit from the configurator's speed as well as its transparency: at the touch of a button, the user receives a cost calculation with the corresponding delivery time. Easy-to-understand instructions allow the customer to assemble the application on site. igus® also supplies a CE template.

Quick 3D configuration for individual applications

"I was looking for an individual gluing machine without having to hire an external design engineer for planning and execution. The Machine Planner from igus® enabled me to design my gluing machine with just a few clicks," says Sven Achenbach, CEO of Sigamo GmbH. "The robot is used in production. It guarantees our customers a 100 per cent identical adhesive application on components."

This application is just one of many possible designs that can be implemented on RBTX with the Machine Planner. Gripping robots for bakeries or pick & place applications in industry: the 3D tool is suitable for diverse industries wherever processes can be automated. With the new configurator, igus® is expanding its leading RBTX platform for Low Cost Automation with a new tool in a complete package. Alexander Mühlens sums it up: "Our goal is to make automation possible simply, quickly and cost-effectively. The Machine Planner does that for the customer."

For more information contact igus®.
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and develop the skills needed to succeed in the industry."

Yaskawa's approach to training goes beyond initial skills acquisition and the company also recognises the importance of ongoing professional development for its employees. "We provide continuous mentoring and coaching to our employees to help them set and achieve their career goals," says Coetzer. "Our managers work closely with employees to identify improvement areas and develop personalised development plans that align with their career aspirations and our company's needs."

Coetzer joined Yaskawa earlier this year and is enthusiastic about the impact the academy could have for South Africans keen to learn and the robotics industry as a whole.

For more information contact Yaskawa Southern Africa.
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Visit: www.yaskawa.com

Jan Fourie, Scatec in sub-Saharan Africa.

Powering a sustainable future: Renewable energy and PPAs

South Africa's energy market is currently witnessing a remarkable transformation as it shifts towards renewable energy to combat the persistent loadshedding crisis, and the global impacts of climate change. Jan Fourie, Executive Vice President for Scatec in sub-Saharan Africa, says: "As the world confronts the detrimental effects of human activities on the environment, renewable energy offers a way to address climate change challenges, without halting industry and development."

The national Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has played a significant role in accelerating the growth of independent power producers (IPPs) and expanding the role of private providers in the energy market.

Additionally, recent key legislative changes and the allowance of wheeling for private companies have further contributed to the adoption of renewable energy solutions and expanded the role of private providers in the energy market.

"Big businesses that have signed power purchase agreements (PPAs) with renewables-oriented IPPs have improved their environmental standing by becoming less reliant on fossil fuels and reducing their carbon footprints," Fourie says, noting that with renewable sources like solar and wind, the generation of electricity emits low to zero levels of greenhouse gases.

"Around the world, countries are increasingly ushering in regulatory environments supportive of renewable energy and moving away from vertically integrated power utilities in favour of private providers and PPAs – which often prove more reliable than state-owned providers," says Fourie. "Climate change concerns are driving this transition."

He highlights that in South Africa, current legislation enables businesses to sign power purchase agreements with independent power producers, offering stable and often relatively low-cost electricity without upfront expenses – "a strategy that can relieve the pressure on Eskom, and aid South Africa in reducing our historical over-reliance on fossil fuels," he adds.

The national grid infrastructure allows for wheeling, that is, the transmission of independently produced renewable power through the grid. "Wheeling enables private sector entities – even those based in areas with unfavourable environmental conditions for wind or solar energy generation – to access affordable, reliable renewable energy," Fourie notes.

He envisions a future with nuanced, multilateral PPAs that allow agnostic energy mixes and flexible financing and contracting models. Private sector PPAs could potentially create a new ecosystem of interconnected projects with innovative methodologies and delivery systems.

Power purchase agreements

However, he says entering a PPA for the first time can be complex and requires some careful planning and negotiation. Fourie suggests that businesses need to collaborate with experienced professionals who can guide them through the process and help overcome any challenges.

Scatec has a number of established solar energy plants in the Northern Cape, and more under construction.

"Navigating the business of power generation and the regulatory environment, including environmental, social, and land permitting requirements, is critical for businesses looking to establish energy generation facilities. Working with experienced entities like Scatec offers them smooth navigation of the regulations and action plans," he says.

Fourie explains that PPAs in South Africa must follow the Electricity Regulation Act No.4 of 2006: Electricity Regulations on New Generation Capacity.

"Private power generators must register with NERSA, and the IPP-generated power is sold either directly to a customer or through a trader. PPAs are typically long-term contracts, but recent changes in regulations, technology, and industry enable shorter agreements and shared risk, allowing more tailored PPAs for private consumers," he adds.

He highlights market education as crucial in the ongoing transformation, as businesses may have limited knowledge of the energy market and the potential for cost-effective participation. Scatec, as a leading renewable energy provider, offers its well-established expertise to walk the path with businesses, alleviate fears and misconceptions, and share insights for successful clean energy implementation."

Managing operational risks is equally important. "Renewable energy projects face challenges such as equipment maintenance, vegetation control, and power system management. A risk management plan is a must for businesses planning to own and operate independent facilities. Scatec offers Operation and Maintenance contracts alongside its renewable energy solutions for the life of the project," he says.

He highlights too that in South Africa, private PPAs are governed by various regulations and policies. The country has taken steps to promote renewable energy development through programmes like the REIPPPP and by lifting thresholds for private sector power generation. He says it's important for private entities to understand the regulations and policies applicable to their circumstances, and to obtain the necessary licences and approvals before engaging in a PPA.

As South Africa's renewable energy market progressively aligns with those of other countries, it is driven by the demand for dependable power and a commitment to minimising the country's environmental impact. In Fourie's view, the growth of renewable energy in South Africa's energy market signifies a pivotal moment in the nation's pursuit of a greener, more sustainable future. □

For more information visit: www.scatec.com

Another private PPA secures 75 MW solar

Air Products South Africa (Pty) Ltd (Air Products) has concluded a long-term Power Purchase Agreement with Mulilo Renewable Project Developments (Pty) Ltd (Mulilo). In terms of the agreement, Air Products will purchase up to 75 MW of renewable energy from a dedicated solar farm, which is to be constructed in the Northern Cape. The solar farm will be jointly owned by Air Products and Mulilo. Financial close is anticipated in the fourth quarter of 2023, looking to generation of power supply from mid-2025. The facility will have the capacity to generate about 240 GWh of electricity annually.

The electricity will be supplied by wheeling from the solar farm to Air Products' air separation units in various locations around the country. Air Products Managing Director Rob Richardson noted: "Air separation is an electrically intensive process and electricity is our most important raw material. This agreement is a significant step towards meeting our medium-term goal, which is to reduce fossil-fuel-based energy requirements and CO_2 emissions by one-third by 2030. Once the project is completed, it will get us a long way down that path, with more to come."

Mulilo CEO, John Cullum said: "Mulilo is excited to partner with Air Products on this important project. It will be one of the first large-scale wheeling solar projects in South Africa and will consolidate Mulilo's standing as a leading renewable energy supplier in the country. The project is furthermore an important step in contributing to ending loadshedding in South Africa, where the private sector has the ability to play an important role."

Rob Richardson, Managing Director, Air Products.

John Cullum, CEO, Mulilo.

Wheeling involves the delivery of energy from a generator to an end-user located in another area through the use of an existing distribution or transmission network. It allows privately generated power to be transmitted across the national grid to customers who want it, in a willing buyer/willing seller model. This facilitates renewables-based energy transmission from sites with good wind and solar resources to corporate, industrial and residential customers in locations that may be less suitable to renewable energy production.

For more information contact Air Products.
Visit www.airproducts.co.za.
Or Mulilo
Visit www.mulilo.com.

Managing multiple energy sources in microgrids

Mark Freeman, Offer Manager Digital Buildings, Anglophone Africa
and Nishandra Baijnath, Systems Architect, Power Systems, Anglophone Africa at Schneider Electric

Mark Freeman, Schneider Electric Anglophone Africa.

Nishandra Baijnath, Schneider Electric Anglophone Africa.

As South Africa struggles to find a level of stability in its power supply system, it is encouraging to see how many businesses and homes are moving to renewable and alternative energy sources to help stabilise energy supply for their own usage.

Most of the renewable energy installations, particularly solar installations, are ticking all the boxes when it comes to realistically delivering on the promised returns and transitioning to a greener source of energy. The market is becoming more educated, and the playing field more competitive, as more providers emerge to meet the demands of this burgeoning industry.

For the early adopters, however, those businesses and households that started implementing renewable energy and alternative energy sources after South Africa first experienced its daily loadshedding (for two weeks) in January 2008, there may be some gaps that need bridging.

The fallout following 2008 also saw dramatic hikes in power costs, which further encouraged businesses to use solar and other renewable resources as well as fossil-fuel-powered generators as alternative sources of energy to ensure continuity of business operations.

Fast forward to 2023 and these renewable sources, such as solar arrays are no longer just a valuable cost saver, but also an integral part of keeping businesses running. Coupled with (usually) diesel-powered gensets, they ensure that business can power through the rolling blackouts that have become a daily standard. However, this is also where we hit a snag.

Many of these systems are not equipped to switch over seamlessly from the grid to solar supply without some form of interruption, nor to optimise the use of the genset to reduce fuel consumption.

Schneider Electric's smart EcoStruxure Microgrid Operation power management system provides for the resilience and stability of hybrid microgrid operations.

A real-life example familiar to many of us is when your local shopping centre goes dark for a few minutes every time loadshedding starts, or when the grid supply returns. This is a result of the momentary delay in operation of the automatic changeover unit swinging the load from the grid to the genset – and then back again when the grid supply returns.

A genset is necessary to provide the critical voltage reference for the solar system but in some cases, the PV system does not communicate with the genset to reduce its output when the solar PV system has the capacity to manage most of the load. As well as being a bit unnerving, the interruption in power supply plays havoc with point-of-sale systems, heating, ventilation and air-conditioning systems and other electrical equipment.

New pieces of the puzzle

The older solar or other renewable systems do not include the smart and intelligent system integration that is available today – and their relatively limited functionality does not provide the flexibility required to manage multiple energy sources and handle interconnected loads in the most efficient way.

To be smart, the system must be able to communicate with the devices that are part of it and to manage the energy and power with interconnected loads operating in parallel with the grid or disconnected from the grid in an islanded manner, all in real time.

If the system does not do this, it can result in damaged equipment, interruption in operations and safety issues, and it does not allow for energy generation through the solar system to reduce the consumption of fuel by the genset.

For solar energy to start running immediately, it needs a reference point, and this is where battery backup comes into play. Older grid inverters also need to be replaced with hybrid inverters to allow for the seamless switchover between various energy sources such as solar, batteries and the grid.

In simple terms, a hybrid inverter uses dc power (from the solar panels or backup battery/ies) and converts it to ac power that is usable in the home or any other building that requires electrical energy. Alternatively, it can use ac power from the grid to convert to dc power used to charge the batteries that store this energy in the form of dc power.

The second last piece of the puzzle is battery energy

storage. Due to the variability of solar power generation (as a result of changing weather conditions, for example), it is not always possible to use it as it is generated. Batteries provide a means to store the solar-generated energy for use at a later stage or to facilitate the few seconds' switchover from solar to grid and in turn, from grid to solar.

The last and important piece of the puzzle is power and energy management software. Schneider Electric's EcoStruxure Microgrid Operation power management system, which is located on the respective site, provides the critical edge control needed for the resilience and stability of the microgrid.

It is a real-time system with deterministic algorithms to manage IEDs (intelligent electronic devices) and generators using the local SCADA/HMI and managing the state of operation for islanding and reconnection as required, thus providing supply stability and enabling reduced fuel use.

Furthermore, EcoStruxure Microgrid Advisor is a cloud-based Energy Management System (EMS) that manages the optimal use of energy resources. It features artificial intelligence (AI) for load / generation forecasting using machine learning (ML) and holistic optimisation.

The EMS uses a hybrid approach with cloud and edge functionality for automatic optimisation of DER (distributed energy resources) operation, controlling when to consume, produce or store energy according to the applicable electricity tariff rate, and it provides a web-based HMI for facility and energy managers. This further extends the functionality of the micro grid system to participate, potentially, in demand response mechanisms like virtual power plants.

Schneider Electric's EcoStruxure Microgrid Operation power management system maximises renewable energy use.

- The system is simple, robust and scalable; solutions can be preconfigured for small, medium, or large sites.
- It provides resilience with advanced power management functionalities for load management, load shedding, black start, and load restoration.
- It is compatible with existing microgrid DER control solutions.
- With the addition of EcoStruxure Microgrid Advisor, it offers grid-connected energy optimisation, allowing for dynamic control of on-site energy sources and loads to optimise a facility's energy performance.
- The system is configurable for small and medium-sized sites with EcoStruxure Microgrid Build.
- Importantly, it incorporates advanced cybersecurity features.

With all the pieces of the puzzle in place – the hybrid inverter, battery storage and energy management system – businesses will be able to reap the full benefits of their initial investment in renewable energy as well as reduced fuel consumption and costs, without having to start again. □

For more information visit: www.se.com

Companies are choosing bigger power plant solutions

Reliable and consistent power supply is critical to economic growth in Africa – and this need is leading more companies to install larger power systems. Zest WEG notes that it is seeing more demand for generating plants with capacity of 10 MW and above. The company has supplied many customers with its modular solutions in this power range.

Bernard Mitton, Business Development Consultant at Zest WEG, says it is becoming more common for customers to request proposals for power solutions that exceed 10 MW. In South Africa, this appears to be mainly a response to continuing and variable levels of loadshedding. In other parts of Africa, says Mitton, it is economic growth that is driving demand.

"For many companies that want to grow their output, continuous and reliable power supply is essential," he says. "In recent years, Zest WEG has been designing and installing more of these large power plants for customers across Africa."

Mitton highlights that it is Zest WEG's depth of in-house engineering expertise and technical capability that earns it these contracts. From the generator sets to the transformers, switchgear and containers, the company can provide customers with a full turnkey solution.

"We often propose a modular system that allows the customer to execute a project in phases," he says. "They can begin with the most cost-effective solution and expand the plant as the power demand grows."

Generators ready to be installed in a custom-engineered container solution.

In one of these 10 MW systems, there will usually be eight to 10 generators installed in a containerised solution or a dedicated power plant room. They can generate power at 400 V, to be stepped up by transformer to 11 kV – or power can be generated directly with an alternator output up to 11 kV.

"For a typical 10 MW power plant, we connect the generators to a common switchboard up to maximum 22 kV, to distribute power to the various on-site loads," Mitton explains. "The switchboard solution can be installed in a container, an E-house or a plant room."

The generating units are custom engineered, built and fully tested in Zest WEG's Cape Town generator facility. Testing includes a step load test and the synchronisation of generators to each other – verifying all setpoints, engine performance and efficiency indicators.

For more information contact Zest WEG.
Visit: www.zestweg.com

Solar installation for fruit packing facility

When Bella Frutta, a specialised packing company for apples and pears based in Ceres in the Western Cape, approached African Technical Innovations (ATI) for a solar solution, it sought to secure a system of the highest quality, providing optimum performance. ATI turned to SOLARWORLD Africa to provide high-quality inverters and panels. The installation proved successful and led to a subsequent project with African Solar Installations (ASI) also using the same premium products.

Bella Frutta, which has a workforce of 620 people during peak season and 250 during off season, provides short-term bin storage, packing, finished product storage, and loadouts. The company was relying on two sizable diesel generators to ensure an uninterrupted electricity supply for conveyor belts and storage units. However, escalating power outages and rising diesel costs led it to consider a complementary photovoltaic (PV) installation that could integrate seamlessly with the existing diesel generators. To attain operational stability and meet the demands of the European market, Bella Frutta sought PV modules and inverters of a high standard in terms of quality, performance, and capacity to provide power security.

Kobus Engelbrecht, Managing Director at ATI, was responsible for the first solar installation at the premises. "We contacted SOLARWORLD Africa for two reasons. Firstly, they are our trusted partners and accept only the best in terms of product performance and client service. And secondly, they represent world-leading brands locally. From SOLARWORLD Africa, ATI installed Huawei SUN2000-100KTL smart string inverters, combined with best-in-class PV modules from Hanwha Q Cells, which allowed us to offer Bella Frutta the most efficient solution.

"For the first phase of the project in December 2020, we used two SUN2000-100KTL Huawei inverters and 430 W Q Cells PV modules for the 200 kWp installation. Following the success of the initial installation, including the integration of the existing diesel generators, Bella Frutta decided to extend and increase its solar power generation."

The second phase installation consisted of eight SUN2000-100KTL Huawei inverters and more than 1 MW of Q Cells PV modules – again supplied by SOLARWORLD.

Jandre Engelbrecht, Managing Director at ASI, headed up the second phase installation. "As Bella Frutta was happy with the initial system installed and the solution, tailored to the load profile, provided for energy savings and performed well, we were confident to recommend Huawei and Q Cells again."

He adds, "Huawei has also embraced digital technology, aiming to eliminate unnecessary costs for its partners as it means there are no unnecessary technical call-out fees. The FusionSolar app is practical, user-friendly and frequently updated. I use it to monitor the Bella Frutta installations on the go."

The Huawei management system allows users the flexibility to check the status of the installation and identify problems remotely, reducing the need for manual re-sets and on-site working hours.

Gregor Küpper, Managing Director of SOLARWORLD Africa, comments: "As a business we pride ourselves in offering high-quality products with excellent performance and building trusted and long-term relationships. When our long-term partners, ATI and ASI, recommended Huawei and Q Cells, we knew both projects would yield favourable results for Bella Frutta in terms of quality and cost savings."

Jean du Plessis, Financial Manager at Bella Frutta, says they can generate between 20 and 30% of power needed to run the packhouse. "With the country's energy crisis, we had to consider alternatives to address the risk involved at our packhouse. One option was solar and the other was generators as we need electricity 24/7. Generating our own electricity on-site means we're relying less on the national grid and traditional utility supply to power our business. In effect, the more energy we produce, the more money we save."

Du Plessis notes another advantageous aspect of the panels in terms of maintenance. "We manage fine by cleaning them a couple of times a year at most. They have no moving parts, so there is no wear and tear involved. Once the initial cost is covered, little spending is required on maintenance and ongoing repair work, so users enjoy the savings."

Green initiatives are also high on Bella Frutta's agenda, and the ability of solar power to produce energy without greenhouse gases or water pollution made this route more attractive.

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

Bella Frutta has installed solar PV to provide an alternative energy supply at its packing facility in Ceres.

Digitalisation is key to transforming the power grid

As the world decarbonises its energy systems, there is an accelerated shift from fossil-fuel-based to renewable energy-based power generation, and growing electrification of the transportation, industrial and building sectors.

Malvin Naicker, MD at Hitachi Energy Sub-Saharan Africa, says digital energy management platforms are needed to manage the complex challenges and increasing capacity requirements of the power system transformation. These platforms will enable greater grid resilience, matching fluctuations in power supply and demand dynamically.

Cybersecurity

A significant aspect of resilience is cybersecurity. The world needs a cybersecure ecosystem for a resilient electric future. Energy is among the top three target sectors for cyberattacks globally. As energy grids become more resilient through digitalisation, attention must be given to the design and implementation of cybersecurity.

Utilities in South Africa are becoming increasingly aware of the advantages of outage management software solutions to manage the supply to their customer base. Some municipalities are using supervisory control and data acquisition (SCADA) and distribution management systems (DMS) to better manage their networks.

Self-generation and energy efficiency

With changes in the statutory regulations and technology, large power users can now generate and use their own electrical energy. As this self-generation becomes more prevalent, users will start to trade power with each other, with the grid being the trading platform for such exchanges. Sophisticated software solutions are needed to manage electricity trading and these are available, allowing for the real-time exchange of power between users and settlement of the respective commercial transactions.

With the continuing development of self-generation systems under way, it is also important to note that it is easier and cheaper to save a kWh of demand than to build new generation capacity to cater for that demand. Improved energy efficiency is essential to comprehensive decarbonisation. Digital solutions available today also support the implementation of energy efficiency, by identifying where energy is being used and what needs to be done to use it more efficiently.

Additionally, solutions such as low-loss transformers enable better use of electrical energy. Even small electrical losses in transformers add up over the lifetime of the equipment, resulting in significant carbon emissions and wasted power that could be saved by more energy-efficient transformers. Furthermore, transformers contain large volumes of material and, through intelligent design and use of material, can be made more sustainable.

Grid connection solutions

As the power generation landscape evolves in South Africa, the demand for grid connection solutions is increasing. It has taken many decades to build the power grid that exists today. There is not enough time to meet the demand for new offtake and grid integration solutions unless new solutions such as prefabricated substations are considered to speed up the deployment of grid connections.

Smart grid solutions consist of three basic components: the devices to collect data and control the grid, the communications network that connects the devices together, and the software solutions that enable management of the grid.

The Internet of Things (IoT) has enabled smaller, cheaper devices that can be used more easily and more deeply in power networks. Distributed on-site smart meters can support demand and outage management.

The drive to decarbonisation is creating the need to optimise energy both locally and system-wide, leading to a complex 'system of systems' that needs to be integrated and managed. Digitalisation is the only way to manage this complexity, simplifying the contextualisation of massive amounts of data. However, this needs to be balanced with managing and optimising today's operations. Hitachi Energy can help customers navigate the increasingly complex energy landscape. It has the combination of connected products, software-based solutions and digitally enabled services to solve real-world challenges and add real value.

For more information visit:
https://www.hitachienergy.com

Digitalisation is the way to manage the complex challenges of transforming the grid and integrating increased capacity.

Energy efficiency in injection moulding machines

With energy prices rising steeply, plastic injection moulding companies like automotive components, technical and packaging manufacturers are relooking the sustainability of their operations to introduce energy efficiency wherever possible.

Traditionally, the power consumption of a typical injection moulding machine is less than 50% of the total consumption of the entire plant, according to Marcus Visser, Strategy and Operations Executive at GreenTech Plastics Machinery.

"When we look at energy efficiency, we need to consider the entire injection moulding system. Our aim is to find the most efficient solution for our customers' requirements," Visser says. Combined with integrated temperature control solutions and intelligent device communication, ENGEL technology from GreenTech can help customers save up to 67% in electricity costs and significantly reduce carbon dioxide emissions.

In recent years, ENGEL engineers and developers have reduced the power consumption of its injection moulding machines substantially. Servo-hydraulic machines already consume less than 60% of the amount of power used by a hydraulic injection moulding machine with a variable pump. On average, power consumption can be more than halved using all-electric injection moulding machines.

"In supplying our customers with injection moulding machines, we have defined efficiency packages," Visser adds. The packages include integrated temperature control and smart assistance systems to reduce power consumption by an additional 20% on average.

Other technical constraints such as accessibility, precision requirements or available space, must also be considered. "An overall view is needed to find the best solution and to reduce the power consumption and carbon dioxide emissions of injection moulding machines," he says.

GreenTech holds various agencies for all ancillaries related to injection moulding to ensure production lines run smoothly and optimally. "We enhance the injection moulding value stream in any factory where injection moulding is used. Knowing they have access to the best technology and service in this field, our clients can focus on their core business," he adds.

GreenTech's major market In South Africa is the automotive industry, one of the most advanced of its kind in the world, with major OEMs manufacturing vehicles locally for export. "The demands in terms of automotive injection moulding solutions are particularly stringent due to the global standards to which all the major OEMs have to adhere," says Visser. These relate to the quality of all components, maximum availability of the production systems involved, and stable processes.

As well as the automotive industry, GreenTech supplies solutions to the technical and packaging industry. Here, the latest trends in plastic injection moulding focus on recycled material or the percentage of recycled material in components or manufactured products, in addition to reducing energy consumption and the impact of digitalisation. "The automotive industry is also looking at boosting recycled content within its processes," adds JC Jonker, Head of Sales and Projects at GreenTech.

GreenTech imports, installs, and services best-in-class European-designed plastics machinery and ancillary equipment.

"Energy efficiency and digitalisation go hand in hand," Jonker says. ENGEL is a global leader in AI developments in plastic injection moulding to cut costs and reduce energy consumption. Another aspect of incorporating AI is to generate sufficient data to be used to optimise production processes and iron out teething problems in integration.

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Managing e-waste: How to dispose of old appliances

e-Waste from electrical and electronic appliances and devices is becoming a major problem for South Africa. According to the Gauteng government website, the country produces around 360 000 tons of e-waste every year, with the province accounting for 55% of that.

Patricia Schröder, spokesperson for the official producer responsibility organisation (PRO) Circular Energy says, "If we are to avoid an environmental catastrophe, consumers need to be better educated on how to dispose of their appliances properly."

New Extended Producer Responsibility (EPR) legislation puts the onus on importers and/or manufacturers of these electrical and electronic products to ensure environmentally sound management of their products – which could include recycling of their products. However, this could be severely hampered if consumers don't know what to do with their old appliances.

e-waste includes most electrical and electronic appliances or devices found in the typical South African

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High-efficiency industrial UPS system

AEG Power Solutions (AEG PS), a global provider of power systems and solutions for critical and sustainable applications, has introduced a new range of uninterruptible power supply (UPS) systems, which feature a full IGBT (insulated-gate bipolar transistor) architecture and industrial-grade built quality. The UPS systems are designed to provide safe power backup to protect refining and petrochemical industries, transportation infrastructure, manufacturing and other critical businesses against power disruptions.

Protect 8 PLUS supports a standard three-phase input and is available as single-phase or three-phase output from 10 to 40 kVA, with 216 Vdc or 384 Vdc battery voltage. By the end of the year, it will also support 60 to 120 kVA in both configurations.

With its IGBT rectifier, the system offers a high input power factor of up to 0,99 and very low harmonic current rejection on the input side (THDi/total harmonic distortion current), which makes it a good fit in situations where the UPS is supplied by a generator set or to avoid harmonic perturbations of loads connected to the upstream busbar. This allows for substantial savings on the sizing of the upstream network. The bi-directional rectifier also enables several battery capacity tests feeding back into the grid without using the bypass line, requiring additional load banks, or affecting the load.

With the Protect 8 PLUS, AEG Power Solutions brings a new pre-charge system (patent filed) to the market, in a UPS that generates a very low inrush current of less than two times the nominal current to optimise the upstream protection.

Protect 8 PLUS offers optimum performances with the built-in static bypass switch, providing a short-circuit capability of up to 1 000% for 50 ms, which is important for petroleum industry applications. On the inverter side, it provides notable output short-circuit clearance when the bypass line is not available. This allows for selective tripping of the faulty load and keeps the other lines working to ensure higher availability and safety for the load. Overall, the system achieves up to 90% efficiency in double conversion operation with input and output galvanic isolation.

Protect 8 PLUS UPS systems are designed to provide safe power backup in harsh industrial environments.

AEG Power Solutions has also improved the maintainability in the UPS system, to enable easier and faster servicing. All important components like power stacks, control electronics and capacitors are accessible from the front and the fans can be replaced without having to switch off the unit.

Protect 8 PLUS features standard output galvanic isolation and n+1 fan redundancy and surpasses the latest JIP33 requirements from the International Association of Oil & Gas Producers (IOGP). This and the optional IP43 certified cabinet make it a suitable solution for harsh environments in heavy-duty industries.

For more information contact AEG Power Solutions. Visit www.aegps.com

Continued from page 18

household or business: domestic appliances, power tools, digital devices and computers, electricity generation and storage devices, lighting, reusable and disposable batteries, cables and the like.

Schröder highlights that such appliances and accessories should never be disposed of in standard refuse bins, dumping grounds or landfills. They are likely to contain materials that are potentially explosive, poisonous or otherwise hazardous to people and animals, and will contaminate the ground and surrounding areas as they break down. Additionally, householders and businesses should be wary of companies that encourage them, as consumers, to take their appliances to a 'smashing centre' or to break an appliance with a bat for fun. This is clearly an unhealthy and unsafe practice and it is not legal in terms of the National Environmental Management Waste Act of 2008 and could result in fines.

"Electrical and electronic appliances require specialised handling, recycling and treatment by suitably qualified organisations, within safely isolated environments," Schröder says. In addition, she notes that e-waste lost to landfill means that scarce resources which could have been harvested and recycled need to be mined afresh.

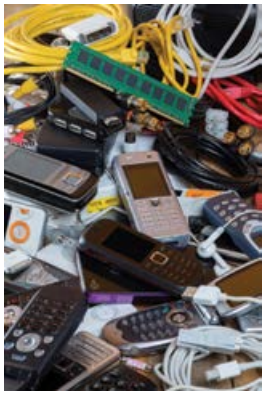
Responsible disposal

Of course it is easier to throw an old appliance in the municipal bin or skip – but there are alternatives that are far safer and more environmentally responsible. Circular Energy offers a dedicated collection service for used or waste electric or electronic equipment, lighting or lighting equipment, and batteries. From the Circular Energy website, visitors should navigate to the 'click to collect' button to arrange for the collection of their e-waste.

As EPR legislation becomes entrenched in South African industry and the retail sector, consumer education and involvement will be key to controlling e-waste. It is also important that a two-way supply chain should be established to ensure that disposal of e-waste is as easy and intuitive as buying an appliance in the first place.

"There's still a lot of work to be done towards achieving that, but consumers can contribute now by making full use of the avenues already available to them," says Schröder.

For more information visit: www.circular-energy.org



All electrical and electronic devices need to be disposed of safely via specialised e-waste facilities.

Manual checking of the levels of heated asphalt in the 55-foot-high storage tanks became arduous and risky, especially in the winter months.

Reliable measurements in asphalt storage tanks

A major manufacturer of roofing and insulation products in Alberta, Canada, produces asphalt shingles at one of its plants in Calgary. In this plant, the company maintains four 55-foot-high (about 18 metres) heated asphalt storage tanks. The plant uses level sensors to help keep track of the amount of asphalt in the tanks in order to manage inventory as efficiently as possible. However, the level sensors in use had proven problematic – making it difficult to obtain reliable readings and without the required level of service or support being provided. That was when the company approached VEGA for a solution.

VEGAPULS 6X provided the solution, meeting the needs of the application.

Malfunctioning measurement instruments

Level measurement is a critical function of most manufacturing operations, as it is in the production of asphalt shingles. When stakeholders and plant personnel have a clear picture of their inventory, they can keep processes running as efficiently as possible without the fear of detrimental events like overfills. Malfunctioning level sensors can be inconvenient at best, and in some cases can be disastrous.

In the case of the shingles manufacturer, when the sensors malfunctioned plant personnel had to take on the task of level measurement themselves. This meant climbing up on the asphalt tanks to check the product level manually. Not only are manual measurements generally less precise than those obtained through purpose-built level sensors, they also can be risky. In this case, climbing the tanks required more safety precautions, especially during winter months when snow would cover the ground and steps leading up to the tops of the tanks. These risky climbs came to be too frequent when the company did not receive service or support to deal with the malfunctioning sensors, so it sought a new sensor supplier.

Reliability and safety in VEGAPULS 6X

When the company contacted VEGA, experts from VEGA assessed the shingles manufacturer's heated asphalt tanks to determine what level measurement solution would best fit its needs. A suitable sensor would need to stand up to the high temperatures of the asphalt vapours and be resistant to the build-up caused by the vapours. Additionally, the tanks required a maximum measurement range of at least 60 feet (>20 metres) from the mounting location that was already in place above each tank.

VEGA's latest non-contact radar sensor, VEGAPULS 6X® provided the solution. The VEGAPULS 6X is designed to meet the needs of any level measurement application; each sensor is built according to the needs of the application. VEGAPULS 6X can withstand process temperatures as high as 450°C (842°F), well above the temperature output of the asphalt vapours. And with regard to the measurement range, VEGAPULS 6X would easily have the reach for 60 feet down, as it tops out at a maximum distance of 393 feet (120 metres). When presented with the benefits of VEGA's sensor, the company agreed to place one on each of its four asphalt tanks.

Service and support

Although the malfunctioning sensors the company had previously used had caused major issues, some of those challenges could have been avoided if it had received the required service and support for the ailing equipment. To ensure it had found a level measurement partner that would be able to offer better service and expertise, it entrusted the commissioning and setup of the new sensors to VEGA service personnel. This would be a good testing ground for VEGA's service: the company needed the new sensors swiftly, so commissioning and setup would need to be done as quickly as possible. VEGA proved up to the task.

VEGAPULS 6X is designed to be simple and intuitive, from the point of purchase to use in the field. And with PLICSCOM, VEGA's display and adjustment module, setting up multiple sensors is straightforward. A VEGA representative set up the first VEGAPULS 6X and copied its settings using a PLICSCOM module. From there, the settings simply needed to be pasted to the other three VEGAPULS 6X units in the tank farm. With the intuitive setup features, all four sensors were up and running within an hour.

Meeting the customer's needs

Equipped with VEGAPULS 6X sensors and backed by the support of VEGA's expert service team, the company now enjoys a clearer view of its asphalt inventory, allowing it to run the plant and produce shingles more efficiently than before. The high precision of VEGA's sensors is matched by their high reliability, so plant personnel do not have to worry about climbing up slippery steps in the cold of winter to make level measurements. VEGA's easy-to-use instrumentation gives users the confidence to operate and configure their level measurement sensors to best fit their needs. And with VEGA's robust support options backing them, the shingles manufacturing company need have no concern about being stuck with malfunctioning equipment. That is what makes VEGA the partner of choice for many companies in the building materials industry and others looking to optimise their processes.

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Indoor farming – an alternative in agriculture

In automated indoor farming a lot of variables need to be measured to inform system optimisation and achieve high yields.

Feeding the world's population despite limited resources is an enterprise that traditionally has required ever more arable land and fresh water. Highly automated vertical farms could offer an alternative for the future of agriculture.

Here, the food is grown indoors so the yield is protected from pests, pathogens or bad weather. At the same time, this type of cultivation reportedly requires 95% less water than traditional agriculture, and fertilisers are used at exactly the right dose. There is no need for pesticides and other polluting substances in indoor farming. And another advantage of this type of cultivation is that vertical farms can be built in the vicinity of cities, enabling savings on logistics costs and reduced CO_2 emissions as a result of lower transport requirements.

The challenge

For indoor farming companies, plant growth needs to be accurately controlled and in order to achieve a high degree of automation, a lot of variables need be measured. On the basis of these measured values, the system can be optimised to maximise crop yield.

Modern vertical farms require a system combination of hardware, automation, intelligent controllers and sensors. Process control and data acquisition are becoming increasingly complex and a conventional system design requires a considerable amount of programming and integration. Each indoor farm has hundreds of I/O signals on its individual vertically stacked layers and in conventional control and automation systems, these would be routed back separately to the controller. Accordingly, maintenance work, troubleshooting and the replacement of sensors becomes very time-consuming. Hence, better and smarter solutions are sought for new projects.

The solution

A variety of different process sensors are used in indoor farms: flowmeters for water and nutrient dosing, pressure sensors to monitor the water level, conductivity sensors to check the concentration of minerals, and sensors to control the pressure at the pumps. Connecting all sensors via IO-Link field modules reduces the complexity of process control and makes more data available from each sensor, thus reducing the overall number of sensors needed.

Recipe changes and design adaptations arising from ongoing innovations are easy to implement using digital communication. The entire setup process – from physical wiring to integration and programming – becomes much more efficient.

With the help of IO-Link technology, customers can standardise their systems and individual modules, so vertical farms can be scaled as needed. This means future projects can be implemented more easily and set-up is accelerated. Customers value ifm as a technology partner that can help them improve all their applications.

Sensors from ifm can also be used in the automated harvesting process; image processing, position sensors and RFID are just a few examples – and here, too, ifm can provide optimum support.

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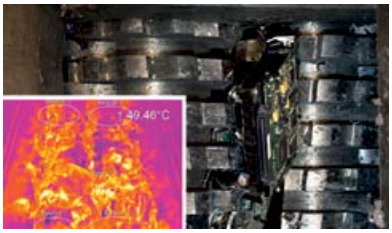
Fire protection in scrap metal recycling



The Optris IR camera detects critical temperatures and reliably signals an alarm to prevent the risk of fire.

Instrotech, the local representative for Optris, highlights the use of Infrared cameras and IR measurement technology as a means to provide fire protection in high-temperature and potentially high-risk industries like scrap metal recycling.

A shredding facility handling scrap metal typically operates unmanned for extended periods of time and has on site, recognised risks for starting a fire: heat, fuel sources and oxygen. The friction of the scrap generates heat that, together with oxygen, can ignite flammable liquids like fuels, oils, and grease, already on the premises, as well as materials such as paper and cardboard.

In unguarded facilities, a fire can spread quickly before being detected. Metal shredding plants are often located in less fortified production halls and thus present increased risk of personal injury and machine damage if a fire does start.

Optris offers a solution with IR cameras in its Xi/ PI series. At an early stage the cameras will detect increased temperatures in shredders, which could lead to a fire, and will reliably signal an alarm to avoid dangerous situations.

For example, the latest solution from Optris, the compact IR camera Xi 410 works fully autonomously. In an alarm situation, the sensor independently sends signals to process instances that can, for example, shut down the motor or disconnect the power supply to affected shredders.

Features such as the motorised focus and integrated auto hotspot finder make rugged and compact imagers like the Xi 410 ideal for safety-related applications, especially in preventive fire protection and condition monitoring of machinery and equipment. The optical components of the infrared cameras can be kept clean effectively in harsh environments by using air purge sleeves.

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Predictive maintenance for port cranes motors and gearboxes

The global port industry is experiencing significant growth and more businesses, using large cranes to move shipping containers, are turning to automated solutions to predict if motors or gears are beginning to fail. The cranes used to move shipping containers can be dangerous and the harsh environmental conditions in which they operate – extreme temperatures, vibration, and unpredictable weather – can cause them to break down or underperform. Most operators and crane employees need to dedicate a lot of their time to check on rotating parts and machines manually to ensure they are working properly and these manual checks cut into the overall production time.

Recently, an Australian port operator worked with Turck Banner Australia to find a solution to monitor the electric motors and gearboxes on the boom and hoist of ship-to-shore (STS) cranes throughout the port facility. The company needed a way to monitor vibration and temperature levels so the components could be serviced before they failed completely, causing excessive downtime and repair costs.

Port monitoring applications typically present many challenges that ordinary sensors cannot solve. The outdoor environment presents unpredictable weather, and the facilities may cover large areas of land. Ports use large and heavy machines, which create high levels of friction and vibration, causing equipment to deteriorate quickly.

Downtime or slow performing machines significantly affect a company's effectiveness and ability to support the growing global demand for shipping services. To prevent this from happening, port operators need to perform a manual inspection of the cranes routinely, to make sure they are in proper working order. The manual check is not ideal because ports are generally quite big so an inspection takes a long time to complete and prevents operators from doing other tasks that would improve the company's throughput and effectiveness.

Turck Banner's wireless products were found to be an effective solution for predictive maintenance at the ports. The large outdoor area cannot be wired easily, and wireless products offer the advantage of covering multiple units over a large area. Predictive maintenance allows for the monitoring of changes in machinery performance and allows for corrective action to be taken before bigger issues arise, saving companies time and money by preventing downtime and the need for emergency repairs.

Using sensors with wireless connectivity to monitor changes in machinery performance allows for corrective action to be taken before bigger issues arise.

The QM30VT wireless vibration and temperature sensor connects to a battery-powered Q45 wireless node to monitor the motors and gearboxes. The Q45 wireless nodes are paired with a DXM Series wireless controller to collect and interpret the values received from the vibration and temperature sensors. The controller can also be set up to regulate TL70 tower lights that are used to notify the port's maintenance team. If the vibration or temperature exceeds safe thresholds, the TL70 will alert the maintenance team to take appropriate action before the problem becomes worse. These set thresholds can be easily adjusted on the DXM controller.

Wireless products and battery-powered devices make installation easy, and the elimination of cables keeps the area free of clutter, especially those zones that may be harder to reach. Turck Banner offers a range of wireless products that are simple to use and include pre-defined I/O mapping between two devices. The DXM Series controller is also scalable and can communicate with up to 47 sensors or nodes, which makes it suitable for changing needs.

Turck Banner sensors are manufactured to be rugged and durable, ensuring they can withstand high vibration, temperature changes and work well in demanding environments. The sensors allow for simple installation and operation; reduced wiring allows for easy mounting, and the sensors incorporate an intuitive setup design. In the case of the port operator, all these factors ensured that the customer received a solution that could withstand the environmental conditions and significantly decrease downtime by using predictive maintenance.

Turck Banner's Q45 photoelectric sensors, its QM30VT vibration and temperature sensors, and DXM Series wireless controllers were used in the port installation.

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Smart asset management in tackling water scarcity

With hundreds of measurement devices of different types and ages typically fitted in a water treatment plant, it can be challenging for operators to manage every single one to ensure they are working at their optimum. Sabyasachi Bhattacharyya of ABB Measurement & Analytics, explains how smart asset management systems can address this challenge and help deliver the accurate measurement performance needed to manage water supplies more sustainably.

The prospective problem of water scarcity is increasingly leading to a search for new ways of managing the world's water more sustainably. A combination of extreme weather, outdated or inadequate infrastructures, and insufficient investment has meant that growing attention is being paid to the way water is being used, even in countries that traditionally have been accustomed to having abundant supplies available. Of particular concern is the United Nations' estimate of a potential global water deficit of 40% by 2030[1], as demand substantially outstrips the earth's finite available supplies of freshwater. Already, some 2.2 billion people do not have access to safely treated water supplies, and 4.4 billion live in areas with little or no sanitation[2].

With the global population estimated to increase by a further two billion by 2050[3], new means and methods need to be found to improve the way in which water is managed, from the production of potable water to the discharge and reusability of wastewater. Much of the potential solution lies in the hands of the world's water utilities, which are coming under mounting pressure to optimise their supply and treatment infrastructures to help maximise the amount of water available.

Water treatment, typically entails multiple processes and requires multiple measurement instruments, monitoring a variety of parameters.

Smart asset management systems, with the ability to collect and monitor data in a unified environment and in real time, have the potential to transform plant and process performance.

Improvement starts with measurement

Whether it's producing safe, high-quality water for drinking or returning industrial effluent to a state suitable for discharge into the environment, treating water is a complex business comprising multiple processes. The interdependent nature of these processes, coupled with targets and regulations relating to potable and wastewater quality, makes it essential to ensure that each process is working at an optimum level.

This requires large numbers of instruments and analysers measuring a wide variety of parameters, many of them on a continuous basis. Parameters measured can encompass pressure, temperature, flow and level as well as pH, conductivity, dissolved oxygen and turbidity, plus chemical and mineral concentrations such as chlorine, fluoride, aluminium and iron. Other instruments might also include positioners, which are used to control valves in pumping and dosing applications.

As well as measuring the quality of the water being treated, the instruments and analysers help operators to assess other crucial areas of performance such as efficiency, energy consumption and potential maintenance requirements of the equipment.

Using measurement as a way of determining plant performance and the long-term accuracy of instruments and analysers is especially valuable. Typically, many water treatment plants will have a lifespan of 40 to 50 years, with much of the treatment equipment, including some measurement devices, lasting for around 20 years. Consequently, much of a site's installed base of instruments and analysers will tend to be of mixed ages, with different levels of technologies, different communications standards, and possibly, different operating principles.

Smart asset management systems offer organisations the potential to shift from preventive maintenance strategies to a predictive maintenance approach.

Managing such a diverse mix of devices, which can number into the hundreds or even thousands on very large sites, can be very challenging for industrial operators. This is where smart asset management systems can help.

In terms of measurement accuracy, regulatory compliance, operational status, and failure diagnosis and prediction, each field device is required to perform optimally. This is critical for all industrial processes, including many of those in the water industry, especially where a mistake could impact on the safety or quality of treated water.

Many devices will have a wealth of data that could be used to help optimise plant and process performance, if the data could be unlocked and made available. However, the proliferation of different technologies used for communicating instrument performance, including Profibus, Modbus, Foundation Fieldbus, HART, 4-20 mA and most recently Ethernet, has traditionally made it difficult for operators to gain an overall picture of what's happening in the processes or to make use of the full value of instrument data in helping to guide maintenance.

Smart asset management can help

With the ability to collect and monitor data in a unified environment, smart asset management systems have the potential to transform plant and process performance through enhanced instrument performance.

Developments in integrating field devices mean that data from different devices using different protocols can be brought into a single environment where key indicators, such as calibration, can be checked and verified against the device's original settings to ensure accuracy is being maintained, and any deviations or faults are flagged for attention.

Hence, smart asset management systems offer organisations the potential to shift from preventive maintenance strategies – where equipment is maintained according to a preset schedule – to a predictive maintenance approach built on a picture of actual performance using real-time data. Unlike preventive maintenance, where there is no way of knowing the true condition of a field instrument or its parts until an intervention is made, predictive maintenance using instrument data enables operators to identify and rectify potential problems before they manifest.

Using a smart asset management system as the basis for a predictive maintenance strategy presents several benefits. In comparison to anecdotal evidence, assumptions, or abstract observations that can influence preventive maintenance efforts, the ability to gather and check instrument data in real time provides evidence of what is actually happening, significantly reducing the risk of misdiagnoses or incorrect conclusions, which can waste engineering resources in incorrect or unnecessary maintenance.

Being able to access the data from field devices also helps to equip engineers with the knowledge they need to fix a problem before arriving on site. Countries worldwide are facing a shortage of engineers as many approach or reach retirement age (in the US, 30 to 50% of water industry workers will be eligible to retire in the next decade[4]) and this means technologies that enable engineers to work more smartly will become increasingly important in ensuring the efficient deployment of engineering resources to carry out essential maintenance tasks.

Another benefit is in supporting regulatory compliance. In key areas such as potable water quality and effluent discharge, where stringent regulations apply, smart asset management systems help ensure that instruments are properly calibrated and maintained to achieve the measurement accuracy needed to meet compliance requirements.

Making smart asset management work

Like any system, a smart asset management system is only as good as the sum of all its parts. A good smart asset management system should consider how data will be collected, and how it can be shared to deliver maximum value.

As an example, ABB's SmartMaster verification and condition monitoring platform draws together operational, engineering and information technology platforms and data to connect the physical and digital worlds in industrial applications. Using the platform, the status of entire fleets of devices can be monitored continuously from anywhere at any time. This provides for the early detection of potential failures, the ability to verify performance of instruments against their calibrated settings, and the ability to check and predict lifecycle performance, among other benefits.

One of the major benefits is the ability of the system to enable sharing of data, addressing the problem of siloing that has traditionally been a characteristic of the water industry. Engineers can access device data via phone, tablet, or other devices, with all status data displayed as a simple health status message using the NE107 NAMUR standard, rather than complex error codes.

A choice of on-premises or cloud solutions also provides users with the option of either managing their own data with remote support or having it managed on a secure platform by ABB.

Towards a more measured world of water

The ability to measure accurately what is happening in a process and apply that information to optimising plant performance is key to achieving the improved water management needed to tackle water scarcity, now and into the future.

Smart asset management enables this by constantly monitoring device performance and ensuring the data can be used when, where and by whom it is needed. Thus, it provides a route to help water utilities move towards optimising their supply and treatment infrastructures and to managing water more sustainably. □

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For more information visit: www.abb.com

Online condition monitoring

Any industry's success depends on the reliability and efficiency of its equipment. The more productive and reliable the equipment, the more efficient and profitable the operations become. However, the maintenance of machines can be a significant challenge. Traditional maintenance methods are often time-consuming and costly and can result in unexpected downtime impacting a company's overall productivity. Prei Instrumentation's online condition monitoring systems address these challenges with an alternative route to equipment maintenance and increasing operational efficiency.

Online condition monitoring is an advanced technology using sensors and software to monitor equipment and detect potential failures before they occur. Prei Instrumentation's online system continuously monitors the condition of equipment and when an anomaly is detected, alerts are sent to the maintenance team, who can then take corrective action. This helps prevent unexpected downtime, reduces repair costs, and extends the life of the equipment.

The online condition monitoring system is versatile and can be used across various industries, including mining, oil and gas, manufacturing, and transportation. It can be used to monitor critical components such as bearings, motors, gearboxes, and pumps and provide real-time data on their condition. This enables the maintenance team to detect and correct problems before they escalate into costly failures.

The system is particularly beneficial for remote locations where accessing equipment can be difficult. In such situations, the online system can be accessed remotely, allowing the maintenance team to monitor equipment from a central location. This saves time and money and reduces the need for site visits.

Providing real-time data on the condition of equipment, online condition monitoring supports efficient predictive maintenance.

Another advantage of the online monitoring system is its ability to collect data over time. This historical data can be used to identify patterns and trends, enabling the maintenance team to predict when maintenance will be required and plan accordingly. In turn, the need for reactive maintenance can be reduced and efficiency of the maintenance schedule increased.

The system's software is user-friendly, and the data can be accessed from any device with an internet connection. In addition, the software visualises the equipment's condition, making it easy to interpret and understand. This helps the maintenance team make informed decisions and take appropriate actions.

With these benefits, Prei Instrumentation's online condition monitoring system presents a valuable investment in plant maintenance.

For more information contact Prei Instrumentation. Visit: https://prei.co.za

Moses Lelaka, Technical Water Lab Manager at WearCheck Water in Johannesburg.

Water analysis is essential for safe drinking water

Access to safe drinking water is a privilege not shared by everyone in Africa. Often, drinking water is contaminated – by damaged infrastructure and distribution systems, breakdowns at treatment facilities, rapid urbanisation, or general water pollution. In South Africa, this means many people are obliged to turn to groundwater.

However, to avoid disease and ill health, it is important to ascertain whether the groundwater is fit for human consumption.

Condition monitoring specialist company, WearCheck, recently integrated its sister company – previously Set Point Water Laboratories, now WearCheck Water – into its operations, adding another service to the company's repertoire.

WearCheck's range of condition monitoring services also includes the scientific analysis of used oil and other fluids, asset reliability care (ARC), transformer oil testing, lubricant-enabled reliability (LER) services and advanced field services (AFS), (rope testing, technical compliance and non-destructive testing), among others.

Thelma Horsfield, General Manager of WearCheck Water, highlights that the company is ISO 17025:2017 accredited and tests water from any source. "We conduct analyses on water from many sources to determine the presence and levels of potentially harmful substances. Naturally available ground- and surface water are invaluable water sources that should be closely monitored when they are being used. The South African Bureau of Standards (SABS) national standard SANS241: Drinking Water Quality, sets out the minimum requirements for safe drinking water and is reinforced in the National Water Act." WearCheck Water operates two ISO 17025-accredited laboratories – one in Cape Town, the other in Johannesburg. Technicians at the laboratories conduct scientific analyses of water samples for a range of clients in different industries from across Africa.

Moses Lelaka, WearCheck's Technical Water Lab Manager in Johannesburg, explains some of the quality systems that govern the water-testing process.

"SANS241 sets out the minimum requirements for potable water to be considered safe for human consumption, covering physical quality, chemical components, heavy metals levels, organics and microbiology. Additional determinants for nearby pollutant influences must be added to SANS241. For instance, where agriculture is practised nearby, checking for fertiliser contamination should be included.

"However, we find that although annual testing in terms of SANS241 determinants is generally followed by water providers, more regular monitoring programmes are often lacking. Daily, weekly, and bi-weekly monitoring, based on the number of people serviced, is often overlooked.

"Monitoring is invaluable in that it signals environmental changes in the water table that can occur quickly due to seasonal changes, rainfall, drought, heavy industry, agriculture, natural disasters, or other factors. Responsible monitoring signals any changes in water quality before they present any harm to life."

Lelaka emphasises that due to the many and varied sources of potential contamination which can severely affect people's health, it is imperative to test drinking water before it is distributed for consumption. He adds that it is equally important to determine the safety of industrial effluent, to ensure it is disposed of in an earth-friendly way.

WearCheck offers water analysis services in every region in Africa where the company has a presence: in South Africa, Zambia, Zimbabwe, Ghana, Namibia, Mozambique, and the DRC.

For more information contact WearCheck.
Tel: +27 (0)11 923 7028
Email: marketing@wearcheck.co.za
Visit www.wearcheck.co.za

High-efficiency OES analysis of metals

SPECTROLAB S is designed to deliver highly accurate OES analysis of metals, quickly.

SPECTRO Analytical Instruments has recently introduced SPECTROLAB S, to deliver higher efficiency OES analysis of metal alloys with greater economy.

A leader in developing high quality OES (optical emission spectroscopy) instruments, SPECTRO has fine-tuned its solid-state detectors using proprietary CMOS+T technology to set a new benchmark in high-end arc/spark OES analysis. SPECTROLAB S provides highly accurate results in under 20 seconds (in low-alloy steels, for example) and analysis of the main alloying elements in some key metals in under 12 seconds (iron, aluminium and copper materials, for example).

The instrument's efficiency and economy have been continuously improved by systematic 'voice-of-customer' inputs and rigorous usability testing. Now, a fully reimagined software suite adds more functional and customisable ease of use. Argon consumption is reduced by up to 50% in standby mode and by 13% during full-flow operation when measuring samples (compared to previous models). Trace limits of detection (LODs) for high-purity copper are improved by 30%.

SPECTROLAB S is designed to supply quick measurements, high throughput, lowest limits of detection, longest uptime, and flexibility going forward. The instrument will serve primary and secondary metal producers, automotive and aerospace manufacturers, and makers of finished and semi-finished goods, well.

For more information contact SPECTRO.
Visit: www.spectro.com

A high-performance multi-product calibrator

Fluke, a global technology leader in the manufacture of compact, professional electronic test and measurement tools and software and locally represented by Comtest, has introduced the Fluke 5560A High-Performance Multi-Product Calibrator, which provides for broad electrical workload coverage and high accuracy.

Meeting demand at the high end of the multi-product calibrator market, the 5560A joins Fluke's product range under the high-accuracy, multi-function 5730A calibrator designed for calibrating 8.5-digit resolution DMMs (digital multimeters). The 5560A is an ideal solution for calibrating up to 6.5-digit DMMs.

A new class of multi-product calibrator

With demand for calibration growing annually, the Fluke 5560A defines a new class of multi-product calibrator, catering for new and inexperienced workers joining the calibration business without much training. Key features of the new calibrator include a large 7-inch display with an intuitive touchscreen for ease of use, Visual Connection Management™ terminals and an optional accessory for efficient digital multimeter calibration with minimal or no lead changes. The rugged and portable calibrator can also be automated using MET/CAL™ Calibration Management Software.

Among the key benefits for users are the minimal training requirements, reduced maintenance, and the ability to calibrate a broader range of equipment using a single calibrator. These all contribute to reductions in the cost of ownership for calibration laboratories. The 5560A is also protected against damage caused by incoming voltages or overload conditions.

In its aim to offer calibration laboratories the next generation of advanced tools, Fluke Calibration has also launched the 5550A Performance Multi-Product Calibrator, which enhances the popular multi-product 5522A to provide a better match for a customer's existing DMM workloads. The 5550A improves the accuracy delivered by the 5522A 5.5-digit DMMs and offers greater functionality. Featuring an intuitive graphical interface, it can calibrate the most popular handheld DMMs with better test uncertainty ratios (TURs) and clamp meters to 1 500 A with continuous current output (30 A).

Calibration on-site and in the field

The 5540A Multi-Product Calibrator is another new addition to Fluke Calibration's range. It extends the capabilities of the 5502A with better performance levels, making it an ideal solution for on-site or mobile calibration in the most demanding field instrumentation workloads. The 5540A is suitable for calibrating handheld 4.5-digit resolution DMMs with increased TURs and clamp meters to 1 500 A with continuous current output. Improvements in comparison to the 5502A include an increase from 20 A to 30 A of continuous current output, and cutting waiting times during heavy usage. A more comprehensive range of thermocouple types and a new easy-connect thermocouple connector widens the temperature workload coverage of the calibrator. The 5540A can be fully calibrated with a Fluke 8588A 8.5-digit Reference Multimeter plus one shunt for the highest current range.

Fluke's 5560A High-Performance Multi-Product Calibrator meets demand at the high end of the market.

Wim Sibon, Fluke Calibration Technical Sales Manager for Electrical Calibration in Europe notes: "In recent years, we have seen increasing demand from laboratories for greater accuracy in their calibrators and multi-product solutions that free up bench space and keep costs down. The 5560A calibrator provides what the market requires and will boost the productivity of calibration laboratories worldwide. This will enable our customers to cope with the demand for more accurate measurements, even with a less experienced workforce.

"Fluke Calibration is committed to providing calibration laboratories with the widest workload calibration capabilities, and our latest additions to the range will enable lab technicians to expand their existing workloads with confidence. The 5502A and 5522A have been the workhorses of calibration laboratories for many years, and now we take their capabilities to a new level with the 5540A and 5550A multi-product calibrators. Backed by more than 50 years of continuous engineering improvements, our comprehensive range of powerful tools are the result of lifelong dedication from some of the best calibration experts in the world."

For more information contact Comtest.
Tel: + 27 (0)10 595 1821
Email: sales@comtest.co.za
Visit: www.comtest.co.za

Using a generator? Save costs

SA businesses are spending a fortune on generators. Vodacom recently revealed that since 2020, it has spent more than R4 billion on backup power solutions such as batteries and generators, with a further R300 million of additional costs for diesel, security and maintenance. Major food retailers are spending R1 million to R3 million per day on diesel just to keep trading.

While smaller businesses spend less than this, generators and the fuel they consume constitute a significant expense, adding to inflation in many industries as costs are passed on to consumers. As loadshedding seems unlikely to abate soon, businesses are looking for ways to save money on backup power generation.

Maintenance

Local engineering services and asset maintenance specialist, Pragma, points out that the less obvious costs related to generating alternative power are also significant. Based on current forecasts for 2023, Pragma estimates that the average generator will run for more than 1 500 hours this year and will need at least six maintenance services.

Morné Steenkamp, Pragma's Asset Health Service Divisional Manager, says, "Generators should last 25 to 30 years, but without proper maintenance, their lifespans are significantly shortened by the current loadshedding. Some businesses are struggling to keep up with refuelling requirements and some neglect more frequent generator services. However, there are opportunities to save costs using appropriate software, business processes and contractor networks."

As a specialist engineering company, Pragma has developed a calculator to quantify potential savings for businesses which use online monitoring and generator management.

"Many companies have multiple generators, but even those with only one need to have a sense of what they can expect from their asset. With proper monitoring and asset management, businesses are realising savings of 30 to 35%," says Steenkamp.

How it works

The calculator works out a tailored business case based on each business's circumstances and generator fleet. It is focused on ensuring the generator(s) remains healthy, optimising fuel usage, increasing generator lifespan due to improved, proactive maintenance, optimal refuelling and reducing callouts and after-hours work.

Hardware and monitoring

Often businesses have a variety of makes and models of generators with varying specifications. As a result of compatibility issues, it is difficult to implement a standard monitoring solution.

Rhynard Prins, Pragma's Asset Health Management Business Development Manager, explains: "Pragma's monitoring system is compatible with the most common generators found in South Africa. We see that many clients buy monitoring hardware but are not clear about how the data from the monitoring solution will be used. Businesses struggle to prioritise the work required on these machines and ensure the work is executed. Pragma's monitoring solution is underpinned by a sophisticated maintenance management system that automatically keeps track of maintenance, refuelling, contractor management and service level agreements through mobile applications."

Morné Steenkamp, Asset Health Service Divisional Manager, Pragma.

Rhynard Prins, Asset Health Management Business Development Manager, Pragma.

Decision-making and benchmarking

Pragma deals with contractors throughout the country. Each invoice can be scrutinised to ensure costs are fair. Its proprietary technology schedules refuelling during working hours to avoid unnecessary callouts or overtime costs to supply after hours. And clients' maintenance staff don't need to travel to sites as they have remote access to the information in real time.

Pragma's involvement varies for each client. Some clients are concerned with ensuring that incoming power is appropriate for the needs of the business, but this can extend or shorten the life of the generator.

When clients deal with a specific contractor, Pragma acts like a corporate governance provider to ensure the service level agreement is being properly managed. The company can also onboard providers from its national contractor base. If there is a breakdown, the system automatically messages the contractor to attend to it. In addition, maintenance frequencies are adjusted based on actual loadshedding, and proactive maintenance is scheduled and checked.

"What differentiates Pragma is that all data points are recorded, analysed and reported, and customers have a real-time view of their generator fleet. We help our clients get a grip on the workload and drive decision making in support of budget forecasts, optimal maintenance strategies, management of contractor SLAs and cost savings," says Prins.

For more information contact Pragma.
Visit: www.pragmaworld.net

Personalised customer service will safeguard people's jobs

Despite the significant advances in AI, human connection, rooted in empathy and proficiency is irreplaceable in meeting and exceeding customers' needs.

Wherever we look, someone, somewhere is discussing artificial intelligence right now. As exciting as the technology is, it is understandable that workers around the world are worried by it. AI presents a real threat to jobs. Consulting services firm PwC forecasts that globally, 44% of workers with low education will be at risk of losing their jobs by the mid-2030s. Based on its findings, the company indicates more men will be affected in the long run as machines replace manual tasks traditionally performed by men. However, it is women who will be most affected initially, due to their higher representation in clerical and administrative functions.

Investment bank Goldman Sachs has put job losses at some 300 million in the next decade.

Yet this is only one side of the debate. The same PwC analysis suggests that the implementation of AI and other smart automation has the potential to contribute up to $15 trillion to the global economy by 2030, as a result of greater productivity. It also states that as much as employment will be lost, jobs will also be gained as needs change in the AI world.

What is missing from these equations, however, is the aspect of human empathy, which remains a vital part of doing business and is a key differentiator in creating value for clients.

"Attention to detail, precision, accuracy and meaningful visibility are just some of the enablers needed when servicing clients," says Marcus Ellappan, Operations Director at Bidvest International Logistics (BIL).

"In an industry where competition is aggressive, meeting clients' KPIs and adding value to their supply chain can lead to a long-term partnership with the client."

Ellappan's colleague Rhett Oertel, who heads BIL's sales division, agrees that there is simply no substitute for personal interaction in building relationships. While AI is based on logic and data, the essence of excellent customer service is a "feeling" that arises between service provider and client when looking for solutions.

"I believe AI could possibly help with suggestions in solving problems that arise, by analysing data or scenarios, but ultimately, it's the people who will decide," Oertel says.

For the moment and the foreseeable future, the human ability to put oneself in a client's position enables a business to gauge the impact every decision has on a customer's operations.

"By showing empathy, we can gain a better understanding of the client's needs and challenges. Logistics and supply chains don't always go as planned, so we need to be able to provide reassurance, show understanding and offer effective solutions to the problems. Over time, these interactions also build trust," Oertel says.

Key skills needed to optimise effective client relationships include:

- Proactive communication

Bidvest International Logistics says there is no substitute for personal interaction in building customer relationships.

- A problem-solving mindset
- Responsiveness
- Expertise
- Empathy and understanding
- Adherence to KPIs
- Joint value creation and
- Ongoing quality improvement projects.

At the same time, Ellappan and Oertel urge businesses not to fear automation and AI capabilities as they can be useful.

"AI is here to stay and we will need to develop complementary skills so we can maximise the benefits of people working with AI," Oertel says.

"We should not be afraid of testing it and using it in scenarios. AI can and will have an impact on our day-to-day working environment, but I believe we could use it to make decisions more quickly, test different scenarios, provide faster feedback and take over the mundane parts of a job, allowing us to focus on the more value-adding activities."

Ellappan likens the advent of AI to the introduction of wheels on a suitcase. This innovation, while subtle, created convenience in that it reduced the manual effort of carrying luggage around. Similarly, with digital transformation becoming a key focus in businesses today, we need to keep up with innovation and technology.

"With big data, AI, robotics and machine learning, more manual tasks are becoming automated. Getting to understand the data from the automated process is imperative for everyone involved. Data-driven decisions will be key to producing solutions generally, to improve customer service and costs."

PwC notes that governments and businesses will need to work together to help people adjust to the new technologies, and it will be essential to establish a culture of adaptability and lifelong learning to spread the benefits of AI across society.

For more information visit: www.bidvestil.com/

Nemanja Krstić, Galix Group.

Best practice in network security

Nemanja Krstić, Operations Manager - Managed Security Services at Galix

In today's interconnected world, network security is critically important for businesses. While rapid advances in technology have empowered organisations, they have also provided new avenues for cyber attackers to exploit vulnerabilities. As remote work continues and becomes more prevalent, the attack surface has expanded, making it crucial for businesses to adopt robust network security practices to protect their sensitive data and critical systems.

There is no one-size-fits-all solution. Each company has unique elements, systems, and data that require comprehensive protection. An organisation's IT security strategy must be thorough and all-encompassing to address the diverse aspects of network security.

A key trend in network security is role-based access to network systems, which helps protect against unauthorised entry. Effective access management solutions can significantly enhance the security of the network. Identity management is another aspect of network security, with zero trust networks gaining traction. These networks focus on providing access control and management for authenticated users, enabling organisations to monitor and report on individual activities within the network. However, implementation can take time, especially for companies with outdated access architectures.

Intrusion protection and detection solutions are further critical aspects of network security. Organisations with large workforces and extensive data inventories can benefit from these, but not all data requires the same level of protection. Compliance plays an important role in determining the sensitivity of data and the appropriate security measures to be implemented. Segmentation of networks, especially for core and non-core systems, makes it more difficult for threat actors to move laterally within the network.

Cyber resilience

The field of network security is constantly evolving to combat new threats, and hackers and intruders constantly adapt their tactics. This makes it essential for Chief Information Security Officers (CISOs) to stay updated on the latest trends and solutions – and to be proactive, as relying on a single solution or vendor may leave organisations vulnerable to emerging threats. CISOs can learn from exploring innovative ideas and methodologies to support the natural evolution of their network security.

To address the evolving cyber threat landscape, businesses need to develop cyber resilience. It's important to realise that hackers consider cyberattacks as their job, continually devising new methods to breach IT environments. Cybersecurity should therefore be considered as an integral part of the overall network strategy. Firewalls and intrusion protection solutions are essential, but they are not sufficient. The human factor is often the weakest link and businesses need to train their staff to recognise and respond to social engineering and phishing attempts. Creating awareness among employees about the potential consequences of cyberattacks is critical, as the impact can be severe.

Zero trust

Zero trust, though it may be a commendable concept, is complex to implement due to the diverse IT architectures of different companies. The concept of Secure Access Service Edge (SASE) provides a flexible and adaptable approach to network security and offers a more standardised strategy that can be applied across various infrastructures.

Policies and procedures

When establishing policies, methodologies and procedures, organisations should refer to internationally recognised standards such as ISO, CIS, and PCI DSS. Rather than pursuing costly certifications, aligning with these standards allows businesses to adopt best practices relevant to their specific needs. Implementing security templates may not fully cater to an organisation's requirements, which is why the alignment approach can be more effective and efficient.

ML, IoT and automation

Artificial intelligence (AI) and machine learning (ML) are increasingly being integrated into the field of cybersecurity – enabling the gathering of data and providing specific threat response capabilities based on behavioural patterns. ML in particular plays a crucial role in security operations centres, automating incident response management and operational playbooks.

As the cyber threat landscape continues to evolve, businesses must adapt to emerging security trends and challenges, and prioritise network security best practices. By implementing comprehensive security measures, fostering cyber resilience, and leveraging technologies such as AI, ML, and IoT securely, organisations can enhance their defences against cyber threats.

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

Electromagnetic energy: changing the way electricity is produced

What if there were a viable alternative to the internal combustion engine? One that can be quickly adapted for different applications, from agriculture to the maritime industry, the motor industry and more. What if, instead of taking up 400 hectares to build a solar power plant, we could generate the same number of kilowatts on land the size of a basketball court? And, what if we could travel unlimited kilometres in electric cars because we didn't need charging stations?

V2Techs, a technology startup co-founded in the USA by a South African team, suggests that these possibilities – and many others – can be realised by applying the principles of electromagnetics.

V2Techs is disrupting the way that electricity has been produced and distributed for the past 140 years. The company has invented an electromagnetic combo motor that works as a prime mover for any electric power generator, and as a substitute for hydropower, wind power, fossil fuels, and other forms of power generation as an external rotating source.

Simple, scalable, and highly efficient, the motor has been named 'Remora', after the fish of the same name, which attaches itself to larger marine animals in a mutually beneficial relationship. By using it in electric power generators, it creates a new technology for electricity utilities, named 'SpinG' (spinning generators).

V2Techs wants to make a positive contribution to reducing the carbon footprint by creating innovative technologies that harvest the power of electromagnetic energy via innovative designs and patented applications.

Shipping

Electric ships, for example, could be retrofitted or newly developed, consistent with the UN's International Maritime Organisation's directive that greenhouse gas emissions be sharply reduced. The industry is the backbone of the global economy, transporting over 80% of the world's goods.

By removing all systems associated with fuel-based power generators, a significant amount of cargo space can be freed up, resulting in substantially reduced shipping costs per container of between 50-60%.

Sasha Vlad, CTO of V2Techs says this new technology marks a substantial leap forward from pursuing alternative fuels like ammonia, gas, green and blue hydrogen, all of which require large production and storage facilities on almost every maritime route.

Microgrids

"Because our technology is scalable, we can convert any electric power generator to a microgrid power plant, with little impact on an existing installation," says Vlad. "Imagine that we could run a wind turbine in a building's basement, without blades or wind. There is no need to store energy, as it can be produced on site, instantly, and on demand."

This would remove the need for large power lines and simplify national power grids. The new concept power plants could be operated by city authorities directly, in small non-polluting facilities, and via remote control technologies.

V2Techs is disrupting the way electricity has been produced and distributed for the past 140 years.

Electric vehicles

EVs would be another industry that could benefit from V2Techs' technology. A new EV could have unlimited mileage, eliminating the need for charging stations, and there could be different forms of kWh payment on board: via mobile phone, NFC payment, or by direct account. Moreover, once parked in the garage, the EV could become an electricity provider for the household, by charging storage batteries in a power wall.

Electric farming

Farms could operate on the same principles as the EV. The technology could open new agricultural areas in remote regions, with no need for national electric power grids, but with all modern farming facilities. With the world population at over 8 billion, new farming lands and lower farming costs will be needed.

Power efficiency is key

In developing the technology, the V2Techs team wanted to find an alternative that has the same, or better, power efficiency as hydropower. At 90%, hydropower has a much higher power efficiency than wind at 59.6%, solar power at 15 to 20%, or coal at 33 to 40%. The power efficiency of a device indicates how much of the input energy is converted into useful power.

"Our technology has a 98% power efficiency, which we achieved by combining three different elements," says Vlad.

The first is a brushless motor, the technology used in a power drill. To this, a flywheel is added, a technology that has been used for centuries for things as simple as a pottery wheel. It creates kinetic energy, the energy an object creates because of its motion. And thirdly, induction. "Our technology has a battery as well as an induction power generator. We harvest energy through the flywheel, feed this back to the battery, and redirect it again to the brushless motor," Vlad explains.

V2Techs has received two WIPO (World Intellectual Property Organisation) patent certificates for its technologies and has three more patent applications pending.

"We're at the forefront of a new age of lower cost, low-emission power generation that has the potential to contribute significantly to a better future around the world," says Vlad.

For more information visit: https://v2techs.net/

The Inclusive Carbon Standard – launched in Johannesburg

In recent years, the carbon offset industry has garnered increased attention as offsets offer one route to combatting climate change. With a growing awareness of the urgent need to reduce greenhouse gas emissions, individuals, businesses, and governments have turned to carbon offsetting as a means to neutralise their carbon footprint. In South Africa, the introduction of the Carbon Tax Act (2019) and subsequent publication of the Draft Framework for Domestic Carbon Standards (2022), confirm that carbon offsetting needs to be taken seriously by local businesses and they need to incorporate it into their sustainability and risk portfolios.

However, the carbon offset industry is complex and multifaceted, presenting challenges that need to be addressed as it continues to evolve. Ensuring the integrity and transparency of offset projects, standardising methodologies, and tackling concerns about 'greenwashing' are critical considerations. At present, the industry relies on a few global carbon standards (the CDM (Clean Development Mechanism), Verra, and The Gold Standard for Global Goals), but the registration and audit processes for projects adhering to these standards can be technically demanding and costly. This has had the effect of excluding many legitimate participants from the offset industry. Hence the drive for a new and simpler carbon standard.

A new carbon standard

The Inclusive Carbon Standard (ICS) is a new global carbon credit programme that brings much-needed simplification and transparency to the industry. It is designed to make carbon offset projects accessible to anyone and everyone while maintaining an exceptional degree of integrity and transparency. Using an open-market strategy and built on an open-source technology stack, the ICS allows project developers, methodology writers and auditors to connect and transact at a significantly lower cost compared to the traditional standards. By removing two of the primary barriers to entry, the ICS encourages a wider group of stakeholders to participate in carbon markets, most notably, historically disadvantaged communities most often affected by climate change.

As a new global carbon credit programme, the ICS brings much-needed simplification and transparency to the carbon offset industry.

The key to affordability lies in making use of technology to reduce the costs of project registration and audit. The ICS incorporates novelties such as component methodologies and landmark projects and values.

Chris Wild, Executive Director at Food & Trees for Africa (FTA) explains: "In assessing the established carbon offset programmes, we noted a number of repetitive methodological elements in the project registration documents. We decided to break these down into what we call 'component methodologies' that can be simply recycled once they are in the system. As a result, instead of paying high-cost fees for technical development, this element of a project is freely accessible if it's already in the ecosystem." One of the other challenges with traditional carbon offset standard methodologies is that they were conceived at a time when some of the technologies we have today did not exist. Wild notes, "The traditional standards were launched before the first smartphone, let alone the advances in remote sensing, IoT and distributed ledger technologies."

The ICS seeks to change this dynamic by encouraging the use of cutting-edge technologies and creating flexibility in concise, project-specific methodologies.

A central concern associated with carbon offsets is their underlying credibility. Without credibility and transparency, the integrity of the entire system comes into question.

An important element in the integrity of any carbon credit programme is the governance structure. "Most of our time on developing this new carbon standard, over the past two years, has been around the governance framework," says Robbie Louw, a director at Promethium Carbon. "The ICS needs to ensure environmental integrity and social safeguards by providing a robust framework for project registration, validation, monitoring, and issuance of carbon credits." A notable feature of the ICS is that all final documentation related to projects and governance will be made publicly available. "Within the carbon offset space, the transparency features of the ICS are globally unique and we feel this is a tremendous leap forward for the industry," Louw adds.

Essentially, the ICS is a carbon offset programme that accurately quantifies and rewards actions that contribute towards conservation, rehabilitation or preservation of the natural environment. It is also designed to enable communities to participate meaningfully in carbon markets and the green economy through environmental projects.

For more information visit: https://trees.org.za/ or: https://www.promethium.co.za/

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Power sustainability

Wind energy plays a central role in the generation of electricity from renewable energy sources. Wind turbines are operated in all climate zones of the world – at sea (offshore), near the coast and inland (onshore). They are often exposed to extreme environmental influences, such as salt water or temperature fluctuations.

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