FEATURES:

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

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ELECTRICITY+CONTROL

CROWN PUBLICATIONS


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Founded in 1952, the MARECHAL ELECTRIC group works to enhance electrical safety in industrial environments, designing and producing LV electrical connection systems for hazardous and non-hazardous areas.
(Read more on page 3.)

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Reimagining how we use energy

It seems we never really think about energy the way we should. Perhaps we have become too accustomed to a world where energy is simply always available?

Indeed, we spent huge effort in ensuring that this was the case. Turbines were refined, generators designed, ac faced off against dc – as cables replaced belts, drives and spinning bars and so on.

Electricity, by all accounts, presented a vast improvement on the purely mechanical means of producing power that it replaced. And with electric energy came the opportunity to burn fossil fuels, make steam, run turbines – and basically light up the world.

All was good. It turned out that power plants like to run all the time, and operations were generally more efficient when running at or close to full load. Coal was in use everywhere. After all, it had powered the steam age rather well (before diesel became more fashionable, that is).

However, what this created was an economic reliance on electrical power that was available 24/7. Smelters could run all the time to feed the burgeoning and growing economies of the world. These technologies provided the critical base load that the economies needed.

But the burning of fossil fuels has slowly but surely been shown to have a starkly negative impact on our environment – and the planet we call home. Carbon is released into the atmosphere, as are particulates, and then there are some pretty nasty invisible components too.

I recall so vividly seeing the comparison of a smokestack fitted with bag filters close to one that had no such filters. There was such an impressive difference: smoke from one, nothing from the other. The wise cynic next to me said, "The really bad stuff you simply can't see…" And that is true.

Little effort was put into cleaner options, like nuclear power. In fact, the environmental opposition to nuclear power seemed so much louder than that against coal technology (as an option). Possibly this was based on little understanding of nuclear reactions, and on the devastating impact these had been shown to be capable of in the 1940s. And the continuing worry about safety considerations, and the cost. (Some might argue, of course, that nuclear may well have been a cheaper option than some of the coal-powered plants we are seeing going up on the horizon – but that's with hindsight.)

Nonetheless, it seems that burning coal has without doubt been far worse for the planet.

This begs the question, of course, as to whether we can reimagine how we use energy; reimagine what we do with it; and reimagine when we can expect to have access to it. Again, cynics may well say that, in South Africa, we have been pondering these issues for the past decade.

Could we imagine a world where huge consumers of energy that need it 24/7 are all co-located with sources of energy (such as hydro) that can be pretty much relied on – or at least, where we have some weeks' notice of an impending disaster?

Could we imagine having to use the sun to heat spaces and (possibly) to run 'general' plants and the like? No sun, no energy – go home and return when we have the energy back?

Storage is clearly getting cheaper, but it is still very expensive in the context of a large plant.

Could we imagine a world where we use energy differently?

Certainly it may sound impossible to us now – but is that not because we are conditioned by the reality we have created, and that we must now repair?

Ian

Ian Jandrell

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

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INDUSTRY 4.0 + IIOT

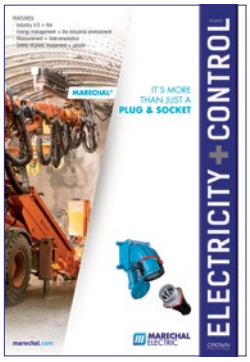
ENERGY MANAGEMENT + THE INDUSTRIAL ENVIRONMENT

MEASUREMENT + INSTRUMENTATION

SAFETY OF PLANT, EQUIPMENT + PEOPLE

REGULARS

A wealth of technology dedicated to your safety



Founded in 1952, the MARECHAL ELECTRIC group was born to enhance electrical safety in industrial environments. Starting from 5 A to 1 250 A and up to 1 000 V the group counts among the major manufacturers and designers in Low Voltage LT electrical connection systems for environments with or without the presence of an EX explosive atmosphere.

DECONTACTOR™ technology
A one-of-a-kind design in the world

The DECONTACTOR™ is a device which combines the advantages of a plug and socket and the performance of an isolator. Built on 70 years of research and innovation, the DECONTACTOR™ range offers a level of reliability and safety not yet equalled anywhere in the world. It allows devices to be connected and disconnected thousands of times and in the most severe environments with perfect safety for the user, which will greatly reduce production downtime! Power your equipment in applications up to 250 A, without having to add an external contactor to break the supply load.

Butt contact technology with a silver-nickel tip

The MARECHAL® DECONTACTOR™ and connectors are all fitted with butt contacts with silver-nickel tips. They provide exceptional connection quality by eliminating the damage due to electric arcs and wear seen with the pin and sleeve system. Silver is an excellent conductor of current even when oxidised. Conductivity is optimal even in the presence of vibration and temperature variation due to the pressure of the springs.

Crimped braids

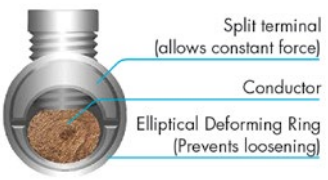
The MARECHAL® contact uses a crimped braid with a spring which provides contact performance and tolerances superior to pin and sleeve contacts. The flexibility of the braid and the spring allows the base contact tip to be always perfectly aligned with the plug contact tip. These contacts, which are silver and anti-corrosion treated, offer very good corrosion resistance.

Auxiliary contacts

Auxiliary contacts on the male and female sides are separate from the main power contacts. These contacts can be used for signal and control requirements.

Elastic lock terminals

MARECHAL® contacts are fitted with 'elastic lock' connection terminals. The wire clamp is split and surrounded by an elliptical deforming ring. This method allows the tightening force on the wire to be constant. Hence despite the creep of the conductor, the variations of temperature and vibration, the conductor wire is perfectly connected to the contact terminal.



Safety shutter

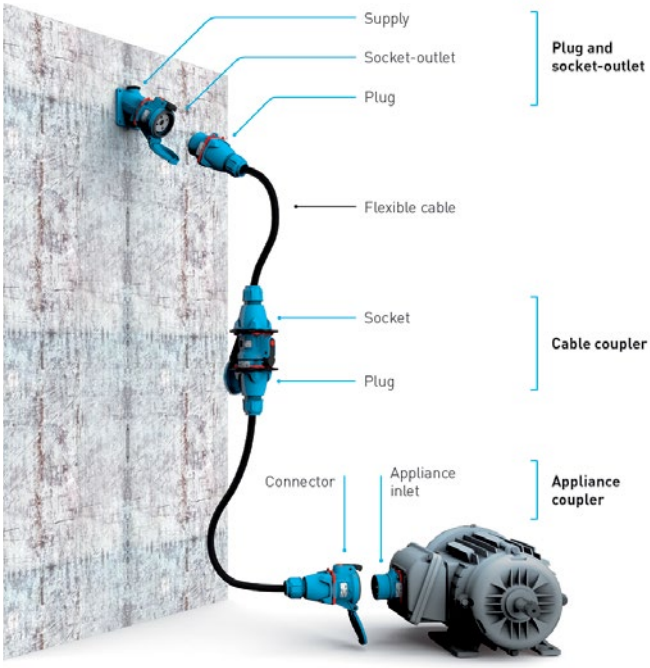
DECONTACTOR™ sockets are fitted with an interlocked safety shutter which prevents access to live contacts. This shutter only unlocks at the time of connection of the plug into the socket, which avoids any risk of electric shock.

Casing in advanced materials

MARECHAL® range connectors and DECONTACTOR™ have casings made from glass-fibre-reinforced polyester (GRP), or metal, depending on the models. This choice of material contributes to the excellent mechanical performance and longevity of the socket.

The main industries using MARECHAL® products are:

- mines and quarries
- heavy industry
- transportation
- chemical & refineries
- agri-food industry
- water treatment
- energy
- ports, marinas, offshore & shipyards
- entertainment & media.



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Realistic technology adoption for Africa's growth

Canninah Mapena, Managing Director, Rockwell Automation in Africa.

In this recent blog post Canninah Mapena, Managing Director of Rockwell Automation, Africa, outlines five key principles to guide the adoption of technology that can help businesses across the continent build a competitive edge.

Africa is undoubtedly a land of abundance and potential. From its mineral resources to its rich agriculture to its youthful population, opportunities abound for the continent to boost its competitive advantage. Add to this mix the power of cutting-edge technology, and there is the potential to build thriving economies. However, while the adoption of technology in Africa is progressing in some instances, it is lagging in others. This means African businesses are not leveraging the full power of what is available to them. Why is that?

We have seen throughout the pandemic how technology aids businesses in the new normal – empowering remote operations, automation and smart, connected industries. Despite this, there are still those who are sceptical of technology, for reasons ranging from the perceived steep capital investment to the learning curve of adopting new systems.

Specifically in Africa, there are still perceptions that advances in automation and technology will replace the need for people. For a continent in which most countries continue to work towards increasing their economic output and creating employment opportunities, the concern around redundancy is understandable. However, I do not believe it should hold businesses back from innovation. All it does is hold businesses back in their ability to compete globally.

The crux of the matter is that the efficiency and business continuity offered by technology adoption are key to achieving a competitive edge in today's global business landscape. We can either oppose the development of technology and be left behind, or start skilling our young, agile population to facilitate a smooth process of adopting technologies to meet strategic business development goals. In my opinion, this process should be driven by five key principles.

Technology is key to achieving a competitive edge in today's global business landscape.

- Inclusive digital transformation

The process needs to be inclusive of the people of Africa. Rather than being threatened by new technology, people need to be a part of the transformation. Employee buy-in is key. Equally important is a dedicated skills development programme so that human assets are recognised as increasingly valuable, rather than replaceable or optional. A digital strategy formed with the input of the people in your business team is key for a successful move to the connected enterprise.

- Innovation aligned to strategy

Innovation for innovation's sake should be avoided. African businesses need to think carefully about what technologies to implement, and why, and avoid investing in systems they don't need – there is no value in investing capital with no gain for productivity.

- Improving the wheel, not reinventing it

Technology adoption must be aligned with a business's existing business model. The idea is not to bring in technology to create all-new processes and operating models, but rather to augment and supplement existing processes to improve output and optimise resources (including human resources). If business leaders are not sure what their business needs to be doing, they need to go back to the drawing board and find clarity before they start considering a big technology move.

- Security front and centre

Many African businesses have been eager to embrace digital and mobile technology, but in some cases the importance of cybersecurity has been overlooked. As businesses increasingly move to the cloud and other technologies to support remote capabilities, cybersecurity systems must be prioritised to protect and improve business continuity.

- Personal interactions remain key

In the melting pot of African culture, we love personal face-to-face interactions. While this has been tough in the

Continued on page 6

Digitalisation, edge computing and the cloud

Digitalisation introduces the benefits of more insight into production processes, increased visualisation and analysis of data and the opportunity to gain a greater understanding of the root causes of unexpected downtime or production bottlenecks. Here, Johannesburg-based Omron Industrial Automation presents some of the ways in which digitalisation and the data it provides can best be used.

Among the benefits of digitalisation – in addition to offering greater connectivity of devices at plant level – is its potential to exchange data with other systems and make it possible to monitor plants remotely, in more depth, over greater distances and longer periods than has been possible previously.

Manufacturing traceability, for example, would traditionally have been achieved via paper-based batch recording, and product level traceability would not have been achievable without digital technology. Predictive maintenance could be achieved, but only via periodic monitoring of devices.

Digitalisation brings with it a host of valuable new functions which make use of the data that probably already existed on the production line but was stranded in disparate systems.

At its most simplistic, digitalisation is about integrating devices to gain information about them that helps rectify problems. Its potential goes much further, and the benefits of digitising systems are widespread, extending across an enterprise. Visualisation can provide greater insight into how productive and efficient a manufacturing plant is.

Barriers

One of the biggest barriers to adopting digital technology relates to the fact that operational technology (OT) has traditionally been designed around the need for machine optimisation, employing architectures and networks that drive optimal performance in machines. Because any digitalisation project's success relies on the convergence of IT and OT worlds, there has been a need for OT technology to evolve so that it can integrate with wider business operations and today, modern machine control solutions incorporate IT functionality. OMRON's Sysmac controller, for example, includes direct SQL database connectivity and can also be provided with OPC-UA as well as MQTT, all of which allow for a simple and seamless method of sending operational information from machine level to the IT environment and vice versa.

Middleware solutions which, where necessary, can act as a gateway to connect legacy devices to the IT world, are also now available.

Data handling solutions

On-premises servers can offer a good data handling solution for applications that need fast access to data.

Processing data at the edge – close to the device itself – offers real-time operational benefits.

When it comes to connecting the OT environment to the rest of the world, security is often a concern. However, if the intention is to analyse and store data in an on-premises IT server, security is likely already provided by the factory firewall or existing security infrastructure.

However, because any connection point may be a potential security threat, there are always some security measures that need to be implemented. OMRON has addressed this issue through the use of 'trusted certificates' – a recognised IT security measure. The trusted certification is unique to the OT device on which it resides and can be easily identified by the IT server.

The downside of on-premises servers is that they are not able to store infinite amounts of data, so if an application requires huge amounts of data to be processed, a cloud-based server offers a better solution – although this will require more stringent security measures. The cloud can provide a scalable data storage solution that is not limited by capacity and does not require architecture changes if storage needs change.

The downside of cloud-based servers is that they cannot provide a real-time connection. There will always be some latency in processing and reacting to data.

Considering the options of data storage platforms, different solutions offer benefits in different applications. Tasks such as production visualisation lend themselves well to the use of on-premises servers because less data needs to be stored, and less data processing is required. Predictive maintenance requires large amounts of data

At a glance

- Digitalisation and data visualisation can provide greater insight into how productive and efficient a manufacturing plant is.
- On-premises servers offer a good data handling solution for applications that need fast access to data.
- If an application requires large amounts of data to be processed, a cloud-based server offers a better solution.
- The best data management approach, allowing OT and IT environments to optimise the use of data created, is often a hybrid solution.

and processing power, so the cloud offers a better storage solution – to churn the data to obtain meaningful information.

Manufacturing traceability probably also lends itself best to the cloud as it requires vast amounts of information to be stored. Likewise, product quality improvement projects would also be best suited to data storage in the cloud as real-time access is not required.

Moving to the edge

Currently, more plant operators are also seeing the benefit of processing data at the edge – close to the device itself – making it possible to gain real-time operational benefits. Again, taking the example of OMRON's Sysmac controller, an integral artificial intelligence (AI) engine allows data to be analysed in real-time, allowing for fast reactions to the information at the point of its creation, which enables real-time predictive analysis. However, the limitation of edge technology is that it cannot handle large amounts of data.

The best data management approach, which allows OT and IT environments to optimise the use of data created is often a hybrid solution that sees data processed at the edge and then escalated for storage in on-premises or cloud-based servers where it can be further analysed to gain the most benefit.

It is useful for OT and IT teams to know that they can work with the same data in more than one place using it at the edge first for real-time processing requirements and then escalating the same data for post-processing purposes. This is possible because data is time-stamped, so it can be referenced and synchronised in different applications.

For added data security, it is also helpful to employ controllers that can spool data, so, in the event of a connection issue or data corruption, there will always be a backup. This is a particularly important consideration in fast moving consumer goods (FMCG) sectors where regulatory compliance and product traceability are high priorities.

A number of platforms are available for data storage and processing, including edge, on-premises and cloud-based servers.

For most manufacturers, the on-premises server solution will offer the best first step on the digitalisation ladder, as it is usually the easiest function to achieve. Many manufacturers will already have some degree of IT infrastructure installed on the factory floor, so storing operational data on premises provides for easy access to the data. Such solutions can also be achieved more cost-effectively if the manufacturer already has a controller that has the capability to escalate data to an IT level. There it can be analysed using any of a range of low-cost software solutions.

The availability of data and the information it can provide is opening many manufacturers' eyes as they start to understand what they can achieve and what traditional processing issues can now be solved. Looking at storage and processing options, there are various platforms available – edge, on-premises or cloud-based servers – to suit the needs of different applications. However, it is important to bear in mind that storing data for the sake of it is costly, and manufacturers should ensure that they use the data, rather than being used by it.

For engineers, it is reassuring to know that digitalisation does not require a fundamental change in the method of manufacturing – it can work in any automated process and its purpose is primarily to gather and handle data. Engineers can look at digitalisation as another tool that offers them greater insight into plant processes which they can use to improve efficiencies. □

For more information visit: www.industrial.omron.co.za

Continued from page 4

pandemic, there are still ways to form personal relationships between businesses that enable them to boost each other. In October 2020, Rockwell Automation launched its business strategy for Africa, and we are currently engaging with local distributors and channel partners. Our strategy is to partner with local industries and local businesses, and to employ local people, to see a wider adoption of technology, aligned to the needs of the market.

Africa is growing – it is the only continent with the potential for double-digit growth. However, we need to invest in adopting key technologies in order to grow. At Rockwell Automation we look forward to connecting and aligning with the different cultures, local requirements, and local businesses to see Africa gain a competitive edge. We partner with our clients to implement the technology they need, informed by their business objectives. □

For more information visit: www.rockwellautomation.com

Expansion of Isando data centre facility complete

Teraco Data Environments Proprietary Limited, Africa's biggest vendor-neutral data centre and interconnection services provider, has completed the JB3 data centre facility, located within the Isando Campus in Ekurhuleni, east of Johannesburg, South Africa.

This multibillion-rand facility represents a strategic addition to Platform Teraco, offering enterprises a scalable platform for IT infrastructure deployment while sustaining performance, reliability, security, and the widest network choice. JB3 comprises a building area of 45 000 m^2, with 12 000 m^2 of data hall space and a 29 MW critical power load. Combined with the existing Isando Campus facilities, the critical power load totals 40 MW across the data centre campus, with room for further growth.

Jan Hnizdo, CEO of Teraco, says the latest expansion at the Isando Campus meets the growing demand from cloud providers and other businesses for data centre capacity and enables Teraco to offer highly resilient and secure colocation facilities. At the same time the company is working towards achieving its long-term vision of enabling digital transformation across the African continent.

"This investment also aligns with the support we pledged to the South African government's investment drive and our commitment to investing billions of rand into South Africa's digital infrastructure. As the leading interconnection hub across the continent, Teraco has over 600 clients, including key networks, cloud providers, global content and managed IT service providers, and direct access to Africa's largest Internet exchange, NAPAfrica, in its data centres."

With over 200 telcos within Platform Teraco providing connectivity to Africa, Hnizdo says enterprises are now accelerating their digital transformation strategies and placing a greater focus on cloud adoption strategies. "Teraco is making significant investments in providing access to digital infrastructure that is resilient and highly flexible. This offers enterprises the ability to scale as network strategies evolve in a world where fast and secure interconnection with strategic business partners and cloud on-ramps are a source of competitive advantage."

Aerial view of the completed JB3 data centre at Teraco's Isando Campus east of Johannesburg.

Platform Teraco provides the lowest latency interconnection points to cloud and content. With a direct private connection to all leading cloud providers, enterprises can deploy cloud services in the most latency-efficient, secure and resilient way. Enterprises can also deploy their public, private and hybrid cloud strategies from the Teraco platform and reduce the time and cost to access these cloud platforms.

Hnizdo says Teraco has continued to see growth in cloud adoption making its role significant for those who need access to robust digital infrastructure. "Our clients use the data centre to scale their IT infrastructure, adopt hybrid and multi-cloud architectures and interconnect with strategic business partners within the Teraco ecosystem. Over the past year, we have seen a 48% increase in direct interconnects to public cloud on-ramps, reflecting the increasing trend of cloud adoption by businesses."

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

Cellular router with WLAN interface

The new TC router 4102T-4G EU WLAN expands the family of industrial cellular routers from Phoenix Contact with a WLAN interface, more I/Os and additional software functionalities.

With its WLAN interface, the new TC router can be configured as an access point to connect to wireless system components located nearby or to allow technicians to gain wireless access to the process on site.

For users, the WLAN interface can serve as a parallel, failsafe alternative to the Ethernet ports, which are switchable between LAN/WAN, to access the internet. In case of a failure, the system automatically changes to WLAN or cellular communication, or expands the bandwidth of poor wired connections. In addition, the new device has more digital inputs and outputs and further software functions such as GRE, L2TP, PPTP, as well as an internal MIB for SNMP.

The TC routers are cellular routers for infrastructure applications which connect widely spread out substations and machines to the control room via VPN. Globally available LTE cellular communication technology enables everything from lean remote control protocols to video transmissions.

For more information contact Phoenix Contact SA.
Tel: +27 (0)11 801 8200
Visit: www.phoenixcontact.co.za

The new TC router with WLAN interface.

Demonstrating digital solutions for industry

ABB recently launched its new South African Digital Solutions Centre, through which the company aims to help business across industries to overcome their most pressing technology and digitalisation challenges.

The centre is located at ABB's Longmeadow facility in Johannesburg. It gives customers in the energy, mining and mineral resources, manufacturing, process industries, transportation and utilities sectors the opportunity to co-develop solutions that take advantage of the benefits offered by digitalisation to unlock lasting business value.

John Manuell, Local Division Manager for Process Industries, ABB South Africa, says, "The new centre is the only one of its kind in Africa and represents our commitment to South Africa and the wider region where we serve an important customer base and recognise growth markets. Most industries and sectors are going through a rapid transformation which is enabled by digital technologies. The South African Digital Solutions Centre strengthens our capacity to serve and support customers with technologies and capabilities that are key to the digital transformation of their operations."

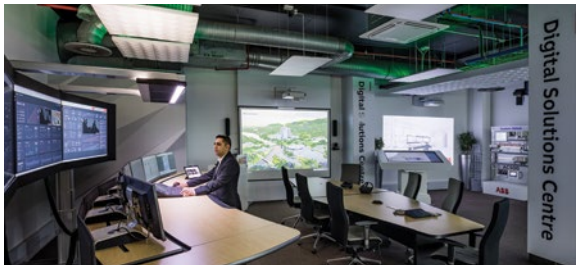
It will help customers to take major leaps in productivity and efficiency, driving competitiveness, quality, and security, through smart grid technology, electrification of all points of energy consumption and advanced automation solutions. It offers customers the ability to experience ABB's digital solutions, advanced automation and 24/7 control room solutions in a fully equipped environment, encountering and solving challenging real-life scenarios. Once customers have identified their business priorities and challenges, the centre allows them to experience how ABB Ability™ solutions can unlock value across the entire value chain.

Remote support is increasingly a significant factor for business continuity and ABB Ability™ Remote Insights enables customers to connect with ABB's global experts remotely, using a laptop, tablet or mobile. This will help businesses save on maintenance costs, reduce downtime and increase safety in their operations. Remote access platform services allow experts to access plant data remotely, to analyse equipment and plant behaviour and recommend corrective actions.

Another feature of the centre is what ABB calls 'the control room of the future'. Here, clients can actively participate in designing their control room and experience how the space will be used in virtual reality, before it is constructed or delivered to site.

"Studies indicate that up to 40% of unplanned downtime can be associated with operator error. This is why it is crucial to create an optimal environment that provides the necessary information and tools, putting the operator in focus," said Manuell.

The centre's 'mine of the future' will be of particular interest to businesses in the mining industry. McKinsey estimates that the digitalisation of mines and mining could save US$373 billion globally by 2025, by raising productivity, reducing waste and keeping mines safe. The digital solutions presented at the centre are embedded in the ABB Ability™ MineOptimize portfolio, which provides mine operators with a suite of digitally connected solutions, products and collaborative services, to unify and optimise the lifecycle of a mine and ensure that the right people have the right information at the right time. In the recently launched ABB Ability™ eMine portfolio, ABB brings together electrification, automation and digital technology. By digitally connecting all solutions, they can be monitored and controlled to optimise operations and energy usage in real time. ABB Ability™ eMine™ focuses around four pillars: power and process control, power and energy management, electrical asset performance management, and mine operations management.



The Extended Operator Workplace in the Digital Solutions Centre demonstrates how production data can be collated.

The centre, which will operate virtually up to the 8th of October, will also offer a range of webinars and workshops designed to assess and understand the digital maturity level of an organisation, either at site or enterprise level. On-site visits will be available to a limited number of customers at a time, in line with Covid-19 health and safety protocols.

The most intensive of these are the Co-Creation Workshops, following a workshop format ranging from one to four hours over up to five days. In these workshops, once a customer's digital maturity level is established, ideas and requirements are outlined and further specified, tested and evaluated. ABB then works with the customer to define follow-up plans as a deliverable.

"The centre was developed for our customers to bring collaboration and co-creation to new levels," says Shiven Sukraj, Local Division Manager for Energy Industries, South Africa. "ABB's technologies are driving industrial productivity and contributing to South Africa's innovation ecosystem in so many ways. Through deeper collaboration with customers and partners, we want to develop powerful solutions that add measurable business value and play our part to guide South Africa into the digital economy."

For more information contact ABB South Africa.
Tel: + 27 (0)10 202 5105
Visit: www.new.abb.com/africa

Cloud connection for IO-Link sensors

The IoT gateway from ifm provides a cloud connection for all IO-Link sensors. Each IoT gateway recognises up to two connected IO-Link sensors and sends their process values automatically via GSM mobile network to the cloud where the data is stored.

Sensor information can be collected directly and sent to the cloud without requiring any connection to a controller, PC, or company network. Apart from voltage supply and GSM network availability, the gateway requires no infrastructure.

The user can visualise and analyse the data via a web-based dashboard. Alarms can be sent as a text message or by email. Setting limit values in the dashboard is simply done, with a few clicks, so the plant operator will be alerted when values are exceeded or not reached.

The data from all sensors can be summarised and exported automatically as a report at any time.

Like all ifm products, the gateway is a sturdy unit and has a high protection rating of IP 65. Hence, it can be used in harsh industrial environments.

Applications

The gateway is suitable for all applications that do not primarily require permanent transmission of measured values in real-time. It can also be used to monitor and evaluate remote parts of the plant that are not connected to the company infrastructure.

Applications include, for example,

- Tank monitoring using a capacitive continuous level sensor type KQ10
- Measurement of compressed air consumption and leakage monitoring using a compressed air meter type SD
- Fan monitoring using a vibration diagnostics sensor type VVB
- Valve monitoring using a valve sensor type MVQ.

The IoT gateway is preconfigured, no sim card is required, to send sensor data via mobile network to the cloud.

For more information contact ifm South Africa.
Tel: + 27 (0)12 450 0400
Email: info.za@ifm.com
Visit: www.ifm.com

Can we reach 'net zero' by 2050?

David Baudains, TEPM.

David Baudains, Climate Change Specialist and Project Manager, TEPM

The concept of net zero has become increasingly topical in recent years. Consensus on the link between cumulative CO_2e emissions and increasing global temperatures was firmly established in 2015 in terms of the Paris Agreement, where signatory nations (197 of them, as of 2021) committed to limiting the global temperature increase to less than 2°C (and preferably 1.5°C), relative to pre-industrial levels.

Despite some initial resistance from large industrial players, nations have by and large pledged to reduce emissions. Some signatories have enacted legislation to mandate national net zero targets; the first of these was Sweden in 2017. Significantly, at the 75th UN General Assembly in September 2020, China committed to carbon neutrality before 2060, and on 20 January 2021, within hours of taking office, Joe Biden set in motion the processes that enabled the USA to re-join the Paris Agreement.

In South Africa the government has approved plans to reduce greenhouse gas emissions to net zero by 2050, as defined in the Low Emissions Development Strategy (LEDS, February 2020).

But what is 'net zero'? Although there is no absolute consensus on a global definition for net zero emissions, most definitions account for the balance between greenhouse gas (GHG) emissions and removals: The sum of GHG emissions (x) and GHG removals (y) must equal a net of zero, or:

positive x + negative y = 0

A generally accepted definition is articulated in the 2018 IPCC (Intergovernmental Panel on Climate Change) Special Report on the impacts of global warming of 1.5°C above pre-industrial levels, where net zero occurs when "human-created greenhouse gas emissions are balanced by greenhouse gas removals over a given time period".

In essence, entities pledging net zero, both private and public, are committing to reduce emissions to a level such that the remainder can be offset through interventions such as sequestration and carbon capture and storage, within a specified timeframe.

Improving efficiencies in industrial processes and use of resources can save energy, limit emissions, and reduce wastage.

Meeting the Paris Agreement objectives

While net zero is viewed as a key instrument in ensuring the minimum target temperature increase of the Paris Agreement is met, there is significant debate as to whether it will achieve the absolute GHG emissions reductions required to combat global warming.

A prominent critique centres on the appropriateness and scalability of carbon capture and storage (CCS) technologies which are critical to facilitating the removal of CO_2 from the atmosphere. These include bioenergy CCS, direct air capture and geo engineering solutions. Given the urgency of time horizons, these technologies are increasingly viewed by sections of the climate science community as speculative and insufficient to check the rate of increase of emissions and temperatures. It is argued that the only way we stand a fighting chance of meeting the Paris Agreement ambition is to reduce greenhouse gas emissions in absolute terms – that is to say, drastically cut fossil fuel combustion. While individual entities may offset their emissions, this might not guarantee the absolute reduction of emissions at a macro scale.

Is net zero a feasible target for South Africa?

Given our country's current energy procurement planning, as outlined in the Department of Energy's 2019 Integrated Resource Plan, and accounting for growth, assuming a fairly consistent economic structure to 2050, meeting a net zero target remains extremely ambitious. Policy uncertainty, policy coordination between government departments impacting the national climate change agenda, and apparent inertia in the short- to medium-term are hampering our ability to get out of the starting blocks.

Recently, however, encouraging signs of progress have become evident at both national and local government level. In March 2021, after many delays, the Department of Mineral Resources and Energy opened the fifth bidding window to procure an additional 2 600 MW of electricity from renewable sources; in June 2021 President Ramaphosa announced that the licensing threshold for embedded generation would be raised from 1 MW to 100 MW – and this has since been gazetted by the Minister of Mineral Resources and Energy, Gwede Mantashe.

At local government level, the relaxation of regulations

around the generation and procurement of power enables municipalities to take advantage of new opportunities – through programmes such as the Western Cape government's Municipal Energy Resilience Project, which aims to support candidate municipalities in identifying and implementing renewable energy generation projects that will improve energy security.

Furthermore, the anticipated Climate Change Act will establish the legislative mechanisms required to support South Africa's transition.

The World Economic Forum is optimistic that net zero can be achieved if three key pillars are addressed effectively:

- Scaling-up efficient technologies, particularly in hard-to-abate industrial sectors (such as cement and chemicals manufacturing)
- Implementing drastic policy change
- Generating demand through carbon pricing and the establishment of carbon markets.

It is anticipated that increased innovation in the energy generation and storage space will provide the incremental gains required to ensure that 90% of the world's energy is provided by renewable sources by 2050, in order to meet the target.

Countries that have achieved net zero

To date, countries that have achieved net zero are: Suriname and Bhutan (Definition: "Emissions of GHGs do not exceed the carbon sequestration by our forests.").

Countries with legislated net zero targets

- Sweden (Definition: "Net zero by 2045, with negative emissions after 2045. Negative emissions are greenhouse gas emission from activities in Sweden that are less than, for example, the amount of CO_2 absorbed by nature as part of the eco-cycle, or less than the emissions Sweden helps to reduce abroad by investing in various climate projects.")
- UK (Definition: "Any greenhouse gas emission would be balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere, such as planting trees or using technology like CCS.")
- France (Definition: "…the balance between anthropogenic emissions and anthropogenic removals of greenhouse gases in the national territory")
- Denmark
- New Zealand (Definition: "Zero Carbon Bill: keep greenhouse gas emissions to near-neutral by 2050, excluding methane")
- Hungary

Other countries and regions with proposed net zero legislation include Canada, the EU, and more. □

At a glance

- In South Africa the government has approved plans to reduce greenhouse gas emissions to net zero by 2050.
- Net zero is seen as a key instrument, globally, in ensuring the minimum target temperature increase of the Paris Agreement is met.
- Despite some considerable hurdles still to be crossed, South Africa is taking steps at national and local government levels that move the country towards its net zero ambition.

For more information visit: http://tepm.com

New Gauteng production facility for intelligent energy storage

Against the background of the shift to allow private power generation up to 100 MW without requiring a licence from the National Electricity Regulator of South Africa (Nersa), South African energy storage company BlueNova Energy recently launched its planned new production facility in Gauteng. At this facility, located east of Pretoria, the Somerset West-based company will manufacture its Intelligent Energy Storage Systems (iESS) to meet growing demand.

Speaking at the launch, BlueNova CEO, James Verster, said this marks the first step towards the company achieving its IESS production goal of 200 MWh a month during 2022. For perspective, 200 MWh is enough stored energy to provide 30 000 to 40 000 homes with electricity from sunset to sunrise.

Imagining a South Africa where load shedding is no longer a concern, where work from home or the office can continue uninterrupted, and where the economy thrives because critical industry processes are never forced offline due to power outages, Verster said, "We are at the tipping point. With boxes like these (the containerised iESS system) I'm speaking about taking four to six Gigawatts off the strained national grid. And we can do it in under 12 months."

The BlueNova team at the launch of the new production facilities, east of Pretoria.

BlueNova's significantly increased production capacity will have the potential to make a major impact on power demand during peak periods. The iESS systems can be used as the primary source for grid-assist applications, as well as in peak shaving, load shifting and in backup applications.

Part of the JSE listed Reunert Group, BlueNova Energy is Africa's premier manufacturer of lithium-ion energy storage and plays a key role in combating South Africa's energy crisis. The official opening of the new IESS production facility marks a critical milestone for the company in its drive to increase production substantially in the year ahead.

For more information contact BlueNova Energy.
Tel: +27 (0)21 205 2000
Email: info@bluenova.co.za, visit: www.bluenova.co.za

Committed to South Africa's energy transition

Malvin Naicker, MD, Hitachi ABB Power Grids.

Malvin Naicker, MD, Hitachi ABB Power Grids

The government's announcement of an increase in the threshold for generation licence exemptions for embedded generation projects from 1 MW to 100 MW is likely to result in an uptick of innovative new technologies in South Africa's energy sector. The shift opens the door for independent power producers (IPPs) to ramp up their power generation capacity to alleviate the electricity supply constraints that continue to affect residential, commercial and industrial sectors.

For IPPs that focus on renewable energy, microgrid solutions with battery energy storage systems (BESS) are ideal to ensure stable and sustainable power supply by harnessing solar energy; they also offer a model for a clean energy future. Although coal continues to play a dominant role in South Africa's power generation, the country can leverage the massive opportunity of distributed energy resources.

What this means, and we see it happening in South Africa at present, is the complete transformation of the energy system, encompassing generation, transmission, storage, monitoring and control. As renewables, over time, replace fossil fuels, power grids must remain resilient and will need to become more flexible to adapt to fast-changing demands.

While solar energy currently constitutes a relatively small portion of overall sustainable power generation, it is the world's fastest-growing energy source. However, delivering on the potential of utility-scale solar energy presents significant challenges: from integration with the grid to deployment and use of storage, to asset and operations management, generation and revenue forecasting and predictability, and the ever-increasing cost pressures and fast-track project cycles.

Hitachi ABB Power Grids has industry-leading expertise and an extensive portfolio of technologies, solutions, software and services designed to support every stage of renewable project development. With over 130 years of engineering know-how in the power and industrial sector, the company probably has the largest installed fleet of components and systems in the space of power systems for electric utilities and large industries. Some of the leading technologies and services available from Hitachi ABB Power Grids are described below.

Microgrids and energy storage offer one solution for distributed generation delivering off-grid power supply.

Transformer performance and quality have a major impact on the availability of power generated and the reliability of the network.

Asset and work management

Among the first joint offerings introduced earlier this year by Hitachi ABB Power Grids and Hitachi Vantara are Lumada Asset Performance Management (APM), Lumada Enterprise Asset Management (EAM) and Lumada Field Service Management (FSM). This asset and work management software portfolio enables energy companies to be more adaptive, collaborative, insightful and predictive. Hitachi ABB Power Grids has combined its deep domain expertise with Hitachi's Lumada digital ecosystem, as well as the domain and services expertise of Hitachi Vantara, to guide customers in using technology to transform their businesses. Lumada features technologies such as machine learning, AI, advanced data analytics, hybrid cloud management and cybersecurity. This asset

Hitachi ABB Power Grids offers a portfolio of 'fit-for-purpose' transformers.

At a glance

- The challenge of the energy transition is so big, we need many sustainable solutions, from multiple players, working in parallel.
- Fundamentally, the changing landscape of the energy system requires a stable and efficient power network.
- With the emergence of new renewables IPPs, alongside national utility Eskom, and a potentially larger role for other suppliers, transactions in a wholesale market may increase.

and work management software directly addresses the evolving needs of power producers to drive improved business efficiencies and bottom-line results.

Energy portfolio management

The Energy Markets Group provides a comprehensive offering of information, advisory and software applications to support energy market participants and operators in the assessment of infrastructure investments such as new power generation projects, as well as providing them with critical information and systems to support energy operations. The Velocity Suite helps with greenfield project siting and interconnection and business development; Reference Case supports asset valuation and merchant exposure which helps secure Power Purchase Agreements (PPAs) and financing; and Nodal Reference Case helps with risk assessment, which is key in PPA negotiations.

With the emergence of new renewable IPPs, alongside the established national utility Eskom, and a potentially larger role for other suppliers, transactions in the wholesale market may increase. This may include PPA contracts to offtakers as well as other bilateral and cross-border transactions. As a result, risk comes into play. To navigate this successfully, an energy trading and risk management (ETRM) system can be employed and over time, may prove necessary in managing and optimising wholesale energy market positions and risks in an evolving market such as in South Africa.

Microgrids and energy storage

Hitachi ABB Power Grids is creating technologies to support all steps in the energy transition. This is not something that can be debated or delayed. The challenge is so big that there is no room for picking winners – we need many sustainable solutions working in parallel.

One solution to address some of the power grid infrastructure challenges combines microgrids and energy storage which are suitable for a range of applications, including peak shaving, capacity firming, uninterrupted power supply and spinning reserve.

These optimised systems allow for fast response times to bridge variations in demand and supply, help to maintain grid stability and ensure reliable and high quality energy supply to support the creation of a stronger, smarter and greener grid.

Power quality solutions

The changing landscape of the energy system requires a stable and efficient power network and many different innovative solutions. Power quality solutions developed by Hitachi ABB Power Grids such as capacitor and filter banks, stepless reactive power compensators and active filters address various issues like harmonics, low power factor, load imbalance and voltage variations that can cause energy losses and power interruptions. Static Compensation (STATCOM) is part of a suite of grid and power quality technologies developed by the company to boost the transmission capacity and stability of the grid on a larger scale and increase the quality of existing and new ac power systems.

High voltage direct current transmission

HVDC technology is used to transmit electricity over long distances by overhead transmission lines or submarine cables. HVDC transmission offers the advantages of controllability and low total investment cost compared to ac solutions for long-range transmission.

Transformer solutions

Transformer performance and quality have a major impact on the availability of power generated and the reliability of the network. Hitachi ABB Power Grids offers a portfolio of 'fit-for-purpose' transformers, 100% tailored solutions designed specifically for renewable applications, including solar inverter transformers and step-up collector transformers, in addition to a full portfolio of digital transformer solutions, to increase system reliability, lower environmental impact and reduce lifecycle costs.

Together with its customers and partners, Hitachi ABB Power Grids is committed to accelerating South Africa's energy transition towards a carbon-neutral future. The company has placed sustainability at the heart of its business because clean energy generation, network infrastructure and electrification of end-user sectors are crucial to decarbonisation strategies.

Sustainability 2030 is the company's strategic plan for sustainability; it draws from the UN's Sustainable Development Goals and is focused on: Planet, People, Peace and Partnerships. As a partner of choice for a sustainable energy future, Hitachi ABB Power Grids is pioneering digital and energy platforms to help customers overcome complexity, increase efficiency and accelerate the shift towards a carbon-neutral energy future. □

For more information visit: www.hitachiabb-powergrids.com

Measuring and testing power supply

Electrical energy is essential to our daily dealings, driving key sectors that keep the economy going, from private households to large corporations.

The availability and quality of the supply are key. Power suppliers, operators and some government structures have the responsibility of ensuring the power infrastructure is adequately maintained and operated in a way that prevents damage to the network and other private installations. The reliability and availability of power supplies, and their seamless operation, are critical to the economy and to customers. Power suppliers are obliged to provide uninterrupted power, preventing disruptions and in compliance with relevant standards.

For DEHN, through its 111 years in operation, safety has always been a primary concern. Using the extensive experience it has gathered in the fields of lightning and surge protection, DEHN works on safeguarding the reliable supply of power. The DEHNrecord SD measuring and analysis device provides a key advantage to the DEHN product range. As a multifunctional protection and measurement device it streamlines the measurements of all relevant parameters while complying with commonly applied standards.

Measurement and testing performance

The DEHNrecord SD measurement and testing capabilities feature power quality measurement to class A, with certification in line with IEC 61000-4-30 and correctly signed 4-pole load profile and power measurement. The device also provides event messages in the event of limit value violations based on the standard EN 50160, and individual limit values that can be parameterised. With integrated digital outputs and inputs for additional control messages, such as remote monitoring of SPDS or individual control impulses in the event of limit value violation, the user has real-time information on the status of the power supply.

DEHNrecord enables the user to monitor the power supply and determine where faults are located.

Advantages

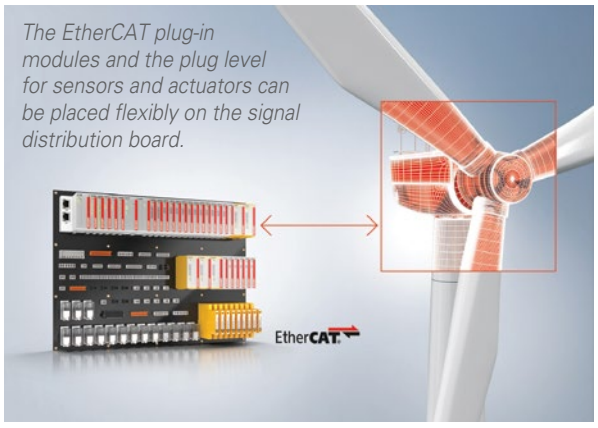
The measurement and testing capabilities of the DEHNrecord place the user in control. Optimised network extension enables the user to determine the exact point where action is required with quick and efficient fault localisation. Defects can be quickly isolated through additional measurements of impulse currents and power frequency surges. With the predictive maintenance feature, trends and faults can be recognised at an early stage, and with the network always in view, the low voltage system can be constantly monitored. In addition, with seamless and legally accurate measurement to Class A standards, the user has a record of power supply system performance should there be a dispute.

By installing the DEHNrecord SD in low voltage systems, such as transformer substations, cable distribution cabinets and renewable energy generation systems, the permanent monitoring of power supply quality provides the user with certainty, and protection from liability claims should the power supply fail.

For more information contact DEHN AFRICA.
Visit: www.dehn-africa.com

EtherCAT plug-in modules for wind turbines

At this year's Husum Wind exhibition in Germany, held 14 to 17 September, Beckhoff demonstrated its many years of know-how and its broad product range for the wind power industry. Among the highlights is a control cabinet for wind turbines, optimised in terms of space requirements and wiring effort, which is made possible by using the EtherCAT plug-in modules from the EJ series.



The EtherCAT plug-in modules and the plug level for sensors and actuators can be placed flexibly on the signal distribution board.

In the control cabinet, the I/O level is realised with the EtherCAT plug-in modules and a compact, application-specific signal distribution board with a wiring level from stock and pre-assembled cables. The EtherCAT plug-in modules are based electronically on the well-known EtherCAT I/O Terminals and offer the same wide range of signals. The electromechanical design enables them to be plugged directly into an application-specific signal distribution board which distributes the signals and the power supply to individual application-specific connectors, in order to connect the controller to further system modules. Elaborate manual wiring of single wires is replaced by simply plugging in prefabricated cable harnesses.

Many of the other components that would otherwise be installed separately in the control cabinet, such as relays,

Wesley-Ciskei wind farm reaches commercial operation

The Wesley-Ciskei wind farm comprises 10 turbines, each with a hub height of 117 m and blades 63 m long.

The 34.5 MW Wesley-Ciskei Wind Farm, located near Hamburg in the Eastern Cape, has reached commercial operation status.

Carl Wlotzka, Project Manager at EDF Renewables, the developer and operator of the wind farm, said: "After successfully completing the final Grid Code Compliance tests, we have now reached commercial operations and we are supplying electricity into the grid."

Built during the Covid-19 pandemic, the project endured the level 5 lockdown when all construction activities ceased for eight weeks. "On re-opening the site, we had to implement strict Covid-19 health and safety protocols, concentrating on a range of measures to combat the spread of the virus. Fortunately, the project was not significantly delayed," said Wlotzka.

"Given the Covid challenges, we are very happy to have completed construction within 23 months."

The wind project is part of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) Bid Window 4.

CEO of EDF Renewables in South Africa, Tristan De Drouas said, "We are proud to be playing a part in contributing to South Africa's renewable energy goals and to the economic development of the Eastern Cape region."

EDF Renewables has contributed significantly to South Africa's renewable energy goals, having now completed four wind farms in the REIPPPP. These include the Waainek, Chaba, Grassridge and Wesley-Ciskei projects, which in total contribute 141.6 MW of generation capacity to the grid.

Local economic development

The project has created numerous jobs and resulted in several key economic development initiatives in the community, including an SMME development and upskilling programme. The objective was to assist about 50 SMMEs in the communities surrounding the project site with upskilling in the fields of: Health and Safety, Communication Skills, Financing and Tendering. SAICA ED was appointed to facilitate the programme.

A bursary scheme assisted two students in the local community to study at an institution of higher learning.

The project is also the subject of an academic study by the University of the Free State to assess the socio-economic impact it has on the local communities, as it is the first renewable energy project under the REIPPPP programme in this locality. Phase 1 of the study developed a baseline of the area and phase 2 will measure the same indicators at the end of the construction phase in order to compare them and assess the effect of the project.

For more information visit: www.edf-re.co.za

fuses or surge voltage protection equipment, are housed as compact plug-in modules on the board. This means the space requirement in the control cabinet is significantly reduced, particularly in series production with mid to high quantities, also lowering costs. Another advantage is the minimised risk of incorrect wiring.

The development of a signal distribution board can be done by the user or as a service by Beckhoff.

At Husum Wind Beckhoff also featured its PC-based control and automation technology, long used in the wind power industry. The focus was on the integration of all plant and system functions: from operational management to pitch control; converter, gear unit, and brake control; wind farm networking; and hydrogen technology as a bridging technology to energy storage.

For more information contact Beckhoff Automation.
Tel: +27 (0)11 795 2898; Mobile: +27 (0)79 493 2288
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Visit: www.beckhoff.com

Turnkey natural gas power plant

Load shedding, unreliable power supply and increasing electricity costs are realities that businesses in South Africa must contend with – and they all factored in the decision by an international manufacturer to consider own power generation using natural gas.

Energas Technologies, a leading supplier of high-end and specialised equipment to the oil and gas industries in sub-Saharan Africa was selected to deliver the complete turnkey project. It entails the supply and installation of a new gas reticulation pipeline; gas engines (gensets); a new gas-fired steam boiler; a waste-heat boiler which will use exhaust heat from the engines to produce steam; interconnecting piping; a new gas engine building and associated electrical infrastructure.

A complete solution

Energas Product Manager, Laetitia Jansen van Vuuren, says the gas pipeline will carry gas from a new high-pressure customer metering station to the gas generator sets and steam boilers. The R Schmitt Enertec (RSE) G500 gensets will be installed in a new building which Energas will supply.

The exhaust heat from the engines will be used in a waste heat boiler. This 'free' steam will result in a substantial annual saving in the gas bill. Furthermore, projections show that, compared to importing electricity from the grid, additional savings can be realised in the first year of operation. The accumulated savings over 10 years, based on inflation and price assumptions, amount to substantially more than the project value.

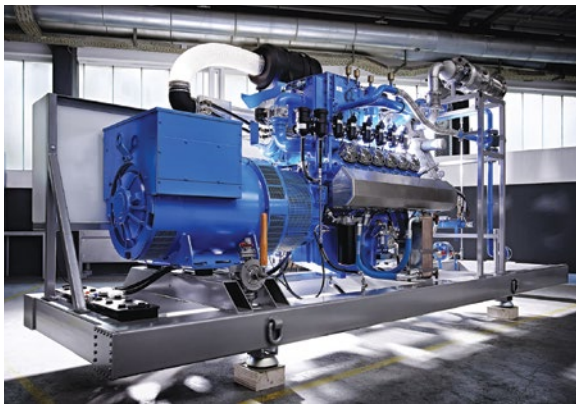
"With the equipment provided, the supplier and Energas can monitor the operation of the engines, tracking various parameters to ensure the engines operate most efficiently. Very few plant operation and maintenance staff are needed to oversee the gensets and steam plant," says Van Vuuren.

"We are convinced that the solutions offered will reduce the overall energy cost to the customer, meet environmental requirements and ensure efficient operation. Our team is capable of executing the project successfully, and we are set to complete it in December this year," she adds.

Key considerations

Highlighting two key talking points van Vuuren says, firstly, heat recovery from engine exhaust gas makes this a very interesting project. Usually, the heat is discharged into the atmosphere. However, the efficiency is significantly increased if the exhaust gas can be used.

"The client previously operated a coal-fired boiler, but it will now be replaced with a waste-heat steam boiler. When more steam is required than can be recovered, the additional steam will be supplied using gas as a fuel source. The waste-heat boiler is a combination boiler; it works by recovering energy from the exhaust heat and also has a gas burner. When the waste-heat boiler is being serviced or the engines are not working, there is a standby gas boiler to ensure continuous supply of steam to the plant," she explains.



The waste-heat boiler is a combination boiler, it uses recovered energy from the exhaust heat and also has a gas burner.

Secondly, having four smaller engines (4 x 500 kW) instead of a single large engine (1x 2 MW) allows for continuous power supply to the plant. When one engine is serviced, the other three can still operate. Or if the plant's usage is low, Van Vuuren adds, one or two engines can switch off while the other operates at a higher and more efficient load.

Its proven ability to offer turnkey solutions was to Energas' advantage. "Engineering and integration of the whole system or solution is what we do best," says Van Vuuren.

The company's core competence is finding and implementing engineering solutions in the energy and natural gas industry. Energas has been a supplier of equipment and solutions to the industry since 2001, when natural gas was introduced in South Africa. It specialises in solving engineering challenges, working in collaboration with its long-term consulting partners and trusted equipment suppliers.

"Energas employs graduate mechanical, electrical and process engineers and technicians who bring together more than 70 years of experience in the industry. When we handle large turnkey projects, we focus on the project management and quality assurance of the projects and use consultants and our suppliers to do detailed design," says Van Vuuren.

She urges businesses to consider the natural gas energy route because of the documented benefits. "Industries choosing own power generation with natural gas will reduce their energy costs and become more independent from the grid, especially when this is combined with heat recovery. Millions of rand can be saved over a few years and they can ensure that their production is not affected during load shedding," says Van Vuuren.

For more information contact Energas Technologies.
Tel: +27 (0)11 397 6809
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Visit: www.energas.co.za

Temperature measurement in the cement industry

Industrial IR sensors and systems for non-contact temperature measurement are essential in the cement industry and can be employed throughout the plant for process monitoring and predictive maintenance. Sensors for non-contact thermometry detect the energy radiated from an object and measure its temperature with high accuracy within a temperature range of -50 to 3 000°C. Here, R&C Instrumentation sets out key monitoring points to support kiln efficiencies and longevity.

Early detection of hot or cold spots is critical to avoid costly maintenance or an unplanned shutdown. Continuous monitoring of the kiln shell along its length, for example, will provide the earliest possible indication of potential problem areas. Spot monitoring of the rotary burn zone temperature is also important for maintaining product quality and kiln efficiency. Monitoring of the temperature on and after the clinker cooler section allows for proper cooling levels to be tracked, and safeguards can be set to prevent fire hazards and conveyor belt burn out.

Non-contact thermometers have a response time in milliseconds, much faster than thermocouples and RTDs, and can be used from an optimal distance with high accuracy. Measuring temperature at a distance from the object means the sensor can be located in a more amenable environment with less heat and fewer vibrations or interferences.

Ratio or two-colour pyrometers are special versions of non-contact temperature measurement instruments often used in harsh environments. The ratio of energy detected in two different narrow spectral bands is used to calculate the true temperature, even through dust, smoke and vapour. Mounted in a water-cooled rugged thermojacket, the sensor can be used in very high ambient temperatures, making it ideal for measuring clinker temperature in the sinter zone of a kiln.

Careful management of the kiln contributes to a plant's success. However, there are a number of problems which can shorten the lifetime of a kiln and are these are important to look out for.

One of the most common relates to the build-up of coating inside the kiln shell. This coating provides protection for the shell, and it is essential that it remains even across the kiln wall. If there is an imbalance within the kiln, perhaps due to poor flame position, the coating may become thin, thus reducing its protective property. Or worse, the coating may fall away from the wall and bring refractory bricks with it. This is a sign of impending kiln failure, unless the operator can cool the kiln locally at the problem point and promote the build-up of new scale.

Another problem, which can significantly reduce productivity, is the build-up of excessive deposits within the kiln. Ring-like formations towards the entrance of the kiln can reduce the throughput of raw materials into the kiln. Early detection is essential to enable the operator to remove such formations before they become too restrictive.

Ratio pyrometers which are designed for use in harsh environments support careful kiln management.

One further problem relates to the position of the flame within the kiln. While it is important to ensure its correct position, length, and form for optimum combustion, it is equally important that refractory bricks in the vicinity of the flame can respond correctly by promoting appropriate levels of protective coating.

By monitoring the temperature of the kiln surface, it is possible to detect each of the above problems before they become too serious. While localised areas of cool temperatures equate to high levels of coating or deposits, relatively higher temperatures indicate low coating and hence poor protection of the kiln shell. By monitoring how much the temperature changes and over what distances, it is also possible to identify the exact nature of the fault, be it a ring around the circumference of the kiln shell, or a localised area of poor coating.

R&C Instrumentation supplies temperature monitoring instruments and is the sole sub-Saharan agent for Raytek, Ircon and Datapaq temperature monitoring instruments, known collectively as Fluke Process Instruments. □

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

Compact temperature measurement devices

Instrotech has available the Optris temperature measurement devices, Xi 80 and Xi 400, which combine the benefits of infrared cameras and infrared thermometers. “With the Xi series, we are launching a semi-autonomous sensor which, in addition to traditional PC- and software-based operation, also works as a smart pyrometer with analogue or digital outputs, and seeks the target on its own. This opens up new fields of application, in mechanical engineering for example, or for multi-sensor applications,” says Torsten Czech, Head of Product Management at Optris.

Ideal for OEM applications

The Xi series is a fusion between a robust, compact pyrometer and an advanced IR camera. The integrated automatic spot finder function enables accurate temperature measurements in moving objects without the sensor having to be readjusted. Sensor adjustment takes place autonomously, without needing a connection to a PC. In addition to a direct 0/4-20 mA analogue output, the devices also offer users digital interfaces such as Ethernet or RS485. An external processing interface provides for the further processing of up to nine freely definable analogue outputs. This makes the pyrometer ideal for OEM applications.

Motorised focus, easy installation and use

Both Xi models are equipped with a motorised focus which enables remote focusing using the free PIX Connect software. The sensors have a resolution of up to 382 x 288 pixels, a frame rate of up to 80 Hz and a measuring spot to distance ratio of up to 390:1. Xi devices are calibrated for temperature measurements within a range from -20 to 900°C. Customers receive a ready-to-use package including a mounting nut, a mounting bracket, software and a connection cable.

Microscope optics

The new microscope optics for the Xi 400 infrared camera provide for reliable temperature measurement on tiny objects from 240 µm. In combination with a suitable stand, this enables professional measurement of printed circuit boards and other electronics components. The measuring distance between camera and object is variable between 90 and 110 mm. The built-in motor focus allows for an easy focusing of the camera with the included PIX Connect software.

The microscope optics of the Optris Xi 400 provide for temperature measurement on tiny objects.

Key specifications

- Analysis of smallest components down to 240 µm
- Motorised focus provides for easy handling
- Recording of radiometric videos
- Optical resolution: 382 x 288 px.

Applications

Circuit boards are a core part of electronic devices. They keep getting smaller – and more powerful at the same time. Temperatures of assembled circuit boards can easily be measured with the microscope optics of the Xi 400 thermal imager so overheated areas can be identified quickly. The causes for excessive temperatures can be many: defective components, incorrectly dimensioned circuit paths or poorly soldered joints. When these are detected in production, they can be prevented.

For more information contact Instrotech.
Tel: +27 (0)10 595 1831
Email: sales@instrotech.co.za
Visit: www.instrotech.co.za

1 000 000 MH-4 sensors since launch in 2020

The MH-4 mobile hydraulic pressure sensor is a reliable and highly resilient sensor.

The WIKA Group is celebrating the manufacture of 1 million MH-4 mobile hydraulic pressure sensors since it launched the product just one year ago in 2020.

The MH-4 is a powerful, reliable and highly resilient pressure sensor. Because the challenges in practice are high, for safe machine operation, the sensor must deliver high-precision measured data, even under the most demanding conditions. With constant performance stability during the full life cycle, the MH-4 ensures the greatest possible operational safety.

With its numerous interfaces, customer-specific adaptations and individualisation, the MH-4 is ideal as an OEM pressure sensor and Wika has already satisfied its customers a million times over.

Since its launch in 2020, the MH-4 has been manufactured to the highest standards on the company’s highly automated production line at its headquarters in Klingenberg am Main, Germany.

For more information contact WIKA Instruments.
Tel: +27 (0)11 621 0000
Email: sales.za@wika.com, visit: www.wika.co.za

Conductivity sensor for use in aggressive media

The Knick SE 656N toroidal conductivity sensor is a sturdy and corrosion-resistant sensor that, due to its high chemical resistance and durability when exposed to aggressive media, is particularly suitable for applications in the chemical industry.

A combination of a large sensor opening and dirt-repellent material prevents blockages and deposits in media with a high level of pollution. The inductive measuring principle enables full galvanic isolation of the measurement sensor from the medium.

The sensor is an all-rounder, suitable for a multitude of applications with a measuring range covering six decades, from 0.002 mS/cm to 2 000 mS/cm. The digital version, equipped with the Memosens protocol, offers considerable process and data security, and ensures reliable data recording.

The SE 656N toroidal conductivity sensor can be used for concentration measurement, particularly in highly oxidising acids and bases, and for online quality monitoring of chemical products in tanks and pipes, phase separation of product mixtures, in paper manufacturing (high fibre concentration), and in heavily soiled media, wastewater and fouling media.

In summary the key features include:

- Process-wetted material: PFA
- Sturdy design
- Resistant to contamination and fouling
- Range of six decades
- Inductive measuring principle, full galvanic isolation of sensor coils from process medium
- Digital with Memosens protocol.

The SE 656N sensor is available from Mecosa (Pty) Ltd, the sole agent for Knick Elektronische Messgeräte in Southern Africa.

For more information contact Mecosa.
Tel: +27 (0)11 257 6100
Email: measure@mecosa.co.za

The corrosion-resistant conductivity sensor can be used in diverse applications, including highly oxidising acids and bases.

Surge protection in process plants

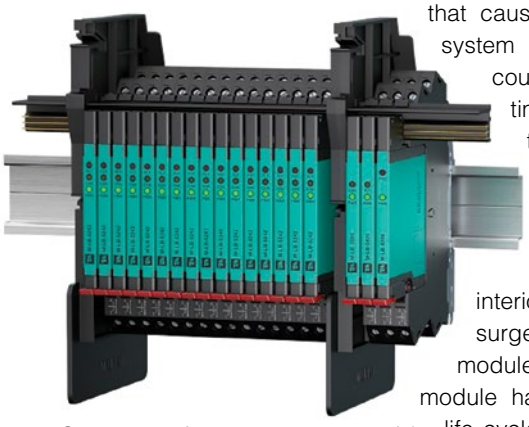
Process engineering plants need to be protected against surge voltages to prevent their availability being jeopardised. However, surge protection modules need to be checked regularly and replaced when necessary. This typically requires considerable effort if the checks are carried out manually, and restricts operation if a signal circuit has to be switched off for the module to be replaced. Pepperl+Fuchs offers a couple of alternatives to eliminate or minimise testing requirements and operational interruptions.

There are many possible causes for surge voltages. Electronics can be damaged by lightning strikes, by transients caused by switching operations and load drops, and by interruptions to the electrical power supply. In addition to the direct destruction of components, there are other effects, in particular the risk posed to plant availability and the consequences of that, such as production downtime, which drives operating costs up. Surge protection systems are therefore an essential, integral part of process engineering plants.

Furthermore, current standards such as EN 62305 (SANS 62305) require that the effectiveness of these systems be checked regularly. Up to now, such checks have usually been carried out manually on-site, which is costly for large plants in particular, and requires trained personnel working with appropriate test kits. However, the test results do not provide any indications of prior damage to the protection module and its state of wear. It has previously only been possible to rate the tested devices as 'good' or 'bad'. To meet the different safety requirements of the signal line market, Pepperl+Fuchs offers two surge protection systems with different functions: the modular M-LB-5000 high-end system with diagnostics, and the M-LB-2000 system for applications in which a minimum specification with additional loop disconnect is sufficient.

Surge protection with condition monitoring

The M-LB-5000 surge protection system with condition monitoring function monitors signal lines automatically and continuously. The patented diagnostics use a special algorithm to detect the different load situations that cause the surge protection system to wear. This includes counting the number of times the gas discharge tube has ignited, detecting the silicon temperature of the suppressor diodes, and measuring the interior temperature of the surge voltage protection module. When the protection module has reached 90% of its life cycle, this is indicated by a yellow diode. This means the protection modules can be replaced neither too early nor too late. Replacing them too early leads to an unnecessarily high replacement frequency, and replacing them too late leads to the plant having phases without sufficient surge protection if the defective protection modules are not replaced immediately. As a result the availability of the surge protection functionality, and of the plant, is optimised, and at the same time maintenance costs are minimised.



Surge protection systems are essential elements in process plants.

The M-LB-5000 modules are mounted on a standard DIN mounting rail. The devices each consist of a base module and the actual protection module. The system also has an insulating partition to maintain clearance when mounting Ex and non-Ex modules on the DIN mounting rail. All modules have a width of only 6.2 mm and provide for simple commissioning without special aids. In addition to the protection and base modules, there are three function modules. The maintenance module reports when a yellow LED lights up on at least one protection module, indicating that this module should be replaced. The fault module indicates when at least one device has a fault (red LED) and needs to be replaced directly. The third unit is a power module that powers the protection modules via the power rail. The error messages are also sent to the function modules or the control panel via the power rail.

Protection modules with signal LEDs

The intuitive, easy-to-read traffic-light display on the protection modules reduces testing effort since the fault can easily be assigned to a specific signal circuit. A green LED on the protection module means the full protective effect is present, there is a sufficient functional reserve, and there is no need for action. As part of the condition monitoring function, the yellow LED signals that the protection module has reached 90% of its life cycle. The signal circuit is still protected, but the module should be replaced soon, during the next regular servicing, for example. A red LED indicates that the protection module may be permanently damaged and no protective effect can be guaranteed. It should be replaced immediately to prevent damage during the next surge voltage event.

Benefits of modularity

During maintenance, the modular assembly of the surge protection system offers significant advantages compared with conventional solutions. Due to the base module on the DIN mounting rail, removing the protection module does

Surge voltages can damage electronic components and pose a risk to plant availability.

not cause a signal interruption. The signal circuit is closed without interruption via the base module at the moment when the connection between the signal circuit and the protection module is no longer established. A protection module can therefore be replaced without affecting plant operation. An additional loop check is not necessary.

However, if the signal circuit needs to be intentionally interrupted – for isolation tests during commissioning or in recurring tests – the protection module can simply be rotated by 180 degrees and plugged in. In this case, the signal circuit is interrupted by an integrated isolating function. This allows the module to replace terminal blocks in the cross connect level with no additional space required. This combination of condition monitoring, more than 100 modules per function module block, loop separation, and 6.2 mm width with single-loop integrity is unique on the market.

At a glance

- New surge protectors from P+F reduce the need for regular testing and limit process interruptions.
- The surge protection system with built-in condition monitoring optimises plant availability and reduces maintenance costs.
- A simpler model is also available for applications requiring only minimum specifications plus loop disconnect.

Terminal block with surge protection

Pepperl+Fuchs developed the M-LB-2000 for applications requiring only minimum specifications plus loop disconnect. It has a form factor similar to that of the M-LB-5000 and is designed to be attached directly to the DIN mounting rail. The main differences are that the module cannot be diagnosed or replaced without interrupting the signal line. A loop disconnect function is achieved when the module is plugged in via two easily accessible switches on the front. The M-LB-2000, also just 6.2 mm wide, saves space in the switch cabinet and practically replaces the terminal block with surge protection. This means disconnect terminal blocks are no longer needed, saving costs. The certificates include ATEX, IECEx, Zone 1 and SIL 3. □

For more information visit: www.pepperl-fuchs.com

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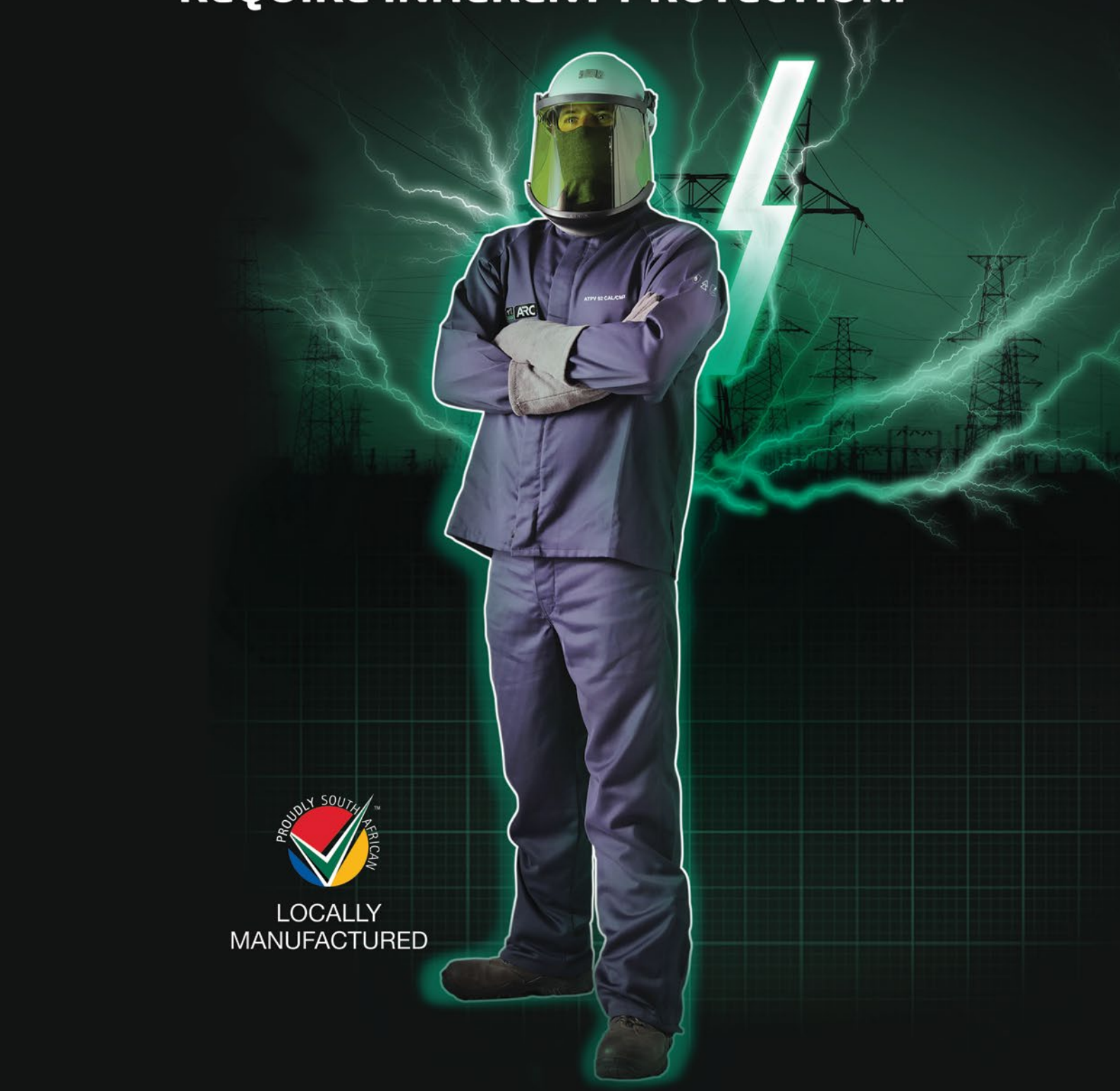

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BOVA ARC

Johannesburg as a live laboratory to measure lightning

The Johannesburg Lightning Research Laboratory at the University of the Witwatersrand (Wits) is pioneering research in lightning protection with support from DEHN Africa.

Lightning is one of the biggest weather-related killers in the world. In South Africa, more than 250 people are killed annually by lightning, and worldwide the number is about 24 000 people. Thousands more are injured and, according to the South African Weather Service, estimated related insurance claims in South Africa amount to more than R500 million each year.

As a climate change hotspot, Southern Africa is likely to see increased lightning activity, making the study of lightning in Johannesburg important to mitigate the dangers to human safety and economic sustainability.

"As we move more towards renewable energy systems using solar panels and wind turbines, which are highly susceptible to lightning damage, we need to learn how these are affected by lightning and how to protect them better," says Dr Hugh Hunt, Senior Lecturer and Head of the Johannesburg Lightning Research Laboratory (JLRL) in the School of Electrical and Information Engineering at Wits.

To build on the university's rich history of pioneering research into lightning and as part of the Wits Centenary Programme that seeks to advance society for good, the JLRL has partnered with lightning protection company, DEHN AFRICA, and Sentech to support research into the protection of renewable energy systems from lightning.

The research involves installing a custom-built DEHNdetect lightning current measurement device – intended for measuring lightning currents to wind turbines – on the Sentech Tower in Brixton, Johannesburg.

"The best way to study lightning is to measure real lightning, which cannot be simulated in a high voltage lab," explains Hunt.

Hunt and his colleague Dr Carina Schumann, who made the first high-speed videos of lightning in Africa in 2017, together with postgraduate students and collaborators from around the world, will see the JLRL turning Johannesburg into a laboratory where live lightning events can be measured and characterised through the use of high-speed cameras, direct current measurements, fast electric field measurements, field measurements and comparison with lightning location systems.

"Lightning is measured in flashes per square kilometre per year and Johannesburg averages a high flash density of 15 flashes/km^2/year, compared to Europe with an average of 3 flashes/km^2/year.

"It is rare to find a country's economic and industrial centre in such a high lightning risk zone and Johannesburg is ideal to study lightning events because of its unique characteristic of having a high cloud base, six kilometres on average, making it possible for us to film a full lightning flash. No other location where lightning currents to tall towers are measured can correlate the measurements with high-speed footage as well as we are able to do in Johannesburg," says Hunt.

Lightning over Johannesburg. The JLRL at Wits will measure and analyse live lightning events.

The JLRL made the first measurements using the DEHNdetect device over the 2020/21 Johannesburg summer thunderstorm season, high-speed filming and measuring an astounding 50 lightning currents. Further support enables the JLRL to conduct future research around the protection of renewable energy systems from lightning. It will also go towards providing bursaries for MSc and PhD students working in lightning protection research, and growing the research capabilities for the JLRL.

Professor Estelle Trengove, Head of the School of Electrical and Information Engineering in the Faculty of Engineering and the Built Environment, says the JLRL is one of the School's flagship projects for the #Wits100 celebration next year.

"Although much is known about lightning, there is much that we still need to learn. The JLRL is working at the cutting edge of lightning physics today and the school is grateful for this further support that allows it to expand this project further.

"We would like to install current measurement equipment on several other tall structures in Johannesburg to get a more complete picture of lightning activity over the city," she says.

International Conference on Lightning Protection 2022

To add to the Wits centenary celebrations, the International Conference on Lightning Protection – the premier lightning conference in Europe – will be hosted in South Africa next year thanks to the successful bid by Professor Ian Jandrell, a renowned expert in the field of lightning, high voltage engineering and forensic engineering, and currently the Deputy Vice-Chancellor: Systems and Operations at Wits University.

For more information visit: www.wits.ac.za/eie/

Electrical products for hazardous locations

Using its expertise and experience in developing leading electrical products for hazardous locations, local manufacturer Pratley developed the world-class Envirogland range, and it offers its knowledge to the industry at large. Marketing Director Eldon Kruger, a recognised authority on the subject and current President of the South African Flameproof Association (SAFA), presents a 'Hazardous Locations' seminar. The seminars are usually aimed at senior management and engineers wanting to refresh their knowledge in this field. Past attendees have benefitted significantly from Kruger's interesting and informative sessions.

According to the South African National Standards (SANS) and the International Electrotechnical Commission (IEC), a hazardous area is where there is a risk of explosion, due to the presence of flammable dusts or explosive gases and vapours. To ensure the health and safety of employees working in such hazardous areas, it is critical that all electrical equipment used does not pose a risk of ignition in the event of any failure.

Over the past few years, Kruger has hosted numerous seminars and workshops to inform and educate managers on the dangers posed by hazardous locations, and on which Pratley products work best in these environments. The seminars can also be conducted as live online webinars. The expert knowledge that Kruger and the company hold has seen the development of Pratley's Ex range of cable glands and junction boxes, which comply fully with IEC and ATEX and South African Ex specifications.

In addition to the specialised seminars presented by Kruger, Pratley offers cable gland training at the Pratley Training Centre. The recently refurbished centre includes a modern, fully equipped conference room and a practical workshop area of over 300 m². Here learners, electrical artisans and engineers learn about the importance of correct cable termination and electrical product selection.

The courses equip artisans with the skills they need to gain the maximum benefit from Pratley's electrical products. The most popular course is a basic theoretical and practical cable gland training workshop focusing on the fitting of cable glands in non-hazardous and hazardous locations.

Eldon Kruger, Marketing Director at Pratley, is a recognised authority on hazardous locations.

For more information contact Pratley.
Tel: +27 (0)11 955 2190
Email: sales@pratley.co.za
Visit: www.pratleyelectrical.com

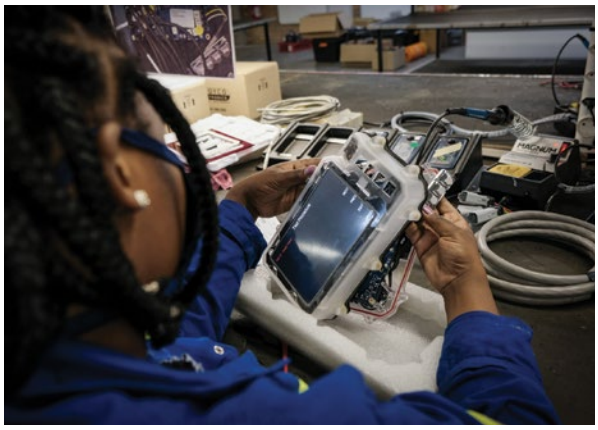
Collaborating on technology for mine safety

South Africa-based Booyco Electronics has entered into a strategic collaboration with technology systems integrator Ramjack Technology Solutions, as it extends its collision prevention system to the world. Working together, the companies will assist mines in integrating Booyco's technologies effectively, in the interests of greater safety and productivity.

"Technology is changing the way key technical services are provided to mines," says Anton Lourens, CEO of Booyco Electronics. "The world is becoming a smaller place, and the value that service providers deliver to mining customers is no longer determined by a corporation's size.

"Technological specialisation now demands expertise, skill sets and hardware that extend well beyond what single multinational companies can provide. That approach has invariably led to silos of expertise developing on mines and these require bridging," Lourens adds. Booyco Electronics will therefore be working with Ramjack Technology Solutions to help mines integrate its proximity detection system (PDS) solutions with other technologies, to support higher levels of safety and productivity.

"With South Africa's advanced mine safety legislation requiring Level 9 compliance for collision avoidance, our partnership can offer considerable overall value to mines around the world," he says.



Booyco Electronics produces its leading PDS equipment in South Africa.

Mike Jackson, President and CEO of Ramjack Technology Solutions, says Booyco Electronics fills an important space as a best-of-breed technology provider in a critical component of mine safety.

"Our role as a systems integrator is to help mines get more value from their chosen production and safety technologies," Jackson says. The company does this in two main ways: via horizontal integration – bridging the gaps between the technology 'silos' on mines, and

Arc flash protection gear with inherent protection

The Bova ARC range of arc flash protection gear from leading safety wear manufacturer Bova, incorporates inherent protection. Using Beier's I-ARC fabric, an innovative solution in thermal protection fabrics that was developed in collaboration with LENZING™, a global leader in inherently Flame Resistant (FR) fibres, the Bova ARC range ensures the safety of the wearer.

The Bova Arc range of protection gear offers wearers the benefits of inherently flame resistant protection as well as comfort.

As well as its inherent FR protection, the I-ARC material gives the Bova Arc range the advantage of comfort.

Inherently flame resistant materials maintain their FR qualities: these cannot wash or wear away, even when the protective wear is subjected to everyday household detergents and bleach. The fabrics also offer strong abrasion resistance and low shrinkage.

"People working in the power generation, distribution and maintenance industries and electrical contractors don't always realise how important it is to wear the right protective garments. An arc flash is extremely dangerous and can affect people as far as seven metres away from the blast, which is why the garments must have the ability to self-extinguish as quickly as possible," explains Deane Nothard from the BBF Safety Group.

The standard for arc rated garments is that they can self-extinguish within two seconds once the exposure to a flame has been removed. However, this is normally measured in laboratory conditions on an unused garment. Bova wanted to emulate these tests with real-life laundering scenarios.

Internal tests were conducted after washes with an everyday household detergent which includes stain removal and fine print advising against washing FR materials. The chemically treated FR fabrics of a number of popular arc garments currently in use, failed after as few as 15 washes and completely burnt out. By contrast, the I-ARC fabric at 15 washes did not ignite at all. A bigger concern is that the treated fabrics showed no noticeable deterioration before they failed.

The Bova range, specifically compared to other inherent FR garments, also offers the advantage of comfort. In any working environment, it is important to work comfortably. The Bova ARC range which is available in CAT2 – 13 CAL/CM^2 and 52 CAL/CM^2 offers a superior weight-to-protection ratio. The lighter weight of the garments

via vertical integration – taking the process right from instruments up to platform level.

He highlights that the inter-operability of leading technologies such as Booyco Electronics' collision avoidance systems is the optimal way to achieve the 'mine of future'. This allows mines to take up the best technologies available and ensure they work together on their on-site platforms.

"Technology providers like Booyco and Ramjack have the advantage of learning from the experience of many mines – not just one," he says. "This gives our customers significant added value, as they can benefit from the learnings that have taken place elsewhere, without bearing the cost of developing that experience on their own."

The two companies have already collaborated informally on a significant deep-level gold mining project in South Africa and are excited by the prospects that this work has opened up. Lourens notes that mines globally are moving towards the Level 9 requirements outlined by the Earth Moving Equipment Safety Round Table (EMESRT), even though relatively few countries to date have made it compulsory through national legislation.

For more information visit:
www.booyco-electronics.com

across both categories compared to those from other leading suppliers adds to the comfort provided by the fabric's breathable properties and good moisture management, ensuring the wearer can still feel cool and dry while benefiting from the inherent FR protection. The LENZING blended materials contain both hydrophilic (water absorbing) and hydrophobic (water resistant) fibres to create an evaporative cooling effect. This allows wearers in different industries and exposed to different arc hazard levels to benefit from the balance of inherent protection, durability and comfort.

For more information contact Bova.
Visit: www.bova.co.za/arc

More than 65 years in industrial electrical equipment

Since 1952 MARECHAL ELECTRIC has designed products to advance electrical safety in the industrial environment.

Created in 1952, MARECHAL ELECTRIC is a French family business, independent, committed to its customers, its employees and its suppliers. With a consolidated turnover of nearly €100 million, its operational and/or sales subsidiaries in Europe, America, Asia, the Middle East, Africa and Australia, offer the best products and local services to the most demanding customers.

A workforce of nearly 500 worldwide includes research and development, manufacturing and commercial development skills. The product range is designed for all sectors of industrial activity where safety and endurance are required.

The company specialises in the manufacture of low voltage electrical connectors from 5 A to 1 250 A, as well as electrical solutions for potentially explosive atmospheres through the TECHNOR® brand.

Customers benefit from MARECHAL® products designed to ensure safety, durability, performance, ease of use and energy efficiency.

The company offers products under two complementary brands – MARECHAL® and TECHNOR® – delivering the same level of quality worldwide. Committed to this approach, MARECHAL ELECTRIC has remained since 1952 an example of success, offering products of unrivalled quality, resulting from the research and development that make the reputation of the French electrical industry. MARECHAL ELECTRIC also stands for the principles of collaboration based on trust and proximity to its partners, suppliers, customers and employees.

For more information contact Robyn Ellis at MARECHAL ELECTRIC.
Tel: +27 (0)11 894 7226
Email: r.ellis@marechal.com
Visit: www.marechal.com

Machine guard locking – the right way

According to ISO 14119 'Safety of machinery – Interlocking devices associated with guards – Principles for design and selection', an interlocking device must prevent a machine's hazardous movement as long as the movable guard, such as a safety gate, is open.

This means that the hazardous machine movement stops immediately when the safety guard is opened, and restarting is prevented for as long as it is open.

An interlocking device with guard locking is considered for use where the machine still poses a danger following the stop command, that is, when it has a time lag – as is the case in machines with rotating blades or oscillating wheels and in robots. The guard is only unlocked when the machine is in a safe state or has stopped completely. The safety gate can only be opened when the machine no longer poses any danger.

The PSENmech safety gate system ensures the safety gate is safely locked until the plant or machine has stopped.

Process protection and personal protection

Different functional principles can be used with respect to safe guard locking depending on the application. The fundamental question here is: Should the operating personnel be protected in addition to the process? For pure process protection (that is, preventing unintentional interruption of the production sequence), guard locking according to the open-circuit current principle is sufficient. The guard locking is held in place by a magnet – and the magnet is deactivated again for unlocking. This is a functional principle offered by products such as the non-contact safety gate system PSENslock, from Pilz. It combines safe safety gate monitoring with an integrated electromagnet and thus offers safe position monitoring with process guard locking in a single system.

Entry requires additional protection

If operating personnel can – or must – enter the machine, and if there are dangerous overrun movements that could result in injury, personal protection must be taken into account in addition to process protection. Here, safe guard locking that complies with EN ISO 13849-1 is necessary. The selection of the appropriate interlocking device is then based on the performance level (PL) determined by the risk analysis. Safe guard locking can be achieved by means of the closed-circuit current principle in this case. Unlike the open-circuit current principle, a spring is used here to activate guard locking, and a solenoid coil is used to open the guard locking. The mechanical safety gate system PSENmech, also from Pilz, provides safe guard locking such as this up to PL c, with fault exclusion up to PL d.

Bistable as a principle

In addition to the closed-circuit current principle, Pilz uses the bistable principle in its safety gate portfolio. This two-channel guard locking control ensures safe guard locking. Fault cases such as a short circuit are recognised with this control, which can prevent unintentional opening of the gate even in the event of a fault. At Pilz, this principle is implemented with the safety gate system PSENmlock, which provides safe interlocking and safeguard locking up to PL e.

Pilz safety equipment is available in South Africa through Prime Automation.

For more information contact Prime Automation.
Tel: +27 (0)41 819 7746
Visit: www.primeautomation.co.za

Bright, uniform illumination for safety and productivity

Improve ergonomics and increase workers' productivity with bright, high-quality, uniform light from the WLS70 sealed, LED strip light. The WLS70, from Turck Banner, is a high-efficacy strip light used in industrial work areas. Ac models can be daisy-chained to power multiple lights and control intensity simultaneously via 0 V to 10 V. Dc models also offer dimmable intensity with PWM.

The uniform light output of the WLS70 reduces shadows, improves visibility, and gives workers the light they need to work efficiently and without making mistakes. With 1350 lumens per foot and a diffuse polycarbonate window the WLS70 illuminates target surfaces uniformly and without hot spots.

The WLS70 is simple to install with quick disconnect options. Its sturdy aluminium housing encased in a shatterproof, polycarbonate shell makes it suitable for use in harsh environments, in indoor and outdoor applications. The WLS70 is available in lengths of 300 mm, 600 mm, 900 mm, or 1200 mm.

The WLS70 is a high-efficacy, energy-efficient strip light designed for industrial applications.

It is exceptionally energy efficient for overall cost savings with over 140+ lumens/Watt. Automatic temperature protection is built into the unit. Dimming assists in saving energy and optimising workplace ergonomics. Its cost-effective design also contributes to a low overall cost of ownership.

As a rugged work light the WLS70 features a waterproof and dustproof IEC IP65-rated housing which makes it usable in challenging environments.

The WLS70 can be used as a machine light, in industrial automation systems, for inspection of plant and equipment, in dairy and poultry production, and in wet and harsh environments, among other applications.

For more information contact Brandon Topham at Turck Banner.
Tel: +27 (0)11 453 2468/
Email: brandon.topham@turckbanner.co.za
Visit: www.turckbanner.co.za

SA engineers head for prestigious master's programmes

Skills development is a critical component that will contribute to South Africa's successful economic growth, infrastructure development, and our future generations. Consulting engineering firm Knight Piésold is one company that builds its core culture around such growth and development. The firm provides specialist services to businesses operating in the mining, power, water resources, infrastructure, and oil and gas industries.

Knight Piésold has a long track record of delivering technical excellence, creative problem solving and exceptional client service. Much of its success is premised on an employee-centric orientation and the creation of an environment where its people are provided with the necessary building blocks to thrive. Employee development is an ongoing priority.

Knight Piésold Southern Africa recently celebrated two of its engineers being accepted for postgraduate studies at the UK's Imperial College London, the only university in the UK that focuses exclusively on engineering, science, medicine and business.

Without either of them being aware that the other was also applying to Imperial College London, civil engineer Shona Vaughan-Williams, and senior civil engineer Prinaven Gounden, have both been accepted for master's degrees. Both had joined the firm as junior engineers after completing their undergraduate degrees with support from Knight Piésold. They agree that without the valuable experience they have gained through their work, they would in all likelihood not have been accepted for these prestigious programmes.

"The motivation I submitted to Imperial College London was based on the work experience I've gained at the firm and the courses that Knight Piésold has supported," says Gounden. "The company encourages its employees to further their studies and grow their knowledge and expertise."

Vaughan-Williams agrees, adding that mentoring and skills development are priorities at Knight Piésold. "I have had two mentors since joining the firm, one of whom focuses on individual development and setting short-, medium- and long-term goals, which encourages you to keep focused and on track. Since I joined the firm as a junior engineer in 2018, I have been encouraged to pursue further courses and studies. As a result, I've attended a couple of courses at the University of Pretoria as well as a few external courses."

That experience, coupled with the extensive project experience Vaughan-Williams has gained, led him to consider a postgraduate degree. He says Knight Piésold's strengths include a strong leadership team with a clear vision of where the firm is going, challenging and interesting projects, which mean no two days are the same, and a positive work environment.

"I'm sad to be leaving, particularly as we're working on some very exciting projects right now, but the firm has been very supportive of the opportunity that has been afforded to me," says Vaughan-Williams. He is looking forward to the doors that a master's degree will open when he returns to South Africa.

Senior civil engineer, Prinaven Gounden (left) and civil engineer, Shona Vaughan-Williams (right), have both been accepted to master's programmes at Imperial College London.

Human Resources Director at Knight Piésold South Africa, Mevashnee Naidoo, says the firm's focus on recruiting the best talent is only one aspect of what sets it apart. "We look to recruit enthusiastic, imaginative and committed people to work with us in solving complex challenges for clients and we retain them by providing them with opportunities to work on exciting projects. We celebrate the strengths and unique talents of each of our employees. We've always encouraged skills development, not only because this grows each employee's technical expertise, but also because it challenges each employee to push themselves forward. Regarding Gounden and Vaughan-Williams, we have every confidence in our employees' return to South Africa, where their careers took flight."

Naidoo adds that as well as filling vacancies, in hiring for the future Knight Piésold South Africa is focusing on proactive talent acquisition to enable business growth. "The company is actively acquiring senior civil engineering talent to execute its projects across Africa successfully."

For more information contact: recruit@knightpiesold.com

Consulting engineering firm Knight Piésold serves clients across different industries, including the water resources sector.

Safe data storage and effective recovery

Lourens Sanders, Solution Architect at Infinidat

Lourens Sanders, Infinidat.

South Africa is an attractive target for cybercriminals for a number of reasons, and the past few years (and months) have seen a sharp rise in high-profile ransomware attacks. One of the key drivers of increasing attacks is the fact that data is a de facto currency and a valuable commodity on the black market. While backup is a critical component of data protection, when this backup is also encrypted by malicious software, companies are often left with few options other than to pay the ransom. That means an effective cyber recovery strategy is key to enabling businesses to get back up and running without having to give in to criminal demands.

Ransomware on the rise

The rapid adoption of digital transformation, artificial intelligence, and the Internet of Things (IoT) has left vulnerabilities in cybersecurity. In the context of the pandemic, it has been a challenge to roll out new technology and address the specific aspects of security that should be done at the same time.

This has made some local businesses appealing targets for strategic attacks. According to Kaspersky, South Africa ranks third in the world for the highest number of users experiencing targeted ransomware attacks. There was a striking increase in targeted ransomware between 2019 and 2020, although general ransomware attacks decreased.

Another concerning trend highlighted by Kaspersky is that 42% of ransomware targets in South Africa paid a ransom in the hope of getting their data back, because they do not have the appropriate systems in place to recover on their own. And although almost half of the victims surrender to paying the ransom, less than half get their data back, which perpetuates the cybercrime cycle.

A comprehensive cyber recovery strategy should provide numerous options for data restoration.

Backup solutions have been the mainstay of data protection for many years, but they are no longer sufficient. Standard backups do not provide a high level of granularity and they can take some time to recover. They also present only a one-dimensional approach to data protection. If that data is corrupted, infected or otherwise compromised, businesses are left stranded. Cybercriminals are increasingly targeting backup solutions, so although data backups remain essential, they are of no use in a targeted ransomware attack because the backups themselves are likely also encrypted and held for ransom.

A holistic recovery strategy

When a data loss event occurs, for whatever reason, the goal is to restore a business to an operational state, where key applications and services are made available, as quickly as possible. Without a holistic strategy, which addresses security gaps and allows businesses to recover their data, mitigating the risk of a ransomware attack is all but impossible.

A comprehensive Cyber Recovery strategy should provide for numerous options for recovery from multiple copies of your data, including snapshots, clones, replicas, or actual backups. This not only addresses the need for enhanced granularity when backing up and recovering, it also protects key applications and services. It enables recovery in the shortest timeframe possible, with multiple recovery points to work from. Furthermore, a thoroughly implemented strategy ensures your data protection environment will not be compromised by ransomware.

Restoration is key

The ability to restore data in the case of loss, damage or compromise, especially from a cybersecurity related incident, is essential to business continuity. Ransomware fees and downtime can sink a business, whereas with an effective restoration and recovery strategy, the impact is minimised because there is always a validated, uncompromised copy of data available.

Today, more than ever, it is critical to adopt best practice around data protection, incorporate processes that validate backups and test restores, and ensure proactive monitoring and alerting to detect anomalies. Purpose-built data protection technologies offer the ability to protect production data, and keep those copies safe and reliable for recovery – a critical requirement in a world where cybercrime is on the rise.

For more information visit: www.infinidat.com

Assisting SA municipalities to manage water loss

The South African Water Loss Specialist Group of the International Water Association (IWA) recently held its regional summit, with almost 200 delegates from around South Africa in attendance, as well as a number of international delegates. The event identified and discussed key water loss management issues facing South Africa and neighbouring countries.

The event, held this year at the start of September, has been presented annually since 1997 by Ronnie Mckenzie, who recently served as the Chairman of the IWA Water Loss Specialist Group.

Water loss in South Africa raises critical concerns for industry and for society and the country as a whole. Water loss from potable water distribution systems rose from around 37% in 2010 to more than 41% in 2016, which is the last year from which official water loss figures are currently available.

In opening the event with a summary of the status quo on water losses in the country and discussing the trends over the past 20 years, Jay Bhagwan, from the Water Research Commission (WRC), said, "This is a concern as the losses show no signs of stabilising and appear to be growing worse rather than better." Bhagwan, who has been working in the water and wastewater fields for over 30 years, is currently the Executive Manager for water and wastewater in the domestic, mining and industrial sectors at the WRC. He also presented details of the many initiatives that have been undertaken by the WRC and referred to numerous reports, user-guides and software, all freely available to assist water managers in addressing leakage and water loss issues.

Bambos Charalambous, past chairperson of the IWA WLSG and the IWA Intermittent Supply Specialist Group cautioned against the practice of intermittent supply. "Many water suppliers in South Africa are introducing intermittent supply as a means of 'reducing water losses' at night, especially in areas where they are not receiving payment for water, and in some cases, they are cutting off whole towns to try and encourage payment. This practice is the worst thing that can happen." Highlighting the dangers of intermittent supply Charalambous showed that it does in fact lead to greater losses and raises the risk of disease outbreaks if the water supply gets contaminated with polluted groundwater during the zero pressure periods.

Many towns and cities around the world are facing their own 'Day-Zero' in regions where severe droughts are occurring. At the summit, delegates heard how Cape Town presents probably one of the best examples internationally of how a major city (population around 4 million) managed to steer itself through the worst drought in over 200 years, avoiding a day zero.

Peter Flower, recently retired director of the City of Cape Town's Water and Sanitation Department, who was in charge of seeing the city through its water crisis, explained what works and what does not work when a city faces the real threat of running dry. Flower said, "Cape Town is the only major city in the world that has managed to reduce its water use by half without resorting to intermittent supply and the lessons learned should be of great interest to any city facing water supply issues."

Stuart Hamilton, Head of NRW (non-revenue water) Development for Miya Water (a global company that works with water and wastewater utilities) and Chairperson of the IWA WLSG, discussed the current status of leakage control and some of the latest techniques in leak detection available globally. Many of the options presented would be beneficial to the region, and Hamilton emphasised the value of investing in what will bring the best results, regardless of budget. He also made the point that there are always solutions to finding leakages. "Water loss will not go away in our lifetime. When you do start on managing water losses, it becomes a lifelong programme of continuous work."

Ronnie Mckenzie recently served as Chairman of the IWA Water Loss Specialist Group.

Jay Bhagwan, Executive Manager: Water Use and Waste Management at the WRC.

Mckenzie discussed the value of monitoring night flows as a key means of identifying levels of leakage in water distribution systems and individual industries and complexes. He highlighted the value of active monitoring where a logger can be used to provide a continuous record of flow into an area, and alarms can be set to trigger whenever the night flow increases beyond the norm due to a new leak.

Niel Meyer, engineer at WRP Consulting Engineers, discussed the issue of pressure management and how to reduce leakage and prolong the life of the pipe network through various forms of advanced pressure control. He said, "South Africa has several of the largest and most successful advanced pressure control installations in the world."

A number of up-and-coming water professionals from different municipalities also presented details of what they are doing in their municipal supply systems to reduce water losses.

This year's two-day event, which is the first such event jointly organised by the SAICE Academy, was supported by several organisations including, IWA WLSG, WISA (Water Institute of Southern Africa), IMESA (Institute of Municipal Engineering of Southern Africa), WRC, Rockblue (a global NPO working to provide clean water and sanitation efficiently and equitably), and WRP.

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

Industry support extended to recycling all plastics

Patricia Pillay, CEO of Polyco.

The Polyolefin Responsibility Organisation (Polyco) has been the driving force behind 26 000 tonnes of polyolefin plastics recycled in South Africa and 64 000 tonnes collected. In response to the recently introduced Extended Producer Responsibility (EPR) Regulations under the National Environmental Management: Waste Act, 2008, Polyco has announced that it will broaden its focus to all plastic types covered under the EPR regulations, as was decided at its annual general meeting in August. This will see the organisation increase its support to producers to manage their products' life cycles responsibly.

Producer Responsibility Organisations (PROs) like Polyco support producers to ensure that all identified plastic products are managed responsibly in order to make a much-needed impact in reducing the problem of plastic litter and pollution in South Africa.

Patricia Pillay, Chief Executive Officer at Polyco, points out that with the new EPR regulations, it is now mandatory for producers to join a PRO or form one themselves. The regulations, legislated for implementation from 5 November 2021, require producers, through their PROs or independent schemes, to manage their products at end of life in order to grow the downstream reuse and recycling of their materials to achieve the published legislated targets. Obligated producers have until 5 November 2021 to register with the Department of Forestry, Fisheries and Environment (DFFE) and ensure that all identified products are covered by an EPR scheme. They can either join an existing PRO, form a new PRO, or develop and submit an independent EPR scheme.

"A challenge with the new EPR regulations is that producers that manufacture more than one type of plastic are required to join more than one PRO to cover their full product range. Considering this, Polyco has made the decision now to manage all plastic polymer types under its mandate. As a membership-based organisation, we followed a consultative process with our members and board and arrived at a 95% in favour vote to increase our mandate. We are very pleased with this result," says Pillay.

Under the new EPR regulations, it becomes mandatory for plastics producers to join a PRO or form one themselves, to manage the recycling and reuse of their products at end of life.

Since its inception in 2011, Polyco has specifically focused on polymer identification codes 2, 4, 5 and 7, as the biggest polymer (plastic) group in the South African market. Following the decision to broaden its focus to cover all plastics, as an organisation Polyco now constitutes a 'one-stop shop' to improve the collection and recycling of all polymer types. "The intention of this decision is to increase our support to all product producers, retailers and manufacturers," says Quinton Williams, Polyco's Business Manager.

Polyco supports producers by growing plastic recycling through collaboration with multiple stakeholders along the recycling value chain, investment in recycling innovation and infrastructure in South Africa, and through educating the industry and consumers about recycling.

The introduction of the EPR regulations plays an important role in minimising the amount of waste that goes to landfill or that lands up randomly in the environment. "Government has big targets to divert waste from landfill and the EPR regulations are a mechanism to achieve these. We place our focus on collaborating within the recycling value chain to reduce the amount of plastic packaging waste going to landfill by increasing the sustainable collection, recycling, recovery and beneficiation of plastic packaging waste materials," says Pillay.

The organisation encourages all manufacturers of plastic products to join an established PRO like Polyco so they can ensure their compliance as responsible producers under the EPR Regulations.

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

Polyco (the Polyolefin Responsibility Organisation NPC) is a non-profit company focused on making waste a valuable resource that works for the country's economy. It aims to grow the collection and recycling of polyolefin plastic packaging in South Africa and to promote the responsible use and reuse of this plastic packaging. Its mission is to reduce the amount of plastic packaging going to landfill and to end plastic waste in the environment.

Established in 2011 by a group of South Africa's responsible polyolefin plastic packaging converters it sees about 196 000 tonnes of polyolefin packaging being mechanically recycled annually. The organisation is funded by its members, who are committed to the environment and to realising a clean South Africa. The members pay a voluntary levy for every tonne of virgin polymer purchased from either local or overseas raw material suppliers, and in turn Polyco ensures that the members' extended producer responsibilities are fulfilled.

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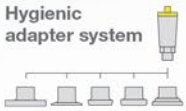

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