PROCESS TECHNOLOGY

AUTOMATION + CONTROL + INSTRUMENTATION

December 2018 / January 2019 vol.32 no.7

PP100007403

INSIGHTS 2019

In partnership with

Electrical Comms Data ECD

ISM sustainability matters

IDEAL NETWORKS

IDEAL Networks' testers now available from your local wholesaler

- **VDV II** cable testers check the integrity of copper cables found in voice, data or video installations.
- **SignalTEK** will provide proof of performance up to Gigabit Ethernet transmission rates on copper and fibre data cabling.
- **LanTEK III** is an easy to use cable certifier that meets existing TIA and ISO/IEC performance requirements.
- **NaviTEK NT** is a network tester for troubleshooting and maintenance of active and passive copper and fibre networks.
- **LanXPLORER Pro** is used for analysing and diagnosing problems in networks, cabling and Ethernet devices using copper, fibre and Wi-Fi interfaces.

A subsidiary of
IDEAL INDUSTRIES INC.

For more information contact:
IDEAL Industries Australia
Phone: (03) 9562 0175
Email: infoaus@idealindustries.com
www.idealnetworks.net

INSIGHTS 2019

Welcome to the 2019 Insights issue where we've asked industry leaders to provide you with their views on what challenges and opportunities lie ahead. The issue combines content from three magazines in one — Process Technology, Sustainability Matters and ECD.

CONTENTS

wfmedia
connecting industry

Westwick-Farrow Media
A.B.N. 22 152 305 336

www.wfmedia.com.au

Head Office
Cnr. Fox Valley Road & Kiogle Street,
(Locked Bag 1289)
Wahroonga NSW 2076
AUSTRALIA
ph: +61 2 9487 2700 fx: +61 2 9489 1265

Editors
Carolyn Jackson
sm@wfmedia.com.au
Glenn Johnson
pt@wfmedia.com.au
Nichola Murphy
ecd@wfmedia.com.au

Publishing Director/MD
Geoff Hird

Art Director/Production Manager
Julie Wright

Art/Production
Colleen Sam, Wendy Blume

Circulation
Sue Lavery, Dianna Alberry
circulation@wfmedia.com.au

Copy Control
Mitchie Mullins
copy@wfmedia.com.au

Advertising Sales
Sales Manager
Nicola Fender-Fox – 0414 703 780
nfender-fox@wfmedia.com.au

Liz Wilson – 0403 528 558
lwilson@wfmedia.com.au

Sandra Romanin – 0414 558 464
sromanin@wfmedia.com.au

Tim Thompson – 0421 623 958
tthompson@wfmedia.com.au

Subscriptions
For unregistered readers price on application.
If you have any queries regarding our privacy policy please email
privacy@wfmedia.com.au

Printed and bound by SOS Print+Media Group

A SMART CITY NEEDS A SMART GRID

Glenn Johnson, Editor

Smart cities necessitate modern infrastructure, and a smart grid is at the top of the list of requirements.

A Smart City can be defined as one in which different types of sensors and data acquisition technology supply information that is used to manage assets and resources efficiently — through a network nowadays known as the Internet of Things (IoT). This includes data collected from citizens, devices and assets that is processed and analysed to monitor and manage traffic and transportation systems, power plants, water supply networks, waste management, law enforcement, hospitals, emergency services and other community services. It could be said that most of the objectives of the smart city relate to social improvements, lifestyle change and sustainability.

Underlying it all is energy as an enabler: whether it be supplying essential infrastructure, such as hospitals and transport, or supplying residential communities, businesses and industry. As a result, a smart city needs a 'Smart Grid'.

The need for a smart grid

Many of the energy requirements of a smart city can be addressed through smart grid technologies.

Reliable supply

Reliability seems to be an obvious requirement, but it has several separate elements, namely:

- reliability of supply
- protection against cyber attacks
- incident response.

Even in the best engineered network problems can arise, whether through faults in the system itself or through external events. A well-designed and smart grid needs to use redundancy to protect supply, distributed intelligence to rapidly identify outages and assess impacts, analytics to identify potential problem areas and automation to avoid outages and restore services. We have already had dramatic examples of failures in this area in recent years in Australia.

As the grid becomes smarter and more interconnected digitally, then it also becomes more vulnerable to cyber attack from cyber-criminals and hostile agencies and nations, making well-designed security protections essential for reliability.

A smart grid should also supply sufficient detailed information in real time to allow for effective response in the event of an incident affecting reliability, or to predict failures before they occur.

Energy efficiency

Energy efficiency in relation to the smart grid involves the minimisation of energy losses. In the case of high- and medium-voltage distribution networks, they are well monitored and optimised to reduce losses as far as possible, and normally this would already be in place.

It is the low-voltage network that is less well monitored or even unmonitored, and so is largely not optimised for reducing losses based on actual load. A smart grid system utilising smart metering and other technologies can help to alleviate this issue.

Energy consumption and generation

Maintaining a balance between consumption and generation has always been a challenge, but with the smart city, there is the opportunity to better exploit microgeneration

> SMART GRID PHYSICAL COMPONENTS MUST BE INTELLIGENT AND MULTIFUNCTIONAL. SO-CALLED 'SMART METERS' THAT ONLY HAVE THE PURPOSE OF ENABLING BETTER BILLING INFORMATION WILL NOT SUPPORT THE FUNCTIONALITY REQUIRED TO TRULY ACHIEVE A SMART GRID.

(such as residential solar), local storage and new consumption types such as electric vehicles.

Information, modelling and automation are key to any sophisticated demand-response management system. Having accurate information about energy flows, major consumption points and sources of stored energy allows for modelling to predict the flow of energy under normal and excessive situations — allowing automation to be used to change the configuration of the smart grid balance of consumption and production.

Infrastructure optimisation

A smart grid can help to optimise infrastructure expenditure. Better balancing of loads and better planning for the impact of microgeneration can lead to a reduction or deferral of capital expense, through better use of existing assets.

Proactive maintenance can also be achieved, by spotting the potential problems as they develop and resolving them, rather than waiting for an outage and having to replace equipment. And information that supports faster identification of problems and root-cause analysis can help streamline operations.

Aligning grid operations with social impact

Traditionally, the priority of outage resolution has been based on the technical characteristics of the problem. With social and sustainable living being a driver of the smart city, the impact on the community of operational activities needs to be more closely considered. For example, fixing an outage may be given higher priority if one of the impacted consumers is an aged-care facility, and lower priority if it impacts a business estate outside of office hours. While this is a more sophisticated use of smart grid data, the information needed to achieve it already exists today.

Characteristics of a smart grid

A smart city needs a sophisticated smart grid system, if the positive social, lifestyle and sustainability targets are to be achieved. There are a number of characteristics that need to be achieved.

Security

Security must be one of the top priorities of the successful smart grid. It will need to achieve the following features:

- Security must always on and not able to be disabled.
- It must be standards based, so that it can be independently verified.
- It needs to provide intrusion detection, since just focusing on the perimeter is insufficient against smart attackers.
- It needs to be compartmentalised so that penetration can be restricted, should it occur.

Distributed intelligence

Smart grid physical components must be intelligent and multifunctional. So-called 'smart meters' that only have the purpose of enabling better billing information will not support the functionality required to truly achieve a smart grid.

In fact, each node in the smart grid needs to be a computing resource, allowing innovation at each layer in the infrastructure. For example, integration with the home or business is a key role for the meter, and control of overall consumption of feeders is a role for the data concentrator, but the true innovation will arrive when these compute resources share information.

Communications

The smart grid must communicate large volumes of information from the meter to the monitoring, analytics and decision-making platforms. Today's IoT technologies, involving cloud technology to enable big data analytics, will make this possible provided the devices combine ease of set-up, ease of maintenance and low cost per interface.

Omnidirectional

Existing grids are designed based on the assumption that the flow of energy is from a centralised generator to the consumer and the flow of information is from the meter to a billing system. For a smart city, the smart grid needs to be omnidirectional:

- Energy can be generated locally and consumed or stored locally.
- Meters can be controlled to turn supply on and off, throttle supply, control relays, control other devices and connect to other meters to gather other utility information.
- Information can flow between the meter and other devices in the home.
- The smart grid must support the omnidirectional nature of energy and information.

Standardised interfaces

Building such a huge collection of interconnected systems as will be found in a smart grid means that automation, command and control, and generation of responses require the close integration of numerous information sources, analytics tools, algorithms and controllers. The smart grid needs to be open and standardised, allowing all its features and capabilities to be exposed to suitably authenticated and authorised systems.

And, it is not just about electrical energy — smart utilities supplying gas and water also need to be considered in the same way.

PRYSMIAN

Creating life long relationships.

Our Network Components keep your cable systems intact.

To link the cable systems and provide communities with a continuous flow of power, you not only need reliable cables, you need dependable components to keep it all together, too. Built on decades of experience we develop state-of-the-art joints, terminations and connectors that'll give your MV network long-lived stability – and you peace of mind.

Read more

We're happy to tell you more:
Ph: 1300 300 304 Fx: 1300 300 307
Email: sales.au@prysmiangroup.com
www.prysmiancable.com.au
Prysmian Australia & New Zealand Prysmian Group

A brand of the
Prysmian Group

LESS IS MORE FOR INFRASTRUCTURE PROJECTS

Resource efficiency and eco-efficiency — producing 'more with less' — have long been core elements of sustainable development, extending even to supply chain resource use and waste impacts. More recently the circular economy concept has emerged as an alternative economic model.

In contrast to the traditional linear economy, the circular economy continuously re-uses resources and materials to reduce dependency on sourcing new raw materials — some of which are becoming increasingly scarce. Waste itself becomes a resource in this new model.

Inspired by circular economy thinking, the Infrastructure Sustainability Council of Australia (ISCA) engaged global engineering and design consultancy Ramboll to apply these concepts to the planning, delivery and operation of major infrastructure projects.

Driving sustainable project delivery

ISCA drives sustainability through the development and application of its IS (Infrastructure Sustainability) rating scheme. This industry-compiled voluntary sustainability performance rating scheme evaluates planning, design, construction and operation of all infrastructure asset classes in all sectors — linking industry, communities and commerce in a holistic framework beyond regulatory standards.

Since the 2012 launch of the IS scheme, 86 projects across Australia and New Zealand totalling nearly $100 billion have either been certified or registered for an IS rating. Collectively these projects have:

- conserved 18.7 million tonnes of $CO_{2\text{-}e}$, the equivalent of powering the households of Brisbane for one year;
- reduced material use by 74%, which has the equivalent environmental benefit of diverting all the household waste of Dunedin for two years;
- reduced water use by the equivalent of 67,000 Olympic-sized swimming pools.

Adding resource efficiency to the drivers

ISCA engaged Ramboll specifically to develop the new Resource Efficiency category for the latest version of the IS rating tool (version 2.0), which launched in July 2018.

ISCA and Ramboll believe that the new Resource Efficiency category will further enhance the ability for the IS tool to deliver significant triple-bottom line benefits, particularly now that version 2.0 allows projects to be supported earlier through the new planning phase rating.

Resource efficiency is interlinked with related, long-established concepts such as waste minimisation, cleaner production (optimising resource and economic efficiency and minimising pollution and waste), industrial ecology, resource recovery and industrial symbiosis (wastes from one industry become raw materials for another). These concepts and models all aim to achieve efficient and sustainable use of natural resources.

In developing the new IS category, circular economy thinking was applied to the planning, delivery and operation of major infrastructure projects. This approach in turn ensures a more efficient and holistic approach to resource management — one that considers optimisation and reduced impacts of material inputs and outputs throughout the project life cycle. For example, projects will be required to develop a Resource Efficiency Strategy as early as possible, so that opportunities can be identified and implemented through the project delivery life cycle.

Through the development of the new Resource Efficiency category, sustainability thinking has been successfully fast-tracked into the mindset and actions of Australia's infrastructure delivery supply chain.

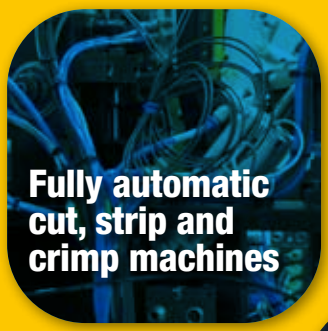
The Ramboll team was led by Nick Houldsworth, Western Australia Manager, supported by Lauren Delony, Sustainability Consultant, Ramboll New Zealand. ISCA efforts were led by Nicole Boyd, Development Manager.

Ramboll Australia

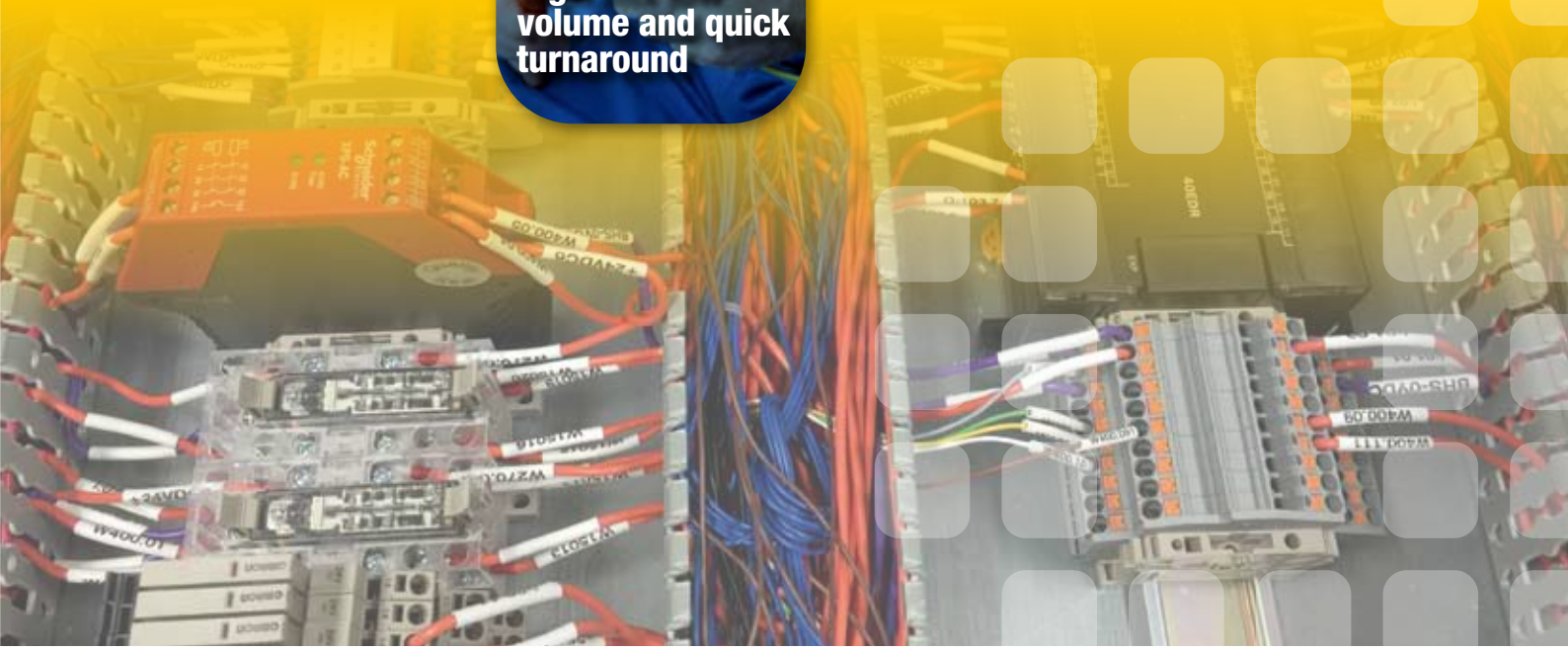
ramboll.com/environment-and-health

Cable Assembly & Box Build Assembly

Metal Work
Label and Wire Marker
CNC Engraving and Machining
Functional Test and Logistic Service



@Ampec we specialise in manufacturing of custom design cable assemblies as well as turnkey electronic and electric product assemblies.



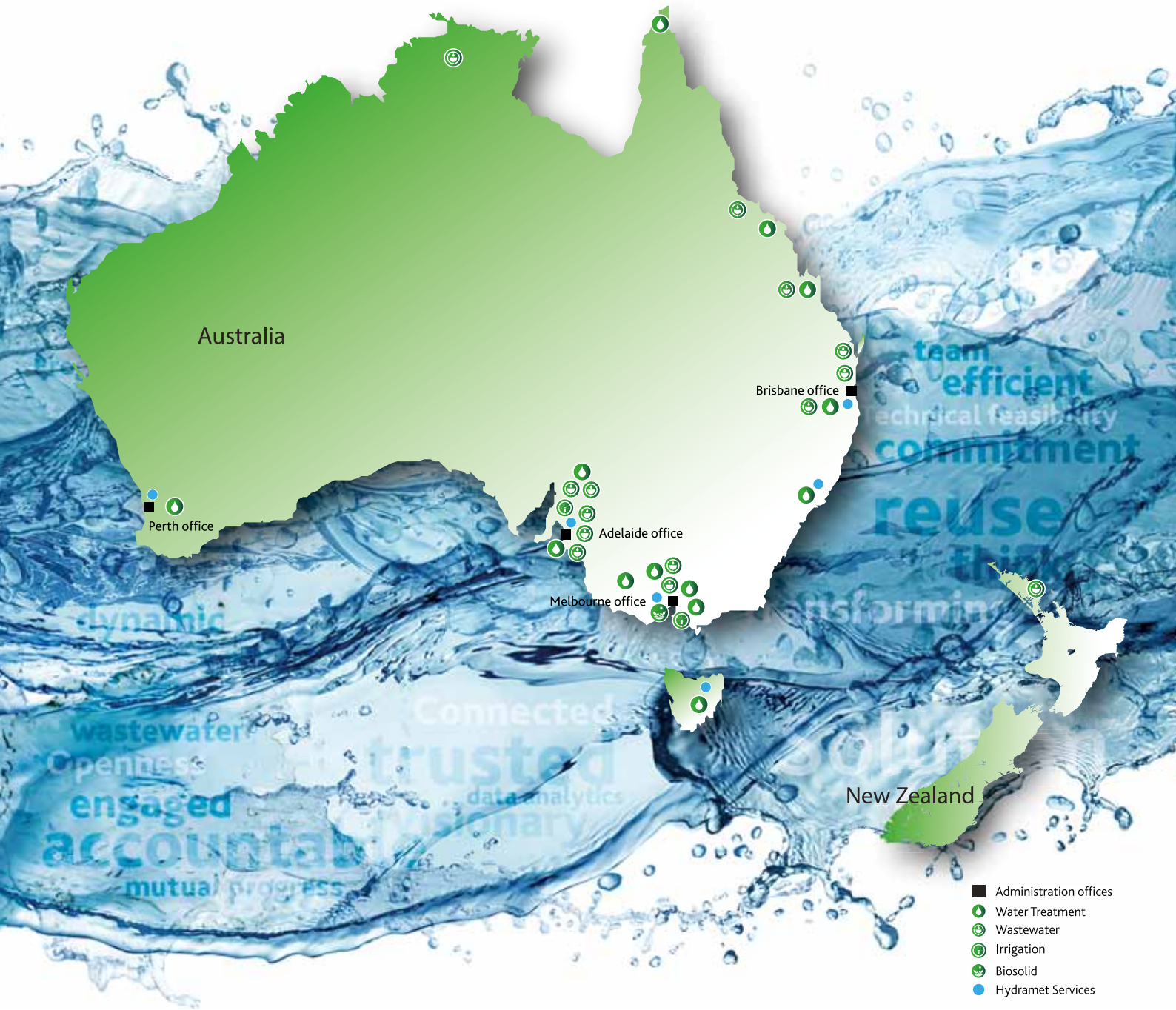
+61 2 8741 5000
e sales@ampec.com.au
w www.ampec.com.au

ampec TECHNOLOGIES

TRILITY™

A member of BEWG

Innovative solutions, committed to the future and confident in making a difference



For more information visit us at **www.trility.com.au**

FRANCOIS GOUWS

MANAGING DIRECTOR, TRILITY GROUP

What are the three biggest challenges facing your industry in 2019?

Australia's population is growing and so is the economy, while climatic conditions are becoming more variable. In order to sustain this current growth trajectory, Australia cannot rely on rainfall as its primary source of water to meet present and future demands. Australia's future prosperity is therefore inextricably tied to how well we plan and manage our vital water resources. As a consequence, the water industry is tasked with the challenge to find and implement alternative climate-resilient sources and practices. The next challenge is having these alternate sources accepted by users. There is no single magical solution, it will invariably involve many integrated approaches, including re-use for potable water. Ultimately, this is a challenge for all Australians, not only the water industry.

Following on from this is the cost of water services. As mentioned above, climate change is forcing us away from traditional surface water sources and most of our water, wastewater and stormwater assets are ageing. Climate change and increased demand factors were never conceived at the time of the assets' original design. Therefore, they need to be adapted, renewed and/or supplemented, which inevitably increases costs. Consequently, the overall challenge is one of who pays for climate change and what the real cost will be.

Another challenge is around our people as we face an industry-based ageing workforce. Through representative associations such as the Australian Water Association, the water industry has very successfully implemented programs to attract graduates. However, the water industry employs thousands of highly skilled vocationally trained professionals and this is where we face a true challenge — the workforce is ageing with not enough trainees to meet the future skills demand.

How is your industry preparing for technology developments such as artificial intelligence (AI)?

I believe the water industry has been bold in recognising and embracing digital technology as an essential tool for the future. Most utilities and service providers have and are implementing digital strategies, and this trend is to continue. The full potential of connectivity, technology and software are yet to be realised, yet still it is so incredibly exciting to see these starting to realise value — which will inevitably result in accelerated development and adoption. Concepts such as predictive analytics are now widely used to accurately predict failures of costly infrastructure resulting in major cost savings and reduced service interruptions. For example, most water infrastructure assets are underground and in prior years huge sections would be replaced on a rolling basis. Whereas today, only specific high-risk sections need to be replaced, due to more accurate predictions.

Another incredibly exciting application is the creation of a digital twin, whereby a process or system is digitally simulated thereby allowing experimentation, development and optimisation on the digital platform before actual implantation. It provides process controllers and engineers with a tool similar to that of the life-like experiences pilots have when flying an airplane simulator.

What effect is energy policy uncertainty having on your sector?

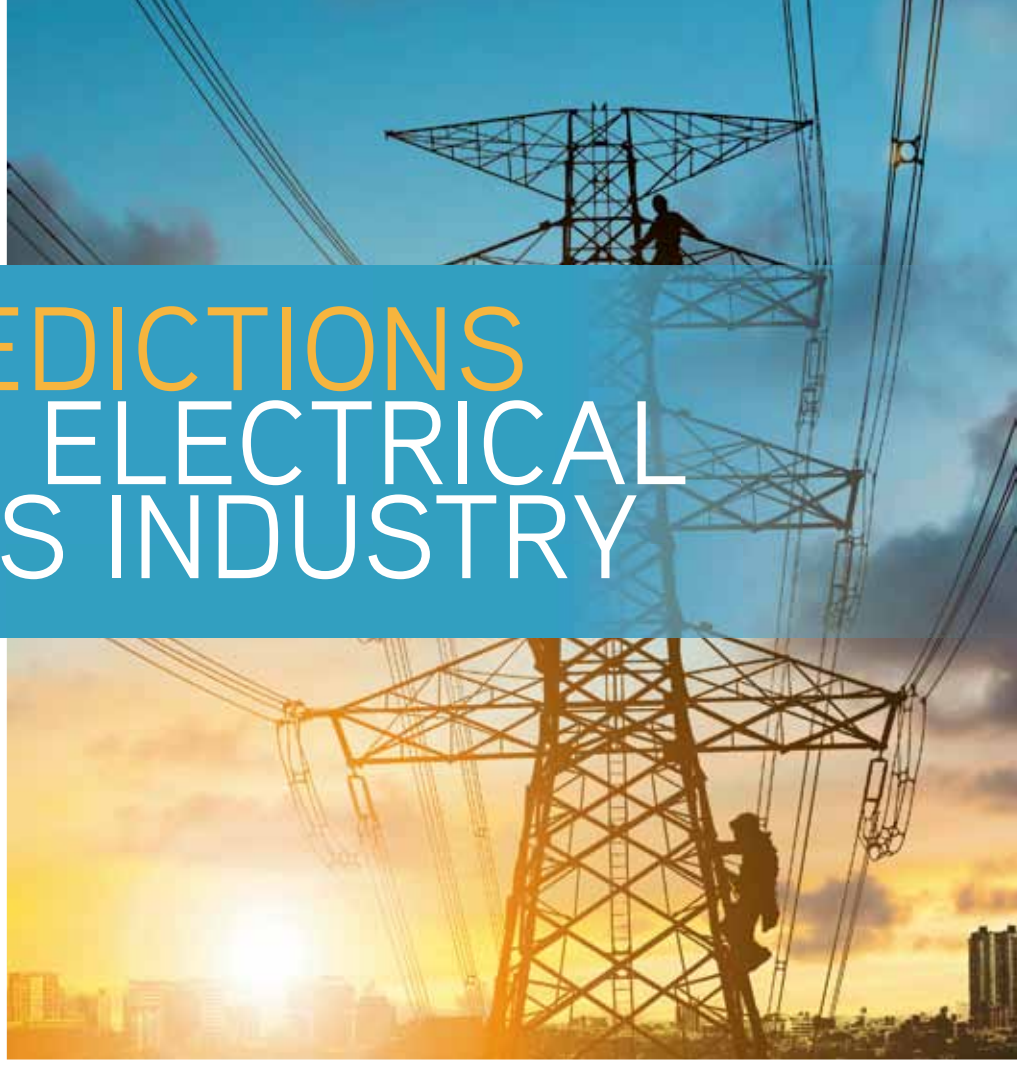
Energy is typically required to provide water, and water typically to produce energy — treating and transporting water requires energy and most power generation or equipment manufacturing requires water.

Energy policies are undergoing change as we move from traditional lower cost fossil fuel generation methods to emerging and newer renewable methods. The uncertainty created while policymakers try and balance the many stakeholders brings both opportunity and challenge. Water and power policies are typically not linked and I believe this will change as several developments are taking place.

The first is wastewater, this has energy-generating potential through biogas. In my opinion, this will change the way we view wastewater treatment plants given rising power costs. The other is the space/real estate available on reservoirs, lagoons, buildings and land used by the water industry, which is increasingly being used for renewable power generation. Water utilities are thus starting to generate more power, while at the same time water is also increasingly being used to store energy in pumped hydroelectric energy storage (PHES) facilities.

Today, most water utilities are pursuing energy or carbon-neutral targets, as well as having active energy management strategies. The water industry is embracing opportunity in uncertainty. I firmly believe, the water industry is embracing opportunity in uncertainty and that future energy and water policies will recognise that water and energy systems are inextricably linked.

Francois Gouws was appointed Managing Director of the TRILITY Group (36 companies and joint ventures) in October 2010. With over 20 years in the water industry, Francois has held roles and directorships throughout Australia, Africa and the United States covering the municipal, petrochemical and mining industries. He is currently the President of the Australian Water Association (AWA), Chair of the Infrastructure Partnerships Australia (IPA) Water Taskforce, Director of WaterAid and a Fellow of the Australian Institute of Company Directors and Engineers Australia.



2019 PREDICTIONS FOR THE ELECTRICAL SERVICES INDUSTRY

Nichola Murphy

From the rollout of the national broadband network (nbn) to the uptake in renewable energy projects, the electrical services industry is expected to experience market growth in the coming years, according to a report from IBISWorld.

Industry revenue is predicted to increase at an annualised 2.7% over the five years through 2023–24, to $22.8 billion. This is good news, as it follows a challenging past five years that have seen decreasing demand from key building markets and subdued household spending.

Current state of the industry

The report stated that industry revenue is projected to decrease at an annualised 1.4% over the five years through 2018–19, to $19.9 billion. This includes an anticipated 4.4% drop during the current year, due to the decreasing demand from residential building and infrastructure markets.

Anthony Kelly, Senior Industry Analyst at IBISWorld, explained, "Demand for electrical services has deteriorated in recent years due to the adverse trends in the construction of non-building infrastructure, such as mineral and energy developments, electricity generation and transmission, water and sewerage infrastructure.

"The current slump in residential building construction is also likely to have severely affected the demand for electrical wiring work on new housing along with renovations and repairs to existing dwellings."

He said there was likely a solid demand for the maintenance and upgrade of existing infrastructure and industrial facilities. This, as well as electrical work on the nbn rollout and renewable energy developments, should support the industry's short-term performance.

According to Kelly, the nbn rollout "generated demand for electricians to work on the connection of cabling to buildings and the optic fibre rollout to nodes and transmission towers. This work tends to be subcontracted through the local Tier 1 contractor and is typically undertaken by larger electrical firms."

Large industry players such as Downer and UGL (CIMIC) are already involved in the rollout of the nbn and the national 4G network, and it is expected to continue to drive demand for industry services over the next two years.

Future areas for growth

Although demand in the residential building market will likely contract further in the short term, the report said "demand for electrical contracting services is forecast to strengthen across most building and infrastructure markets from 2020–21 onwards".

During these challenging market conditions, many contractors chose to specialise in niche markets such as IT cabling, renewable energy and home automation to remain profitable.

These are supposedly key areas for growth or increasing demand over the next five years, predicts Kelly. He particularly pinpointed "the supply of home and business automation through C-Bus cabling and sophisticated Wi-Fi systems, and the implementation of energy auditing of existing buildings, industry equipment and processes, with the view to optimising energy consumption and cost savings".

"There are also some opportunities for firms specialising in the implementation of renewable energy for homes, businesses and communities as well as work on co-generation facilities for industrial and commercial premises."

More independent operators are also expected to enter the industry in specialist markets, and employment levels will rise. The report found industry employment is projected to increase by an annualised 0.3% over the 10 years through 2023–24.

An employment boom is already being seen across some parts of Australia. For example, a report by Green Energy Markets found that investments in wind and solar farms have provided 5169 job-years of employment in Victoria and 5156 in Queensland.

In terms of employment opportunities in different Australian states, Kelly explained there is a "slight skew in demand for electricians trained for working on high-voltage equipment and instrumentation on mining and resource projects in Western Australia and Queensland. This includes maintenance of existing facilities. Also strong demand for tradespeople specialising in railway infrastructure, including wiring and signalling for the major rail projects in Melbourne and Sydney over the next five years."

©stock.adobe.com/au/YuttanaStudio

The three most populous states, New South Wales, Victoria and Queensland, account for about 78% of total industry enterprises and 80% of the larger employer enterprises.

Challenges or opportunities?

To ensure a high level of safety and quality, the electrical industry is subject to stringent regulations and standards as well as registration and licensing controls at the state and territory level. These are considered barriers to entry into the industry, especially in terms of specialisation, as this would require a certification to work in each specialist area and it may differ depending on the region.

"Qualification requirements vary between jurisdictions and can be surprising; for example, in Victoria there is special certification to work on high-voltage wiring, but you don't have to be an electrician!" Kelly said.

Despite these restrictions, regulations can actually stimulate demand in the industry, with the report particularly noting the National Electrical and Communications Association's (NECA) call to introduce mandatory home safety electrical audits. This would ensure wiring and electrical appliances in existing housing stock comply with the Australian Building Code (ABC) and the Australian and New Zealand Wiring Rules. NECA stated that audits should be carried out by a qualified and licensed electrician, and the Transfer of Title would not occur until a proof of audit was produced.

IBISWorld also highlighted the potential benefits that could come from the requirement for existing buildings to meet energy-efficient standards (NABERS). It stated, "There is a role for electrical contractors to regularly monitor existing electrical appliances and to upgrade installations such as arc fault detection devices (AFDD) that can automatically trip a circuit or safety switches, such as residual current device (RCD) that protects against electrocution."

The key to success

The report suggested it is becoming more attractive for new operators to enter the market and existing workers to set up their own businesses.

The industry is highly fragmented, with about 98.6% of industry enterprises consisting of a workforce of fewer than 20 people, including 46.8% of businesses with no paid employees. No single company holds more than 5% of the total industry market, but some of the larger diversified construction firms have a significant industry presence. While IBISWorld suggested the industry may become more concentrated over the next five years, it still does not expect any firm to become a major player.

So what is the key to success? 250 key success factors were identified by IBISWorld, but the report narrowed it down to the six most important. These were: the ability to change operations according to market demand; the flexibility to change which market the firm operates in; having a good reputation; quickly adopting new technology; having contacts in key markets; and the ability to compete on tender.

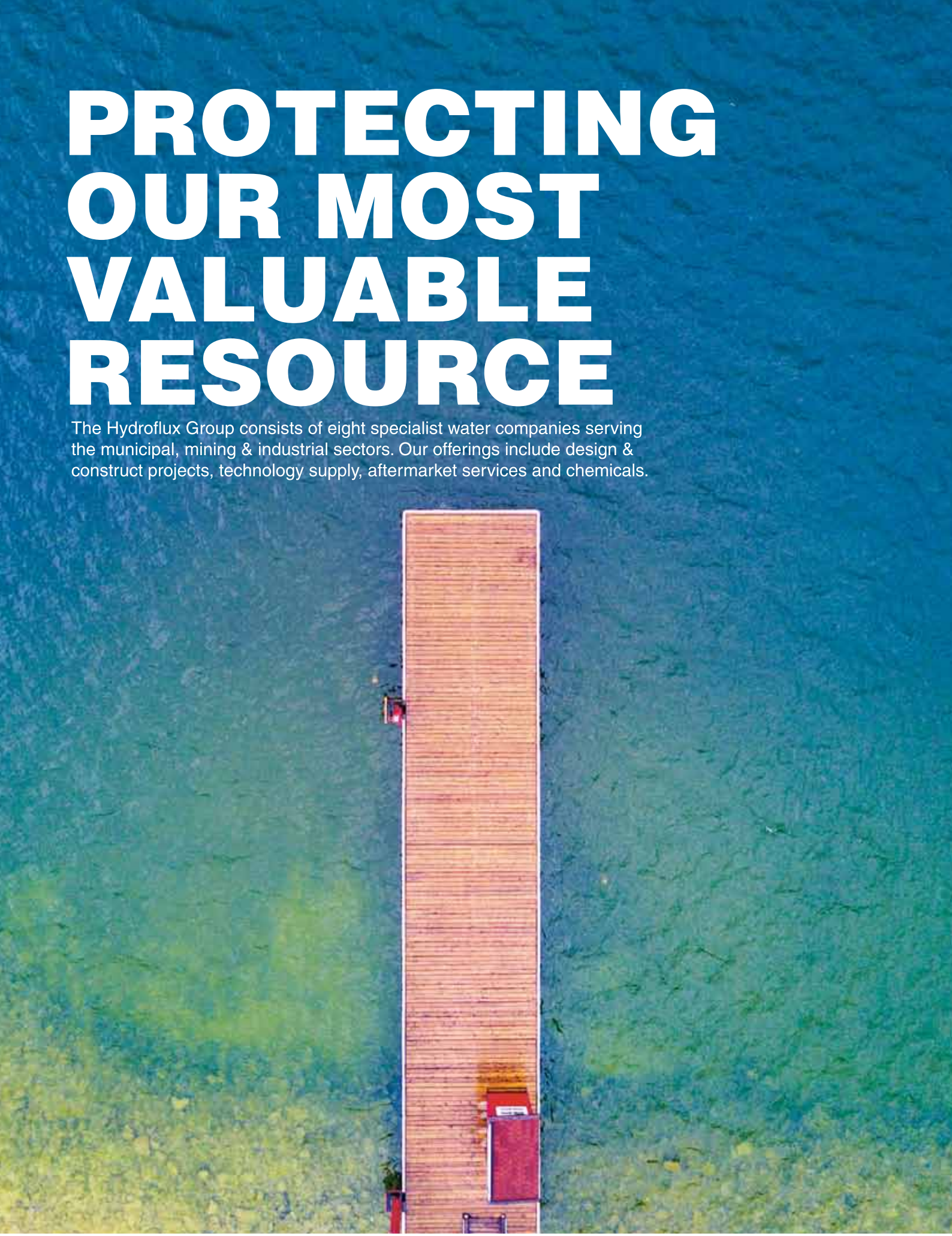
Regarding advice on how to succeed, Kelly stated businesses should aim to "maintain a solid cash flow and ensure the business has systems in place to ensure on-time payments of invoices and purchase orders. To enter a diverse industry such as electrical contracting it may be beneficial to specialise in the higher technology growth markets, such as home automation or industrial instrumentation or auditing."

The report described the electrical services industry as "one of the largest specialist construction industries" and activities include installing and maintaining basic electrical circuitry on buildings and industrial equipment, installing electric lights, power facilities and instrumentation.

The *Electrical Services in Australia* industry report is available at www.ibisworld.com.au.

PROTECTING OUR MOST VALUABLE RESOURCE

The Hydroflux Group consists of eight specialist water companies serving the municipal, mining & industrial sectors. Our offerings include design & construct projects, technology supply, aftermarket services and chemicals.



1300 417 697
www.hydroflux.com.au

HYDROFLUX
WATER | SCIENCE | TECHNOLOGY

ADRIAN MINSHULL

CEO, HYDROFLUX

What key trends do you predict will have an impact on the growth of your industry in 2019?

There has been a marked, positive change in the drivers to build wastewater treatment systems and our customers' attitudes over the last few years. In 2019, we believe the majority of customers will no longer be looking to just meet their compliance obligations at the lowest capital cost, but seriously factoring in the operating cost and more importantly, the long-term sustainability of the process and equipment.

Recycling of wastewater and energy recovery are also becoming common drivers due to both water scarcity/reliability and rising energy costs. This trend will have the biggest impact on our industry in 2019.

What are the three biggest challenges facing your industry in 2019?

Recycling, particularly the recycling of wastewater into usable potable water or as a substitute for potable water, is certainly one of the bigger technological challenges and Australia's home-grown technology in many areas of water recovery is certainly leading the world. Unfortunately, water recycling is also energy intensive, and with the uncertainty surrounding energy cost, the next challenge is the incorporation of energy recovery into the recycling process.

We need to address once and for all the challenge of public acceptance of the use of recycled water as potable water, particularly since much of our drinking water has been recycled, in some instances many times. Globally and in Australia there simply is not enough fresh water to sustainably provide for even the current population.

Finally, disposal of wastewater treatment by-products (sludge) is also complex and in some states stockpiles are building without a sustainable and commercially viable re-use or disposal solution.

What is your industry doing to attract, upskill and retain talent?

Lately the industry has seen an increase in interest, particularly in the engineering and science areas from both graduates and mid-career people. Possibly because the image of our industry has changed from the less attractive image of providers of sewage and pollution treatment system to the more positive image of providers of sustainable environmental protection systems.

Water scarcity, droughts, dying coral reefs, uncontrolled population growth and climate change are daily mainstream media headlines and the employees appreciate working in an industry where they can make a difference to the future. Retaining talent in our industry is about providing the freedom to explore ideas in a technologically rapidly advancing environment. The days of working your way up the ladder for 20 years before management would listen to your ideas are long gone.

What strategies are being implemented by your industry to improve sustainability?

There's a complete strategic transformation. Wastewater is now a resource. From wastewater we can recover and recycle the water, make energy from the biomass and provide fertiliser for growing food. Local sewage treatment plants are now becoming receival depots for waste produce and combining them with their own biomass to become decentralised energy generation plants, often producing more energy than their own needs and exporting it to the local grid.

What effect is energy policy uncertainty having on your business?

Uncertainty in energy policy with rapid price fluctuations, always trending upwards, for both electricity and natural gas is having a negative impact for a couple of reasons. Wastewater treatment is often unavoidably energy intensive and thus costly, and rising and unpredictable energy pricing can negatively impact the level of compliance and decrease the predictability of operational costs for our clients. At the same time, whilst we are seeing an increased demand for energy recovery, either as a biogas that can be fed into boilers or used to generate electricity, a level of certainty about future pricing of energy would make the business case for these energy recovery systems sounder.

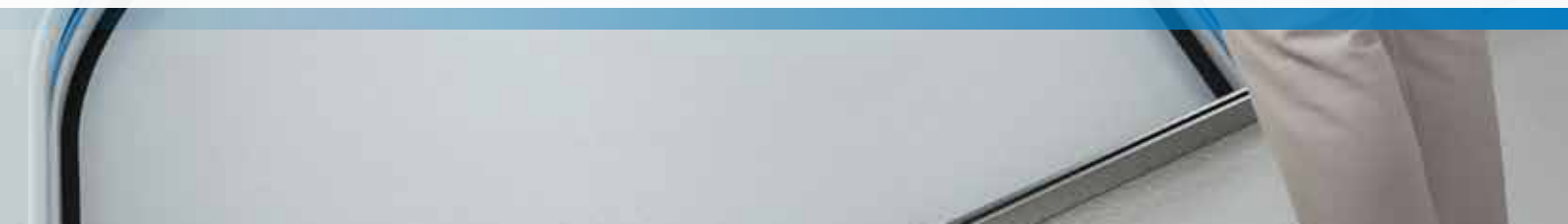
Having worked in the Australian water and wastewater industry for the last 35 years, Adrian Minshull has overseen the design and construction of thousands of water and wastewater projects throughout Australia and the SE Asian region. Before co-founding the Hydroflux Group, Adrian founded AJM Environmental Services in 1999 which grew to be one of the leading industrial wastewater treatment companies in Australia in the early 2000s. As the Group Chairman and CEO of Hydroflux, Adrian's specialist areas include new product and process design and development, large project management and corporate strategy and governance.

DRIVING YOUR INDUSTRY 4WARD.

THIS IS SICK

Sensor Intelligence.

Industrial automation is changing at an extremely rapid pace. As an innovation leader, developing cutting-edge sensor technology, SICK offers solutions today that are ready for the challenges of the future. With intelligent sensors that collect data, evaluate them in real time, adapt to their environment and communicate in the network. Enabling a new quality of flexibility, networked intelligence for efficient processes and reliable cooperation of humans and machines. We think that's intelligent. www.sick.com.au



DAVID CROSSLEY

MANAGING DIRECTOR, SICK AUSTRALIA AND NEW ZEALAND

What key trends do you predict will have an impact on the growth of your industry in 2019?

Automation and Industry 4.0 will really start to make an impact in 2019. We are already getting interest from many of our customers on what it means to them and how they can utilise the latest technologies to create a competitive advantage for their businesses. Interest in our seminars has been extremely high in 2018, and a number of industry leaders have kicked off Industry 4.0 pilot projects with us. Automation of processes and utilising data to drive efficiencies requires sensors to be the eyes and ears. We are therefore seeing the drive in automation across all industries from mining to logistics to manufacturing pushing further ahead in 2019.

Another driver in 2019 will be the continued growth of online shopping driving faster parcel processing and tracking. We all want our parcels delivered next day — or today if possible — and we want to know exactly where they are at any point in time. To do this you need robust scanning and tracking and we see significant demand in this area. Crucial in our market is the ability to provide 24/7 support to ensure our customers can maintain their delivery targets at all times. We are seeing real growth in service support contracts and ongoing growth in our systems and service teams is expected to continue in 2019 and beyond.

How is your industry preparing for advanced manufacturing capabilities?

As a manufacturer of sensors, SICK is at the forefront of Industry 4.0 and a leader in the drive towards advanced manufacturing. That drive is fundamental to creating opportunities for new business models, enhancing performance, managing risk and ultimately making informed decisions through data and insight.

As building blocks of the future, SICK sensors act in an intelligent manner and can further process the collected measurement data and autonomously transmit it, and SICK is continuing to make advances in the areas of networking and data transmission. We enable our customers to collect targeted, application-specific data by individually configuring our sensors for optimised and efficient production processes. Supporting this change we see the industry commencing a digital journey through a willingness to be open to collaborating across industry, embracing new ideas and further developing an agile start-up culture. This, coupled with a clear vision and strategy tailored towards a technology and digital roadmap, will transform traditional industrial automation concepts into the new age of the Fourth Industrial Revolution.

What is your industry doing to attract, upskill and retain talent?

The culture at SICK is based around its people, so attracting and retaining talent is critical. We have recently launched a program called SensorING, where we take a new graduate and send them to our head office in Germany for three months, then to a regional subsidiary in Singapore for three months, before they come back into our business in Australia or New Zealand for an additional six months rotating throughout the business disciplines. This program is designed to jump-start the career of talented engineers and create the environment to build our future leaders.

We also invest heavily in training of our people. Around 10–15 of our team travel to Germany each year to learn about the latest technology, complete leadership training and network across the business. SICK is heavily focused on supporting the next generation of engineers by actively collaborating with local educational institutions such as RMIT, Swinburne University and University of Melbourne. We open up our training facilities to run multiple sessions with final-year students on SICK leading technologies and how they are used in real-life applications to help our customers. In addition we have for many years supported interns from our Germany head office so they gain international experience and understand the issues faced in global subsidiaries. This exposes them to different parts of the business in projects such as mapping price approval processes, streamlining our external safety training programs and optimisation of our inventory management. All projects are based around some initial research into the issues and business, putting together a business case or brief for change, planning and managing the project to completion and then formally presenting the results to the management team.

We also support a local intern focusing on Industry 4.0 applications. These projects are customer facing and require the student to understand the customer's process, apply lean thinking and then implement sensor technologies to any gaps uncovered for the collection of data for analysis.

David Crossley is Managing Director at SICK Australia and New Zealand. With more than 26 years' industrial experience in engineering, sales and marketing across different continents, he has been key to the expansion and success of the growing business. David holds an MBA from Monash University and a Bachelor degree in engineering.

AI AND COMPUTER VISION FOR WASTE TREATMENT PROCESS MONITORING

MATERIALS IDENTIFICATION AND ONLINE MASS BALANCE

A clear contribution to the circular economy is the recovery of recyclable materials from the waste stream. Despite the significant efforts made by local governments to implement waste segregation at the point of collection, large amounts of recyclables continue to be discarded in the wrong disposal bin.

State-of-the-art waste treatment facilities can recover a large percentage of this valuable material. However, they deal with stream flows that are extremely variable in composition and are often multilayered, limiting the capacity to achieve 100% accuracy in recovery rates. This is due to current processing methods lacking the ability to provide information on the composition (weight and characteristics) of the waste in real time.

To improve recovery ratios, a real-time monitoring system is required as part of the mechanical waste segregation process — a limitation of current technologies.

Under current conditions, obtaining valuable data (such as traceability of materials, mass balance and performance of the separation equipment) is a laborious process that requires stopping the regular operations of the plant and modifying the equipment to conduct tests. Changes in the composition of the waste and equipment performance irregularities are also factors that prevent accurate data gathering on the separation process. Some of these anomalies are often discovered months after taking place.

Spanish start-up Sadako is developing an advanced system capable of providing data in real time, facilitating the decision-making process. The solution integrates artificial intelligence and computer vision to develop advanced algorithms and machine learning, as well as multilayer neural networks (deep learning). Ferrovial Services came to the party to trial the technology in three waste treatment facilities, each located in a different country with different types of waste — UK, Portugal and Spain.

The system includes a collection of monitoring points, installed throughout the separation process, which are connected to a central server. These points gather the necessary information to obtain a clear vision of the overall process, and the specifics of the separation process in terms of mass balance, purity and incidents. The information is gathered and made available for each of the different materials that make up the waste flow.

With this advancement, facility operators will have access to accurate data detailing the characterisation of the waste and the performance of the treatment plant. Additionally, technology suppliers will have the opportunity to contribute to the creation of next-generation equipment.

Broadspectrum
www.broadspectrum.com

ARE YOU WIRED IN PREPARATION FOR THE UPDATED STANDARDS?

With the much anticipated release of the new wiring rules AS/NZS 3000 on June 26 2018, it is critical that installations are protected and comply with the updated standards.

In residential installations, all circuits will now be required to be protected by 30mA Residual Current Devices (RCD), this now includes hard wired devices such as hot water systems, ovens and air conditioning systems.

NHP have you covered with a complete range of Residual Current Circuit Breakers (RCBO) and RCD devices to suit these needs with the NHP MOD6 range offering:

- 6kA fault level
- 6A to 40A current ratings RCBOs
- 40A to 63A current ratings RCCBs
- 10mA & 30mA sensitives
- 1P, 2P and 3P&N
- Switched neutral and un-switched neutral options.

Not only have requirements for residential installations changed but there are also changes for non-residential installations.
Formerly, socket outlets and lighting circuits up to 20A required RCD protection, however this has now increased up to and including 32A. All fixed wiring equipment up to and including 32A should now have a 30mA RCD fitted.

To ensure these requirements are met, NHP have complete range of RCBO and RCD devices with the NHP DIN-T offering:

- 6kA and 10kA fault levels
- 6A to 40A current ratings RCBOs
- 40A to 125A current ratings RCCBs
- 10mA, 30mA, 100mA & 300mA sensitives
- 1P, 2P, 3P and 3P&N
- Switched neutral and un-switched neutral options.

For medical installations or medical equipment in the home, NHP have RCDs meeting the required Australian Standard AS/NZS 3003. These solutions are with 10mA devices with switched neutral in 1P width devices, saving half the space of a typical 10mA RCD.

Higher risk applications such as outdoor equipment, kindergartens, or bathrooms, NHP have a 10mA range of devices to offer that extra level of protection.

When choosing to have upstream RCD protection it is important that special selective RCDs are used. Selective RCDs prevent the upstream RCD accidentally operating which would normally cut power to many circuits instead of the intended individual circuit. NHP also offer these selective type RCDs, Type S.

These changes are improving safety at home and at work so why wait for them to be enforced and make the first step to a safer environment now with NHP.

Intelligent Panelboards make RCD Compliance Testing Easy!

NHP's new break through range of modular Concept Panelboards features the revolutionary integrated Rapid Test earth leakage system.

NHP Concept panelboards with Rapid Test is unique and enables an entire distribution board to be tested in accordance AS/NZS 3760 within minutes ensuring maximum safety of personnel and minimising costly downtime.

The layer of smart technology allows RCD testing to be safely and quickly performed while reducing the risk of live work.

For more information,
visit nhp.com.au/more/rapidconcept

NHP ELECTRICAL ENGINEERING PRODUCTS
1300 NHP NHP | nhp.com.au |

NHP106826 11/18

OPINION

WHY MANUFACTURERS ARE BEING LEFT IN THE DARK WHEN IT COMES TO DATA

The Fourth Industrial Revolution has been characterised by demands of perfection — manufacturers are expected to produce the perfect product in the most effective way possible when it comes to time and resources. But what happens when they run into unexpected obstacles such as interruptions or malfunctions?

Breakdowns in production lines can cost manufacturers anywhere from $50,000 to $2 million per hour.[1] Unsurprisingly, manufacturers often can't afford the expenses associated with unforeseen downtime — yet according to technology research company Vanson Bourne,[2] 82% of companies have experienced at least one unplanned outage over the past three years.

While manufacturers are investing heavily in data-led technologies such as the IIoT, machine learning and AI, they are not always equipped with the necessary analytics skills to leverage data gathered from these technologies to their fullest potential. In fact, Capgemini[3] found that this is the case for almost 60% of organisations in a recent study.

We can see a clear gap between the potential of technologies like the IIoT and the realisation of this potential.

A stab in the dark

'Dark data' is a common but little-acknowledged problem experienced by most manufacturers. It occurs when a company is generating information but is unable to use it in a meaningful way.

Often dark data rears its head when data is being created by machines but is not visible and as a result not used for making decisions. More frequently, disconnect occurs where there are no adequate storage facilities to retain data long enough to process it or where huge volumes of data can't be scaled by data science teams. Alternatively, companies are unable to hire enough data scientists to process all the gathered information so they end up working with just a limited sample. In addition, many predictive maintenance systems end up sending alerts for too many anomalies (false positives) or not enough (false negatives), and manufacturers are paying the price.

Getting predictive maintenance right can have a real impact on the bottom line. To give a practical example, more than a third of manufacturers lose 1–2% their annual sales[4] to scrap and rework. This loss could be avoided by putting effective systems in place to identify issues before the quality check stage and, ultimately, save valuable resources.

The light at the end of the tunnel

The good news is there has been a shift in industry thinking, and some manufacturers are now implementing effective ways of storing and processing data.

The IIoT and AI are among a slew of technologies detecting early signals of future problems and helping manufacturers take proactive actions to prevent them. Automating the process of analysing a growing number of datasets is key to mitigating the risk of dark data and predicting machine health accurately.

Applying a cognitive approach to predictive maintenance is a good way to kick off this process. While a manual approach is useful to identify common issues occurring across all machines, it can only use known problems from past experiences and assumes that only outliers are anomalies.

By implementing a cognitive, 'machine-first' approach to anomaly detection, manufacturers can create a mechanism where the algorithms can adapt to changing conditions and learn the data domain for each individual machine. This knowledge is then transferred across similar machines and validated through feedback from subject matter experts.

In layman's terms a cognitive approach will eventually create a fully automated and cognitively enabled machine learning system, which can predict anomalies before they occur. Imagine how many resources could be saved if manufacturers were alerted about potential downtime and could fix the issue to prevent costly interruptions.

The next frontier

Even in this age of digitisation, manufacturers are still left in the dark when it comes to knowing when equipment is due for maintenance, upgrade or replacement.

Investing in data-led technologies and taking a cognitive approach can help build a rock-solid foundation for accurate anomaly detection scenarios, and enable truly efficient predictive maintenance strategies. Using these technologies to solve the dark data problem unveils a competitive advantage to any organisation brave enough to take the plunge.

References

1. Vanson Bourne Ltd 2017, 'After the Fall: Cost, Causes and Consequences of Unplanned Downtime', published on behalf of ServiceMax, ‹https://lp.servicemax.com/Vanson-Bourne-Whitepaper-Unplanned-Downtime-LP.html›
2. Ibid.
3. Subrahmanyam KVJ 2018, 'Unlocking the Internet of Things: Why scale is the smart route to high value', Capgemini, ‹https://www.capgemini.com/2018/04/unlocking-the-internet-of-things-why-scale-is-the-smart-route-to-high-value/›
4. Vanson Bourne Ltd op cit.

Ruban Phutan is the co-founder and Chief Product & Analytics Officer at DataRPM (acquired by Progress) where he leads product and data science for the flagship Cognitive Predictive Maintenance product, which solves the complex business problems of minimising asset failures and unplanned downtime while maximising efficiency in Industrial IoT.

Low-cost level measurement.
Radar sensor for water management.

Reliable level measurement in water treatment facilities, pump stations and rain overflow basins.
Open channel flow measurement and water level monitoring.

VEGAPULS WL S 61

- Measuring range up to 8 m
- Can be used outdoors without restriction
- Flood-proof IP 68 housing
- Operation via Bluetooth with Smartphone, tablet or PC

Further information: www.vega.com/wls61

Phone 1800 817 135

Looking Forward VEGA

Boutique gin distillery opens in Melbourne

The art and science of gin distilling have come together at Brogan's Way, a newly opened artisan gin distillery in Melbourne. The distillery, producing premium gins, runs on a Totally Integrated Automation (TIA) concept from Siemens — the same technology used by other leading brands such as Jack Daniel's in the US and Coopers and Asahi in Australia.

Brogan's Way's founder and co-owner, Simon Carr, said these automation solutions are crucial to the success of small distillers like Brogan's Way as it gives the company increased visibility of the process, which allows it to respond quickly, flexibly and cost-efficiently to current market demands, with no loss of quality.

"Technology is very important in the craft brewing and distilling marketplace, particularly when you don't have enough staff or time — which are your most precious resources. Technology is like having another member of the team," said Carr.

At the distillery in Richmond (Melbourne), Siemens has partnered with the original equipment manufacturer, Deacam, to enable Brogan's Way to control the variables in the distilling process to ensure quality and consistency in every batch.

With the craft brewing and distilling industry growing at an unprecedented rate, efficient and scalable automation has become an essential part of the industry. The technology provided by Siemens gives smaller manufacturers the same scalability as much larger businesses. Digitalisation makes the flood of data in breweries and distilleries transparent and easy to follow: from stock receipt to shipping, from the brewing vat to management, and from product development to the glass.

The technology provided by Siemens to Brogan's Way automates the Fermecraft solution, which was designed and engineered by Deacam to address a real need for automation in the fast-growing craft brewing and distilling sector. The modular automation solution helps craft brewers and distillers to regulate and automate processes including fermentation vessel control functions such as manufacturing process, cooling and heating, packing, pump control and trade waste. Fermecraft has the scalability and flexibility to be retrofitted into new and existing equipment of various sizes. Siemens, as a technology partner with Deacam, is proud to support home-grown Australian innovation.

Deacam Director Warren Bradford said, "Automation is critical for craft distilling to enable data capture and the ability to produce the same product time and time again. As an original equipment manufacturer, Deacam understand the responsibility that we have to shoulder when selling our product to the craft brewing and distilling industry. It's essential that what we're using is scalable, and it's essential that one part can talk to another part. It's important for a distillery to be able to come along in two or three years' time and add extra pieces of equipment that can seamlessly integrate into their existing automation system."

The key technologies used at the distillery include Siemens' SIMATIC S7-1200 PLC, SIMATIC Comfort Panel HMI, SINAMICS G120 modular drives and SCALANCE M876 router, which automate the Fermecraft system to maintain the controller of the chiller. This is crucial as the distilling process typically takes two to six weeks and throughout this period the temperature must stay within a strict range to ensure the quality of the product. The Siemens Fermecraft solution enables Brogan's Way to access the control data for this chiller remotely in real time to ensure each batch is at the perfect temperature.

Siemens Australia and New Zealand Business Development Manager Leonie Wong said, "At Siemens, we have a longstanding relationship with many of the large brewing companies in Australia. It's exciting for us to show that our solutions are also extremely beneficial for small-scale manufactures such as Brogan's Way. In this industry, automation is the key to maintaining quality and consistency, so we're really proud to have been involved in the beginning of their digitalisation journey and look forward to continuing to grow with Brogan's Way.

"Data is what drives quality decision-making and Industry 4.0 is about enabling all manufacturers — regardless of their size — to unlock the full potential in their operations."

Siemens Ltd

www.siemens.com.au

VIC | NSW | QLD | WA | SA | TAS | NT | ACT | NZ | PNG

Lighting

Australasia's only end of life recycler for all types of lighting waste – (inc: Fluorescent Tubes and Globes/Lamps).

- Fluoro Tubes
- Domestic Globes/Lamps
- Commercial Globes/Lamps

Batteries

Recycling solutions for all types and quantities of batteries in world class plant. From dry cell to the latest in electric powered car ev-batteries.

- Mixed Domestic Batteries
- Lead Acid Batteries
- Commercial & EV-Batteries

E-Waste

Advanced sorting and separation systems for the recycling of all types and quantities of e-waste.

- All types of Monitors, TVs, Displays
- PCs, Laptops, Tablets
- All other E-Waste

cmaecocycle

1300 32 62 92
www.cmaecocycle.net

Industry has a new choice

Introducing APS Industrial: your gateway to industrial success.

At APS Industrial, we're the gateway that connects the world's leading industrial manufacturers to the local industry. With exclusive local access to the market's broadest portfolio of industrial low and medium voltage electrical and automation products, we offer a true one stop shop that promises simplicity, security and connectivity.

In an industry landscape rapidly transforming through digitalisation, quality and a competitive edge matter. APS Industrial is the new choice that gives you both.

NATIONAL DISTRIBUTORS OF

SIEMENS

Weidmüller TDK RITTAL KATKO

apsindustrial.com.au

DAVID HEGARTY

MANAGING DIRECTOR, APS INDUSTRIAL

What key trends do you predict will have an impact on the growth of your industry in 2019?

Digitalisation and energy management are the key trends I see positively impacting the growth of our industry in 2019.

When it comes to digitalisation, the future of manufacturing and Industry 4.0 are well-documented areas of potential growth. While Industry 4.0 was primarily developed around advanced manufacturing capability, we're beginning to see those technologies and skill sets influence broader industry, which presents genuine productivity and growth opportunities. Beyond manufacturing, digitalisation is enabling intelligent infrastructure and I expect continued investment in smart devices for optimising core civil functions. The result is more technology into more projects. This is exciting not only for our industry but the wider public who will experience the benefits.

As globalisation continues to drive global supply chains, there is increased need for global standards to enable cohesion. These standards will cascade down to the solutions our industry provides and businesses will need to adapt where they may not have been required to previously.

The cost of energy has risen significantly in recent years which we all see and feel. I believe the higher prices are here to stay and that the sustainable answer is to use energy more efficiently — and the best way to do that is to monitor and manage. The natural flow-on from that will be more investment in technologies, devices and the engineering expertise around it.

What are the three biggest challenges facing your industry in 2019?

Opportunities also present challenges and energy management is no exception — it's a challenge today and it will be tomorrow. An organisation's ability to navigate the cost and reliability of energy will continue to challenge Australian industry and drive innovation.

The same can be said for digitalisation and Industry 4.0. While I see both as tremendous opportunities and necessities for Australian industry, the challenge is for businesses to take the first step. I think people know it's an opportunity, and they know to some extent it's unavoidable, but they don't know where to start. In addition to the technology there's also the added layer of cultural change that needs to be understood and managed.

That idea of culture leads into the third challenge, which is skills and expertise planning and resourcing. This means acknowledging the new skills and expertise that businesses require and welcoming them into your organisation. The classic adage 'never do today what you can put off until tomorrow' exists here, but my advice would be to work out your field of travel, partner with proven experts and get started.

What is your industry doing to attract, upskill and retain talent?

The first thing I would say here is probably not enough. That certainly doesn't mean nothing; however, there are some really positive activities around early engagement of STEM skills throughout our industry.

The catalyst for technology revolutions is often industry investment, and APS Industrial's core manufacturing partner, Siemens, is responsible for many leading examples of that. Whether it be the 'Code Camps' they host for the children of staff to learn coding skills during the holidays, the Industry 4.0 Apprentice Program or the more than $1 billion in software grants they have awarded to universities in 2018 to expose local students to leading global technology. It's all about education and exposure to new technologies that will maximise the size of the talent pool for the jobs of the future.

It's also important to note that the learning never stops. APS Industrial are privileged to be partnered with the world's leading industrial manufacturers and sharing that knowledge and expertise with the industry is a core focus.

How is your business preparing for changes in standards and regulations in 2019?

The launch of APS Industrial in March involved the acquisition of two existing companies which required standardising internal processes and systems. With that in mind, we are evolving our current ISO accreditation to reflect the new business in 2019 which is exciting for our team and our customers.

On the technology front, we're also extremely well placed to respond to any impending or future industry standards and regulation changes by virtue of our partnerships with the leading global manufacturers — who are members and drivers of global standards committees.

From the outset, we've made it clear that we will bring the world's best products and technologies to the local market and wrap local customer service and support around that. While the obvious upside to that for our customers is reliability, quality and peace of mind, the added bonus is the readiness of the products to not only comply with current standards, but the ones after that.

David Hegarty is the Managing Director of APS Industrial and brings over 25 years of global industry experience to the role. Previously, David was Head of Market Development – Pacific Region at Siemens, which followed 18 years at Rockwell Automation where he was Managing Director – Australia and New Zealand for 5 years.

control logic

Industrial intelligence

"Through early adoption of technology we will leverage our expert resources to educate and innovate providing solutions that will drive outcomes and exceed expectations."

We are Australia's most trusted value-add distributor, and proud to continue our 35+ year tradition of delivering award winning technical support, solutions and services from our global leading product portfolio.

We invite you to experience the Control Logic difference!

1800 557 705 | sales@controllogic.com.au
www.controllogic.com.au

Find us on LinkedIn
linkedin.com/company/controllogic

MICHAEL BACON

EXECUTIVE DIRECTOR & CEO, CONTROL LOGIC PTY LTD

What are the three biggest challenges facing your industry in 2019?

We are fortunate that our products are used in several different industries including mining, oil and gas, water, manufacturing, food and beverage, materials handling, transport infrastructure and energy. All have shared individual challenges, but also represent opportunities.

As Industry 4.0 — or the IIoT — continues to provide connectivity to more and more devices and assets, the challenge becomes: 'how do businesses manage and analyse the data that is now available to them to truly influence better decision-making?' Firstly, a secure connection is critical and often neglected or misunderstood. Point-to-point secure VPN connectors simplify IoT and provide peace of mind that your machine or asset is safe from malicious attacks. Secondly, enabling data is only the start: true digital transformation can only happen when it's understood what data is required and how it is then used to improve efficiency and productivity, regardless of whether the machine is local or remote. It is at this point that businesses will differentiate themselves. And finally, as workforces become increasingly mobile, the capabilities of a business to retain the accumulated knowledge of longstanding employees will continue to challenge business.

What is your industry doing to attract, upskill and retain talent?

I can't speak for the industry, but can share with you what Control Logic is doing and focused on in this area. We have implemented a graduate program which provides hands-on experience and mentoring in one or both of the sales and technical support functions of our business. This year we have welcomed three graduates to our team and they are proving to be a great asset to the company.

We also actively work with our team to consider their own personal development goals. Each year our team members can apply for assistance to co-fund further studies and this speaks to our culture of continued learning and our commitment to assist them in achieving this.

Last, but certainly not least, I believe it's vitally important to build a collaborative team. Every member of Control Logic was involved to create a clear company vision and a set of values by which we operate. Our team are providing an environment to work together to achieve more and celebrate our collective successes.

How is your business preparing for changes in standards and regulations in 2019?

With our diverse capabilities we often need to consider changes to standards and regulations — not just from a perspective of what they mean to our business but also what it means to our clients' businesses.

An example is the new AS/NZS 3000 standard. In conjunction with our partner Novaris we will be running education seminars across the country to help industry understand what the changes mean and how to design and implement best practice within their protection schemes.

In addition to this, our machine safety experts from our Safety Services division will be reviewing the transition from AS 4024 to AS/ISO international standards and will be working with industry to ensure compliance to the new standard and assist our clients keep their workforce safe.

How close to reality are smart cities and how much is hype?

Sure there is hype but it's also real. Think about how we already commute and transact within cities today compared to 10 years ago. Technology will not be the inhibitor, stakeholders — likely to be both public and private entities — and the investment models to fund the infrastructure projects will take some time to evolve.

We at Control Logic are focused on enabling smart cities to share data by connecting the different systems and technologies via industrial Ethernet. By digitally enabling infrastructure we can play an important and exciting role in the development of the cities of the future.

What strategies are being implemented by your industry to improve sustainability?

There is renewed interest in high-quality products which provide longer lifecycles as our industry comes to the realisation that the amount of electronic waste we generate is not sustainable, and that the total cost of ownership goes beyond the initial purchase price. In particular, interest in the energy efficiency of individual devices now forms part of an overall power quality and energy efficiency strategy within many businesses.

We, in conjunction with PULS, have been at the forefront of discussions in Australia regarding both the commercial and environmental benefits of selecting the most energy-efficient power supply. PULS take sustainability seriously and always make sure their R&D engineering team use fewer materials and components while maintaining the longest lifetimes and smallest size possible.

I am always thrilled when Control Logic is able to help our customers achieve their sustainability goals.

With more than 29 years of industry experience, Michael Bacon is the CEO and part owner of family-owned business Control Logic. Having started his career as an electrical apprentice, Michael later completed an associate diploma in electrical and electronic engineering before joining Control Logic in 1995. Over the years, Michael has held various roles within the company including sales, technical duties and management duties, and has overseen and driven a sustained period of growth.

AI: THE SECRET TO SMART CITIES

Lauren Davis

Artificial intelligence (AI) is proving a key enabler of smart cities, with new sensing technologies designed to provide citizens with a safe and smooth experience as they go about their everyday lives.

That's according to expert speakers at the 2018 Hong Kong Electronics Fair (Autumn Edition), organised by the Hong Kong Trade Development Council (HKTDC) and held from 13–16 October in conjunction with electronicAsia, making it a massive week for members of the electronics and technology industries.

The last day of the event opened with the final session in the three-part Symposium on Innovation & Technology, exploring the theme 'Technologies & Success Applications in an Age of AI' — with a particular focus on smart cities. Unfortunately, the symposium was delayed for close to half an hour as speakers arrived late, following a significant signal failure on the train line during the morning rush hour — one that resulted in six hours of delays, and has since been deemed Hong Kong's worst service breakdown ever.

The irony was not lost on speaker Mick Spiers, Vice President of Thales Revenue Collection Systems, who said that as the world's population continues to grow, the need to get our cities moving again becomes ever more urgent. He noted that 50% of Earth's 7 billion people currently live in cities — a number that will have increased to 70% of 9 billion people by 2050.

So how can cities combat increasing congestion? The key, said Spiers, is to use city infrastructure in more intelligent ways. Even ride-sharing services aren't an overly efficient option, he said, with vehicles in many cases only accommodating the driver and their passenger — a passenger who might have previously opted to take public transport instead.

Spiers' proposal, and that of Thales, is to implement 'Mobility 4.0', whereby multiple modes of transport work and connect together to better get people where they need to go, serviced by a single, intelligent transport planning app. Unlike apps which are specifically based around either public transport or ride sharing, this hypothetical 'mobility-as-a-service' app would include all possible modes of transport, planning the user's trip based on their individual preferences (concerning price, speed, sustainability, etc) as well as real-time traffic information. As the app comes to learn its users' travel patterns, it would also make recommendations based on past experience. The ultimate aim would be for the user to only need to pay a single fare, settled by a company such as Thales across all relevant transport operators, thus completing the seamless experience of the journey.

While mobility as a service is still in relatively early stages, there are other ways in which AI is helping to manage traffic on the roads, as noted by Herbert Jinsong Tang from Quanergy — a 3D LiDAR sensor and solution innovator. Using its core perception software platform, Qortex, Quanergy's LiDAR sensors take information from the environment to provide what Tang calls "perfect 3D perception". The sensors thus serve as a useful companion to street cameras, doing what they cannot — providing 3D shape information with high accuracy, orientation and integrity.

Quanergy's LiDAR sensors have already been deployed in Australia, as part of a pilot study to reduce traffic congestion in Adelaide. Led by global technology company Cisco, the first phase of the pilot saw six sensors set up at the busy intersection of Grenfell and Pulteney Streets in the heart of Adelaide's CBD. These sensors gathered intersection-approach traffic information, such as location and speed of vehicles as well as pedestrians. With this information, algorithms were tailored to recommend traffic light intervals, thus improving traffic and pedestrian-crossing flow.

With the trial now complete, Quanergy plans to deploy its sensors around Australia in Brisbane, Newcastle and Sydney, and eventually in Hong Kong. It's the first step in a future that will include, according to Tang, smart street lighting, intersections, roundabouts, parking, tolling and more. This is in addition to smart safety monitoring, with Tang predicting that the sensors of the future will be able to detect jaywalking, wrong way driving, railway crossings and more.

Traffic management is also one of the services provided by NVIDIA AI Technology Center, as noted by the company's General Manager, Samuel Lo. Deployed in the Chinese city of Shenzhen, NVIDIA's AI technology undertakes real-time monitoring of intersections, then optimises the traffic lights based on the conditions.

But AI can also be used to keep our streets safe, said Lo, in the form of better surveillance technology. He noted that a smart car-shaped surveillance robot known as O-R3, produced by robotics company OTSAW, can be found patrolling the streets of Singapore.

Lo reiterated the fact that AI can work better than cameras, seeing through noise and better identifying people and objects — the analysis of security footage will therefore no longer be a solely human task. He gave the example of an escaped criminal who was caught last year after being observed by face-recognition cameras in the Chinese tourist town of Wuzhen — cameras which were initially set up to identify tourists staying in its hotels, using this data to enable entry through face scanner-equipped gates to the town's various attractions.

In an even stranger example, face-recognition cameras in eastern China have this year caught three separate fugitives on three separate occasions — each one attending concerts for pop star Jacky Cheung. Over the course of April to May, the suspects were identified by cameras located at the ticket entrance to Cheung's concerts, with alerts sent to the authorities within minutes. Each suspect was subsequently found and arrested before they could leave the concert venue, unable to hide among the tens of thousands of other attendees.

The role of AI in smart cities is clearly an important one, influencing everything from traffic management to security and maybe one day our transport habits. The crucial thing, then, is to ensure that AI is deployed in a way that is truly beneficial for cities and all their inhabitants. Only then, when we have smart governments using smart technologies to run smart cities, will we have smart citizens.

Lauren Davis travelled to the 2018 Hong Kong Electronics Fair (Autumn Edition) as a guest of the Hong Kong Trade Development Council.

Perfecting the recycling process

Bottle-to-bottle recycling is a closed-loop process that conserves landfill space and energy usage by turning used plastic bottles into plastic resin for new bottles.

CarbonLITE Industries operates one of the world's largest bottle-to-bottle polyethylene terephthalate (PET) recycling plants, which is located in Riverside, California. The 20,400 m^2 plant recycles more than two billion plastic bottles annually using a six-stage process. Half-ton bales of bottles are decompressed into single bottles which are washed in caustic water, sorted and ground into flakes. The flakes are thoroughly washed, rinsed, dried, decontaminated and then melted down into pellets, which are packed and shipped to bottle manufacturers and other customers.

When the CarbonLITE plant opened in 2011, it did not have a SCADA system installed. There are about a dozen separate operator interface terminals (OITs) on the plant floor, and each one was running a different type of HMI software by a different vendor. The OITs only displayed their local processes and did not connect with each other. As a result, information was not visible or accessible to most plant workers, so when a worker would need to find out what was happening in another area of the plant, they would have to use a radio or walk there, which is very impractical in a facility with an area nearly equivalent to four football fields.

CarbonLITE solved this problem by taking the software that was running in one area and spreading it across the plant to unite all of its different systems. Systems integrator Trimax Systems had used Ignition to develop automation controls for the front-end conveyor system and remote control handling system while the plant was under construction. In 2012, Trimax convinced the company to use Ignition for the entire plant.

Trimax used the Ignition Works package to combine all of the stations, PLCs, devices and proprietary systems in the plant under one software solution. This has provided visibility to vital information across the company, enabled the many systems on the plant floor to communicate and work together, and empowered the staff with a greater ability to run processes efficiently.

According to Bryan Riley, Trimax Systems' lead engineer on the CarbonLITE project, the biggest part of the job was "combining everything into a unified system, so that they can look at the entire plant from multiple locations". Now, operators can view information for the whole plant from any computer on the network with Java. This gives the operators the ability to see where any problems are located and troubleshoot them.

With the Ignition Mobile Module, the system can also be accessed on smartphones and tablets. "It becomes a very powerful tool. The maintenance mechanics and the operators and everybody can walk around the plant floor with real live data on them at all times," said Riley.

Ignition also provides remote visibility which allows the corporate office to look at its process and get numbers, trends and reports directly.

It is also cost-effective for smaller organisations. In comparison to other SCADA software packages, Ignition allows companies to put many users on its licence without causing explosive increases in cost. "One of the nice things about this system is that it comes with unlimited licensing from your server, whereas with other SCADA packages you have licences for the number of seats," said Bob Kimmel, an engineer at Trimax Systems.

"With other systems you not only have to buy the development package and the runtime package, but you also have to purchase runtime packages for each one of the systems that will be running the SCADA software."

The results of the project were excellent for both CarbonLITE and Trimax, and CarbonLITE is pleased with the new functionality, according to the former director of operations for Trimax. The Trimax team was able to complete the project at a very low cost because it consisted of a single work system that contains many tags and screens within it.

Trimax considers Ignition its software of choice. Riley says that Ignition gives the company "all of the tools that we want and we need, and the tools that make our lives better without adding the extra complications that don't need to be there". For example, Riley made templates that he used repeatedly for the project.

"The amount of time it saves in programming is just fantastic compared to other HMI systems," he said. Trimax can even set up new connections remotely without having to come to the site.

ESM Australia

www.esm.com.au

Series 210 cabinet, perfect 19" rack mount for wall mounting, under desks, or mobile applications. Custom sizes available.

MFB®

DESIGNERS & MANUFACTURERS
OF 19" RACK SYSTEMS

We're proud to pin our reputation to our constant development in racking solutions. But as we make advancements for tomorrow, we never forget the past.

Our commitment to continuity-of-design ensures each new product and advancement is back compatible with existing units, enhancing and prolonging the life of every MFB product.

With a solid history of over 45 years supplying innovative, off-the-shelf and custom built racking systems, you can rely on MFB for consistent compatibility.

AUSTRALIAN MADE
MAKES AUSTRALIA

bsi. ISO 9001 Quality Management

19" Rack Cabinets
Licence No. 84394

www.mfb.com.au

VIC - **P** (03) 9801 1044 **E** sales@mfb.com.au
NSW - **P** (02) 9749 1922 **E** sydney@mfb.com.au

Find us on

Make Every Day Your Best Day of Production

Be the best in your industry with Honeywell Connected Plant, a suite of applications that delivers higher levels of safety, reliability, efficiency and profitability. These proven industry solutions turn data into actionable insight so you can optimize operations, predict plant failures and eliminate unplanned downtime.

Honeywell
THE POWER OF CONNECTED | Connected Plant

Discover more at **www.honeywellprocess.com/iiot**

ANDREW HIRD

SALES DIRECTOR FOR PACIFIC AND SOUTH EAST ASIA, HONEYWELL PROCESS SOLUTIONS

What are the three biggest challenges facing your industry in 2019?

One of the key challenges we see for the process industries is retaining knowledge in the face of a rapidly changing workforce. The average person entering the workforce in 2019 will change careers seven times, expects to progress to new roles every two years, and is attracted to companies where the latest technologies are leveraged. Combine this with the large numbers exiting the workforce through retirement and we see a significant challenge ahead. The race is on to capture the wealth of knowledge that the retiring workforce will take with them, while finding novel ways to rapidly attract and impart this knowledge to an incoming workforce with very different needs.

The process industries have made significant progress implementing cybersecurity strategies at the IT layer of their organisations, but we still see several challenges in doing so on the process control network (PCN) layer. One such example is the dependence on USB devices, which remain the principal vehicle for updating and maintaining PCN configurations. Researchers from Honeywell recently analysed USB usage and behavioural data from 50 production sites across four continents that utilise Honeywell's Secure Media Exchange technology. Of the threats blocked by this technology, 26% had the potential to cause major disruptions to industrial control systems. This included several well-known threats such as Stuxnet, Mirai, TRITON and WannaCry.

The other largest challenge that we see for the process industries in 2019 is how to improve operational sustainability in a highly competitive landscape.

What strategies are being implemented by your industry to improve sustainability?

In the process industries, it was once considered a nice-to-have to be able to predict undesirable process conditions and equipment failures before they occurred, but in today's highly competitive landscape this thinking has changed. To improve sustainability, the process industries require predictability to operate not only at desired capacity, but at optimal efficiency for every possible second that a plant is running. Many of our customers are now implementing strategies to better connect their assets, people and processes to improve the sustainability of their operations and make every day their best day of production. Although the strategies differ across organisations, the common enabler is the IIoT. While an IIoT-enabled plant may use a combination of sensors, automation systems and cloud technologies integrated with current systems and analytics, they all aim to increase intelligence. Whether this is realised through a predictive asset performance management system or the use of intelligent wearables for increased workforce competency and productivity is not necessarily important. What is important is that our customers can leverage IIoT to transform their work processes from manual and reactive, to automatic and proactive.

What is your industry doing to attract, upskill and retain talent?

The incoming workforce has very different needs than those who are nearing retirement, especially when it comes to the use of technology. We see several of our customers in the process industries seeking to understand how best to leverage technology to attract, upskill and retain talent. One such area where we are working to address these challenges is by using intelligent wearable technology to increase workforce competency and productivity. By leveraging how people best retain knowledge — doing not reading — our customers are using Honeywell Skills Insight competency tools that include augmented and virtual reality to train their workforce on critical tasks in the field with dramatic results. On the productivity front, Honeywell Skills Insight productivity tools bring knowledge and expertise to field operators in the moment by integrating control room and field workflows via intelligent wearables and a suite of productivity apps, so that field operations are performed with speed and precision.

How is your industry preparing for technology developments such as artificial intelligence?

While we have seen early adopters in the process industries take the dive into IIoT and realise true value, we are now seeing mainstream adoption taking place. Not in the future, but now, our customers are using powerful cloud networks to collect, aggregate and model data for accurate prediction of asset degradations and failures, and put contingencies in place to limit the impact on their organisation using artificial intelligence. This approach is fundamental to improving process reliability and increasing operating margins by delivering real-time, intelligent and actionable insight to end users. The true value of the IIoT can only be fully realised with a holistic view of one's organisation, and although it may take time for some to become a truly data-driven organisation, this evolution is happening and there are already companies reaping the benefits.

Andrew Hird is currently the Sales Director for Pacific and South East Asia for Honeywell Process Solutions, and has been involved in the process industries for 21 years holding engineering, sales, marketing sales management and general management positions. He holds engineering and science bachelor degrees from Monash University and a Masters of Chemical Engineering.

REPORT: IIoT KEY FOR SUSTAINABILITY IN GLOBAL SUPPLY CHAIN

Improving the environmental sustainability of their operations through the adoption of Industrial Internet of Things (IIoT) technologies is a crucial priority for organisations engaged in the global supply chain, according to a new a study undertaken on behalf of satellite communications company Inmarsat.

The report 'IIoT on Land and at Sea' found that over one-fifth (21%) of businesses surveyed reported full IIoT adoption, with a further quarter reporting that they were in the trial stage of IIoT deployment. There are a number of drivers for IIoT adoption, though almost half (46%) of respondents reported that monitoring environmental conditions (such as water, soil and air quality) and improving resource efficiency are the two largest drivers.

The research also highlighted that many global supply chain organisations are realising their sustainability objectives through the use of IIoT — over two-thirds (67%) of respondents with fully deployed or trial-stage IIoT solutions stated they were achieving environmental sustainability improvements. Early successes in achieving sustainability objectives have been seen in the implementation of smart electrical grids, smart street lighting, environmental monitoring, and fuel efficiency monitoring and telemetry.

However, the research also uncovered that those organisations with unreliable connectivity were less likely to be achieving improved environmental sustainability. Access to reliable and resilient connectivity is essential for IIoT technologies to function, enabling the constant transmission of data to optimise operations — and with many global supply chain organisations operating in remote regions or at sea, where terrestrial networks are not available, satellite communications networks are key to achieving this.

"The global supply chain is faced with a multitude of challenges, tasked with reducing its impact on the environment and adhering to stricter government regulations, while accommodating the needs of a growing population," said Paul Gudonis, President at Inmarsat Enterprise. "Our research shows that organisations are adopting IIoT to help them achieve these goals, and that many are succeeding in this aim.

"However, it is clear that without the right connectivity networks, IIoT deployments won't succeed in delivering the improvements in sustainability they are capable of. The global nature of the supply chain means that organisations need reliable connectivity to gather mission-critical data from every area of their operations and analyse it in real time, though patchy terrestrial coverage makes this challenging. With global and reliable coverage, only satellite communications offers the levels of connectivity organisations need to make IIoT a success."

As a provider of mobile satellite connectivity for Industrial IoT deployments across the global supply chain, Inmarsat owns and operates an L-band satellite network offering 99.9% availability suitable for critical IIoT applications, rugged and energy-efficient terminals, and low-latency data transmission. It is thus a suitable connectivity solution for enabling monitoring and automation applications in remote and hostile environments.

Inmarsat Services Ltd

www.inmarsat.com

WHAT YOU THINK IS THE END IS JUST THE BEGINNING.

Here at ResourceCo, we believe there's no such thing as waste. It can almost always be recycled, reused or reduced to protect the earth's limited resources. If you have a waste problem, we'll take it away, then bring it back as something better.

- Construction & Demolition Materials Recycling
- Alternative Fuels & Carbon Abatement
- Transport & Logistics Solutions
- Asphalt Recycling
- Concrete Recycling
- Bulk & Engineered Fill Supply
- Fixed & Mobile Pre-mixed Concrete Batching
- Commercial & Industrial Materials Recycling
- Aggregate, Screenings & Asphalt Based Product Supply
- Disposal, Treatment & Management of Waste Soils
- Mine and Quarry Rehabilitation
- Management of Project Specific waste
- Tyre and Conveyor Belt Recycling
- Renewable Energy
- Carbon Abatement Sales & Auditing
- End of Life Landfill

Call 1300 696 733 or visit resourceco.com.au

QCSE Quality Certified System ISO 9001
QCSE Environmental Certified System ISO 14001
QCSE Safety Certified System OHSAS 18001

RESOURCECO

TOMORROW'S SOLUTIONS. TODAY

Keeping chemicals out of our waterways

Environmental water quality is set to improve in Australia and New Zealand, thanks to the development of a new method to set the maximum acceptable concentration of chemicals in waterways.

Intended to help protect aquatic ecosystems, the method's development was part of a revision of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. It was made possible by a collaborative research effort that included the Queensland Department of Environment and Science (DES), CSIRO, the Environmental Research Institute of the Supervising Scientist, the NSW EPA, Environmetrics, The University of Queensland (UQ) and the National Institute of Water and Atmospheric Research (New Zealand).

©stock.adobe.com/au/Couperfield

"The new method is helping develop guidelines for approximately 60 high-priority chemicals, particularly pesticides, metals, industrial chemicals and pharmaceuticals," said UQ researcher Dr Michael Warne, who contributed to the work.

"This means we can continue to make sure our waterways aren't toxic to the thousands of species, from fish to microalgae, that we share these resources with."

Dr Warne said his decades of work to clean Australia's waterways were inspired by the book *Silent Spring*, published in 1962, which documents the adverse effects of pesticides on the environment.

"It made me realise the importance of water quality to ecosystem health and the harmful effects of pesticides," he said.

With the guidelines now incorporating scientific developments since the year 2000 — ie, when they were last updated — Dr Warne said Australians and New Zealanders can now be "much more confident that our waterway ecosystems will be protected" — though there is still room for improvement.

"These guidelines are designed to protect organisms from the effects of individual chemicals, but organisms are generally exposed to mixtures of different chemicals," he said.

"I'm now focusing my research, along with my colleagues from DES, on developing a method to estimate the effects of mixtures of chemicals.

"There's simply no room for complacency, particularly with issues like the quality of water discharged on the Great Barrier Reef and the water quality in many urban waterways.

"We need to keep working towards better water quality, for not only our own sake, but for the life that thrives in our waterways."

The University of Queensland
www.uq.edu.au

Microgrid trial helps uni transition to renewables

The Australian Renewable Energy Agency (ARENA) has agreed to provide $2.97 million in funding to Monash University and technology partner Indra Australia to trial a microgrid on Monash's Clayton campus.

The Monash Smart Energy City project builds on Monash University's commitment to reach net zero emissions by 2030. The pilot project will test the microgrid across the Monash University Clayton campus in Melbourne's south-east, using Indra's Ingrid 'Advanced Grid Management' (AGM) software platform.

The microgrid will be operated as a grid-connected smart embedded network containing a variety of distributed energy resources (DER) including up to 1 MW of rooftop solar, 20 buildings with automated energy management systems, 1 MWh of battery storage and electric vehicle charging stations.

The $7.1 million project will provide for the deployment and integration of Indra's software platform and enable Monash to demonstrate how a 100% renewable electricity system can operate reliably, provide value to consumers and reduce strain on the energy network.

ARENA CFO Ian Kay said this project would help Monash University transition to renewable energy.

"The project will use Monash University as a 'living laboratory' that will help universities form their own microgrids and take control of their energy usage.

"Universities use a significant amount of power during the day; Indra and Monash have offered a solution that can reduce peak demand and place the education sector on a path towards renewables," Kay said.

Findings from the project will help inform ARENA's work around DER, as Australia moves towards an increasingly distributed energy system. ARENA has also recently launched the Distributed Energy Integration Program with energy market authorities, industry bodies and consumer associations.

Indra Australia Energy Solutions Manager Giovanni Polizzi said: "We are pleased to be a key technology partner in this leading initiative in which Indra's intelligence leverages edge computing using both centralised and distributed components to monitor and control distributed grid elements in real time. It will allow Monash to control and optimise when and how energy is used across the campus."

Monash's Net Zero Initiative Program Director, Scott Ferraro, said: "Through the Net Zero Initiative, we will be sourcing 100% of our electricity from renewable sources by 2030.

Indra
www.indracompany.com

Sometimes Cheap Can Cost You

Stuck without the quality inspection equipment your optical network needs? AFL's FlexScan™ OTDR offers all the essentials to troubleshoot and verify your FTTH PON or point-to-point optical network. With FlexScan, network verification and troubleshooting have never been so easy, so complete, and so cost-effective.

See the difference for yourself! Visit **content.AFLglobal.com/Demo-Request** to schedule your demonstration.

OTDR Feature	FlexScan	Other OTDRs
Basic OTDR: Trace and event detection	Included!	Included!
SmartAuto™ Multi-pulse Acquisition: Detect closely-spaced events before splitters while still measuring through splitters in a single test	Included!	$
LinkMap® Display: Easy to understand, color-coded icons indicate passing/failing connectors, splices, splitters, macro-bends and faults	Included!	$
Visual Fault Locator: Pinpoint faults in cabinets and splice closures	Included!	$
Reporting Software: Create professional OTDR test reports	Included!	$
Wave ID Source & Power Meter: Dual-wavelength loss tests in seconds	$	$
Lost time, Second Truck Roll: When you lacked the tools to find the fault	Never!	$

FlexScan OTDR

Pocket-sized
Performance-packed
User-friendly
Saves you money!

AFL

www.AFLglobal.com
1300 232 476

POWER MONITORING TO AID CO_2 REDUCTION TARGETS

CO_2 emissions need to be reduced by at least 50% by 2050, according to the United Nations Intergovernmental Panel on Climate Change (IPCC).

Achieving this will not halt global warming altogether, but it will limit the global temperature rise to 2˚C. Accordingly, Australia has committed to a 26–28% emissions reduction target by 2030.[1]

Commercial buildings are a substantial contributor to global energy usage, accounting for 40% of global energy consumption, and around 10% of the electricity consumed in Australia, which is better than the global average but could still be improved.[2] Australian facilities managers, building owners and tenants can contribute to reducing CO_2 emissions by reducing the amount of energy they use. This can be achieved through the use of effective measurement and analysis tools that illuminate actual energy usage and highlight where savings can be achieved.

Australian building standards and ratings

The key is to prioritise energy efficiency. In fact, this is so important that there are now requirements in place for commercial buildings to disclose their energy efficiency ratings. The National Australian Built Environment Rating System (NABERS) is an Australian Government initiative to measure and compare the environmental performance of Australian buildings and tenancies. NABERS uses 12 months of real, measurable information such as bills or waste consumption data to compare the performance of a building or tenancy to benchmarks created by the performance of other, similar buildings in the same location.

The resulting star rating helps identify how a building is performing. For example, a one-star rating means the building is performing very poorly, while a six-star rating means the building is a market leader. The electronic rating certificate is valid for 12 months, during which time it's possible to work towards improvements.

The Commercial Building Disclosure (CBD) program, mandated by the Australian Government Department of the Environment and Energy, requires sellers and lessors of large commercial office spaces to provide energy efficiency information to prospective buyers and tenants.[3] The program relies on NABERS ratings.

The voluntary Green Star requirements assess the design of office fit-outs. While not mandatory for government compliance, the Green Star ratings can provide a useful measurement that can help lower operating costs, reduce liability and risk, improve the health of the working environment, and attract and retain tenants, among other benefits.

According to the National Construction Code, areas greater than 500 square metres must have gas and electricity monitoring in place. Areas greater than 2500 square metres must individually monitor and record the energy used by air conditioning, lighting, hot water supply, internal transport devices such as lifts (if there are more than 11), general power usage and other ancillary plants.[4]

The government is also working with state and territory governments to implement minimum energy performance requirements for new buildings and major refurbishments.[5]

Reducing power use with power monitoring

According to NABERS, tenants can make their offices more energy efficient at low or even no cost, and could potentially reduce their bills by as much as 60% year-on-year with the right approach.[6]

Facilities managers should implement a suite of solutions, such as those provided by Socomec, that can help monitor energy usage, analyse the consumption and communicate insights so that areas for efficiency gains can be identified and leveraged.

To effectively manage energy usage, it's important to have real-time monitoring of energy usage and events. This makes it possible to track performance and identify potential energy savings while there's still time to achieve them, rather than days, weeks or months later when the information may be out of date.

Furthermore, it's crucial to have visibility at all levels of energy infrastructure. This avoids blind spots and ensures that all energy consumption is accounted for and allocated to the proper source. Instead of a general requirement to cut energy use, facilities managers can get specific insights that can lead to meaningful action. For example, facilities managers may be able to see that air conditioners left running overnight or on weekends are using a significant amount of electricity. They can then decide to turn the air conditioning off at certain times to reduce electricity con-

sumption without affecting tenants unduly.

This can be extended down to the device level. Being able to see that certain devices are power hungry versus others means decisions can be made regarding servicing or upgrading those devices to more energy-efficient models.

Power monitoring systems to consider

Facilities managers should choose a measurement and monitoring solution that includes AC and DC connectivity for hybrid power supplies and is safe to use, with no hazardous voltage on panel doors. The solution should use smart sensors with a long operational range, automatic rating configuration and safe disconnection of the current sensor under load.

The ideal solution is one that's scalable, with modules easily added anywhere in the measurement system.

It should also offer easy-to-understand reports that are accessible from anywhere, both locally and remotely.

Cloud connectivity offers a higher level of analysis, while visual reporting makes it easier to see at a glance what's going on. Being able to visualise and analyse real-time and historical measurements from a large number of connected devices is vital. And, all reported information should be accessible from any centralised management software.

The solution should measure real-time electrical values, analyse the power quality of the grid and loads, send alarms via email whenever thresholds are exceeded and provide a summary of alarms in progress as well as a log of finished alarms.

And, the solution should include a network quality analyser that doesn't just determine how much power the building uses but guarantees the availability of electrical installations and the safety of assets. This is particularly important for critical buildings such as data centres, banks and infrastructure providers.

A network quality analyser can also reveal whether power quality problems stem from transport and distribution issues, unbalanced loads or neighbours sucking up the power. Once these factors are understood, measures can be taken to reduce their influence on power quality, which can also reduce the amount of energy that is wasted.

A sophisticated solution will help decision-makers account for influencing factors including outside temperatures, surface area of the building, occupancy and more. It should take into account tenant comfort, lighting, security and environmental quality, as well.

The system should then let facilities managers identify potential energy savings by analysing various parameters. This could include a consumption comparison between several sites and periods, cost analysis, peak demand analysis, reactive energy penalties analysis and comfort parameters analysis such as temperature and humidity.

Personalised dashboards per user, per site, with personalised reports and alarm features will make it easier to keep a tight leash on power consumption. And, as changes are made, the system should make it easy to quantify those savings by measuring against energy performance key performance indicators (KPIs) and correlation analyses.

It's important to choose a solution that can be retrofitted to the building without significant disruption. This lets building owners gain monitoring and measuring capabilities without having to invest in expensive refurbishment. Consequently, they can more easily comply with government regulations and use their improved energy-efficient ratings to make their building more attractive to potential lessees or buyers.

Next steps

The first step towards reducing CO_2 emissions and improving buildings' energy efficiency is to understand exactly how much energy is being used and why. Once these benchmark measurements are in place, tenants, facilities managers and building owners can begin enacting strategies to reduce energy consumption. Constantly measuring the outcomes of these strategies is crucial so their efficacy can be well understood. If energy-saving measures aren't effective, they could potentially be abandoned in favour of measures that yield stronger savings.

By committing to taking smart initiatives to reduce energy consumption, all Australian building owners and tenants can contribute to the planned emissions reduction target of 26–28% by 2030.

References

1. http://www.environment.gov.au/climate-change/publications/factsheet-australias-2030-climate-change-target
2. https://www.enu.hr/wp-content/uploads/2016/03/energy-management-guide-for-tenants.pdf
3. https://www.energy.gov.au/government-priorities/energy-productivity-and-energy-efficiency/commercial-building-disclosure
4. National Construction Code Section J8.3 Facilities for Energy Monitoring
5. https://www.energy.gov.au/government-priorities/energy-productivity-and-energy-efficiency/commercial-buildings
6. https://www.enu.hr/wp-content/uploads/2016/03/energy-management-guide-for-tenants.pdf

IPD Group Limited
www.ipd.com.au

bürkert
FLUID CONTROL SYSTEMS

What does an exciting hair colour have to do with blood analysis in a lab?

Fluid Control technology from Bürkert is the critical success factor for both of them. In the production of haircare products our solutions keep the ingredients meticulously separate. Thus, hairs easily shines and looks beautiful. And in the laboratory Bürkert Systems separate analysis media with uncompromising precision. This ensures reliable diagnoses. Wherever gases or liquids come into play, specialists in all industries trust in solutions from Bürkert. Because we deliver ideas that make the difference.

We make ideas flow.

www.burkert.com.au

CHRIS HOEY

MANAGING DIRECTOR, BÜRKERT AUSTRALIA

What key trends do you predict will have an impact on the growth of your industry in 2019?

Much of the industry is hoping that intelligent manufacturing will drive growth; however, we need to have innovative manufacturing first. We have seen an increase in activity levels in Australian manufacturing in recent years, as we seek to carve a unique market where we are globally competitive. To maintain this level of activity, the industry sector has been encouraged to "innovate or perish". The companies that embrace technology in a customer-centric way will be the survivors in this new economy. Strong manufacturing growth will deliver strong automation industry growth.

We may also see mining investment returning, as they too must remain competitive and up to date with the latest technologies. Whilst I don't see this becoming as strong as the boom years, I predict a slow but sustainable progress in technology implementation in this area.

How is your industry preparing for advanced manufacturing capabilities?

With all the hype of the Internet of Things, it is a great time to be in the market of the 'Things'. Over the last five years or so, we have seen companies launching products and software designed for the smart factory. During this same period, work was underway to improve standards and new communication protocols in order to connect the puzzle pieces into workable systems. 2019 will see many implementation trials assessing how (or if) these tools will create tangible value.

I hope these trials will release the hype bubble so we can then focus on applying appropriate technologies. When I say appropriate technologies, I refer to the use of new technologies to create value. Not only for those implementing, but their customers and suppliers as well. It is this value chain concept that should be our long-term vision.

How is your industry preparing for technology developments such as artificial intelligence (AI)?

It is great that AI poses no risk to the automation industry, which cannot be said for many others. The output of any system using AI will be naturally limited to the amount of data it can process via its computing algorithms, as well as how fast it can develop that data into valuable information and instructions. In this industry, that equates to technology-enhanced sensors and final control elements. If AI is driven by quality information, I see a strong move towards choosing superior equipment and reliable suppliers, as buyers' decisions will be based more heavily on life-cycle costs. Ask yourself: where would be the value in having predictive maintenance telling you the same valve will fail again? This will still bring your process to a halt and in turn cost you money.

I hear that there will be so much data, we will have no choice but to use AI eventually. As an example, one smart modulating valve could generate as much as three terabytes of data per year, and your site might have a hundred of them. But what data makes sense to read, analyse and store and how often? These questions will first sit with the engineers commissioning the systems. In time such decisions will become commonplace, and perhaps even be pre-empted in the diagnostic software. This will be a learning process for us all in the coming years.

What is your industry doing to attract, upskill and retain talent?

We are currently in a period of extreme workforce transition. It's predicted in 2020, just two years from now, globally 50% of the workforce will be millennials, responsible for one in every three dollars spent. At the same time we are seeing the mass retirement of the baby boomers, which is changing many of the senior positions and opening organisations to a fresh way of thinking.

These two factors combined make a strong statement that we must start to proactively embrace this movement, and seek to address the latest industry needs with the newly graduated technology experts, who will be integral to future product and solution development.

Our industry is finally defined as 'operational technology' (OT); however, we're immediately being merged into information technology (IT). Along with the trend towards smart factories, IIoT/i4.0 and AI, I don't see this direction slowing. The industry should embrace this change instead of fighting against it.

In response, Bürkert's looking to enhance the engineering teams by employing young and innovative staff who are educated in computer science, networking and information systems and who are engaged and excited by this new landscape.

Those businesses left hanging onto old ideas, or seeking minimal disruption at the management level, will eventually fall short and drift to irrelevance in their market segments. The companies that embrace change, bringing young innovators onboard with fresh ideas, will be securing a foundation of success moving forward.

Chris Hoey is the Managing Director for Bürkert Australia and Regional Coach of Asia-Pacific. Whilst holding a diverse international management portfolio, Chris remains hands-on and strives to be part of developing applications of new technologies to meet current and future challenges. With 30 years of experience, his enthusiasm for industry evolution and solution development is second to none and is a key influence within the business in seeking new modernisms and efficient processes for Bürkert customers.

NEW RELEASE

KAISHAN
ENGINEERING THE FUTURE

PERMANENT MAGNET VARIABLE FREQUENCY (PMVF)

The most energy efficient air compressor range yet!

Precise variable air control means big energy savings for compressed air reliant industries

This revolutionary new compressor range offers a perfectly integrated systematic optimisation of the compressor unit, advanced permanent magnet motor and Kaishan 2-Stage technology to achieve the optimum operating combination. Available from 22kW to 75kW*.

PERMANENT MAGNET 2-STAGE TECHNOLOGY

Kaishan new generation 2-Stage technology

Advanced Permanent Magnet Motor

Precision engineered integrated compressor unit

*The new range of PMVF integrated technology compressors is under constant review and expansion

AUSTRALIA WIDE SALES AND SUPPORT

www.southerncrossaircompressors.com.au

SOUTHERN CROSS
COMPRESSORS (AUSTRALIA)
Air Power for Industry

Call for advice on your compressed air system

1300 098 901

MARK FERGUSON

CEO, SOUTHERN CROSS COMPRESSORS (AUSTRALIA) PTY LTD

What key trends do you predict will have an impact on the growth of your industry in 2019?

With the continuing rise in energy costs, air compressor operators will or should be seeking to lower their costs of generating compressed air. Ways they may achieve this are:

- Making sure their current system is well maintained and air leak free by conducting an air audit or leak detection survey.
- Optimising efficiency by combining with the right ancillary system components including dryers, filters, after coolers, pressure vessels, oil/water separators, auto drains etc.
- Upgrading to a more efficient type and model of compressor that is matched to their production output and demand profile.
- Utilising variable speed drive technology that programs the compressor to provide for fluctuating demands in work schedules thereby using less energy in lower or non-usage periods.
- Opting for two-stage compressors that allow the compression ratio to be split over two distinct rotary screw airends resulting in compression ratios across each airend of around 3:1. The outcome is less slippage, less bearing loads and with intercooling, significantly higher outputs for the installed motor power. The output of a two-stage compressor is typically around 20% higher than that of an equivalent single-stage compressor.
- Utilising new age, PMVF compressed air systems that combine the most energy efficient combination of proven energy-saving technologies in the compressed air industry today. It really is a unique systematic optimisation of an advanced compressor unit, superior airend quality and dynamics integrated with the latest in permanent magnet motors which require a lower kW input to maintain specified air demand. It's a game changer, offering unsurpassed efficiency in compressors down to 22 kW, providing models suitable for virtually any industry application. When PMFV is applied through two-stage technology models, it can provide up to 50% increased efficiency over conventional compressor types.

What are the three biggest challenges facing your industry in 2019?

1. Providing our clients with the very best energy-saving technologies available to offset the expense of powering their industry with compressed air. That requires both the manufacture of world's best compressed air engineering and energy-saving technologies through ongoing research and development.
2. Offering a range of compressor types and models that are specifically suited to any output need from small workshops to major industry. We need to educate our customer base to understand the 'pay back' realities of embracing new compressed air technologies which will in turn save millions of dollars in energy savings across Australian industry.
3. Providing mobile and in-house servicing facilities through highly trained technicians with minimum response times. This requires the education of Australian industry on the importance of strict maintenance regimes that ultimately save more than they cost.

How is your industry preparing for advanced manufacturing capabilities?

In our particular case, our parent company, Kaishan Group, is constantly researching and trialling new, energy-saving technologies in manufacturing and research facilities around the world. Now, Australian industry can access latest, world's best engineering and technology that provides them with a real choice, allowing near-perfect matching to customer requirements. This is showcased with the new range of permanent magnet, variable frequency (PMVF) compressors mentioned earlier.

How is your industry preparing for technology developments such as artificial intelligence?

With the introduction of Variable Speed and PMVF technologies that have the ability to program from single- to multi-system compressors to automatically respond to compressed air demand, we have already entered a form of artificial intelligence that provides peace of mind to operators. Such control systems ensure that the compressor/s are running at peak efficiency from 0 to maximum demand. Automatic monitoring and warning systems also let operators know when and why any efficiency loss occurs.

How close to reality are smart cities and how much is hype?

If we stick our heads in the sand and don't believe much of the hype then we are not speculating on the future and will ultimately stagnate. Technological and human progress seems to constantly accelerate and what we can only dream about today can jump up to bite us pretty quickly if we become complacent and don't invest in 'Future Industry Speculation'.

A recent specialised installation of our KHE compressors is so automated that the system can be operated, programmed and controlled from any of the customer's facilities throughout Australia... something we would not have considered a relatively short time ago.

For over 30 years, Mark Ferguson has worked with a myriad of compressed air equipment applications across Australia. Starting in the industry as a Graduate Engineer, Mark has been involved in all aspects of compressed air including sales and marketing, design and manufacture through to business leadership. "It has been an amazing journey through an incredible number of industries and applications and I've never lost the passion for what I do," he said.

POWER SIGNAL CONDITIONER

For successful energy management, consumption values of machines and systems must be known. The WAGO 2857-570/024-00X 3-phase power signal conditioner in a DIN rail-mount enclosure offers a solution for measuring currents and voltages in a 3-phase supply network, remotely from the control level.

Measured variables such as active, apparent and reactive power, energy consumption, power factor, phase angle and frequency can be accessed via a Modbus interface. Two integrated RJ-45 sockets streamline the interconnection of up to 32 devices.

In addition, the 3-phase power signal conditioner can log the corresponding measured variables onto a microSD card. Simple configuration and display of measured variables using WAGO's interface configuration software enable the user to perform comprehensive data analysis.

Current is measured via current transformers or Rogowski coils, allowing flexibility of installation. Other benefits include a slot for microSD cards for fast and secure mobile measurement, compact device in a DIN rail-mount enclosure which saves space, Modbus interface and a digital signal output as pulse output (configurable pulses/kWh) provides permanent energy consumption monitoring.

WAGO Pty Ltd
www.wago.com.au

EMBEDDED SYSTEM WITH AI CAPABILITY

The SINTRONES ABOX-5100 Series can be applied to AI-related fields such as AI deep learning and virtual reality in data centres, in the cloud and on devices which could drive the expansion of industrial automation capabilities.

The ABOX-5100 Series is powered by a new generation APU (a CPU with GPU compute functionality), the AMD Ryzen, which will be able to support up to four CPU cores and eight threads. It comes with the AMD E9260 or the Nvidia GTX-1050TI, its GPU following the Vega GPU Architecture. Three full-size Mini-PCIe slots for internal expansion and one M.2 A-E Key 2230 for Wi-Fi/GPS/4G LTE are also available, as are four USB 3.0 ports and eight Gb Ethernet with the option of PoE 802.3af.

Deep learning relies on GPU acceleration, which the ABOX-5100 Series delivers with a small footprint while being fully operable in harsh environments, making it a suitable choice for industrial automation. It offers a wide input voltage range of 9–48 VDC with intelligent power management, allowing timed delay settings for powering on or off, and a completely fanless design. The ABOX-5100 Series also supports the MXM Version 3.1 Type A and PCIe x8 interfaces. The operating temperature is -40 to 70°C and storage temperature is -40 to 80°C.

The ability to connect computing systems to deep learning and affordable sensors has enhanced autonomous machines enabling them to utilise the IoT with artificial intelligence. Such power will enable a new wave of automation in various industries.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

MANAGED ETHERNET SWITCH

The MLB-E4202 is an industrial 10-port managed Ethernet switch with eight Gigabit auto negotiating copper RJ45 ports and two SFP 100BaseF fibre ports.

It is designed for industrial applications and features a rugged metal enclosure, fanless operation and wide operating temperature range of -40 to +75°C. In addition, the Ethernet ports provide 1.5 kV RMS isolation.

The MLB-E4202 provides dual redundant 12–58 VDC power inputs via a screw terminal power input block with reverse power protection. DIN rail and wall mounting options are available.

Firmware features include a Layer 2 line-speed switching fabric, multicast and a broadcast storm function to protect networks from unexpected traffic flooding. The MLB-E4202 is a suitable solution for general applications and harsh industrial environments. With plug-n-play ease of use, and compact size, the MLB-E4202 can easily be used on factory production lines, embedded into machines and intelligent transports systems or applied for simple network expansion.

Interworld Electronics and Computer Industries

www.ieci.com.au

M12 CONNECTORS SUPPORTING 630 V

Powerful voltage supplies for M12 circular connectors have up to now been realised via 7/8″ solutions. In Profinet, the M12 L-coding with 0.75 kW at 63 V and 16 A is a firmly established standard.

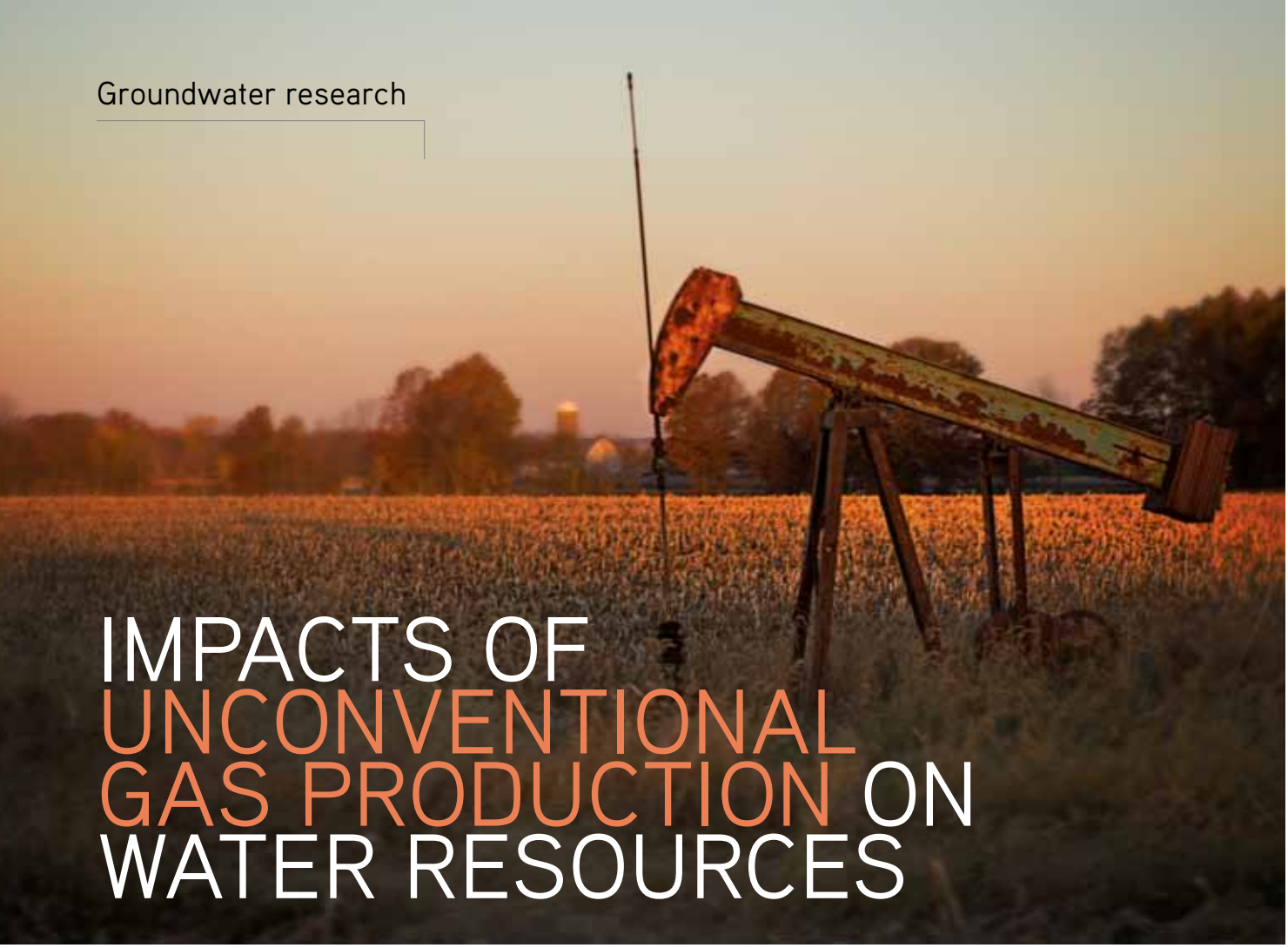
In order to offer the widely used M12 form factor to device manufacturers for voltage supply, HARTING will be supplying the K-coding with 7 kW at 630 V and 16 A in the first half of 2019, allowing the integrated transmission of data, signals and power. The logical consequence for housing manufacturers will be simplified planning and cost savings.

With power of this magnitude in a compact M12 housing, particular attention must be paid to clearance and creepage distances to protect users properly. This is accomplished with a PE contact attached to the housing, which is configured as a preleading pin in the mating face in order to bleed off voltage and conduct away flashovers on the housing or between contacts.

With the high voltages, the PCB socket must be protected from flashover on the contact side. To this end, all the hold-downs are separated from each other with an insulator. K-coded cable is available in a crimp version. The connection will be secured with the familiar screw fitting typical of the M12 design. There will also be a new PushPull variant that clicks audibly into place.

HARTING Pty Ltd

www.harting.com.au



IMPACTS OF UNCONVENTIONAL GAS PRODUCTION ON WATER RESOURCES

Researchers from the National Centre for Groundwater Research and Training, based at Flinders University, have identified very low chances of problems with groundwater contamination due to fracking, but a very high likelihood of some kind of incident at the surface where unconventional gas is produced.

Unconventional gas production — such as coal seam gas and shale gas — is a highly contentious issue, with concerns that groundwater contamination could be among many possible impacts. However, just because something is possible does not mean it is probable, and it is quantifying the probability of impacts on water resources that presents an interesting and important scientific challenge.

The Flinders researchers sought to quantify the likelihood of surface water and groundwater contamination, and shallow aquifer depletion from unconventional gas developments. They compiled several hundred global scientific comparisons — from Australia, North America and Europe — between the likelihood of impacts to surface and groundwater sources from producing shale gas, tight gas and coal seam gas.

"Our work synthesises global literature and fundamental scientific understanding to quantify the probability of impacts on water resources occurring," said study co-author Professor Craig Simmons.

The results, published in the journal *Groundwater*, show that spills at the surface can and do happen everywhere that gas production from unconventional reservoirs occur, and that production processes require human vigilance for the prevention and mitigation. The researchers note that more attention is needed to bring the probability of surface spills down.

The researchers believe the likelihood of something bad happening underground is much lower than the general public may tend to believe, having examined a wide range of possibilities. However, they warn that this risk will be quite variable, depending on how deep the gas is and what the geology between that gas and the potable water above it looks like.

"To minimise this risk we must use appropriate well construction technology, really understand our geology (faults and fractures and permeability) and monitor extensively," explained co-author Dr Margaret Shanafield. "It is extremely difficult to understand exactly what is going to happen at depths of several kilometres, and there will likely be some areas where risks are too high to proceed.

"Each site and system really does need to be considered on a case-by-case basis."

Introducing gas production from unconventional reservoirs has led to widespread environmental concerns, amplified by difficult public access to trustworthy data on the likelihood of adverse impacts to their community. Dr Shanafield said the new report provides an important step forward in presenting quantifiable scientific information, but she recognises that communities still have broad issues surrounding possible unconventional gas production that need to be addressed.

"This is not just about science. We should not underestimate the socioeconomic impacts on communities, even if no contamination occurs. These are outside the scope of our work, but gaining a social licence to operate is profoundly important.

"The likelihoods presented in our research provide a starting point for comparing the probabilities of adverse impacts between types of water resources and pathways, rather than just articulating possible impacts in qualitative terms. This quantitative scientific understanding is critical for ensuring a well-informed, evidence-based discussion and debate."

FREE DELIVERY
For all orders over $150*
*Exclusions apply

OVER 14,000 PRODUCT LINES

LSC
Security Supplies

Security specialists since 1926

The widest range of security products

CCTV


Cable

Intercoms

Access Control

Alarms


Tools


Hardware

FROM ALL THE BIG BRANDS

HID · AMC · Energizer · ring · powerbox · CS · alhua TECHNOLOGY · LOCKWOOD ASSA ABLOY · PADDE BY LOCKWOOD · DCS Direct Cable Supplies · SALTO inspiredaccess · FSH FIRE & SECURITY HARDWARE P/L

ALL ACROSS AUSTRALIA

Victoria [HQ]
140-158 Dryburgh Street
North Melbourne, VIC 3051

New South Wales
44 Skarratt Street
Silverwater, NSW 2128

Queensland
15-17 Jeays Street
Bowen Hills, QLD 4006

South Australia
333 Halifax Street
Adelaide, SA 5000

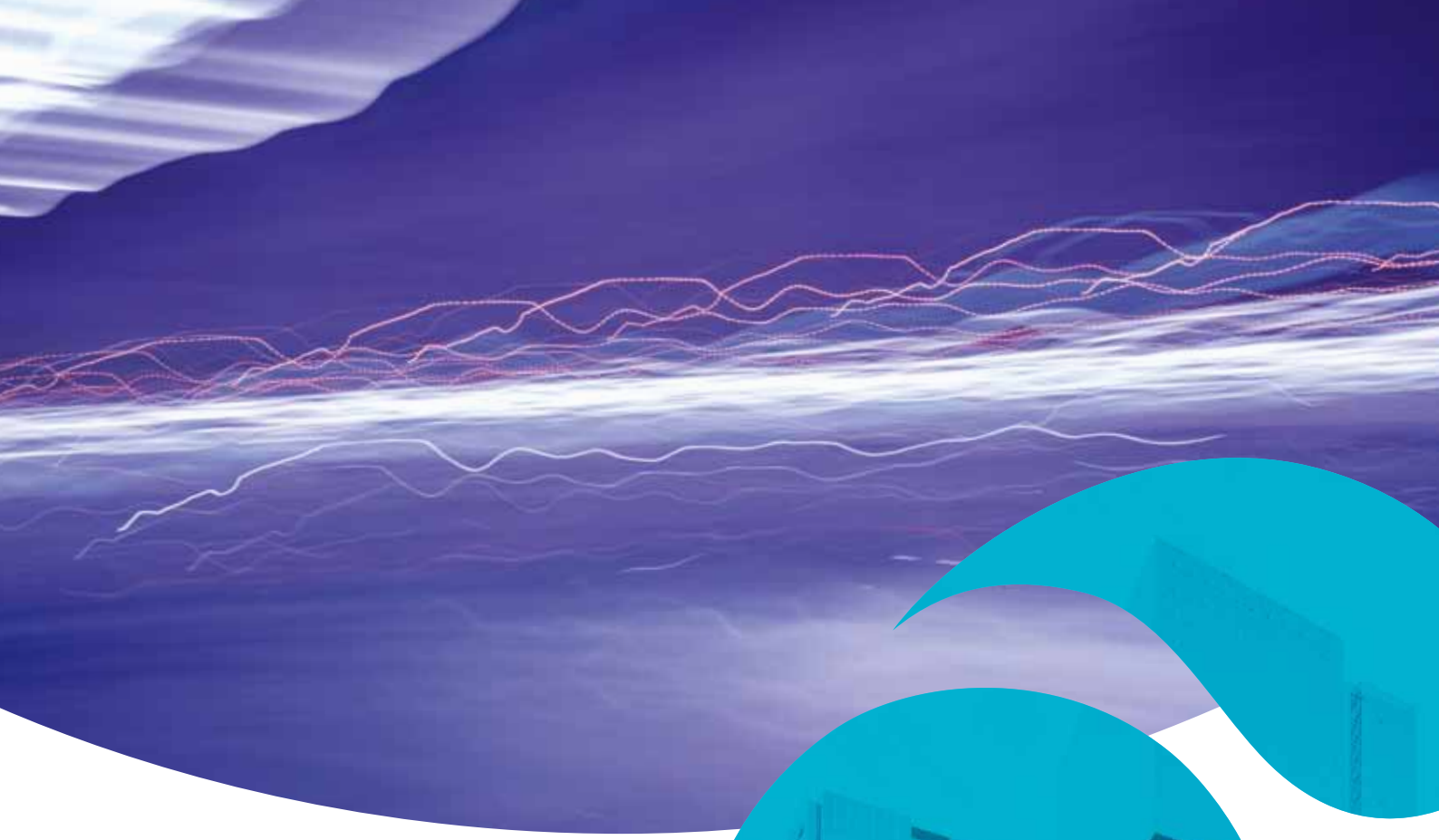
Western Australia
9 Brennan Way
Perth, WA 6104

*Contact us on **1300 646 269** for more information about our training courses.

DOWNLOAD OUR LATEST CATALOGUE ONLINE

Visit **specials.lsc.com.au** to download our latest catalogue. While you're there, why not sign up to receive regular updates on new products, training and events as well?

1300 646 269 • lscsecuritysupplies.com.au • info@lsc.com.au



Take control of your energy and reduce your cost of power by up to 40%

This is the power of the future.

As electricity costs continue to rise Capstone microturbines provide industry with the ability to secure long term energy savings while significantly reducing greenhouse gas emissions. Installing Capstone microturbines allows you to generate your own electricity and recover the waste heat from the turbines to provide heating and/or cooling for your processes and to protect you from grid outages.

Installing Capstone turbines allows you to efficiently generate your own electricity, heating and cooling at a fraction of the cost of grid energy and slash your carbon emissions by up to 50%.

Purchase | Rental | Power Purchase Agreements

P. 1300 678 476
optimalgroup.com.au

OPTIMAL
optimised energy solutions

Capstone

CRAIG DUGAN

CEO, OPTIMAL GROUP

What key trends do you predict will have an impact on the growth of your industry in 2019?

The Australian energy consumer, both large and small, has watched successive governments struggle to provide a coherent, long-term energy policy. In recent times, while climate science denialists have shrunk in number, the scars of more than a decade of climate science debate continue to exert a disproportionate influence over government policy. There is still no obvious end in sight to the problem.

Many in the Australian industry have lost patience waiting for governments to deliver a solution to their energy problems. In 2019 we will see the industry increasingly taking matters into its own hands. We will see more behind-the-meter energy solutions to deliver certainty to the cost of operations, as well as direct power purchase agreements with new, more nimble market entrants. We have already seen this with the take-up of domestic rooftop solar and storage systems; there are now strong signs industry will also embrace these solutions in order to guarantee a reduced cost in energy.

What are the three biggest challenges facing your industry in 2019?

The three biggest challenges facing our industry and Australia more broadly are gas, gas and gas. More specifically: affordable gas, reliable gas and local gas.

As one of the top LNG exporters, and with one of the largest natural gas deposits on the planet, it beggars belief that the East Coast of Australia has some of the highest gas prices in the developed world. Indeed, there have been times over the last 18 months where Australian gas has been less expensive in Tokyo than in Australia.

Australia urgently needs a domestic gas reservation policy. Our natural gas is a sovereign resource and it should be developed for the benefit of all Australians. Cheap gas means cheap electricity; in other words, cheap energy. Cheap energy means strong manufacturing and jobs growth. We are blessed with an abundance of natural resources, a highly skilled workforce and world-leading innovation. But we are being held back by the cost of energy.

It is worth noting that leading gas producers are also calling for a domestic gas reservation policy. It's likely this position has been triggered by two factors. First, gas producers can see the direct correlation between gas and electricity prices. Second, if gas prices continue to rise, the domestic gas market will shrink as customers switch to alternative energy sources.

What effect is energy policy uncertainty having on your business?

Optimal was launched in 2012 and has quickly grown to where it is today: a company with a $25 million annual turnover. Over the years, erratic energy policies and rising prices have encouraged some customers to invest in their own embedded energy solutions. But many have waited and watched, hoping rising prices would eventually reach their peak and begin to fall.

In 2017, we saw the price of energy spike, particularly in natural gas. Since then, the market has awakened to government inaction and complacency from energy retailers. Under these conditions, the industry has been forced to invest in energy solutions. The rhetoric of two-year paybacks has been replaced by the need to secure the survival of their business operations by taking steps to secure long-term energy cost reductions.

How close are smart cities and how much is hype?

Electricity grids as we know them are changing and will never be the same again. Large, decentralised power stations are no longer able to operate competitively and the market is being forced to evolve.

The so-called "smart city" offers the promise of energy being generated and consumed within a large, city-wide microgrid. The benefits are enormous. Having large feeders which can flow two ways, rather than one way, defers the need for upgrades. Transmission losses will be slashed and energy efficiency will surge.

The theory is fantastic, but it is impeded by the reality of our current networks. The current business model assumes electricity runs in one direction. And there is little incentive for network owners to shift to embedded generation while they are guaranteed a return on investments in network upgrades.

Smart cities need smart networks. And smart networks need a business model that encourages embedded generation while ensuring reasonable return to the network owner.

Craig Dugan is an accomplished and experienced executive with more than 29 years of energy industry experience. A qualified chemical engineer, Craig is the co-author of multiple gas technology patents. Prior to founding Optimal Group, Craig was managing director of Process Group, a leading process engineering company.

AUSTRALIAN WATER ASSOCIATION

ozwater'19

Australia's biggest international water conference and exhibition

7–9 May 2019 | Melbourne Convention & Exhibition Centre

TRANSFORMING OUR WORLD

Returning in 2019 to the Melbourne Convention & Exhibition Centre, thousands of water professionals from across Australia and internationally will unite in one of the world's most liveable cities to share ideas on the future of water in Australia and overseas.

Make new connections

Find solutions to your challenges

Discover the latest technologies

Register today at **www.ozwater.org**

@ozwater

JONATHAN McKEOWN

CHIEF EXECUTIVE, AUSTRALIAN WATER ASSOCIATION

What key trends do you predict will have an impact on the growth of your industry in 2019?

On the positive side, the following main trends will support growth of the water industry in 2019:

Demand for water infrastructure: The rate of population growth in our east coast cities with the escalated growth rates over the next 10 years is creating new demands for water services. This increased pressure is creating a positive impact on state government planning, community engagement and infrastructure investment. New projects in water infrastructure are expected to increase demand for skills and long-term resources from the water sector. This is being witnessed in the expansion of capacity at existing water plants, the upgrading of waste treatment plants and the commissioning of new plants.

Community support to provide for water security: The recent and continuing drought conditions in NSW and Queensland have raised the issue of water security on the national political platform, enabling both urban and regional communities to successfully push new approaches to address and overcome the challenges of water security. This heightened community awareness licenses our political parties to address the very real issues of providing water security.

SDGs underwriting our projects: There is a growing awareness of the UN's Sustainable Development Goals in the Australian community. Goals that go well beyond just the provision of clean water for all including gender equity, education and partnerships. The SDGs encourage people to think globally whilst acting locally.

On the negative side, these positives can be quickly demolished by a downturn in the economy because of regional conflicts, commodity and oil price disruptions, a currency crisis or a natural disaster. Additional political instability and leadership in Australia will further delay any true long-term water planning and resource allocation needed to confront our water challenges.

What are the three biggest threats facing your industry in 2019?

The first threat remains climate: Climate uncertainty and the ability to change climatic conditions to destabilise steady economic development and investment remains a very real threat in 2019. Any number of significant climate changes that produce severe drought or floods can cause rapid economic downturn. A lack of clarity on both immediate responses to water needs caused by climatic changes and a lack of transparent long-term management planning to restore productive water capacity will deepen the economic damage suffered.

The second threat is a lack of national political water leadership: Australia is still labouring under a system of inconsistent regulation of water across eight different jurisdictions across the states and territories. There is no clear National Water Plan that can provide all consumers of water with security of supply. There is not a national water entity charged with the task of coordinating our national water needs beyond COAG. COAG itself is plagued by political short-term vision and partisan competition. What we need is leadership from the national government to drive the inclusion of matters that include: increased use of groundwater with managed aquifer recharges in regional Australia; safe and affordable drinking water for all people regardless of location; water to support industry and agriculture; water management to create livable communities; water to protect the environment; a nationally transparent water trading system; and a recognition of Indigenous water cultures and values.

There needs to be a national commitment to ensure that all sources of water are considered. However, Australia's water leadership needs to be shared with the state governments who possess the constitutional powers relating to water. There is now a real need for a new level of competitive neutrality in the water sector, a neutrality that can unlock maximum efficiencies and innovation from new players, technologies and approaches.

We need to question how our historically large urban water monopolies can be shaped for a future that will need more decentralised water management. It's a future that will require more local community engagement and the introduction of more competition in the delivery of water services based on the adoption of new technologies. In the design, management and delivery of our water services we need to harness new agility and innovation to remove outdated silos of operation that hinder real customer engagement in an age of digital disruption and imminent automation.

The third threat is a lack of community understanding on water issues: When not confronted with a water crisis, most Australians and the politicians that represent us become complacent about our water challenges. This is in part a result of the success Australia has enjoyed in the effective delivery of water services that are largely hidden and mostly undervalued. The importance of the delivery of these water services deserves to be better valued and understood as the major economic driver for the country. The removal of water services would reveal a massive impact on the economy, but it is the need to progress the community's awareness of new options for water management that deserves new focus.

Highlighting the progress on science, technology and management systems would help grow the community's appetite for new water recycling, community-based water projects, stormwater harvesting and the use of new sources of water. It is only with such community engagement that Australia will be able to keep up with the rate of scientific research and modern technologies to improve our water management practices.

Jonathan McKeown has been the Chief Executive of the Australian Water Association since May 2013. He has worked as a commercial lawyer and a management consultant for over 200 businesses and projects across Asia and the Middle East. Prior to his current role, Jonathan was Chief Executive of the NSW Farmers Association.

NEW PRODUCTS

MICRO-TACTICAL FIBRE OPTIC CABLE

The AFL Micro-Tactical Fibre Optic Cable combines the ruggedness of military tactical cable designs with the ultra-high fibre density of AFL's micro-cable technology. Designed for rapid deployment in optical networks requiring high mechanical performance specifications, extreme environmental exposure and highly dynamic operating conditions, the military-grade micro-tactical cable is able to withstand high tensile loads, severe crushing forces, repeated impacts and extreme temperatures.

With AFL's selection of tactical cable jacket materials, the cable can be used in applications requiring exposure to UV, moisture, industrial chemicals or confined spaces. The military-grade tactical cable has fibre counts up to 96. It is used in areas such as broadcast, military, mining, rail and petrochemical.

Main features include high fibre density allowing for longer deployment lengths; ruggedised tactical cable design for operating in harsh conditions; highly flexible for rapid deployment and ease of installation; longer assembly lengths reduce number of optical connections and enhance network performance; and supportive of all fibre types for high-speed optical networking.

AFL Telecommunications Pty Ltd
www.aflglobal.com/au

OTDR FOR 5G/LTE BACKHAUL

Anritsu introduces the ACCESS Master MT9085 series of handheld testers that provides accuracy and broad measurement capability during installation and maintenance of fibre-optic cable in LTE and 5G backhaul, as well as Metro and Core networks. Maintaining the portability, performance and operability of the field-proven ACCESS Master platform, the MT9085 series incorporates a wide 8″ colour touchscreen for enhanced operation, as well as integrates Anritsu's Fibre Visualizer as a standard feature.

The built-in 8″ touchscreen, rotary knob and hard keys of the ACCESS Master MT9085 series improve OTDR waveform analysis for ease of use, helping cut on-site work time. Further simplifying verification and reducing test time is the Fibre Visualizer. Field technicians can use the tool to display fibre events, such as splices, connectors and splitters, as a schematic map. By eliminating complex operations, such as reading and analysing optical waveforms, Fibre Visualizer allows technicians at any experience level to conduct high-quality fibre measurements and pass/fail evaluations. In addition, automatic pass/fail evaluation based on preset threshold values reduces operator evaluation errors.

A flexible platform allows functionality to be easily added to the ACCESS Master MT9085 series. A high-performance optical power meter, visible light source and optical fibre end-face inspection function VIP (Video Inspection Probe) can be integrated into the platform to create a complete all-in-one toolkit for fibre installation and maintenance. Measurement results can be managed easily at the central office using WLAN and Bluetooth connections.

Anritsu Pty Ltd
www.anritsu.com

WHEN IT COMES TO SWITCH-MODE POWER SUPPLIES, CHOOSE THE #1^

QUICK AND EASY ONLINE ORDERING

1 Register your business at www.techbrands.com/register
2 Check price and availability
3 Order

TECH BRANDS by ELECTUS DISTRIBUTION

Power & Ecotech | Cables & Connectors | Sound & Video | Test & Tools | Security & Surveillance

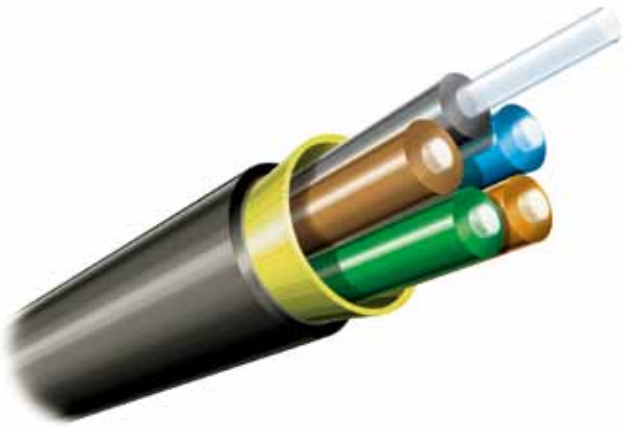
LOCAL • SERVICE • STOCK

MORE WAYS YOU CAN IMPROVE YOUR BUYING WITH TECHBRANDS...

SAVE TIME	Shop at a single reliable supplier with a large product range
SAVE MONEY	Competitive prices with volume pricing
IMPROVE EFFICIENCY	Fast despatch from local distribution centres in Sydney and Auckland
PEACE OF MIND	Providing consistently great service

www.techbrands.com
1300 738 555

NEW PRODUCTS



LIGHT DUTY RISER CABLE

The Prysmian Light Duty Riser cable is made for distribution of optical fibre within multi-dwelling units (MDU) or office buildings. This tight buffered multi-fibre optical cable is suitable for light loads and applications in local area network (LAN), including: FDDI cabling, Ethernet and Token Ring.

The cable's lightweight design enables speedy installation, while the small diameter means less installation space is needed. Being low smoke zero halogen eliminates the production of black toxic smoke and corrosive acid during the event of a fire.

The Light Duty Riser cable is indoor and outdoor rated, for easy transition from the OSP to the Building Riser. It can also be easily terminated, as the design includes 900 μm buffered fibres.

Prysmian Australia PTY LTD

www.prysmiancable.com.au

CONSTANT CURRENT LED DRIVER

Mean Well's LPF-25 series is a 25 W AC/DC LED driver featuring the dual modes of constant voltage and constant current output. The LPF-25 operates from 90–305 VAC and offers different rated voltage models ranging between 12 and 54 V.

With efficiency up to 87% and a fanless design, the entire series is able to operate between -35 and +70°C case temperature under free air convection. This series is rated with IP67 ingress protection level making it suitable to work for a variety of applications in dry, damp or wet locations.

Features include: universal AC input/full range (up to 305 VAC); short-circuit/overcurrent/overvoltage/overtemperature protections; built-in active PFC function; cooling by free air convection; fully isolated plastic case; suitable for LED lighting and moving sign applications.

TechBrands

www.techbrands.com

TRANSFORMING WINDING ANALYSER

The Megger MWA330A Transforming Winding Analyser is a three-phase transformer test system that combines TTR and resistance testing into one. It can be used to effectively test power transformers, distribution transformers, CTs and VTs, and motors or generators. It delivers portability, reduced set-up time, increased safety and better productivity for a job site. It is available to rent from TechRentals.

All ratio and winding resistance tests such as three-phase turn ratio, three-phase winding resistance, auto vector detection, heat-run tests, and more, can be carried out with a single three-phase lead-set connection. The instrument performs DC resistance measurements on all high- and low-side windings without the need for reconnection or a separate switch box.

The MWA330A features Kelvin clamps with adjustable jaws which can open to 100 mm and banana plug input for connection to terminal blocks. This eliminates the need for special lead sets and minimises operator error. Additionally, the unit also features a bright 12″ touch-screen display, PDF report generation, PC interface via USB and an in-built printer.

TechRentals

www.techrentals.com.au

DAVID SULLIVAN

HEAD OF ELECTRIFICATION PRODUCTS, ABB AUSTRALIA

What key trends do you predict will have an impact on the growth of your industry in 2019?

There is little doubt that digitalisation will continue to drive new economic possibilities at a pace of change that is unprecedented. Being digitally enabled — that is having your machines, robot and systems feeding data to the cloud — is an entry ticket to the Fourth Industrial Revolution.

Industrial companies that invest in digital technologies are achieving significantly higher uptime, speed and yield, and are laying the groundwork for advanced technologies such as artificial intelligence. And it's not only industrial companies that will be impacted: essential infrastructure, such as the power grid and the water supply, as well as transport networks, will increasingly be controlled and operated by autonomous systems and will be managed in radically different ways.

The value of the data we collect lies in the intelligence we create from it. If you get advance warning when a robot or a machine is going to break down, you can avert a disruption in your supply chain, saving huge amounts of money and keeping your customers happy. Increasingly, ABB's business is centred on providing this kind of actionable intelligence to its customers. We have some 70 million connected devices along with 70,000 industrial control systems installed worldwide.

More recently, ABB has been reshaping the service delivery model by connecting people in production facilities, headquarters and ABB to deliver objective data insights that ultimately increase customers' profitability by improving plant efficiency, increasing safety, reducing risk and lowering costs. The new model bundles industry knowledge, cloud-based solutions and services into a 24/7 service delivery concept.

Not only are we experiencing the Fourth Industrial Revolution, but also an energy revolution that is radically changing our energy landscape. Our electricity networks are experiencing unprecedented changes from the integration of renewables, distributed energy sources, changes in customer demand patterns, loss of baseload power generation, grid instability and power price volatility.

The key here is the smart, or intelligent, control systems that maximise the supply of renewable energy over conventional generation, while seamlessly delivering supply of electricity to consumers. And then the Internet of Things, with improved sensing, communications and control software, is enabling more rapid

response and greater real-time visibility of the state of electricity network assets.

Finally, we should remember that it's not only about sustainable sources of energy but also about how we use energy. This bring me to another major trend we will witness: sustainable transport. Globally and locally, ABB is partnering with industry, government, automotive manufacturers and customers to support the road to zero-emission transport.

We have already laid the groundwork for e-mobility. ABB equips trains with drive systems that generate electricity when travelling downhill. We deliver flash-charging solutions for electric buses for public transport that can be recharged at stops in just 20 seconds. We equip ocean-going tankers with electrical systems that reduce fossil fuel consumption by more than 40%. Locally, ABB is proud to be part of the Chargefox project and enabling the launch of Australia's first liquid cooled electric vehicle charging station.

It is now up to industries, infrastructure providers and policy makers to keep pace with developments in technology and EV manufacturing, and facilitate the transition to e-mobility.

What strategies are being implemented by your industry to improve sustainability?

As we all embark on the complex transition from a fossil-fuelled past to a clean energy future, ABB is providing technologies that enable renewables to become a reliable power source. The challenge of using renewables in the energy mix is to balance supply and demand. The grid can become unstable as the intermittency of the sun and wind may not match consumer loads. This is where new technologies such as microgrids come into play: using a combination of grid stabilisation and energy storage systems, the power supply can be kept constant, even while sourcing energy from the wind and sun every day.

ABB in Australia is the world leader in microgrid technology and solutions. And across Australia, we have been helping remote communities and farmers to meet and sustain their own energy needs by incorporating renewable and clean energy technologies into the power grid.

Globally, ABB is part of the United Nations' 'United for Efficiency' partnership to transform developing countries and emerging economies to use energy-efficient products. The International Energy Agency has estimated that more than 30% of all electrical energy is used by industrial electric motor systems globally. A transition to energy-efficient motor systems could reduce this electricity demand by 20–30% in 2030 depending on the development and implementation of energy efficiency and environmental policies. We provide expertise on energy efficiency in these areas to help governments devise policies that accelerate energy savings to countries reach the goals of the Paris Agreement.

How is your industry preparing for technology developments such as artificial intelligence?

We believe that AI systems will act as a 'knowledge multiplier' for technicians in the field, so that one technician on a remote mine site or offshore oil platform can service products that previously would have required ten specialised technicians. This is done with support from augmented-reality (AR) goggles that can overlay specific instructions or guidance from an AI system to help walk the remote technician through the complex task of repairing a complex machine or switchgear.

At the same time, as some jobs are being displaced by AI, new ones will be created. In a recent report, the World Economic Forum predicts that 75% more jobs will be created as a result of AI. Many of these jobs will involve the creation, deployment and maintenance of AI-based systems.

In the robotics space, ABB is building the world's most advanced robotics factory in Shanghai which will combine connected digital technologies, state-of-the-art collaborative robotics and cutting-edge artificial intelligence research to create the most sophisticated, automated and flexible Factory of the Future.

How close to reality are smart cities and how much is hype?

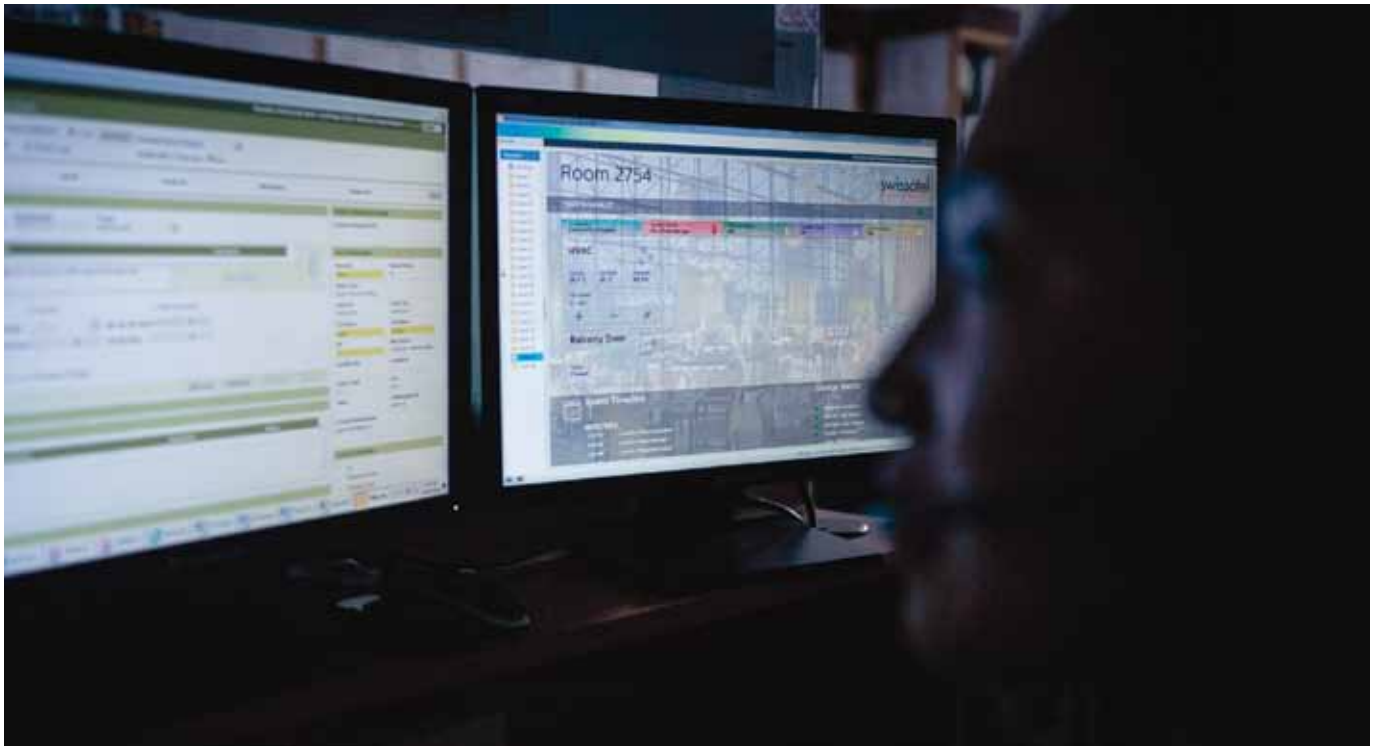
A popular interpretation of the physical nature of a smart city can be an interconnected society where the building has automation features providing comfort and energy efficiency to the inhabitants. Invariably many people consider the smart city to be the realm of smart data, with high levels of internet connectivity incorporating the Internet of Things.

ABB is involved in the smart city project of Kalasatama, in Helsinki, Finland. The vision for Kalasatama includes intelligent solutions for building technology, energy management and transport. Results so far show that the energy efficiency of Kalasatama residential buildings is improved with remote-controlled home automation systems provided by ABB. These automation systems enable up to 15% reduction in electricity and water consumption. The savings potential is based on the option of monitoring the consumption data online in real time, and also on mobile devices when out and about.

The solutions embedded in the project enable excess power generated from renewable energy sources in the district itself — for instance from solar panels and wind turbines — to be fed into the power grid to enable electric vehicles to draw electricity from the grid or feed it back; to store energy; to create easy-to-use services; and to provide more flexibility and transparency in the distribution grid, helping to lower consumption and emissions.

David Sullivan has been the Head of Electrification Products division for ABB in Australia since 2017. He leads a technology portfolio that covers the full electrical value chain from substation to the point of consumption, enabling safer and more reliable power. He also oversees ABB Australia's Electric Vehicle Charging Infrastructure and Solar businesses. Previously he led the Medium Voltage business for three years and, prior to this, managed national sales and account management for the Power divisions. David has more than 20 years' experience, both locally and internationally, in the electrical supply industry as it relates to utilities, process industries and minerals. He holds an electrical engineering degree from University of NSW and an MBA from Open University UK.

Lighting management system to make hotels smarter



Signify's IoT system, Interact Hospitality, has debuted at AccorHotel's Swissôtel The Stamford in Singapore.

The system enables guests to alter lighting, temperature and make room service requests at the touch of a button. It also lets hotel staff know if a room is occupied and helps them to respond quicker to guest requests, providing useful information to improve the guest experience, optimise operations and save energy. The first commercial implementation of this smart system takes place at the 1261-room Swissôtel The Stamford in Singapore.

By integrating lighting, sensors, HVAC and property management systems, it allows managers to monitor their entire property via a single dashboard. The system's open Application Program Interface (API) enables its connection to a variety of hotel systems, so that real-time information can be fed into everything from housekeeping to engineering systems, helping to make hotel operations more efficient.

One of the key operational benefits of Interact Hospitality is energy savings. In hot climates especially, HVAC can consume more than half of a hotel's energy use. By using data from occupancy sensors located in guest rooms and information from property management systems, Interact Hospitality can automatically turn down systems — including HVAC and lighting — when rooms are unoccupied. This allows managers to reduce electricity bills while ensuring rooms match guest preferences.

Katya Herting, Hotel Manager of Swissôtel The Stamford, said: "As a hotel catering for the next generation, we're constantly looking for ways to improve how we manage our hotels and deliver new value for our guests. This new system helps us to improve levels of service even further and gives our managers a 360° overview of our operations across the entire hotel. This technology is helping us to eliminate unnecessary work for our staff while enabling them to service guest requests in record time."

The intuitive room management system also displays information on room status so that staff do not reach out to guests unnecessarily. If a room is set to 'Do Not Disturb', the laundry delivery is automatically paused to respect guest wishes and save staff unnecessary trips and time. This also helps to increase staff satisfaction through more seamless processes.

Jella Segers, Global Lead Interact Hospitality at Signify, said, "With Interact Hospitality, we offer a fully integrated smart room system that helps a hotel improve its operational efficiency while enhancing the guest experience. For example, we know that around 35% of hotel guests leave a light on in the bathroom during the night to orientate themselves when waking up in a new environment. This may affect sleep quality and prevent deep sleep. With our new room management system, low-level night lights come on automatically when a person steps out of bed, so as not to wake them fully or disturb others in the room."

Segers said, "In addition, hotel guests can now change the lighting easily at the touch of a button on the control panel, selecting predefined settings for example, when reading, working or to relax and unwind in their room."

Signify

www.signify.com

red lion® Panasonic

RED LION & PANASONIC PLC value packs

order now 1800 557 705

LIMITED TIME ONLY!

complete industrial solution that connects, monitors and controls

Save now with Red Lion and Panasonic PLC bundles for a limited time. Bundle a CR1000 HMI with Panasonic's FPOR or Red Lion's CR3000 HMI with the newly released FPOH PLC.

MQTT ORG | OPC UA | Modbus | EtherNet/IP | dnp

from $790* ex gst

PLC value packs | what's included?

- Panasonic PLC FP Series
- Red Lion HMI CR Series (choose from 4", 7", 10" or 15")
- Free programming software
- Includes bundled accessories

support access

With the purchase of any pack, you'll have access to training and support nationally.

*T&Cs apply. See **controllogic.com.au/valuepack.html** for full details.

control logic

for more information call 1800 557 705 or email sales@controllogic.com.au
www.controllogic.com.au/valuepack.html

New technology enables better stormwater treatment

(L–R) Urban Stormwater Technologies development manager Craig Rothleitner, Curtin researcher Dr Zahanggir Alam and research supervisors Associate Professor Anna Heitz, Associate Professor Faisal Anwar and Dr Dipok Sarker.

Curtin University researchers have found that a new stormwater treatment device improves treated water quality by as much as 80%, in a development that could prevent harmful pollutants from entering waterways and cut recycling and infrastructure costs for authorities globally.

Carried out in collaboration with Urban Stormwater Technologies (UST) and published in the *Journal of Environmental Management*, the research demonstrated how a new design of catch basin insert (CBI) treated stormwater more thoroughly at the source by removing gross pollutants such as leaves and plastic, as well as smaller dissolvable pollutants — the vast majority of which are not captured by previous designs.

The research was part of the PhD thesis of Dr Zahanggir Alam, from Curtin's School of Civil and Mechanical Engineering. He said the new CBI uses a specifically developed filtration material and was shown to capture 95% of waste entering the drain while improving treated stormwater quality by 80%.

"By removing dissolvable pollutants such as nutrients from stormwater run-off, the CBI can help arrest the declining health of waterways such as Perth's Swan and Canning rivers and the ocean," he said.

"Excessive nutrients in our rivers create a lack of oxygen in the water that can kill fish and also leads to algal blooms that block the sun and prevent photosynthesis by plants — all of which harms entire river and marine ecosystems."

Research principal supervisor Associate Professor Faisal Anwar said the new design of CBI offers economic as well as environmental benefits, and could potentially revolutionise the way stormwater is treated.

"Government and local councils spend a lot of money trying to reactively manage stormwater contamination and this solution could possibly present a vastly more efficient and cost-effective way of treating stormwater when all reactive costs are considered," Assoc Prof Anwar said.

"There are many billions of dollars' worth of stormwater infrastructure already in the ground in Perth and this new technology has the potential to transform what is currently the major source of urban waterway contamination into a new water resource."

Dr Alam said the CBI has the potential to be used as the primary treatment component of water-sensitive urban designs, but further research was needed to explore this.

"While this research focuses on the removal of nutrients from stormwater now, it can be further developed to also remove heavy metals, hydrocarbons and other environmentally harmful dissolvable pollutants," he said. "This will be the focus of our research moving forward."

Dr Alam received a Curtin University Chancellor's Commendation for his work, awarded to research doctoral students who submitted outstanding theses, judged to be in the top 10% of theses examined for that year, and considered to have made a significant contribution to the field of knowledge.

Curtin University

www.curtin.edu.au

Acromag
THE LEADER IN INDUSTRIAL I/O

Metromatics

Going the Distance with Remote Ethernet I/O

Industrial-Strength Ethernet I/O with High-Density Efficiency

Acromag's Ethernet I/O Modules are ideal for SCADA, IIoT and remote monitoring or control applications. These rugged modules provide a very cost-effective and highly dependable solution to interface sensors, actuators, relays, instruments, and other devices to an ethernet-based control system.

Acromag Advantages

- High-channel density for very cost-effective solutions
- Ethernet/IP, Profinet, Modbus TCP/IP, or peer-to-peer communication
- Easy configuration via USB/Windows or built-in web server
- Dual Ethernet ports for daisy chain connections
- Counter, integrator and totalizer functions

Rock-Solid Reliability

- High-voltage isolation and surge protection dissipate harmful signals
- Redundant power and communication prevent costly downtime
- -40 to 85°C operation and Class 1 Div 2 hazloc approvals and ATEX certification

Visit www.acromag.com
TO LEARN MORE

www.metromatics.com.au | sales@metromatics.com.au | +61 7 3868-4255

ISO9001 AS9100 MADE IN USA

RoHS Compliant

Smart Grid Automation

WAGO RTU 750XTR

EFFICIENT TELECONTROL SOLUTION

The **WAGO-I/O- SYSTEM 750 XTR** provides an ALL-IN-ONE system for measurement, regulation control and telecontrol.

The 750 XTR's fieldbus independent modular slice-card I/O design provides a flexible hardware platform for all automation and engineering applications.

WAGO Telecontrollers can be configured with:

- DNP3 standards
- IEC 61850-7-4 (Server/Client)
- IEC 60870-5-101/-103/-104
- IEC 61400-25

eXTReme Size
... up to 5x smaller

eXTReme Isolation
... up to 5kV impulse

eXTReme Vibration
... up to 5G acceleration

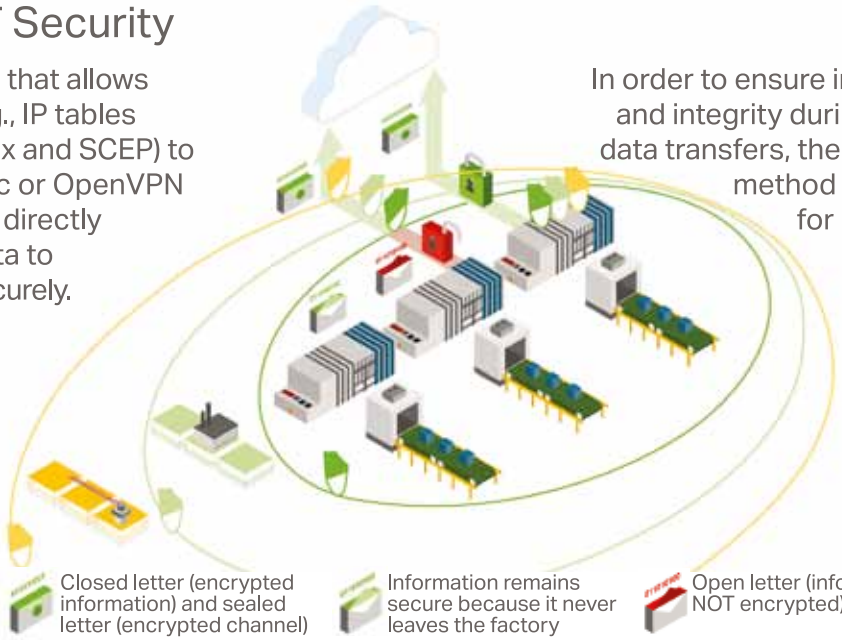
eXTReme Temperature
... from -40 °C to + 70 °C

PROFINET · Modbus · DeviceNet · PROFIBUS · CANopen · EtherCAT · KNX · EtherNet/IP · CC-Link · BACnet

CYBERSECURITY
Integration and IT Security

Linux® provides the basis that allows security mechanisms (e.g., IP tables (firewall), VPN, IEEE 802.1x and SCEP) to be implemented. An IPsec or OpenVPN tunnel can be configured directly from the PLC allowing data to be encrypted and sent securely.

Both the PFC100 and PFC200 Controllers support all TCP/IP family protocols for the simple connection to a network: DHCP, DNS, SNTP, FTP, Telnet, http and Modbus TCP/UDP.



In order to ensure information security and integrity during Web access and data transfers, the TLS 1.2 encryption method is used as standard for establishing secure HTTPS and FTPS connections, and the SSH protocol is integrated as standard for establishing secure shell and SFTP connections.

Closed letter (encrypted information) and sealed letter (encrypted channel)

Information remains secure because it never leaves the factory

Open letter (information NOT encrypted)

CLOUD & LOCAL DATA CONTROL
MQTT in Every PFC Controller

Communication between PFCs and cloud suppliers is conducted via MQTT protocol and encrypted with TLS 1.2. The cloud connection data is configured via Web-Based Management. Thanks to the standardised MQTT protocol, it is possible to send data to Cloud Data but also to intercommunicate (publish/subscribe) between other MQTT devices by configuring a local MQTT broker on PFC directly.

With WAGO Cloud Data Control, we offer a solution that links elements from the real and digital world. WAGO Cloud Data Control can manage and monitor all WAGO PFC Controllers, application and data.

EMBEDDED LINUX - OPEN & EASY
In WAGO PFC Industrial Controllers

With Linux® on the controller side, the user is independent of updates as well as licensing policy of a single software vendor. To use any C or Linux® functionalities in CODESYS, an import interface is available that dynamically loads and uses Linux® libraries in the CODESYS runtime system.

We bring together what belongs together and combine high-performance WAGO hardware with a future ready Linux® operating system.

CODESYS · OPC UA · HTML · Java · LIGHTTPD · OSADL · open source · SQLite

sales.anz@wago.com | (03) 8791 6300 | www.wago.com.au

NEW PRODUCTS

AC WALLBOX CHARGING STATION

The ABB EVLunic AC wallbox provides a high-quality, cost-effective electric vehicle charging point. It provides a convenient way to charge an electric vehicle while doing something else at the same time.

The charger is contained in its own enclosure that can be either wall or pole mounted. Users have the choice between 52 different product variations to meet their specific needs.

Main benefits of the charger include: easy installation — saves time; compact design — saves space; high quality — more reliability; and DC leakage included — saves extra devices.

Main features include: 4.6 to 22 KW charging power, sealed electronics compartment and range of installation options.

ABB Australia Pty Ltd
www.abbaustralia.com.au

STORMWATER MONITORING SOLUTION

Stormwater monitoring is carried out to ensure that pollutants do not enter our waterways or, at worst, their effects are minimalised. Thermo Fisher Scientific is able to offer a range of stormwater monitoring solutions tailored to the user's needs.

The heart of any stormwater monitoring package is the flow meter to measure how much water flows past and to calculate the pollutant loading. The MACE FloPro uses a doppler ultrasonic area velocity sensor that can measure bidirectional flows in open channels, pipes and stormwater culverts without the need for civil works or weirs and flumes, etc.

The FloPro multiple card interface enables additional equipment to be connected, such as individual water quality sensors, multiparameter water quality sondes, weather stations and automatic water samplers, for those parameters that can only be measured by complete laboratory analysis.

Thermo Fisher Scientific has had good results by coupling the MACE flowmeter with an In-Situ multiparameter water quality sonde, the Aqua TROLL 500 water quality meter, enabling measurement of baseline water quality as well as the changes that occur during and after a storm event. Typical parameters to be measured include turbidity (suspended solids), salinity, pH, nitrates and many others.

The FloPro also allows for all password-protected data to be telemetered to either a server of the user's choice or to the In-Situ cloud-based data management system, HydroVu.

Thermo Fisher Scientific
www.thermofisher.com.au

SWITCHBOARD ENCLOSURE

The IPD EXT56 switchboard enclosure system is designed, tested and certified for outdoor applications.

Made from marine-grade aluminium to withstand Australia's harsh climate, the system is an off-the-shelf modular structure, UV resistant, non-toxic and fire retardant. Unlike custom welded enclosures, EXT56 is adapted to suit the popular techno modular framework and can be designed to provide access from all angles, decreasing assembly times and reducing labour costs. Extensions and modifications can be done easily.

Available in a sanded finish or powder coated to suit specific application requirements, the EXT56 switchboard system will assist in keeping building power running smoothly and efficiently. Assistance with design and assembly is available via IPD's trained sales engineering staff.

IPD Group Limited
www.ipd.com.au

AIR KNIFE

The compact Super Air Knife provides a powerful curtain of airflow while reducing compressed air usage and noise when compared to other blowoffs. The knife offers an efficient way to clean, dry or cool parts, webs or conveyors, delivering a uniform sheet of laminar airflow across the entire length with hard-hitting force.

Even at high pressures of 80 PSIG (5.5 bar), the sound level is quiet at 69 dBA for most applications. Amplification ratios (entrained air to compressed air) of 40:1 are produced. The Super Air Knife meets WorkSafe and OSHA dead-ended pressure and noise requirements.

The best way to cut energy costs is through proper maintenance and use of the compressed air system. The most important factor to dramatically boost efficiency is proper use. The Super Air Knife uses only one-third of the compressed air of typical blowoffs used in cleaning, cooling and drying operations and can be instantly cycled on and off.

Super Air Knives are available in many lengths, from 76 up to 2743 mm, in a variety of materials that include aluminium, type 303 stainless steel, type 316 stainless steel and PVDF plastic.

Applications include part drying after wash, sheet cleaning in strip mills, conveyor cleaning, part or component cooling, web drying or cleaning, environmental separation, pre-paint blowoff, bag opening/filling operations and scrap removal on converting operations.

Compressed Air Australia Pty Ltd
www.caasafety.com.au

DIGITALISATION AND THE CHANGING FACE OF POWER MANAGEMENT

Mansi Gandhi

Digital transformation is nothing new, but its effect on the entire electrical supply chain is profound.

Today, the proposition for investing in intelligent building technologies for energy management is only part of the conversation, according to research firm Navigant Research. "Customers are looking for solutions that translate a complete data profile of their facilities, systems and operations into business metrics. The result is an evolving technology landscape."

Digitalisation has enabled more enhanced, intelligent and efficient power infrastructure, which is driving smarter control, usage and energy efficiency across the electrical power chain, according to John Atherton*, General Manager – Power Quality, Australia and New Zealand, Eaton. Organisations providing power quality solutions will play a crucial role in ensuring reliable power and power availability all along this chain from data processing and storage, right through to data collection, said Atherton.

The first step is to efficiently collect the data, then importantly, draw value from this data through analytics and the application of data science, according to Atherton. This allows more value to be provided back to the client through better availability, efficiency and reduced operational costs.

"This is a key reason why we are investing in new monitoring software for our UPS systems and building intelligent circuit breakers for control and monitoring."

5G and the power grid

The key technology evolution that will impact growth is 5G, as it will enable more efficient connectivity, said Atherton. "Therefore, driving more distributed demand at the 'Edge' and demand at the central core of the 'Cloud' (large data centres) as more data is stored and processed, and fundamentally more services are provided."

Another growth area is the evolution of the electrical grid, according to Atherton. As more diverse energy sources are integrated to make a more efficient and cleaner electrical grid, this evolution will cause grid instability and potential reliability issues in the short term. When grid reliability is impacted, power quality solutions such as UPS systems will be required to mitigate this risk.

"Evolution in battery technology will also play a key role in both 5G and the grid, with technologies like lithium ion batteries providing solutions for both distributed power quality applications at the edge and for larger scale grid stability. Eaton is investing its R&D on how these technologies can effectively and safely be integrated into power quality solutions of the future."

Top growth markets

The top five industry sectors in terms of demand for power quality solutions are:

- Telecommunications — Customised DC power quality solutions to support critical communications during the rollout of 5G across Australia.
- Data centres — Integrated, intelligent and efficient power chain to support the growth of large critical data centres which support the cloud.
- Infrastructure — Big investment in intelligent infrastructure to drive efficiency on the east coast of Australia as city population rises. Power dependent technology and applications will require solutions with ruggedised design for harsh environments and higher IP-rated qualities, ensuring safe and reliable operation of transport systems.
- Education — IoT adoption and digital education. Eaton recently installed a micro data centre and UPS solution at Coomera Anglican College to support its new digital learning infrastructure including a 360-degree image projection space called the Imaginarium.
- Industrial — Automation across many industrial sectors including mining, agriculture and manufacturing, driving a need for ruggedised cabinets and UPS to ensure connectivity. Eaton recently worked with Serverworks in New Zealand to design a compact telecommunications system with four hours of back-up power to keep communications online during disaster recovery operations in the Pacific Islands.

Non-traditional applications

While Eaton continues to witness strong demand from traditional markets, IoT is creating new opportunities outside of traditional applications such as aquaculture, where automation is used for monitoring of water, feed, temperatures and filtration. "Without power quality solutions close to the point of automation, these aquafarms stand to lose whole pens of fish during a breakdown.

"We have seen a steep increase in applications for the agriculture segment as these industries, like others, are focused heavily on driving efficiency through digitalisation. For these applications we often find they are deploying technology in harsher environments."

Through its long association supporting the telecommunications industry, Eaton has solutions and locally based engineering resources that are providing application expertise to ensure the correct solutions are deployed to meet these demanding segment requirements — protecting both power availability and technology as well, Atherton said.

Challenges

"With the technology layer moving so quickly in our economy, it is important that we support our customers with quality power management solutions, whether it be large data centres hosting the cloud, intelligent infrastructure supporting our growing city populations or applications supporting digital transformation, all of this is dependent on power.

"Locally in Australia and New Zealand, we believe continued investment in our local application engineering capabilities and service fulfilment team is a key initiative. These strong local capabilities will allow us to customise power management strategies to meet our customers' diverse needs."

However, technology is changing quickly and is all dependent on power, which means the power quality market needs to be agile and quick to adapt, said Atherton. An example is the implementation of 5G, which could potentially run on high-frequency millimetre waves. These waves can handle more data but can't travel as far as lower-frequency waves used by older networks. As a result, 5G would need to rely on clusters of antennae as well as decentralised data centres close to consumers and businesses, therefore impacting the way power quality solutions are deployed. 5G will also enable IoT and see a proliferation of distributed smart devices, so the form factor and size of power protection solutions will need to change to meet demand.

**Based in Sydney, Atherton is responsible for managing and increasing Eaton's market presence in Australia and New Zealand for the company's range of industry-leading portfolio of power quality solutions for data centre and industrial applications. He joined Eaton in 2016, following a 15-year career at both Schneider Electric and APC by Schneider Electric where he held a number of senior regional management roles including Business Vice President, APJ Regional Director for Software and Prefabricated Data Centres, and Head of Services for the Pacific Region.*

Eaton Industries Pty Ltd
www.eatonelectric.com.au

MAGNETIC ROTARY ENCODERS

The ENA58IL magnetic rotary encoders bring robustness and accuracy together in a compact design while ensuring reliability in the production process. They are designed for common fieldbus systems and Ethernet-based interfaces, which enable users to select the optimum sensor for their specific applications.

A one-piece, compact housing concept offers all common protocols and is designed for easy system integration and wear-free, robust technology for reliable performance. They have a high resolution and absolute accuracy of <0.1° for maximum precision, and can be used to monitor rotational speed and position even in harsh environments, such as in wind turbines.

The series is available with both a solid and recessed hollow shaft, ensuring the best adaptation to a wide variety of applications. This generation of magnetic rotary encoders, based on the principle of high-performance magnetic detection, is a suitable solution for applications requiring high-precision measurements, compact installation in small spaces and long-lasting operation in harsh environments.

Pepperl+Fuchs (Aust) Pty Ltd
www.pepperl-fuchs.com

FLEXIBLE CAPACITIVE DISPLACEMENT SENSOR

The ElasitSense EDS sensor is a contact capacitive displacement sensor. The sensing element is made of a hyper-elastic elastomer stretchable strain gauge. It comprises dielectric sheet and deformable electrodes. During operation, the sensor is stretched by a machine or a structure which produces a change in capacitance. The displacement value can be calculated based on this change.

Unlike other piston-based displacement sensors, the EDS sensor offers capabilities to measure both linear and off-axis measurement. It also has robust and flexible design that is highly resistant against shock, vibration and installation misalignment. Due to this, the sensor is suitable for application in harsh industrial environments with minimum costs. This low-cost sensor also has no sliding parts in its design, further reducing its installation and maintenance costs.

The EDS series contact capacitive displacement sensor can be used either as a standalone or as a part of the system together with the other daisy-chained sensors. The sensor generates analog output as current, 4–20 mA or as voltage, 0–10 V, on request. It can also be provided with an RS485 interface. With a fast measurement rate up to 10 kHz, this EDS sensor is suitable for fast and dynamic measurement tasks. Measurement range is 20–200 mm with an accuracy of 0.1% FS.

This technology is suitable for metal forming applications. It is commonly used to detect faulty operations of stamping tools due to the presence of metal slugs. Other potential applications include process automation, structural condition monitoring, predictive maintenance and R&D.

For more information go to: https://www.bestech.com.au/contact-capacitive-sensor/

Bestech Australia Pty Ltd
www.bestech.com.au

UNIVERSAL FLOW METER

The AptiFlow is a universal flow meter designed to measure liquids, gases and vapours in a wide range of applications, and can be used in a wide range of process conditions, from high vacuum to high pressure, and sub-zero to over 500°C with selected materials.

AptiFlow can be engineered to produce solutions for difficult applications. Elements may be machined from solid for high mechanical integrity, made as

two-piece sections for very large duct diameters (over 6 m), headless for fully enclosed installations and with dual manifolds for stacked transmitters.

AptiFlow provides a cost-effective solution for measurement in large diameter pipes or ducts, with low permanent pressure loss (energy lost with use is minimal), robust construction (for long service life) and negligible wear (giving long-term stability with zero drift or degradation).

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

AUSTEST Laboratories

Austest Laboratories offers the most comprehensive and publicly available EMC, Environmental, Electrical safety and Telecom product testing in Australia and New Zealand. As an INDEPENDENT testing and certification company, we assist manufacturers, importers and exporters in gaining access to local and international markets.

Our Testing Services Include:

- RCM compliance to Electrical safety (EESS) and ACMA (EMC) requirements
- Acoustic Engineering and Consulting
- Shock, Vibration, Temp/Humidity, Altitude testing
- Accelerated UV/Solar and Corrosion testing
- Energy Efficiency (MEPS) testing for a wide range of products
- Telecommunications Testing for PSTN, DSL and GSM/3G
- Wireless device testing inc WLAN, Bluetooth and 433MHz devices
- AU/NZ + Global Product Certification and Approvals

Industries Served

- Automotive
- Commercial and industrial including mining
- Consumer goods including Information Technology products
- Defence and Aerospace
- Lighting
- Energy Products including Solar
- Rail
- Telecommunications
- Transportation and Packaging

SYDNEY (Main Office)
Unit 2, 9 Packard Avenue,
Castle Hill NSW 2154, Aust
Tel: +61 (0)2 9680 9990
Fax: +61 (0)2 8850 3113

MELBOURNE
2 Brex Court
Reservoir, VIC 3073, Aust
Tel: +61 (0)3 9464 4016
Fax: +61 (0)3 9464 0687

ADELAIDE
13 Newfield Road,
Parra Hills West, SA 5096, Aust
Tel: +61 (0)8 8288 7400
Fax: +61 (0)8 8288 7411

BRISBANE
Phone: +61 (0)7 3177 3384

UNITED STATES
Tel: +1 323 578 5588
Fax: +1 323 372 3734

www.austest.com.au | austest@austest.com.au

STRUCTURED CABLING SOLUTIONS

With the rising volumes of data exchanged and increasing numbers of networks, the demand for higher speeds and the density of equipment are vital for having more reliable, secure and high-performance electrical and digital building infrastructures. The Legrand LCS^3 structured cabling range is particularly designed to meet these needs.

The range is said to offer numerous advances in terms of performance, scalability and efficiency. It is equipped with tool-less connectors that can cope with critical environments, with copper solutions as high as Category 8. It also includes a considerably expanded fibre-optic offer, allowing speeds of as much as 100 Gbps.

The solutions are modular, easy to install in enclosures and optimised for easy maintenance.

Legrand Australia P/L
www.legrand.com.au

CABLE CERTIFIER

The IDEAL Networks LanTEK III is an easy-to-use cable certifier that meets existing TIA and ISO/IEC performance requirements for testing up to Cat. 7A/1000 MHz.

Key features include: certifies twisted pair cabling to TIA/ISO standards; locate hidden connections, splices and cable faults using Time Domain Return Loss (TDRL) and Time Domain Crosstalk (TDX); permanent link adapter saves money with field-replaceable RJ45 contacts; FiberTEK III modules for tier 1 certification of fibre cabling (optional); long battery life — 18 h continuous operation; and test data software for powerful client PDF reports.

Using the free IDEAL AnyWARE app, field technicians can share test data with colleagues or customers without leaving the jobsite, resulting in greater collaboration, more on-time job completions and reduced costs.

IDEAL INDUSTRIES (AUST) Pty Ltd
www.idealnetworks.net

UTILITIES SHOULD PREPARE FOR EV ADOPTION

Energy utilities need to take a proactive approach to prepare their networks for the increasing uptake of electric vehicles (EVs), according to a study.

The growing demand for energy from EVs will affect the grid in three ways: increased overall consumption, increased peak demand and greater unpredictability. A joint study by L.E.K. Consulting and Australian EV charging infrastructure company Tritium explained why utilities should start planning for the future implications of EVs on the electricity grid and local infrastructure.

"There are significant opportunities for network owners, operators and energy retailers as EVs are one of the few growth drivers for many developed energy markets, and also enable the opportunity for utilities to build closer customer relationships," said Natasha Santha, Principal at L.E.K. Consulting. "But utilities need to be proactive in planning for a future scenario of significant EV adoption, especially in a world where spending capex on additional infrastructure at the cost of the consumer is no longer a palatable response."

While there are currently only about 4 million EVs globally, the number is expected to reach 50 million by 2025 and 125 million by 2030. This means there will be a modest increase in overall energy demand in the short to medium term, but a much more significant impact on increased peak demand at a local level.

The report stated that in 2017, the estimated electricity demand from all EVs was 54 TWh, which equated to 0.3% of global electricity demand. Assuming there is a similar level of battery energy efficiency in 2030 as today, the predicted increase in EVs will cause the overall share of energy demand to increase to 6.3%.

However, owning an EV will increase a household's electricity consumption by about 50%, and the report highlighted the need for utilities to incentivise charging in low-demand times to prevent overloading the local electricity infrastructure. This is especially important considering the 'clustering' effect, said the report, in which some suburbs, streets and locations have a higher proportion of EV ownership than others. If multiple houses on a single street charge simultaneously, the feeder lines may not have sufficient capacity to meet demand. For example, assuming that most EV owners charge at the end of the traditional work day, overlaying the impact of EV charging on a local network (with 50% EV adoption) would drive peak demand up by around 30%.

By 2030, the number of charging stations required globally will exceed 130 million units, which is almost 30 times the current stock, estimates the International Energy Agency.

The report found the development of high-power charging infrastructure may have a more manageable initial impact for network operators. High power chargers, up to 350 KW each, are typically installed as a group of chargers and equate to very large (1 MW+) connections, but the charger owners will deploy the appropriate infrastructure adjacent to the charging equipment at the time of installation.

Santha said EV uptake in Australia is still in its infancy in Australia, but preparation efforts should begin as soon as possible. "Given the expected pace of adoption, and time it will take to turn over the car parc, grid owners have sufficient time to prepare for the change.

"As the need for the deployment of public fast chargers is required in Australia, utilities will need to be ready to turn around new connections quickly."

Five measures were suggested to stabilise future grid behaviour and ensure utilities do not become a barrier to scale EV adoption:

1. Design tariffs and demand response programs: Utilities should prepare incentive structures to manage residential chargers, such as time of use EV tariffs that can shift customer charging behaviour alleviating local feeder stress. They could glean lessons from South Australian and Queensland networks, which are trialling new tariffs to encourage households with electric hot water systems to heat them in off-peak periods.

FIVE MEASURES WERE SUGGESTED TO STABILISE FUTURE GRID BEHAVIOUR AND ENSURE UTILITIES DO NOT BECOME A BARRIER TO SCALE EV ADOPTION.

2. Utilise smart software: Managed charging uses software to schedule home charging throughout the night, avoiding the risk of EV owners all plugging in during the evening peak.
3. Improve grid information: Provide clear and detailed information publicly to businesses and entrepreneurs looking to invest in and install public charging infrastructure. For example, PG&E, a Californian utility, has created an interactive mapping tool for network capacity highlighting the locations on its network where existing equipment has the capacity and is ready to be utilised for EV charging.
4. Assess adjacent opportunities from charging infrastructure: These opportunities may be stationary battery storage, to reduce grid augmentation costs and enable charger deployment in areas of the network that would otherwise be prohibitive.
5. Trial, test and work with charging manufacturers: Collaboration and joint research will enable utilities to be at the forefront of emerging vehicle, charging and grid integration technologies.

The report was released at the Australian Utility Week expo in Melbourne.

DIGITAL STORAGE OSCILLOSCOPE

The Keysight DSOX3024 digital storage oscilloscope offers 200 MHz of bandwidth with 4 analog channels, 16 digital channels and an update rate of 1 million waveforms per second. This device has a sampling rate of 2 G/s (4 G/s half-channel interleaved mode) and 2 Mpts memory depth. It is available to rent from TechRentals.

Its built-in WaveGen 20 MHz waveform generator improves the probability of capturing random and infrequent events and with deeper memory, capturing long and non-repeating signals while maintaining a high sample rate. It is also capable of storing and removing waveforms via USB.

The MegaZoom IV technology also enables the user to quickly navigate and zoom in on any areas of interest. The DSOX3024A lets users see more of their signal, more of the time with the large 8.5″ WVGA display with 800 x 480 resolution.

TechRentals

www.techrentals.com.au

ACTUATORS WITH ELECTRIC CYLINDERS

AUMA actuators may now be supplied with Elektro Zylinders to replace hydraulic oil cylinders, with a conventional AUMA SAC or variable speed actuator coupled to a replacement of a hydraulic cylinder.

The construction of such cylinders is via the double tube technique, whereby the flow grease lubricant is contained in an inverted bucket arrangement. Drive mechanisms are such that coarse trapezoidal threads or roller ball techniques may be incorporated, depending on whether self-locking is required or otherwise.

The move to such devices is promoted by the awareness that older hydraulic oil facilities have the potential to leak hydraulic transmission oil into city and district water supplies. The risk of such an event is now considered unacceptable, quite apart from the costs associated with clean-up.

Barron GJM has supplied 40 such arrangements to date, some for local water authorities but others for facilities in India and Malaysia. The benefits include: no more leakage of lubricant; a neat, self-contained arrangement; and high precision, with a typical 4 mm positioning capability in 4 m stroke.

Barron GJM

www.barron.com.au

NEW PRODUCTS

WEATHERPROOF BATTEN

The Tempest Nova weatherproof batten from Energetic Lighting provides a wide range of options for external IP65 lighting requirements. It has all the standard functions expected from a weatherproof batten, such as IP65 waterproofing, IK08 vandal proofing, stainless steel clips, easy installation with large terminal blocks and more.

One of its major highlights is the multipower switchable driver that provides eight different wattage settings from 10 to 40 W. It is also available with a dimming microwave sensor, emergency option or both, making it a flexible solution.

Energetic Lighting Australia Pty Ltd
www.energeticlighting.com.au

FLOWMETER

The Type 8098 flowmeter is part of the FLOWave product range. It is based on SAW (surface acoustic wave) technology and is mainly designed for applications with high hygienic demands. This is achieved by using stainless steel materials and a measuring tube free of any wetted parts except for the actual tube — a suitable outer hygienic design.

FLOWave offers a range of integrated functions, including the advantages of flexibility, ease of cleaning, compact dimensions, light weight, easy installation and handling, and compliance with numerous standards. Optimal measurement results can be achieved with homogeneous, air and solid free liquids. Integrated viscosity compensation can be used for higher viscous liquids.

Gas and steam cannot be measured; however, their flow does not have any negative effect on the device or its operation. Other liquids flowing through again afterwards are measured correctly as before.

The product is suitable for liquids with low or no conductivity. With low energy consumption, it conforms to hygienic requirements and is CIP/SIP capable. It also offers digital communication, parameter setting via a communicator, a digital display and Wi-Fi.

Burkert Fluid Control Systems
www.burkert.com.au

HANDHELD CONDUCTIVITY, SALINITY, TDS AND TEMPERATURE METER

The H10C Handheld Conductivity, Salinity, TDS and Temperature meter from ECD is a microprocessor-based instrument. The meter has a large LCD that displays the conductivity, salinity or TDS and temperature, along with user prompts and measurement-mode indicators.

The IP67 waterproof case has a shock-resistant protective rubber boot and keys that provide both tactile and audio feedback.

A few keystrokes will adjust all of the parameters for the probe including the TDS constant, reference temperature and temperature coefficient. The mode key toggles the display between the conductivity, salinity (ppt) and TDS (mg/L) screens.

A single 4-wire electrode will measure conductivity, salinity and TDS.

The device is battery powered using four 1.5 V AAA batteries.

Additional features include: automatically finds the best range for each measurement mode and has automatic temperature compensation.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

ON-SITE SEWAGE TREATMENT SYSTEM

The RoadTRAIN is a pre-fabricated on-site sewage treatment system specifically designed for use in remote locations. These plug-and-play micro sewage treatment plants are available in three different sewage treatment process options and two modes of fabrication.

It is the flexibility of fabrication methods that continues to be a deciding factor when considering alternatives. Remote locations will often have accessibility problems and having any equipment delivered greater than the size of a shipping container can present challenges. In these cases, the preference is to supply the 'bolted and assemble on site' design which is flat packed in 20′ containers suitable for shipping anywhere in the world. Comprehensive assembly details are supplied along with all components down to nuts, bolts and washers. Installation can be conducted using local trades with everyday tools.

If logistics is not an issue, the system can be supplied as a completely welded and assembled system that requires minimal installation works.

The most commonly used RoadTRAIN is based on the extended aeration activated sludge process, although rotating biological contactors are also popular. RoadTRAINs configured as membrane bioreactors have been used in some of the most sensitive areas.

Whichever RoadTRAIN process is preferred, the performance, combined with the fact that they are simple to operate and require little maintenance, makes them suitable for treating sewage in any remote location.

Hydroflux Epco Pty Ltd

www.hydrofluxepco.com.au

SIDE MOUNT KITS FOR CABINET COOLERS

EXAIR's Type 316SS side mount kits make the mounting of a NEMA 4X Cabinet Cooler possible when an electrical enclosure has limited space on the top or side. They are corrosion resistant and offer a low-cost way to purge and cool electrical control panels, protecting sensitive electronics from heat, dirt and moisture.

Cabinet coolers convert an ordinary supply of compressed air to -7°C without refrigerants or CFCs. The cold air is circulated through the enclosure to eliminate high-temperature malfunction. Cooling capacities up to 5600 btu/h are available. Cabinet cooler systems include a compressed air filter to ensure no moisture or dust is introduced inside the panel, while optional thermostat

control minimises compressed air use. The cabinet coolers are UL listed, conform to the CE general safety directive for machinery and have no moving parts to wear out.

High-temperature cabinet coolers for ambient temperatures up to 93°C are also available. They include internal components that can withstand high temperatures, like those near furnaces, ovens and boilers.

The side mount kits maintain the NEMA 4X rating of large and small electrical enclosures when mounting cabinet coolers on the side of control panels. Models for use on NEMA 4 and 12 enclosures are also available.

Applications include cooling PLCs, microprocessors, variable frequency drives, industrial computers and robotics.

Compressed Air Australia Pty Ltd
www.caasafety.com.au

DATA LOGGERS

The DataTaker DT80 series is a multipurpose measurement and control data logger. The series is compatible with most meteorological, hydrological, environmental and industrial sensors. They offer extensive communications capabilities and deliver data by using user-preferred protocols.

With support for multiple SDI-12 sensor networks, Modbus for SCADA systems, FTP and web interfaces and a 12 V regulated output to power sensors, the DT80 is a totally self-contained solution. The DT80 series comes in different variants that include models with integrated cellular modem capabilities, Wi-Fi and vibrating wire technology for geotechnical applications.

The DT80 loggers are programmable, with user-friendly software, and are expandable to 300 analog inputs with an expansion module. They are also cloud enabled, so data can be accessed conveniently with DataTaker Live.

Thermo Fisher Scientific
www.thermofisher.com.au

CIRCULAR CONNECTOR

Quick-connect circular connectors are becoming an ever more popular solution for cabling in servo drives: plug in, turn the housing to the right, done.

The EPIC POWER LS1 Twist from LAPP Australia has a robust and practical locking mechanism. It is compatible with the market standard and makes connection easier. Both halves of the connector are securely locked and protected against vibration. The EMC version prevents electromagnetic interference resulting from high currents. Circular connectors for power supply are used in robots and machinery, as well as in wind turbines and other applications where a compact and powerful connection system is required.

The EPIC Power LS1 Twist line caters to all contact configurations and becomes the latest addition to LAPP's LS1 range of power connectors.

LAPP Australia Pty Ltd
lappaustralia.com.au

Bundaberg Regional Council trials smart water meters

©stock.adobe.com/au/Brian

With Telstra having switched on its narrowband Internet of Things (NB-IoT) network across Australia in September, Bundaberg Regional Council will now be one of the first to implement NB-IoT enabled smart water meters as part of its strategy to increase water efficiency across the region.

"We are doing a 12-month trial with WaterGroup's NB-IoT enabled smart water meters, to explore the benefits of incorporating smart technology into the region's water meter reading infrastructure," said Water and Wastewater portfolio spokesperson Cr Jason Bartels, Bundaberg Regional Council.

The Bureau of Meteorology reports non-revenue water loss in Australia in the past five years at 878,027 mL, averaging approximately 10% of utilities' system input. Causes of water loss include real or physical losses, such as leaks in a system's network, and apparent losses, such as metering inaccuracies and unauthorised consumption.

Seeking to reduce these losses, WaterGroup and Taggle Systems have been contracted by Bundaberg Regional Council to carry out the 12-month trial. Efficiencies and cost savings for the council, as well as the ability for residents to keep a closer eye on water consumption, are just some of the benefits of having smart water meters installed in 1250 homes throughout the region.

"The ability to provide a customer portal through which residents can manage their own water consumption was also a factor in choosing this metering solution," Cr Bartels said.

"This will mean that residents involved in the trial will be able to receive near real-time information about water usage, avoiding 'bill shock' and identifying potential leaks sooner."

WaterGroup launched its first commercially available NB-IoT ready, fully integrated, ultrasonic smart water meter in January 2018. Easy to connect, with long battery life and long-range connectivity, it is NMI certified and meets all the relevant Australian standards.

"With Telstra's long-range coverage, our NB-IoT enabled water meters will be able submit data from hard-to-reach places, and provide increased frequency and availability of data that will help the council quickly understand its water usage and realise cost savings," said Guenter Hauber-Davison, Managing Director of WaterGroup.

"This is an evolutionary approach for Bundaberg Regional Council, especially now as regional water suppliers are facing the ever-growing demands and challenges to become more water efficient and sustainable during some of Australia's toughest drought conditions."

"The data that can be collected from smart meters is invaluable from an operational perspective," concluded Cr Bartels. "The data from the smart meters is transmitted to a central point and, if rolled out permanently across the region, would mean manual meter reading would no longer be required."

WaterGroup Pty Ltd

www.watergroup.com.au

HOW READY IS AUSTRALIA'S POWER SYSTEM FOR SUMMER?

Summer is always a challenging time of year for the grid, with increasing demand, potential heatwaves and unplanned infrastructure outages threatening to impact power supply. The 2.1 GW of new generation and storage capacity that has entered the National Electricity Market (NEM) during 2018, as well as additional sourced reserves, will help ensure there are sufficient available resources, according to the Australian Energy Market Operator (AEMO).

©iStockphoto.com/snvv

The AEMO 2018/19 summer readiness plan aims to address risks to Australia's power system and ensure consumers have access to reliable, secure and affordable power throughout the summer period. It outlines actions taken concerning four key areas: sufficient available resources, continuing operational improvements, contingency planning, and collaboration and communication.

"Findings from AEMO's 2018 Electricity Statement of Opportunities (ESOO) projected a heightened risk of involuntary load shedding in Victoria and South Australia for the upcoming summer, in the absence of further action," said AEMO Managing Director and Chief Executive Officer Audrey Zibelman.

"The Bureau of Meteorology is forecasting a hotter and drier summer which, coupled with other risks we have identified, suggests we have a challenging summer awaiting us. But while we know that unexpected events can and do happen, particularly when the power system is under pressure and most prone to failure, AEMO is confident the plans we have made and the targeted actions we have taken in collaboration with the wider energy industry and governments have appropriately equipped us to tackle any unforeseeable events the upcoming summer might bring," Zibelman said.

As a result, AEMO has sourced up to 930 MW of off-market reserves through the Reliability and Emergency Trader (RERT) mechanism to manage reliability shortfalls in Victoria. This includes 90 MW (70 MW in Victoria and 20 MW in South Australia) of the 132 MW of demand reserves available from the AEMO/Australian Renewable Energy Agency (ARENA) trial and 40 MW of off-market reserves using long notice RERT contracts. AEMO will also seek between 405 and 800 MW of reserves ready for rapid contracting if required.

The report said the reserve is only used if the market does not respond with enough supply or demand resources to ensure the reliability standard is met.

"Our continued operational efficiencies and refinements in our forecasting methodologies, together with the increased capacity of approximately 2100 megawatts of new generation capacity, means we did not need to procure the same level of strategic reserves as last summer. We will continue to engage in discussions with industry to ensure additional reserves are available to us should unforeseen circumstances arise," Zibelman said.

This 2.1 GW of additional new capacity by December 2018 is made up primarily of wind and solar generation capacity, and the two new utility-scale batteries in Ballarat and Gannawarra. The report put this into context, stating wind and solar represented around 6 of the 56 GW of the NEM's total registered generation capacity in July 2018.

AEMO's summer plan also focused on undertaking extensive emergency preparedness exercises and hosting information-sharing sessions with a wide range of industry stakeholders and all government jurisdictions. Improving operational forecasting models was another focus for the AEMO, including increased sampling of real-time data from rooftop PV systems to improve the accuracy of short-term forecasts and close collaboration with weather service providers.

Beyond this summer, it expects almost 6 GW of new wind and solar to be operational in the next two years, which will alleviate the short-term risk of involuntary load shedding during summer peak periods. But these issues are not limited to summer alone, and mid- to longer-term strategic planning and resource investment, outlined in AEMO's Integrated System Plan, will be necessary to ensure ongoing reliability and stability of Australia's power system throughout the year.

Accurate Time Control – Quality Muller®

24hr, 24hr/7 day, 24hr/7 day ASTRO Time Switches

VS10.18/VS14.18

SC08.11pro

SC08.13pro Astro

VS10.18	24hr Analogue DIN Mount Time Switch
VS14.18	24hr Analogue DIN Mount Time Switch with 100hr Reserve
SC08.11pro	24hr/7day Digital DIN Mount Time Switch, 46 memory locations
SC08.13pro	24hr/7day Digital **ASTRO** DIN Mount Time Switch, 60 memory locations

Analogue 24hr, Digital 24hr/7 Day and Digital 24hr/7 Day ASTRO Time Switches

EUROPEAN QUALITY, AUSTRALIAN INNOVATION

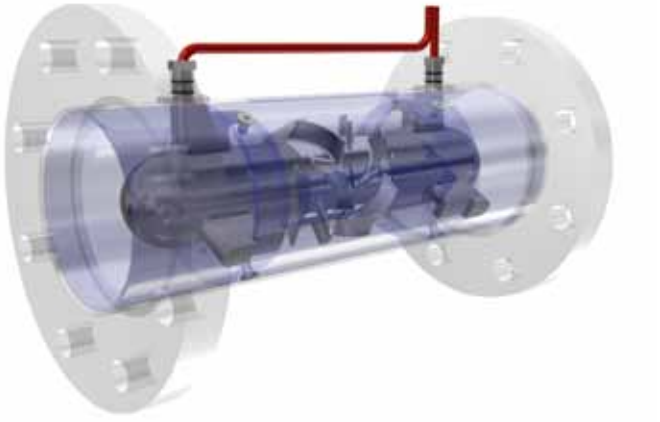
Available from your local Electrical Wholesaler

AMPERE

Who else would you trust!

sales@ampere.com.au | www.ampere.com.au | Ph 03 9645 3401 | 1800 267 373 | Fax 03 9681 9650

TURBINE FOR POWERING SMART WATER NETWORKS



Sea-Lix turbines extract power from water distribution networks, tides and rivers. The POGMO is a pico-turbine from Sea-Lix that provides off-grid power to smart water networks. The smaller POGMOs produce enough power to feed monitoring equipment, while the larger POGMOs are designed for heavier tasks like valve actuators. While they offer good capabilities by themselves, the recommended approach is to use them in combination with each other.

In water distribution, the quality of water network operations — in particular, leakage and pressure management — is a function of data availability and data resolution. Fitted directly into the main water network or in a bypass branch, the POGMO turbine provides a suitable power supply at selected locations in the water distribution network. Once installed, it can power a wide array of equipment, such as sensors, actuators and communication devices. It allows for continuous monitoring and reporting of pressure, flow and water quality — without limitations on sample frequency. Instant and continuous data is an integral capability for network optimisation.

By enabling precise pressure management, the POGMO is also designed to contribute towards reducing operational expenditures (leakage rate reduction, number of service calls) and capital expenditures (fewer pipe bursts, reduced stress on pipes and equipment, increased life expectancy).

AUTECH Control Group Pty Ltd
www.autechcontrol.com.au

CONTROLLERS WITH ETHERCAT

WAGO has increased the application scope for its second generation of PFC200 controllers with the addition of EtherCAT capability.

The EtherCAT system is configured via special configuration dialogs in the e!COCKPIT Engineering Software. These specify that the controller should function as an EtherCAT master, what field devices should be addressed, what form the topology of the network takes and what parameter values should be sent to the slaves on start-up.

Besides the protocol stack in the form of a library, the runtime system also provides components for direct access to the Ethernet interface and diagnostics. Advantages include using the PFC200 as an EtherCAT master, controlling WAGO slaves with the EtherCAT fieldbus system such as the EtherCAT fieldbus coupler of the WAGO-I/O-SYSTEM 750 and also controlling additional field devices, which can be declared in e!COCKPIT via a standardised device description.

Running the PFC200 controller as an EtherCAT master requires a licence in e!COCKPIT, assigned to the controller and loaded into the controller together with the project. No other installation steps are required.

WAGO Pty Ltd
www.wago.com.au

CORDSETS FOR FOOD AND BEVERAGE

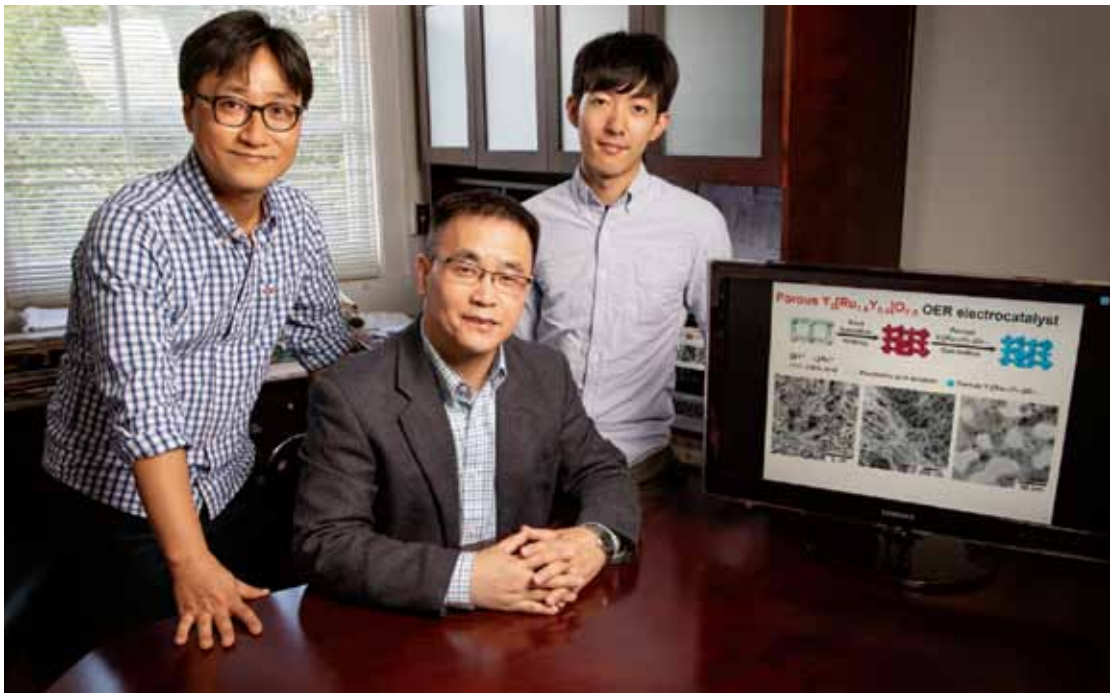
Pepperl+Fuchs' latest range of hygienic cordsets offers smooth and easy-to-clean surfaces tailored to food production. With the additional stainless steel coupling nut, they create a complete connection for sensors and actuators in the food and beverage industry. A range of cordsets is available to satisfy the requirements of both the product contact and splash zones.

The 4-pin series of M8 and M12 connectors are specifically suited to the splash zone. Washdown-design connectors have metal knurling and smooth, easy-to-clean surfaces. The selection of materials and layouts has been designed to meet the unique requirements of this zone.

To satisfy the strict requirements in the product contact zone, hygienic-design connectors are needed. These M12 connectors have a 1.4404 stainless steel knurled nut with a smooth surface that food cannot adhere to. With high quality standard, the M12 connectors have been designed for use in the product contact zone, in compliance with EHEDG standards. These connectors meet strict requirements for protection, corrosion resistance and hygiene. The portfolio also features extended temperature resistance up to 105°C.

Pepperl+Fuchs (Aust) Pty Ltd
www.pepperl-fuchs.com

Catalyst helps split water molecules for hydrogen fuel



Postdoctoral researcher Jaemin Kim, Professor Hong Yang and graduate student Pei-Chieh (Jack) Shih are part of a team that developed a new material that helps split water molecules for hydrogen fuel production.
Image credit: L Brian Stauffer.

Breaking the bonds between oxygen and hydrogen in water could be a key to the creation of hydrogen in a sustainable manner, but finding an economically viable technique for this has proved difficult. Now, US researchers have discovered a hydrogen-generating catalyst that clears many of the obstacles — including abundance, stability in acid conditions and efficiency.

Electrolysers use electricity to break water molecules into oxygen and hydrogen. The most efficient of these devices use corrosive acids and electrode materials made of the metal compounds iridium oxide or ruthenium oxide. Iridium oxide is the more stable of the two, but iridium is one of the least abundant elements on Earth, so researchers are in search of an alternative material.

"Much of the previous work was performed with electrolysers made from just two elements — one metal and oxygen," said Hong Yang, a professor at the University of Illinois at Urbana-Champaign. "In a recent study, we found if a compound has two metal elements — yttrium and ruthenium — and oxygen, the rate of water-splitting reaction increased."

Yao Qin, a co former member of Yang's group, first experimented with the procedure for making this new material by using different acids and heating temperatures to increase the rate of the water-splitting reaction. The researchers found that when they used a substance called perchloric acid as a catalyst and let the mixture react under heat, the physical nature of the yttrium ruthenate product changed.

"The material became more porous and also had a new crystalline structure, different from all the solid catalysts we made before," said postdoctoral researcher Jaemin Kim. This porous material — a pyrochlore oxide of yttrium ruthenate — can split water molecules at a higher rate than the current industry standard.

"Because of the increased activity it promotes, a porous structure is highly desirable when it comes to electrocatalysts," Yang said. "These pores can be produced synthetically with nanometre-sized templates and substances for making ceramics; however, those can't hold up under the high temperature conditions needed for making high-quality solid catalysts."

Yang and his team looked at the structure of their new material with an electron microscope and found that it is four times more porous than the original yttrium ruthenate they developed in a previous study, and three times that of the iridium and ruthenium oxides used commercially.

"It was surprising to find that the acid we chose as a catalyst for this reaction turned out to improve the structure of the material used for the electrodes," Yang said. "This realisation was fortuitous and quite valuable for us."

With their work now published in the journal *Angewandte Chemie*, the next steps for the group are to fabricate a laboratory-scale device for further testing and to continue to improve the porous electrode stability in acidic environments.

"Stability of the electrodes in acid will always be a problem, but we feel that we have come up with something new and different when compared with other work in this area," Yang said. "This type of research will be quite impactful regarding hydrogen generation for sustainable energy in the future."

ARE YOUR SUGAR MILLS EFFICIENT?

Robert Glass, Global Food and Beverage Communications Manager

The role of electrification in sugar milling energy efficiency is becoming more important.

Humanity has had a strong relationship with sugar for at least the last 10,000 years. Yet it was only in the 1700s that a mechanised means of producing sugar emerged, using steam engines for production. Surprisingly, steam power is still prevalent. In a time when energy efficiency underpins competitiveness of manufacturers you need to ask: how efficient is your sugar milling process?

It's fair to say that the human race is hooked on sugar. What started as an almost religious ingredient in ancient New Guinean culture has spread globally and, over the course of 10,000 years, come to underpin the modern food industry. In 1800, it is estimated that the average person in the US ate the equivalent of 8 kg of sugar every year — a number that rose to 45 kg per year by 1900. In the words of author Rich Cohen for *National Geographic*, "Sugar was the oil of its day."

With such a sugar-hungry market, sugar manufacturers' main focus is remaining competitive. This involves increasing throughput and, more often, improving energy efficiency to reduce costs.

From ABB's experience in working with sugar businesses, one of the biggest areas of energy inefficiency is the sugar milling process. While the first steam-powered sugar production machine was introduced in the 1700s, many sugar plants continue to use steam as a way of powering milling equipment.

Theoretically, this makes sense: bagasse, a by-product of sugar production, can be fed into boilers to generate steam that powers turbines that operate milling systems. This creates a circular economy in the manufacturing plant.

This does make good use of waste by-product, but it is often unreliable and inefficient due to the energy expended. Instead, manufacturers are investing in energy-efficient motors and drives to electrify the process. Using a variable frequency drive (VFD), in addition to a high-efficiency electric motor and a generator, allows engineers to not only have greater control over the energy usage of the milling equipment, but also reduce energy costs by up to 40%.

For example, ABB recently worked with a sugar mill in Pakistan to deliver a similar project. The mill had previously relied on steam turbines to power its crusher, using bagasse as its sole source of energy. ABB worked with the mill to modernise its systems, allowing it to use the bagasse to create steam, and that steam was used to turn a generator. The electricity produced fed a high-efficiency motor and an ABB drive powering the mill.

Due to the motor's design, it provides uptime despite the harsh operating conditions — avoiding remnants of sugar cane fibres interfering with the motor. This new system required only 350–400 kW of power compared to the 650–700 kW of the previous system power, providing a saving of more than 40%.

With the world's love affair with sugar unlikely to come to an end any time soon, significant energy savings such as this are a necessary factor in remaining competitive. By looking at ways to improve existing processes and modernise equipment, plant managers and engineers can ensure their company is primed to reap the full benefits of the sugar rush.

ABB

www.abb.com

+61 3 8720 0800

STEINERT

MAGNETIC + SENSOR **SORTING SOLUTIONS**

CANS
PAPER
PLASTICS
SORTED

sales@steinert.com.au

www.steinert.com.au

Tyrecycle

No-one in Australia goes further in recycling rubber.

Every year, thousands of tonnes of tyres are dumped illegally. This is a major environmental and public health concern; but it needn't be.

In Australia, Tyrecycle is the market leader in tyre recycling, with a national network of collection and processing facilities.

Our recycled rubber is used for sporting and playground surfaces, tile adhesives, brake pads and much more. It's just another way of working towards our own goal of zero waste to landfill.

To learn more about us visit tyrecycle.com.au
call 1300 4 TYRECYCLE (1300 489 732)
or email sales@tyrecycle.com.au

AUSTRALIAN TYRE RECYCLERS ASSOCIATION ATRA

TyreStewardship AUSTRALIA 2015/16 ACCREDITED WE SAY NO TO TYRE WASTE

QCSE Safety Certified System AS/NZS 4801

A RESOURCECO COMPANY