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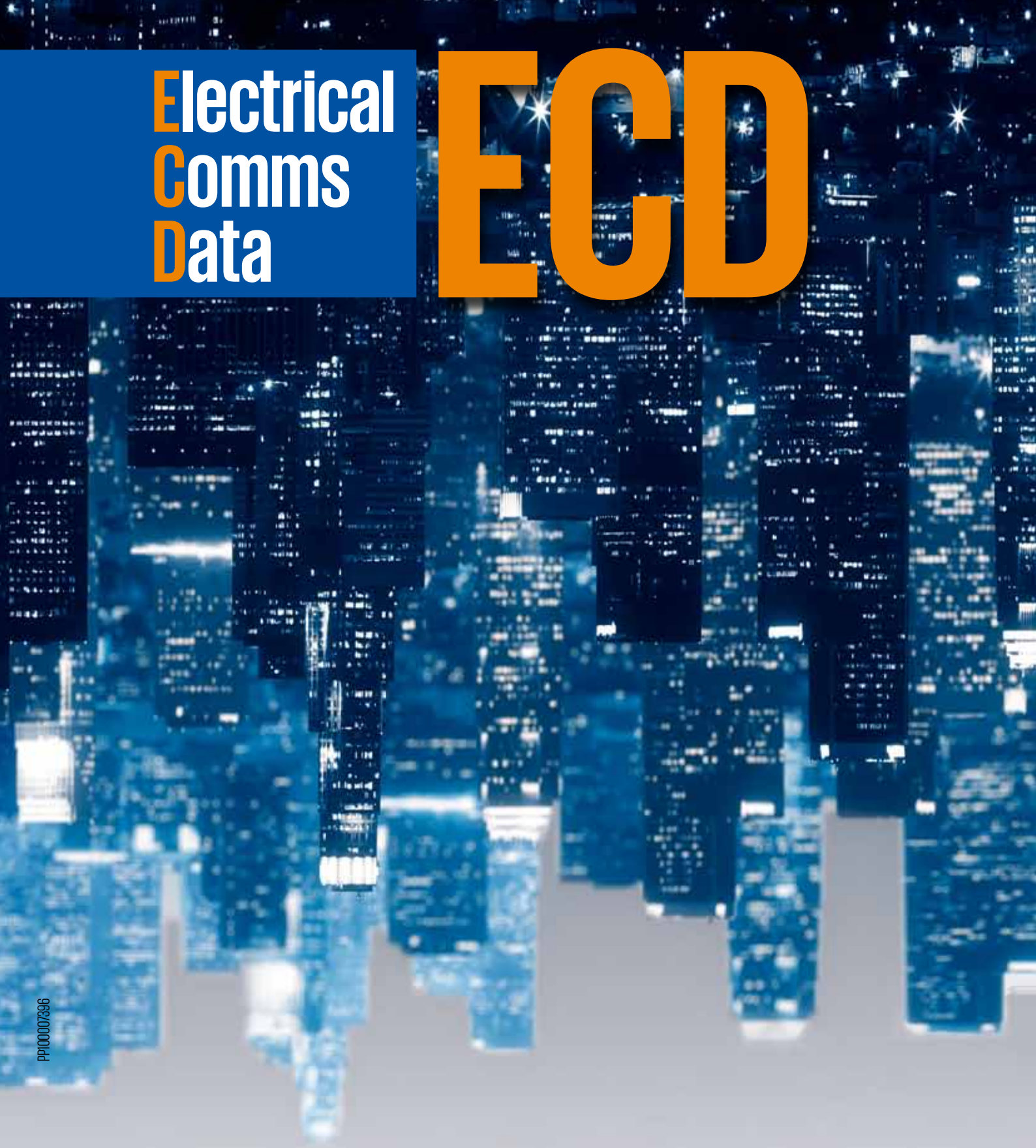

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SMART CITY
FROM CONCEPT TO REALITY

MICROGRIDS AND
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TRADE SERVICES
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CONTENTS

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FROM THE EDITOR

Building a smart future is a common theme in this issue, covering smart cities, smart buildings, energy management and IoT.

We will look at the changing energy landscape in the lead-up to the Smart Energy Conference and Exhibition 2019, which will bring together over 120 experts and 5000 smart energy industry professionals. With renewable energy increasing and Australia experiencing one of its hottest Januarys, this is impacting grid reliability. The article on p18 discusses how Energy as a Service (EaaS) allows consumers to embrace microgrids and take advantage of energy resilience, sustainability and cost without the technical, regulatory and operational risks.

We also take a look at smart cities, which are a widely discussed topic but encompass a wide range of visions and interpretations. So is the smart city still just a concept? On p4, we look at how Kalasatama, in Helsinki, Finland, has transformed from a vision into a reality.

In the trade services space, IoT could still have a huge impact on how the industry operates. While many will embrace the opportunity to streamline business processes and increase productivity, some remain sceptical, and the article on p22 suggests trade services have a choice when it comes to IoT: adapt or perish.

This issue also features articles on data centre trends, workplace lighting and breaking down the barriers to e-waste recycling. This is my first issue as Editor and I welcome feedback, so if you are working on any exciting projects, would like to contribute an article or have any topics you would like to hear more about, please feel free to get in touch.

Nichola Murphy – Editor
ecd@wfmedia.com.au

SMART CITY — FROM CONCEPT TO REALITY

*Ian Richardson**

Famous Irish playwright, novelist and critic George Bernard Shaw described in his play *Back to Methuselah* a conversation that the serpent has with Eve: "You see things; and you say 'Why?' But I dream things that never were; and I say 'Why not?'"

This quotation was used by President John F Kennedy in an address to the Irish Parliament in Dublin in 1963. It was then adapted and quoted by his brother, Robert F Kennedy, in his 1968 campaign for the presidential nomination as "Some people see things as they are and say, why; I dream things that never were and say, why not."

The notion of 'why not' has been applied to the concept of a smart city for some years. With over half of the world's population currently living in an urban area, and a projected 70% of the population to live in urban areas by 2050, governments worldwide are looking at urbanisation and smart cities to support economic growth.

However, a smart city means different things to different people. Is a smart city an adaption of the futuristic cartoon of the sixties? Is it an image of the 1927 movie *Metropolis* directed by Fritz Lang? Some people are concerned that a smart city is a step towards the fictional Big Brother character from George Orwell's novel *Nineteen Eighty-Four*.

With the many interpretations of what a smart city should provide, it is clear the vision of a smart city can have many forms. 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, or IoT. But is the smart city still just a concept?

A smart city vision has been turned into reality in Kalasatama in Helsinki, the capital of Finland. Almost 10 years ago the City Council decided to propose the 175-hectare (430-acre) site become a model of the smart city concept.

Initially, the partners for the technical development of the Kalasatama district were the regional energy supply company Helen Oy and ABB Finland. A jointly produced paper, known as the Kalasatama Smart Energy System, defined the properties of a usable smart energy system that would underpin the design requirements for the smart city of Kalasatama. The white paper was based on the existing European guidelines plus the national energy efficiency recommendations, and lays the foundation to design a true smart city urban development.

The Smart Kalasatama project will offer a home for approximately 28,000 residents along with employment for over 8000 people by the early 2030s. Currently, over 3000 people live in the Kalasatama district and the City Council's vision is that the smart services of Kalasatama will save one hour of a citizen's time every day. In the early planning stages, the urban designers set targets for the development for climate neutrality and a high-quality neighbourhood. This encompassed targets of being carbon neutral by 2035 and having a 60% total emissions reduction by 2030, compared with the 1990 level.

The Kalasatama Smart Energy System paper defined certain basic features that needed to be provided in each building in order to achieve the high-efficiency energy targets. All apartments and buildings in Kalasatama are required to have the following features:

- Binding contracts defined by the city requiring each house include basic automation and be part of the smart grid.
- Central off switches to disconnect non-priority electrical loads when leaving the apartment.
- Reduction of the nominal room temperature setpoint when leaving the apartment.
- Closed loop controls with outside sensors for heating systems and ventilation systems.
- Each house be part of the central heating and cooling system.
- Compulsory electric vehicle (EV) charging infrastructure.
- Separate measurement of electrical loads such as lighting and EV charging to allow energy management.
- Measured load data to be available to energy management and load management systems via a smart grid interface.
- Consumption data to be able to be checked by residents via smartphones or tablets.

The underlying principle of the paper was to facilitate and support the efficient use of heating, cooling, water consumption and energy usage. There is a clear requirement for a building automation system and the City of Helsinki required an open protocol with innovative solutions to be available. The City also wanted to provide test platforms within the smart city for the testing and innovation of new sustainable solutions. The vision was for the smart neighbourhood of Kalasatama to be a showcase of a modern urban development providing work, leisure, housing and services together in a single development.

KNX was chosen to fulfil the task of the building automation platform due to its stability and reliability, along with the standardisation of KNX through the ISO/IEC 14543-3 international standard. This ensured an open protocol supported by numerous manufacturers as well as the ability to incorporate future technology onto the system, as demonstrated by the KNX system's forward and backward compatibility since 1991. The international standard ISO/IEC 14543-3 was also recently released as a direct text adopted in Australia as the Australian and New Zealand Technical Specification SA SNZ TS ISO/IEC 14543.3.

> KALASATAMA IS BECOMING ONE OF THE WORLD'S MOST EXTENSIVE INTEGRATED AREAS THAT UTILISES A BUILDING SERVICES ENGINEERING STANDARD.

At the building level, the use of a standardised bus system provided economy for the installation and the ability to easily incorporate multiple disciplines and functions onto a common bus such as lighting control, heating, cooling, blind and shutter control, water and waste management, security, audiovisual interfaces, remote access etc. An essential requirement from the City Council was for building users and residents to be able to personalise and control their own automation. KNX was able to provide these requirements from existing products, and can integrate new technologies as they become available without modifying the base building infrastructure.

Outside of the apartment and building, the automation information is available via internet connectivity with KNX/IP, KNX IoT and KNX Secure. A building automation system does not require the high speed of Ethernet connectivity within the building, which means cabling costs are reduced through the use of a traditional twisted pair bus cable. Reliability and immunity to electromagnetic interference from power cables also makes the KNX twisted pair bus system a viable option to CAT 6 or similar cabling systems within the building automation infrastructure.

Kalasatama is becoming one of the world's most extensive integrated areas that utilises a building services engineering standard. Many countries around the world have visited the Smart Kalasatama project to gain insight and share experiences.

As a smart city development, Kalasatama has gone beyond that of a building automation system providing energy efficiency and convergence of building operating systems and services. The basic building block of a standardised KNX bus system providing building automation allows essential data to various service providers via a gateway to their specific system. The service providers can utilise this data for trend analysis and modelling. The data transfer is not just one way, and in the event of unusual demand situations, energy suppliers can signal energy reduction requests that can be incorporated down to building and room level in order to avoid service outages. The KNX system is able to meet the high demands for data security with KNX Secure devices preventing cyber attacks.

The Smart Kalasatama project has also provided a platform for the testing of new solutions that allow smart urban living and increased livability in the neighbourhood. A number of pilot programs were underway in 2017/2018 where Smart Kalasatama has hosted innovative projects in a modern urban environment enabling the development of their smart solution prototypes, including:

- solar power plants embedded in the building design;
- smart mini-grid systems;
- new storage solutions for electricity;
- district-level heating and cooling grids;
- EV network including charging stations and the availability of shared EVs for residents;
- smart vacuum waste removal and management system;
- Kalasatama Health and Wellbeing Centre where a program that alleviates stress and anxiety in patients is being trialled;
- the Helsinki public health organisation introduced the Kalasatama Wellbeing pilot which provides life crisis solutions and virtual psychological support leading to self-help services;
- an artificial intelligence system that provides an image-based platform to coach users in food choices by analysing their meals. The aim is to reduce the risk of developing Type 2 diabetes by providing nutrition advice;
- a digital shopping tool providing tailored grocery bags with organic foods on the basis of the user's personal preferences.

In addition, the Smart Kalasatama project consolidates urban transport infrastructure to ensure mobility of residents. The consolidated and well-planned design of the residential buildings, workplaces, recreation spaces, shopping and services precincts provides efficient and low-cost transport requirements to residents.

The fundamental European guidelines of energy efficiency and energy reduction targets are met with the integrated KNX building automation system and building design. Renewable energy programs work with the energy provider and interface to the building automation systems. The intelligent energy systems project is a joint effort from local energy provider Helen Oy, ABB Finland and Fingrid, the national electricity transmission grid operator, which works on Kalasatama's smart grid interface and its related products such as EV infrastructure, plus energy management and storage. So the smart city concept provides a place for easy living in a modern urban environment.

The futuristic view of a smart city portrayed in those old movies may not be the reality of what we see now and what is ahead in the future. The George Bernard Shaw quote, "Why not?", paraphrased by the Kennedy brothers, John and Robert, embodies the principle of what is possible in the smart city.

**Ian Richardson is a Senior Product Engineer with ABB in Australia and Chairman/Director of the KNX National Group Australia since 2011. KNX is the only worldwide standard for home and building automation, adopted by Standards Australia as a technical specification. KNX devices can manage lighting, blinds and shutters, HVAC, security systems, energy management, renewable energy, audio video, whitegoods, visualisation, remote monitoring, etc.*

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'WOMEN IN ELECTRICAL TRADES ROADMAP' LAUNCHED

The National Electrical and Communications Association (NECA) has launched the 'Women in Electrical Trades Roadmap' with Michaelia Cash, Minister for Small and Family Business, Minister for Training, at the NECA College of Electrical Training, Joondalup Campus.

The Women in Electrical Trades Roadmap is a national initiative aimed at increasing recruitment and retention of women in the electrical trades. This initiative was developed in consultation with employers, apprentices, registered training organisations (RTOs) and government training organisation (GTOs).


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"Increasing the number of women in the trades is a complex issue, but not unresolvable," said Suresh Manickam, CEO of NECA.

"Unfortunately, parents and young women do not have a good understanding of the electrical trades. This leads to a poor perception of the electrical trades among parents — this is something that we all need to change. We need to get into schools much earlier. We need to inform young women and their parents that an electrical trade is just as rewarding as going to university and with no HECS debt. What was once considered a dirty trade is now a clean trade and well paid.

"This is a great industry. The electrical industry is the original disruptor. One hundred years ago we brought light and electricity into homes, today we are making smart homes possible. It's an exciting time to be entering the electrical trade.

"This national map will play a critical role in addressing the shortage of women in trade. However, this roadmap in itself will not solve the lack of women in trade in Australia. In order to address the shortage of women in the trade, we seek partnerships with governments so we can tap into 50% of the population. After all, it is governments that have the access to courses, education and schools. NECA can then provide the subject matter expertise and industry pathways," Manickam said.

EMERSON APP CAPTURES PLANT CONDITIONS

Operations teams can easily report plant safety and performance issues with Emerson's new application AMS Inspection Rounds for the AMS Trex Device Communicator.

Plants often rely on manual inspection rounds to detect abnormal plant conditions not identified by sensors, but the app allows operators on rounds to electronically record abnormal conditions immediately, such as unusual equipment noise, spills, smells, excessive corrosion or safety hazards.

Condition data can be captured in real time and timestamped for compliance and audit requirements. AMS Inspection Rounds automatically delivers this data to other plant systems to help inform business decisions.

The app has clear dashboards of routes, status, alerts and action items, meaning users can identify, schedule and coordinate steps for resolving issues quickly, as well as save time associated with transcribing paper notes.

It provides automated workflows to field operations and maintenance personnel to ensure consistent and repeatable collection of condition data, while also allowing them to access historical data to identify and eliminate root causes of recurring problems.

"Route-based inspections are a key line of defence for identifying abnormal and unsafe conditions that may reduce efficiency or put personnel in danger," said Mani Janardhanan, Vice President of Product Management, Plantweb and Reliability Solutions, Emerson Automation Solutions. "AMS Inspection Rounds helps ensure that issues impacting safety and reliability are detected, reported and resolved earlier."

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NEW STANDARD FOR ENERGY-EFFICIENT AIR CONDITIONING

Standards Australia has published a new standard that sets out specific requirements for the design, selection, installation, commissioning and maintenance of energy-efficient residential air conditioning.

"There are countless schemes in place to guide energy-efficient products in our homes, but none look at the installation and design of air conditioning and its impact on overall energy efficiency," said Standards Australia CEO Bronwyn Evans.

AS/NZS 5141:2018, *Residential heating and cooling systems – Minimum applications and requirements for energy efficiency, performance and comfort criteria* was published following the work of industry representatives, consumer advocates, regulators and technical experts. It applies to all new installations, replacement installations and additions in residential buildings, including ducted and non-ducted air conditioners and gas-ducted air heaters.

Phil Wilkinson, Executive Manager – Government Relations and Technical Services at the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH), added, "This is a vital piece of the puzzle to reduce the impact our industry has on global warming. We now have a standard for consumers to rely on for a comfortable, cost effective and safe outcome."

"Over the last two decades, equipment energy efficiency programs such as Energy Labelling and MEPS (Minimum Energy Performance Standards) have driven air-conditioning equipment manufacturers to dramatically improve the energy efficiency of their products," said Robert Beggs, Chair of the Standards Australia Technical Committee responsible for the standard. "However, these efficiency gains (which have come at a cost to the manufacturer and ultimately the consumer) can be blown away with poor application or installation.

"This standard now introduces minimum requirements for the selection and installation of the equipment and system components to ensure that the installed system can operate at optimum efficiency. Other important consumer requirements such as noise levels, system reliability, serviceability and workmanship are also addressed by this standard."

HUGE JOB BOOST FOR NT TRADIES

Registered contractors are set to benefit from the Northern Territory Government's rollout of its $100 million Public Housing Stimulus Program over the next 18 months, supporting up to 550 full-time jobs.

Announced in November 2018, the stimulus program will see major and minor upgrades to urban public housing properties, with works including construction, plumbing, electrical, painting, roofing, fencing and security installations. This will be a huge boost for jobs and small businesses, as well as a valuable investment in public housing stock.

The first projects have been awarded, with one job already completed. $60 million of work has already been identified, and it is expected around $35 million of work will go to tender over the next six months.

"Creating jobs is the Territory Labor Government's number one priority and we will continue to invest in programs that stimulate our economy," stated Chief Minister Michael Gunner. "This stimulus is part of our plan to boost spending within the construction industry in order to support small businesses."

Last year, a previous stimulus worth $69 million generated work for more than 220 Territory contractors at around 3000 public housing properties and resulted in more than 250 vacant properties returned to public housing stock.

The new stimulus is expected to yield more positive results, according to Master Builders NT Chief Executive Dave Malone. "Investing $100 million in upgrades will underpin as many as 550 full-time jobs but this program will support more than a thousand tradies in some way over the life of the program."

Trevor Miller from MWK Constructions, a small business with only three employees, said the construction industry has welcomed the support from the government following difficult working conditions.

"This stimulus is a win-win for everyone. There's not a huge amount of work around at the moment so this will be a big help for small businesses like mine who will be able to keep employees in work," Miller said. "We always use local subcontractors such as plumbers, electricians and cable technicians, and we buy from local suppliers so the flow-on effect means everyone benefits."

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BATTERIES BEST FOR CHEAP ENERGY STORAGE

Lithium-ion batteries are predicted to be the cheapest technology for storing electricity by 2050. This is according to a model developed by researchers at Imperial College London, which calculated the lifetime costs of nine electricity storage technologies for 12 different applications between 2015 and 2050.

The researchers stated that previous studies on electricity storage focus on investment cost, and "the future lifetime cost of different technologies (ie, levelised cost of storage) that account for all relevant cost and performance parameters are still unexplored".

"We have found that lithium-ion batteries are following in the footsteps of crystalline silicon solar panels," said senior author Iain Staffell, a lecturer at the college's Centre for Environmental Policy. "Lithium-ion batteries were once expensive and suited only to niche applications, but they are now being manufactured in such volumes, their costs are coming down much faster than the competing storage technologies."

Lowest lifetime costs will fall by 36% by 2030 and 53% by 2050 across the 12 applications, according to the model, which incorporates data from more than 30 peer-reviewed studies.

The cheapest energy storage mechanism is currently pumped-storage hydroelectricity, where water is pumped to a higher elevation with spare energy, then released to harvest the energy when needed. However, as time progresses, pumped-storage hydroelectricity costs do not decrease, whereas lithium-ion battery costs come down, making them the most competitive in the majority of applications from 2030. For long discharge applications, pumped hydro, compressed air and hydrogen were the cheapest, the model found.

First author Oliver Schmidt, PhD researcher at Imperial, said: "I was always quite sceptical toward lithium-ion storage for stationary applications, but when it comes to the levelised cost of storage — investment, operation and charging cost, technology lifetime, efficiency and performance degradation — lithium-ion combines decreasing cost with sufficient performance to dominate the majority of power system applications. I would have expected others to outperform in certain applications."

While it does not say anything about whether lithium-ion batteries are the best suited technology for stationary storage, Schmidt said the model is likely to be the cheapest option in the immediate future because it has a head start in the market. The researchers also pointed out that the model cannot predict how new materials or advances will impact the market.

The open access model may affect research strategies for storage, the researchers said, and it could also help industry and policymakers make informed investment decisions.

The research was published in the journal *Joule*.

ELECTRICAL WORKERS FAIL TO USE INDEPENDENT EARTH FOR POLARITY TESTING

The Queensland Electrical Safety Office (ESO) is reminding electrical workers to use an independent earth whenever possible, rather than the installation earthing system.

Recent disciplinary hearings have involved workers failing to ensure the correct polarity of supply after performing work on the incoming service. The Electrical Licensing Committee noted that in many cases electrical workers failed to use an independent earth when conducting polarity tests.

"An independent earth provides a zero voltage reference, free from voltages which may be present in the bonded earthing system of the installation, which is preferred for the correct identification of polarity. AS 4741 Testing of connections to low-voltage electricity networks is referred to by supply authorities, their subcontractors and ESO inspectors when testing low-voltage services for correct polarity. It provides that when testing polarity, unless the earthing system is proven to be isolated from the neutral, an effective independent earth must be used," said Queensland ESO in a statement.

Independent earths should be driven into the ground at least two metres away from the main earth stake, meter box, water pipe and any other earthed conductive parts associated with the installation, the statement said.

"Incorrect polarity can result in dangerous electric shocks and property damage. Always use an independent earth where possible."

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Warren & Brown Technologies launches into e-commerce with its new website: wbnetworks.com.au.

Warren & Brown Technologies (WBT) is pleased to announce that our new and refreshed WB Networks e-commerce website is live. The newly designed site has a fresh look and feel, creating a user-friendly browsing and shopping experience for its valued customers and business partners.

As a leading Australian owned and operated business, and major supplier to many Telecom Carriers and Enterprise networks globally and locally, this extension of WBT's impressive track record of service and innovation takes its product and service offering to a whole new level.

With access to over 3,000+ quality products, including the HypaConnect copper and optical fibre cabling solutions, ducting raceway, telecom carrier connectivity products, patch cords, accessories and much more, at competitive prices, the new site is a cornerstone of WBT's leading service offering.

The new design provides enhanced navigation, search function and product filtering capabilities in each product category. These new features allow customers to define and have more control over their shopping experience. Customers can now narrow product selections by preferred attributes, or quickly search for products by name, type or part number. These new capabilities make the site very useful for evaluating product options before placing an order.

Offering express delivery options, fast order turnaround time, secure payment options, live chat, ongoing specials and promotions for the Australian market, the website will provide WBT customers with even greater responsive service and delivery of key network connectivity infrastructure solutions. And for more complex network requirements and end-to-end solutions, the WBT sales and technical teams will continue to engage with customers on a regular basis.

The responsive design of the new website adjusts and responds to various screen sizes, so the site can easily be viewed on desktops, laptops, tablets and mobile phones. Moving forward the content will be updated regularly, providing customers with new product offerings, technical support, product information and responsive service.

"The launch of our e-commerce site highlights Warren & Brown's commitment to technology and desire to serve our customers' needs, simply and safely," stated Neil Domelow, Managing Director. "Our goal with the new site is to create an easy shopping experience for our customers."

To top it all off, there's an introductory offer of 10% off all products purchased from the new online store. To access the discount, visit wbnetworks.com.au and enter promo code: WB-ONLINE10 at the checkout. This offer is valid for online orders only until 31st March 2019.

About Warren & Brown Technologies

Warren & Brown Technologies (WBT) was originally established in 1921 as a tool-making factory in Melbourne, Australia. Over the years, the company has evolved to become a leader in precision tools and telecommunications network connectivity infrastructure technology. WBT has remained proudly Australian owned and operated for over 97 years, committed to the local design, manufacturing and technology industry. This commitment has resulted in the creation of hundreds of jobs and world leading solutions.

The professional team at WBT continues to lead the way in designing and manufacturing telecommunications hardware products, which have been deployed in countless networks around the world.

We pride ourselves on being a global leader in the supply and manufacture of optical fibre and copper communications equipment. Innovative designs, attention to detail and a willingness to go above and beyond the requirements of our customers are what establishes WBT as the industry benchmark.

As we look towards the exciting and dynamic future of the telecommunications industry, our history and experience gained over the last 97 years ensures that we are well equipped for the challenging times ahead.

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TOP 5 DATA CENTRE TRENDS IN 2019

Vertiv has released its top five trends for the year, and predicts the edge of the network will be the "epicentre of innovation" in the data centre space. It stated activity will focus on increased intelligence designed to simplify operations, enable remote management and service, and bridge a widening skills gap.

"Today's edge plays a critical role in data centre and network operation and in the delivery of important consumer services," said Vertiv CEO Rob Johnson. "This is a dramatic and fundamental change to the way we think about computing and data management. It should come as no surprise that activity in the data centre space in 2019 will be focused squarely on innovation at the edge."

Simplifying the edge

Vertiv states there is a convergence of a smarter, simpler and more self-sufficient edge of the network with broader industry and consumer trends, including the Internet of Things (IoT) and the looming rollout of 5G networks, to drive powerful, low-latency computing closer to the end user.

Intelligent infrastructure systems with machine learning capabilities working in tandem with cloud-based analytics are fundamentally changing the way we think about edge computing and edge services. The result will be a more robust, efficient edge of the network with enhanced visibility and self-healing capabilities requiring limited active management.

Vertiv Managing Director Australia and New Zealand Robert Linsdell highlighted the need for his region to get the edge right.

He said: "We have a highly disperse geography and many of our primary and resurging industries such as mining and manufacturing aren't done in cities with access to centralised data centres. They're in far-flung destinations where even basic connectivity can be poor or absent.

"The only way to harness the power and benefits of IoT and smart city applications in these areas is through edge computing and we need further investment in this area to make sure technology expectations among customers, staff and businesses are met across the region."

Workforce revolution

With an ageing workforce and training programs lagging behind the data centre and edge evolution, this is creating staffing challenges for data centres around the globe.

In 2019, organisations will begin to change the way they hire data centre personnel, moving away from traditional training programs towards more agile, job-specific, in-house training with a focus on the edge. Businesses are also expected to turn to intelligent systems and machine learning to simplify operations, preserve institutional knowledge and enable more predictive and efficient service and maintenance.

Smarter UPS systems

According to Vertiv, new battery alternatives will present opportunities for the broad adoption of UPS systems capable of more elegant interactions with the grid. This will result in load management and peak shaving features in the short term, while in the long term organisations will use some of the stored energy in their UPS systems to help the utility operate the electric grid. Vertiv said the static storage of all of that energy is a revenue generator waiting to happen, and we are moving closer to mainstream applications.

Pursuing normalisation

The data centre remains far too complex to expect full-fledged standardisation of equipment, but Vertiv said there is interest on two fronts: standardisation of equipment components and normalisation across data centre builds.

The latter is manifesting in the use of consistent architectures and equipment types to keep systems simple and costs down. In both cases, the goal is to reduce equipment costs, shorten delivery and deployment timelines, and simplify service and maintenance.

High-power processors and advanced cooling

As processor utilisation rates increase to run advanced applications such as facial recognition or advanced data analytics, high-power processors create a need for innovative approaches to thermal management.

Direct liquid cooling at the chip — meaning the processor or other components are partially or fully immersed in a liquid for heat dissipation — is becoming a viable solution. Although most commonly used in high-performance computing configurations, Vertiv suggested benefits such as better server performance, improved efficacy in high densities and reduced cooling costs justify additional consideration. Another area of innovation in thermal management is extreme water-free cooling, which is an increasingly popular alternative to traditional chilled water.

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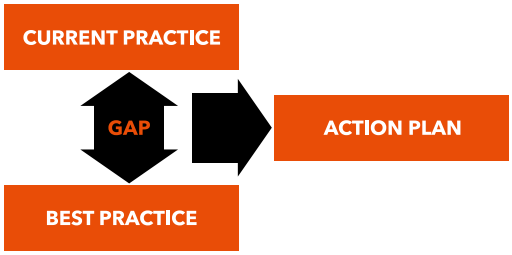
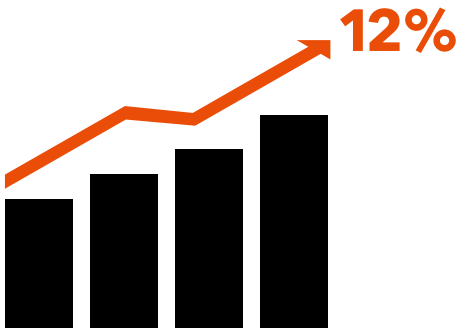


FIX

Most productivity issues, once they have been identified and a solution provided, can be addressed by the business as Business As Usual (BAU) activities at a modest cost



SUSTAIN

Focused productivity improvement initiatives deliver rapid gains, but without a sustainability strategy, 50% of the benefits usually dissipate within 3 years. FieldForce4 delivers sustainable benefits through productivity measurement, monitoring and a management service that permanently sustains the benefits

Customer reference

"The Best Practice Productivity Review from FieldForce4 was the best value consulting engagement that we have ever undertaken." Fulton Hogan

FieldForce4 client and reference list:

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www.fieldforce4.com | info@fieldforce4.com

MICROGRIDS FOR BUILDINGS — ADDRESSING A LARGE-SCALE ENERGY ISSUE

James Hunt, General Manager Solution Sales

As Australia swelters in the now annual 'once-in-a-lifetime' heatwave, Australians are cranking up their air-conditioning units to stay cool. In January this year, Australia was home to all 15 of the world's hottest temperatures. This extra demand for energy puts undue pressure on the grid, as well as racking up significant power bills. In worse-case scenarios, this can lead to load shedding or even state-wide blackouts.

Because of this constant threat, energy prices and reliability of the grid remain top of mind. To reassure citizens that climate change and energy policy are being taken seriously, the federal government needs to develop a strategy that provides resilience and emphasises the need for investment in smart energy technologies. While the first instinct is often to think bigger, the answer for energy stability and efficiency actually lies in thinking much smaller.

Microgrid solution

Microgrids have proven to be a viable option to strengthen the electrical grid and serve communities when disaster strikes. Making the most of connected sensors and other Internet of Things (IoT) technologies, microgrids have a positive impact on communities where infrastructure is lacking — or non-existent — by allowing the creation of power grids with a customised energy infrastructure based on the community's needs. In addition, for economies like Australia — where electrical infrastructure is in place, but ageing — new technologies connected by microgrids can transform legacy infrastructure into a resilient power grid that offers reliable access to energy, even when extreme weather hits. Furthermore, since most modern microgrids embrace renewable energy and improve flexibility, they provide value to both consumers and the grid between storms in the form of low-cost clean energy and load management.

By establishing an energy system that is resilient, reliable, sustainable, predictable and digital, we remove the barriers from all our critical systems and enable our businesses and communities to reach their full potential. Microgrid adoption is a decision we cannot afford to pass on as we fortify our future for the new energy landscape.

A microgrid is a local electrical distribution system with controlled loads and distributed energy resources that operate in a coordinated way to provide one or more of the following capabilities: to manage energy consumption on site, to provide services to the grid or to increase the resiliency of the network.

A microgrid contains an integrated automation system, which enables smart microgrid control; energy use optimisation; power and heat demand response; and energy storage. This intelligent grid often capitalises on renewable energies, such as solar and wind.

The building management opportunity

Microgrids, by managing energy and diverse low-carbon resources, can provide cheap, clean, reliable power to those within it. Consequently, this is an increasingly attractive option when retrofitting buildings. Other benefits of microgrid solutions include the following:

- The technology enables coordination of these resources and the building management systems to deliver energy savings and reduce operational expenses.
- Facilities have an added layer of transparency and level of control over their operations and day-to-day power usage.
- Buildings have an increased energy reliability. For example, in the case of a natural disaster such as a storm, bushfire or heatwave, a microgrid can protect a building from the effects of wholesale market demand spikes ensuring power consistency.
- A microgrid is a green solution that places businesses at the forefront of sustainable practice.

Most of these building management systems come equipped with smart panels that are 24/7 connected to the internet. Moreover, microgrids help by managing power quality to all parts of the building and will enhance operational efficiency and assist in saving electricity. Most of the buildings in smart cities will come equipped with solar panels, which will help them in producing the required electricity for its operations and simultaneously help in decreasing their carbon footprint.

In Finland, global discount supermarket chain Lidl is constructing a world-first distribution centre operating on 100% renewable energy. A smart microgrid control solution will be used to monitor and control the building and is expected to provide energy savings of over 50%. Closer to home, in South Australia, the SA Produce Market has developed a microgrid using solar, battery storage and backup diesel generation to both manage energy cost and energy security. In the event of any future blackout, they will be able to operate as an island from the rest of the electricity grid.

The future of microgrids

As visibility of how microgrids can supplement current power infrastructure increases, the conversation around how to implement microgrids — and pay for them — has naturally followed.

Energy as a service (EaaS) is a business model that is disrupting the space, empowering consumers to embrace microgrids across Australia. EaaS enables consumers and communities to take advantage of energy resilience, sustainability and cost that is tailored to their unique objectives without requiring them to operate a utility or break their budget.

For example, communities that need to significantly upgrade existing electrical infrastructure while configuring their system to integrate renewable, on-site distributed energy can now do so without the lingering concern of surpassing their energy or capital construction budget. This allows end users to be more creative and strategic with the way that they manage their energy. Furthermore, EaaS allows consumers to transfer technical, regulatory and operational risks to counterparts that are more prepared to mitigate them without giving up governance rights.

> “ ENERGY AS A SERVICE (EAAS) IS A BUSINESS MODEL THAT IS DISRUPTING THE SPACE, EMPOWERING CONSUMERS TO EMBRACE MICROGRIDS ACROSS AUSTRALIA.

As with the Mornington Peninsula Shire in Victoria, which has launched a Community Grid Project to support local electricity needs and avoid a $30 million transmission line. Local residents and businesses are driving this initiative and will be seeing the benefits for years to come.

Looking to the future, a web of microgrids across a city can support the wider network of energy supply. At times of peak demand, utilities can call on electricity stored in microgrids’ batteries or use their generators to provide a boost of power. If this happens, these hybrid microgrids will make the existing grid far more resilient.

The journey to better resilience in the face of the increasingly severe impact of climate change requires us to think differently about energy. Software, analytics and the decentralised control of digitised equipment helps make the most of the physical infrastructure that we have in place, achieving resilience while minimising redundancy. Innovative business models like EaaS unlock the ability to bring that technology to bear today — before we feel the impact of the next storm.

Schneider Electric
www.schneider-electric.com.au

Optical fibre patch cords

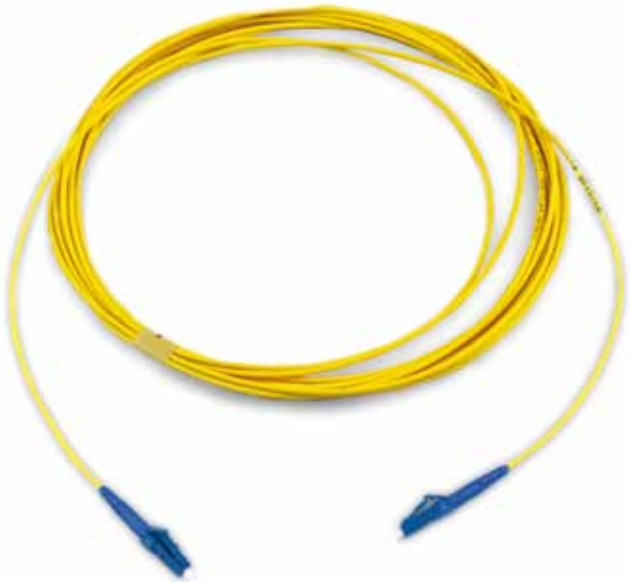
Warren & Brown Technologies high-performance optical fibre patch cords are available in singlemode, multimode, simplex and duplex. All of the patch cords are individually inspected and tested at the time of production and comply with ANSI, Bellcore, TIA/EIA and EIC standards.

The optical fibre patch cords come in many fibre types, lengths, sizes and connector options to suit numerous applications. The optical fibre patch cords are all provided with a low smoke zero halogen (LSZH) sheath as standard. LSZH considerably reduces the amount of toxic and corrosive gas emissions during a fire.

Good quality connectivity begins with high quality patch cords. Sub-standard patch cords will affect the performance and reliability of the network and are often the most common source of failure within a network. The risk of network downtime due to unreliable cabling is one that should be avoided.

Warren & Brown Technologies

www.wbtnetworks.com.au



Solar tester

The HT I-Ve Solar Tester is designed to measure the efficiency of single-phase photovoltaic systems and verify the I-V curve of a module or a string. It is available to rent from TechRentals.

For measuring I-V curve, the Solar Tester manages an internal database of modules (which can be updated at any time by the user) to compare the measured data with the rated values, thus allowing the immediate evaluation whether the string or the module fulfils the efficiency parameters declared by the manufacturer.

Measurement of short-circuit current Voc/Isc and open-circuit voltage can be performed with ease using the HT Solar Tester. Data from the instrument can be downloaded onto a smartphone or tablet via Wi-Fi for easy viewing of results.

The HT Solar Tester also features the HTCloud database, which allows the user to share results and measurements with colleagues. Additional features include an online FAQ and trouble-shooting assistant, power measurement of modules and strings, and a large LCD 128 x 128 backlit display for easy operation in bright conditions.

TechRentals

www.techrentals.com.au

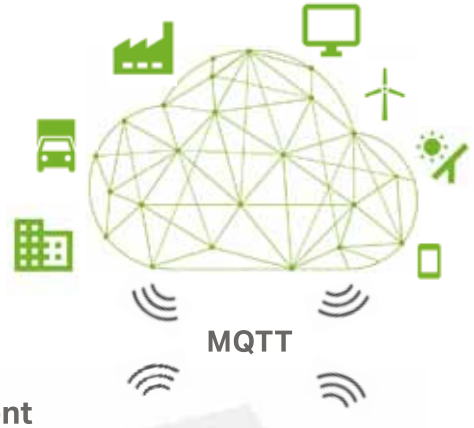
Get Access to the Data from Everywhere

WAGO Energy Management System

This user-friendly solution, consisting of software combined with a modular control system, records measurement data from different media and influential factors for energy monitoring and processes them for further analyses, archiving and reporting. With application controllers from the high-powered PFC200 family, data from meters and sensors can be easily collected by one convenient input module and parameterized through the available software application – no programming necessary.

WHY WAGO?

- **Easy input parameterization via Web visualization:** No Programming experience required
- **Connect existing sensors to the WAGO-I/O-SYSTEM:** Interrogation into existing systems for flexibility
- **Scalable, modular I/O system:** Hassle-free expansions at any time



Cloud Connectivity: New Possibilities for Your Energy Management

The cloud makes it possible for you to access your current energy and process data from any location. It also offers big data intelligence so you can process, analyse and save larger data volumes. In just a few simple steps, both WAGO PFC100 and PFC200 Controllers can be transformed into an IoT device by installing a firmware upgrade and programming an IEC application with the corresponding library. Status information such as Run/Stop, connection status, device information, and variables defined in the IEC program can then be transmitted to the cloud and visualized.

Measuring & Evaluating

Anywhere high currents are measured and processed, WAGO's current transformers are your first choice. Voltage taps also easily and safely tap the measurement voltage in existing systems. The WAGO-I/O-SYSTEM 750 offers a comprehensive range of perfectly tuned solutions for your energy measurement applications. The 3-phase Power Measurement Modules detect and process all relevant variables in a 3-phase supply network. They provide system operators with increased insight into energy consumption by specific machines and systems, as well as the ability to perform comprehensive network analysis.

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THE IoT WAVE — ADAPT OR PERISH

*Peter Darley, General Manager Australia**

Ten years ago most people operating in Australia's trade services industry were still scribbling quotes, invoices and their daily schedule on the back of any scrap of paper they could find. It was chaotic, inefficient and costly.

Move forward a decade and many, if not the majority, of these businesses are now utilising complex cloud-based technologies to manage their businesses, allowing them to get on with the job they are paid to do. From accounting to job management, MR and quoting, most administrative jobs can now be done easily and simply.

While many are still bedding down this first wave of change, a new wave is about to hit. The second phase of the trade services digital revolution, the Internet of Things (IoT) age, could have an even more profound impact on the way the entire industry operates. For those businesses that embrace the opportunity it will be a pathway to growth and prosperity, but those that resist will be quickly left behind.

In its simplest form, IoT refers to the interaction between machines which are connected to the internet. When the digital age first took off, technology was still dependent on physical input; machines still needed a human being at the helm. Today, IoT represents the next stage of digital evolution. Human-to-machine interaction has been streamlined with an online network that processes data and allows sensors or devices with an internet connection to speak to each other and perform automated functions.

One of the biggest barriers preventing some trade service companies from getting on board is a lingering confusion about what IoT means for their business.

In the trade service industry, IoT can be seen when a technician synchronises their job calendars to track appointments, prioritise projects and plan best routes. An example of this is where simPRO assisted Swissport and Thermacell in improving its facilities management capability at England's Luton Airport through installation of simPRO's IoT hardware and software solutions. With simPRO IoT, the airport established sensors that monitored the performance of its lounge air conditioners remotely in near real time and automatically received alerts in response to anomalies.

The applications are various and can be applied to many different sectors. For example, IoT can assist fire safety technicians through

sensors in a fire detection or sprinkler system, which then monitors and reports back the current state of the equipment they are tasked to keep an eye on. In the security sector, IoT allows real-time viewing of security cameras from devices connected to the internet, allowing clients to view live footage of their home or business anywhere, at any time and on different devices.

Of course, there will always be those who think IoT is nothing more than a gimmick, and an unnecessary disruption in technology development that will only make life and business more difficult. There may be business owners out there who believe that IoT is an extravagant and unjustifiable expense, and that IoT systems will likely die down to serve a niche market. Those that accept the disruption will be those who prosper from the adoption.

A recent report commissioned by the Australian Computer Society (ACS) revealed that there is much to gain from IoT, as it currently presents a $30 billion opportunity for Australia's tech sector by 2023, with IoT hardware, software, solutions and communications systems presenting unprecedented growth rate prospects. At this point, being left behind by not embracing IoT is not a risk; it's a certainty. But why risk it?

IoT has the potential to streamline business processes, increase productivity and produce logical and data-driven solutions that consistently help to achieve goals. Trade businesses that adopt IoT are effectively futureproofing their operations with strong competitive advantage like real-time productivity and energy monitoring of machinery, as well as tracking of key maintenance indicators to predict and prevent failure provide real-time inventory of inputs. It also allows businesses to communicate with supply chain and factory operations and monitor real-time tracking of outputs, allowing for quality assurance to be performed in real time as well as status and location tracking of goods.

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IoT systems can help trade businesses across the spectrum, from ambitious niche start-ups to globalised industrial companies. It facilitates machine learning and automation that can help those small businesses explore new growth opportunities and larger businesses to stay competitive in the market for longer.

No matter their size, trade service businesses are able to use IoT systems to respond more quickly to competition and customers' demands and volatile market conditions. It can provide real-time insights into trends, creating opportunities to alter production activity, fine-tune strategies or find alternatives that save a business cost and time. Essentially, machines that are connected and able to share data allow business owners the luxury of spending less time wondering and more time taking action.

The truth is that IoT is already making a significant impression on Australia's economy. Manufacturing, for example, is expected to achieve potential benefits of $50 to $88 billion, according to an IoT report produced by ACS.

The time is now for businesses to consider the following preparations for a world where IoT makes significant industry contributions. IoT systems are certain to change the way service scheduling is completed and therefore we all must be prepared for new styles of service agreements, scheduling and task-related activity:

Plan

IoT systems are rapidly changing how we do things, but a business still needs to have a clear direction. Identify where your business uses the most resources or requires the most time and effort. Pinpoint opportunities where a process can be streamlined, and consider whether these areas could be improved by automated systems and an IoT network.

Security

Cybersecurity is one barrier keeping many businesses away from connecting to IoT. While there is certainly an ever-present risk to online data, a growing IoT presence means a greater acknowledgement of online safety. Technicians are constantly developing new ways of protecting data and the integrity of IoT systems, so be sure to keep up to date with the latest security developments.

Invest in the infrastructure

It's no use committing to a new age of industry when the office is filled with lock-and-key filing cabinets. IoT systems require an efficient flow of data and therefore require suitable hardware, including internet ports, hard drives, strong connection speeds and modern interfaces. The good news is that simPRO IoT can be retrofitted to existing systems with little effort.

**Peter Darley was appointed General Manager Australia for fast-growing SaaS business simPRO. He joins simPRO with a strong background in sales, marketing and operations in field service industries, events, broadcasting and information technology. Darley joined simPRO from Schindler Lifts where he was National Sales Manager, Repair and Digital Services, where he oversaw a number of complex digital implementation projects as well as developing new product development sales and marketing for Schindler's Internet of Things (IoT) strategy. He also previously held positions with Wesfarmers and OTIS.*

simPRO Software
www.simPRO.com.au

Handheld device

The Panasonic Toughbook FZ-T1 handheld device is a slimline, rugged model designed for mobile workforces seeking an all-in-one solution.

The 5″ Android device will suit the mobile needs of industries such as retail and hospitality, emergency services, manufacturing, and transport and logistics.

With its voice and data capabilities, integrated barcode scanner and wide range of functionality and accessories, the Toughbook FZ-T1's balance of mobility and durability is set to improve workforce productivity and the ease and efficiency of business operations across Australia.

The Toughbook FZ-T1 handheld will be available in a 4G model, with voice and data capabilities. Built for the needs of the modern mobile worker, the high-performance device has the Android 8.1 Oreo operating system, a Qualcomm Snapdragon quad-core CPU, 16 GB Flash and 2 GB Ram storage.

Light and slim, the Toughbook FZ-T1 weighs under 240 g. It is designed for military standard 810G, dust and water resistant to IP68, tumble tested and capable of withstanding drops of up to 1.5 m, and operating within a temperature range of -10 to +50°C.

With an easy viewing 5″ display, the Toughbook FZ-T1 has 10-finger input, daylight-readable screen, is capable of operating in the rain and can be used with gloved hands or an optional passive pen.

It has an enterprise-class, straight-line barcode reader built in with two trigger buttons (either side of the device) to make it easy for left- and right-handed operators. These accessories are suitable for operators scanning regularly, or needing to scan at a distance in warehouses or while operating forklifts.

Designed to operate a full shift, the Toughbook FZ-T1 comes with a 12 h battery life and warm swappable functionality, allowing the user to switch their own batteries without interrupting work.

For clear communication in busy work environments up to construction site noise levels, the Toughbook FZ-T1 is equipped with noise suppression technology and loudspeaker. It also has an 8 MP rear camera for easy document capture.

Panasonic Australia Pty Limited
www.panasonic.com.au

Mobile invoicing app

Invoice2go is the mobile invoicing app that gives building and home services professionals control over their time and business. It gives users the tools they need to deliver estimates, manage appointments, track jobs and offer clients the ability to pay any way.

Business owners can create appointments to store job notes and manage their schedule. They can drill down on a client profile to see upcoming and past appointments, as well as transfer the appointments to invoices for fast and easy billing.

The time tracking feature allows users to track the time spent on a job, assign it to a client, save job notes and quickly create an invoice from their billable time.

Integration with Xero can minimise the time spent on the paper trail. Small business owners who use both Invoice2go and Xero are able to sync their accounts, so all invoices immediately and automatically sync up to their Xero account, reducing the amount of time it takes to issue an invoice, and then recreate it in Xero.

Invoice2go
invoice.2go.com

STP shielded modular jacks

The Warren & Brown HY series category 6A STP modular jacks have been specifically designed to simplify and accelerate network deployment. These fully shielded modular jacks include a number of features which allow them to be easily installed in modular patch panels, wall outlets and floor distributors such as easy visual inspection of the wiring colour code to ensure every connection is correct.

These shielded jacks can be terminated with standard IDC termination tools or the Warren & Brown HY series terminating tool, and the universal keystone format allows for multiple mounting options.

Meeting or exceeding ISO/IEC 11801 Ed.2.2 system performance for Class EA networks (10 G, 500 MHz), the HY series CAT6A shielded jacks are suitable for PoE and PoE+ applications and their secure metal contact provides earthing integrity at the patch panel.

To ensure network deployment is simplified, these jacks are equipped with multidirectional cable entry to allow for straight or angled cable installation, and the optimised printed circuit design enables improved high frequency crosstalk performance.

Warren & Brown Technologies
www.wbtnetworks.com.au

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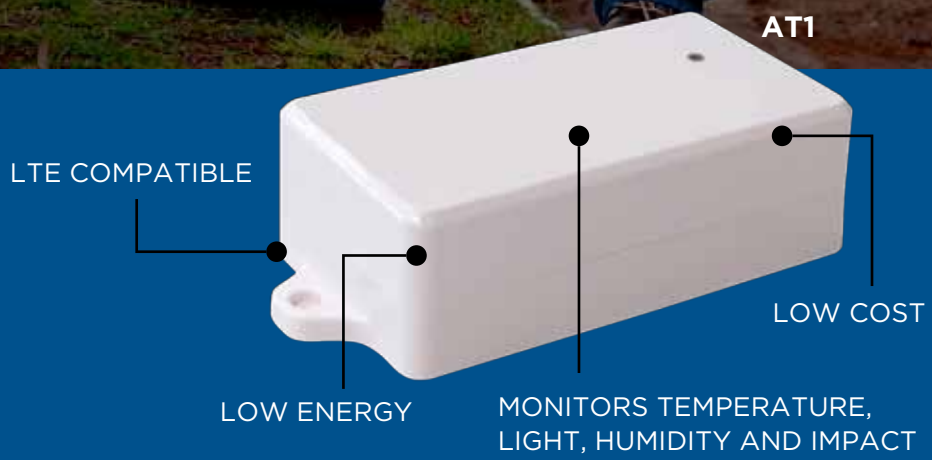

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Power transducers

The APT-TH Series power transducers monitor watt consumption of three-phase loads. They provide an analog signal proportional to the active power consumed by the monitored load. The three current-carrying conductors pass through the three windows of the top section and the matching voltage input at the terminals.

It is a one-piece solution for measuring power; no external current transformers are needed and installation is easy. The design of the APT-TH ensures that the transducer is always correctly orientated.

If connected improperly by mismatching the current and voltage inputs, or placing a conductor through the sensing window back to front rather than front to back, the LED will change colour from green to amber. The LED will also turn amber if the phase A conductor is placed through the phase B sensing window, or if power factor is lower than 0.50.

Other features include: three ample sensing windows — wire carrying 200 A fits easily; LED Indicator — shows correct phase relationship match; easy installation — DIN rail or panel mount; detect broken or missing tools or drill bits; monitor pumps to detect open intake or outflow lines, cavitation or failing bearings; measure wattage/horsepower of grinding and milling equipment to optimise feed rate; monitor equipment so that the constant output proportional to wattage consumed can be compared with utility bills for a cost per hour or cost per operation of a machine or process.

Veederline Pty Ltd
www.veederline.com.au

M12 circular power connectors

The HARTING M12 power connector has been released in the IEC 61076-2-111 standard K-coding for use with power up to 630 V and 7 kW. In order to offer the widely used M12 form factor to device manufacturers for voltage supply, HARTING will supply the K-coding with 7 kW at 630 V and 16 A, 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 PushPull variant that clicks audibly into place.

HARTING Pty Ltd
www.harting.com.au

DC/DC converters

MORNSUN has added four series of DC converters, all with dual isolated regulated outputs, to the R3 DC/DC wide-input converter family.

The URD-S-3WR3, URD-YMD-10WR3, URD-LD-20WR3 and URD480524D-30WR3 series adopt international standard pins and have strong EMI ability and good compatibility. As well as this, the series provides a 4:1 ultrawide input voltage range of 18–75 VDC, with efficiencies up to 84%.

Features include: positive primary/secondary output; isolation voltage of 1500 VDC/3000 VDC/3000 VAC; and an operating temperature range of -40 to +105°C (URD-LD-20WR3)/-40 to +85°C (others).

Additional to meeting EN62368 standards, the series offers protection for input undervoltage, output short circuit and overcurrent. Typical applications include but are not limited to data transmission, telecommunications, distributed power supply systems, hybrid A/D systems and remote control systems.

DLPC Pty Ltd
www.dlpc.com.au

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EUROPEANS CALL FOR BETTER WORKPLACE LIGHTING

Most Europeans are not satisfied with their workplace lighting, with suggestions for improvements including personalisation, automation and adjustability.

A pan-European survey, conducted as part of the Repro-light project by consortium members Bartenbach GmbH and Mondragon University, asked 1100 workers across Germany, Spain, Italy and Austria what changes they would like to see in their working environment's lighting that could improve their productivity, mood and performance.

It found that 56% of end users would like better workplace lighting, particularly women and workers over 50. These figures are high considering this lighting should follow a strict lighting design code (eg, EN. 12464-1), which guarantees factors such as brightness levels.

This suggests personalised lighting is needed to satisfy all users. The survey report stated: "We hypothesize, that other factors of workplace lighting (e.g. adaptability of light levels and light colours), not integrated in current lighting standards, could be driving factors behind the wish for an improved workplace lighting."

There was also a higher preference for improved lighting for those who worked predominantly in a fixed place, with higher visual demands and less control over the lighting. For example, 45% of those who already used electronic devices such as tablets and smartphones reported they "totally disagreed" that workplace lighting should be improved. But the report warned this does not mean electronic devices for lighting control would increase satisfaction, as it could be dependent on the age of the lighting installation.

Half of respondents, particularly workers under 30, placed emphasis on the physical luminaire aesthetics, 80% wanted lighting which automatically adapts to personal needs, 72% said their lighting should be changed with varying working activities and 79% wanted their work light to change colour when it becomes dark outside.

An overwhelming majority also believed that light influenced their mood and work performance. Over 90% believed it impacts their mood, 87% said it affects their performance and 92% said it influences their vigilance in the workplace.

The results suggest that people are demanding lighting that boosts productivity and general wellbeing in the working environments, both in industrial spaces and in offices. The survey report concluded there were 11 requirements that could be derived for personalisation, including: providing easy-to-use interfaces; ability to adapt brightness and colour; "owned" workplaces and aged eyes need personalised lighting; and integrating daylight in personalised designs.

However, the survey was only part of the first phase of the Repro-light project, and it will be moving on to investigation and design iteration to develop a 'Luminaire of the Future' that aims to meet users' needs.

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LABOR PLANS TO "SUPERCHARGE" HYDROGEN INDUSTRY

Nichola Murphy

The Labor Party's $1.14 billion National Hydrogen Plan, which aims to position Australia as a leader in the hydrogen industry, has largely been met with support.

With the global market for hydrogen predicted to be worth $215 billion by 2022, according to the International Energy Agency, it represents a huge opportunity to deliver economic, employment, energy and environmental benefits to Australia. This includes contributing up to $10 billion of exports per annum and 16,000 new jobs by 2040, ACIL Allen Consulting analysis projects.

Announcing the plan in Gladstone, Opposition Leader Bill Shorten said, "It's about time Australia entered the hydrogen race." Labor's six-point plan to "supercharge" Australia's renewable energy industry includes research and development, commercialisation, deployment, infrastructure and regulatory reforms.

As part of the proposal, Labor would allocate $1 billion of Clean Energy Finance Corporation (CEFC) funding to support clean hydrogen from its commitment to double CEFC's capital by $10 billion.

The Australian Renewable Energy Agency (ARENA) would also be asked to allocate $10 million of its funding to establish hydrogen refuelling infrastructure across Australia, as well as invest $90 million of unallocated funding to support research, demonstration and pre-commercial deployment of hydrogen technologies.

The plan noted Gladstone's potential as an export hub for hydrogen and stated, "A Shorten Labor Government will make Gladstone the hydrogen capital of Australia." A $3 million National Hydrogen Innovation Hub would be established in Gladstone to kick-start early commercialisation of hydrogen technologies, provide a hub for investment and research agencies, and develop opportunities to leverage LNG infrastructure to support hydrogen exports.

"Hydrogen gas is an energy source that can be produced through the process of electrolysis using renewable energy, meaning it can leverage Australia's world-class renewable energy to make much cleaner hydrogen competitively," said a joint statement from Shorten and other Labor ministers. "Developing a hydrogen industry will deliver new opportunities for manufacturing, transport and electricity generation."

Australia's abundance of solar and wind resources, existing gas pipeline infrastructure and proximity to Asian markets means it is well placed to export hydrogen.

Australian Gas Infrastructure Group (AGIG) — currently building Australia's largest electrolyser, Hydrogen Park SA, in partnership with the South Australian Government — welcomed the announcement of the national strategy.

"Hydrogen also has the potential to revolutionise the nation's transport and heat sectors. Hydrogen fuel cell cars, trucks and trains can combine zero emissions electric motors with the fast refuelling and long ranges associated with diesel vehicles today," said AGIG Chief Executive Officer Ben Wilson. "An important consideration for the haulage sector is that hydrogen is actually lighter than diesel per unit of stored energy, whereas batteries are significantly heavier."

Wilson said hydrogen can be blended into Australia's natural gas networks and pipelines, to start the journey towards a decarbonised heat sector. "In the medium term, the gas distribution networks can be converted to 100% hydrogen, delivering zero carbon energy for cooking, hot water and heating," he said.

The plan was similarly welcomed by Energy Networks Australia, with CEO Andrew Dillon stating, "One of the most exciting properties of hydrogen is its potential to serve as a large-scale battery, utilising existing gas networks."

He noted the importance of national policies that support the development of a hydrogen sector to help Australia take advantage of a potentially abundant, clean energy resource. "Funding support for research and development, led nationally, that supports the ultimate commercialisation of hydrogen technologies will provide important impetus," Dillon said.

As we head towards this year's federal election, Labor insisted it will grasp the opportunities presented by hydrogen, with Shorten stating: "I want Australia and Queensland to be at the front of the hydrogen revolution not behind it."

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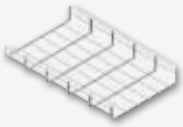

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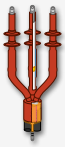

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Building a nation of battery recyclers

Australia is the worst of any developed country for battery recycling at 5–10%, compared with Belgium at 75%, identified a panel conducted by Lighting Council Australia during National Recycling Week. The panel discussed minimising e-waste and the barriers to recycling for Australians, which include a lack of awareness and the fact it can be financially disadvantageous for electrical contractors.

In 2015, Lighting Council Australia, in partnership with the Queensland Department of Environment and Heritage, established the EXITCYCLE battery recycling initiative. The ongoing aim of the scheme is to increase the recycling rate of emergency and exit lighting batteries, and prevent up to 90 tonnes of toxic metal ending up in landfill annually. Signatories to EXITCYCLE, which include government sector organisations, e-waste collectors and private businesses such as Evolt, commit to recycle at least 95% of their end-of-life emergency and exit lighting batteries at their nominated sites.

However, there is a significant amount of work that needs to be done for the purpose of bringing the recycling of batteries to an acceptable level in Australia. All stakeholders within the industry need to come together, including the government, electrical wholesalers, electrical contractors and manufacturers, to develop a scheme that is practical and simple.

While most of the emergency lighting products available in today's market include environmentally friendly batteries, this was not the case 20 or 30 years ago, and the luminaires installed then are coming up for replacement. There are potentially hundreds of thousands of these products installed, which is why there is an urgency to have a workable scheme now.

While there would be a handful of electrical contractors who recycle batteries correctly through e-waste management providers such as CMA Ecocycle and MRI e-cycle solutions, the majority of the luminaires end up in landfill, including the batteries.

According to EXITCYCLE, about 90% of batteries used in emergency and exit lighting are nickel cadmium (Ni-Cd) and an estimated five million of these batteries are disposed of in landfill each year. Cadmium is a toxic heavy metal that can have negative impacts on the human body and natural environment if left to contaminate landfill. The liners in landfill currently preventing the leaching of these toxic metals into soils and seas will disintegrate long before the toxic batteries themselves, which puts into perspective the need to prioritise battery recycling.

Manufacturers need to commit to using only environmentally friendly batteries, which Evolt has done since the business began in 2005, and the EXITCYCLE scheme should be nationalised. The Queensland pilot program was the pioneer; however, it needs to be expanded. In the same way the recycling of cans and bottles, which started in South Australia, has been adopted nationally, the EXITCYCLE program needs to be introduced to all states and territories.

Evolt proposes an increase in the number of collection points, potentially using electrical wholesalers as logical places for old fittings to be returned when electrical contractors are there purchasing new products.

While there are recycling companies in Australia that provide specially designed containers for recycling, there is currently a cost that needs to be covered for transport back to the recycling point. The industry needs to consider who is responsible for this cost.

The difficulty of recycling some of these products varies depending on the battery's technology. For example, lead acid and Ni-Cd batteries collected by e-waste recyclers such as MRI are shipped to recycling centres in Korea. These shipments can incur export and government tariffs, which doesn't encourage the industry to utilise recycling companies in countries like Korea.

The next step is building awareness of the impact of not disposing of these environmentally damaging batteries correctly. We need to ensure that not only are the signatories of the scheme working on educating customers and raising awareness, but new members need to be recruited to help raise the EXITCYCLE public profile. This includes manufacturers, government and electrical wholesalers, who can talk to contractors and encourage changing their approach to recycling.

With the recycling of food waste, packaging and mobile phones on the rise, it's now time to address the critical issue of e-waste.

Eduardo Yudowski is General Manager – MMR for Evolt, one of Australia's leading distributors for emergency lighting, and has more than 20 years' experience in marketing, management, development and commercialisation of technology products for consumers and trade segments. Yudowski has also been nominated for Lighting Council's Sustainability Award in this year's National Awards for Excellence in Lighting, which recognises individuals or companies who have demonstrated a longstanding commitment to advancing the sustainability and environmental aims of Lighting Council Australia.

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Test mode software upgrade

The AFL FleXpress test mode is the latest software upgrade for the AFL FlexScan OTDR.

The test mode enables dual-wavelength network verification in less than 5 s per fibre, as compared to around a full minute with previous applications.

It includes automated remote control of optical switches for testing MTP/MPO connections and/or high fibre count cables and stores test results automatically as .SOR files, which can be uploaded for reporting using the TRM 2.0 Test Results Manager software.

The test mode is available for the FlexScan FS200-300 (high dynamic range, 1310 and 1550 nm) and FS200-304 (high dynamic range, 1310, 1550 and 1650 nm) models.

AFL Telecommunications Pty Ltd

www.aflglobal.com/au

Power monitoring device

The Socomec DIRIS A-40 power monitoring device offers multiple functions to assist with measuring voltage, current, power, energy and quality.

It allows building managers and electrical contractors to effectively monitor power consumption in new and existing buildings.

The panel-mounted power monitoring device allows the analysis of both single- and three-phase loads, providing a versatile solution for small as well as large applications using more than 1000 W distributed power. With three current sensor formats (solid-core TE, split-core TR and Rogowski coil TF), the DIRIS A-40 can be installed during the build process or retrofitted, delivering a versatile monitoring solution for all applications. Other features include: in and out digital (3/2): state, pulse, alarm report; RS485 Modbus, Profibus or Ethernet connectivity (Modbus TCP, BacNET IP); compatible SmartSensors; and IEC 61557-12 compliant.

The assisted configuration wizard provides users with a step-by-step guide. The wizard will detect and correct any configuration errors, providing quick and effective installation, while reducing commissioning time.

Real-time monitoring of all measurements can be accessed and viewed anywhere, anytime via the embedded WEBVIEW-S monitoring software. Predefined alerts set up by the users will be sent via email to notify of any disturbances. Electrical disturbances can be investigated and maintenance requirements anticipated with historical records of multiple electrical parameters.

A selection of WEBVIEW variants is included on a range of Socomec power monitoring devices to enable easy data monitoring and analysis. WEBVIEW-M is embedded on the DIRIS G and DIRIS Digiware D-70 power monitoring units, allowing management of up to 32 connected measuring devices. WEBVIEW-L allows management and comparison of up to 200 connected measurement devices and integration with third-party applications.

IPD Group Limited

www.ipd.com.au

Battery discharge tester and logger

The Megger Torkel 950 is used to perform load/discharge testing to determine the true capacity of battery systems. A 200 ADC current clamp which allows on-load testing is included with the kit. It can be programmed for constant current, constant power, constant resistance or other user-defined load profiles. It is available to rent from TechRentals.

When connected to the included BVM300 battery voltage monitor and logger, the unit becomes a complete discharge test system enabling cell by cell voltage measurement. This allows the user to easily identify the battery string that failed the load tests. The tests are controlled by a built-in PC which can be copied over to a USB memory stick.

The 950 works with battery systems ranging from 7.5 to 500 V, and can discharge at up to 220 A. The test can be carried out without disconnecting the battery from the equipment that it serves. The unit will sound an alarm when the voltage reaches a level slightly above the final voltage. If the voltage drops to a level where there is a risk of discharging the battery, the test will stop automatically.

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SMART BUILDINGS AND ENERGY MANAGEMENT

Justin Charlot, Product Marketing Manager - EMCS & Building Automation

Across the globe, it's estimated more than 100 new devices connect to the internet every second. People are more connected than ever, with an average of four internet-connected devices per person, and the numbers are estimated to grow even faster over the next five years. The future is here and it's time to get smart about how we adapt to it.

Widely referred to as the Internet of Things (IoT), this third wave of technology, following computers and the internet, refers to the connection between people and digital data. From our smartphones and wearables to everyday appliances, the way we live and work is changing at a rapid pace and this technology explosion is creating enormous pressure on existing infrastructure and energy resources.

From mixed overall demand to a lack of consistent standards, adoption of IoT has been slower than expected, but with a growing emphasis on best practice and critical insights, smart buildings are leading the way in delivering the change necessary.

Intelligent technology managing heating, ventilation and air conditioning (HVAC), lighting and fire safety that was once considered groundbreaking is increasingly becoming the norm in most buildings. And as the demand grows, so has the means of using data to make better decisions. It's no longer enough for smart buildings to simply contain intelligent systems. Everything must be connected in an integrated, dynamic and functional way.

With the commercial building sector responsible for approximately 10% of Australia's total greenhouse gas (GHG) emissions, improving building energy efficiency with an energy management plan is one of the quickest and most cost-effective ways to reduce operational costs while decreasing harmful emissions.

Energy management is not just about installing energy-efficient equipment. It is the ongoing process of identifying, planning and implementing improvements by establishing enduring processes to monitor and achieve best practice in the use of energy. Whether you are a developer, building owner, product manufacturer or building occupant, the delivery of a more sustainable building environment is the top priority.

In addition to the inherent benefit of reducing the environmental impact and financial benefits associated with reducing energy bills and optimising internal operations, an energy management plan also provides value where there are legislation requirements, particularly when it comes to energy ratings and CO_2 emission reporting.

From measurement through energy metering, to energy management controllers and software, the innovative systems log data and provide valuable insights into building operations and performance including advanced analytics, fault detection, smart alerts and in-built reporting capabilities. NHP's cloud hosted energy management platform, InfoSyte, empowers users to identify energy efficiency and process improvement opportunities.

When it comes to the construction sector, the importance placed on energy conservation, efficiency and reduction of emissions while maintaining operational performance is of the upmost priority. This was reflected in a project undertaken by Perigon and NHP at the Student One building in Brisbane. Designed to house 727 students who were not required to pay electricity as part of their housing, there was no financial incentive to conserve energy, meaning the overall energy footprint of the building was at risk.

To combat the likelihood of negligent energy use and reduce overall power consumption, an initiative was introduced to pro-

mote good practice by incentivising the building occupants with a discretionary reward if they kept their energy consumption under a certain threshold during a set timeframe.

An intuitive VMU-C energy meter combined with the EM2 web-server was installed to enable Student One to manage the overall building, including remote access as required. In addition to the web-based energy monitoring system, NHP supplied Concept distribution boards specifically designed to improve and assist with acquiring the NABERS and Greenstar based requirements the building owner aimed to achieve.

On a smaller scale, the developer of the 5x4 Hayes Lane Project in Melbourne wanted to challenge the inefficiencies that often exist within the Australian construction industry by delivering a more sustainable and efficient way to build in an urban environment.

This unique, inner-city dwelling only occupies a five by four metre footprint. Within this small confinement, the narrow house is able to generate, store and control its own power through solar panels. The building's peak energy load was also reduced by 20–30% by using a variety of initiatives like the Allen-Bradley PanelView human machine interface to monitor and run the heating and cooling, hot water and hot tub temperature.

Smart buildings make occupants more productive and lower the cost and environmental impact over the life cycle of the building. They are just one way we are building a truly intelligent, innovative and smart future.

NHP Electrical Engineering Products Pty Ltd
www.nhp.com.au

Dry-type digital transformer

ABB has launched a dry-type (oil-free) digital transformer, the ABB Ability TXpert Dry. The product incorporates digital capability within the company's dry-type transformers.

Transformers typically use oil for cooling and insulation but dry-type transformers are designed to work without oil, where the core and the coil are cooled by air and non-flammable solid insulation material. This makes them safer, as the flammability element of oil is eradicated, and also more environmentally friendly. Such transformers are suited to high-risk applications like offshore as well as densely populated areas and sensitive ecosystems.

Due to its dry-type design, digitalisation and little or zero maintenance, the ABB transformer offers safety and data security, with plenty of uptime and optimised operations. Smart sensors collect data and combine them into powerful analytics, enabling key functionality such as power quality monitoring, self-supervision and lifecycle assessment.

ABB Australia Pty Ltd

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Electronic circuit breaker

The Phoenix Contact PTCB is a compact, single-channel electronic circuit breaker. Measuring 6 x 106 mm, the device offers space-saving circuit protection and potential distribution.

The smart device protects 24 VDC loads against overload and short circuiting. It can be used as a standalone circuit breaker or with Clipline complete DIN rail terminals and accessories for additional output or with multiples connected together. Adding the PTCB to existing applications is quick and easy, as the device does not require users to purchase another set of terminals.

Suitable for a wide range of applications, technicians can adjust the amp values on the device from 1 to 8 to tailor it to their needs and ensure optimal adaptation to the connected load/application. The device can be modified during start-up and can also be adjusted at any time to respond to changes in the application. It is equipped with a relay status indicator with a pre-warning LED so that users can see the functional status of each circuit breaker.

The product is operational even under extreme ambient conditions. Suitable for use in temperatures ranging from -25 to 60°C, it is shock and vibration resistant. The push-in capability means that connecting the device requires no tools and a low insertion force.

The portfolio of PTCB electronic circuit breakers features three adjustable devices with different nominal current ranges between 1 and 8 A, and four devices with fixed nominal currents of of 2, 3, 4 and 6 A.

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The GE MDS Orbit industrial wireless router platform is designed to offer the security, reliability, performance and wireless flexibility required for next-generation industrial networks. It enables users to deploy advanced communications using diverse options of wired and wireless technologies including Ethernet, Serial, USB, 2G/3G/4G, Wi-Fi, licensed and unlicensed radio.

Point-to-point, multipoint, store and forward, and self-healing topologies allow for flexible deployment architectures with the option of redundancy. Licensed and unlicensed radio links are possible up to distances of 40 km to create a large distributed network. The platform has been used in distributed processes like oil and gas, electricity, water and wastewater utilities, heavy industrial and mobile vehicles.

With advanced cybersecurity capabilities including secure boot, advanced firewall and FIPS 140-2 certified, it is able to secure and protect networks and assets. Features include: industrially hardened with an operating temperature range of -40 to +70°C, enhanced ESD protection and Class 1/Div 2 & IEEE 1613 compliance in a die-cast aluminium enclosure.

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SAFETY

FOUR CONCERNS ABOUT SAFE CONSTRUCTION WIRING

Regular audits of construction projects by WorkSafe Queensland have revealed four key areas for concern in regards to wiring compliance.

Electrical workers installing non-compliant construction wiring

Electrical workers installing construction wiring must ensure the installation is compliant to the Wiring Rules AS/NZS 3000 and the additional requirements of AS/NZS 3012 'Electrical Installations – Construction and Demolition sites'. All construction wiring, including switchboards, fixed RCDs, emergency evacuation lighting and transportable structures, must be inspected and tested in accordance with the Wiring Rules following installation.

Principal contractors or PCBUs failing to maintain the construction wiring installation

Inspectors have identified construction wiring installations that have not been maintained or have been damaged during construction activities. The principal contractor on a construction site must ensure the construction wiring installed on site remains compliant with AS/NZS 3012 for the duration of the project.

As a minimum, the principal contractor must ensure construction wiring (including switchboards) is visually inspected every six months to verify the integrity of the installation. Where the visual inspection identifies damage or non-compliance to the standard, that part of the installation must be isolated, repaired or replaced, and tested as required.

Failure to conduct risk assessments prior to installing construction wiring

Inspectors have also identified installations that do not have adequate mechanical protection, particularly on temporary fences and transportable structures.

Electrical workers should conduct a risk assessment before installing construction wiring to consider the likelihood of the cables being subject to mechanical damage during any construction activities. If there is a risk of damage, the electrical worker must consider either relocating the cables or installing additional mechanical protection.

Non-compliant switchboards are being installed in construction wiring installations

Switchboards that have been built by electrical contractors or PCBUs have been found which do not meet the requirements of AS/NZS 3012, which outlines the specific requirements for switchboards installed as part of the construction wiring installation.

These include protection from mechanical damage, suitability for the environmental conditions and provisions for the retention of extension leads. WorkSafe said it is particularly concerned about the methods used to install cables into these switchboards, as they must be effectively secured in place to prevent mechanical damage.

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