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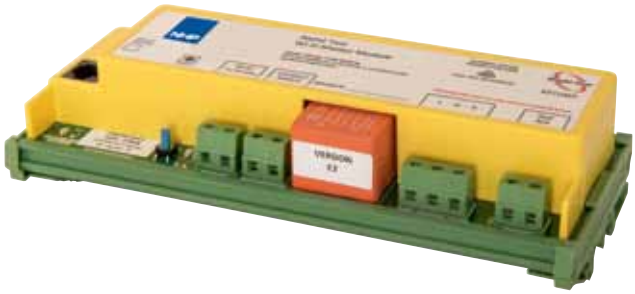

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FROM THE EDITOR

Renewables, IoT and integration are transforming the urban energy landscape.

The data released by the Clean Energy Regulator in March revealed that there was a 41% increase in installed renewable energy capacity across all Australian states and territories in 2017, compared to 2016. This equated to 3.5 million solar panels being fixed to Australian rooftops, or more than 9500 installed every day. The growth in solar and other distributed energy resources is also leading to growth in the energy storage market.

Australia is on the cusp of an energy storage boom, thanks to rapidly falling costs and supportive policies, according to the Climate Council's 'Fully Charged: Renewables and Storage Powering Australia' report. The cost of lithium-ion batteries has already fallen by 80% since 2010, and these costs may halve again by 2025, according to the report. "In 2016, there were 6750 new household battery installations with the market predicted to have tripled in size in 2017, with over 20,000 new installations. 74% of people polled from across Australia expect household batteries to be commonplace in homes in the next decade."

Energy storage solutions are also supporting sustainability and efficiency requirements of smart cities, smart vehicles and smart homes. The Australian Government's $50 million Smart Cities and Suburbs Program has already seen $27.7 million allocated to 49 projects, with the second round of funding set to deliver further innovative smart technology solutions to urban challenges, said Minister for Urban Infrastructure and Cities Paul Fletcher in a recent statement.

The urban energy transformation is creating opportunities and driving innovation and changes in business models. Are you making the most of these opportunities?

Mansi Gandhi – Editor
ecd@wfmedia.com.au

MCBs: THE WHAT, WHY AND HOW

Florian Krackhecke

Most of you may be familiar with miniature circuit breakers (MCBs), but do you know how they actually work?

MCBs have been around since 1923 (patented in 1924). Today, MCBs are installed in homes, offices and other buildings, protecting electrical wires from overloads and short circuits. The fundamental principle, however, is based on the first "electromagnetic circuit breaker" patented by Hugo Stotz in 1924. Since then MCBs have been further advanced, continuing the pioneering spirit of Stotz.

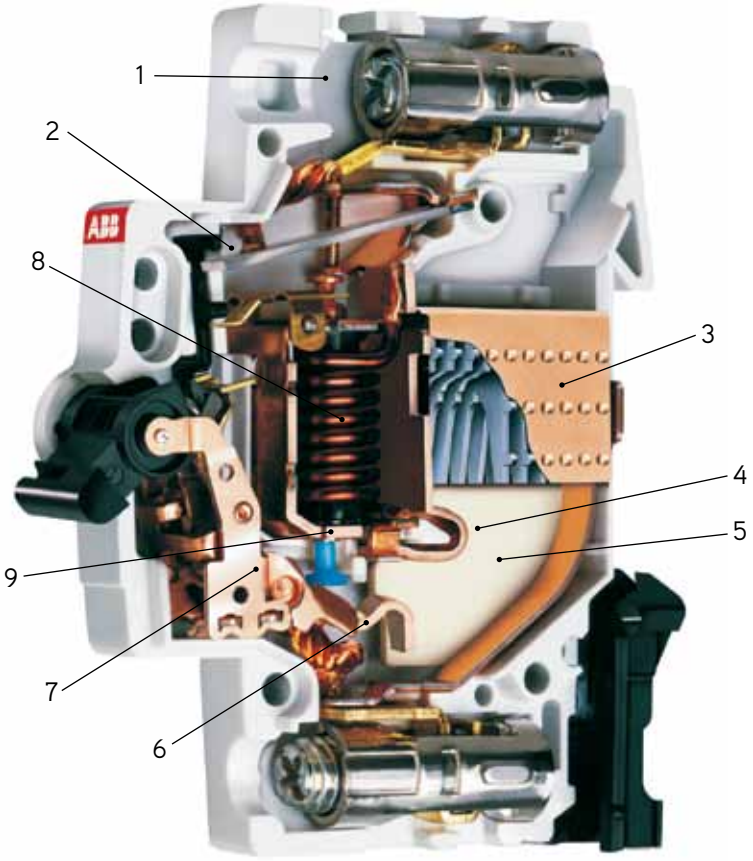
Looking on the inside of a miniature circuit breaker can help understand how they actually work. For overload protection, the temperature of a bimetal, through which the current passes (yellow area), is decisive. If the nominal current — the current the circuit breaker is designed for — rises slightly, the bimetal heats up to a greater extent and, after a certain period of time, this causes the switching mechanism to trip.

Short-circuit protection is located in the electromagnetic coil (green area). In the event of a short circuit, the current rises very sharply and the coil creates a magnetic field that both trips the switching mechanism and opens the contacts via a quick release mechanism. The additional quick release for opening the contacts in the event of a short circuit helps to keep the energy of the short circuit to a minimum, which in turn keeps the 'stress' the wires are subjected to as low as possible.

In both cases, ie, short circuit or overload, the shutdown process results in an electric arc between the contacts of the MCB. This electric arc is actually counterproductive when trying to ensure a separation of the two circuits. In order to extinguish the arc, which has a temperature of more than several thousand degrees Celsius, it must be directed away from the contacts, over the arc runners and past the pre-chamber plates to the arc chamber (blue area). In the arc chamber, the formerly powerful electric arc is split into several smaller arcs until the driving voltage is no longer sufficient and they are extinguished.

Release mechanisms

A miniature circuit breaker has various tripping mechanisms — (A) it can be



Construction and operation of an MCB:

(1) busbar terminal block
(2) bimetal for overload tripping
(3) arc chamber
(4) fixed switch contact
(5) prechamber plate
(6) movable switch contact
(7) switch mechanism
(8) short-circuit tripping by electromagnetic coil that moves the impact anchor
(9) so that it impacts against the movable switch contact (6)

Image courtesy of ABB.

switched on/off manually, (B) it can be tripped thermally and (C) it can be tripped electromagnetically. The electromagnetic and thermal tripping for short-circuit and overload protection work separately from one another. In addition, certain fitments can affect the tripping mechanism (eg, shunt release).

The manual switch is obvious and warrants no further explanation.

The thermal tripping mechanism functions with the help of a bimetal strip (see figure, explanation 2). As the name suggests the strip is made of two different bonded metals with different expansion coefficients, such as brass and steel. When the circuit is overloaded, the bimetal strip gets hot and one metal in the strip expands more than the other and it bends, triggering the switching mechanism (see figure, explanation 7), causing the MCB to trip. The 'trip' function is triggered by means of a spring-loaded accumulator. Here, the bimetal can be heated directly or indirectly and, due to its expansion coefficient, its action is time delayed. The key factor for tripping the switch mechanism of a circuit breaker is the heating — ie, the current + time. Thermal tripping is the most common type of trip in apartment buildings.

Electromagnetic tripping occurs under different circumstances, for example, when a current runs from an external conductor through the metallic housing of a lamp. The low-resistance connection to the green-yellow PE conductor to the housing, and thus to 'earth', causes an electromagnetic trip and the MCB provides protection against indirect contact in accordance with VDE 0100-410.

So how does it work? Electromagnetic tripping occurs by means of what we call an impact anchor (see figure, explanations 8 and 9). The action is accelerated powerfully and quickly by magnetic forces in the direction of the movable switch contact, thus isolating the contact as quickly as possible. Further tripping is triggered by a mechanical construction that acts on the spring-loaded accumulator and resets the shift lever (see figure, explanations 6, 10 and 11).

Due to ABB's 'trip-free' mechanism, both the electromagnetic and thermal tripping mechanisms are active when the switch lever is blocked in the on position. This guarantees effective protection, and prevents switching on when a fault is present. ABB's MCBs are produced at the Heidelberg site in a cutting-edge manufacturing plant, which has recently been awarded the Industry 4.0 award.

Benefits

Unlike fuses, which can only be tested by random sample and in doing so renders the fuse useless, every MCB undergoes a thorough functional test.

During the test both the thermal and magnetic trips and the mechanical functions are checked. Herbert Franken, author of the book *Niederspannungs-Leistungsschalter* (*Low-Voltage Circuit Breakers*), identified the following advantages of miniature circuit breakers when compared with fuses:

- Switching off covers all poles.
- During low over-currents and moderate short-circuit currents, turn-off times are shorter than for fuses.
- Overload and short-circuit characteristics are correctly assigned by the manufacturer, and tripping accuracy is high.
- Operation is safe even during the most severe overload conditions.
- Once a failure has been rectified, the MCB is immediately in a ready-to-use state without any parts needing to be replaced.
- Switch positions can easily be made visible.
- Remote tripping is possible.
- MCBs are also disconnectors, which fuses, if fusible inserts are used, are not.

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Electrical Comms Data news

NEW INDUSTRIAL ELECTRICAL DISTRIBUTOR LAUNCHES IN AUSTRALIA

The Australasian Power Solutions Group and its operating subsidiary, APS Industrial, have launched in Australia. The new company offers a broad range of low- and medium-voltage industrial electrical and automation products across Australia.

The company has been formed by experienced leaders in the local industry and incorporates the existing businesses of Ramelec and HiTech Control Systems. Together, these two companies have been successfully servicing the electrical needs of customers in Australia for over 20 years.

The new company will be led by the former MD of Rockwell Automation Australia and New Zealand, David Hegarty, with former NHP CEO Lloyd Thomas.

APS Industrial will offer Siemens Industrial Automation products and solutions exclusively as master distributors of the range in the region. The company also has key distributor partnerships with Weidmuller, Rittal and EPCOS/TDK.

Jeff Connolly, CEO of Siemens Australia, said, "APS Industrial is a major move that indicates how serious we are about long-term growth in the region. We've listened to customers and want to give them 'real choice' that delivers the best products, combined with the best customer experience. We see APS Industrial as an extension of the Siemens family, and the credentials of the board and senior management team speak for themselves."

"With the onset of the digital age and Industry 4.0, Australian businesses — and indeed global businesses — will be reliant on the digital connectivity provided by technology partners in order to succeed in the future," said Lloyd Thomas, chairman of APS Group.

"In Australia, that partner will be APS Industrial and with an experienced and accomplished customer-focused leadership group, we look forward to growing our business together with our customers," Thomas said.

"The core focus of APS is to meet the needs of customers with a professional and easy-to-do-business-with approach. By partnering with the world's leading technology companies and ensuring our extensive range of products can seamlessly communicate with each other, we're excited by the 'game changer' that APS Industrial will represent for the Australian industrial electrical industry," said MD/CEO David Hegarty.

APS Industrial is headquartered in Melbourne and in addition has a national network of offices in Adelaide, Perth, Sydney and Brisbane supported by strategic local stockholdings and expert technical and application knowledge.

(Standing L to R) Lloyd Thomas, Chairman of APS Group; Jeff Connolly, CEO and Chairman of Siemens Pacific; (seated L to R) Michael Freyny, the head of Digital Factory and Process Industries at Siemens Australia and New Zealand; and David Hegarty, Managing Director and CEO of APS Industrial. Image courtesy of Siemens.

THE IMPORTANCE OF VERIFYING e-PROFILING CARDS

The Queensland Electrical Safety Office is reminding employers and licensed electrical workers supervising electrical apprentices about the importance of verifying e-profiling cards submitted by apprentices.

E-profiling provides important data about the work performed by apprentices under their training plans, said ESO.

Registered training organisations and employers rely on the e-profiling record to identify and track an apprentice's progression and achievement of competency through on-the-job application of knowledge and skills, according to ESO.

"These records may also assist in resolving apprenticeship progression issues which centre on a lack of on-the-job work experience.

"Most importantly, the e-profiling record is used to determine an apprentice's readiness to undertake their capstone assessment. This assessment leads to the completion of their qualification, which may ultimately result in the issuing of an electrical work licence.

"Verifying e-profile cards must not be merely a tick and flick process. You are verifying the evidence provided to ultimately determine the apprentice's competency to perform electrical work and qualify for an electrical work licence.

Additionally, this information forms part of an apprentice's assessment and may be used as evidence by us if there are future issues relating to competency.

Licensed electrical workers are responsible for verifying e-profile cards and they must confirm the apprentice performed the work, said ESO.

If the licensed electrical worker supervising the apprentice does not agree the data is a true reflection of the work performed, the tradesperson must reject the card and have the apprentice amend it. If there are queries about how to accurately capture the work being performed by the apprentice, discuss these with your registered training organisation.

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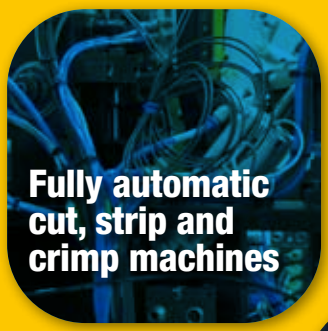

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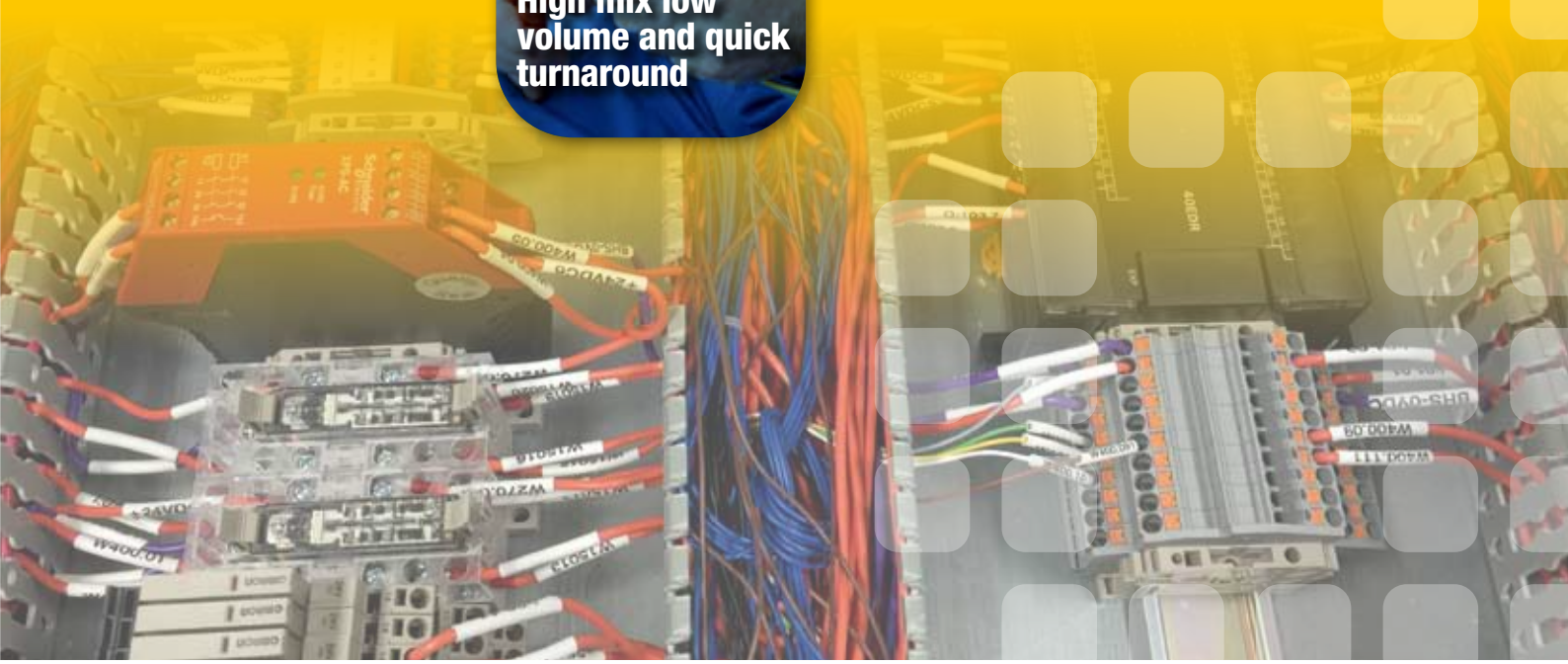

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COMMERCIAL CONSTRUCTION OUTLOOK STRONGEST IN YEARS

The value of non-residential building approvals jumped by 14.8% in February, adding to growth of 18% over the previous 12 months, according to the latest ABS data.

"It confirms the strongest outlook that commercial construction has enjoyed in years and that the long-awaited upturn in the sector is underway," said Master Builders Australia National Manager Economics and Housing Matthew Pollock.

"Better still, the pipeline of non-residential construction projects is broad based, with the data showing strong growth across a wide range of sectors, including for new offices, factories, warehouses, aged-care facilities, education, entertainment and accommodation buildings," he said.

"Master Builders expects non-residential building activity to grow by 14.6% in 2017/18, with the value of work done estimated at just over $41.5 billion," said Pollock.

"New dwelling approvals fell by 6% in February and are down by around 600 new dwellings compared to the same month last year. The fall in new starts is a good indicator that new housing commencements are likely to moderate towards the latter half of 2018," he said.

"However, approvals for new renovations continue to perform strongly, supporting an expectation of an elevated level of work in 2018 and laying the foundations for a forecast boom in alterations and additions over the next five years," said Pollock.

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RITTAL AUSTRALIA SIGNS DISTRIBUTION DEAL WITH APS INDUSTRIAL

Rittal Australia has signed a national distribution partnership with APS Industrial, an electrical industrial and automation equipment distributor.

APS Industrial, a new locally owned and managed independent company provides automation, power distribution and switchgear, motor control, enclosures, connectivity, industrial communications and wiring solutions. APS has acquired Ramelec and HiTech, two Australian distributors with a national footprint.

Rittal ANZ Managing Director Michael Mallia said Rittal's existing partnership with Ramelec is strengthened with APS's experienced leadership team. The synergies that existed between Rittal and Ramelec's product ranges are further enhanced with the addition of the Siemens Industrial Automation product portfolio that APS brings, he said.

APS Industrial is headquartered in Melbourne and has offices in Adelaide, Perth, Sydney and Brisbane supported by strategic local stockholdings.

NHP ACQUIRES REXEL'S ROCKWELL AUTOMATION RELATED BUSINESS ASSETS

NHP Electrical Engineering Products (NHP) has acquired Rockwell Automation related business assets from Rexel Industrial Automation.

As part of the transaction, NHP has been granted exclusive distribution rights for the complete range of Rockwell Automation products, systems and solutions throughout New South Wales and South East Queensland. This acquisition expands NHP's existing distribution coverage for Rockwell Automation to now cover the entire South Pacific region.

"With the acquisition of the Rockwell Automation related business assets from Rexel Industrial Automation, which includes a strong team of automation professionals, we have strengthened NHP's position as the local choice for specialist electrical and automation products, systems and solutions. As the exclusive distributor across the entire South Pacific for Rockwell Automation combined with NHP's existing complementary product solutions and value-add manufacturing capabilities, we have the largest coverage of automation and control solutions in the region," said NHP CEO & Managing Director Stephen Coop.

The acquisition by NHP expands opportunities for Rockwell Automation in New South Wales and South East Queensland by leveraging NHP's extensive manufacturing and partner network.

The sale of Rexel's Rockwell Automation related business assets to NHP represents a good outcome for all parties, said Rexel Australia Managing Director Robert McLeod. "Rexel remains focused on continuing its growth in the traditional electrical distribution market and developing its business across a number of specialty areas with a wide range of technical offerings."

NHP will assume responsibility for the distribution of Rockwell Automation throughout the entire South Pacific region on 1 May 2018.

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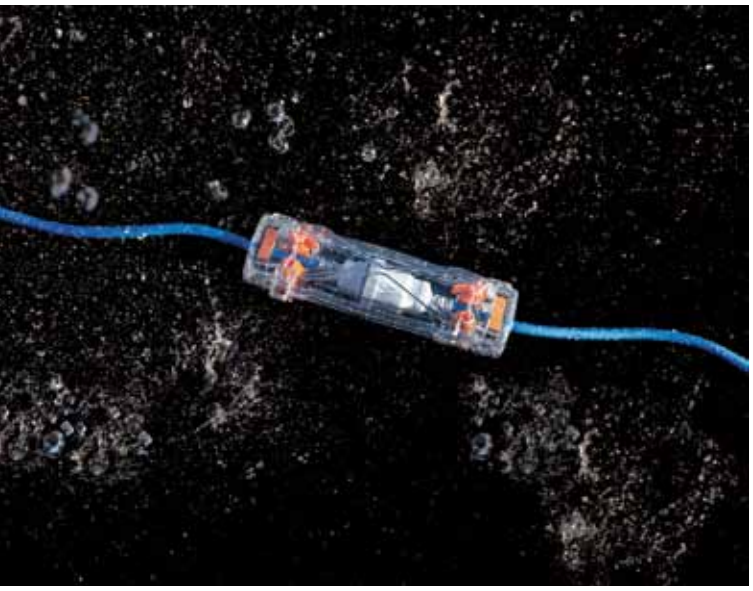

Weatherproof connector protector

The Ampfibian X1 weatherproof connector protector features a retaining mechanism to keep power cords firmly together and patented seals to prevent electrocution in the wet.

Suitable for trade and commercial use, the product is IK09 impact resistant, IP55 hose and weatherproof, and designed to fit standard and heavy-duty 10 and 15 A extension leads up to 12 mm in diameter. It also has a recessed flip-out hook, making it easy to hang up off the ground.

Featuring two pairs of cleats that grip the cable (not the plug or socket) gently but firmly, the product is designed to hold up to 100 kg firmly so that the lead is not disconnected during use.

Ampfibian

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Device manager

The latest version of Emerson's AMS Device Manager features alert optimisation capabilities and mobile device health dashboards.

Out-of-the box alert filtering templates created using human-centered design principles provide the potential for a 60% reduction in unnecessary alerts coming from intelligent field devices, according to the company. Technicians and engineers are frequently inundated with multiple device alerts, often stemming from a single issue within a device. The latest version of AMS Device Manager resolves the problem of nuisance alerts with predefined configuration templates that filter out all alerts tangential to the core problem, leaving only meaningful, actionable notifications.

Alert filtering helps today's digital worker to remove noise from critical data, providing that worker with the essential information needed to make fast decisions. Containing all relevant details, the alerts will help engineers create work orders and build part lists for field technicians to perform maintenance, saving valuable hours in the field.

The release also delivers the AMS Device View web interface, an intuitive browser-based display with mobile-friendly dashboards. The web interface allows users to view device health and calibration status from a wide range of devices.

AMS Device View is part of Emerson's Always Aware portfolio, a part of the Plantweb digital ecosystem, providing users with the applications, tools and digital intelligence they need to increase production, maintenance efficiency and safety from wherever they work.

Emerson Automation Solutions

www.emersonprocess.com.au

Insulation tester

The Sonel-MIC-5001 5 kV insulation tester weighs 0.9 kg, tests voltages from 50 V to 5 kV and measures insulation resistance up to 5 TΩ and displays leakage current.

The large white backlit display includes an analog bar graph for observing trends, large digital display of insulation resistance or leakage current and supporting digital readouts of test voltage and elapsed time.

The tester is rechargeable from the mains or 12 V vehicle socket and will also operate while being charged. It can store almost 12,000 test records, which can be downloaded to PC via the USB port to the included Sonel Reader software.

Other features include: continuous indication of insulation resistance or leakage current; automatic discharge of capacitance of tested object after the insulation resistance measurement; acoustic signalling of 5 s periods to facilitate obtaining time characteristics; measured test times of T1, T2 and T3 for measuring the absorption coefficient DAR and polarisation index PI; ramp test insulation resistance measurement and measurement of breakdown voltage with increments up to ~1 kV/s; the ability to charge from car lighter (12 V) socket (additional accessories); IP65 rated; 600 V CAT III; protection against measuring live objects; two- and three-lead measurement method.

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ALIGNING THE DATA CENTRE TO MEET THE DEMANDS OF SMART CITIES AND IoT

Robert Linsdell

Smart cities and the Internet of Things are front of mind lately. Research from KPMG indicates Australia's economy will benefit to the tune of $120 billion annually by the year 2025 from IoT and smart city deployments. The building blocks to get there mean a serious rethink of how our IT infrastructure is designed and deployed, and a greater focus on initiatives that increase capacity and energy efficiency at the same time. Developing these building blocks requires the input of electrical and engineering professionals to help us meet the 'always-on' expectations of technology.

The journey to IoT and smart cities

2018 is the year when we are finally seeing real-life IoT and smart city applications bear fruit. It's happening mostly in isolation, but slowly we're starting to see separate initiatives come together to give us an idea of what a more connected future world looks like.

In New South Wales under the Smart Move project, for example, Newcastle is developing initiatives such as technology-fitted bus stops that provide users with more information — real-time schedules, how many seats are available, etc. The city is also looking to embed real-time traffic analysis into roads and intersections to ensure that, for example, emergency vehicles get green lights.

Up in Darwin, our most northerly capital city is undertaking a $10 million program to 'switch on the city' and boost the economy. This includes upgrading street lighting to LED on 'smart' columns that can adjust lighting to help deter street crime.

These are just some examples, and before we know it we'll be living in the smart cities we've anticipated for so long. But before that, there's work to be done to put the right IT infrastructure in place to make sure they work.

Ramping up the edge

The data centre is changing in line with the IoT and smart city movement. We've long talked about the edge of the network and its importance in this changing landscape, but the prospect of IoT and smart cities means getting it right is more important than ever.

While we've labelled the term smart 'cities', the truth is that we expect the features and benefits of these cities to be felt everywhere, including remote areas. In Australia, this presents a unique challenge.

Our uniquely dispersed population means that there are often thousands of kilometres between smaller rural towns and major cities. We can't expect these towns to rely on data centres or networks linked to major cities to provide smart city-like services. They have to be able to go it alone.

Smaller towns and rural areas will need smaller, secure, 'modular' data centres to match and process the bulk of data required for IoT and smart city applications right there on the edge where the data is created.

That means that more than most countries, we've got to get it right.

Getting smart on the environment

One of the key goals of smart cities is to solve some of the environmental challenges we've created for our planet over the years.

With innovation in play or on the horizon, such as applications that track individual or corporate carbon footprints and advise on how to reduce them, autonomous electric vehicles or smarter use of renewable resources, our smart cities promise to improve our energy efficiency.

But there are simpler ways to improve energy efficiency now that many organisations are missing. We estimate that data centres account for almost 5% of the energy used in Australia, and that rate is increasing as we develop more IT-intensive digital services such as artificial intelligence (AI) and machine learning and run them on more and more devices.

Modular data centres certainly have an edge — their power usage effectiveness (PUE) numbers tend to be much lower than a traditional data centre. But we'll always need that larger, core data centre in the mix as the heartbeat of any large organisation's digital services. There's plenty of work that can be done here to increase energy efficiency.

Data centre optimisation, a process that monitors how energy is used throughout the entire data centre, can make a huge difference. From there, the data centre can be 'retuned' with smarter cooling solutions, for example. At Vertiv, we have seen optimisation savings in some instances as high as 50%. We're talking the potential equivalent of taking dozens or more houses off the grid for each data centre that goes through this process.

Naturally, this exercise also brings considerable savings into an organisation. Any cost savings you can make with energy consumption go straight to the bottom line.

Performing a data centre optimisation exercise can also lead to large one-time payments through initiatives such as the New South Wales energy savings certificate (ESC) payment and similar initiatives in other states. These reimbursements mean the government is prepared to match dollar-for-dollar efficiency spend.

These changes are more important than ever — across Australia, we experienced significant rises in our energy bills last year, and rumours are rife that we could be in for the same again in 2018.

Moreover, data centre optimisation also leads to a significant increase in IT capacity, a further bonus for implementing more digital services and positioning organisations to take advantage of the new IoT landscape.

The 'Gen 4' data centre

As edge and core data centres combine, along with public cloud and co-location, we're starting to see the emergence of the 'Gen 4' data centre.

The necessary deeper connection between edge and core is elevating these architectures beyond simple distributed networks as we've known them to date.

We're already seeing this happen with innovative architectures delivering near real-time capacity in scalable, economical modules that leverage optimised thermal solutions, high-density power supplies, a range of batteries and advanced power distribution units.

Bringing it all together are advanced monitoring and management technologies that allow the new data centre environment to be controlled from a single pane of glass.

This means hundreds or even thousands of distributed IT nodes operate as a unit, reducing latency and up-front costs. Utilisation rates are increased, removing complexity and enabling organisations to add network-connected IT capacity where they need it.

Essentially, it means more choice for organisations, and engineers and electrical professionals who can be part of providing that choice will be a vital asset to organisations navigating their own IoT paths.

Meeting the new expectations of technology

The bottom line is that smart cities and IoT are almost here. The roles of electrical professionals and engineers need to adapt to meet the infrastructure and data centre needs of this new era.

Businesses and people's tolerance for failure and outages is diminishing quickly. They will expect that all the new digital services and connected landscape will just work.

But those of us in the industry know that there is a careful recipe of infrastructure, resilience, security and redundancy to be thought through and implemented before we can live up to that expectation.

Robert Linsdell is Managing Director Australia and New Zealand for Vertiv (formerly Emerson Network Power), a critical infrastructure, edge technology and data centre optimisation specialist.

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DATA SECURITY UNDER THE MICROSCOPE

Over 60 data breach notifications were reported during the first six weeks of the new Notifiable Data Breaches (NDB) scheme. This is according to the Office of the Australian Information Commissioner's (OAIC) first quarterly report since the introduction of the scheme in February.

Just over half of the eligible data breach notifications received in the first quarter indicated that the cause of the breach was human error, said the OAIC's acting Australian Information Commissioner and acting Privacy Commissioner, Angelene Falk.

In the 2016–2017 financial year 46% of the data breach notifications received by the OAIC voluntarily were also reported to be the result of human error, said Falk.

"This highlights the importance of implementing robust privacy governance alongside a high standard of security. The risk of a data breach can be greatly reduced by implementing practices such as Privacy Impact Assessments, information security risk assessments and training for any staff responsible for handling personal information."

The NDB scheme requires entities to notify individuals and the commissioner when their personal information is involved in a data breach that is likely to result in serious harm. These data breaches are referred to as 'eligible data breaches'.

Failure to comply with the scheme can attract fines of up to $2.1 million.

"A data breach notification provides individuals with the chance to take steps that reduce their risk of experiencing harm, such as changing relevant passwords for online accounts. This can reduce the overall impact of a breach. More broadly, the transparency provided by the NDB scheme reinforces Australian Government agencies' and businesses' accountability for personal information protection and encourages a higher standard of security," said Falk.

"Over time, the quarterly reports of the eligible data breach notifications received by the OAIC will support improved understanding of the trends in eligible data breaches and promote a proactive approach to addressing security risks."

Most small businesses with an annual turnover of less than $3 million do not have to comply with the Privacy Act and therefore with the NDB, according to the Australian Industry Group (Ai Group). However, there are numerous exceptions, the group said. "A small business with an annual turnover of $3 million or less will have to comply with the NDB if it is: a health service provider; trading in personal information (eg, buying or selling a mailing list); a contractor that provides services under a Commonwealth contract; a reporting entity for the purposes of the *Anti-Money Laundering and Counter-Terrorism Financing Act 2006* (Cth); an operator of a residential tenancy database; a credit reporting body; employee associations registered or recognised under the *Fair Work (Registered Organisations) Act 2009* (Cth); businesses that conduct protected action ballots; businesses that are related to a business that is covered by the Privacy Act; businesses prescribed by the Privacy Regulation 2013; or businesses that have opted in to be covered by the Privacy Act," said the Ai Group in a statement alerting its members about the scheme. If an organisation has an annual turnover of $3 million or less and meets one of the above criteria, the NDB will apply to that organisation or some aspects of it, according to the group.

> IF AN ENTITY KNOWS WHAT INFORMATION IT HOLDS, WHO HANDLES IT, WHO IS RESPONSIBLE FOR IT, WHERE IT IS HELD AND HOW IT IS PROTECTED, THEN THE ENTITY CAN ENSURE ITS DATA BREACH RESPONSE PLAN IS AS EFFECTIVE AS POSSIBLE.

According to law firm MinterEllison's 'Perspectives in Cyber Risk 2018' research report released prior to the introduction of the scheme, only 54% businesses had a cyber risk response plan in place. This is despite more than a third indicating that they were subject to at least one cyber incident in the last 12 months that compromised their systems or data.

MinterEllison Partner Paul Kallenbach, Head of Cyber Security, said, "There is a distinct risk for those not prepared, given that cyber incidents are occurring — and will continue to occur — with ever greater frequency, severity and impact."

The firm recommends organisations focus on understanding and documenting their data and information flows; prepare, test and update their incident response plans; and provide regular training to staff at all levels, said Kallenbach. It's vital they do this, as cyber attacks are here to stay and pose a serious risk issue for government and business, he said.

"This year's report shows there was a decrease in the percentage of organisations that say they audit their suppliers' IT security practices at least annually (from 34% in 2016 to 21% in 2017) and, in an environment of increasing adoption of cloud services, that's also a key area where risk management for cyber should be focused," said Kallenbach.

Veronica Scott, leader of MinterEllison's National Privacy Group, said the Cyber Risk report echoes the advice of Timothy Pilgrim, Australian Information Commissioner and Australian Privacy Commissioner, who has expressed the view to the firm that, "If an entity knows what information it holds, who handles it, who is responsible for it, where it is held and how it is protected, then the entity can ensure its data breach response plan is as effective as possible."

"An important finding from this year's report is that the uptake of cyber insurance continues to rise (from 39% in 2016 to 62% in 2017)," noted Leah Mooney, Special Counsel in MinterEllison's Insurance & Corporate Risk team. "However, whilst cyber insurance is a useful risk management measure for many organisations, it is important to recognise it is not a panacea and must form part of a wider toolkit of cyber risk management measures."

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Medium-voltage connectors

The Nexans Australmold 200LR and 200SR MV connectors are available up to 24 kV 250 A and are suitable for cables up to 95 mm^2.

The interface 'A' connectors are designed, engineered and manufactured by Nexans. They have all the advantages of the EUROMOLD product line: sturdy EPDM connectors with a tough 3 mm thick semiconductive screen, automated production process and 100% factory testing. These separable elbows and straight connectors are designed to connect XLPE and EPR medium-voltage cables to equipment.

Typical applications include connecting to distribution transformers, switchgear and motors. Benefits include compact design; easy to install; one size fits all; eco design. The connectors are backwards compatible to the industry standard with a small footprint when installed.

Nexans Australia Pty Limited
www.nexans.com

Fibre inspection kit

The Fluke Networks FI-1000 enables the user to quickly inspect and certify fibre end-faces inside ports or patch cords. Its 2 s automated PASS/FAIL certification eliminates subjectivity and ensures accuracy of results. It is available to rent from TechRentals.

The FiberInspector Kit features a USB fibre inspection video probe which requires a Versiv mainframe to operate such as the DSX-5000 (with or without fibre modules) or the Optifiber Pro (also available from TechRentals). The 2 Mpx Fluke Video Probe is used for end-face inspection. It has a field view of 425 μm (horizontal) and 320 μm (vertical) to detect a minimum of 0.5 μm particles.

Included in the FiberInspector Kit: USB fibre inspection video probe for Versiv products and a tip set (LC, FC/SC bulkhead, 1.25 and 2.5 mm universal tips in a box).

TechRentals
www.techrentals.com.au

CCTV tester

Ideal Networks SecuriTEST IP tester allows technicians to install, test, troubleshoot and document IP/digital, HD coax and analog CCTV camera systems with a single tester.

Its 7″, high-res touchscreen and simple-to-use functions ensure just one tester is needed, even on complex installations. For instance, the tester IP can be connected quickly and easily to any IP or analog camera via in-built RJ45, Wi-Fi and BNC ports.

In addition, the self-contained tester can supply power to cameras via PoE (Power over Ethernet) or standard 12 VDC power using its internal Li-ion battery. The long-life battery provides up to 10 h continuous usage, but technicians can also pass PoE directly from the switch on an active network to a connected camera, reducing battery consumption. Regardless, the handheld tester removes the need to use external power adapters and injectors. As well as saving space in a technician's kit bag, this, coupled with one-handed operation and a customisable shortcut menu, makes it easier to work on lifts and ladders.

The tester offers automated camera connectivity via the QuickIP function. This allows even novice technicians to connect and configure IP cameras as quickly and easily as their analog counterparts. Using the ONVIF protocol, the tester can connect to cameras from virtually every manufacturer without the need for proprietary software for each vendor.

The tester includes a number of other advanced reporting tools to enable installers and technicians to document performance. Detailed, automated reports can be sent directly from the jobsite, allowing projects to be completed more quickly. Using the built-in Wi-Fi and web browser on the intuitive tester, reports can be sent straight from the tester using email or file-sharing services. The tester can also be used with screen-mirroring, allowing others to view the screen on SecuriTEST IP in real time using their own mobile devices.

Cable tracing, length, wiremap and quality testing is possible for twisted pair cabling to help determine and pinpoint common cabling faults.

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Why You Should Be Crying Over Spilt Milk: Cost of Unplanned Downtime

ServiceMax, from GE Digital, commissioned Vanson Bourne to conduct a global study into unplanned downtime, "After The Fall: Cost, Causes and Consequences of Unplanned Downtime." The study surveyed 450 IT & field service decision makers in the UK, US, France and Germany across the manufacturing, medical, oil and gas, energy & utilities, telecoms, distribution, logistics and transport sectors, among others.

Multi-Million Dollar Pain

82% experienced at least one unplanned downtime outage over the past 3 years – average number was **2**

Outages lasted an **average of 4 hours** and cost **$2 million***

*Vanson Bourne Study, "After The Fall: The Costs, Causes and Consequences of Unplanned Downtime" 2017

Show Me Where It Hurts

46% couldn't deliver services to customers

37% lost production time on a critical asset

29% totally unable to service/support specific equipment/assets

Loss of customer trust, impacts on productivity, penalties and KPIs

Don't Bring Me Down

17% **Human error** contributes to 17% of unplanned downtime

46% 46% due to **hardware failure/malfunction**

40% 40% due to **software failure/malfunction**

What's Hit Hardest?

62% **Production/ Productivity**

60% **Information Technology**

59% **Customer Service** are hit hardest by unplanned downtime

Treat The Cause, Not The Symptom

65% say a digital twin with predictive maintenance could help prevent major failures

54% plan to invest in a digital twin by 2020

51% plan to invest in APM & 49% plan to invest in FSM in next three years

DIGITAL TWINS

Field service management is expected to become a primary revenue driver within the next 2 years, on average

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MOVING BEYOND THE HYPE

*Lawrence McKenna**

Australian homes are expected to have over 300 million connected devices by 2021, according to technology research firm Telsyte. The smart home revolution is sweeping the world, but is there more hype than reality?

Many stories are created by snake oil salesmen to target customers that do not understand smart homes. Federal and state governments want smart technology-based industries and businesses but do they know how to encourage innovation and changes to drive economic growth in the age of Industry 2.0.

Smart homes don't operate in isolation — they are part of an integrated web of outcomes that are critically dependent on external factors. To provide a better understanding of smart homes, let us discuss — what's a smart home; what it isn't; what is needed for a thriving smart home industry; benefits of smart homes; hurdles of building smart homes in brownfield sites as well as greenfield sites.

Smart home vs home automation

A home with security, lighting, heating and air conditioning, door intercom, entertainment audio and video systems on separate panels and systems is not a smart home. That is simply home automation. This has been around since the 1980s. Unfortunately, this does not stop 'used-car' style of salespersons profiting from home buyers/home owners.

A smart home is a residence with devices — such as appliances, lighting, heating, air conditioning, television sets, computers, entertainment audio and video systems, security, and camera systems — that are capable of communicating with one another, across a single, integrated communications network (ICN), and can be controlled from anywhere, with any device. A smart home requires connectivity between all the equipment and systems in a building.

Smart home and IoT technology solutions need to be people-centric, offer safety and comfort, and improve the quality of human life. This can be achieved by automating the mundane, for example, managing people's health, helping achieve work-life balance, helping with managing time in a time-poor lifestyle. So what's next?

The next stage is a cognitive home — a home where all the day-to-day household tasks, family member scheduling and task coordination, and family member-work coordination is automated and semi-managed by artificial intelligence (AI). The next generation of homes can become a reality by incorporating a smart home with ICN. All of this will happen in the 2020s.

In 2016, there were around 9 million private dwellings in Australia, each with 2.6 occupants on average. The number of dwellings is growing at 1.4% a year, ie, 126,000 a year. In the 2020s, around 10 million homes will be looking to turn into smart homes, then cognitive homes. This growing demand of smart home services and

solutions would lead to creation of around 50,000 small business in Australia. But what services would these small businesses focused on the smart home industry provide? I expect successful businesses to:

- design and install cabling and infrastructure for homes. Businesses must have electrical and registered cabler capabilities;
- build an ICN and integrate different systems in to an ICN. These businesses must have networking capability;
- install and configure the various appliances, lighting control, heating, air-conditioning control, television sets, computers, entertainment audio and video systems, security, and camera systems. These services can be provided by home automation and entertainment systems integrators;
- provide smart home 'design and construct' services with a contract to manage/upgrade services over a fixed period, eg, five years, 10 years.

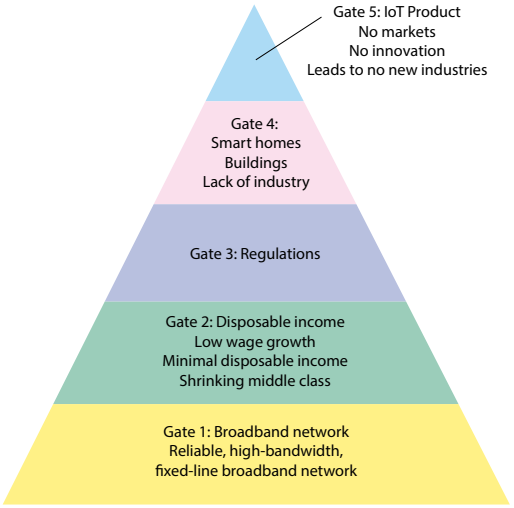

Figure 1

Before you start a new smart home business, you need to ask yourself, where do the opportunities lie? This brings me back to my earlier statement — smart homes are part of an integrated web of outcomes that are critically dependent on external factors. This leads to the 'Laurie Paradox' — that's another article in itself, but I've summarised it in Figure 1.

The Australian smart home industry needs Gate 1, Gate 2 and Gate 3 open for business before the environment exists for the creation of a new technology-based industry, let alone 50,000 small businesses around smart homes that can grow and flourish. Not factoring in the new business opportunities around IoT and automation innovation. It is amazing what one can do with a Raspberry Pi.

Unfortunately, only the Commonwealth Government can deal with Gates 1, 2 and 3. While ideology undermines common-sense and good engineering, Australia will be significantly behind the rest of the world in the 2020s. The damage has been done and it will take a decade to reverse course. It's important to note that Kazakhstan rates higher in broadband throughput, etc than Australia. The modelling that I have done indicates that from 2022, 2.6% of the workforce will be impacted by automation, year on year. New industry sectors in technology will be desperately needed. Unfortunately, due to artificial intelligence (AI) and automation and the issues mentioned in the three 'Gates', the foundation required to create new industries will not be in place until the mid to late 2020s. It is expected that Australia may be the only country globally to suffer a digital recession, due to the compound negative effects of automation on employment.

Smart homes in brownfield sites

My two-storey home is around 20 years old and has three roof voids. As a tradesperson and an engineer, I decided to install an ICN into a brownfield environment in December. I needed to understand the issues of the smart home integrated communications network, ie, what worked; what did not work; what kind of training would unskilled workforce require; what products worked and did not work; costs etc — from a practical perspective. So, what did I learn?

J-hooks: They were used as the cable pathways. They cost around $350 per box, and it took my 9-year-old daughter and myself one day to get these done. It was easy to move the cable pathway around existing services.

Maintenance walkway: This was something that I did not consider until halfway through the project — until I found my 16-year-old son hanging through the ceiling while assisting me in hauling cable. He had lost concentration. It cost us $600 in materials and my 9-year-old daughter and I completed the project in two days.

Cabling: I have secured cabling samples, connectors and other tools from many manufacturers. I, along with my two sons, evaluated and understood the termination method, quality, simplicity and variance in termination and test results. Reichle & De-Massari were preferred for smart home ICN infrastructure — they accommodated my small order and supplied the required cable, connectors and tools.

Separation: I used F/UTP, with appropriate polyethylene (PE). The cost of running cables through the walls was in the order of $1500–$2000. This is not a viable or cost-effective solution. The impact to the home owner and the greater economy does justify routing of walls to maintain separation. The running of duct on the outside of a finished wall is not a viable solution, even though it meets current regulations. It looks terrible and devalues the property. With nine million existing residences, ACMA, Communications Alliance and industry will need to address this problem intelligently and pragmatically.

Communications room: I was fortunate that the house had store room under the stairs that could be turned into communications room. 12 RU rack solution that I filled quite quickly. I found that a small rack could not be avoided. For single-storey dwelling, a swing-down rack from the ceiling in the hallway would be my recommended solution. nbn will need to review their standards/specifications to support smart home equipment racks and communications room.

Smart home: greenfield

As fate would have it, the family is now looking to sell the house and build a new one. I wish I had known this earlier. While looking over plans, more plans and then more plans, and weekend inspections, it has become quite evident that house designs and intent have not changed in 90 years.

My first hurdle is securing a communications room in a hub location that can distribute cabling. The second hurdle is access and replacement of cables. F/UTP will become obsolete in the early 2030s. The third hurdle is getting the home Li-Fi ready. The last hurdle is space in the first floor ceiling to support PAoIP speakers and a future Li-Fi/LED lighting system etc. I have three months to sort these engineering issues out. I would be pleased to keep you updated next year on my learnings. Until then — enjoy life!

**Lawrence McKenna is the Telecommunications Section Manager at Wood & Grieve Engineers, and is also the Deputy Chair – Engineers Australia VicITEE, and Director – BICSI South Pacific. Lawrence is a highly qualified Specialist Telecommunications and ICT Engineer with over 25 years of industry experience. Lawrence's career started with Queensland Rail as a radio apprentice. His experience includes voice networking (incl. PABXs, regional-wide networks), telecommunication and transmission networks (optical fibre and microwave radio), structured cabling designs, WAN/CANs, LANs, audiovisual systems, security systems and various radiocommunication systems. Lawrence is a member of the Standards Australia (Standards development) CT-001 (Communications Cabling), CT-002 (Broadcasting and related services), the ITU-T SG5 working group and the ITU-R ARSG-5 working group.*

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Power quality loggers

The Fluke 1740 Series three-phase power quality loggers are used for studying and monitoring utility power quality and demand to industry standards. They offer advanced data aggregation and analysis that saves time, reduces manpower and eliminates errors associated with traditional data collection and reporting.

The loggers are fully compliant with the international power quality standard IEC 61000-4-30 (and AS/NZ 61000-4-30.2012 standards) and meet Class A requirements. They are capable of simultaneously logging more than 500 parameters for each averaging period, allowing technicians to analyse power quality in detail and to correlate intermittent events with detailed waveform data to identify the root cause of disturbances.

The included software makes it quick and easy to set up the logger and automates the complex task of analysing and reporting the data. An optimised user interface, flexible current probes and an intelligent measurement verification function that lets technicians digitally verify and correct connections makes set-up easy and reduces measurement uncertainty. Connection errors are automatically indicated via an amber light on the unit's power button which turns green once corrected. Because measurement and logged data can be viewed using a wireless Wi-Fi connection, the 1740 Series minimises technicians' time in potentially hazardous environments and reduces the hassle of suiting up in personal protective equipment.

The loggers are rated AS/NZ 61010 600 V CAT IV/1000 V CAT III for use at the service entrance and downstream.

Fluke Australia Pty Ltd
www.fluke.com.au

Adjustable cable gland

Treotham is extending its Pflitsch blueglobe cable gland series with a flexible variant. Fitted with a multiple inlet, it allows the user to remove one or more of the three inlets as required simply using a screwdriver. The M25 cable gland can accommodate cables with diameters from 6 to 20 mm and provides an IP68 (15 bar) protection rating.

The advantage for the user is that with only one cable gland size, the product can be used to install all the cables most commonly found in automation, machine construction and electrical engineering applications. The required sealing range can be set in seconds without the use of special tools. The gland also achieves high strain relief up to class B as defined in EN 62444, making additional safety measures to prevent cables being pulled out superfluous in most applications.

The cable gland is available in the handy M25 size and in stainless steel grades AISI 303 and AISI 316Ti. It is approved for operating temperatures from -40 to +130°C. Slit versions of the sealing insert are available to allow quick and easy installation of preassembled cables.

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Smart building solution

The Honeywell Command and Control Suite release 200 connects building personnel with data analytics to help drive operational improvements and efficiencies.

CCS R200 builds on the original Command and Control Suite by offering more user interfaces to bring building performance data to key personnel, when and where they need it — from building operators and managers to security incident response teams — helping to reduce operational costs, mitigate risk and enhance business continuity.

The solution combines intelligent automation, advanced analytics and data visualisation with the contemporary user experience of consumer home and mobile electronics, bringing simple, intuitive displays to building operations to enhance facility and security management in an easy-to-understand manner.

The latest release brings the holistic integration, map-based visualisation and incident workflows of CCS to the control room workstation, desktop PCs and windows tablets, extending the software's mobile, touch-optimised experience to more interfaces.

Building off the basic components of the original Command and Control Suite, CCS R200 is designed with the same ease of use as the Command Wall, which was designed as a collaboration and team decision-making tool, and features map-based visualisation and navigation from a single intuitive touch screen. CCS R200 brings that same ease of use to core operational interfaces, the Command Station and Command Console, extending an organisation's ability to turn complex data into easy-to-implement changes to enhance overall building operations.

In addition to new interfaces, CCS R200 includes enhancements to the original system's Incident Workflow feature, which guides users through scripted responses to security incidents and other emergencies. The enhancements include map visualisation to clearly locate an incident, such as a fire alarm going off, to quickly identify the exact location.

Honeywell Building Solutions

www.honeywell.com

Relays

The Potter & Brumfield Power PCB relay T9V series is designed for electrical vehicle charging stations, charging cables and for photovoltaic inverter applications.

With 40 A/250 VAC ratings in a small form factor, the T9V series relay enables PCB space savings and ultimately smaller applications. The extended contact gap (>1.8 mm) provides better isolation and full disconnection of the grid, enabling applications at higher altitudes.

The relay can be driven with reduced coil power down to 350 mW, meaning that less energy is needed during the duty cycle and lower self-heating. The relay is in accordance with IEC 60335-1 and has a common pin layout, which makes this a relay that can be fitted for many existing applications and designs. It is a global relay solution with UL, CQC, TUV and VDE certifications.

TE Connectivity

www.te.com

Operator interface

The GE Quickpanel+ range of operator interfaces connects machines, data and people. Distributed by Control Logic, the interface integrates process control, view and an option to run an embedded data historian for improved real-time control in one complete unit.

With a wide-screen and high-resolution display to provide vivid, clear images and enhanced process visualisation, the user can enjoy the functionality of a PC such as remote desktop, web browser, built-in peer networking and FTP and HTTP servers.

Available in 6″, 7″, 10″, 12″, or 15″ screen sizes, the QuickPanel+ controller supports five IEC programming languages: relay ladder, sequential function chart, structured text, instruction list and function block diagram, along with support for a wide selection of controllers and I/O from multiple vendors.

Control Logic Pty Ltd

www.control-logic.com.au

Solar panel lifter

The GEDA SolarLift is the smart solution for lifting solar panels, racking and tools up, onto and across the rooftop. The solar platform is designed to carry up to 9 x 35 mm panels or 8 x 40 mm thick panels at one time at a speed of 25 m/min or 30 m/min. The rubber padding and solar clamping arm ensure that the panels are delivered securely and safely.

Two units are available: SolarLift 200 Standard and the SolarLift 250 Comfort. The load-bearing capacity depends on the ladder sections being used, their inclination, as well as their total length.

The compact design of the solution allows it to be easily transported on a trailer, ute or in a van. Robust rubber wheels make moving the unit around the site and installation easy. The base section with platform form a trolley to transport ladder sections easily across the worksite. Its footprint is small enough to wheel it into a lift.

Energy Smart Water

www.esw.net.au

18 V 7 Ah battery

Bosch's ProCore 18 V 7.0 Ah high-performance battery is said to offer 90% more power than the previous 18 V 6.0 Ah battery.

The power increase is thanks to an improved cell design and measures taken to minimise internal resistances. The battery features CoolPack technology that allows it to handle higher power demand over a longer period. The technology is said to substantially prolong the battery's lifetime compared to a conventional battery without that technology. Heat dissipation from the inside out is maximised in this technology by the synergy between several components; the housing and the heat sinks in the interior, which completely encase each individual cell, are manufactured from high-density polyethylene.

The battery is designed without any internal spacing, which ensures the heat it produces is not stored in the interior. Improved cell connectors made from copper provide lower resistances and more power as a result. The battery pack has special openings for heat dissipation during the charging process as well. The cooling feature means that the battery can be charged very quickly. The five-level LED display allows tradespeople to keep the charge level under control at all times.

Bosch Australia

www.bosch-solarenergy.com.au

IoT IN POWER DISTRIBUTION

Giovanni Polizzi, Energy Solutions Manager, Indra

The strong uptake of rooftop solar is reshaping the way energy is generated, distributed and used. It is also creating growing challenges for power distribution companies.

Already there are 1.7 million Australian customers with power generation panels in place, and this number is expected to rise as more people seek ways to reduce their bills and live a more sustainable lifestyle. Interestingly, at 1 pm on 17 September in South Australia, 48% of all power in the state was being supplied by the rooftop solar systems that now adorn 26% of all houses.

For distributors, the challenge comes from two important aspects of distributed energy resources:

- The power industry estimates only 30% of the energy produced by a household is actually used on premises and the rest is fed back into the network.
- When such a great portion of customers are relying on locally generated energy, it causes rapid changes in the balance of power demand and generation.

The bottom line is that distribution networks were never designed for two-way flows of power. They were built to transfer power in one direction — from a large generation plant to end users.

Their feeders and transformers are now operating in conditions that differ significantly from their initial design and performance decays. Also, as power demand increases along with locally distributed generation, feeders' thermal limits may be reached and power quality issues eventually appear.

Balancing power demand and generation therefore becomes a local issue. This is because renewables can experience very rapid changes in output levels while the distribution network has no means of providing a balance. It must rely on the much slower-reacting transmission network or suffer the consequences at power quality level.

So, there is an urgent need to implement measures that can kick in within the required time frame when an unbalanced supply–demand situation occurs.

Better monitoring required

Another issue comes from the fact that Australia's power distribution network is mostly monitored in its high- and medium-voltage areas. When it comes to the low-voltage network, where most customers are connected, there is no ability for monitoring and so operators are essentially unaware of what's happening as customer load profiles change.

Also, the network assets involved might be 30, 40 or even 50 years old and be significantly affected by out-of-design working conditions such as reverse energy flow.

As a result, better monitoring is urgently needed to understand the impact of solar generation and the new patterns of distribution that are occurring. Operators need to have ways to ensure that their assets can be controlled and not damaged.

Alternative monitoring options

One option is to connect every distribution transformer back to the central control room, where the received data is processed and analysed. However, this would require an enormous investment to establish the required point-to-point connections and

eventually cause a massive rise in workloads for control centre staff.

Another option is to use Industrial IoT, through the installation of low-cost sensors and wireless communication gateways that collect and process data locally. These can discriminate between significant events and warnings to be sent to the control room and those that are within the expected operational values and don't require further action. This option is a far more economical way to collect and process required information.

As the voltage decreases in the network, so does the value of the assets, however their number increases. Therefore, the Industrial IoT approach is much more cost-effective and allows the distribution network to be closely monitored and new ways to be developed to better interact with the growing number of energy-generating sources.

Information can also be provided to other parts of the electric system. For example, traditional generation can be alerted before a generalised drop in rooftop solar generation occurs in a large area, due to cloud cover for example. The generator can then be ready to provide the required power as needed in real time.

Streamlining the balance between rooftop solar generation and local demand can also be improved by the combined action of PV and batteries or other storage capacity. This maximises efficiency while minimising any detrimental impact to the electricity supply through the grid.

Changes in the local balance between generation and demand can be quite sudden and need local solutions, so data must be collected and processed locally for two main reasons:

- Centralised processing of large volumes of data requires long times and a lot of resources.
- The latency of collecting data, sending it to a centralised platform, and processing and sending results back to the gateway for action is far longer than the required reaction time to network events, if power quality is to be maintained and service reliability guaranteed.

A staged approach

For organisations that have always worked with operational technology, such as SCADA systems, which are generally totally isolated from other company IT systems and the internet, an IoT strategy as described can be scary to contemplate. There are significant security issues that need to be considered and resolved before internet-connected devices are used to control the power grid.

Additionally, connecting the plethora of network components required to collect data and establish two-way communication will require the use of a range of different technologies, protocols and standards. Operators also have to know the connection points, characteristics and energy states of all panels and batteries being used in the mix.

For this reason, the best strategy for distribution companies is to take a phased approach to the introduction of IoT devices. Begin by using them to monitor the low-voltage network. Data can be collected from devices such as transformers, reclosers, sectionalisers, circuit breakers and relays and processed locally in the gateways to generate warnings whenever the operational parameters overcome specific thresholds.

These signals can be monitored in the existing systems (ADMS) or have a system on their own that is then integrated to provide a continuous view of the network across different voltage levels.

For this to be achieved, gateways must have sufficient intelligence to adapt the data sampling rate to the varying conditions of the assets, and increase the amount of collected data when a deviation from normal occurs. In these cases, data is fed back to the monitoring centre that is alerted to the problem.

The generated warning can be very finely defined, as the gateways are able to process mathematical algorithms and run specific software applications to extract valuable information for operators. They can also increase the sampling rate upon request (or autonomously) so that any transient effect can be clearly spotted and analysed. The ability to elaborate data locally, thus reducing the amount of data that is sent out of the gateways, is also important to reduce the cost of wireless communication.

Taking further steps

A pure monitoring function does not represent any threat to the control of any network asset. Once operators are comfortable with this, some level of automation can be implemented, using IoT data for basic operations. This will help with efficiency, but any problems won't have an impact on the resilience of the network.

Then, once all issues of security have been addressed and operators are familiar with the simple operating instructions, IoT-enabled devices can be used to their full potential for more complex control of the network. As experience increases, new algorithms and software applications can then be deployed in the gateways to produce new warnings or to increase the healing capacity of the network and its connected IoT-enabled assets. They can also perform the combined action of a number of neighbouring gateways in case of events affecting larger portions of the network.

This gradual approach will ensure the benefits of IoT can be realised while any associated risks are minimised. Both distributors and consumers can benefit from the growth of residential generation and the network will be best placed to deliver electricity as required.

Indra, in collaboration with Intel, has developed InGRID.AGM, the Industrial IoT solution for utilities, which — through the combined action of the open, interoperable and real-time integration platform and Intel-based IoT gateways — provides edge computing solutions for Active Grid Management.

Indra
www.indracompany.com

RCD testing device

NHP has partnered with Rapid Test Systems to bring RCD testing device Rapid Test to the local market. The device is claimed to be up to 180 times faster than regular testing methods. Rapid Test can be retrofitted into your switchboard with minimal disruption to your business operations.

This system enables an entire distribution board to be tested within minutes ensuring maximum safety of personnel, diagnosing problems immediately. The captured information is automatically uploaded to a secure cloud-based reporting system, providing easy access for the user to view testing results and compliance certificates on a preferred device, remotely or on-site.

In applications where safety and downtime are a concern, such as mining and manufacturing, the implementation of the device is said to not only save you time and money, but also safeguard operations.

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

Fibre-optic connector inspection system

The AFL FOCIS Duel Fibre Optic Connector Inspection System is an optimal tool for optical network installation, turn-up, troubleshooting and maintenance. It builds on the company's FOCIS Flex design and also provides verification that proper connector cleaning practices are being used.

The new system contains two ports — the first is fully featured with the same capabilities as the FOCIS Flex and the second port is a fast and convenient female-style adapter for patch-cord viewing, with auto-focus and 2X zoom capabilities. This added capability allows technicians to inspect connectors on bulkhead adapters (Port 1) and patch cords (Port 2) without swapping adaptor tips.

The FOCIS Duel is a self-contained, tether-free, compact, handheld inspection solution, available with more than three dozen tips supporting all commonly used connector types.

The Port 2 adapter tips are available for all common connector types — universal 1.25 and 2.5 mm, SC and LC in both UPC and APC polish types. With the press of a single button, Port 1 of the FOCIS Duel auto-focuses, captures, centres and analyses the end-face image to industry standard IEC 61300-3-35 (2015), IPC, AT&T and user-defined criteria.

With a rechargeable battery and integrated 2.4″ colour TFT LCD screen, FOCIS Duel can be used independently. It can perform cleanliness analysis and store Port 1 images and reports locally.

It works with the AFL FOCIS App (iOS and Android) which provides a comprehensive and user-friendly feature set as well as connectivity with AFL's cloud-based aeRos workflow automation platform.

AFL Telecommunications Pty Ltd
www.aflglobal.com/au

Surge protection devices

The Valvetrab SEC-DC type 2 surge protective devices are designed to protect linear direct current sources. The Safe Energy Control (SEC) technology makes the products durable and powerful.

The devices provide protection for all standard 120/220 VDC applications. The self-extinguishing capability of the protective device eliminates the need for a backup fuse. Sensitive downstream components are protected, thanks to the low voltage protection level.

The easy-to-read status indicator and the floating remote indication contact keep the user informed about the status of the product at all times. Recurring inspections of the protective devices can be carried out quickly and easily with the Checkmaster 2 test device.

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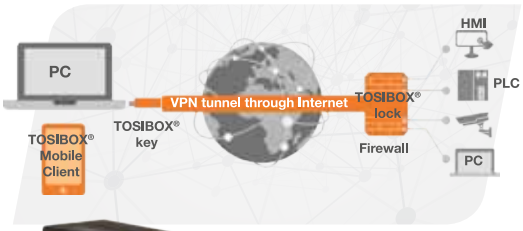

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The Ampfibian Industrial Series of power adaptors covers 10 to 50 A, with single- and three-phase plug-tops available.

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The adaptors have an H-Class rating (water and dust resistant to IP55 and IK08 impact rated), are UV stable and feature a fold-out hook for hanging.

Every adaptor is also equipped with a residual current device which, along with the circuit breaker, is visible beneath a clear lid for easy inspection, to protect against electrocution. They also feature automatic cleats to prevent accidental disconnection and a lockout tag on the RCD lid.

Ampfibian

ampfibian.com.au

Datacomms range

Comprised of various fibre-optic and copper cables, the Prysmian Datacomms range provides users with their data and communication cable needs. With solutions for different applications in both indoor and outdoor environments, this range includes Prysmian's M@xlan, M@xtel, OptiC@t5e, Indoor/Outdoor Optic Fibre Riser and Outdoor Fibre Optic cables.

Prysmian's composite OptiC@t5e communication cable is a combination of a four pair Cat 5e and two bend-sensitive fibres. It's capability for super high speed makes the building attractive to future owners. Not only is the cable sheath low-smoke zero halogen (LSZH), but each fibre also has a LSZH buffer. This makes the building safer, as when the cable burns, no toxic black smoke is emitted, and no corrosive acid is generated.

The cable allows immediate connection to existing twisted pair telecommunication networks via the cat 5e cable. OptiC@t5e includes BendBrightXS, the latest in bend-insensitive fibre-optic cable technology from Prysmian. The BendBrightXS is virtually insensitive both to micro and macro bending, making it easy to install and particularly suitable for installation in compact and tight installation areas. These fibres sit in the safety of a low-smoke halogen sheathed cable, ready to be connected to super high speed internet, when available.

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Ethernet tester

The Viavi SmartClass Ethernet Tester is a compact and battery-operated instrument which provides 1 G electrical and optical interfaces. It is available for rent from TechRentals.

It is an easy-to-use Ethernet/Internet Protocol (IP) tester that is suitable for frontline technicians who support Metro Ethernet networks. The Viavi SmartClass tester is used by technicians for the installation, turn-up and maintenance of Ethernet and IP services in the field.

This SmartClass tester is suitable for basic physical layer cable testing, Layer 2 (L2) and Layer 3 (L3) traffic generation, and full RFC2544 Ethernet testing. It also determines maximum throughput, latency, frame loss rate, back-to-back frames and jitter.

Applications of this tester include performance assessment of Carrier Ethernet services, activation and maintenance of metro Ethernet networks, deployment of active Ethernet (point-to-point) access services, switched networks and quality of service (QoS) verification.

TechRentals

www.techrentals.com.au

Optical power meter

The VeEX FX80 PON optical power meter is an inline optical power meter geared for FTTx/PON service activation. It simultaneously measures downstream signals to the ONT and upstream signals to the OLT.

Key features include FTTx power meter for B/E/G-PON applications; ONU and OLT test ports with pass-through design; fixed SC/APC Interface for ONU and OLT test ports; concurrent measurement and display of Upstream and Downstream signals; 1310 nm Upstream CW/Burst signal support; 1490/1550 nm Downstream signal support; programmable thresholds with pass/fail indication; optional broadband power meter with universal adaptors; non-volatile storage for >930 measurements; wired transfer of stored results to a PC via micro USB; upload of stored results to VeEX R-Server workforce management system or Fiberizer Cloud; and high-contrast LCD — visible outdoors, backlight for indoor or low light conditions.

Specifications include wavelength-selective level measurements for verifying B/E/GPON networks according to ITU-T G.983/4 and IEEE 802.3ah recommendations; calibrated wavelengths 1310/1490/1550 nm; FTTx PON Power Measurement range (Passthrough): -40 to +10 dBm (1310 nm), -40 to +12 dBm (1490 nm) and -40 to +25 dBm (1550 nm); burst measurement range at 1310 nm -30 to +10 dBm; pass through insertion loss ≤1.5 dB; BB-OPM absolute accuracy ±0.5 dB; linearity ±0.2 dB at 1550 nm (≥-40 dBm); optical return loss at 1550 nm ≥55 dB; display resolution 0.01 dB; broadband (CW) measurement range — Standard (PM1) version -65 to +10 dBm and high (PM2) version -50 to +25 dBm; communication I/F micro USB; battery built-in, rechargeable Li-polymer; and battery operating time (without backlight) for broadband OPM mode >80 h and FTTx PON mode >40 h.

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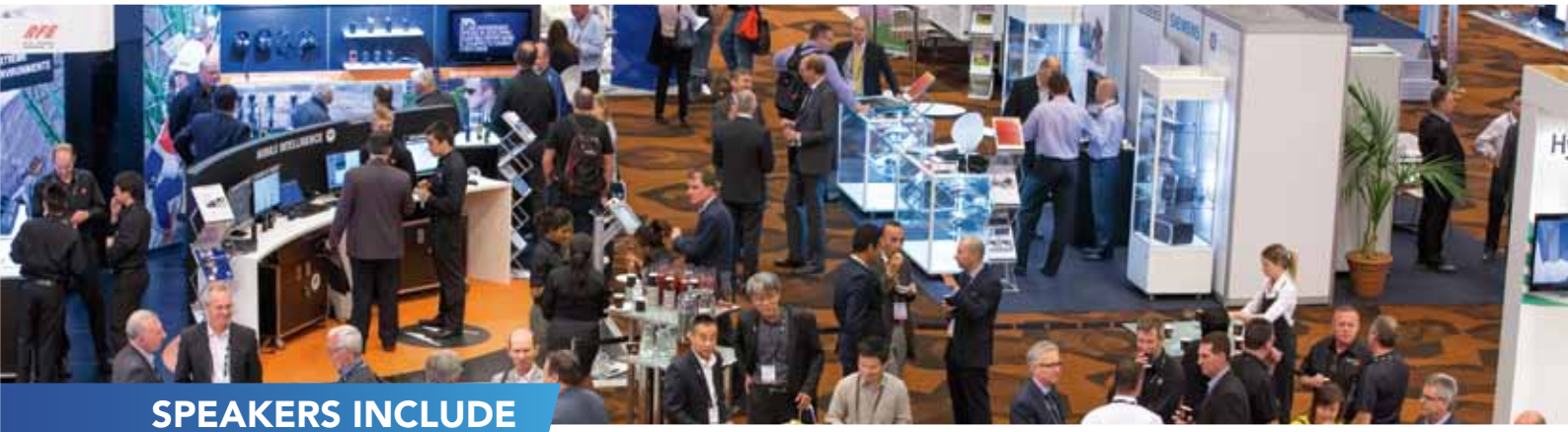

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The role of charging infrastructure in EV uptake

There is a global awareness that electric vehicles are key to reducing greenhouse gases and delivering clean, sustainable transport systems. Charging infrastructure to support electric vehicle uptake has, therefore, become an important topic of discussion for governments, investors and suppliers.

Discussions around the role of charging infrastructure in EV uptake initially gets stuck in a classic chicken-and-egg scenario. If there is not a good public charging infrastructure in place, drivers have range anxiety and lack the confidence to purchase EVs. At the same time, investing in charging infrastructure is uneconomical if there are not enough electric vehicles on the road. To get unstuck from this scenario, range anxiety and investment in charging infrastructure need to be addressed.

DC fast chargers provide a way to overcome range anxiety and perceived range barriers. It can quickly add range to an electric vehicle to make long journeys possible. A network of DC fast chargers makes electric vehicles more attractive to potential buyers and helps to increase adoption rates.

Fast charging is a relatively new technology that began significant deployment post-2013. The 50 kW fast chargers can charge an EV in 30 minutes. In 2018, 175–475 kW ultra-fast charging is already a reality. This is a very exciting development, also referred to as High Power Charging (HPC) in the industry. More charging options for EV drivers will significantly reduce range anxiety, make long-distance driving in a limited-range EV feasible, promote awareness and boost range confidence in prospective buyers.

Initial investment and support by government, car manufacturers and investors will kickstart adoption of this technology. Some car manufacturers have already started building their own charging networks, and many governments and utilities have already created programs to encourage the deployment of charging infrastructure through incentives and partnerships.

Norway's EV uptake is amongst the highest in the world and the country is a leading example of how generous government support in charging infrastructure can drive EV adoption. In 2017, more than half of the new cars were EVs or hybrids and 20% of these were zero emission. Tritium has also seen an increasing demand for widespread fast charging infrastructure in this market.

There is still a challenging learning curve in terms of what the best policies and initiatives are to overcome barriers to EV uptake, and the best way to deploy charging infrastructure for electric vehicles. What we do know for sure is that fast charging is quickly gaining interest and growth on a global scale, and is playing an ever-increasing role in EV uptake and adoption.

In 2013, Tritium launched the award-winning Veefil-RT, a 50 kW DC fast charger for EVs. Today, Tritium exports to 22 countries around the world. In 2018, Tritium will again be instrumental in bringing the latest 175–475kW ultra-fast High Power Charging (HPC) stations to market.

Ultra-fast HPC chargers are game changers. EV drivers will benefit from these chargers at highway rest stops, petrol stations and inner city areas because the charging time will be under 8 minutes. These scalable and flexible solutions will go a long way to grow EV uptake.

Tritium is already supplying fast chargers to some of the leading global networks around the world like Norway, Germany and the UK. In Australia, Queensland launched the world's longest EV fast-charging network in 2017, and Tritium supplied most of the fast chargers for this network. To encourage uptake, the chargers are free to use at first. The Queensland Electric Vehicle Super Highway, as it is called, provides a network of fast-charging EV stations allowing drivers to travel from the state's southern border to the far north, recharging on renewable electricity along the way.

In 2017, Tritium supplied Belgian EDF Luminus with all the fast chargers for the Belgium phase of the fast charging corridor connecting France, Belgium and the Netherlands. The Veefil chargers were deployed along the Belgium motorway system, linking the country's major cities.

James Kennedy is the Chief Technology Officer and co-founder of Tritium, a Brisbane-based company specialising in the design and manufacture of electric vehicle fast charging infrastructure. His valuable battery management expertise was used in James Cameron's Deepsea Challenger submarine that reached the deepest spot in the ocean in 2012.

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STANDARDS UPDATE

*Simona Tomevska, Stakeholder Engagement Manager, Energy and Electrotechnology**

As the standards development process rolls on and the latest project prioritisation draws to a close, previous rounds are being finalised and committees will soon be established to get projects underway. But as Standards Australia continues pursuing core business in developing standards, there are also some broader projects underway, including a recent agreement reached with Energy Networks Australia.

New projects

One of the recent successful proposals from the energy, communications and data field of work relates to a series of standards on explosive atmospheres. This standard is electrotechnical in nature and deals with design, installation and operation of pressurised and artificially ventilated rooms used in potentially explosive atmospheres.

Whilst the safety aspect is effectively aimed at the potential for gas or vapour to be undetected and ignite, those impacted will likely be employed in the energy and electrotechnical sector. This explains the focus of this sector on delivering a standard to help improve safety of all its workers.

The standard is proposed to be AS NZS 60079.13, Explosive atmospheres – Part 12 Equipment protection by pressurised room "p" and artificially ventilated room "v". The standard is also part of a series (AS/NZS 60079) which covers essential safety requirements for explosive atmospheres. The standard provides guidance to help prevent explosions and fires where there is a risk of the potential presence of a flammable gas or vapour.

This particular standard is an essential document in the series to deal with certain protection aspects when other parts of the series cannot be used. As such, it forms an important link to safety and expands the coverage of the 60079 series to a broader range of applications.

Showing the significance of this particular standard, it is intended for use in industrial facilities across Australia and New Zealand. The facilities are from several industries including manufacturing, petrochemical, grain, and offshore oil and gas.

The standard has only recently been approved and there is much work to do, but safety improvements, such as those planned for this standard, are always an ideal outcome to work towards.

Partnership with Energy Networks Australia

The energy and electrotechnology industry is evolving at a rapid pace with the application of digital technology to traditional infrastructure. This is changing business models and physical infrastructure requirements, and presenting new security challenges for operators, Australian businesses and consumers.

Particularly in recent years, the electricity grid has been changing from its traditional centralised structure to one where the grid is decentralised and includes 'prosumers'. Prosumers are consumers of electricity who also produce energy; common examples include owners of solar panels who then sell the excess energy back into the grid.

As the ways which consumers use energy networks change, cybersecurity vulnerabilities of these networks are also changing. As such, Standards Australia is working with Energy Networks Australia to focus on the role of standards in increasing cybersecurity to the changing energy network. This will take the form of a Grid Cyber Security Standards Roadmap Report.

This report will include:

- A collection of broad perspectives on existing Australian grid cybersecurity standards;
- A recommendation for Australian participation in any relevant international standards committees;
- A recommendation for the development of new or the adoption of relevant international standards to support grid cybersecurity in Australia; and
- An explanation of the standards development pathway and the process used by Standards Australia to develop standards, including a prospective timeline.

While the government sets Australia's legislative and regulatory framework, Australian and international standards play a crucial role in supporting the broader institutional architecture.

> FOR THE ENERGY AND ELECTROTECHNOLOGY SECTOR, THERE ARE CURRENTLY 59 COMMITTEES AND 80 ACTIVE PROJECTS.

Standards enable and support Australian industry to engage with, and benefit from, the digital economy.

The agreement is in its early stages but significant progress is expected in coming months, with a number of roundtables and forums with interested stakeholders planned. As progress is made, Standards Australia will be advising the broader community of outcomes and what it means for every Australian.

Spreading the word

Members of the stakeholder engagement team travelled to major cities across every state and territory in Australia over the past two months. The purpose was to engage with people familiar with Standards Australia's processes, as well as those less aware of what we do and how we do it.

Specifically for the energy and electrotechnology sector, there are currently 59 committees and 80 active projects. The sector sees Standards Australia staff interact with energy regulators, representatives of federal and state governments, energy councils, Australian Industry Group, Engineers Australia, Master Electricians Australia and many more stakeholders.

The work of Standards Australia reaches a number of different aspects of several sectors — all of which remain an equal focus of the organisation and will see significant progress this year as work well and truly gets underway.

**Simona Tomevska has been with Standards Australia for over two years. She started as a Project Manager involved in standards development and then shifted to the role of Stakeholder Engagement Manager for the Energy and Electrotechnology sector. Standards Australia is a non-government, not-for-profit standards organisation and, despite being in its 96th year, shows no sign of slowing down. Clear evidence of this is in the electrical sector, with some standards having been around for years (such as the Wiring Rules) and others the result of exciting new projects in areas such as distributed electricity and battery storage.*

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THE RISE OF RENEWABLE CITIES

Around the world, urban areas of all sizes are stepping up to the urgent challenge for cities and towns to become carbon neutral and are setting targets to ramp up renewables in their energy mix. Australian cities and towns are taking charge of their energy future, and developing solutions for their local areas.

The City of Adelaide has also set this challenge as a priority and is well on the path of its five-year Action Plan. The city was thus a natural fit for the third Renewable Cities Australia forum and electric vehicle workshop — an event that will share case studies from its host city as well as the innovations and successes achieved in other urban areas across Australia.

Going renewable is more than just adding solar panels and batteries — it's about a well-considered path with a mix of solutions, involving new ways to manage energy and waste and thinking differently about urban transport. Corporate sustainability strategies now involve understanding energy management, such as the types of power purchase agreements; the benefits of blockchain for transacting energy; and tools for whole communities to map solar resources. All these topics and more will be discussed when Australian local government and business leaders share their real case studies on the first day of the forum.

Business and industry will meet with local government representatives to discuss projects already underway, such as how nine metropolitan councils in Perth are leading the way turning waste into renewable energy and how Victorian University is taking action towards 100% renewable power. The Mayor of Port Augusta, Sam Johnson, will meanwhile share the challenge of a regional area becoming a renewable energy hub for industry.

The focus on the second day is the future of urban transport — for consumers, for fleets buyers, for industry and for public transportation — and the incentives and regulatory changes that are needed to adopt low-carbon transport options. Behyad Jafari, CEO of the EV Council, will share views of who should take the lead in this planning. Mark Thompson of PwC will highlight the scenario of high-growth uptake of electric vehicles and perspectives will be provided from Renault, Jaguar Land Rover and Hyundai — all launching new electric vehicles in Australia this year — while Tritium and JETCharge will discuss the infrastructure needed to support this uptake. Tony Fairweather of SEA Electric will talk about how electrifying the rigid truck segment is happening much sooner than forecast, while Roger van der Lee will outline how driverless technology is part of the future of transport and is already being deployed.

Detailed case studies, networking and visits to the exhibition area will be followed with a free walking tour, hosted by the City of Adelaide. This informal session will include a visit to an energy storage system in a commercial premises, viewing the progress of the 20-storey U City — on track to become South Australia's highest rated Green Star-rated multipurpose building — and the City of Adelaide Electric Vehicle Charging Hub.

Renewable Cities Australia will be held from 23–24 May at the Adelaide Convention Centre and provides free access to the co-located Australian Energy Storage exhibition. Registration is available for single days or for the two-day forum, plus the walking tour (subject to available places). Further details are available at www.renewablecities.com.au.

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