Electrical Comms Data

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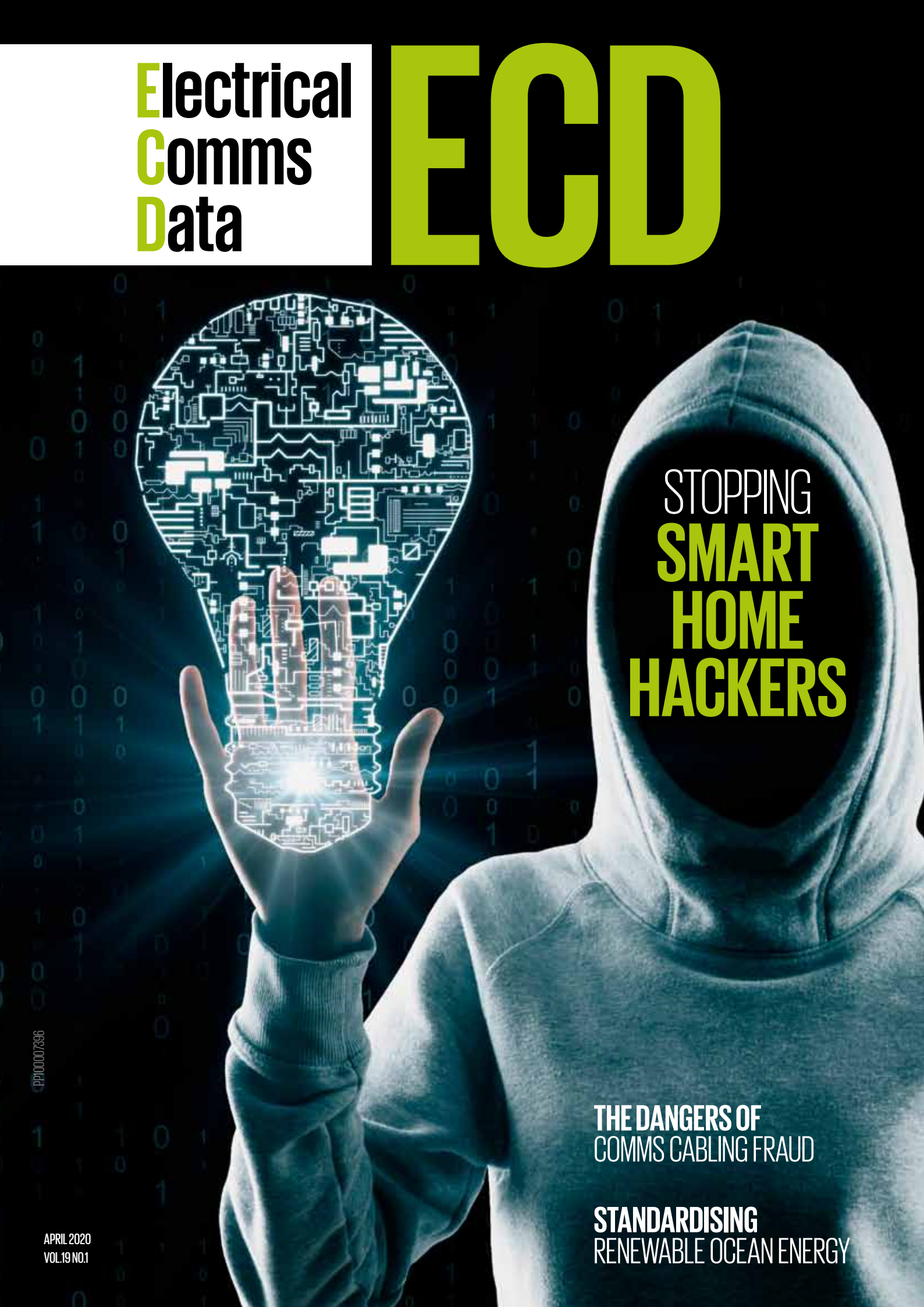

STOPPING SMART HOME HACKERS

THE DANGERS OF COMMS CABLING FRAUD

STANDARDISING RENEWABLE OCEAN ENERGY

PP100007396

APRIL 2020
VOL.19 NO.1

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CONTENTS

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FROM THE EDITOR

It has been a somewhat eventful beginning to 2020 — and not necessarily in the best of ways. Last edition I wrote to you about the bushfire crisis gripping the nation, and just two months on we have now found ourselves in the midst of yet another crisis, with the ongoing spread of coronavirus (COVID-19) around the world. In this climate of uncertainty, self-isolation and panic buying at the supermarkets, many people are spending a lot more time at home to protect themselves and others from illness. But how secure is your home against other types of threats? With more than 50% of Australian residences containing at least one IoT-connected device, according to figures from Telsyte, the risk of data breaches is now higher than ever. This is largely due to the fact that many smart devices contain vulnerabilities that leave them open to hackers — even seemingly innocuous items such as light bulbs are not immune. The Swinburne University's Cybersecurity Lab is currently working on an approach to help improve the security of smart home devices, and outlines steps that people can take to reduce the risk of data breaches.

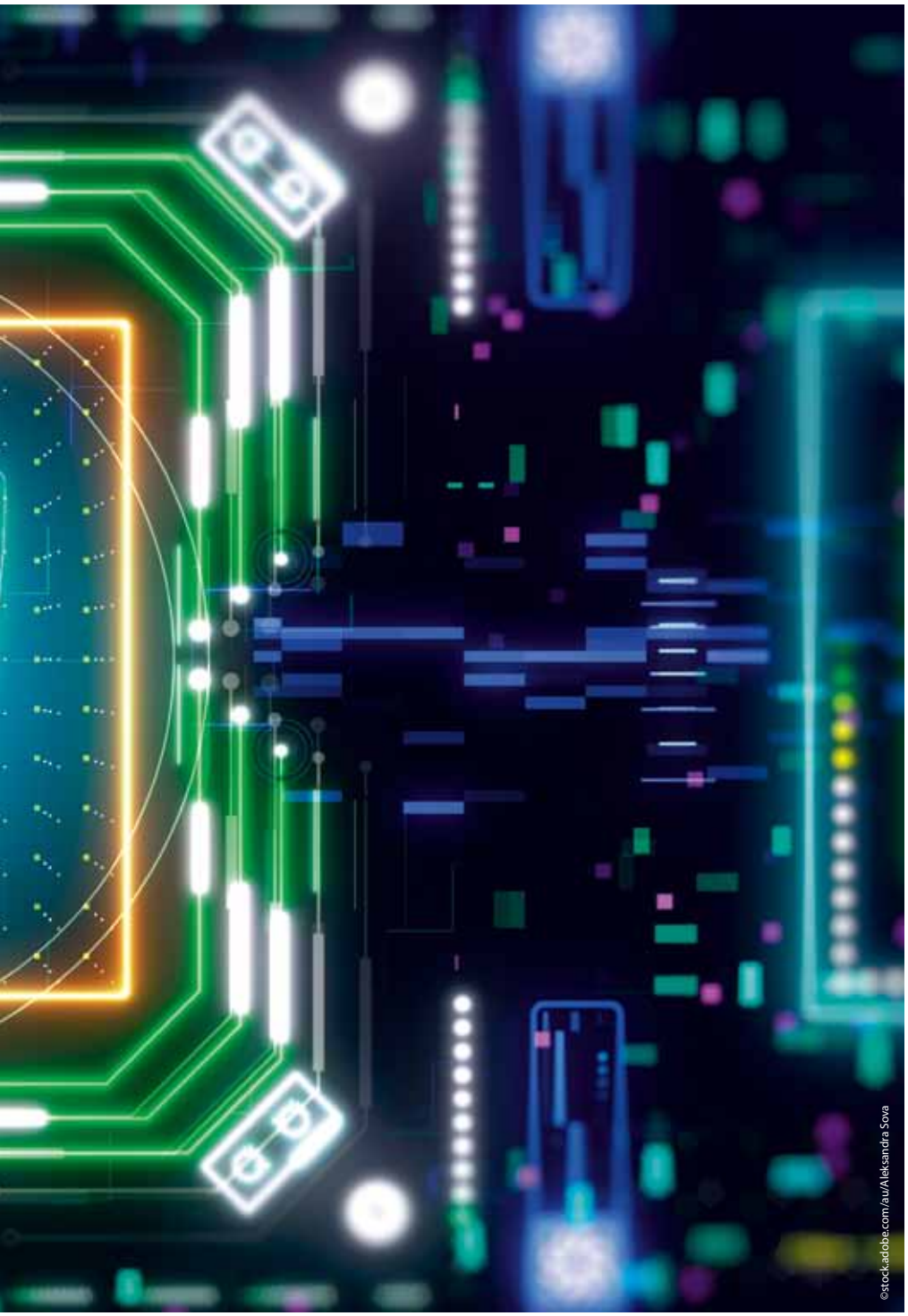
Despite the potential security risks that come with IoT-connected devices, however, this very same technology enables better-connected, smarter cities to thrive. Standards Australia has recently launched an artificial intelligence standards roadmap for the nation, with the overarching goal of supporting better data collection, more efficient services and transport systems, and powering our cities with more sustainable energy into the future.

Amy Steed – Editor
ecd@wfmedia.com.au

HOW SECURE IS YOUR SMART HOME?

Amy Steed

Smart home technology has undergone a recent surge in popularity, with the average Australian household now containing 18.9 IoT-connected devices.



Emerging technology analyst firm Telsyte predicts that this number will rise to 30 by 2022, forecasting that the main growth will be driven by the adoption of energy and lighting smart devices, security devices such as cameras and other smart appliances including smart speakers.

Convenience, energy savings and security are just a few of the reasons cited by those who are embracing smart technology within the home. But just how secure are these devices? The media abounds with stories about data and privacy breaches, from voice assistant Alexa listening in to private conversations, to Amazon handing police the user data it collects through its Ring surveillance technology. And even something as seemingly innocuous as a light bulb is no longer immune to data breaches, new research has found.

The dark side of smart lighting

In 2019, researchers at the University of Texas, San Antonio conducted a review of the security holes that exist in popular smart light brands.

"Your smart bulb could come equipped with infrared capabilities, and most users don't know that the invisible wave spectrum can be controlled. You can misuse those lights," said Murtuza Jadliwala, Professor and Director of the Security, Privacy, Trust and Ethics in Computing Research Lab in UTSA's Department of Computer Science.

"Any data can be stolen: texts or images. Anything that is stored in a computer."

Some smart bulbs connect to a home network without needing a smart home hub, a centralised hardware or software device where other IoT products communicate with each other. Smart home hubs, which connect either locally or to the cloud, are useful for IoT devices that use the Zigbee or Z-Wave protocols or Bluetooth, rather than Wi-Fi.

If these same bulbs are also infrared-enabled, hackers can send commands via the infrared invisible light emanated from the bulbs to either steal data or spoof other connected IoT devices on the home network. The owner might not know about the hack because the hacking commands are communicated within the owner's home Wi-Fi network, without using the internet.

"Think of the bulb as another computer. These bulbs are now poised to become a much more attractive target for exploitation even though they have very simple chips," Jadliwala said.

Jadliwala recommends that consumers opt for bulbs that come with a smart home hub rather than those that connect directly to other devices. He also recommends that manufacturers improve security measures to limit the level of access that these bulbs have to other smart home appliances or electronics within a home.

The study, titled 'Light Ears: Information Leakage via Smart Lights', was co-authored by Anindya Maiti and published in the September 2019 issue of the journal *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*.

How can smart tech vulnerabilities be detected?

In 2019, Swinburne University's Cybersecurity Lab was awarded $360,000 by the federal government to research and develop technology to stop smart devices being hacked. As part of a three-year project, a team led by the Dean of the Digital Research Innovation Capability Platform, Professor Yang Xiang, has been testing for vulnerabilities in any devices and appliances connected to the internet.

> YOUR SMART BULB COULD COME EQUIPPED WITH INFRARED CAPABILITIES, AND MOST USERS DON'T KNOW THAT THE INVISIBLE WAVE SPECTRUM CAN BE CONTROLLED. YOU CAN MISUSE THOSE LIGHTS.

"We tested many smart devices, which cover most of the popular brands on the market. The product types include smart bulbs, smart plugs, routers and smart cameras. We developed our test methods for security analysis and vulnerability detection on these devices. Vulnerabilities such as memory leaks were found — these vulnerabilities allow an attacker to crash a device by sending malicious messages remotely," Xiang said.

"Smart home devices are becoming pervasive. The security of smart home devices has always been a concern. Unlike traditional software or system security, the security issues of smart devices are more intuitive and frightening. Imagine the situation where all the electronic devices in your home suddenly fail — your life will be significantly impacted. Therefore, our team believes that it is crucial to strengthen the security protection of smart home devices.

The Swinburne team is hoping to develop a methodology that will help them to assess whether or not a smart home device is vulnerable. Given that there are hundreds of millions of intelligent devices, it is impossible to research each device in detail, so an automated detection method is required.

"We hope to promote the security rating of smart devices in Australia through our research, [and] to assess the safety level of smart home devices and make the results public. On the other hand, we hope that our approach will help manufacturers. We will report the security issues we find to vendors, and assist them in finding vulnerabilities," Xiang said.

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Improving smart home security

According to Xiang, manufacturers need to pay attention to security issues when they design and develop their products, but users must also be aware of the dangers.

"Let's have a look at how a hacker can invade a smart home device," he said.

"First, a hacker must utilise at least one security hole to launch the attack. Second, the hacker must be able to communicate with the device. Therefore, we can see that there are two main factors whether a smart device can be hacked: whether the device has the vulnerable hole and whether anyone rather than the legitimate user can communicate with the device.

"It is the responsibility of vendors and developers to detect and fix vulnerabilities. Users can report to the manufacturer to help them improve product security. At the same time, users should also update the product firmware to avoid the vulnerabilities that have been discovered," he said.

In addition, Xiang emphasises the importance of protecting account passwords on smart home apps, because if the hacker can obtain the user's account password through the app, then they will be able to attack the device. Connecting the device to an insecure network environment may also enable malicious monitoring by a hacker.

"Although it is not easy to disguise and launch an attack by intercepting and capturing information in the existing network communication security background, there are still risks," Xiang said.

"Whether some products are more vulnerable than others, I think it depends on the product development process and the security awareness of the developers. In the real world, developers usually use common software modules (eg, from open sources). This effectively helps reduce development costs. But it poses security risks if there is a problem in these modules.

"From another perspective, in more logical and more complex devices, it may be difficult to find vulnerabilities because they are hidden deeply. In some simple devices, such as light bulbs, developers with insufficient security awareness and knowledge may not be able to design secure software and thus leave some security holes."

ARBS 2020

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POSTPONED

The rescheduled exhibition will be held on

15-17 FEBRUARY 2021

Melbourne Convention & Exhibition Centre

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SMART DATA HUB OPENS UP RENEWABLE ENERGY POTENTIAL

Amy Steed

A consumer-facing energy data hub is under development by Wattwatchers, aiming to provide better visibility for energy use in the home.

'My Energy Marketplace' monitors energy data in real time, combining this data with Internet of Things (IoT) technologies and smart appliances into an app store model.

It enables users to access their data with mobile apps, take valuable data with them when they change energy providers and decide for themselves whether to allow other companies to use it.

The Australian Renewable Energy Agency (ARENA) has provided $2.7 million in funding for the three-year $8 million project, which could also assist with integrating renewables into the electricity system.

"Whether it's rooftop solar, battery storage, energy efficiency, controlling electricity loads and appliances remotely, or the uptake of electric vehicles, we need better data to effectively run the future grid consisting of more and more decentralised consumer energy assets," said ARENA CEO Darren Miller.

"The Wattwatchers project is designed to provide both the data and consumer participation needed to manage an increasingly decentralised electricity system. This also aligns strongly with other ARENA-funded initiatives for DER, demand response and new marketplaces."

Indeed, Wattwatchers' platform will allow third parties such as the Australian Energy Market Operator (AEMO) and distribution network service providers (DNSPs) to pay for access to consumer data to get better visibility of the state of the network, the impact of consumer behaviour and growth of distributed energy resources. Granular data also allows consumers to provide demand response during peak energy usage periods.

An Australia-wide My Energy Marketplace rollout is being planned, with the installation of ARENA-subsidised Wattwatchers smart energy solutions at 5000 homes and small businesses. The technology will also be implemented at 250 schools, providing participants with data, communications and software services for three years.

"With more and better data, consumers will be better informed to buy their energy. They can identify and take action on energy efficiency opportunities, both behavioural and appliance-driven, and use energy at times that suit them," said Wattwatchers CEO Gavin Dietz.

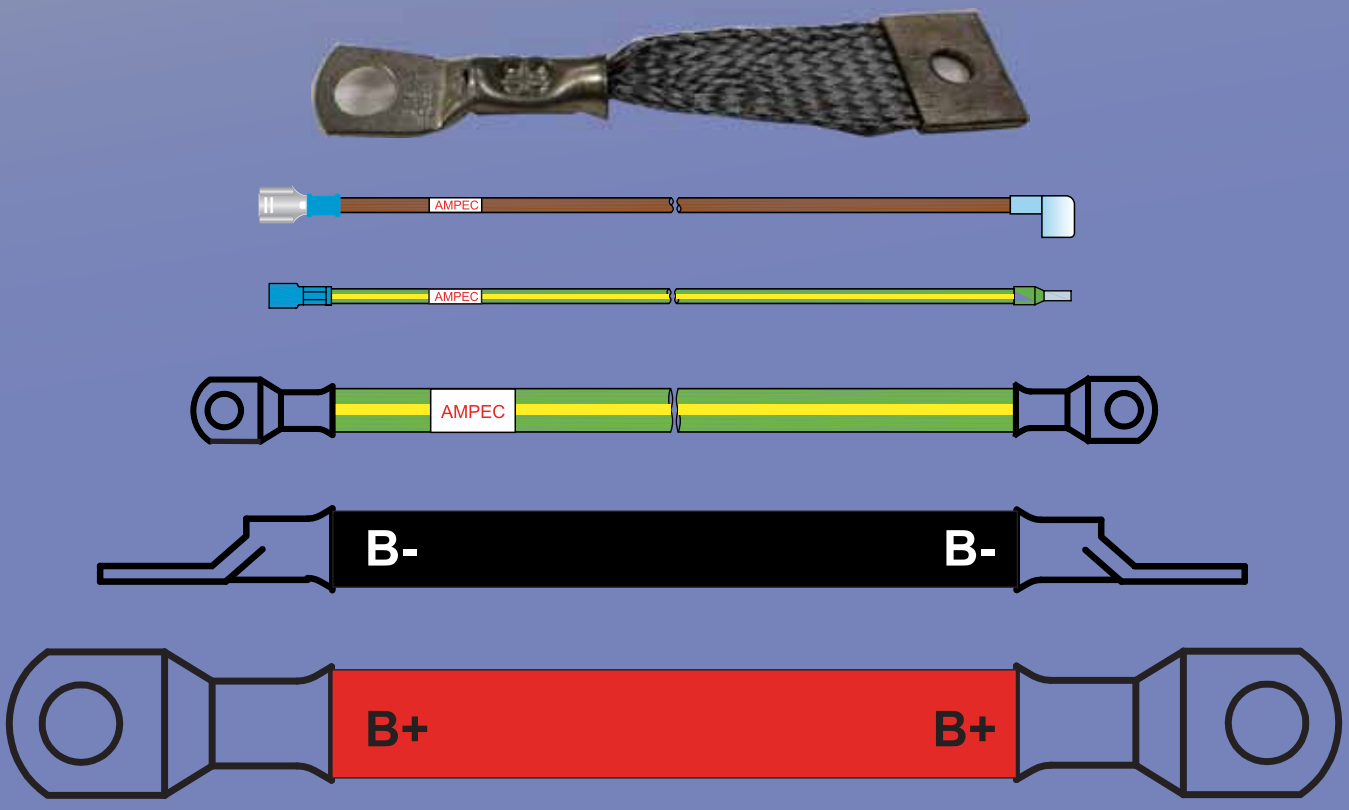
"Network businesses and market operators currently have poor visibility of the low-voltage grid, which is connected to over 10 million Australian consumer sites, and face a mission-critical challenge to both see and control DER as Australia moves to higher and higher penetration of renewable energy, especially small-scale solar."

Dietz said the founding vision for Wattwatchers dates back to 2007 — when energy costs were only half what they are now and there were only 7000 rooftop solar systems in the whole country.

"Fast forward to 2020 and our vision now is an 'app store for energy' business model, which will give electricity consumers unprecedented control over their energy data, with portability and choice of apps and services," he said.

"The Wattwatchers MEM team is now actively recruiting new channel partners including local councils, school communities, citizen initiatives, industry associations, member-based organisations and corporate partners. Deployment at home, small business and school sites will begin in earnest in a few months' time, ramping up throughout the 2021 financial year."

Wiring Harness Solutions



ampec TECHNOLOGIES

Ampec Technologies Pty Ltd

Tel: 02 8741 5000 Email: sales@ampec.com.au

Battery discharge load unit

The Megger Torkel 950 is a battery discharge load unit. The unit is utilised to perform load/discharge testing, which is the only way to determine a battery system's actual capacity. It is available to rent from TechRentals.

The 950 battery discharge tester unit can be programmed for constant current, constant power, constant resistance or user-defined load profiles. The kit includes a 200 ADC current clamp allowing on-load testing.

The Megger Torkel 950 battery discharge tester works with battery systems ranging from 7.5 to 500 V and can discharge at up to 220 A (15 kW maximum power). The test can be carried out without disconnecting the battery from the equipment that is serves. Tests are controlled by a built-in PC and results can be copied to a USB memory stick.

TechRentals

www.techrentals.com.au

CAT 6 cable

Cabling is the core foundation of every network — its ability to provide high-performance and reliable transmission is essential for carrying out day-to-day business operations.

From critical data centre links that connect network switches and servers, to horizontal and backbone links that deliver voice, data and video for networking, communications, audiovisual, security and building management applications, Belden has end-to-end copper cabling systems to address networking challenges, while providing bandwidth and scalability for the needs of the future.

As the national distribution partner for Belden Cable in Australia, APS Industrial offer a complete range of Category 6 performance level cabling solutions. This includes the 4800 series, with its good signal power and signal-to-noise performance, and the 3600 series with mid-range performance and 2400 Standards Compliant Plus system cable.

The complete range of Belden Category 6 cabling features larger copper, Central X or Tape Fillers. The availability of Bonded-Pair technology is an added option that makes the installation as robust as possible.

These features combine to offer users an improved signal strength, crosstalk and signal-to-noise performance and system uptime.

APS Industrial

www.apsindustrial.com.au

Industrial displays and panel PCs

Emerson has released a portfolio of RXi industrial display and panel PC products for monitoring, visualising and enhancing everyday production processes in life sciences, metals and mining, power and water, and manufacturing and machinery. A modular design is foundational to the industrial display platform, enabling users to select the right configuration based on application needs and minimising life cycle cost through flexibility, easy serviceability and field upgradeability. The vivid and responsive displays are designed to improve an operator's capabilities to make better decisions.

The industrial displays are designed to work with both Emerson's programmable logic control (PLC), programmable automation control (PAC) solutions and third-party control systems. The industrial display portfolio features standardised physical designs to minimise the variety of enclosure cut-outs required for OEM applications, making each display easily replaceable and upgradeable in the field with no need to modify existing or install new cabinets.

Three display types provide options for a variety of applications. The RXi - Panel PC includes a high-performance and rugged industrial PC for powerful computing capabilities. The RXi - Industrial Monitor works with most industrial or commercial PCs for plant floor visualisation. The RXi - Web Panel supports web-hosted applications.

Displays are available in sizes ranging from 7″ to 24″, providing a single, scalable platform for a multitude of operations and applications. Key features for all models include vivid projective capacitive, multi-touch screens that can operate in temperatures from 20 to 65°C and optional sunlight-readable screens on select sizes.

The portfolio carries multiple certifications for high performance in rugged environments and is IP66-certified for protection against dust and strong jets of water.

Emerson Automation Solutions

www.emerson.com/au/automation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CALCULATOR CAN PREDICT SOLAR POWER BILLS

Australians looking to switch to solar/battery power can now use a calculator to predict what their next four energy bills will cost.

The calculator has been created by independent solar expert Finn Peacock, and is designed for potential solar/battery users to determine future savings prior to making their investment.

"I wanted to provide a 100% consumer service that is fully transparent," Peacock said.

"I want everyday Australians to access genuine, real data about how solar and batteries can help them save on their power bills."

Peacock — a chartered electrical engineer who previously worked at the CSIRO's Energy Transformed Flagship — is also CEO and founder of SolarQuotes, a website helping everyday Australians access solar energy.

"I'm at the coalface of consumer behaviour in relation to solar, and after 10 years of helping hundreds of thousands of homeowners understand their energy needs, I know that the key driver for people considering solar is the number on the bill," he said.

"Once people buy solar they will usually judge the investment based on the size of their first bill after the install. I wanted people to have a good estimate of what that would be, including the next three bills after that.

"All the online calculators I could find, including my old one, only gave one annual savings figure. They also combined the battery and solar savings so there was no transparency in relation to where your savings were coming from and how each quarter would perform. Finally, where you live matters. Australia has large seasonal variations, which affects sunlight — so being able to drill down to quarterly bills reflecting the seasons of any given location is important if you want accurate savings predictions.

"I'm obviously a huge advocate for solar and renewable energy, so it is important to me that this tool provides information about separate paybacks and bills in relation to solar and batteries in order for everyday Australians to make informed decisions using accurate and unbiased information."

SolarQuotes teamed up with Australian solar monitoring company Solar Analytics to source seasonal electricity usage patterns for each state/territory in Australia based on thousands of real-life solar owners.

"We then combined this data with local solar irradiance data as measured by the National Renewable Energy Laboratory in the USA, and calculated how much solar would fall on your panels, how much would be used in your home, and how much would be exported to the grid or put into a battery. This allows us to calculate the predicted bill for each season."

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5G HAS NOW REACHED 34 COUNTRIES

There has been a rapid surge in the spread of 5G technology around the world, according to a new report by VIAVI.

'The State of 5G Deployments' states that, as of January 2020, commercial 5G networks have been deployed in 378 cities across 34 countries.

The country with the most cities with 5G availability is South Korea, which recorded 85 cities, followed by China with 57, the United States at 50 and the UK with 31. In terms of regional coverage, EMEA leads the way with 168 cities where 5G networks have been deployed, Asia is second with 156 cities, and 54 cities are covered by 5G across the Americas. Deployments include both mobile and fixed wireless 5G networks.

VIAVI findings indicate that a number of operators are blanketing the largest population centres, with as many as five communications service providers (CSPs) deploying 5G in cities such as Los Angeles and New York.

"For 5G operators there is a heady mixture of optimism and fear," said Sameh Yamany, Chief Technology Officer, VIAVI.

"The optimism is related to a plethora of new commercial applications that could change operator economics for the better, even though they may not feel the commercial impact for some time. The immediate fear is that they will get left behind in the short-term marketing battle by rivals operators if they're not fast enough in their land grab.

"Nonetheless, very quickly, the overarching driver will change from simply having 5G network availability to having the best 5G networks. Even as operators continue their 5G build-out, they will simultaneously have to shift gears from network validation and verification through to advanced analytics and automated network troubleshooting. The race for the best 5G network has only just begun."

FAKE CABLING DOCUMENTS ARE FRAUD — GO DIRECTLY TO JAIL

Paul Stathis, Chief Executive Officer, BICSI South Pacific

If seeing an article with this title in a 'technology' column seems weird to you, it's even weirder for me to be writing about it. But sadly our industry has recently encountered what amounts to fraudulent activity, so I feel compelled to write about it.

In a recent meeting between all the cabling registrars — BRCA (BICSI), TITAB, ACRS (NECA), FPAA and ASIAL — and the telecommunications regulator — the Australian Communications and Media Authority (ACMA) — it was brought to our attention that some unscrupulous people were presenting fake cabling registration cards on worksites and falsifying application documentation to become registered cablers.

Fake documents, no matter how trivial they may seem to be, amount to fraud.

An RTO whose documents were falsified has already reported the matter to the police, while the registrar who had false documents presented to them in applications will be referring the incidents to the police and naming the individuals.

While only a handful of people would stoop so low as to falsify documents, such incidents can put our overall industry in a bad light, in spite of the good work done by the vast majority. Do you recall the impact of the 'Infinity cable' disaster a few years ago? While that cable represented only a small percentage of the overall electrical cable installed in Australia, it did massive damage to the reputation of the industry — all because non-compliant and dangerous cable was imported into Australia without legitimate safety documentation. The importer was fined a paltry $33,000, but the enormous cost of remediating the collateral damage was mostly borne by the retailers. Sadly, the reputations of many electrical contractors were severely damaged through all of this.

Preventing another Lacrosse Building fire

Another sad reminder of the consequences of falsified documentation is the Lacrosse Building fire in Melbourne's Docklands in 2014. A small balcony fire spread along much of the building's facade, due to combustion within the aluminium panels that clad the entire building.

According to a City of Melbourne report on the fire:

"The MFB [Metropolitan Fire Brigade] has identified in this case that the product used in the construction of the lightweight wall was a product called Alucobest. This product does not have technical specifications readily available on its website for supply in Australia.

"A review of the documentation lodged by the Private Building Surveyor with Council has highlighted:

- *That the documentation does not provide sufficient detail to determine if the wall was designed to be non-combustible or not.*
- *There is no evidence within the fire engineering design report as to whether this wall was considered to be not non-combustible.*
- *No specific documentation lodged by Private Building Surveyor with Council, proving that the wall system was approved or accredited.*

"The MFB have also obtained a sample of wall cladding material for testing. The findings of the testing have determined that the material and wall cladding system is not non-combustible when tested in accordance with the Australian Standard AS1530.1."

Unfortunately it took a major fire to highlight erroneous documentation. If it had been qualified from the start and compliant

product used, perhaps the fire would have been contained to the balcony, rather than spreading to much of the building and causing millions of dollars in damage.

Why communications cabling matters

Some of you may say that communications cabling isn't in the same category as fire safety. On the surface, that may be true. But when you recognise that most, if not all building services are going digital and being internet-connected, the importance of communications cabling will, in some instances, be more important than fire safety. In a healthcare facility, for example, patients' lives are dependent upon monitoring. In smart buildings, digital technologies can instantly detect and enunciate fires, with occupants being quickly guided out by sophisticated egress guidance. Autonomous vehicles will move people much safer than human-driven vehicles. But what if a cheap non-compliant connector fails to deliver PoE (Power over Ethernet) and a powered heart-monitor fails? What about an untrained 'lackey' terminating cables so badly that it fails intermittently and a fire detector doesn't work at the worst possible time — when there's actually a fire. The connector may have a bogus sticker on it claiming compliance that fools the installer. And the 'lackey' may have a bogus Registered Cabler card that fools the induction officer to get access to the worksite. But when things go wrong, the investigators — Worksafe, the insurer or the coroner — won't be fooled. Someone is always held to account. And if you're the one who tried to fool people with fake documentation, you're in for a world of trouble.

When asked for a legal opinion, Forensic Engineer Peter Turnbull qualified that fake documents can't be classified as fraud until proven so, but should be called 'negatively augmented' or 'negatively enhanced' documents. But if it's alleged that you issued negatively augmented or negatively enhanced documents, you're likely to go to court. And if you lose, then it's fraud. We call this a 'business-ending event'. Depending on the severity of the incident, it could even be a 'life-destroying event'.

In a 7 March *Sydney Morning Herald* article, NSW Building Commissioner David Chandler stated that those "making fraudulent declarations, [can get] up to two years in jail".

In reviewing these incidents of negatively augmented documents, the ACMA stated that while assessing fraud was outside its remit, such documents are in fact statutory documents and therefore compel individuals to be truthful. In other words, if you fraudulently present yourself as something you're not, you are in serious breach of the law. And if charged by the police, you'll end up with a criminal conviction. So, is it really worth trying to fool people with fake documentation?

Upholding the industry's professionalism

We're presenting this information because most of us in the ICT industry are professional and want to do the right thing. We certainly don't want unscrupulous 'cowboys' tainting our industry's reputation with fake documentation, simply to make a few extra bucks profit with cheap non-compliant products or lowly paid unskilled labourers. All of the registrars are vigilant in checking documentation to ensure individuals legitimately qualify to be registered cablers. We've been on the front foot to report suppliers selling illegal copper-clad aluminium cables to the regulator. And we actively communicate to the wider community the importance of engaging qualified registered cablers for dependable communications cabling work. That's why so many induction officers demand presentation of registration cards before allowing access to the worksite; and why so many consultants call for evidence of registration in their tender documents.

With the surge in Internet of Things (IoT) and PoE applications in smart buildings and smart cities, and the greater reliance of digital life-safety and medical systems on connectivity, the importance of quality cabling will only intensify. So much will depend on the quality of your workmanship and the quality of the products you choose to use — lives may actually depend on what you do and what you choose. There is no place for fake documentation in our industry. The registrars won't tolerate it. Nor should you.

BICSI South Pacific
www.bicsi.com.au

Electrical Comms Data news

CABLING SUPPLIES UNAFFECTED BY COVID-19 STOCKPILING

Some electrical workers have struggled to source electrical cable due to stockpiling sparked by coronavirus fears.

NECA has been engaging manufacturers as a priority, and following discussions with the main cabling manufacturers, has stated that there is enough cable in Australia to meet local needs. It said there are currently no supply issues and there is sufficient inventory.

One major manufacturer did have a brief supply issue last month after its Chinese factory shut for longer than expected due to coronavirus (COVID-19). This has now been resolved and the manufacturer's factory is operating at full capacity and is shipping to Australia one-third more product than usual.

Other manufacturers have had no issues, although there has been increased demand as contractors appear to be stockpiling product.

NECA is urging contractors to only purchase the products they need, to avoid inconveniencing other electrical contractors and having unnecessary stock on hand.

NECA has also spoken with local wholesalers and other electrical product manufacturers. All have reported having good inventories and stated that it is business as usual at this time.

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MANAGING ELECTRICITY NETWORKS DURING BUSHFIRES

A fact sheet about how bushfires affect electricity networks, and how networks can prepare for the impact, has been released by Energy Networks Australia.

"This fire season has been particularly devastating, and Energy Networks Australia conveys its deep sympathy and concern for all those impacted," said Energy Networks Australia Chief Executive Officer Andrew Dillon.

"Bushfires can have a direct and indirect impact on electricity networks. Fire can damage power poles and other equipment, and heat and smoke from fires can cause overheating at substations.

"The recent fires have destroyed more than 5000 power poles across Victoria and NSW and entire sections of electricity networks are being rebuilt from the ground up."

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Dillon said power had been restored to most customers in the fire-affected regions; however, some customers in inaccessible or unsafe areas remained off-supply. Generators had also been provided to help get the lights back on for some remote customers.

"Networks are continually working on fire prevention measures including installing new technologies, removing or pruning high-risk trees and inspecting equipment," he said.

"Networks' first priority is safety for our workers and our customers."

BREAKING NEWS: ARBS RESCHEDULED FOR FEBRUARY 2021

ARBS Exhibitions has announced ARBS 2021 will be held Monday, 15 to Wednesday, 17 February 2021 at the Melbourne Convention and Exhibition Centre.

Sue Falcke, ARBS Exhibition Manager, said, "Given that current predictions determine the virus situation could continue for up to six months and maybe even longer, we have focused our efforts on moving the exhibition into 2021 when we feel it will be most appropriate and safest to reschedule."

The exhibition will remain at the Melbourne Convention and Exhibition Centre and will occupy the same space, have the same floor plan and have the same itinerary as was proposed for ARBS 2020. The event will host over 300 exhibitors, a renowned industry awards program and a comprehensive seminar presentation series.

In the interim the organisers have announced an enhanced digital offering, which will be coming soon on its website. This is an extended platform that will showcase comprehensive product information, pictures and video material to provide a more in-depth connection between their exhibitors and their customers.

Simon Bradwell, Managing Director of ebm-papst ANZ, AREMA Director and ARBS Director/Secretary, said, "At the end of this crisis I know we will absolutely need to be at ARBS to reassure our customers and our suppliers, and to give ourselves the best opportunity to rebuild for a stronger more resilient industry for the future."

The ARBS event for HVAC&R and building services professionals provides a B2B forum for the entire industry to connect.

Save the new date — ARBS 2021 will be held from 15–17 February 2021 at Melbourne Convention and Exhibition Centre.

For further information, visit www.arbs.com.au.

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Electrical Comms Data news

NEW AEMC RULE TO PREVENT POWER OUTAGES

Better information about potential electricity shortfalls will now be available for power system businesses, following the release of new rules by AEMC.

The new AEMC final determination will give generators and demand response providers more information ahead of time about potential shortfalls and forecasted needs in the power system. This will help avoid blackouts as generators can better schedule their maintenance outside of peak times.

The change also helps implement the national retailer reliability obligation (RRO), which has underpinned the reliability of the national electricity market since 1 July 2019. The RRO makes electricity retailers contract with generators or 'on demand' resources to cover projected supply shortfalls.

The rule provides greater transparency around AEMO reliability assessments over the medium term of two years. It also includes extending from two to three years, the period for which generation availability is published.

The determination relates to MT PASA (medium-term projected assessment of system adequacy), which is carried out by the Australian Energy Market Operator (AEMO) to assess whether or not electricity supply is expected to meet demand.

Acting AEMC CE Suzanne Falvi said the changes would give the market more granular detail on generation reliability and availability ahead of time, giving generators and demand response providers more opportunity to respond and fill a projected gap in power supply at a lower cost to consumers.

"This work is part of the AEMC's system security and reliability action plan," Falvi said.

"Increasing the accuracy and transparency of information in the market helps the market operate more efficiently. It will result in AEMO procuring emergency reserves more effectively and give energy suppliers the information they need to get on with the job. All of this will help lower the costs consumers see on their energy bill, and this remains a key focus for the AEMC in 2020."

KNX IP SECURE ACCEPTED AS ISO STANDARD

KNX IP Secure has recently been recognised as an international security standard for smart buildings, designated EN ISO 22510.

KNX is already known internationally as a technical standard in the smart home and building sector. Since the adoption of the KNX standard as ISO/IEC 14543-3 in 2006 and the release of the Australian and New Zealand Technical Specification SA/SNZ TS ISO/IEC 14543.3 in 2017, the global recognition and acceptance of KNX as an open protocol for smart buildings has achieved substantial growth year on year.

The new ISO standard based on KNX IP Secure was published at the end of November 2019 and was created specifically to cover open data communication for building automation and building management via KNX/IP. With the growing awareness of cyber threats that smart buildings can be exposed to and the resulting increase in security requirements for building automation, this latest ISO standard highlights the role of KNX as a global technology leader.

Since 2006, the KNX technical standard has been a forerunner in top global and regional standardisation for building automation. During the development of KNX, security has always been a top priority, to the point where experts still considered the standard to be very secure.

"With the ongoing progress in intelligent networking of buildings and infrastructure, including trending topics such as sector coupling, smart grids, etc, there is a constantly growing number of data-driven use cases in KNX projects that rely on very sensitive data and require particularly high levels of security. This is exactly where we start with KNX Secure, in which we expand our already very secure standard with additional security mechanisms to meet the highest IT security demand," said Franz Kammerl, President of the International KNX Association.

KNX Secure provides double protection, effectively preventing attacks on smart buildings. Created in 2015, KNX Secure is based on international security algorithms standardised in accordance with ISO 18033-3 and uses recognised encryption in accordance with AES 128 CCM. It protects the IP communication between the KNX installations by extending the IP protocol in such a way that all transferred telegrams and data are completely encrypted. At the same time, KNX Data Secure effectively protects user data, including data exchanged with the various terminals, against unauthorised access and manipulation by means of encryption and authentication. Both mechanisms can be combined and used in parallel to achieve maximum security for smart buildings.

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COULD LIQUID AIR SOLVE THE GLOBAL ENERGY STORAGE CHALLENGE?

Balancing power supply and demand could be about to become easier for electricity providers, following new research by University of Birmingham academics.

Led by energy experts at the institution, MANIFEST (Multi-Scale Analysis for Facilities for Energy Storage) is a £5 million project that taps into Birmingham's long-standing expertise in cryogenic and thermal energy storage.

MANIFEST addresses a number of research questions about how materials are better used in energy storage devices, how storage technologies can be better integrated and how integrated energy storage devices can be best optimised in the energy system.

The project, led by Dr Jonathan Radcliffe, brings together Birmingham's expertise in liquid air and thermal energy storage with scientists from across the country working on thermomechanical and electrochemical storage technologies and their integration and optimisation.

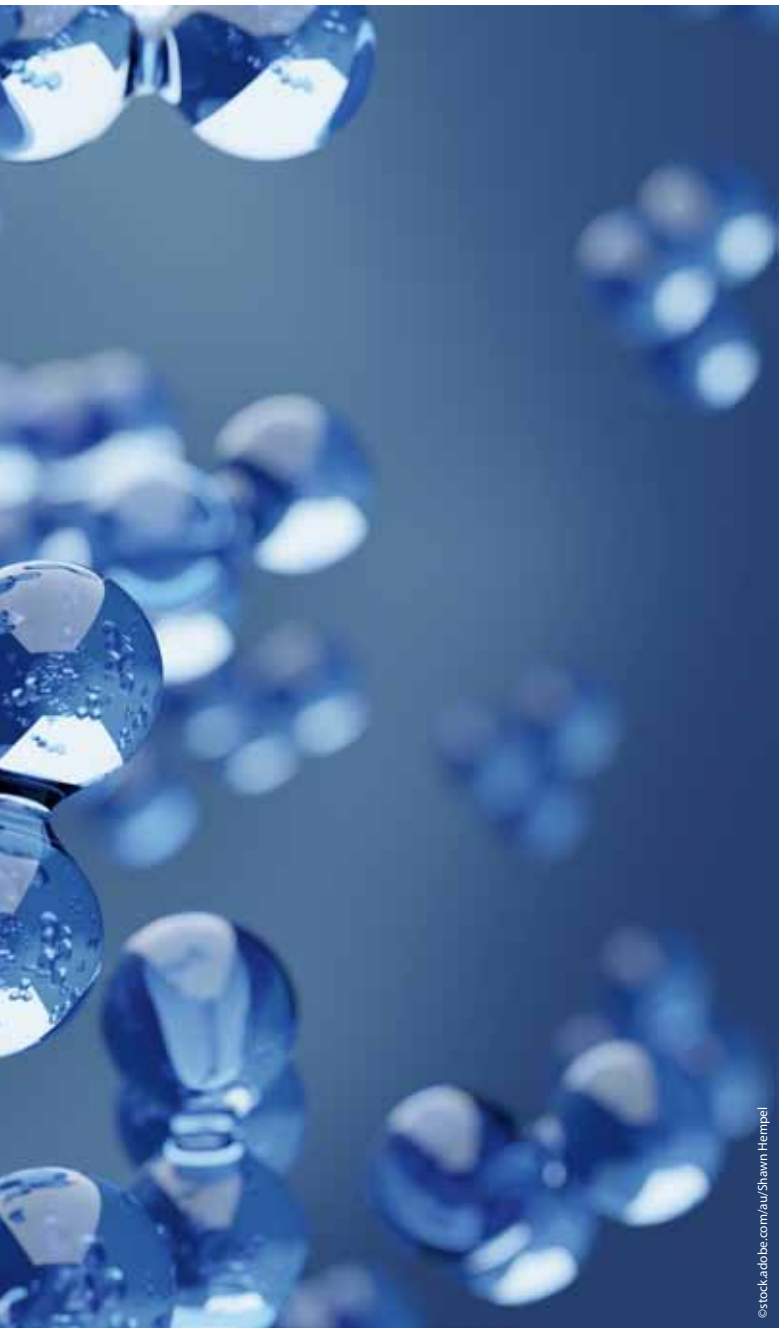
Air's main component gases liquefy at ~-196°C and the result occupies a 700th of the volume of those gases at room temperature. When liquid air is warmed and allowed to expand, its forceful expansion can spin turbines — operating generators and recovering part of the electricity used for liquefication.

Professor Yulong Ding from the University of Birmingham — one of the originators of liquid air energy storage — is working on multiscale modelling of energy storage systems in MANIFEST.

"Modelling energy storage systems is extremely complex and challenging, the MANIFEST program provided cross-university and cross-discipline collaborations for addressing the challenge. Equally important and also of our particular interest is experimental validation of multiscale modelling through this research program," Ding said.

"Technologies such as liquid air and thermal energy storage have a great potential to help crack the energy conundrum: how can variable generation from renewables meet the needs of energy users. We have one of the world's first experimental cryogenic energy storage facilities on campus and also achieved success with the first commercially available shipping container constructed from cold storage materials that can be charged with cold energy."

Additionally, the University of Birmingham is working on establishing UKESTO (UK Energy Storage Observatory) as part of the MANIFEST project — creating a national 'observatory' for energy storage that will give scientists online access to data from experimental facilities at the partner universities within the consortium.



Experimental cryogenic energy storage facilities at the University of Birmingham.

> TECHNOLOGIES SUCH AS LIQUID AIR AND THERMAL ENERGY STORAGE HAVE A GREAT POTENTIAL TO HELP CRACK THE ENERGY CONUNDRUM: HOW CAN VARIABLE GENERATION FROM RENEWABLES MEET THE NEEDS OF ENERGY USERS.

"MANIFEST is allowing the detailed study of a range of energy storage technologies and their potential impact across the energy system. There is a focus on batteries now, but that is just part of what will be required to integrate renewables at the scale needed to be on track for net-zero. And whilst there is a growing number of energy storage demonstrator sites in the UK and globally, there is little data available on their operations," said MANIFEST and UKESTO lead Jonathan Radcliffe.

"UKESTO will connect energy storage pilot plants on university campuses to create a network of national facilities that establish the UK as an innovation hub — allowing systematic study of energy storage technologies to an extent that is not possible with industrial demonstrators."

The observatory makes use of the UK Energy Research Centre's Energy Data Centre, a well-established national data repository.

Professor Ding and Professor Toby Peters, Professor of Cold Economy at the University of Birmingham, are widely recognised as the 'founding fathers' of liquid air energy storage, having identified both the need for large-scale energy, long duration storage back in 2004 and the potential to integrate mature components from existing industries in a new system able to scale to hundreds of MWs.

Ding led the team which invented and proved the idea of cold recycle, key to achieving high levels of efficiency, while Professor Peters mainstreamed the concept of liquid air as an energy storage solution vector for both electricity grids and clean cold and power.

"We're hugely excited at the opportunity to build on the vast experience in cryogenic energy storage at the University of Birmingham and help to unlock the potential of liquid air and other energy storage technologies," Peters said.

"Liquid air energy storage is a unique solution to provide low-cost, large-scale, long-duration energy storage with no geographical constraints. It also can harness waste heat or waste cold in the system to further increase the overall efficiency.

"With the demand now for large-scale, long-duration energy storage, liquid air can emerge as the serious competitor to lithium-ion in grid-scale storage."

Battery storage units

CBi-electric's battery storage units are available in 100, 125 and 250 A versions 80 VDC and are non-polarity sensitive.

The 100 and 125 A are two-pole units (2x1 pole configuration) while the 250 A is a four-pole unit (2x2 pole bridged configuration). These configurations allow for both the positive and the negative strings to be isolated simultaneously and are lockable in the off position as required by AS/NZS 5139:2019.

The MCBs are contained within an IP67 UV-rated enclosure suitable for indoor or outdoor installations. The battery storage range is suitable for isolation of the battery installation or providing overcurrent and short circuit protection.

The MCBs have an operating temperature range between -40 and +85°C. They can be sold separately for OEM applications.

CBI Electric Australia Pty Ltd
www.cbi-electric.com.au

Industrial fieldbus network I/O

The CREVIS G-series industrial fieldbus network I/O provides users with field and bus connectivity for smart integrated solutions — through a wide range of digital, analog and special modules — for almost any signal type. Users can communicate effectively with overlying systems, or other equipment, via widely used communication protocols by combining slice I/Os with a network adapter module to match their requirements.

The G-series network adapters include DeviceNet, PROFIBUS, CANopen, CC-Link, Modbus TCP, Ethernet IP, PROFINET, MODBUS, EtherCAT and Powerlink. Whatever configuration is required, users can easily advance to a powerful distributed CODESYS control solution. G series CODESYS controller modules support MODBUS TCP and RTU protocols. With the powerful CODESYS software platform, users can enjoy program speed that is as fast as the classic PLC. The G-series conforms to industrial standards and certifications, making it suitable for applications anywhere.

Global M2M
www.globalm2m.com.au

Discharge measurement and analysis

The Omicron MPD is a partial discharge measurement and analysis system. It incorporates a range of leading-edge technologies that are designed to provide accurate, reliable and reproducible measurements. The MPD corresponds to the relevant standards for electric PD measurements and also provides analysis techniques. It is available to rent from TechRentals.

The system features a measurement unit, a USB controller and sophisticated analysis software. Including a modular plug-and-play system enables assessment features to achieve high measurement accuracy. The single channel unit is expandable to an unlimited number of channels.

The Omicron MPD allows for high interference immunity for measuring under difficult conditions and fully digital data processing enables high levels of accuracy. Numerous functions are integrated into the MPD 600 system for accurate and easy handling of the measured data.

TechRentals
www.techrentals.com.au

Smoke alarm

The PSA LIFESAVER LIF10YPEW smoke alarm is designed with the latest photoelectric sensing technology and equipped with an in-built wireless interlink module. This means that when one smoke alarm activates, all smoke alarms in the same wireless network will sound. This smoke alarm is versatile, easy to install and compliant with the latest Australian Standards. The dual bug screens in the smoke alarm have been included to reduce false alarms by insects. The smoke alarm is designed with a sealed 10-year battery so users won't have to worry about changing the battery. The LIFESAVER LIF10YPEW can be interlinked up to 24 smoke alarms, and it is compatible with PSA LIFESAVER 5800 series mains powered smoke alarms using the wireless baseplate LIFWMB2. The LIF10YPEW comes with a 10-year lifetime warranty. The LIFESAVER range of smoke, heat and carbon monoxide alarms provides a complete fire safety solution. All products are compliant to the new Queensland smoke alarm legislation.

PSA Products
www.psaproducts.com.au

HOW A BATTERY STORAGE SYSTEM CAN STABILISE THE GRID

A report that analyses the performance of one of the world's largest lithium-ion battery energy storage systems has just been released by Aurecon.

The Hornsdale Power Reserve, owned and operated by Neoen, supplied by Tesla and located in South Australia, was built two years ago to stabilise the state's electricity grid. It also aimed to facilitate integration of renewable energy and help prevent blackout events.

The large-scale battery storage system has reportedly delivered more than AU$150 million in electricity cost savings during its first two years of operation.

"It demonstrates at scale the potential for battery storage to provide fast acting supply and demand balancing to the network, which is critical to maintaining consistent frequency for grid stability and improving integration of renewable energy to the national electricity market," said Paul Gleeson, Aurecon's Managing Director – Energy, Resources and Water.

The report quantifies the market benefit of the presence of Neoen's Hornsdale Power Reserve on the National Electricity Market throughout 2019, compared with a modelling of what pricing would have been if it had not been present in the market.

Aurecon found that the existing 100 MW facility reduced the contingency frequency control ancillary services costs by approximately AU$80 million, and the total regulation frequency control ancillary services cost by approximately AU$36 million, for a total cost reduction of approximately AU$116 million.

Aurecon's latest report also provides analysis of the major network outage in Victoria on 16 November 2019 that caused the grid in the state of South Australia to 'island' or become separate from the rest of the national electricity grid.

"The islanding event in November 2019 resulted in substantial cost savings of approximately AU$14 million, with Hornsdale Power Reserve's presence significantly reducing the duration of price spikes during the event when all services needed to be sourced locally within the state of South Australia," Gleeson said.

Louis de Sambucy, Managing Director of Neoen Australia, acknowledged the importance of Aurecon's report.

"Realised with our partners Tesla, the expansion of the world's largest battery will not only mean more savings for all, but will also demonstrate the highly innovative services that batteries can provide to the grid and continue to position South Australia at the forefront of the energy transition," de Sambucy said.

The Project Management Institute recently included Hornsdale Power Reserve as one of the world's most influential projects of the past 50 years. The Reserve's expansion will help to further demonstrate that large-scale battery energy storage is an essential part of the mix required to ensure grid reliability and stability in a controlled transition to renewables.

Aurecon Pty Ltd
www.aurecongroup.com

Industrial IoT power meter concentrator

The ICP DAS PMD Series industrial IoT power meter concentrator is equipped with a 7″ and 10.4″ touch panel and is designed for panel mount installation. It provides an easy way for viewing power data and setting the system parameters on the local side. The series also is equipped with built-in web server that allows direct connections via browsers to the system for viewing power data and setting the system parameters.

This product supports the Modbus TCP/RTU, SNMP, FTP and MQTT protocols for seamless integration with the back-end SCADA/MES/IT/IoT/ network management systems.

In addition to ICP DAS M-7000 I/O modules, the series can connect to standard Modbus TCP/RTU Slave modules. By working with the I/O modules, and functions such as IF-THEN-ELSE logic rule execution and alarm notification functions including LINE/Messenger/Email, the PMD offers more thought-out power demand management and alarm notification functions, and is able to perform load shedding of the devices if required, and enables real-time monitoring and control of the power consumption of the devices.

When using PMD Series to build a power management and monitoring system, during the whole process of system development, no programming is required. It takes a few clicks on a webpage to complete all settings, making it easy for the user to quickly view the power data of the devices and process the data for statistics and analysis. The series is an easy-to-use and easy-to-build total solution for power management and monitoring that makes for more efficient energy usage.

ICP Electronics Australia Pty Ltd
www.icp-australia.com.au

Industrial Ethernet cable assemblies

TE M12 industrial Ethernet cable assemblies are designed to deliver speed, reliability and ruggedness. These data cable assemblies now support Ethernet protocols as part of the company's package of Industrial Ethernet and fieldbus solutions.

In order for Ethernet to be used in industrial environments, cables and connectors must be adapted to withstand harsh environmental conditions often found there. Users of these cable assemblies can choose from a wide range of features to meet their specific needs. Jacketing, for example, is in PVC, or halogen-free PUR or other FRNC (flame retardant, non-corrosive) materials. PVC provides a competitive and economic solution for occasional movement or vibration, while PUR is more suited to more demanding applications in harsh environments where operational reliability is crucial.

Depending on the material, the assemblies withstand up to one million flexes, machine oils, abrasion and UV radiation, according to the company. A compact full-metal housing with crimp flange/crimp sleeve provides 360° shielding against EMI/RFI interference. The hexagonal crimp of the sleeve gives a vibration-resistant and torsion-proof cable strain relief, in accordance with IEC 61 373, Category 1, Class B, as well as safe shield termination. Category 5e cables can achieve transmission rates of 100 Mbps to meet network requirements in the field and at supervisory management levels. The assemblies are available with several standard cable length options from 0.5 through to 30 m.

TE Connectivity
www.te.com

Solar inverter

SolarEdge has announced a new EV charging single-phase inverter. The two-in-one EV charger and solar inverter solution features faster charging via its solar boost mode. By simultaneously utilising grid and solar power for charging, solar boost mode charges EVs up to four times faster than a standard mode 2 charger.

The inverter also offers a smart mode, allowing home owners to gain energy independence and reduce both their electricity bills and carbon footprint by diverting excess solar production for EV charging. Easy to install and commission, it reduces both the workload and hardware and installation costs of installing a standalone EV charger and a solar inverter. Compatible with multiple EV connectors, the solar inverter is also available as an EV-ready solution for future EV purchases.

SolarEdge Technologies Inc.
www.solaredge.com

Modular data acquisition system

Bestech Australia has announced the release of the robust data acquisition system from imc Test and Measurement GmbH, imc CRONOS-XT. This data acquisition system is available in modular configuration and suitable for applications in harsh and industrial environments.

The unit consists of a base data acquisition unit and multiple signal amplifier modules. The modules can be easily connected with just a click to form a complete system. The CRONOS-XT is rated with IP67 protection class and MIL-STD810F. This certifies that this system thoroughly tested for protection against dirt, dusts, water, shocks and vibrations.

With the modular building blocks technology, the imc data acquisition system is designed to be suitable for any test and measurement requirements in the user's laboratory. A wide range of measuring amplifiers is available to cater for almost all sensor types including thermocouple, RTD, DC signals, IEPE, LVDT, strain gauges and many more. The amplifiers are available with wide measuring bandwidth and 24-bit digitisation to generate precise and accurate signals.

The imc CRONOS-XT is suitable for mobile applications due to its modular configuration and being independent of the main power supply. It also offers a GPS feature for reading of movement and positioning data. An example of applications of imc CRONOS-XT is measurement on construction machinery such as tractors and agricultural equipment, as well as vehicle testing applications in harsh environments.

Bestech Australia Pty Ltd
www.bestech.com.au

5 EMERGING DATA CENTRE TRENDS IN 2020

Organisations will increasingly favour hybrid architectures that incorporate public and private cloud models and edge assets around a reconfigured core, according to Vertiv.

This preference will replace the enterprise-or-cloud debate that previously dominated the landscape in recent years, and is one of five emerging 2020 data centre trends identified by experts from the IT infrastructure provider.

The trending hybrid architectures will allow organisations to maintain control of sensitive data while still meeting soaring demands for more capacity and increased computing capabilities closer to the consumer. As connectivity and availability become conjoined concepts in this new data ecosystem, an increasing premium will be placed on seamless communication from core to cloud to edge.

"A new equilibrium is emerging in the data centre space as the industry wrestles with capacity challenges and advanced applications that are forcing significant changes to data centres of all shapes and sizes," said Vertiv CEO Rob Johnson.

"At the same time, speed of deployment is increasingly becoming a tipping point in technology decisions and will likely shape investment and innovation in the space ... This will manifest itself in many ways, but the message to data centre equipment providers is clear: the status quo is not acceptable."

Additional information on hybrid computing and other trends identified by Vertiv experts is included below.

1. Hybrid architectures go mainstream

While cloud computing will continue to be an important part of most organisations' IT strategy, there has been a subtle change in strategy as organisations seek to tailor their IT mix and spending to the needs of their applications. As more of these hybrid architectures emerge, it becomes increasingly clear that the enterprise data centre is alive and well, even if its role is changing to reflect a mix that best serves modern organisations.

2. Speed of deployment as the new arms race

As capabilities across technologies and systems flatten out, data centre and IT managers will increasingly turn to other criteria for selecting equipment. Cost is always a separator, but more and more the decision will depend on how quickly assets can be deployed. When all other factors are close, any advantage in speed of deployment and activation can be the determining factor. This is especially true as computing continues to migrate to the edge in today's distributed networks, where delivery delays mean lack of service — and revenue.

3. Average rack density remains static, but...

Although average rack density is likely to reflect marginal increases at best, the surge in advanced applications and workloads related to artificial intelligence (AI), such as machine learning and deep learning, will make pockets of high-performance computing necessary and more common. Vertiv experts anticipate early activity in this space in the areas of defence, advanced analytics and manufacturing in 2020, laying the foundation for more widespread adoption in 2021 and beyond. These racks so far represent a miniscule percentage of total racks, but they nevertheless can present unfamiliar power and cooling challenges that must be addressed. The increasing interest in direct liquid cooling is a response to high-performance computing demands.

"A NEW EQUILIBRIUM IS EMERGING IN THE DATA CENTRE SPACE AS THE INDUSTRY WRESTLES WITH CAPACITY CHALLENGES AND ADVANCED APPLICATIONS THAT ARE FORCING SIGNIFICANT CHANGES TO DATA CENTRES OF ALL SHAPES AND SIZES.

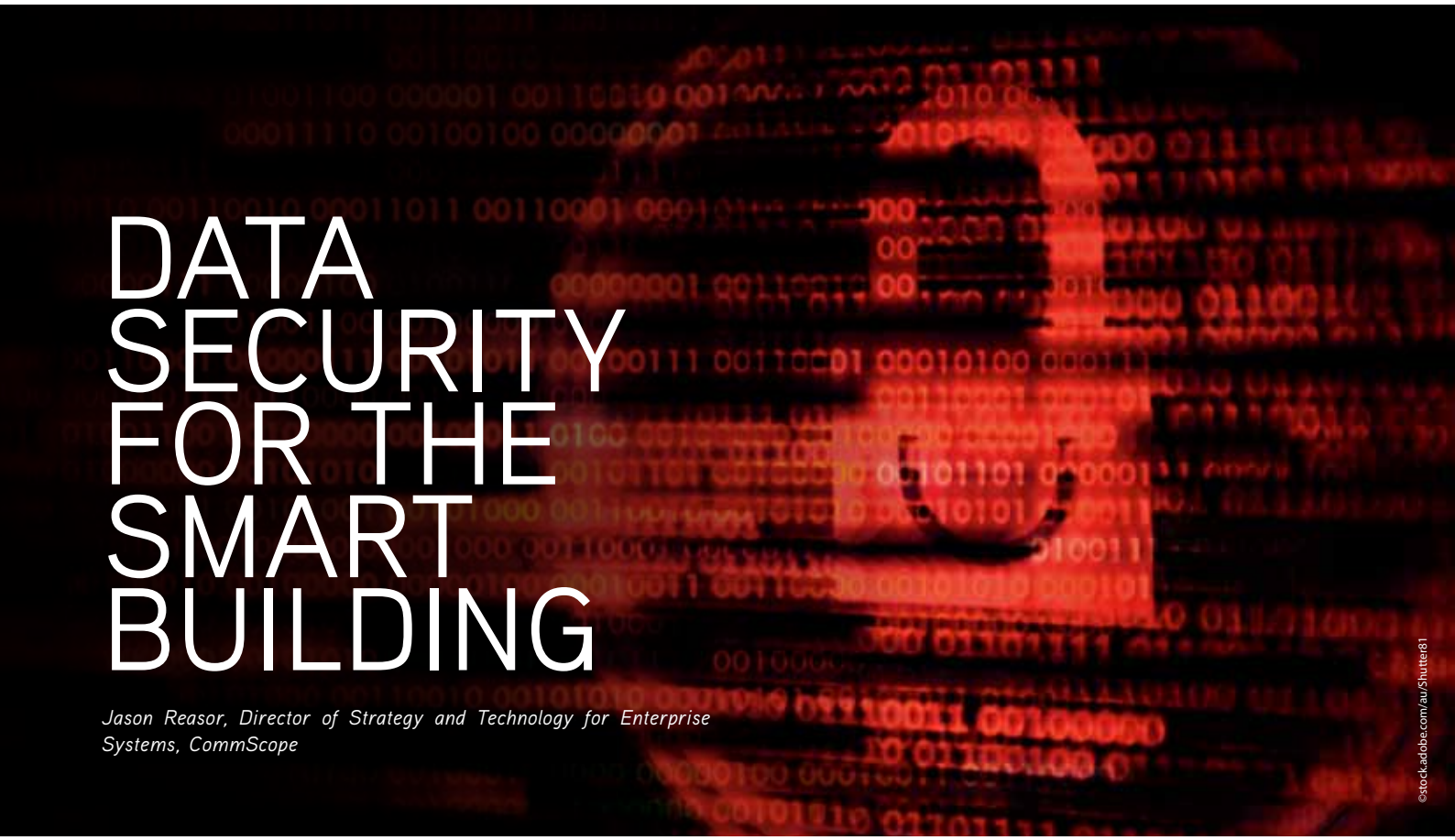
4. Batteries pay it forward

In 2016, Vertiv experts predicted lithium-ion batteries would begin to find a home in the data centre, and that has proven to be true as lithium-ion today holds a significant share of the UPS battery market. That share is growing and starting to extend to edge sites, where the smaller footprint and reduced maintenance requirements are a natural fit. The next step is leveraging the flexibility of lithium-ion and other emerging battery alternatives, such as thin plate pure lead (TPPL), to offset their costs. As 2020 progresses, more organisations will start to sell the stored energy in these batteries back to the utility to help with grid stabilisation and peak shaving. Expect this to be an important part of larger conversations around sustainability in the data centre industry.

5. Global cross-pollination

The US, particularly Silicon Valley, has been the epicentre of the digital universe and this generation of data centre development, but innovation happens everywhere. A parallel digital ecosystem with notable differences is emerging in China. Data centres across Europe and in other Asian and South Pacific markets, such as Australia, New Zealand and Singapore, are evolving and diverging from traditional practices based on specific regional issues related to data privacy and controls and sustainability. For example, general data protection regulation (GDPR) compliance is driving hard decisions around data management around the world. Those issues, and more vigorous attention to environmental impacts, are leading to new thinking about hybrid architectures and the value of on-premise computing and data storage. In China, some data centres have been running 240 VDC power into manufacturer-modified servers to improve efficiency and reduce costs. DC power has long been a theoretical goal for US data centres, and it's not hard to envision other parts of the world adopting the model being embraced today in China.

Vertiv Co
www.vertivco.com



DATA SECURITY FOR THE SMART BUILDING

Jason Reasor, Director of Strategy and Technology for Enterprise Systems, CommScope

According to a 2018 Forbes Insights survey, 60% of enterprises said their Internet of Things (IoT) initiatives have enabled them to expand or transform with new lines of business. Over the coming year, 94% anticipate a profit boost of at least five to 15% as a result of IoT.

A recent CommScope blog noted that it is the underlying infrastructure, as well as the connected devices, that define a smart building. Yet, enterprise deployment of IoT has become a defining characteristic of the smart building. The extensive network of edge-based IoT sensors is emblematic of an IT environment that uses the constant flow of operational data to improve future outcomes. Being able to support all the enterprise's connected systems and devices with a converged low-voltage network provides additional 'smart' benefits.

The two sides of smart building infrastructure

For IT managers, a hyper-connected network is a double-edged sword. While it can vastly improve things like enterprise efficiency, productivity and growth opportunities, a hyper-connected network also poses increased risks to data security. Essentially, every connection becomes a back door into your network. Of course, this is hardly news, as the industry has long been aware of the security implications of having billions of additional devices connected to the network.

Less well known, however, is that as commercial building networks evolve — becoming more heavily integrated into all aspects of the enterprise — the physical layer becomes a more attractive target. Perhaps even more surprising is that, according to a 2015 study by IBM, 60% of all data security breaches in 2015 were carried out by insiders with either malicious or inadvertent intent. So, what steps can you take to lock down your physical layer?

Tips for a more secure smart infrastructure

The right connectivity strategy can go a long way towards protecting your data from on-site attacks.

- **Physical layer monitoring and detection:** Automated infrastructure management (AIM) systems are a key weapon in fighting on-site unauthorised access. Using intelligent cabling, connectors and patch panels, they automatically document all changes and alert personnel to new and non-scheduled connections, such as an intruder plugging in a laptop to gain unauthorised access. Alternatively, the AIM system can integrate with an existing intrusion detection system to identify and communicate the exact location to the intrusion detection system. Some AIM systems also can be integrated with enterprise anti-virus software to identify rogue or infected devices by physical location — minimising the cost and damage during an attack.
- **Security monitoring and sensors:** Enhanced connectivity like that found in intelligent buildings allows for networks of IP security cameras and occupancy sensors that help spot unauthorised intruders. With the right cabling infrastructure, these Power-over-Ethernet (PoE) devices can be placed just about anywhere they're needed for optimal coverage.
- **Powered fibre/PoE cabling:** In a powered fibre or powered Ethernet network, all connected devices draw their power from the switches, which are typically backed up by UPS batteries and generators. This centralised power structure is inherently more resilient and secure. In case of a main power failure, the AIM system and all connected security devices will continue to function.

The smartest approach is rarely the most complex

Ironically, some of the most effective means of securing advanced smart building networks involve practical and common-sense approaches. If you're familiar with Occam's Razor, this shouldn't surprise you. Still, it underscores the value of being able to break down the most complex problems into their most basic components.

CommScope Solutions Singapore Pte Ltd
www.commscope.com

Cyclone-tested glass-glass solar panels

SOLARWATT's Vision glass-glass modules are durable and robust against environmental influences. The 2 mm-thick glass panels are lightweight, not complicated to install, with maximum yield reliability, mechanical strength and fire resistance. The panels provide 100% protection against PID (potential induced degradation) and have a 30-year product and linear performance guarantee.

The Vision glass-glass panels are approved for Australian cyclone conditions, as demonstrated in rigorous strength tests undertaken to assess their performance and resilience in extreme weather conditions such as cyclones.

Under testing conditions, the Vision 60M and Vision 60M Style solar modules were found to resist vertical design loads of 6.52 kPa when supported on mountings at 800 mm centres and 6.16 kPa when supported on mountings at 1200 mm centres.

The Certificate of Compliance applies to SOLARWATT Vision 60M — 315 and 320 Wp, and Vision 60M Style (black) models: 300, 305, 310, 315 and 320 Wp.

SOLARWATT Australia
www.solarwatt.com.au

LED holders

The TE LUMAWISE Type Z LED holders are designed to provide quick and easy mechanical and electrical connections of chip-on-board (COB) LED arrays in a wide variety of lighting designs. They can be used to develop Zhaga-compliant modules.

Low-profile versions are available, all featuring a snap-in retention that secures the LED in the holder during assembly and ensures proper positioning in the fixture. The LED holders are now also offered with an attachment feature for LEDIL optics, so the lighting designer can opt for beam-shaping flexibility in spot and downlight applications.

The unit holds the COB-LED in place on the heatsink with the help of a sticky tape mounting or LED clamping. The electrical connection is created without any need for soldering — a simple poke-in wire connection suffices. Wire sizes 18 and 20 AWG can be used solid, fused and stranded. Attachment of LEDIL Elise optics is also simple. The high-reflectivity housing is moulded in a flame-retardant, halogen- and red phosphorus-free thermoplastic, rated V-0 under UL94.

Holders fit to the standardised mounting footprint as described by Zhaga, so they will be widely accepted. They are suitable for use in a wide range of new and retrofit interior and exterior applications, including spotlights, track lights, recessed downlights, wall sconces, reading lamps, area and object lighting, streetlights, architectural lighting, sign and symbol luminaires, and runway lights.

TE Connectivity
www.te.com

Micro data centre

Schneider Electric's EcoStruxure Micro Data Centre is designed to support distributed IT network deployment in environments ranging from small edge applications to hyperscale data centres.

The self-contained unit includes a single-rack enclosure, remote monitoring and management services, physical security, UPS, power distribution and cooling devices.

Users can install a 6U wall mount to keep the unit's edge servers, networking equipment and UPS off the floor. The mount is designed to be less intrusive than other enclosures and comes with an integrated dust filter and fan ventilation, making it suitable for light industrial environments.

The company's micro data centres are also available in single row, pod and modular configurations, which are meant to be flexible and scalable.

Users can complete device security vulnerability assessments which aim to help users identify threats and vulnerabilities, prevent risks, comply with security policies and regulations, and understand security best practices via cloud-based monitoring and management software, EcoStruxure IT Expert.

Schneider Electric IT Australia
www.schneider-electric.com/ups

Splice and patch shelves

Warren & Brown 1RU 96F LC/A splice and patch shelves come with 4 1/4 RU trays that can be equipped with 24 LC/APC or LC/UPC pigtails and 12 LC duplex adaptors each. The shelf allows for a maximum of 4 splice and patch trays with a total capacity of 96 LC connections.

The tray design allows for good cable management and efficient fibre termination. Side clip locks allow individual trays to be extended or retracted as required, allowing for easy cable access.

The product can be installed in WBT ODFs and most other rear- and front-mount data racks. It has high density up to 96 fibres in a 1RU single-sided 300 mm footprint or 192 fibres in a double-sided 600 mm footprint — up to 7680 LC fibres in a 1200 x 600 mm double-sided ODF configuration.

Other features include possibility of left- and right-hand side cable management for patch cords; supplied fully loaded with adaptors and stripped pigtails, ordered as one part number; optional lid and 2RU 19″ brackets for 192 fibre OSP cable; lower density of 48 and 72 fibre modules available; and SC/APC, LC/APC or LC/UPC connectivity.

Warren & Brown Technologies
www.wbnetworks.com.au

Smart DIY security bundle

The D-Link AI-based DCS-8331KT smart DIY security bundle is a home monitoring solution that allows the user to automate and control devices throughout their home, regardless of where they are.

The security bundle includes a smart full HD Wi-Fi camera with built-in smart home hub, a smart door and window sensor, as well as a smart motion sensor. It has the ability to provide continuous local recording to the user's NAS or event recording to the cloud.

The smart full HD Wi-Fi camera blends artificial intelligence (AI) and intelligent video analytics (IVA) detection with 151° views of the room in true 1080p full HD at 30 fps. The built-in AI-based IVA features mean that the camera is smart enough to send an alert only when it really matters. It also enables users to set and customise individual person detection, multi-zone detection, boundary-crossing detection and priority zones.

The DCH-B112 smart door and window sensor integrates seamlessly with the DCS-8330LH smart home or Amazon Echo Plus. This sensor detects the opening and closing of doors and windows and includes a range of other features including a sensor bypass button that enables the user to open doors and windows without triggering an alert and tamper detection.

The DCH-B122 smart motion sensor also works with the smart home hub or Amazon Echo Plus. This sensor allows the user to get motion detection alerts on their phone and has up to two years' battery life. Easy to mount on any wall with an adhesive strip, it is compatible with Amazon Alexa and connects with Zigbee technology using the free mydlink app.

D-Link Australia Pty Ltd
www.dlink.com.au

DEVELOPING STANDARDS FOR OCEAN ENERGY AND SMART CITIES

Standards Australia has been working with international partners to support the journey to decarbonisation. This year, it joined the international conversation on renewable ocean energy.

Water covers 70% of Earth's surface but currently remains underutilised as a source of energy. There could be major benefits to the Australian economy, communities and energy sectors from investing in ocean energy initiatives, such as harnessing available wave and tidal resources.

The first step has been taken, with Standards Australia setting up a committee to discuss the implications and standardisation of this energy source. The global appeal to address climate change is driving major growth in renewable sources of power generation, and it is undeniable that water is one the world's most valuable and attainable resources.

The facts:

- Energy can be harnessed from waves, tides, currents and temperature differentials.
- Australia's industry is centred around wave and tidal.
- Waves are created by wind passing over the surface of the ocean.
- The natural movement of water within oceans can be transformed into electricity.
- Water has more available energy per unit area than land.

Standards will play an important role in moving forward with this initiative. While the journey into ocean energy is just beginning, Standards Australia will continue to provide important updates in other areas in support of renewable energies and smart cities.

The road to smart cities

Standards Australia has this year launched the 'Artificial Intelligence Standards Roadmap: Making Australia's Voice Heard'. The roadmap provides recommendations to ensure Australia can support AI and its future across the globe. A stable foundation is important in allowing innovative projects and enhancements like this to grow and evolve.

There are many intricate pieces to the development of a smart city, and artificial intelligence is a key piece in the puzzle. While the future of autonomous AI seems quite some time away, the reality is that we are already in the midst of it, and Standards Australia intends to be a leading voice in supporting its ongoing development and use.

Over the last three years, some of the world's most advanced economies have announced over AU$86 billion in focused AI programs and activities. In response to this, Australia, along with the United States, UK, China, Germany and others, has identified AI standards and policy frameworks as national priorities.

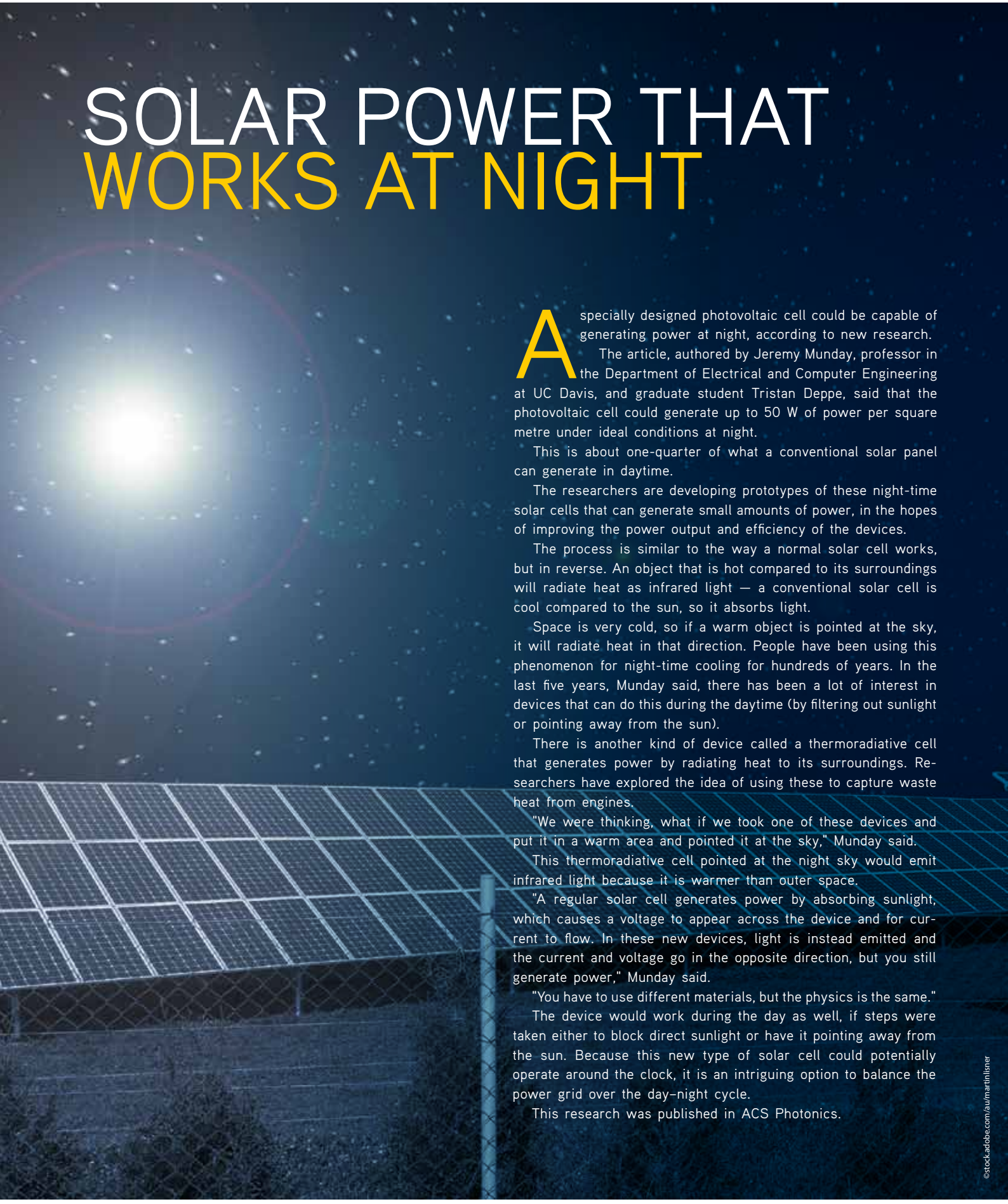
The roadmap was developed with participants in consultation forums, as well as stakeholders who made formal written submissions. These consultations highlighted the opportunity that exists to turn salient concerns into opportunities to develop 'responsible AI', by tackling specific areas such as privacy, inclusion, safety and security, programming bias and getting the policy and regulatory balance right.

This growth in AI, and the investment underpinning it, has the potential to transform the lives of Australians and is an essential building block to supporting smart cities. Developing standards to support this growth will shape the responsible design, deployment and evolution of these new technologies.

Smart cities are the ultimate goal for tech solutions and city management. Collecting data and managing services, transport and energy in the most efficient way are key to supporting sustainable opportunities. Standards Australia intends to be a key player in supporting a solid foundation for these initiatives, renewables and smart cities, to continue to grow and evolve across Australia and the wider world.

Standards Australia
www.standards.org.au

SOLAR POWER THAT WORKS AT NIGHT



A specially designed photovoltaic cell could be capable of generating power at night, according to new research.

The article, authored by Jeremy Munday, professor in the Department of Electrical and Computer Engineering at UC Davis, and graduate student Tristan Deppe, said that the photovoltaic cell could generate up to 50 W of power per square metre under ideal conditions at night.

This is about one-quarter of what a conventional solar panel can generate in daytime.

The researchers are developing prototypes of these night-time solar cells that can generate small amounts of power, in the hopes of improving the power output and efficiency of the devices.

The process is similar to the way a normal solar cell works, but in reverse. An object that is hot compared to its surroundings will radiate heat as infrared light — a conventional solar cell is cool compared to the sun, so it absorbs light.

Space is very cold, so if a warm object is pointed at the sky, it will radiate heat in that direction. People have been using this phenomenon for night-time cooling for hundreds of years. In the last five years, Munday said, there has been a lot of interest in devices that can do this during the daytime (by filtering out sunlight or pointing away from the sun).

There is another kind of device called a thermoradiative cell that generates power by radiating heat to its surroundings. Researchers have explored the idea of using these to capture waste heat from engines.

"We were thinking, what if we took one of these devices and put it in a warm area and pointed it at the sky," Munday said.

This thermoradiative cell pointed at the night sky would emit infrared light because it is warmer than outer space.

"A regular solar cell generates power by absorbing sunlight, which causes a voltage to appear across the device and for current to flow. In these new devices, light is instead emitted and the current and voltage go in the opposite direction, but you still generate power," Munday said.

"You have to use different materials, but the physics is the same."

The device would work during the day as well, if steps were taken either to block direct sunlight or have it pointing away from the sun. Because this new type of solar cell could potentially operate around the clock, it is an intriguing option to balance the power grid over the day–night cycle.

This research was published in ACS Photonics.

Cloud-based platform for business operations

Fergus is a cloud-based platform enabling end-to-end operations management for small to mid-sized trades and service businesses. It enables users to see at a glance where all the revenue in their business is, reduces double handling and keeps everything related to a job in one place while automating admin.

Its core features include a real-time visual dashboard with tools for costing, invoicing, scheduling, resource planning, timesheets, GPS, workforce tracking and H&S compliance. The user-friendly interface enables businesses to manage hundreds of jobs at a time, helping to streamline the business and improve profitability.

The platform makes team management more efficient with field service tools in the mobile app to keep teams organised. These include job cards, drag-and-drop scheduling, group scheduling and instant job notifications to keep teams updated on changes to job scope, location and more with push notifications. It also has convenient next-day scheduling to give teams visibility into job times with a calendar. Users can turn quotes into POs to order items from materials suppliers.

The platform's features create an effective business management approach, allowing users to utilise insights about their business to help pick profitable jobs and grow margins. Tools enabling this include a dashboard to view the status of revenue, job financial summaries, a WIP report to organise jobs by invoice progress and automatic invoice reminders that send text messages to customers when invoices are overdue. It has integrations with Xero and MYOB accounting software, as well as a number of trade suppliers including Middy's and Reece.

Fergus

fergus.com/en-au/

SWITCH TO REGULAR CASH FLOW BY REQUIRING A DEPOSIT

Chris Strode, founder, Invoice2go

No matter your trade, cash flow is the lifeblood of a successful business. Without a steady cash flow and streamlined payment processes, it can be difficult to sustain your electrical business's longevity.

Keeping a finger on the cash flow pulse can not only help your business survive slower periods, but it can also help when it comes to planning and budgeting for upcoming jobs or large expenses.

One way to generate a steady cash flow is to request a deposit before you start work on each project. A deposit is a great way to formalise a job and ensure that both you and your client are committed to seeing it through to completion. It's also one of the best ways to boost your cash flow and positively impact your day-to-day financials, especially if the project has up-front costs before it can commence. Here are some of the ways requesting a deposit can boost your cash flow.

Automate the incoming money

To operate a successful business, it's important that there is more money coming in than going out. While many electricians might take this as a given, it can be deceivingly difficult to maintain a positive cash flow. Whether you're working on a small, one-off job such as rewiring a single light or a large undertaking such as the installation of electrical systems in an entire house, a deposit provides peace of mind that you will be able to cover the costs of some or all resources, wages or other business expenses before the job is complete.

Requesting a deposit may seem daunting, however there are a multitude of small business tools available that can provide you and your client with the confidence to move forward. For instance, mobile invoicing app Invoice2go allows you to request a deposit on your approved estimate right from the palm of your hand. Digitally requesting a deposit makes it easy for your clients to pay, boosting your cash flow and saving you time on the paper trail down the track.

Cover out-of-pocket expenses

Not only can deposits help to boost your cash flow during slower periods, but they also provide a safety net to cover any unexpected out-of-pocket expenses that might occur. While regular wages, basic equipment and standard tools are expected and budgeted for, on occasion, a job might require specialised equipment that you don't have immediate access to. The pain of being caught at a job site waiting for the scissor lift or generator to arrive is only heightened if you need to reach into your own pocket to cover the cost. Deposits ensure that when these extra costs come, you won't be left out to dry waiting for the invoice to be paid.

Take the guesswork out of your finances by providing clients with a cost estimate, and structure the deposit amount and payment schedule around it. Typically, the larger the project is, the larger the deposit should be. However, working with your client to reach an agreeable amount that works for the both of you can help them feel less hesitant to hand over the amount, while at the same time feeling like their needs are being met. Cover your expenses and keep your clients happy — that's what we call a win-win!

Supply payment terms to get the job started faster

Outlining payment expectations and requesting a deposit gets your working relationship off on the right foot, and allows you to spend more time focusing on what you're there to do — electrical work. Imposing payment terms that require payment in, for example, 15 or even 30 days and charging interest or a small fee for those customers that miss the deadline can help boost your cash flow by helping you get paid, and get to work, faster. Becoming more efficient with deposits, invoicing and payments over time can help you to streamline your business's processes and, as a result, potentially expand your workload. The more customers you're able to service, the more money you will see coming in.

Requesting a deposit before you begin a job can be a great way to generate consistent cash flow for your electrical business. It can also provide the stability and certainty that you can get to work sooner and get paid faster.

Chris Strode is the founder of Invoice2go, the mobile invoicing app that gives small businesses and contractors control over their time and business.

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TOP 5 POWER QUALITY PREDICTIONS FOR 2020

John Atherton, General Manager Power Quality, Eaton ANZ

Reliable, quality power will continue to play an important role in 2020, as it does every year in Australia. In fact, it will become even more important with the imminent arrival of 5G. Telecommunication providers will have to ramp up their network upgrades in preparation for 5G, and the increased focus on the relationship between power quality and connectivity will play a critical part in ensuring the resilience of these high-speed networks.

Here are Eaton's top five power quality predictions for 2020.

1. Increasing demand for cybersecurity

2020 will see an increasing awareness and demand for enhanced cybersecurity in remote monitoring and control of AC and DC UPS systems, particularly in relation to critical infrastructure. With cyber threats becoming more prevalent and sophisticated, data centre and network operators must protect their critical infrastructure against cyber threats. As industries introduce smarter connected technologies, trust is becoming increasingly important. Technology is reliant on power availability. Without power, there is no connectivity.

2. IoT and edge need 5G

The expansion of the 5G network in Australia will remain under the spotlight, as telco providers roll out 5G in Australia across 2020. 5G will be the 'enabler technology' that drives IoT expansion and edge demand, facilitating the development of technology such as driverless cars and smart cities. The quicker and more efficiently this can be rolled out, the quicker the market can leverage the full benefits that IoT can bring.

3. Edge infrastructure

Edge computing will continue to see an increase in demand. The rollout of 5G requires that the latency for a device to talk to the network and for the network to talk back must go below one millisecond. In the current 4G networks, latency can be 10–20 times higher. Supporting 5G requirements will come as both a challenge and an opportunity for power management companies in 2020; it is expected globally that 8.5 million small cells will have to be deployed per annum.

4. Growth in lithium-ion

2020 will feature increased deployments of lithium-ion batteries in AC and DC UPS systems, moving away from traditional VRLA batteries. Li-ion manufacturing capacity is growing, and the price point is improving. The market is starting to embrace the benefits that Li-ion provides, including enhanced performance, smaller footprints and longer battery life.

5. UPSaaR will pick up the pace

UPS-as-a-Reserve (UPSaaR) is an application where large UPS installations can be leveraged to provide grid stability services back to the electrical grid through the energy supplier. Data centre operators and other users of large UPS systems can generate an alternate revenue stream from their existing or new investment in a UPS. UPSaaR is picking up pace with providers who already have aggregated generators in place. With widespread blackouts forecast by the AEMO for 2020, we can expect to see the market further exploring and deploying their UPS infrastructure on UPSaaR platforms.

Eaton Industries Pty Ltd
www.eaton.com

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Westwick-Farrow Media
A.B.N. 22 152 305 336
www.wfmedia.com.au

Head Office
Unit 7, 6-8 Byfield Street, North Ryde
Locked Bag 2226, North Ryde BC NSW 1670
Ph: +61 2 9168 2500

Editor: Amy Steed
ecd@wfmedia.com.au

Publishing Director/MD: Geoff Hird

Art Director/Production Manager: Julie Wright

Art/Production:
Colleen Sam, Veronica King

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

Copy Control: Mitchie Mullins
copy@wfmedia.com.au

Advertising Sales:

Sales Manager – Liz Wilson
Ph: 0403 528 558
lwilson@wfmedia.com.au

Caroline Oliveti
Ph: 0478 008 609
coliveti@wfmedia.com.au

Tim Thompson
Ph: 0421 623 958
tthompson@wfmedia.com.au

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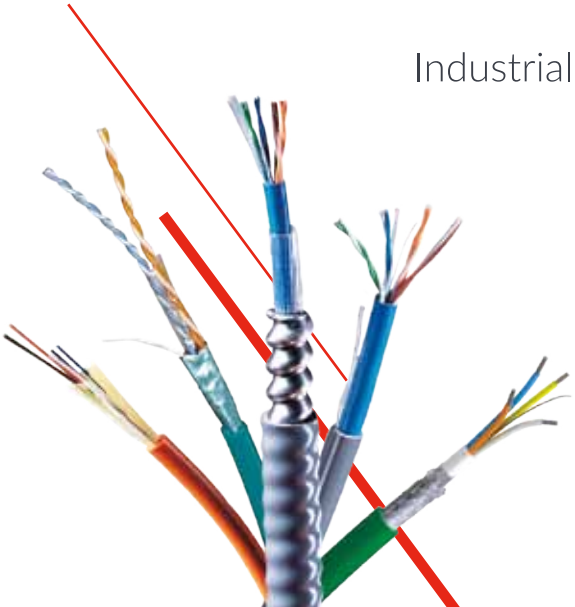

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