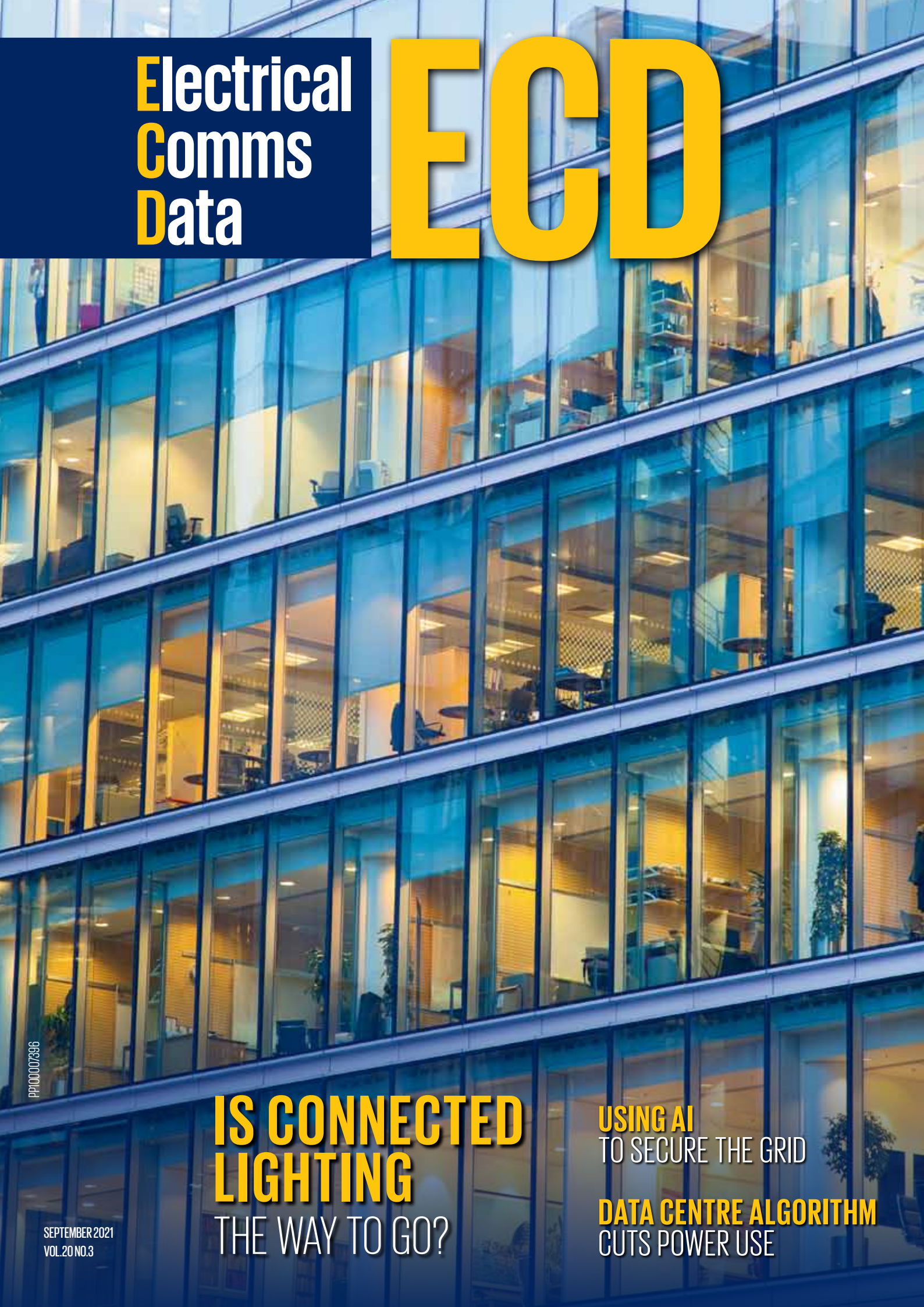

Electrical Comms Data

ECD

IS CONNECTED LIGHTING THE WAY TO GO?

USING AI TO SECURE THE GRID

DATA CENTRE ALGORITHM CUTS POWER USE

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SEPTEMBER 2021
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FROM THE EDITOR

Welcome to the September edition of ***ECD*** — I am pleased to be back in the world of electrical, comms and data once more.

And what a time it is to be jumping back in. It seems that 2021 has taken a turn for the worse, with the Delta variant of COVID-19 tightening its grip on Sydney and spreading to other parts of the country. Most states have experienced lockdowns in recent weeks — and while the Sydney-wide construction ban has just lifted at the time of writing, the majority of those who are able to work from home are still doing so.

But one day in the near future, we will be returning to our work buildings — buildings that may stand to benefit from smart and connected technology systems. With the connected lighting industry expected to surge in coming years, the benefits provided by this type of technology often reach far beyond simple energy savings. However, research suggests that there is a general lack of knowledge among consumers about the return on investment connected lighting can offer.

In this issue, we also look at how machine learning technology can be used to accurately predict wind and solar, helping to securely integrate these sources of power into the grid. Artificial intelligence is also enabling a higher share of renewable energy in the national electricity market without compromising overall grid stability. This is important because, according to the Energy Security Board, a redesign of the entire national electricity market is needed. By opening the grid to cheaper, large-scale renewables, we can support the transition to a more modern energy system for Australia's future.

Amy Steed – Editor
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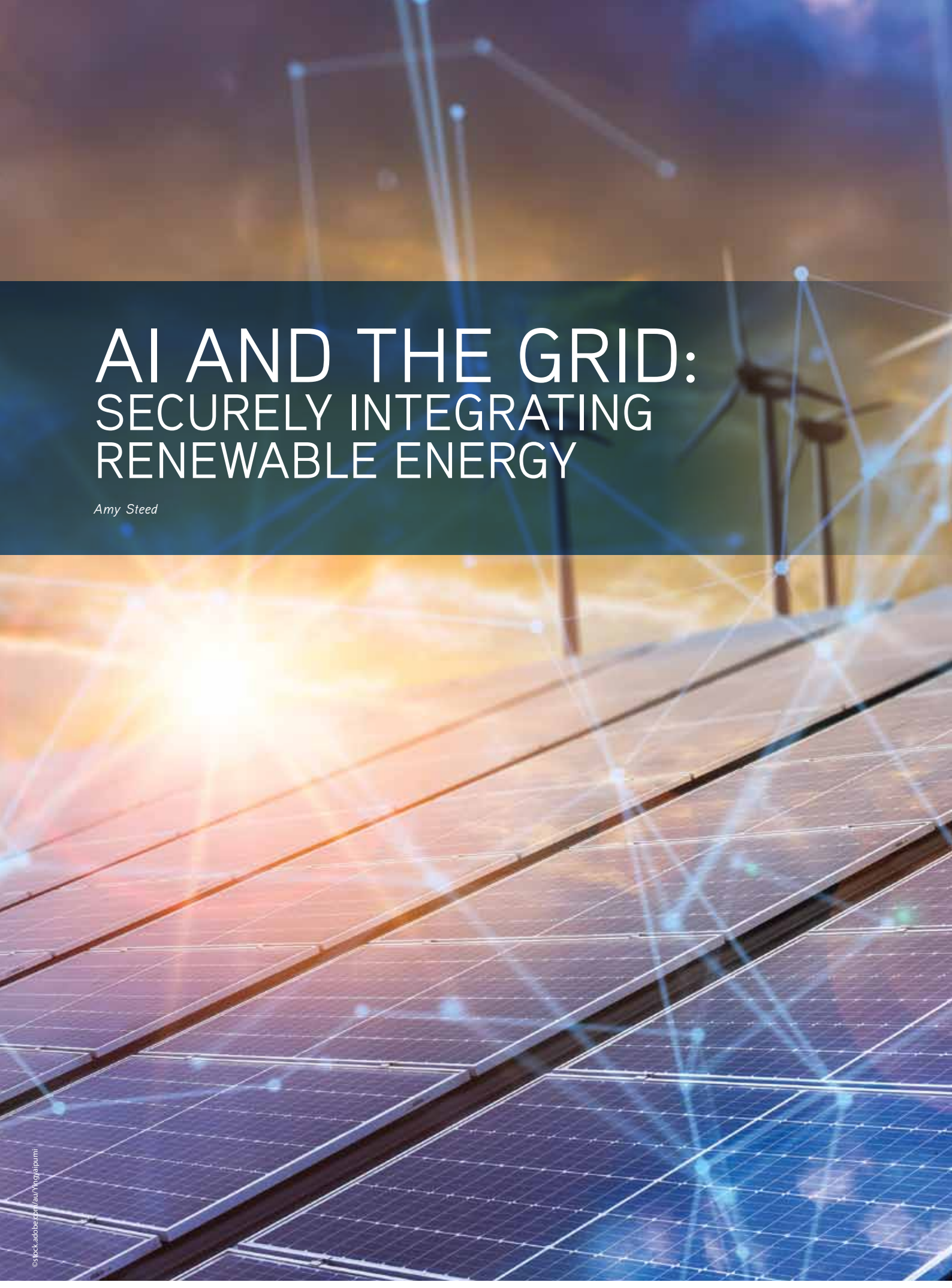
AI AND THE GRID: SECURELY INTEGRATING RENEWABLE ENERGY

Amy Steed



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As Australia looks to design an energy grid that is fit for the future, finding the best ways to integrate renewable power sources is high on the agenda.

In July 2021, the Energy Security Board (ESB) handed final advice on the redesign of the national electricity market (NEM) to the Energy National Cabinet Reform Committee.

The overarching goal of the submission is to support an orderly transition to a modern, new Australian energy system, with a rapidly increasing growth in large- and small-scale renewable generation. One of the key reform pathways proposed by the ESB was opening the grid to cheaper large-scale renewables by reducing the costs of providing this power generation.

It also highlighted the importance of unlocking benefits for all energy consumers — including solar PV, batteries and smart appliances — by putting the necessary arrangements in place to make better use of existing rooftop solar and customer batteries.

"This isn't just a tweak around the edges; it's about a whole redesign of the national electricity market," said ESB Independent Chair, Dr Kerry Schott.

"We all know reform isn't optional. It is not something we can choose to do; it's something we have to do to confidently embrace Australia's energy future, while reducing the risk of price shocks and blackouts."

How artificial intelligence can be used to ease grid pressure

Machine learning technology is being used to accurately predict wind and solar power to securely integrate them into the national electricity grid.

> BY IMPROVING THE ACCURACY OF FIVE-MINUTE AHEAD FORECASTS REQUIRED BY THE NEM, THE GENERATION FORECASTING SOLUTIONS DEVELOPED BY THE WORLEY AND MONASH TEAM CAN PROVIDE BETTER FORECASTS TO REDUCE THE FREQUENCY OF POOR DISPATCH, THEREBY SUPPORTING A HIGHER SHARE OF RENEWABLES IN THE MARKET WITHOUT COMPROMISING ON OVERALL GRID STABILITY.

As part of a collaboration between Monash University's Grid Innovation Hub, Worley and Palisade Energy, the Australian Renewable Energy Agency (ARENA)-funded project aims to provide wind and solar power generators with more accurate and reliable five-minute ahead self-forecasting tools.

By improving the accuracy of five-minute ahead forecasts required by the NEM, the generation forecasting solutions developed by the Worley and Monash team can provide better forecasts to reduce the frequency of poor dispatch, thereby supporting a higher share of renewables in the market without compromising on overall grid stability.

"The energy market operates at five-minute intervals — so every five minutes there is updated information about energy being produced," said Dr Christoph Bergmeir, from the Department of Data Science and AI at the Faculty of Information Technology (IT) at Monash University.

"The big difference between conventional power and renewables is that with fossil fuels, you can decide how much you produce. With renewables you rely on the wind and the sun. Wind and solar farms need to be in the energy market, so they need to be able to say, 'in five minutes' time, this is what we are going to produce and what we can sell'. If you don't produce enough from renewables, this energy needs to be covered from other sources.

"If you have more demand than you have supply or the other way around, the network frequency gets out of the band it is supposed to be in. That makes the network unstable, and the network operator has to compensate for that. What producers then often need to do is buy power from other suppliers to meet the demand, known as 'causer pays'. Whoever has the best forecast accuracy is therefore advantaged, because they end up paying less. And if renewable energy producers have to pay less of these costs, it makes them more competitive."

The forecasting models that the team have developed are based on machine learning algorithms, drawing on internal supervisory control and data acquisition (SCADA) data feeds from the generators as inputs to the model. The 130.8 MW Waterloo Wind Farm in South Australia and the 11 MW Ross River Solar Farm in Queensland were chosen for the study. The overall project had a total budget of close to $1 million and demonstrated that improvements can be made to forecasting accuracy for both wind and solar generators by utilising and enhancing best-practice machine learning techniques. These forecasting models can be applied to all energy farms in Australia; however, more research is needed on the solar side.

"Our project focused on using sensors that are already onsite, measuring wind speed and wind direction by themselves. That data is readily available. Solar farms are similar, with some readings directly available," Bergmeir said.

"These farms have an obligation to send that data to the Australian Energy Market Operator (AEMO), so that means data feeds are directly available. This worked well for wind — for solar it also worked, but for the solar I think the system would probably profit from having additional data like cloud cover detection, things like that. To get external sensors, and compare the current system to a system that has, say, a sky cam to track to cloud movement.

"I think the next step is looking at integrated solutions where you also have a battery, either onsite or directly connected in some way. The forecasting is already done for wind and solar, so incorporating an algorithm to optimise the system as to when to charge the battery would be beneficial. And looking at these integrated systems of energy storage."

Researching and testing renewables technology

The Australian National University (ANU) has also taken steps to help develop a climate change resilient electricity grid, with the opening of the Distributed Energy Resources (DER) Lab.

This facility will research and test new technologies such as batteries, solar panels and electric vehicles, which will form a key part of the future grid.

"As Australia moves away from large centralised fossil-fuel powered generators to a decentralised grid consisting of a vast array of distributed renewable energy assets, we need to find innovative ways to enable this vast amount of renewable energy to safely and effectively enter the electricity grid," said ANU Vice-Chancellor, Professor Brian Schmidt.

"The Lab will provide a fail-safe power system to rapidly, efficiently and securely develop and test technologies and systems before deploying them into the live grid."

The DER Lab was announced in 2019 with $1.5 million in funding from the ACT Government. The project to design and construct the national facility has been a partnership between ITP Renewables, UNSW Canberra, evoenergy and ANU.

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Electrical Comms Data news

COMMS CONNECT MELBOURNE RESCHEDULED FOR MARCH 2022

Comms Connect Melbourne has been postponed to 8–10 March 2022 due to concerns about ongoing COVID-19 outbreaks.

The event, which is Australia's premier critical communications and public safety exhibition and conference, was originally scheduled to be held on 19–21 October 2021.

"We are confident this decision is in the best interest, safety and wellbeing of all in the industry, given the current outbreaks and lockdowns across the country," said WF Media Managing Director Geoff Hird.

"Our key industry stakeholders, including leading industry bodies ARCIA and TCCA/ACCF, have supported the move, as have our sponsors and conference speakers. We wanted to make this call now to allow our partners plenty of time to adjust their plans and resource commitments."

Comms Connect Melbourne is in its 14th year and is the annual meeting place for the sector's key vendors, suppliers, public sector leaders and end users. The updated conference program will be released late next month and the current list of sponsors, exhibitors and supporting industry bodies can be found here. The Australian Radio Communications Industry Association holds its annual ARCIA Awards gala dinner as part of the event, and this will now take place on 9 March.

"With the vaccination rollout ramping up nationally now, we look forward to a very strong Comms Connect Melbourne in March next year and a business events rebirth," Hird said.

FUNDING BOOST TO TACKLE SKILLS CHALLENGES IN SA

South Australian tradespeople will have greater access to affordable courses to improve their skills under a $430,000 funding boost secured by the Construction Industry Training Levy.

The extra funding comes as demand in building and construction activity surges across South Australia, including in regional areas.

Extra funding will enable further savings on subsidised training courses initiated by the Construction Industry Training Board (CITB).

The funding also will help regional tradespeople to access more training to secure their jobs and ensure a qualified pool of apprentices are licensed and work-ready outside of metropolitan Adelaide.

CITB Presiding Member Maree Wauchope said the new funding measures reflected industry priorities and would focus on the most in-demand skill areas to meet significant consumer interest in the federal government's HomeBuilder Grants scheme.

Almost 14,000 grants, each worth $25,000, have been handed out in South Australia — the highest rate per capita in the country.

"The board made the decision to increase funding for successful training initiatives and to maintain support into the next financial year," Wauchope said.

"The CITB works to ensure levy payments are invested in crucial areas that matter like apprenticeship support and direct funding for high-quality training. This is a great outcome for the industry and the state."

The financial boost is supported by Innovation and Skills Minister David Pisoni.

"South Australia's economy is roaring back to life with 15,300 jobs created in the last month as a home building boom creates massive demand for tradies," Pisoni said.

"The Marshall government's $280 million investment in skills training is critical to ensuring South Australia has the skilled workforce necessary to drive further investment and even greater job creation."

CITB Chief Executive Officer Andrew Fullgrabe said the average cost of undertaking more than 100 courses would be halved and the range of courses available to more than 6000 apprentices broadened.

"This includes courses to upskill employees in work health and safety training, construction skills and management," Fullgrabe said.

Training providers will be supported to deliver more courses in regional areas with a doubling of the existing travel subsidy.

Fullgrabe said the Construction Industry Training Levy helped more than 13,000 construction workers access more affordable training last financial year.

"Our current funding boost is targeted to deliver more assistance to individuals and businesses," he said.

"The levy is helping construction workers undertake training that complements their existing trade qualifications and improves their skills or knowledge.

"At a time when the construction industry is undergoing significant challenges, South Australia's current and prospective construction workers are accessing training the levy supports now more than ever."

To learn more about the CITB, visit the website: citb.org.au.

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MULTI-UTILITY PROVIDERS CREATING RESILIENT COMMUNITIES

Multi-utility service provider Altogether Group — an amalgamation of Flow Systems, Flow Utilities and Meter2Cash Solutions — has unveiled a new brand identity to reflect its simple and sustainable water, power and data services.

CEO Terry Leckie said that Altogether has an ambitious vision for the future, with a strong focus on increasing the Group's presence in South East Queensland.

"Our name change reflects the maturity of our business as a multi-utility serving communities across Queensland and New South Wales. With better ways of using, producing and thinking about power, water and data, we are working together with strata and building managers, body corporates, developers and communities to create a better future for everyone," Leckie said.

"Through local utility services, we deliver genuine long-term, sustainable benefits to all stakeholders. We currently provide electricity, gas, hot water and potable water embedded network services to over 25,000 customers through our local teams in Brisbane, Gold Coast and Sydney. Our vision is to increase this to 100,000 within the next three years," he said.

Over 400 communities already receive Altogether's services including the recycled water system at Sydney's Central Park and efficient embedded energy networks in the high-rise communities of Brisbane Skytower, Q1 and Southport Central in Queensland.

In South East Queensland, the company is primarily working with building and strata managers to provide embedded energy services, which allows communities to gain access to competitive wholesale electricity rates while also allowing the generation and distribution of inexpensive renewable energy.

At Q1 Resort & Spa, one of the most iconic skyscrapers in Surfers Paradise, Altogether is now maintaining the Q1 embedded energy network with the introduction of smart electricity, hot water and drinking water metering with remote monitoring and control.

"By replacing manually read meters with smart meters and automation, Q1 Resort & Spa has removed the unpredictability in utility pricing now and into the future. User-pay utility services help to lower existing strata fees and make it easy for residents to ensure they are in better control over their usage whilst getting the best price available. Electricity is purchased in bulk at the tower's gate meter and potential savings are shared with our customers," said Drew McKillican, Executive Manager of Energy Services at Altogether Group.

"Altogether's air-conditioning solution chills water centrally allowing the system to function more efficiently and bills to reflect each customer's use. Residents also benefit from embedded gas services and a new hot water plant to replace ageing systems," he said.

Multi-utility approaches are creating resilient communities and sustainable outcomes, allowing people a financial stake in their community infrastructure that can benefit them directly. This is often called the 'circular economy', which presents a significant economic opportunity for Australia. It is estimated that the circular economy will deliver AU$1.4 trillion in cost savings by 2025 — Australia's share is estimated at $26 billion per year.

"Next-Gen utility services like Altogether are transforming communities around the world, offering innovation, jobs, economic growth, resilience and a circular approach to resource management," Leckie said.

"At the heart of what we do is empowering communities to thrive by delivering reliable, localised essential services. We're constantly opening new doors and exploring new possibilities to progress communities. That's why we capture local resources, reduce wastage and offer more affordable solutions — in turn, helping to build more resilient communities," he said.

MENTAL HEALTH INITIATIVE FOR STRUGGLING TRADIES

Tradies are being urged to check in with their workmates and make sure they are coping mentally.

R U OK? has released 'Tradies Tools to Talk', a conversation guide to help them determine when and how to ask their workmates "are you OK?"

Additional resources feature tradies sharing their stories and practical tips along with information about how to spot the signs someone might be struggling, and clear pathways of support for someone who answers, "no, I'm not OK."

For tradies, talking about feelings isn't always easy — and that can add to the pressure for a workmate who might be doing it tough. By making time to genuinely reach out and connect, it is possible to make a difference to someone struggling with life and help them find professional support when needed.

Download the free resources, including the Conversation Guide for Tradies, at https://www.ruok.org.au/tradies.

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IS CONNECTED LIGHTING THE WAY TO GO?

Amy Steed

With an ever-increasing emphasis on buildings, systems and cities becoming 'smart', the market for technologies such as connected lighting is a huge one.

Worldwide sales of smart lighting and connected control systems are expected to swell to $21 billion in 2023, up from $10 billion in 2018, according to research by Omdia.

Meanwhile, forecasting from Guidehouse Insights suggests that global annual revenue for connected lighting systems will experience a compound annual growth rate of 17.6%, reaching $6 billion in 2028.

However, at the consumer level, there is a general lack of awareness about the value that smart and connected lighting systems can provide. This is true both for the individual consumer and for the commercial sector at large. Limited clarity around the return on investment (ROI) beyond a simple upgrade to LEDs has proved to be one of the biggest barriers for commercial adoption of connected lighting, while individual consumers are often priced out when it comes to installing this type of technology in their homes.

Despite this, there are some real benefits associated with connected and smart lighting solutions. For instance, they have the ability to leverage advanced sensors, meaning they can intelligently control lighting and support the automation of an entire building. These solutions are able to coordinate heating, ventilation and air conditioning (HVAC) operability, as well as security, access and maintenance systems. This comes with obvious financial perks, with huge energy savings generated by occupancy sensors, dimming controls and demand management. However, it can take time to reap the rewards after paying large upfront costs to install the technology in the first place.

As the benefits of this technology are gradually becoming more apparent, the uptake of connected and smart lighting is accelerating.

What are the key drivers?

According to the report 'Connected Lighting Overview', key investment drivers include vast energy savings, greater awareness of the Internet of Things and voluntary building standards. The proliferation of LEDs has also led to an increased adoption of connected lighting systems, because having LEDs in place makes it easier to swap to this type of lighting.

Omdia research suggests that lighting manufacturers have tried to refocus their marketing activities on benefits that reach beyond energy savings — with many instead opting to position their products as part of the 'IoT revolution'. These companies have also introduced a number of smart-lighting solutions for residential end users, although the cost of set-up and installation service is usually very high and not many families can afford the luxury of a professional smart lighting system. This, in turn, has prompted manufacturers to introduce simple, highly affordable DIY solutions that do not require professional installation.

"Smart lighting technology is becoming more accessible to consumers thanks to the growing availability of simple DIY smart-lighting systems," said Pal Karlsen, research analyst, building technology, at Omdia.

"However, there are a few barriers preventing mass adoption. The main obstacle is arguably the lack of awareness and appreciation of the benefits smart lighting can provide to the consumer. This is a critical factor preventing the business from reaching its full growth potential."

Better education is key to continued market growth

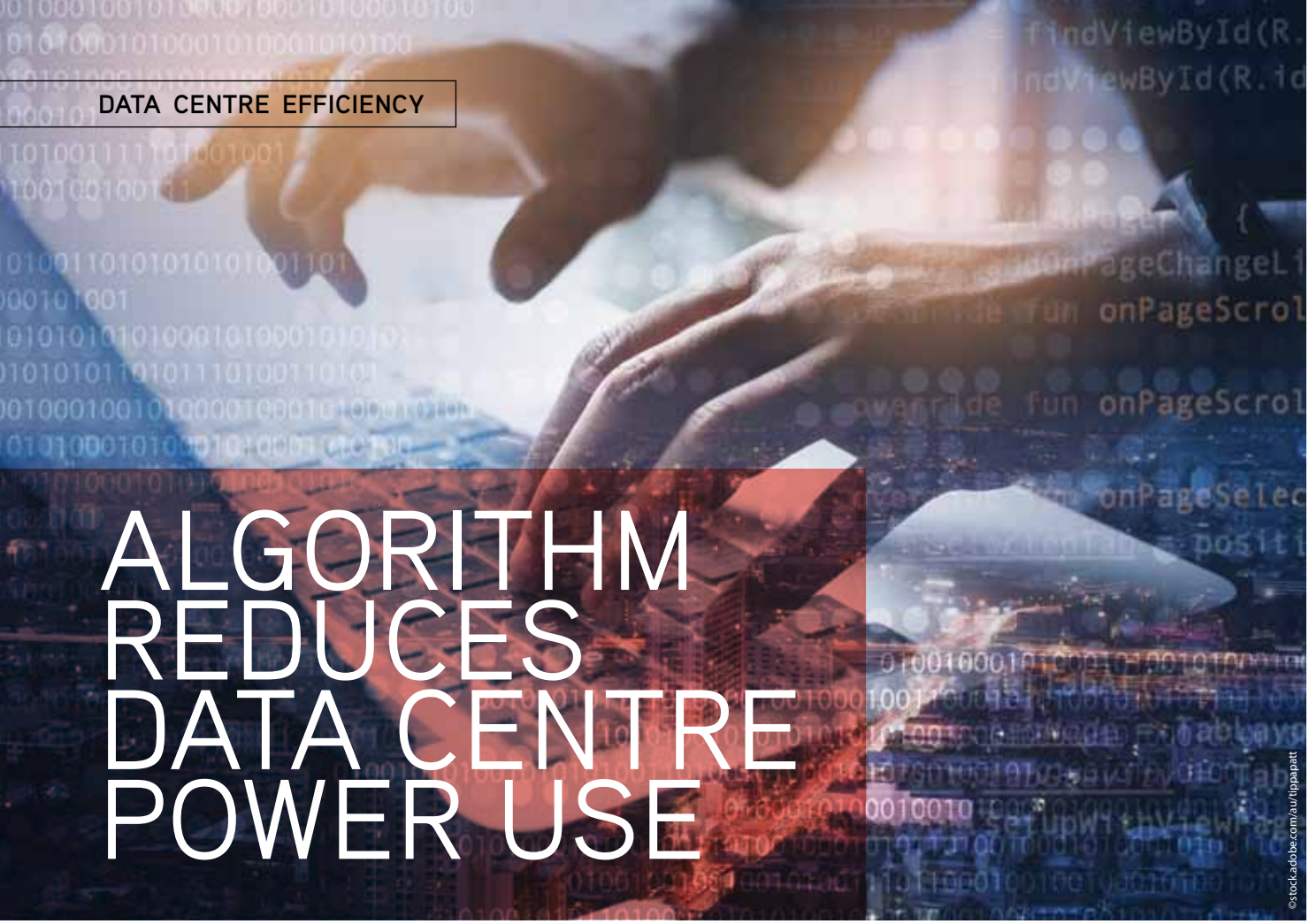
Put simply — messaging around the benefits provided by connected and smart lighting systems needs to be improved, and made more consistent. For instance, smart lighting systems can enable 'human centric lighting', which allows customised lighting conditions in the home to help improve residents' sleep, productivity and comfort.

"Health benefits can be a very strong argument in favour of making an investment in a smart lighting system, but manufacturers have not been able to effectively share this message with consumers," Karlsen said.

"Manufacturers will need to dedicate more effort to educating customers about the real-life benefits of smart lighting systems. This educational outreach can include real case studies and results from scientific studies or consumer tests where the benefits of smart lighting have been demonstrated."

More clarity is also required in messaging about the ROI benefits for connected lighting systems in commercial buildings. While most industries understand that upgrading to LED lighting will produce energy savings, the value in creating a connectivity grid within an entire building is less widely appreciated. According to Szymon Slupik, CTO and founder of Silvair, "The value of additional services enabled by smart lighting is seven to 10 times more valuable than the lighting controls and energy savings themselves."

So it seems that the value of connected lighting systems has the potential to go far beyond the simple reduction in energy usage that LEDs provide — but only if consumers are made fully aware of the key benefits.



ALGORITHM REDUCES DATA CENTRE POWER USE

An algorithm that could significantly reduce the power consumption of data centres around the world has been developed by Danish researchers.

One of the major downsides to heightened internet usage around the world is the impact it has had on climate, largely because of the massive amount of electricity consumed by computer servers.

In fact, studies have demonstrated that global data centres consume more than 400 terawatt-hours of electricity annually. This accounts for approximately 2% of the world's total greenhouse gas emissions and currently equals all emissions from global air traffic. Data centre electricity consumption is also expected to double by 2025.

The transition to cleaner power has therefore become a pressing one, with the researchers from the University of Copenhagen expecting that major IT companies will deploy the algorithm immediately.

Several years ago, Professor Mikkel Thorup from the University of Copenhagen's Department of Computer Science was among a group of researchers behind an algorithm that addressed part of the problem, by producing a groundbreaking method to streamline computer server workflows. This particular body of work ultimately saved both energy and resources. Tech giants including Vimeo and Google implemented the algorithm in their systems, with online video platform Vimeo reporting that the algorithm had reduced their bandwidth usage by a factor of eight.

Now, Thorup and two fellow UCPH researchers have developed another algorithm that makes it possible to address a fundamental problem in computer systems — the fact that some servers become overloaded while other servers have capacity left.

"We have found an algorithm that removes one of the major causes of overloaded servers once and for all. Our initial algorithm was a huge improvement over the way industry had been doing things, but this version is many times better and reduces resource usage to the greatest extent possible. Furthermore, it is free to use for all," Thorup said.

Dramatic rise in internet traffic

The algorithm addresses the problem of servers becoming overloaded as they receive more requests from clients than they have the capacity to handle. This happens as users pile in to watch a certain Vimeo video or Netflix film. As a result, systems often need to shift clients around many times to achieve a balanced distribution among servers.

The mathematical calculation required to achieve this balancing act is extraordinarily difficult, as up to a billion servers can be involved in the system. And, it is ever-volatile as new clients and servers join and leave. This leads to congestion and server breakdowns, as well as resource consumption that influences the overall climate impact.

"As internet traffic soars explosively, the problem will continue to grow. Therefore, we need a scalable solution that doesn't depend on the number of servers involved. Our algorithm provides exactly such a solution," Thorup said.

According to the American IT firm Cisco, internet traffic is projected to triple between 2017 and 2022. Next year, online videos will make up 82% of all internet traffic.

From 100 steps to 10

The new algorithm ensures that clients are distributed as evenly as possible among servers, by moving them around as little as possible, and by retrieving content as locally as possible.

For example, to ensure that client distribution among servers is balanced so that no server is more than 10% more burdened than others, the old algorithm could deal with an update by moving a client one hundred times. The new algorithm reduces this to 10 moves, even when there are billions of clients and servers in the system. Mathematically stated: if the balance is to be kept within a factor of 1+1/X, the improvement in the number of moves from X2 to X is generally impossible to improve upon.

As many large IT firms have already implemented Thorup's original algorithm, he believes that industry will adopt the new one immediately — and that it may already be in use.

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The specially constructed Treoflex TA6 cables have a double screen made up of tinned copper braid and 100% aluminium tape and are used to supply power to motors from frequency converters while maintaining full electromagnetic compatibility. They are suitable for both fixed installations and moveable connections in industrial equipment, process lines and machines operating in dry and damp rooms.

The standard cable stock ranges from 1.5 up to 240 mm^2. From 6 to 240mm^2 the cables utilise the three split earth design which features a symmetrical 3-core design improving EMC compliance compared to the 4-core version. The three split earth design also reduces the outer diameter of the cable allowing for easier termination into cable glands.

The range of Ultra VSD cables from LAPP has a black outer sheath with a double screen made up of tinned copper braid and 100% copper tape wrap. Our standard stock ranges from 1.5 to 120 mm^2.

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Treotham also supplies an extensive range of other cables including control cables, power cables, data cables, crane cables, single cores, high-temperature cables, bus/DeviceNet cables, solar cables, instrumentation cables and chainflex cables for moving applications. With a full range of LAPP cables and accessories, Treotham offers a total solution for any application.

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The Acuvim II high-performance power and energy meter from Accuenergy provides a robust solution for power quality analysis/monitoring and kWh metering. The meter supports BMS to boost energy efficiency, management and measurement across offices, sites and surrounding environments.

The Acuvim II meets monitoring challenges by providing the specific required metrics. It has over 400 measuring parameters to deliver the results required in today's data-driven world.

Acuvim II meters can also be expanded to feature advanced communication modules such as Modbus-RTU, SNMP V2, PROFIBUS, BACnet, DNP3, Wi-Fi and RS-485 for data communication.

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Acuvim II provides data logging, time-of-use and waveform monitoring. The meters can also monitor solar and battery storage, facilities management and power/energy management. Acuvim II is ready for a wide array of monitoring applications.

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The LED focus

LED lighting continues to power ahead as the world finds new ways to use the technology throughout various industries and applications.
With a growth rate approaching 10%, there's still room for development and innovation from new and existing players in the sector who can deliver specific outcomes.
As one of these businesses, the Luminetic brand is committed to delivering a selection of industrial LED solutions suitable for a broad range of uses.
Designed and engineered to provide reliable, safe, and energy-efficient LED lighting solutions to the Australian market, the Luminetic core product catalogue includes flood, high bay, and high mast options.

The Issues with Old Technology

Operating in the Extremes

In a region of the world where fires, floods and cyclones can occur in unison, it's fair to say that Australia's climate knows how to deliver the extremes.
Until today, these conditions have played havoc with equipment and installations that aren't designed to handle the heat (amongst other elements).
In the world of industrial lighting, traditional high-intensity discharge (HID) technology is still often in use. Relying on mercury vapour, metal halide and high pressure sodium lamps — where a type of vaporised metal becomes a gas inside a glass chamber — can raise specific problems.

What are the Issues?

As one of the oldest types of electrical light on the market, the HID lamps produce light by sending an arc between two tungsten conductors (electrodes) and through an ionised gas housed inside the lamp.
HID luminaires need ignition, often delivered by a voltage pulse or a third electrode inside the bulb and require a warm-up phase for the material inside to evaporate into plasma.
Over time, as the HID luminaire gets older and deteriorates, it will steadily require more and more voltage to provide the same amount of light output, reducing its efficiency until it exceeds the ballast resistance level and goes out forever.

What Problems Occur?

More voltage means more heat, and in Australia, where it's already hot, this can spell disaster for HID light fittings.
Rapid discolouration, loss of light quality and total failure are the common symptoms of an overheating HID lamp, causing the unit to simply shut off and, in some instances, even explode.
Another factor to consider is that when the HID lamp has reached its end of life and stops operating, the ignitor will continuously attempt to start the failed unit. This problem left unattended causes damage to the capacitor, the ignitor itself and even the ballast, which results in more than just a lamp change.
These issues, combined with the guaranteed loss of efficiency — up to 70% of output over its lifespan — means that in many scenarios and workplaces around the country, HID lighting technology may not be a road you want to go down.

What are the Solutions?

By comparison, LED lighting offers many clear advantages over the old HID technology.
It's no exaggeration to say that an LED luminaire can offer a 10x increase in lifespan while maintaining a higher output and performance over the duration.
In terms of energy consumption, an LED lighting variant can provide more lumens with less voltage than it's HID counterpart and doesn't suffer the same increase in voltage demand and the associated heating issues that plague these legacy systems.
In many cases, a direct LED replacement can provide a complete turnkey improvement for your business regardless of industry.

The Systems

Carefully designed and engineered for local conditions, Luminetic's range of LED technology mitigates lighting problems associated with severe climatic conditions.
For example, the HBT high bay series, equipped with revolutionary airflow designs and high-temperature LED chips, delivers superior performance in the heat.
Key features of the HBT heat-resistant high bay series :

- 13,000lms to 50,000lms output range
- 100, 150, 200 & 400 watt variants
- IP65 & IK07 rated for indoor use
- Unit weight from 2.3 to 8.5kg
- Up to 100,000 hours of reliable light

The HBT Series also comes with anti-aging tempered glass, an operational temperature range of - 40 to + 65 degrees Celsius and a hassle-free 5-year warranty.
Luminetic's high bays also offer less flicker than traditional units and comes with a replaceable power supply.
Replacing the old plastic covers with heat-resistant tempered glass that allows for improved light transmittance and safety — while incorporating graphene technology for better heat dissipation and overall lighting efficiency — enabling you to maximise the benefits of an LED lighting luminaire.

Outcomes for Industry

Regardless of industry sector or application, a robust LED system will significantly improve your lighting department and the broader business.
In Australia's harsh climate, where equipment needs to be designed and built to last, there's every reason to take a fresh look at a modern LED solution.
From improved efficiency, heat resistance and better light to vastly reduced maintenance schedules and greater energy efficiency with less consumption, all your targeted improvements can be supported by a switch to Luminetic.

Complete LED Solutions

Exceeding the Standard

For support with product selection, rating information, lighting design solutions and other practicalities, Luminetic can help.
Whether you're looking for a direct replacement option for your existing lighting or ready to go for a brand-new and customed design, meeting Australian standards is critical.
Adhering to these OH&S requirements can make or break your plan for sports facilities and grounds, sheds, street lighting, and certainly in a warehouse or workshop scenario.
It's where our engineered lighting design service comes to help in making the right solution possible.

When Layout is Key

A poorly designed lighting layout, whether LED-based or otherwise, can leave your business, your staff, and your visitors in the dark, literally.
Particularly important in environments where critical and detailed work occurs, a correct lighting design and layout can help reduce performance-related issues and improve productivity.
From helping your people do their best work to complying with Work Safe standards and ensuring that your facility exceeds the relevant Australian Standards, it pays to step back and create a tailored lighting plan from the outset.
Key features of the HBS lightweight high bay series:

- 11,839 to 24,289lm output range
- 100, 150 & 200 watt variants
- IP65 & IK07 rated for indoor use
- Unit weight from just 1.3 to 2.3kg
- Up to 100,000 hours of reliable light

The HBS Series also comes with anti-aging tempered glass, an operational temperature range of - 40 to + 50 degrees Celsius and a hassle-free 5-year warranty.

The Luminetic Advantage

Luminetic provides and is committed to engineered lighting designs that deliver better, brighter results.
With a complimentary lighting design service available to everyone, we can use your specifications and requirements to deliver the right product choice and ensure your desired workplace is spaced out and set to the most optimal performance.
Using this approach, you can be sure that you are squeezing all the value from your LED technology and leaving the old way behind for good.

Enjoy a Brilliant Outcome

For an industrial lighting solution that delivers the goods on multiple fronts, many businesses are now choosing LED.
With the addition of engineered lighting designs for compliance and overall performance, the benefits are too significant to ignore.
For the world of heavy industry like mining & resources to industrial spaces and detailed assembly areas, an LED lighting solution from Luminetic will deliver what you've been looking for in a solution.
To enjoy higher lumen output with less maintenance, reduced costs, and lower power consumption, let us offer you all the advantages that Luminetic LED's have to offer.
Check out our products or talk with the team at luminetic.com.au.

Luminetic
LED SPECIALISTS

Luminetic
www.luminetic.com.au

UV-resistant outdoor cables

When they are installed outdoors, cables should be UV-resistant. LAPP Australia is expanding its range of durable outdoor cables, including four PVC cables for data and signal transmission in the low-frequency range with a black outer sheath (BK). This makes them suitable for outdoor use in accordance with DIN EN ISO 4892-2.

The LAPP UNITRONIC products include LiYY BK with black outer sheath, LiYY (TP) BK with twisted sheath, LiYCY BK shielded version and LiYCY (TP) BK shielded version with twisted pairs.

LAPP Australia Pty Ltd
lappaustralia.com.au

Rack mount enclosure

To meet rising demand for 28″ deep custom rack mount enclosures, METCASE has added to its COMBIMET 19″ range. Applications include networking and communications, industrial computers, sound and studio electronics, laboratory instruments and control systems.

The 28″ (711.2 mm) deep custom COMBIMET is METCASE's deepest 19″ rack case and is designed to fit 1000 mm-deep racks.

Standard COMBIMET enclosures have removable top, base and rear panels, offering full access to the PCBs. The top and base can be specified as either vented or unvented. Other features include ergonomic front panel handles and mounting holes for PCBs and chassis. M4 earth studs on all components ensure electrical continuity.

The 28″ deep custom COMBIMET cases are available in all heights from 1U to 6U and in any colour (with no extra charge if one of 29 stock colours is specified). Cases are supplied fully assembled.

All COMBIMET rack cases can be supplied fully customised. Services include CNC punching, folding, milling, drilling and tapping; fixings and inserts; painting and finishing, digital printing of legends and logos.

ROLEC OKW Australia New Zealand P/L
www.metcase.com.au

Surge protection devices

Switching operations are by far the most common cause of overvoltages. Surge protective devices according to AS/NZS 1768 Cat. C3 provide effective protection against these dynamic disturbance variables. Whether an industrial or residential environment, Cat. C3 SPD protection is designed to ensure point of entry protection for installations and devices.

Features include: low voltage protection level with varistor-based protective circuit; powerful disconnect device provides optimum protection; high surge capacity of Max Single Impulse of 100 kA (Imax 8/20 uS); usage up to 250 A without backup fuse saving time, money and space; and universally pluggable protective devices enable ease of maintenance.

Phoenix Contact VALVETRAB MS devices are surge protective devices with a modular design consisting of a base element and a protective plug. The overall width per path is 17.5 mm, corresponding to one unit of horizontal pitch (HP).

Ready-to-install VAL-MS SPDs are available in all configurations for an application (three-phase and single-phase, MEN and separate N-E options). Bi-connect terminal blocks enable easy bridging for residual-current devices and fuses while impedance-neutral plug insertion and removal facilitates insulation resistance testing. There is no need for complicated wire disconnection and reconnection. Standard relay alarm outputs allow easy connection to remote monitoring systems and coded plugs make replacement simple and error-free.

MacLean Electrical (Australia) Pty Ltd
www.maclean-electrical.com.au

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CASE STUDY

Large-scale commercial battery for Canberra

Infrastructure and renewables development company Elvin Group has installed what it says is Australia's first commercial urban large-scale-based utility battery in Canberra.

The battery will form an essential part of electricity infrastructure that will supply north Canberra suburbs of Holt and Ginninderry and represents the first installation in Australia to supplement an urban power supply on a large scale.

Elvin Group Renewables Managing Director Sam Blackadder said the battery and solar array represented the first phase in a plan to provide Canberra with reliable renewable energy to power homes.

"The project has been developed in line with the ACT network distributor, Evoenergy, who are committed to supporting the connection of renewable solutions that enable continued reliable and high-quality power supply to the Canberra community," he said.

Evoenergy Group Manager Strategy & Operations Leylann Hinch said the company wants to facilitate ACT's progression to net zero.

"Evoenergy is committed to working with the energy industry and the community to promote the uptake of renewable energy and facilitate ACT's progression towards a net zero carbon future. We are excited to be a part of innovative projects like these and we're dedicated to transforming our grid to be at the forefront of our energy network transition and technology change," he said.

The 5 MWh battery will have the capacity to service the average energy needs of approximately 5400 households for an hour, and will also stand ready to pump power into the grid in the event of a shortfall, making sharing between ACT and NSW more efficient.

"We are excited by this project, not only is it a major 'in-front-of-meter' installation in Australia but it is the first stage of a nationwide move to renewable energy and a wholesale reduction in our carbon emissions," Blackadder said.

"The aim of this installation is to show that community how renewable resources are a viable solution to meet Canberra's needs for stable, reliable, consistent and environmentally positive energy."

As the project expands, batteries can be placed at strategic sites around the grid, to inject bursts of power to fill gaps in dispatchable supply through a virtual power plant (VPP), meaning that the nation's existing power supply can be used more efficiently to serve greater demand.

"The growth of Canberra's population and more frequent extreme weather events have increased the demands on reliable power supply throughout the ACT. Over the past two years, the impact of storm events, hot summers and the devastating bushfires placed increased risk on the territory's power supply. Networks are looking for non-network options that help avoid extended brownouts/blackouts and fluctuating voltage.

"We have been developing this project for a large-scale battery installation to support electrical grid infrastructure in potentially constrained parts of Canberra's network via frequency control and ancillary services (FCAS)," Blackadder said.

The FCAS is a process used by the energy market operators to maintain the frequency of the system within the normal operating band as it delivers a fast injection of energy, or fast reduction of energy, to maintain supply and demand.

Elvin Group CEO Craig Elvin said the company has always focused on the long-term needs of Canberra and believes in proactively advancing energy projects that benefit the region. The company is currently involved in projects developing some of Australia's first hydrogen hubs along the east coast of NSW and Queensland. These will feature Australian-developed electrolysers, with plans to manufacture them in the ACT. The company is an active National Energy Resources Australia (ACT Cluster) member, focusing on the adoption of hydrogen.

"As part of the Holt project we will also be installing a 500 kW ground-based solar array which will help ensure the operating ability of the battery during early afternoon evening peak loads," Elvin said.

Project completion is expected May 2021.

Technical specifications for Holt 5 MWh BESS

- Site Location 151 Drake Brockman Drive
- Battery Details: 2.5 MW/5 MWh Tesla Megapack BESS
- 2 x 1.25 MW Tesla Megapacks
- Includes Elvin Group installing a new distribution substation and related to connect to Evoenergy's 11 kV network
- Solar Details: Proposed 500 kW ground mounted solar farm
- Planned augmentation for locally generated green hydrogen converted to electricity storage for grid support
- Utility-scale battery connection into National Energy Market for FCAS grid support
- Elvin Group has developed and coordinated all the works for this installation
- Local labour, products and jobs have been utilised where possible

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A BAN ON SF6 IN THE ENERGY SECTOR IS OVERDUE

Kevin Nesdale, General Manager, Power Distribution Systems & Services at Eaton ANZ

With international pressure mounting on Australia to adopt more ambitious climate goals, there are steps the energy sector can take to assist in this task.

A significant reduction in the use ofw in the medium-voltage electrical sector is one of these steps, and would send a message to the world that Australia is taking action.

While it has been recently reported that renewable energy is booming in Australia, one unintended but hugely hazardous consequence is going largely unnoticed: a rise in emissions of the powerful greenhouse gas sulfur hexafluoride. Also known as SF_6, this substance is widely used across the electrical industry within switchgear, from large power stations to wind turbines to electrical substations, to prevent short circuits and accidents — reducing the chances of electrical accidents and fires. However, this gas tops the Intergovernmental Panel on Climate Change's (IPCC) list of extremely harmful greenhouse gases, with a global warming potential 23,500 times greater than CO_2. SF_6 is extremely persistent, and can take as long as 3200 years to disappear from the atmosphere. It can also be a threat to personnel in case of significant leakage. Alternative solutions to SF_6 already exist, and provide similar insulating properties, with minimal cost or technical barriers to adoption.

Xiria switchboard.

What are the risks?

SF_6's primary threat is environmental. In 2018, measurements in the EU showed that SF_6 emissions had a global warming impact equivalent to 6.7 million tons of CO_2 — comparable to 1.3 million cars being driven for a year. In Australia, CSIRO's analysis shows that SF_6 emissions increased by 27% between 2012 and 2018.

While most SF_6 switchgear equipment comes with sealed tanks, no equipment is fully leak-proof. Worse, there could still be many models in the field with high leak rates. Our own studies show there could be up to 15% SF_6 leakage during the full lifecycle of a switch.

Unfortunately, these emissions could accelerate in the near future without SF_6-free alternatives. As we shift towards renewable energies in the upcoming decades, large power plants are set to be replaced by smaller wind turbines and photovoltaic banks, increasing the volume of connections to the electricity grid and the demand for switchgear. If these new installations keep using SF_6-insulated equipment, we could see a sharp increase in its concentration in the atmosphere.

Finally, SF_6 presents a risk for personnel. Being heavier than air, it spreads in low-lying areas, which could be a danger for staff working

in pits and trenches, potentially causing asphyxiation. Although significant leaks are very rare, the older the equipment gets, the higher the risk.

The EU has already banned the use of SF_6 in many applications and industries and is likely to introduce regulations to phase it out of the medium-voltage energy sector later this year. At this stage in Australia, the conversation has only just begun.

Why are regulations needed?

Alternatives to SF_6 in switchgear have existed for years, but the uptake has been slow. A study published in the EU showed that whilst most energy players are expecting a decrease in the use of SF_6, a majority of respondents said policies and regulations would be the main factor in their decision to adopt SF_6-free alternatives. They also said financial incentives and a complete ban on the gas are two of the most useful policies to promote these alternatives. Clearly, government guidance is a key influence in the industry's decision-making and would be a catalyst for rapid change. As there are no significant technological or cost barriers to eliminating SF_6 from our electrical networks, government policy could assist in implementing this change.

What are the alternatives?

Safe and reliable alternatives have now existed for many years. Compact switchgear using cast resin insulation instead of gas has been around since the 1960s and cast resin insulation combined with vacuum switching technology since the late 1980s.

These alternative technologies have improved and now have comparable current ratings, short circuit ratings and physical size to SF_6 options, removing technical barriers to their deployment. These are suitable for many applications, including solar plants, windfarms, commercial industrial buildings, data centres, road and rail infrastructure and large grid operators, and have proven to be more reliable for frequent switching, necessary in large wind and solar parks for example.

Whilst upfront costs are about 15–20% higher than SF_6-insulated equipment, the total cost of ownership ends up being lower with a decrease in required maintenance. Indeed, there is no need to maintain, top up, test, inspect and report on, and dispose of SF_6 anymore.

There is little we can do with the SF_6 we have already sent in the atmosphere, but continuing to use SF_6 is a legacy we don't want to leave, especially when proven alternatives exist. Changes to phase out SF_6 could be the small push the sector needs to wave this harmful gas goodbye.

Eaton Electrical (Australia) Pty Ltd
www.eaton.com

Industrial LED floodlights

Luminetic's FLS Series of industrial LED floodlights are designed and manufactured for Australia's conditions. This lightweight range is available in 30, 100, 150 and 200 W, delivering over 100,000 h of light with IP66 and IK07 protection ratings.

Designed to provide an energy-efficient, safe and reliable option, the FLS Series is a suitable exterior lighting solution for applications that include general area lighting, commercial lighting, security lighting and facade lighting.

All Luminetic LED lighting comes with a 5-year warranty.

Pacific Automation

www.pacificautomation.com.au

Battery-powered security camera

Smart home security vendor EZVIZ has added a wireless security camera to its product offering. The battery-powered BC1 is sold together with a base station and can deliver steady performance for up to 365 days on a single battery charge. It includes sharp 1080p video quality, colour night vision, two-way communication and active defence features.

Equipped with a 12,900 mAh rechargeable battery, the camera has long battery life and gives users freedom in deciding the location of installation without worrying where their power outlets are. Performance is supported by the included base station, which ensures a stronger Wi-Fi connection even at extended distances.

The product renders vivid, colourful imaging at night with two built-in spotlights and is IP66 rated to withstand most weather conditions. The magnetic base eliminates common installation considerations, as no cables, wires, brackets or professional installers are required.

Integrating a passive infrared sensor and person-shape detection algorithm, the camera is able to distinguish humans from other moving objects. Upon detection of humans, it will send mobile alerts to the users, while setting off a loud siren and flashing two spotlights to deter would-be trespassers on the spot.

For users who seek to scale up their home security system, EZVIZ offers flexible kit options. Users can choose to bundle up one, two, or three BC1 cameras with a single base station. Video storage is also flexible — users can store videos on local microSD cards or subscribe to EZVIZ CloudPlay for unlimited cloud storage.

EZVIZ

www.ezvizlife.com

Fanless embedded computer

The Neousys POC-400 is an ultra-compact fanless embedded computer for industrial applications. It utilises the latest Intel Elkhart Lake platform Atom x6425E 4-core CPU that can deliver 1.8 x CPU and 2 x GPU performance improvement, compared to the previous generation.

In addition to the performance boost, POC-400 features an ultra-compact design, which can easily fit into restricted spaces. The system comes with a DIN-rail mounting chassis and an abundance of front-access I/O interfaces. Featuring three 2.5 GBASE-T Ethernet ports with IEEE 802.3 PoE+ capability, they provide higher data bandwidth for devices such as NBASE-T cameras. It also has two 4K DisplayPort, 2x USB3.1 Gen1, 2 x USB 2.0 and COM ports for general industrial applications.

Supporting Neousys's proprietary MezIO interface for function expansion, users can add functions such as isolated DIO, RS-232/422/485, ignition control and 4G/ 5G by installing a MezIO module. The POC-400 comes with an internal M.2 E key socket for a Google TPU or an Intel Movidius VPU module to transform it into a lightweight AI inference platform at the edge.

Key features include Intel Elkhart Lake Atom x6425E Quad-Core 2.0 GHz/3.0 GHz 12 W processor; rugged -25 to 70°C fanless operation; 2 x 2.5GbE PoE+ ports and 1x 2.5 GbE port with screw-lock; 2 x USB 3.1 Gen 1 and 2 x USB 2.0 ports with screw-lock; and M.2 2280 M key SATA Interface.

The product also has dual DP display outputs supporting 4096 x 2160 resolution, front I/O access DIN-mounting design and is MezIO compatible.

Backplane Systems Technology Pty Ltd

www.backplane.com.au

Powertec Wireless Technology bring 5G fixed wireless internet access solutions

Powertec's powerful new 5G fixed wireless access (FWA) solutions are available to customers in Australia and New Zealand. All the solutions in the Inseego 5G product portfolio feature outstanding signal performance to extend the 5G network edge, enabling broader 5G coverage and higher throughput for internet users everywhere.

The first product available through Powertec will be a 5G/LTE outdoor CPE device that delivers high-speed broadband for global consumer, enterprise, and SMB markets. Other solutions in Inseego's broad 5G portfolio will also become available to enterprise customers through Powertec.

"These new products open up 5G internet access to a variety of new customers, from urban corporates to rural homes. They also give customers the power to choose between a variety of service providers, and not be locked into a single fixed wireless service," said Powertec Product Manager Paul Boyce.

Powertec's 5G portfolio of product can be found here: https://powertec.com.au/buy/cellferno-m2000-5g-cat20-outdoor-cpe/

The Cellferno M2000 is the latest addition to the Cellferno range; the M600 which features Cat6 2x2 MIMO technology is capable of speeds up to 300Mbps, while the M1200 features Cat12 4x2 MIMO technology which is capable of speeds up to 600Mbps.

The Cellferno M2000 5G Cat-22 Outdoor Modem is equipped with a dual-mode 4G LTE-A Pro and 5G NR Snapdragon X55 chipset supporting 4T4R multi-antenna technology. Its integrated 4×4 MIMO antenna system provides high gain (up to 14 dBi) on all sub-6 GHz bands and incredible speeds up to 2.5GB/s.

ABOUT POWERTEC WIRELESS TECHNOLOGY

An Australian-born and owned, global hardware and communications company, Powertec is optimising connectivity far and wide with its cost effective, smart technology solutions. From humble beginnings in 1995 on the Gold Coast, the company has grown into an international operation with 60 staff and offices across Australia and New Zealand.

Through a commitment with its customers, partners and manufacturers, Powertec has secured exclusive distributorship in Australia and New Zealand for many complementary products that have attracted over 1,000 partners, dealers and retailers.

Powertec Distribution

Powertec Distribution supplies and distributes high quality wireless and connectivity products and accessories to complement its Solutions offering. They are industry leaders in cellular coverage, wireless networks, Antennas, RF accessories, emergency and disaster recovery, gateways, routers and modems.

Powertec Solutions

Utilising skilled professionals, Powertec efficiently facilitates wireless connectivity — from initial consultancy, to design, surveys and installation to a successful handover. Powertec Solutions services include cellular in-building coverage, Wireless and LoRa Networks, IoT platforms and sensors, and engineering of Masts and Towers. Markets that Powertec provide connectivity services to include: Agribusiness, Education, Emergency Services, Government and Defence, Health, Mining and Retail.

Powertec Wireless Technology Pty Ltd
www.powertec.com.au

CASE STUDY

WA business park powered by renewable microgrid

Peel Business Park in Nambeelup will draw the majority of its power from a renewable energy microgrid.

The industrial estate worked with FIMER to develop the customised solar, battery and microgrid solution.

Fully integrated and commissioned in March 2021, it will deliver safe, reliable and green energy to the tenants of the estate, with expected energy cost savings of around 30% compared to published tariffs in Western Australia.

The Peel Business Park is a multistage, 1000-hectare greenfield industrial estate being developed in Nambeelup (approximately 70 km south of Perth) in Western Australia. DevelopmentWA has activated the first phase of the Peel Business Park, with Stage 1 lots released in 2020.

Due to the remoteness of this new industrial development area, an existing power connection to the traditional grid did not exist, and it was not economically feasible to construct and extend a new full-supply grid connection to the site. An onsite, behind-the-meter solar and battery solution was highlighted as the most cost-effective, reliable and green alternative to a traditional servicing approach.

By utilising a smart renewables microgrid solution, the business park will instead use locally generated renewable energy directly from an onsite solar farm, along with a battery energy storage system, to power over 50% of the site.

Avora Energy was engaged by Peel Renewable Energy to design, procure, construct and commission the solar and battery solution. Sunrise Energy Group was a technical and project management partner to the project. Jarrah Solutions provided protection, SCADA and comms schemes for the project, including the microgrid control system.

The renewable energy solution includes a 1.2 MW solar farm, incorporating over 2772 bifacial 440 W panels with a NEXTracker single-axis tracking system; a FIMER skid-mounted solar and battery inverter system with medium-voltage power distribution system; and a 2.5 MWh Saft battery energy storage system.

"During the product component selection process, we were looking for a combined inverter and battery solution that would elegantly meet all the technical and project requirements. FIMER's PV and battery solution was a fully integrated solution that could be delivered on a single skid that ensured easy installation, commissioning and servicing," said Jeff Brill, Avora Energy's Managing Director.

The FIMER solution was designed specifically for this project. With over 12 months of planning across multiple teams in Australia and Europe, the customised 40" skid incorporates:

- a FIMER PVS980-58 central inverter
- a FIMER bidirectional inverter, the PVS980-58BC, including grid-forming-ready technology
- a hybrid medium voltage transformer
- associated switchgear.

Utilising the hybrid station with both FIMER inverters enables the technology to share a portion of hardware that brings significant synergies over the system's life, including fast installation, high reliability and a rapid return on investment as well as long-term support and maintenance benefits.

The 1.2 MW solar farm is serviced by the FIMER PVS-980-58 solar PV inverter, which provides high-efficiency, low-auxiliary power consumption with innovative air cooling and is designed for outdoor applications.

The FIMER PVS-980-58BC, a bidirectional inverter, will service the 2.5 MWh energy storage solution and will convert, store and discharge excess power from the battery solution in periods of high demand.

The battery system installed and commissioned on the site is a 2.5 MWh Saft solution with a 1.2 MW power rating. Saft's containerised lithium-ion batteries are equipped with sophisticated temperature management, safety equipment and cloud-enabled controls.

As the estate grows and more tenants move in, the flexibility of the FIMER solution will enable Peel Renewable Energy to expand its renewable energy offering, using either ground or rooftop-mounted solar arrays.

The solar generation and battery energy storage solution has an expected annual output of over 3 GWh and will reduce CO_2 emissions by approximately 2100 tonnes per annum.

FIMER Australia
www.fimer.com

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Data centre cooling system

The STULZ CyberCool Free Cooling Booster offers a flexible, high-performance cooling solution designed for data centres. It enables the savings potential of free cooling to be fully exploited in both new and existing systems. This not only maximises operational reliability and enhances equipment lifespan, it also reduces CO_2 emissions.

Water-cooled chillers that previously did not meet the technical requirements for using free cooling can now be retrofitted with the cooling system, which is fully integrated into the hydraulic system. The plug-and-play facility has a high level of prefabrication, meaning it can be used with most conventional chilled water systems. It offers factory-tested hydraulics, coordinated cooling components and intelligent control, with the option of high-quality part-load capable components with redundancy, and a mode of operation with or without glycol.

Available in five sizes with cooling capacities between 270 and 1800 kW, the cooling system is designed to provide optimum control and communication. The integrated control cabinet solution uses patented free cooling control software, based on SEC.blue controllers from STULZ, which feature an integrated Ethernet interface and a micro-SD port for firmware upgrades and data management. This intelligent controller monitors both the outside and the operating temperatures, and regulates the cooling capacity according to current demand.

The product supports three operating modes — free cooling, mixed mode and mechanical cooling. Depending on the outside temperature, the system automatically selects the most appropriate mode to ensure efficient operation. As a result, it provides effective free cooling capability and condensation temperature control — even with higher outside temperatures.

When combined with the STULZ Explorer WSW and CyberCool WaterTec chillers, the cooling system forms a coordinated and energy-efficient air-conditioning system.

STULZ Australia Pty Ltd

www.stulz.com.au

Isolated three-phase smart power meter

The PM-3133i Isolated 3-phase Smart Power Meter from ICP DAS gives access to real-time electric usage for three-phase power measurement.

With an accuracy of <0.5% (PF=1) the PM-3133i series can be applied to the low-voltage primary side and/or medium-/high-voltage secondary side, enabling users to obtain energy consumption readings from the monitored equipment in real time under operation. The power meter is equipped with wired clip-on CT (various types, support input current up to 400 A). It operates over a wide input voltage range of 10–600 VAC, which allows worldwide compatibility. Built-in AC isolator protection means total isolation between the AC measurement side and the control side.

Product features include: true RMS power measurements; energy analysis for 3P4W, 3P3W, 1P3W, 1P2W; current measurements up to 400 A with different CT ratio; isolated voltage measurements up to 600 V with clip-on CT for easy installation; supports Modbus RTU protocol; multiple data format.

It is recommended that the CT and reference voltage of the meter be installed on the primary side of the 'AC Filter' with an EMI ferrite core to minimise the interference effects of the inverter.

ICP Electronics Australia Pty Ltd

www.icp-australia.com.au

Clamp-on meter

The AEMC TRMS Power Clamp-on Meter Model 407 is safety rated at 1000 V CAT IV, and is safe to operate in all electrical environments.

The product is designed to be rugged for demanding work environments and will withstand both dust and water spray with its IP54 rating. It is also ergonomically designed and easily used by one hand, including function selection and button pushing even with a glove on.

In addition to the standard measurement of volts, amps, frequency, resistance, diode checking and continuity, the product offers several functions including: AC, DC and AC+DC volts, amps and power, True InRush, power measurements, harmonic analysis, data logging and more.

AEMC Instruments

www.aemc.com

Micro data centre solutions

The Vertiv SmartRow2 provides intelligent features to allow for more efficient management of IT applications at the edge. It has an advanced built-in IT management solution with the Liebert RDU501, plus an intelligent door lighting system that easily alerts IT managers of issues like high temperatures.

It has a fully enclosed design that can be configured for cold- or hot-aisle containment. Contained airflow provides greater cooling effectiveness for IT equipment while DC inverter compressor technology reduces compressor cycling and component wear, while providing efficient cooling to all components within the rack.

The SmartCabinet 2-ECO is a fully integrated, self-contained micro data centre that combines power, cooling, containment and monitoring in a compact design. Unlike its earlier variants, the SmartCabinet 2-ECO adds an ECO Fan module that, when activated, can intelligently leverage cooler ambient air in a comfort cooled space to cool down the IT equipment during office hours and automatically switch to air-conditioning mode if ambient temperature rises after office hours.

The ECO Fan also functions intelligently, providing emergency ventilation in the event of overheating or a cooling unit failure.

Vertiv Australia Pty Ltd
www.vertivco.com

Programmable DC power supplies

The Advanced Energy Intelligent Laboratory Series of programmable DC power supplies are designed to have a small footprint and high power density.

The iLS600, iLS600-R and iLS1500 feature programmable capability with good measurement accuracy. They also have a wireless remote sense feature that reduces noise in a wide range of test and measurement applications.

Designed for both benchtop and rackmount applications, the compact, lightweight, programmable units incorporate embedded 12-bit D/A and A/D converters for accurate voltage and current measurement. Digital rotary controls enable rapid adjustment and fine-tuning of the output voltage and current while front (iLS600) and rear (iLS600-R and iLS1500) ports offer convenient control remotely via USB, Ethernet and analog control inputs. The wireless remote sense feature regulates the DC voltage at the load without added sense wires to greatly reduce noise.

The iLS600 and iLS600-R power supplies feature a single output that delivers power up to 600 W. The iLS1500 power supply offers a single output delivering up to 1500 W. Five single output models ranging from 30 to 400 V are available for both the iLS600 and iLS1500. The DC power supplies allow both series and parallel operation. Output current ranges from 2.5 to 33 A for the iLS600 and iLS600-R, and from 5 to 70 A for the iLS1500.

With full OCP and OVP protection, the power supplies conform to UL 60950-1, UL 62368-1 and CAN/CSA C22.2 No. 62368-1 product safety standards. They are LXI-certified for easy interoperability with other devices and available LabView Drivers.

Advanced Energy
www.advancedenergy.com

5G AND CYBERCRIME: WHY 5G IS MORE COMPLEX TO SECURE THAN OTHER NETWORKS AND KEYS TO EMBEDDED SECURITY

Brian Grant, ANZ Director, Thales

The 5G conundrum leaves embedded security as the key to Australia's critical infrastructure safety.

Cloud, the Internet of Things (IoT) and telco networks are all at the forefront of data privacy and cybersecurity conversations in Australia. This is not new — everyone agrees higher levels of security are needed to face the challenges arising from today's accelerated digital growth rate. What is new, however, is that over the next three to five years most of the technologies aforementioned and organisations' digital platforms, which are already facing increased cyber threats, will rely directly or indirectly on 5G networks. This includes our national infrastructure as well as organisations from critical infrastructure sectors including banking and finance, government, communications, energy, food and grocery, health, transport and water. This reliance on 5G, while providing fantastic opportunities, will also greatly increase the cybersecurity risk for our economy and for Australia as a nation. Before 5G becomes a keystone to our economy, it is important we understand how to better secure it for a safer connected future.

5G's balancing act: a world of opportunities in a heightened cyberthreat universe

5G will offer organisations unprecedented opportunity, radically enhancing the way enterprises and government capture, store and use data. This will have particular benefits when looking at the growing number of IoT devices used by those critical infrastructure sectors. With 5G, connected devices will be able to generate and exchange a wide variety of high- and low-value data at much greater scale,

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leading to a lower price point. It will increase the extent and speed at which data and insights can be analysed — thanks to greater machine learning capabilities — to help drive new digital services, faster and cheaper. 5G will also offer latency of a few milliseconds, enabling organisations and service providers to operate highly autonomous systems that are geared towards specific requirements. Critical and vital industries such as health care, financial services, energy and more are already heavily investing in or exploring the potential of 5G. However, 5G poses unique threats that need specific considerations and approaches. In particular, concerns are rising around data confidentiality, integrity and availability: these are intrinsic to safe and reliable operations, yet most organisations in critical industries are not fully prepared to guarantee its safeguard.

Addressing the unique intricacies and challenges of securing the 5G network

First of all, the architecture behind 5G itself poses new risks to the security of data. Historically, network functions resided on their own propriety hardware platforms, the physical isolation of which provided a particularly strong level of protection. However, network function virtualisation (NFV) — whereby network functions rely on software and run on virtual machines (VMs) — means that, going forward, network elements will be distributed as and reside in software. This poses a risk of contamination from malware to the networks themselves or the infrastructure that is connected to the network. Secondly, to deliver ultra-low-latency requirements, many of the new 5G applications are hosted in data centres at the edge of the network (mobile edge computing, ie, MEC). Edge locations typically have fewer physical protections or computing security controls and new use cases that employ edge computing subsequently increase the attack surface, exposing organisations to greater risks. There is also a risk that 5G could actually be too fast, chiefly when we look to automate actions based on data, known as zero-touch automation (ZTA). In practice, this could mean that corrupted data from hacked or compromised devices automate the wrong or even harmful outcomes. The high level of automation could also unwittingly help malware spread throughout a system or to third-party and downstream systems that would otherwise be secure. Finally, we have seen the software and technologies that have driven the digital economy over the last decade being weaponised to steal, expose, compromise or block access to data. With 5G being the first ever cellular generation to launch in the era of global organised cybercrime, nation states are implementing aggressive cyber programs — this raises many concerns in terms of the scale, depth and impact of a successful cyber attack. This is particularly worrying considering the increased attack surface brought by the billions of devices expected to be connected to the internet in the next couple of years –— massive denial-of-service attacks could be performed by coordinating thousands or even millions of devices. We absolutely need to prioritise the protection of the network and the data at the source, before looking at other, more superficial, security layers.

Promising regulatory conversations and initiatives: a first step

For the past year, we have seen positive conversations and initiatives happening at a national and state level, some of which rightly call for embedding security at the core of the technologies and networks themselves. The Australian Strategic Policy Institute has, for example, called for the Australian Government to implement 'Clean Pipes', a default level of security delivered to customers that prevents cyberthreats at the source of the network provided

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> THE ARCHITECTURE BEHIND 5G ITSELF POSES NEW RISKS TO THE SECURITY OF DATA.

to them. The Department of Home Affairs is currently progressing the Protecting Critical Infrastructure and Systems of National Significance reforms, a key initiative of Australia's Cyber Security Strategy 2020 and part of the Security Legislation Amendment (Critical Infrastructure) Bill 2020. The NSW Government-sponsored taskforce of industry leaders has recently called on federal, state and local governments across Australia to adopt internationally recognised cybersecurity standards for cloud services. It has also urged governments to evaluate proposals or tender bids more favourably from companies that adopt cybersecurity and other risk standards for telecommunications and IoT. It is important we move those conversations further, to start actively protecting infrastructure, systems and technologies so they can be highly secure when 5G peaks.

Embedded security the only way: a change of mindset needed, today

5G will expand the attack surface, with data and digital systems being located anywhere from a few metres from its origin to miles away in the cloud with billions of devices as potential attack vectors. Unfortunately, we cannot rely on users to provide the extra level of security needed in such a highly connected world. Each new data breach report we see points to users — humans — being one of the biggest risk factors in cyber incidents and data breaches. We need to move away from user- and computer-centric approaches and instead focus on the systems, data and network. Security needs to be embedded, woven into digital systems as well as into organisations' operations and processes.

Codifying security

It is vital that any edge computing and its locally stored data is physically and logically secured, typically using public key infrastructure (PKI) and encryption. With any solution supporting low processing latency, wide geographical diversity, centralised management and integrated threat alerting are a must. Luckily, much of the automation required for codifying PKI, encryption and granular access control is already available and has been deployed successfully. We just need to go further.

Cohesive security from the edge to the core

Traditional security, such as encryption of data in transit, should be augmented with the securing or anonymising of the data as it is collected at the edge. Edge data security should be able to be systematically integrated with downstream processing, such as in cloud applications. This will require organisations to embrace holistic security platforms and move away from point security solutions — often favoured by application providers or developers.

Keys as the root of all trust (even in the zero-trust era)

The keys needed to secure networks, machines, devices, users and data must be protected and managed in a highly secure manner to ensure integrity of the digital systems and its operations. Legacy approaches of storing security keys in software or applications, or of storing keys and the data it is protecting together, are untenable and too easily exploited in the current cyberthreat landscape. To ensure integrity of critical infrastructure, security needs to be implemented end to end from the device to the corresponding application in the cloud, ensuring systems and data can be trusted and only authorised access is allowed at either the application or user level. Trust in the digital ecosystems that we build is what will allow organisations –– and Australia as a nation –– to reap the benefits of 5G. As such, it is critical that industry and government work together to re-think, re-frame and re-strategise our overall cybersecurity posture to focus on embedded security first.

Thales Australia
www.thalesgroup.com

CLEAN ENERGY EVENT RETURNS TO MELBOURNE THIS OCTOBER

With an extensive pipeline of renewable energy and hydrogen projects and strong demand for rooftop solar and battery storage, the growth of renewable energy in Australia is showing no sign of slowing down. For this reason, All-Energy Australia is gearing up for a face-to-face event this October in Melbourne to continue supporting the industry's growth and accelerating the transition to a renewable energy future.

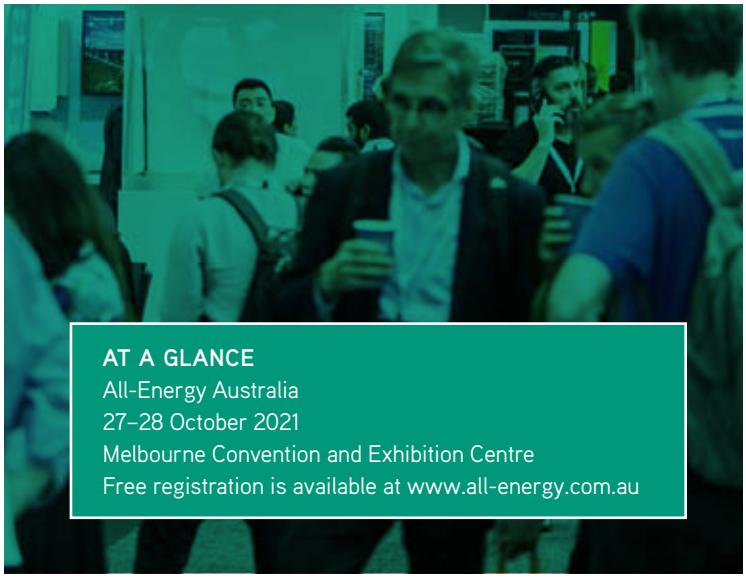
This free-to-attend exhibition and conference, organised in partnership with the Clean Energy Council, is where renewable energy professionals can get exclusive access to the latest technologies and trends, and discuss the opportunities and challenges in the sector. As one of the industry's largest all-encompassing clean energy events, the expo floor will feature over 150 leading companies including Growatt, Enphase Energy, Clenergy, SMA, Krannich, Fronius, Canadian Solar, Array Technologies, Huawei, Sunman and Red Earth Energy Storage.

"The 2021 event takes place at a crucial time in our country where Australia's clean energy transition is more important than ever. All-Energy Australia provides a platform for the industry to connect visitors with leading suppliers on our exhibition floor and drive conversations about the future of renewables at our multi-stream conference," Robby Clark, Portfolio Director at All-Energy Australia, said.

With the conference agenda to be announced in September, this year's program will have more than 170 expert speakers discussing the latest in solar energy, energy storage, hydrogen energy, electric vehicles, bioenergy, distributed energy resources and more. All-Energy Australia will also host the Clean Energy Council's Solar Masterclass, a one-stop shop for installers to get their fix of expert advice on the big design and installation issues facing the rooftop solar industry.

The health and safety of exhibitors, visitors and staff is All-Energy Australia's number one priority.

The organisers of the event are actively monitoring the COVID-19 situation as it evolves and working with the venue and relevant authorities to ensure the event will have the highest health and safety protocols in place.



AT A GLANCE
All-Energy Australia
27–28 October 2021
Melbourne Convention and Exhibition Centre
Free registration is available at www.all-energy.com.au

ENERGY EFFICIENCY EXPO AIMS TO HELP BUSINESSES CUT ENERGY COSTS

As Australia deals with the economic impact of COVID-19, cost management is more important than ever.

Electricity prices account for a large portion of businesses' expenses and carbon emissions, making energy management investments a strategic and cost-effective way to meet these goals.

States and territories across Australia also recognise the massive potential of energy efficiency, with the launch of new grants, policies and programs to help businesses cut energy bills and address climate change. This is an opportunity for organisations to start adopting energy efficiency practices and technologies to reduce operating costs and build greater resilience.

For this reason, Energy Efficiency Expo is returning to Melbourne this October as a face-to-face event to help businesses discover the latest energy saving technologies and unlock the full benefits of energy efficiency. This free-to-attend exhibition and conference, organised in partnership with the Energy Efficiency Council, will showcase a wide range of energy efficient products and services, such as LED lighting, energy management equipment and software, HVAC, thermal performance products and water heating efficiency technology. Featuring more than 80 speakers across two days, the conference program will focus on policy, energy systems, innovative technologies, integrated energy transition, and strategies for various sectors including manufacturing, office buildings and local government.

"The 2021 event takes place at a time where managing costs is vital in Australia. Now is the time for organisations to start implementing energy management upgrades to slash electricity bills and lower carbon emissions. Energy Efficiency Expo will provide businesses, government and industries the opportunity to connect with innovative energy solutions suppliers and gain actionable information at our conference," said Robby Clark, Portfolio Director at Energy Efficiency Expo.

The health and safety of exhibitors, visitors and staff is the number one priority. The organisers of the event are actively monitoring the COVID-19 situation as it evolves and working with the venue and relevant authorities to ensure the event will have the highest health and safety protocols in place.
Energy Efficiency Expo will be held from 27-28 October 2021 at the Melbourne Convention and Exhibition Centre. Free registration is available at www.energyefficiencyexpo.com.au.

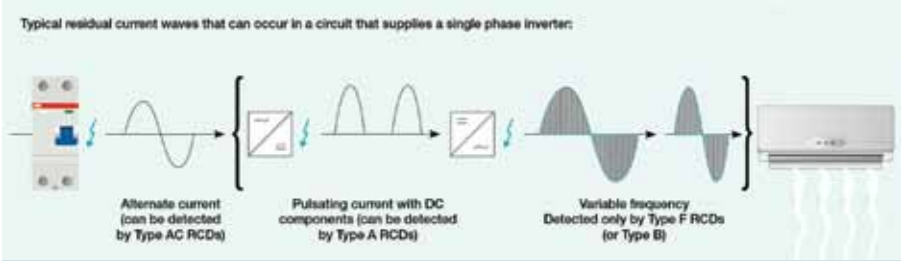
THE SPECIAL REQUIREMENTS OF AIR-CON CIRCUIT PROTECTION

To satisfy the safety requirements of more stringent Australian wiring standards, ABB has introduced new residual current protection technology.

Australian Wiring Standards have been reviewed to acknowledge the increased use of electronics, as well as renewable and emerging technologies, where there is a greater impact from high frequency and DC waveforms on the AC supply.

The latest legislation, AS/NZS 3000:2018 Electrical Installations "Wiring Rules" clause 2.6.3.2.2, now requires all final sub-circuits in domestic and residential electrical installations to be protected by 30 mA RCDs. As a result, many air-conditioning manufacturers with inverter drives are recommending the use of Type F RCDs (residual current device) for the upstream protection of this equipment.

To meet these new standards, ABB's residual current protection range now includes Type AC for basic linear loads with alternating current earth faults. The offer includes type A for loads with electronic rectifiers or phase control generating alternating current and pulsating DC earth faults, Type F for single phase frequency inverters generating multi-frequency currents and Type B for three-phase inverters generating multifrequency and smooth DC earth faults.



A single-phase air-conditioner frequency converter, commonly referred to as an inverter, is an often-used electronic drive which regulates the speed of an electric motor, operating on supply voltage and frequency. An incorrectly selected RCD can lead to nuisance tripping, poor performance and poor protection.

With the introduction of Type F to the ABB RCD range, ABB can now offer the ultimate in reliability, safety and performance for the demanding load of frequency converters.

Type F RCDs have been specifically designed for single-phase inverter applications to ensure superior protection in case of an earth with increased resistance to nuisance tripping including the ABB DS201 Type F RCBO (MCB+RCD).

"ABB's new Type F RCDs clearly respond now to changing legislation and customer needs for reliable and accurate protection of circuits supplying single-phase inverters with a proven solution," said Ian Richardson, Market Development Manager, Energy Distribution, Electrification business, ABB Australia.

"The DS201 Type F RCBO provides an ideal solution for sub-circuit protection of air conditioners in domestic and residential applications. The DS201 Type F is economic in both cost and space to provide the compliance required for AS/NZS 3000:2018."

For severe loads, the ABB Type B RCD provides protection with increased frequency range and the capability to detect smooth DC earth faults.

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SECURE YOUR DATA & EQUIPMENT

A data enclosure is your last line of defence, so it needs to be strong enough to stop unauthorised access.

The MFB range of Class B and Class C enclosures are purpose built frames fitted with key locks and boltwork approved by the Australian Government Security Construction and Equipment Committee (SCEC)

All enclosures are fitted with tamper evident cable entry systems, high impact clear polycarbonate panels on doors, secure venting systems and certified combination locks.

An alternative product, the MFB range of High Security enclosures provides a lower level of security and is not SCEC approved. Effectively construction methods mirror the Class B and Class C series, however the doors are fitted with a cheaper bilock keying system. Also additional flexibility with the design regarding cable entry encourages effective quick installation and high volume data cable installations.

With over 50 years in the business, and backed by the SCEC approval for manufacture, these Australian built 19"rack mount enclosures provide peace of mind in relation to the security your data needs.

SCEC APPROVED PRODUCT

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