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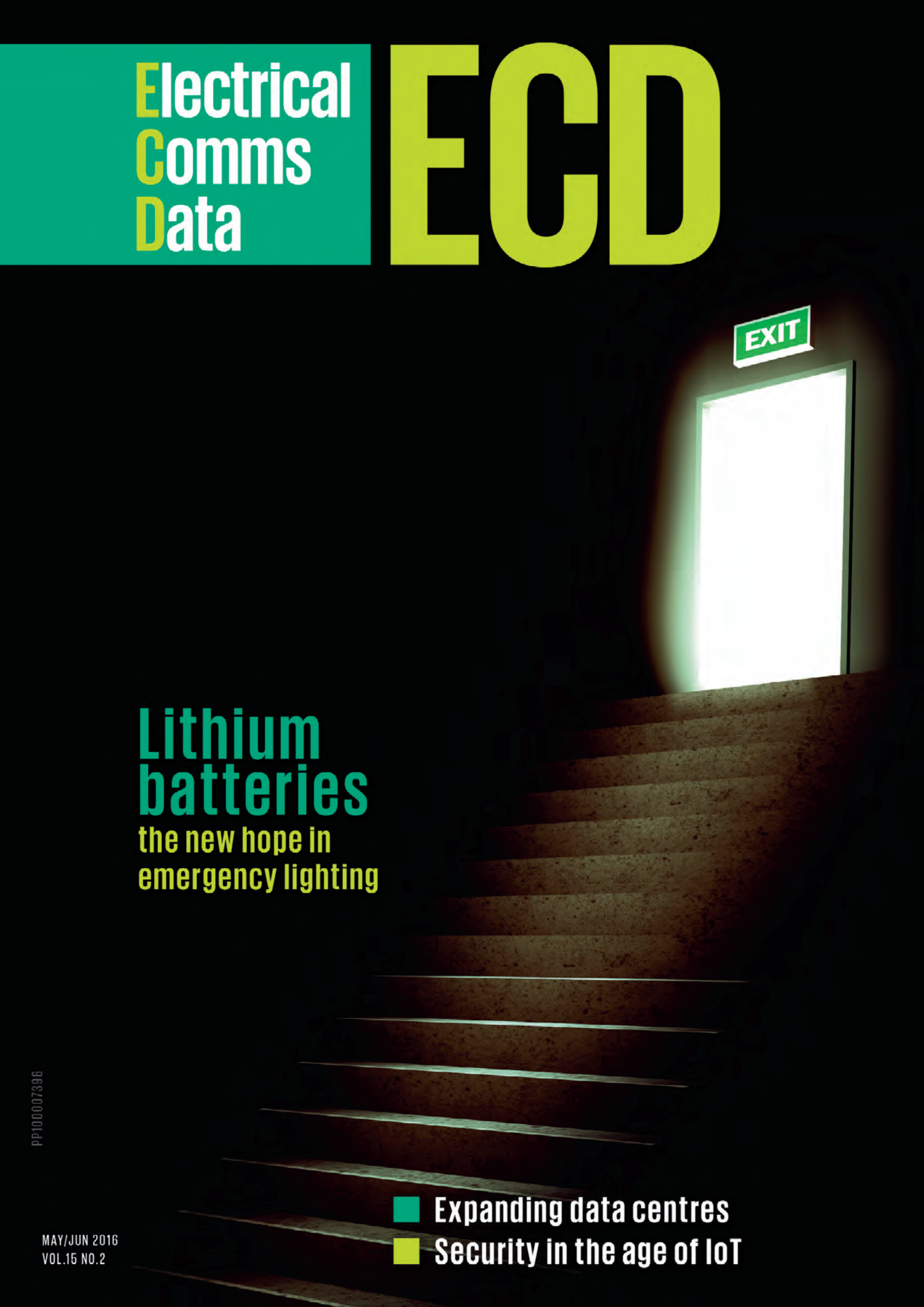

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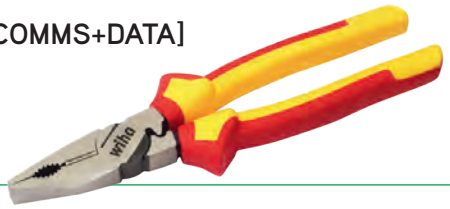

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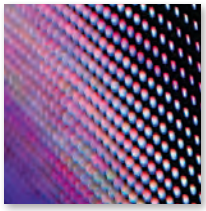

FROM THE EDITOR

You often hear of things 'coming full circle', and I am living proof that this phenomenon does in fact exist. The last time ECD editor Mansi Gandhi took off on maternity leave, I stepped in as editor to keep things afloat until she returned. Today, I find myself in the very same position, as Mansi is once again off bringing a new life into the world.

I'm pleased to be back on deck and look forward to delving back into the electrical comms and data industry, where it seems there is never a dull moment. We've got some bumper issues planned for the remainder of 2016, including this one.

If you think you've heard enough about the Internet of Things already, think again. This is one topic that will continue to steal column space as it increasingly moves from a high-level concept into our daily lives. The truth is, the IoT represents such a significant change that it's hard to think of an area or industry that won't be impacted by its growth. This is especially true for our three feature topics this issue: lighting, data centres and security — all of which are feeling the weight of what this increased interconnectedness will bring. So, enjoy the following pages — I do hope you find some enlightening content herein. I'll be on board as the guest editor for ECD till early 2017 and would love to hear from you in the meantime, so please feel free to drop me a line.

Best regards,

Dannielle Furness – Editor
ecd@westwick-farrow.com.au

EXPANDING A DATA CENTRE

IT ALL COMES DOWN TO POWER

Demand for data centre space continues to defy gravity, rising despite a weak international market and relatively slow economic growth in Australia.

Virtual desktop environments are a leading factor in data centres needing to expand. With apps, security and operating systems all stored in the cloud rather than on individual devices, data centres must be bigger, faster and have more capacity to cope. Australia is a mature market for virtual workspaces, with an above-average uptake among enterprise companies.

Ward Nash, VP for ANZ at IGEL Technology, said, "A rise in virtual workspaces is leading to higher demand for data centre space. Australia is a mature market for virtual infrastructure, which is leading investment towards the country. For example, at IGEL we provide thin clients and a range of operating software designed for virtual desktop infrastructure, and we recently moved our APAC HQ from Singapore to Sydney to take advantage of the opportunities here. This is also leading to many data centre facilities looking at expansion as a means of coping with demand."

Research conducted by Digital Realty Trust back in 2010 predicted that 80% of data companies would look at expanding over the next few years, a statistic now backed by Frost & Sullivan reporting that data centre services revenue in 2014 was $872 million and a report by Paul Budde putting total data centre investment for the last five years at approximately $5 billion.

With growth expected to ease over 2016 and 2017, as fewer new data centres enter the market, expansion of existing facilities will play a key role in maintaining a strong data market in Australia.

Cloudera and Intel have just released results from research (conducted by Unisphere) whereby 319 business leaders directly responsible for data centre operations were asked about their use of big data and what factors would contribute to the evolution of data centres over the next few years.

The research showed that IT plays the lead role in initiating data modernisation projects and that major concerns include data governance and security, as well as accessing data stuck in silos.

Commenting on the research, Sean Anderson of Cloudera said, "Accessing data stuck in silos is the most challenging element in creating an impactful data pool for analytics.

"Walling off data and limiting access is great for security, there is no other sure-fire way to keep data safe than creating real physical separation. But this has its drawbacks. Limited data access means limited insight. How do we expect our analysts and data scientists to build the best models on limited data?

"Not only is this cumbersome for analysts but it creates operational complexity and lower ROI due to managing multiple systems. So for the data management professional, it is not surprising that 38% of respondents viewed data being stuck in data silos as a pervasive issue."

Twenty-eight percent of respondents to the Cloudera/Intel survey listed "network saturation" as a major challenge presented by the growth of data volumes associated with big data analytics, and more than half mentioned the performance of I/O and analytical applications as being a direct challenge.

This is a reflection of the challenging and multifaceted nature of a data centre build. To maintain performance and security while expanding the data centre in a careful and structured manner that will bear out sensible ROI, without overstepping the mark, is a delicate balancing act. To expand, or to create a new space — that is the question.

Looking at the equation from a return-on-investment perspective, the five most common yet challenging considerations are:

1. Whether to build a brand new facility or whether to convert an existing site into a data centre.
2. The length of time that it takes to source a prospective data centre site.
3. Whether or not the site selected has the power capability required for a data centre.
4. Risk assessing the surrounding environment to consider potential issues such as flood areas that can cause damage to the facility.
5. The time and capital required to acquire and develop a data centre site or building. Projects need to manage factors

> CLEAR ALIGNMENT WITH BUSINESS GOALS IS THE KEY FACTOR IN MOVING FORWARD.

including structural and legal reviews before a site can be signed off for use as a data centre. Without effective planning, many projects run off course or are put on hold.

Based on these factors, there is significant sense in expanding a data centre, rather than risking the capital investment required to build a complete new space.

Optimising an existing facility to cope with increased demand is also not without issues, but does mitigate many of the above 'pain points'. Of primary importance is a very thorough analysis of the facility's power demands and capacity to cope with an increased workload.

In order to optimise the data centre successfully, IT leaders and engineers must address three key areas:

Analysis of power needs

- The first step engineers should take, if this is not already in place, is to conduct a review of power utilisation across the data centre/s as well as power demand from different business units. This initial step could reveal unused power capacity.
- Business units tend to 'hedge' their power requests — asking for around 30% more than they actually require. Therefore, the engineering team should have the appropriate internal approach to 'test' business units' requests for power to calculate how realistic they are.
- For instance, a review process could use 'volumetric analysis' to effectively capture data which reveals how much power is really needed by different business units.
- This process calls for effective collaboration between the IT team, engineers and business units, as well as accurate data capture of power needs.

Implementing effective expansion

- Companies should be looking to expand by areas based on kilowatts of IT load — not by area required in square feet.
- Organisations should build outwards in an optimised incremental fashion — it is extremely inefficient to build a huge facility that will take years to reach full running capacity.

Ongoing energy monitoring

- Engineers should look to obtain accurate, ongoing insight into power usage throughout the data centre. For example, meter power usage at multiple points as far as the power distribution units (PDUs) and deliver this information to the customer for further analysis and reporting.
- By measuring to such detail, engineers can effectively optimise and continually improve power usage effectiveness (PUE) at existing and new facilities.

Expanding on the point regarding effective expansion, it is critical to look at the projected needs of the data centre in an incremental fashion, rather than building a huge box and waiting for it to fill.

Yes, data centre facilities are buildings, and buildings are real estate, and square footage is the universal language of real estate. But the lifeblood of a data centre is power and the conversation needs to start and end with that or a data centre project can go astray.

This demand is a direct result of the increasing strategic importance of data centres, led by a rise in virtualisation and a continual growth in demand for data storage.

In today's high-density computing environments, power is the real determinate of data centre requirements and the best mode of expressing them in terms of kW of IT load, or, in other words, the kW of data centre-delivered electrical power required to drive the facility's computing devices (mainly servers).

As a measure of power and capacity, kW most directly translates into the environment required to support the volume of MIPS and terabytes that the data centre is to support both now, and in the future. What's more, it is a real, finite measure — there is no functional obsolescence of kW of IT load.

Cloudera's Sean Anderson says of the conundrum: "Clear alignment with business goals is the key factor in moving forward. Understanding the technology is one aspect to making an integral shift in your information architecture, but it's not the only one. A company can partner with a vendor, engage a systems integrator or hire the right people to ensure they are successful with the technology.

"A much more complex challenge is changing the culture of an organisation to not only be successful with new technology but also ensure that you have the right minds thinking the same way about how data is supposed to fuel the business," he said.

As each successive generation of computing and storage gets more efficient per kW, the data centre gets more MIPS/terabytes out of the same level of kW of IT load. Therefore, any evaluation on the viability of expanding a data centre must come back to the estimated power load that will be placed on the increased space, and the availability (and reliability) of that power.

As data centres continue to expand in Australia to meet this rising demand for more computing power, engineers, electricians and cablers will work closely with IT leaders to compute the optimal balance between size, power and computing performance.

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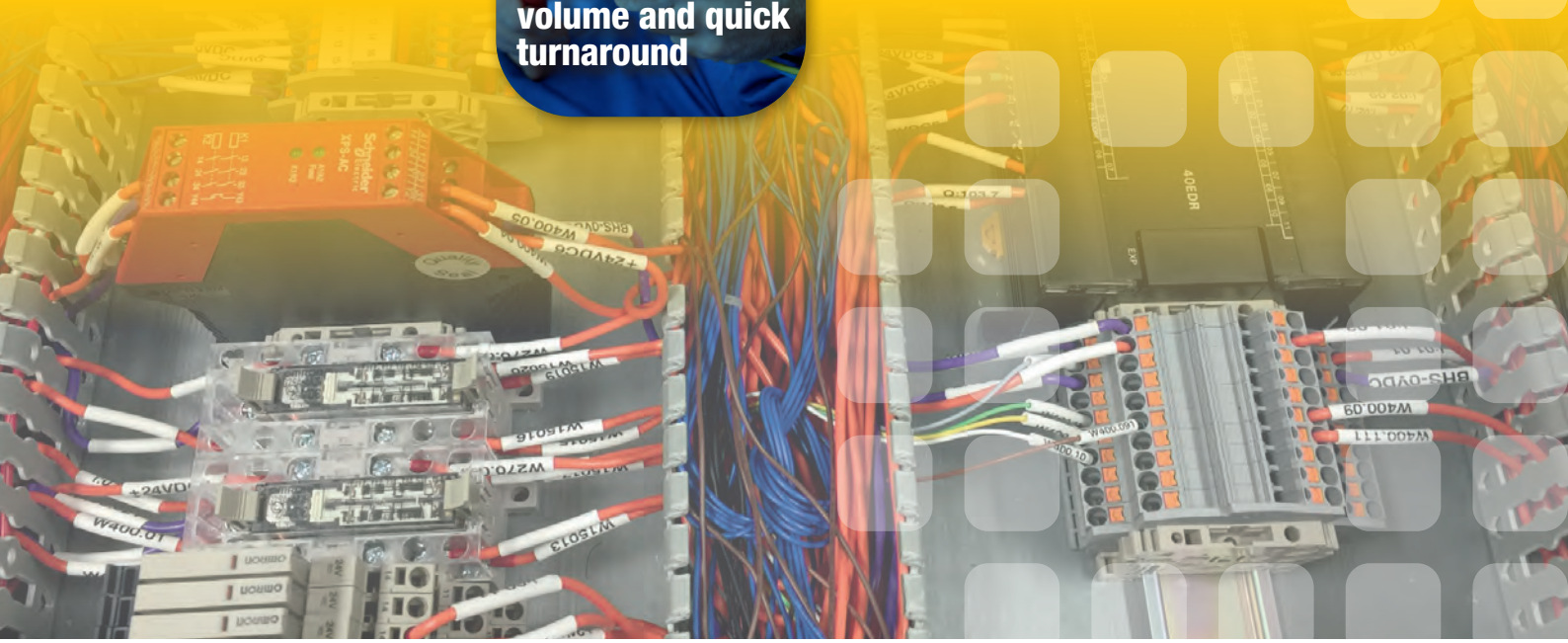

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INSIGHT:

RET WON'T BE MET IN 2018

Tristan Edis, Director – Analysis and Advisory, Green Energy Markets

Based on analysis within the latest Renewables Report, Green Energy Markets has concluded that supply will fall short of the Large-scale Renewable Energy Target (RET) by 2018.

This will mean power retailers, and consequently their customers, will be paying the shortfall penalty (this is $65 for every megawatt-hour of renewable energy short of the target, which effectively works out to $92.86 because the penalty isn't a tax-deductible expense).

So how did it come to this and what, if anything, should we do about it?

The first thing to note is that any shortfall is not for lack of renewable energy projects. Nor is it problems to do with the fundamental economics of those projects.

Rather the shortfall is a product of wounded confidence in the finance community.

Severe wounds to confidence are understandable given developments such as Dick Warburton, who, while chair of the Abbott Government review of the RET, telling the *Australian Financial Review* the entire scheme could be scrapped (akin to cutting projects' revenue in half) without a cent of compensation. Another was Tony Abbott revealing to Alan Jones that he'd have liked to have scrapped the RET altogether.

A majority within the government baulked at such extreme measures but it left financiers rattled. Such a battering to confidence can only be healed by positive experience and therefore the passage of time, but unfortunately time has been left in short supply.

Back in late 2013 when financiers put a hold on renewable energy investment to await clarity about the Abbott government's policy, we knew there was a shortfall of renewable energy certificates awaiting in 2018. Given the two-year lag typically involved in financing and constructing renewable energy projects, things could have been OK if we'd resolved the uncertainty reasonably quickly, even if the target remained at 41 terawatt-hours (TWh). But by the time it was ultimately resolved in mid-2015 we had precious little time left, and were left with financiers fearfully cowering in their bunkers.

Back in April last year, Green Energy Markets estimated that an LRET target very similar to the 33 TWh target that was ultimately enacted could be achieved provided the market committed investment to construct 1200 MW in 2015, which would need to be followed by another 2500 MW in 2016.

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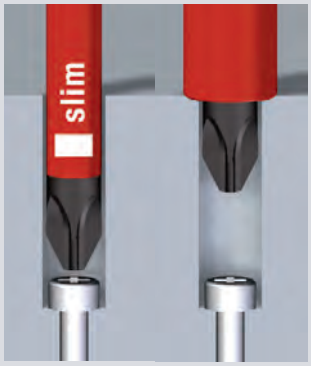

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Spot prices have soared

Unfortunately the country committed to less than 500 MW and most of that won't even contribute towards the 33 TWh target, instead being used by the ACT Government to count towards their own 90% renewable energy target.

In light of this, our December Renewables Report estimates 4400 MW would need to be committed in 2016 to avoid a shortfall in 2018. We've underestimated the ability of the renewables industry to deliver in the past but this turnaround appears inconceivable.

The price for Large-scale Renewable Energy Certificates, known as LGCs, suggests this is the consensus view of other participants. Spot prices for LGCs have soared past the nominal shortfall penalty of $65 and are now in the low $80s. Meanwhile some forward trades beyond 2017 have traded only a few dollars off the tax-effective level of the shortfall penalty of $92.86.

LGC spot price history

Such a price for LGCs is completely out of alignment with the underlying economics of large-scale renewable energy projects. The ACT Government's wind energy procurement auction managed to secure three projects at a cost of $81.50, $87 and $92 per MWh. Taking the highest price of $92/MWh as a guide and given these projects would receive somewhere between $35 and $60 per MWh from selling the underlying electricity, this roughly implies a top-up from LGCs of about $32 to $57 per certificate to make such projects viable. That's an awful lot less than current spot prices.

The discrepancy between the market and economic fundamentals comes down to financiers' lack of confidence about the long-term settings for the LRET. They're prepared to build projects for the ACT Government for $81.50 to $92 per MWh because they don't need to worry about what a future federal government might do with the LRET.

Confidence should recover over time provided the federal government resists the temptation to intervene in the market and the Environment Minister's supportive statements about the scheme spread to other Cabinet Ministers.

However, over 2016, project commitments are likely to be mainly driven by state governments and government-owned retailers who are offering contracts that provide some long-term price certainty for project developers. Our detailed assessment of these state government procurement initiatives, alongside Australian Renewable Energy Agency's (ARENA) large-scale solar auction, indicate

> THE SHORTFALL IS A PRODUCT OF WOUNDED CONFIDENCE

1100 MWs could be committed this year. Coupled with some large behind the meter rooftop solar installations, it's realistic to expect a break-out year for large-scale solar of more than 450 MW in project commitments.

1100 MW falls well short of what's required to ensure the RET target is met in 2018 and also makes achievement of targets in subsequent years very challenging. But it is still a significant source of demand that will finally allow the renewables industry to regain its feet and rebuild its confidence.

It is no doubt deeply disappointing for everyone that Australia will fall short of the target, incurring unnecessarily high LGC prices and penalties when it could have been easily avoided. However, if politicians start talking about tinkering with the scheme yet again they'll make things worse. The current high LGC prices are acting to lure investors and power retailers out of their bunkers in spite of their wounds. Alinta's tender for renewable energy and AGL's 1000 MW Powering Australian Renewables Fund announcement are promising signs. Investment grade large power consumers are also wising up to the fact they're paying too much for LGCs and could instead contract directly to support new projects. With time this will ultimately drive enough supply to overcome the shortfall and bring LGC prices down to levels in line with economic fundamentals.

This article was originally published on Green Energy Markets.

Green Energy Trading
www.greenenergytrading.com.au

Tristan Edis is Director – Analysis and Advisory for Green Energy Markets. He was previously Editor of Climate Spectator, and has experience working at the independent think tank, the Grattan Institute, the Australian Government's Greenhouse Office, the Clean Energy Council and Ernst & Young's Project Finance division.

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SHIFTING PARADIGMS IN THE AGE OF IoT

*Kirsty Jagger**

How many smart devices do you own? However many, it's just the start.

A new Markets and Markets study estimates 15.4% growth in smart appliances in the next five years, which means that by 2020 these smart autonomous devices will reach 30 billion in number and the market will be worth about $52.6 billion. In particular, millions of consumers around the world are increasing the demand for smart home security products. But what are the security implications of smart security?

To answer this all-important question, international security futurist Marc Goodman provided an insightful perspective in his address to ASIAL's Security 2015 Conference in Melbourne. He said security devices moving into the digital realm will "create tremendous opportunities to improve security, but it's also going to create its own risks and threats".

Size and scale of the risk

"When we talk about internet changing its size from a metaphoric golf ball to the sun, we are talking about the number of available connections to the internet," said Goodman.

With IPv6, there are 78 octillion possible connections. That's 78 billion billion billion, or enough space to give one trillion IP addresses to each grain of sand on Earth! So more and more things are going online, hence the 'Internet of Things'.

"The challenge about it from the security side is we can't even protect the devices that we have online today. The Internet of Things is just more things to be hacked. While we have been excellent at wiring the world, we have failed to secure it, and that's something we need to give grave consideration to," warned Goodman.

"Not only are these new technologies creating massive security risks, but they are also opening up new challenges for law, public policy, regulation, privacy. So the technology is following Moore's Law and is exponential — doubling, doubling, doubling — but all our traditional legacy systems are completely analog and linear and so we're really headed for some very interesting times ahead."

Smart systems and their hackability

Let's take security cameras, for example. Goodman says around 30% of the systems, particularly those of consumer grade, come out of the box with no passwords whatsoever.

"So if anyone knows the right IP address or the right address to reach your camera, they can log in and see you at any time.

And there are thousands of websites that are dedicated to exactly this kind of voyeuristic viewing of people," said Goodman.

"30 to 40% of cameras do have passwords, but those passwords are administrative passwords that are in the manuals for the camera, so if you go online and Google the name of the manufacturer, you can download a PDF of the camera operations manual and see what the administrative password is."

But even those who spend tremendous sums on security can be hacked.

"Former FBI director Robert Mueller recently said, quite famously, 'there's only two types of companies: those that have been hacked and those that will be'. A sense of overconfidence is the enemy in a situation like this," said Goodman.

"We've had prisons in Florida who actually had the prisons' doors online, available to the internet, and they were hacked and all of a sudden the prison doors are opening [...] We have 300,000 implantable medical devices that have an IP address — so your heart is now online, which means now, for the very first time, the human body itself is becoming subject to cyber attacks."

Who is at risk of cybercrime?

From big business to small business, right down to the individual, everyone is vulnerable because, as Goodman warns, attacks are generally not personal.

"When you think about these cyber attacks, they are not coming against you — they are coming against everybody. There are not people that are coming after your company — there is software that is coming after your company. The days of humans hackers sitting at keyboards, trying to break into your network, are mostly over. Almost all of these security threats are carried out by automated tools."

Crimeware (a type of malicious software designed to carry out or facilitate illegal online activity) shakes the doors and finds an opening, Goodman explains. Then the average time to detection of a cyber breach is 211 days, according to a study by Trustwave Computing. That means the average company that is broken into has hackers living in its systems for nearly seven months before they even realise it. According to the same study, 75% of Fortune 500 companies in America could be penetrated in just under 15 minutes.

"That's not just a security threat — that's like a hot knife going through butter. It's like taking candy from a baby," Goodman said.

What it means for security moving forward

Goodman says all of the security paradigms that worked well previously are now broken by these technologies. Moving forward, curiosity and collaboration will be key.

> WE CAN'T EVEN PROTECT THE DEVICES THAT WE HAVE ONLINE TODAY.

"The skill set required for successful security professionals moving forward will be quite different from what it was in the past, but I would say the key skill set people need is curiosity," Goodman said.

"You need to be curious about the world around you because things are changing so, so rapidly. And you need to be adaptive and flexible and open to new things and recognise that you may not have all of the answers.

"We in security tend to think that we have to do it all alone [...] but the security threat is growing so exponentially greater day by day that we're going to need outside help. There's currently, according to CISCO, a shortage of 1 million cybersecurity professionals around the world today. By 2020, that number's going to grow to 2 million people. So if you are a chief security officer or you're a chief security information officer, you'll never be able to battle this by yourself.

"You need to get your COO and CEO on board, you need to get your board of directors thinking about this and you need to get all of your employees involved. You even need to get the general public involved. Your customers. You need to create channels [...] so that you can bring in all of this outside intelligence. We on the security front need to be much smarter and much more clever about crowdsourcing security and getting non-traditional players to feed into all of this."

So the next time you install an internet-connected device, make sure you give enough thought to securing the device from would-be hackers!

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**Kirsty Jagger is the Marketing and Communications Manager for the Australian Security Industry Association Limited. Established in 1969, ASIAL is Australia's peak national security industry body. ASIAL is dedicated to supporting its members, promoting standards and safeguarding public interests.*

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BARRIERS TO OVERCOME FOR INDOOR WIRELESS NETWORKS

A new report suggests that there are a number of barriers that prevent the installation of an indoor wireless network, despite the value it can add to commercial premises and the high level of mobile devices and traffic within these buildings.

The second instalment of a new global study, commissioned by global network infrastructure leader CommScope and carried out by Coleman Parkes, surveyed the professionals who design and manage commercial buildings — including building and facilities managers, real estate managers and architects — to explore this untapped business opportunity and consumer need.

The study said there are an estimated two billion smartphone users globally, with an approximately 80% of mobile traffic originating or terminating within a building, and only an estimated 2% of commercial buildings that have dedicated technology to ensure strong and reliable mobile coverage indoors.


© iStockphoto.com/Alija

Dr Ispran Kandasamy, global leader, Building Solutions at CommScope, believes building professionals should take greater responsibility.

"People are obsessed with their mobile phones and see indoor wireless coverage as important as having access to water and electricity," said Kandasamy.

"Only by taking the lead will building owners be able to provide much needed connectivity in their properties."

Survey respondents asserted that indoor wireless coverage could increase a property's value by 28% on average, meaning that a $2.5 million office building could be worth $700,000 more with an indoor mobile system.

Respondents also cited benefits for the enterprise tenant, including an increase in workforce productivity (77%) or the possible recruitment of more talented individuals (46%). Two-thirds of respondents also rated indoor wireless connectivity as 'essential' for employees.

However, providing mobile coverage to users within larger and more complex buildings requires investment in technology, and the top three roadblocks that respondents said prevented the installation of indoor wireless networks included: the cost of the network (35%); the complexity of the technology (19%); and the lack of skilled workers to manage it (11%).

Kandasamy said that while there are clear concerns around the cost and complexity of the technology, building owners should understand that ignoring this issue could result in more costly work in the future. He believes that engaging with architects, facilities managers and enterprises at an early stage will ultimately save money, as well as provide an enhanced user experience.

This is the second instalment of CommScope's research into the building industry's attitudes towards the provision of indoor mobile coverage. CommScope will launch a comprehensive report with an analysis of the findings and recommendations to the industry on 7 March 2016.

To pre-register for an early copy of the report and download the Executive Summary, go to www.commscope.com/IBW-Survey-Report-2016.

ROCKWELL AUTOMATION APPOINTS NZ COUNTRY MANAGER

Rockwell Automation has announced the appointment of Nigel Williams to the role of country manager for New Zealand.

Williams will be based in Auckland and responsible for all NZ sales activities. He will provide leadership in the development and execution of strategy for New Zealand, in alignment with the ANZ regional strategy, in order to achieve the sales target.

With more than 25 years' experience in the industrial automation industry, Williams is well placed to manage and grow the New Zealand business. Prior to this role, he spent 10 years at Siemens, predominantly in the food and beverage sector. He has also worked in channel management roles and the building technology area of the business.

Williams is not entirely new to the company, having held various sales and sales management roles between 1992 and 2004, including national sales manager.

"It's great to be back working with Rockwell Automation again. The company has made a longstanding commitment to the New Zealand market in terms of service and support and longevity. I'm proud of that commitment and excited by their clear vision to help customers be more productive and optimise their enterprise," he said.

Williams will work with the company's distributor, NHP Electrical Engineering, in the execution of the company's sales strategy. He will also play an active role in the coaching and development of the sales team to meet their individual goals.

"I'm looking forward to working with our dedicated and talented team and enhancing the relationship with our distributor, NHP Electrical Engineering. Through this relationship, we are well placed to meet our customers' automation requirements," said Williams.

David Hegarty, regional director of Rockwell Automation South Pacific, congratulated Nigel on his new appointment saying, "It's a real pleasure to announce Nigel as our New Zealand country manager. He is ideally placed to lead and grow our business in New Zealand over the coming years."

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Gigabit stackable switches

Allied Telesis has added the IE510 Series of Gigabit stackable switches, which are suitable as core or distribution switches for industrial applications, to its industrial networking portfolio. When deployed with the IE200 Series of Industrial Ethernet switches, the IE510 switches can be used to connect devices such as CCTV cameras, industrial automation systems and building management systems.

The first model to be released, the AT-IE510-28GSX, provides the flexibility of 24 SFP bays with four 1/10 Gbps uplink ports and the scalability provided by Allied Telesis Virtual Chassis Stacking (VCStack). The switch comes with the AlliedWare Plus next-generation operating system, including Ethernet Protection Switched Ring (EPSRing), comprehensive automation using scripting and triggers, and Allied Telesis Management Framework (AMF).

The switches can be upgraded from Layer 2+ to a full Layer 3 feature set with a software licence package. A choice of 24 or 48 Gigabit ports, dual-speed SFP+ uplinks and PoE models are also available. The x510DP models feature dual hot-swappable load-sharing power supplies for maximum uptime, while the x510DP, with front-to-back or back-to-front cooling options, is suitable for data centre applications.

Allied Telesis International (Aust) Pty Ltd
www.alliedtelesis.com.au

OTDR modules for field tester

Anritsu has announced the availability of OTDR modules for its next-generation Network Master Pro MT1000A all-in-one tester. These OTDR modules can operate standalone or be simultaneously installed with an available multirate transport module to create a rugged, handheld solution that field technicians can use to ensure the performance of mobile, metro, access or long-haul networks.

Anritsu's Fibre Visualiser streamlines the optical testing process by minimising the number of settings to be made and compiling the results into a clear, graphical summary of both overall and individual characteristics. Colour-coded pass/fail results are provided based on user-defined thresholds. Failing events are also highlighted and viewable by touching the icon. When an optical link has passed all criteria, files can be saved and customised reports generated by pressing a button.

When combined with the MU100010A multirate transport module, the tester ensures optimal network operation. Its broad test capabilities, including OTDR, Loss Test Set, IEC 61300-3-35 based Connector Inspection, 10 MB to 10 GB Ethernet, SONET/SDH/PDH, Fibre Channel, OTN and CPRI, make it suitable for mobile front-haul, backhaul, CRAN, metro and access networks.

The OTDR modules feature high resolution and dynamic range of up to 46 dB to ensure quick and thorough evaluation of singlemode and multimode fibres. A visual fault locator (VFL) is also optional.

Anritsu Pty Ltd
www.anritsu.com

FTTx/PON power meter and microscope

Available to rent from TechRentals, the JDSU OLP-87 PRO is designed for the qualification, activation and troubleshooting of B-PON, E-PON, G-PON, XG-PON and 10G-EPON networks. As well as being part of the JDSU SmartClass family, the product combines a FTTx/PON power meter with a P5000i microscope for both testing and inspection analysis.

This compact field unit performs: end-of-line testing and maintenance of all FTTx/PON signals; simultaneous measurements for voice, data and video signals (through-mode capability); and automated pass/fail fibre analysis using included software.

The device also has a touch screen interface and USB connectivity, simplifying usability for technicians in the field. It features 1490 and 1550 nm wavelengths (λ) downstream and 1310 nm λ burst mode upstream. The unit also comes with onboard storage and reporting software, as well as various tip adapters.

TechRentals
www.techrentals.com.au

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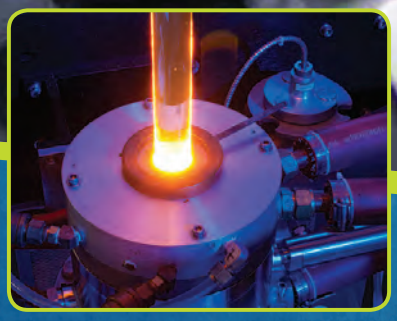

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Living on the edge

Mark Roberts, IT Business Unit Manager, Rittal

Our networks and data centres are coming under pressure as emerging technologies push them to the limit. The demand for data and information has, and is, growing to the point where today's systems are struggling to cope.

One of the common themes raised in discussions around the increasing burden placed upon IT infrastructure is the 'Edge'. Unfortunately there is no simple summation of what the Edge is, as this can differ by organisation and/or by market.

Edge data centres and networks in the Telco market represent infrastructure deployed at a regional level rather than being centralised. This is done to enable the delivery of live streaming media, on-demand streaming media and social networks. The key benefit to the user being better availability and performance …. after all, nobody likes to watch the buffering % climb at a snail's pace!

The Internet of Things (IoT) has its own take on the Edge. The IoT is a network of physical objects, be they devices, vehicles, buildings or other items that are provisioned with electronics, software, sensors and network connectivity enabling the collection and exchange of data.

The Edge in this scenario can refer to the sensors that collect the data, which when processed provides information that gives a person or organisation knowledge that ultimately enables more informed decisions to be made. The huge volumes of data presented by the IoT requires real-time processing, which can cause latency and flexibility issues when data is stored centrally.

To combat this, we are seeing some applications being decentralised to Edge Data Centres and 'Micro' Data Centres. A good example of this is a high-profile Australian mine that has multiple data centres at different locations which collect and process data relating to the mine operation itself, as well as controlling autonomous trains and trucks. This data is then analysed and acted upon many hundreds of kilometres away at a network operating centre.

Within the industrial arena, the Edge often refers to the location of IT equipment that has superseded industrial controllers and proprietary protocols. The term 'Industry 4.0' has been referred to as the fourth industrial revolution, a new phase in the organisation and management of the entire value chain over the full product life cycle. This cycle is increasingly oriented

towards individual customer requirements and extends from ideas, orders, development and manufacturing to end-customer product delivery and recycling, including all associated services. The framework is provided by networking all the elements involved in the value chain so that all relevant information is available in real time, and using the data to derive the optimum value adding stream at all times. Linking people, objects and systems produces dynamic, self-organising and cross-company value adding networks that can be updated in real time and optimised on the basis of different criteria including costs, availability and consumption of resources. Increasingly we are finding the IT equipment that drives Industry 4.0 moving out of the server room and onto factory floors and into other harsh environments which challenge the performance and operational characteristics.

For the majority, the Edge refers to any decentralised processing environment outside of the primary data centre. This may be a remote office, warehouse or factory. It may also refer to a hybrid cloud environment where some applications may be forced to reside 'on premise' due to an organisation's rules around data sovereignty, or to ensure performance is maintained. As with other Edge locations, one of the key challenges lies in providing a holistic physical infrastructure that is secure, reliable and scalable.

The significant take up of Cloud and Co-location services in Australia has given many organisations a feel for what can be realised when you have millions of dollars to spend on IT infrastructure. There are now many Tier III cloud facilities built and operating around the country and in the same sense as flying at the pointy end of the plane, once you've experienced how it should be done it's very difficult to go back. Fortunately, the challenge of providing the correct physical infrastructure for IT equipment at the Edge is becoming easier.

The concept of the Micro Data Centre is basically taking the critical infrastructure that you'd find in a large data centre and shrinking it down into one or two racks. The solutions typically range from 3kW to 12kW in terms of delivering power and cooling.

Power typically includes a single phase UPS, bypass switch and intelligent power distribution rails with switching options that may be important for remote sites.

Cooling often uses an in-rack DX (Direct Expansion) split system that essentially provides its own environment that has little impact on the location in which it is placed and vice versa.

Racks typically have an IP55 protection rating to limit ingress of water and dust and at the same time limiting potential for condensation and enabling the use of gas fire suppressant systems.

As the racks often have a hybrid configuration, 800mm wide racks provide ample room for cabling, whilst depths of up to 1200mm accommodate the deepest of servers. Heights vary from 24U to 47U, with focus being placed on usable rack space after power and cooling elements are taken into account.

Security and resilience can be found in enclosures that offer electro-magnetic locking systems to govern access into the racks via key pads or proximity cards, and automatic door opening kits that act as a failsafe should the cooling system fail catastrophically. Monitoring of the infrastructure's performance and security is critical, especially in the case of fire detection where options exist for early smoke detection coupled with gas flood suppressants to negate any potential threats.

Micro Data Centres will play an important role in the physical IT infrastructure market as we see IT being deployed in more remote and harsh locations. By their very nature they also lend themselves to being redeployed, extending and protecting the initial investment. Standardisation allows organisations to deliver infrastructure faster and once operational, to manage and deal with support issues in a more efficient manner. Off-site configuration and pre-commissioning also enables quality to be maintained, providing the client with peace of mind.

“

For the majority, the Edge refers to any decentralised processing environment outside of the primary data centre.

Rittal Pty Ltd
www.rittal.com.au

Security cameras

Sony has added the SRG-120DS, a total of six full-HD pan/tilt/zoom (PTZ) cameras, to its SRG series. The range includes the SRG-120DS, -120DU, -120DH, -360SHE, -300SE and -300H.

The compact and lightweight designs ensure these cameras can be installed in a variety of locations while integrating seamlessly to different applications as either a primary or secondary camera. The SRG camera line-up, with 1/2.8-type Exmor CMOS image sensors, provides crisp and detailed full-HD (1920x1080/60p) images with low noise condition.

The cameras also feature different connectivity capabilities for various needs in video output ranging from HDMI, 3G-SDI, USB2.0 and 3.0 to standard IP network. They can be controlled via the VISCA protocol over IP connections and are also compatible with Sony's RM-IP10 IP remote controller to enable comfortable pan, tilt and zoom operation with optical three-axis joysticks.

Users can also control up to 112 cameras over IP connections by using five remote controllers, while camera control with the VISCA RS422 and RS232C allows the cameras to be controlled remotely. The range is expected to be available in Australia from April 2016.

Sony Australia Ltd
www.sony.com.au

Distribution boards

RackLink has announced its growing range of AC/DC rack-distribution boards, designed with a 3 or 4RU form factor which can accommodate up to 24-pole DIN-mount hardware.

There are a variety of predrilled holes for fitting busbars and running cable into the rear of the unit, while the boards can arrive preloaded with the user's choice of DIN-mount accessories or as an empty chassis ready to populate on-site with existing equipment.

The distribution boards are designed for easy installation. Users can simply mount the rear of the unit into the rack, load up with hardware and cabling, then screw the front plate on when the job is completed. The rack-mount products also come finished with a black-ripple powder coat for a professional look, which disguises fingerprints from operation.

The company also offers customised boards with variations on design to suit different installation requirements.

RackLink
www.racklink.com.au

Wall socket range

Repelec has released USBsockets, a patented wall socket range that combines an Australian Standard approved dual 240 V power socket with powerful 3.5 A twin USB-powered charging outlets.

The range is a direct replacement to the standard Australian GPO double power point, which means no messy wiring issues and the socket can be installed in minutes by a qualified electrical contractor.

While cheaper USB wall sockets (also known as wall plates) may be available, many of these are not approved or do not fit standard socket wall holes. USBsockets are compliance approved and quality assured with solid components, along with a sleek design in a range of colour options.

The LED ports also emit a soothing green LED light when the doors are open and charging is in progress. USBsockets are available through leading electrical wholesalers.

Repelec (Aust)
www.repelec.com.au

CASE STUDY

Care and comfort

Medical and allied health services provider Primary Health Care Limited operates a network of medical and pathology centres across Australia, including the Campsie Medical and Dental Centre (CMDC) in south-western Sydney.

As part of a commitment to providing optimum patient care, CMDC needed to identify an HVAC solution that suited the physical layout of the building and delivered the appropriate levels of comfort across a range of rooms, including consultation suites, small offices and open-plan waiting areas. The existing system did not support the needs of the centre or its staff and patients, so Primary Health Care embarked on a vigorous evaluation process to determine a more suitable HVAC solution.

Traditional ducted systems in applications such as this often deliver extreme variations across separate areas, wherein some are too warm and others too cold. Variable refrigerant flow (VRF) systems can provide individual temperature control for each room but require refrigerant leak detection systems for small rooms in order to meet with AS1677 requirements. This would entail the installation of refrigerant detectors and alarms that require yearly calibration to comply with Australian law, representing additional ongoing expense.

Mitsubishi Electric was selected to provide a smarter space-saving solution that could be uniquely tailored to suit the specific needs of the practice and its varying room sizes.

Large open-plan areas incorporate a traditional VRF system, while individual consultation suites and smaller rooms feature Mitsubishi Electric's Hybrid VRF. CMDC is the first commercial installation of the hybrid solution, which allows heat exchange between refrigerant and water and negates the need for additional detection and alarm systems in smaller rooms. Integration between the standard and hybrid systems is seamless and both are operated via a Mitsubishi Electric AE-200E centralised controller.

Primary Health Care was pleased with the outcome and staff have noted a substantial difference in temperature stability across all areas of the practice, prompting the company to plan a rollout to more centres in their network.

Mitsubishi Electric Australia
www.mitsubishi-electric.com.au

Pre-terminated copper cabling assemblies

The AFL Pre-terminated Copper Cabling Assemblies are designed to offer a factory tested copper cabling solution for Category 6A shielded and Category 6 unshielded systems in data centres, horizontal and backbone cabling subsystems, as well as Category 6A and 6 networks. The solution also offers the flexibility of having one end or both ends terminated for use in cross connects or consolidated points.

Pre-terminated cables help ensure reduced time and costs associated with on-site cable terminations. They are suitable for use with narrow installation time frames or if an on-site termination environment is hazardous or poses health and safety risks. They also offer better cable management and guaranteed throughput.

The cabling assemblies also allow for switch upgrades to be easily completed, and MAC work handled, by on-site staff. The cables can also be re-used.

AFL

www.aflglobal.com

Mini CAT6A patch cords

Warren and Brown Technologies has released the Mini CAT6A S/FTP (shielded) patch cords, which deliver the same level of performance as standard diameter Category 6A (CAT6A) shielded patch cords while being approximately 15% smaller in diameter.

The smaller patch cords are designed for networks in buildings such as data centres, and in healthcare and educational facilities. CAT6A patch cords support data rates of 10 G up to 100 m and a bandwidth of up to 500 MHz, but traditionally are larger in diameter than CAT6 patch cords, and may cause congestion in racks. With a smaller diameter the mini patch cords help to reduce congestion in a rack and around patching fields. This provides better airflow and improved usability, while still allowing for high-speed 10 G transmissions as per ISO/IEC 11801.

The smaller patch cords are also suitable for helping to futureproof building networks. By installing CAT6A infrastructure now for new installations, the cabling system can provide enhanced performance for Power over Ethernet (PoE and PoE+) as well as support wireless systems that rely on 10 G.

Warren & Brown Technologies

www.warrenandbrown.com.au

Rack server

Dell has added the PowerEdge C6320 rack server to its 13th-generation Dell PowerEdge server portfolio.

The product is designed to offer four independent server nodes in a 2U chassis. Compared to the previous generation, it provides up to two times the performance improvement on the LinPack spec, including up to 28% better power efficiency. This allows users to optimise application performance and productivity whilst conserving energy use and saving traditional data centre space.

The device features the latest generation of Intel Xeon E5-2600 v3 processors and provides up to 18 cores per socket (144 cores per 2U chassis), up to 512 GB of DDR4 memory and up to 72 TB of flexible local storage.

It also comes integrated with iDRAC8 with Lifecycle Controller, which allows users to automate routine management tasks and reduce the time and number of steps to deploy, monitor and update their servers

throughout their life cycle.

Its flexible, modular platform with automated management makes it suitable for appliances such as the Dell Engineered Solutions for VMware EVO:RAIL, Dell XC Series of Web-scale Converged Appliances and other HPC offerings.

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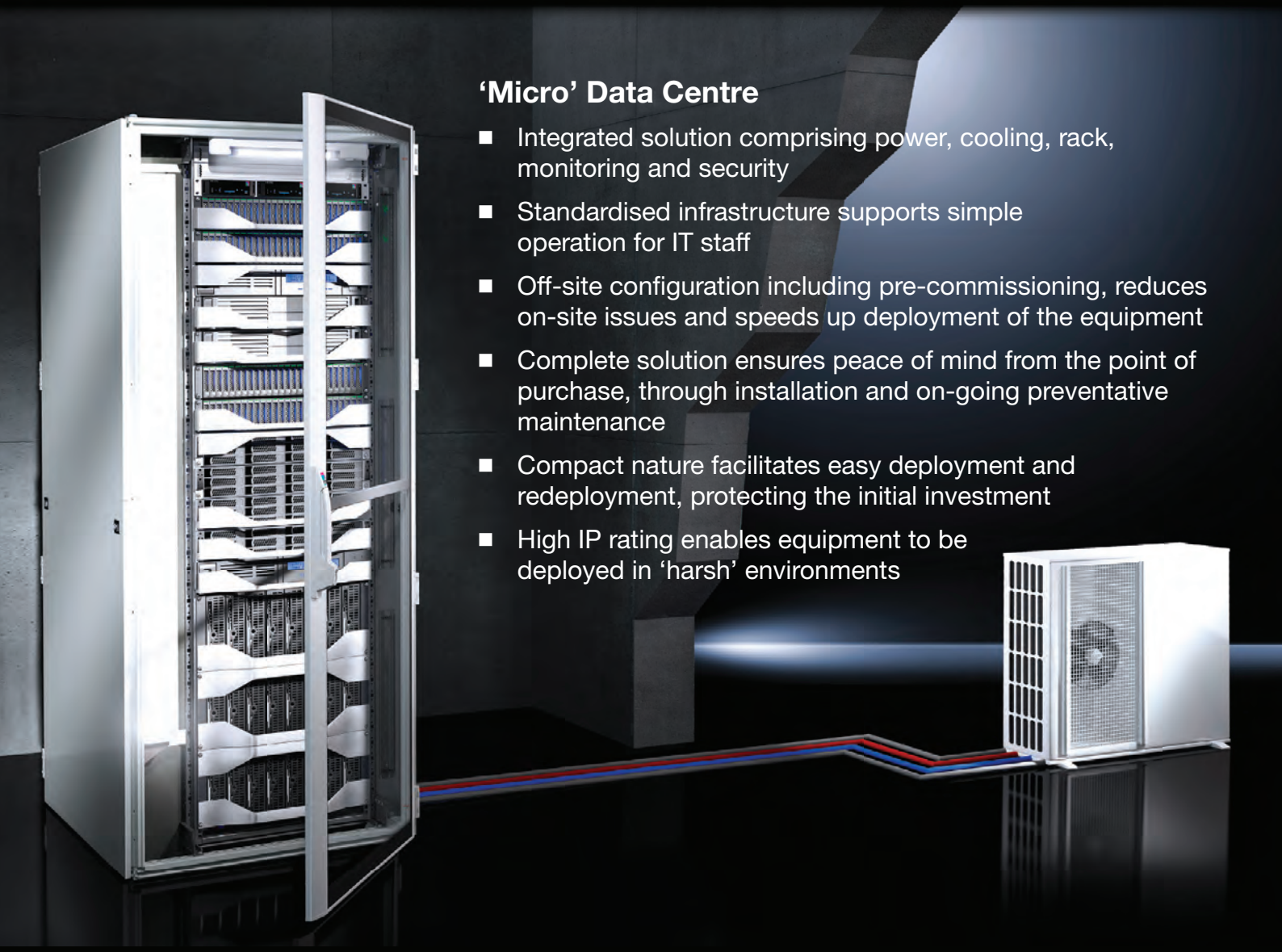

‘Micro’ Data Centre

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QUALITY MATTERS

Nic Larue, Product Manager: PQ, EV, Solar Proj., Busway (Interim) Marketing

Power quality problems can lead to equipment failure, high energy costs, business downtime and slow production. It is, therefore, important for businesses to understand and improve power quality to improve overall efficiency.

Put simply, power quality refers to how effectively your facility uses and distributes the power delivered to it. Power quality problems can usually be characterised in terms of the effect on the supply voltage. Typical symptoms include: flickering lights; transformer issues, such as noise, extra heat or premature failure; and unexpected equipment shutdown.

Why power quality matters

Power quality is an area of growing concern due to its associated financial impacts, downtime and damage to equipment. Not to mention, it's becoming more common due to the digitisation and increasing use of electronic devices in industry facilities, ie, computers and digital machines.

In the industry sector, the cost of poor power quality can reach 4% of annual turnover and is often equivalent to the total balance payable on a facility's energy bill. The more worrying statistic, however, is the EPRI finding that 80% of power quality disturbances are generated within a facility. That means a business's approach to power will often hurt its bottom line. For example, if power is being inefficiently handled within a plant, it's likely you'll be paying more for the electricity that you're using.

Power quality issues also put greater strain on your equipment, which not only means downtime and repair costs, but can be an issue for staff safety as staff are operating equipment that is not performing adequately. The life span of equipment is also impacted by poor power quality, meaning, again, more costs associated with maintenance and the replacement of depreciating assets.

Given the pressure that rising electricity prices are putting on businesses, plus initiatives surrounding the rollout of more cost-reflective tariffs, it's not surprising more businesses want to tackle poor power quality. The challenge lies in understanding how to identify the problems.

Measuring to manage

It's a classic business adage that you can't manage what you can't measure, and that principle certainly holds true for power quality.

The reason many businesses don't measure is because they don't know what they should be tracking, nor how they should go about the process. While every location is different — and has its unique profile of installed loads and grid-supplied power issues — research studies from Europe and the US help highlight what should be monitored.

In the US, for instance, research studies show that voltage sags and swells and harmonics are, by far, the most common issues facing facilities. Over in Europe, businesses are hit hard by transients and surges, voltage dips and short interruptions. In Australia, we have found that the following power quality issues are of growing concern: harmonics; poor power factor; voltage sags; transients.

How to measure

When planning an approach to measurement there are two options: a short-term, 'quick fix' like approach; or a long-term approach which is more aligned with the overall facility or company goals. The short-term approach might, for example, involve measuring known problem areas within a facility over a two-week period. Although doing this is better than doing no measurement at all, this method won't support ongoing continuous-improvement goals of the facility. That's because the analysis will likely only provide a small glimpse into what's happening — rather than the complete picture.

While a short-term approach will be effective, based on our experience conducting hundreds of power-quality audits, it is recommended companies install a permanent power quality monitoring system to detect and record all disturbances on an ongoing basis. With continuous monitoring comes the possibility of making continuous improvements to your system's power quality and sustainability.

Where to manage

To perform power quality measurements, a system should be equipped with power quality metering devices. These devices should be able to capture and record short-term power quality events; and provide current and voltage information, continuous disturbance measurements and power quality compliance evaluations.

Power quality meters usually have a higher cost than power meters with basic functionality, thus it is important to place them in the right places within your electrical installation, or on sensitive loads. For example, placing a power quality meter on the main incomers allows monitoring of the power supply quality, detection of any background distortion coming from the energy provider and compliance with utility standards. Also, a key for continuous improvement of power quality and power system health is to collect and connect the information of all available sources into a single system, and provide tools that evaluate, analyse, report and alarm on power quality issues.

Analysis includes the interpretation of recorded data and the evaluation of power quality's impact on the electrical installation and equipment. The analysis can be performed on a regular basis (for example, once per month) or ad hoc (when there is a problem caused by a potential power quality disturbance).

Analysis is usually performed by skilled and experienced professionals, with specific competencies in power quality, electric installation and equipment, who are capable of correlating power quality disturbances with equipment damage, malfunction or electrical installation downtime.

Because electrical and maintenance personnel in a facility may not be power quality experts, the current trend is to embed increasing analysis and expertise capabilities into power quality monitoring systems. Such systems can provide meaningful dashboards and

> THE RIGHT KIND OF CORRECTIVE ACTION CAN CREATE AN ALMOST IMMEDIATE FINANCIAL BENEFIT

appropriate widgets to analyse power quality problems. For example, a trend graph should be used to analyse steady state power quality disturbances (harmonics, unbalance, power factor etc) where exceeding recommended limits on a regular basis can lead to issues such as equipment overheating or failure and network overload.

Equipment to solve power quality problems

Once you have a clear understanding of power quality challenges, it's time to take action. Manufacturers have developed a range of equipment to help consulting engineers and facility personnel. In some cases, the options are clear, while other situations may require a bit more thought.

- **Transients.** Transient voltage surge suppressors are the best option for protecting against transients in a power system.
- **Voltage sags and interruptions.** The best choice here depends on extent of any interruption. Uninterruptible power supplies and other energy-storage options could do well with shorter-term interruptions, but back-up generators or self-generation equipment is needed when longer outages are encountered. Other solutions could include static transfer switches and dynamic voltage restorers with energy storage.
- **Harmonics.** Active filters are the recommended solution for harmonic mitigation, thanks to their flexibility and dynamic mitigation performance. Alternative approaches could involve passive filters, multipulse arrangement transformers or harmonic correction at the equipment level (for example, by integrating harmonic filtering into variable speed drives).
- **Power factor.** Reducing power factor requires producing reactive energy as close as possible to connected loads. Installing capacitors on the network is the easiest and most common way to achieve this goal.

Taking power quality to the next level

By implementing a more proactive process of continuous power-quality improvement, facility managers can minimise the risk of future problems and interruptions and maximise both operational efficiency and equipment lifespan. The following short- and long-term steps can help facility managers improve their uptime, energy efficiency and asset management:

Within the next few weeks: Plan a project roadmap. As a starting point consider monitoring the power quality at plant level or at critical areas with sensitive loads.

Within the next 6 months: Analyse the results of your monitoring and its impact on your equipment and installation. Assess the power quality correction technologies. Identify an initial project with reasonable investment that can result in positive results over a relatively short period of time (for example, an immediate opportunity to deploy power quality equipment for a particular device or process).

Within the next 12 months: Plan methods for expanding power quality solutions more broadly throughout your organisation. Collaborate with internal stakeholders and/or seek out expert service organisations that have the technical expertise and global presence to support a long-term infrastructure integration project.

Tackling power quality

Poor power quality is a huge cost to businesses of all sizes — directly in terms of the energy prices businesses pay and indirectly in terms of the cost of replacing and repairing inefficient machinery or in terms of loss of production. Although the symptoms of poor power quality can be relatively easy to spot, understanding what exactly is causing the power quality issue is more complex. That's why continuous monitoring is so important. If you're not monitoring what's happening within your facility then your business could be leaking cash without you knowing.

Although a variety of solutions to manage power quality challenges exist, a lack of knowledge in how to address critical aspects of power quality performance is holding businesses back. As electricity prices continue to rise, it is critical facility managers take action now to protect the bottom line for the long term. The right kind of corrective action can create an almost immediate financial benefit in the form of electricity bill savings.

Schneider Electric
www.schneider-electric.com

Case study

SULO Australia identifies 15% in energy usage savings and tackles power quality

SULO Australia, an Australian manufacturer and supplier of plastic and metal bin products, operates a highly automated, large-tonnage injection moulding plant in the country.

The company made the decision to undertake an energy audit. The audit was subsidised by the New South Wales Office of Environment and Heritage and was conducted by Schneider Electric to identify where and how energy was being used across the MGB manufacturing plant.

After a 15-week in-depth audit, a number of key findings were reported back to the SULO team, highlighting where energy was being used across the plant. Interestingly, across the facility just four machines were consuming 80% of the site's power. On completion of the audit, there were 16 energy-saving opportunities presented back to SULO.

These 16 opportunities had the potential of reducing annual electricity costs by 15% across the entire plant, equating to over $200,000 per annum.

Improving power quality has now become more important than ever and therefore SULO installed and commissioned two Schneider Electric power factor correction units. These units have improved the power factor from 0.80 to 0.96 and will result in ongoing energy cost savings.

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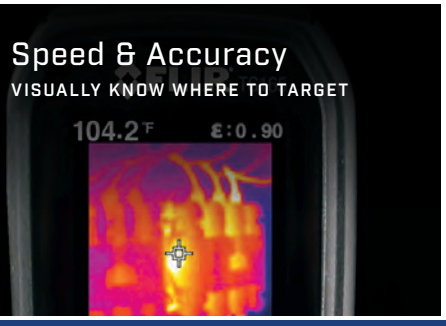

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CASE STUDY

Trials and tribulations

South East Queensland currently has one of the world's highest penetrations of solar PV systems — a situation that looks set to increase further as more and more customers embrace renewable energy alternatives for homes and businesses.

This high level of uptake makes Queensland a particularly attractive market segment for members of the battery energy storage systems (BESS) sector and explains why energy distributor Energex has embarked on a BESS trial at the company's test and training facility in Rocklea, Brisbane.

The purpose of the trials is to explore the effects of BESS technology on peak demand and power quality. Energex is particularly proactive when it comes to demand management, having previously developed the PeakSmart air-conditioning program. Customers that select an eligible appliance and connect it to the program are issued with a signal receiver from the retailer or installer, which caps energy consumption for short periods on a few days of the year. It's akin to running the system on an economy setting and has no perceived impact on performance, ensuring users remain comfortable, according to Energex.

The company hopes to take learnings from the program and apply them to the BESS trials, ensuring that customers achieve optimum results from solar PV and battery storage systems.

For phase one of the trials, Energex has partnered with a number of companies including Redflow, Sunverge, Tesla, Reposit and SolarEdge. In addition, it has elected to install a Smart Hybrid System from Redback Technologies.

Fasil Worku, electrical engineer for Redback, said that the trials align neatly with the company's goals.

"Redback is changing the way home owners and businesses use the solar power they generate, meaning savings on power bills, no power outages and at a lower upfront cost and a much faster return on investment than our competitors," he said.

The trial will also explore remote access and control of systems at certain peak times, in much the same way as Energex's current practice with hot water systems, pool pumps and, of course, air conditioners. All of which is aimed at easing demand and supporting the network.

The company is particularly pleased to have a Queensland-based partner in Redback and see the trial as part of a longer-term strategy to manage network demand based on the ever-changing usage habits of customers.

Adrian Roberts, Energex senior future tech implementation engineer, said, "Through this trial we will be able to record real time from the systems and observe the usage habits, which is similar to the smart technology processes we currently use for air conditioners and hot water systems.

"The trial also allows Energex staff to gain firsthand experience working with the latest technology and better understand the changes we are likely to see over the next 20 years," he said.

Both sides were happy with the implementation and Worku said the installation was smooth.

"The installation was quick and easy. We're confident Redback will stack up well in the testing and are looking forward to the results when they become available," he said.

Redback Technologies Australia
www.redbacktech.com

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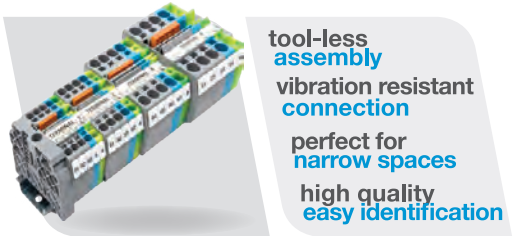

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ORIGIN ENERGY TO BUY POWER FROM 56 MW MOREE SOLAR FARM

Origin Energy has signed up for a landmark 15-year power purchase agreement (PPA) with developer Fotowatio Renewable Ventures (FRV) to buy all electricity and large-scale generation certificates (LGCs) generated by the recently commissioned 56 MW Moree Solar Farm (MSF) in northern NSW.

MSF is the first large Australian solar project to use a single-axis tracking system, with 223,000 PV modules that follow the sun's path from east to west to maximise the energy generated during the day. Having achieved first generation early last month, the farm is expected to produce approximately 145 GWh of energy annually — enough to supply around 24,000 Australian households — with a minimal variation in annual output of around 5%.

Under the terms of the PPA, Origin has contracted for 100% of the electricity generated and 100% of the renewable energy certificates (RECs) created from Moree Solar Farm. This will meet consumer demand for renewable energy and help meet Origin's obligations under the federal government's Renewable Energy Target.

The Australian Renewable Energy Agency (ARENA), which is providing $101.7 million funding support to the farm, has congratulated FRV on this milestone. ARENA CEO Ivor Frischknecht noted FRV reached financial close on MSF in July 2014 by being willing to sell electricity and LGCs in the spot market, instead of obtaining a power purchase agreement first.

"In doing so, FRV has pioneered an alternate PPA pathway for project developers in the development and construction phase of large-scale solar PV projects," Frischknecht said. "This could encourage other renewable developers to consider taking on market risk, and therefore result in more large-scale renewables being developed."

Minister for the Environment Greg Hunt also commented: "This is a significant milestone for the large-scale solar industry as it demonstrates that a developer can finance and build a large-scale solar plant in Australia without first securing a contract to sell the electricity generated by the plant."

Images courtesy of Schneider Electrical

SCHNEIDER ELECTRIC BRINGS ENERGY TO 45,000 RURAL STUDENTS IN KENYA

Lack of electricity in Africa remains one of the biggest barriers to the region's development and prosperity, and it continues to trap millions of people in extreme poverty. A third of all primary schools do not have access to any electricity, meaning 90 million students across the continent are left being educated from places that have no power.

Schneider Electric has designed an off-grid PV solution in order to address electrification issues. The project is now providing power for the education needs of more than 45,000 primary school pupils across 128 schools throughout the country.

Fola Esan, president at Schneider Electric Kenya, said time restraints were a big challenge for the project.

"Thanks to our internal engineering capabilities, our wide network of local entrepreneurs in Kenya, and our strong collaboration with the REA, we've developed an off-grid solar power back-up, easy-to-install and -maintain solution that provides power for light, but also for computers," said Esan.

"Now, each school benefiting from this solution can connect 30 computers, 34 lamps, one printer and 15 plugs."

The solution comprises 2 PV inverters with solar charge controller. The first PV inverter is dedicated to supply energy for lighting and the second PV inverter is for computing. These 2 PV inverters are supported by Deep Cycle Solar GEL batteries and Solar PV modules.

The company has also endeavoured to train local workers to complete installations and a staff member from each school to maintain the system and regulate its usage.

CSIRO DRIVES GREEN AGENDA WITH ELECTRIC CARS

Always trying to stay on top of science and innovation, the CSIRO is rolling out 10 fully electric cars to its national fleet as part of efforts to reduce its carbon footprint.

The organisation has delivered the first two of these electric cars — as well as two additional electric bikes — to staff at its Discovery Centre at Canberra's Black Mountain.

In the near future, CSIRO also plans to deliver electric cars to CSIRO locations in Melbourne, Brisbane, Hobart, Perth, Townsville and Newcastle.

CSIRO will use solar panels at its sites that will generate enough renewable energy to charge and run the cars, making them emission-free.

Parts of the interior and bodywork of the cars are also made from recycled water bottles, plastic bags, old car parts and home appliances.

"The cars and electric bikes are the latest in a raft of initiatives to lower emissions, reduce waste and improve the sustainability of operations across CSIRO," CSIRO General Manager for Building and Infrastructure Services Mark Wallis said.

"As our scientists continue to lead the way in many aspects of alternative energy, emissions and waste reduction, and water and energy-efficiency technology, we also want to be an organisation that puts those same things into action across our sites and operations. The money saved or earned can be reinvested into national science priorities."

CSIRO already replaced 36 of its petrol-only vehicles with electric/petrol hybrid cars in 2015 as part of these efforts. The organisation has also reduced carbon dioxide equivalent emissions by a combined thousands of tonnes with various other recent sustainability initiatives.

Image courtesy CSIRO

SIEMENS POWER STATION CONTRACT A BOOST FOR REGIONAL NSW

AGL Energy Limited (AGL) has announced approval on a $63 million project to install a distributed control system (DCS) at AGL Macquarie's Bayswater power station in the NSW Hunter Valley. The DCS is a semiautomated system that monitors, controls and instructs the various parts of a power station, to help manage efficient performance and operation.

AGL Macquarie's Bayswater and Liddell power stations combined supply approximately 30% of electricity demand in NSW and, as part of the project, the company has executed a contract with Siemens Australia to deliver and maintain the DCS and a simulator training facility.

The installation will include Siemens' DCS: SPPA-T3000 control system and SPPA S3000 simulator.

AGL Macquarie General Manager Ian Brooksbank said this is an exciting announcement for the future of Bayswater power station and a significant investment that is a boost for the Hunter economy.

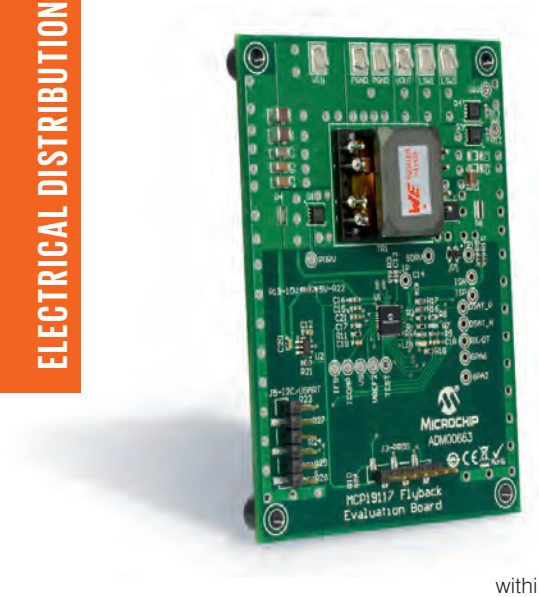
"The new DCS will enhance safety, improve power station reliability and enable the plant to operate more efficiently. It will transform how we operate the plant and perform as a business.

"Our employees will be using world-leading technology to operate one of Australia's largest and most important power stations," said Brooksbank.

Speaking on the project win, David Pryke, executive general manager for Siemens Australia's Power and Gas Division, said, "Cost and resource efficiency are key concerns for most plant operators. With AGL, we are aiming to deliver benchmark technologies at the Bayswater power station that not only help plant operators, but also the local and state economies."

Installation of the DCS is expected to start in September 2017 during a major maintenance outage on Bayswater Unit 1, and continue on successive planned unit outages until late 2019. The project also includes construction of a new control room and training simulator, which will be available from July 2017.

Bayswater power station was commissioned in 1985–86 and consists of four generating units with a total capacity of 2640 MW. Bayswater produces approximately 15,000 GWh of electricity per annum, or enough to power two million average Australian homes.



LED analog-based controllers

Microchip Technology has launched two digitally enhanced power analog controllers for LED lighting applications. The MCP19116 and MCP19117 are designed to increase accuracy for LED lighting and allow users to carefully control LED light output levels for long-life applications.

The MCP19117 is functionally equivalent to the MCP19116 (both mid-voltage 4.5–42 V) but offers a debugging interface and 12 GPIO as opposed to 8 GPIO. By combining the power and performance of an analog-based controller with the flexibility of a digital interface, the products offer an intelligent pulse width modulation (PWM) controller with a fully integrated 8-bit PIC MCU core. The digital interface also allows for communication and configuration, allowing a subsystem to report status or be remotely controlled. This functionality is necessary for adding lighting to many applications, including automotive and remotely accessible Internet of Things (IoT) devices.

The devices can also be programmed to respond to measurements or events within the system, dynamically tailoring the operation to the environment or intelligently responding to faults for robust operation. They are similar to their predecessors but contain additional calibration features for improved accuracy and measurement, as well as a larger flash memory for storing additional code.

Microchip Technology Australia
www.microchip.com

Pole surface switches

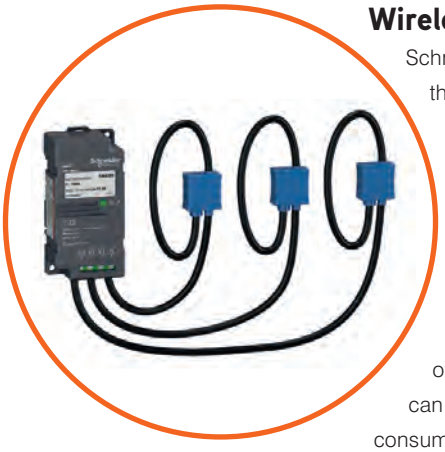
NHP has expanded its ISO plugs and sockets range with the release of ISO 20, 32 and 40 A 4-pole surface switches.

Switches are available with and without a back box in Grey (G), without the back box in resistant orange (RO) and also in resistant white (RW) material.

All units have certified AC23 and M ratings and comply with protection rating IP66 when used in conjunction with a back box.

The NHP ISO range allows users to integrate all type of components such as a mixture of ISO products, cam switches, indicators and push-buttons into one unit to suit specific requirements. The company offers fully customisable, locally designed and tested solutions.

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



Wireless energy meters

Schneider Electric has released the PowerLogic EM4300 Wireless Energy Meter, designed specifically for retrofit situations. The meter is quick and easy to install, taking up a small footprint within a switchboard.

Collecting a broad scope of electrical data, the meter can be used to monitor energy consumption, detect potential savings and optimise the service for the building occupants.

The range is flexible and has a high level of scalability, with the quick installation keeping downtime to a minimum. There is no need to introduce additional cabling conduit as the solution fits easily into the switchboard. If several meters are required, they can be connected with a single gateway.

The wireless monitoring provides measurement performance of 1% accuracy. The transmission is actioned using Zigbee Pro HA protocol with 2.4 GHz radio frequency and is compatible with Com'X and MPM gateways, data loggers and energy servers. Collected data is then transmitted through to a building management system so that analysis can be made.

Schneider Electric
www.schneider-electric.com

Combination plier

Wiha has launched its electrical combination plier, a 220 mm plier designed with the input of electricians for electricians.

The lightweight tool offers a slim handle for a comfortable grip, while the design of the two-component handles also complies with the latest ergonomic findings in terms of their soft and hard zone distribution and outer geometry. Offering high levels of safety for electricians, the tool complies with international standard IEC 609000:2012, which ensures the tool is approved for work in the area of live parts up to 1000 VAC and 1500 VDC. When working with 1000 V tools, Wiha also recommends users observe the national safety and accident prevention regulations.

The pliers are made from high-quality C70 drop forged steel, while the jaws also feature Dynamic Joint, which offers high-quality strength, durability and cutting ability. Due to optimised joint construction there is less loss of force, meaning less force needed for cutting. The cross hatch pattern in the nose also makes cable strand twisting simple, while a lug crimper is fitted between the handle and the jaws.

Premium Tools
www.wiha.com

60-cell solar panel

SunEdison has added the SE-P265NPB to its P-Series of solar panels. The 60-cell, 265 W panel has a very low temperature coefficient.

The product has four bus bars per cell helping to maximise its energy-harvesting capabilities with a 35 mm silver frame containing MC4 connectors. The polycrystalline solar panel offers good model efficiency of 16.2% and is designed to give a better return on investment based on the higher volume of watts per module. It is multi-MPPT transformerless inverter compatible and also features a positive power tolerance while being Potential Induced Degradation (PID) free.

All P-Series panels and cells used in manufacturing undergo rigorous post-production quality testing, with every cell photographed and inspected electronically for defects and then tested for efficiency. There is a 10-year limited warranty on materials and workmanship and a 25-year linear power warranty.

SunEdison
www.sunedison.com

LED REPLACEMENT RISKS

A simple replacement of fluorescent tubes with LED tubes is one of the lowest cost options for energy-efficient lighting retrofits, but it can come with significant performance and safety risks, according to this information from lighting specialist enLighten Australia.

The recent extension of the Victorian Energy Saver Incentive (VEET) scheme's commercial lighting upgrade operating hours (Schedule 34) has seen an explosion in direct selling of LED tubes, in some cases free of charge, with the installer claiming the VEEC rebates.

We have outlined the major risks below to allow building managers and owners to be in a better position to compare lighting upgrade options. In order to minimise these risks, a full luminaire replacement with either an LED batten, bulkhead, troffer or panel is recommended.

A recent acknowledgement of these risks is the decision by the NSW Energy Savings Scheme administrators, IPART, to ban T5 adaptor retrofit kits and LED tube replacements as eligible activities due to the potential hazards arising out of such retrofit installations.

Product safety and compliance risk

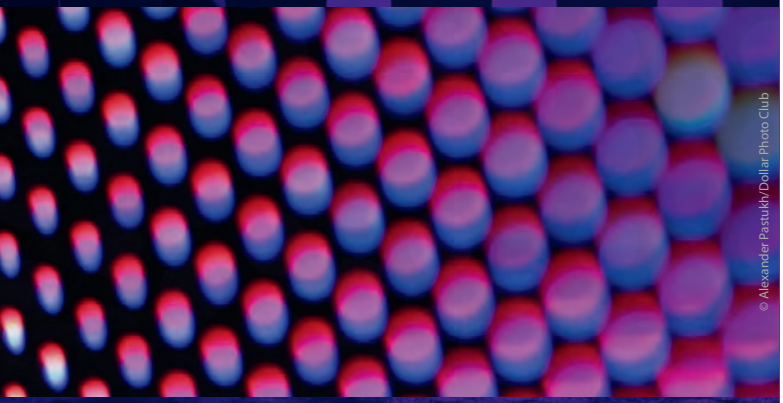
Safety testing and certification of non-emergency luminaires

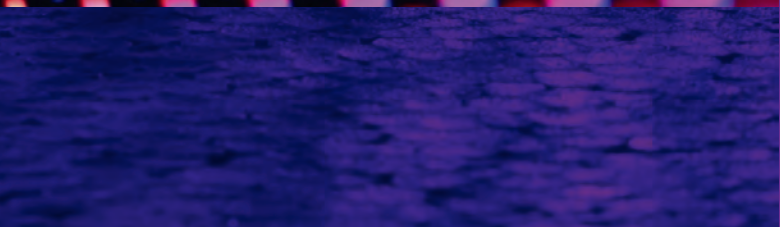
Every luminaire sold in Australia must undergo AS/NZS 60598 or equivalent testing, which covers its classification, marking, mechanical construction and electrical construction. In addition, the NSW, SA and Victorian energy-efficiency rebate schemes require an additional Australian Certificate of Suitability/Approval as an added safety feature. This is not a mandatory requirement for product sales, but rather a requirement to participate in the rebate schemes.

Any luminaire that is modified will have altered electrical, mechanical and thermal characteristics. This modified luminaire should therefore be recertified under AS/NZS 60598 to ensure the safety of the fittings for potential electrical shock, fire or mechanical integrity risk management.

Safety testing and certification of emergency luminaires

In addition to the above, emergency luminaires need to undergo mandatory AS 2293.3 testing to gain the thermal characteristics and photometric classification of the fitting. This basically tells us if the fitting is thermally capable to house all the components and operate within temperature limits of the battery, light source and control gear. Also, it gives a classification based on the light output, which enables us to decide how far apart the fittings can be spaced, so that in case of an emergency, safe egress of the occupants is facilitated.





If a T8 fluorescent tube is replaced by an LED tube, will the newly modified or retrofitted luminaire perform under emergency conditions (ie, loss of power) as intended? This is not determined during installation. In addition, the photometric classification of the modified or retrofitted luminaire, based on the emergency lumen output, would definitely change. Does the scheme require a reassessment of the emergency luminaire spacings to reflect the new classification, ie, the distance required between emergency fittings to achieve compliant light outputs?

Electromagnetic compliance issues

Although the tubes might be separately tested for EMC compliance, once they are put into luminaires with existing control gear, there's typically no new testing done on the modified luminaire. Safety and performance risks include higher electromagnetic interference, possible harmonics and higher inrush currents due to changed electrical and electronics of the fitting. Just checking the power factor for modified luminaires doesn't address the EMC, harmonics and inrush current issues.

Moreover, existing fittings can have a variety of electronic/magnetic ballasts or power factor correction capacitors. Compatibility issues can cause an increased power consumption, tripping of circuits and additional loads.

Installation safety issues

It is quite possible that LED tubes are being retrofitted into very old fluorescent batten luminaires, which increases the risk of unsafe installations. For example, an average LED tube at 300–400 g is three times heavier than a fluorescent tube at 100–150 g. Modifying older fittings introduces the possibility of cracked or broken tombstones and retrofitting heavier LED tubes can cause tubes to fall out of fittings. This poses a huge risk for bare battens (battens that do not have a wire cage or diffuser) that are commonplace in car parks and fire stairs.

Product lifetime and heat management issues

The thermal performance of the modified or retrofitted luminaire cannot be predicted, as the fitting on-site could range from a bare batten to a fully enclosed IP68 luminaire installed in different environments — from a freezer room to an outside, sun-facing building facade. LED lifetimes can reduce significantly if the heat is not constantly drawn away from the LEDs.

VEET's latest product approval requirement for an ISTMT test by a NATA accredited laboratory, as per the IES LM-84-14, is not possible on a modified luminaire with LED tube replacements. No such test is required for 'modified' or 'retrofitted' luminaires. This unduly punishes luminaire manufacturers, who are required to spend significant time and money testing their products when individual tube sellers are not bound by any such requirements.

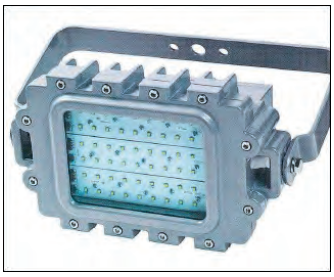
Photometric and light distribution issues

A fluorescent tube emits lights from its entire 360˚ surface, while LED tubes only emit light across a 180˚ angle. Therefore, the photometric performance or light distribution can vary a lot from the originally intended fluorescent luminaire. For example, a suspended fluorescent fitting with upward and downward light throw used in office spaces can have disastrous lighting outcomes if fitted with LED tubes. More examples of unsuitable retrofit options include reflector fittings such as fluorescent office troffers and industrial battens.

Conclusion

The only positive outcome of replacing a fluorescent tube with an LED tube is the low upfront product and installation cost for the end customer looking for a short-term solution. While the selling of LED tubes is a matter to be assessed by the relevant electrical safety regulatory bodies, we strongly believe that modifying or retrofitting fluorescent luminaires with LED tubes should not be encouraged and incentivised further by state rebate schemes. We do not promote retrofitting existing luminaires with new lamps and control gears as the fittings were not initially designed for these new components.

enLighten Australia Pty Ltd
www.enlighten.com.au



LED floodlight

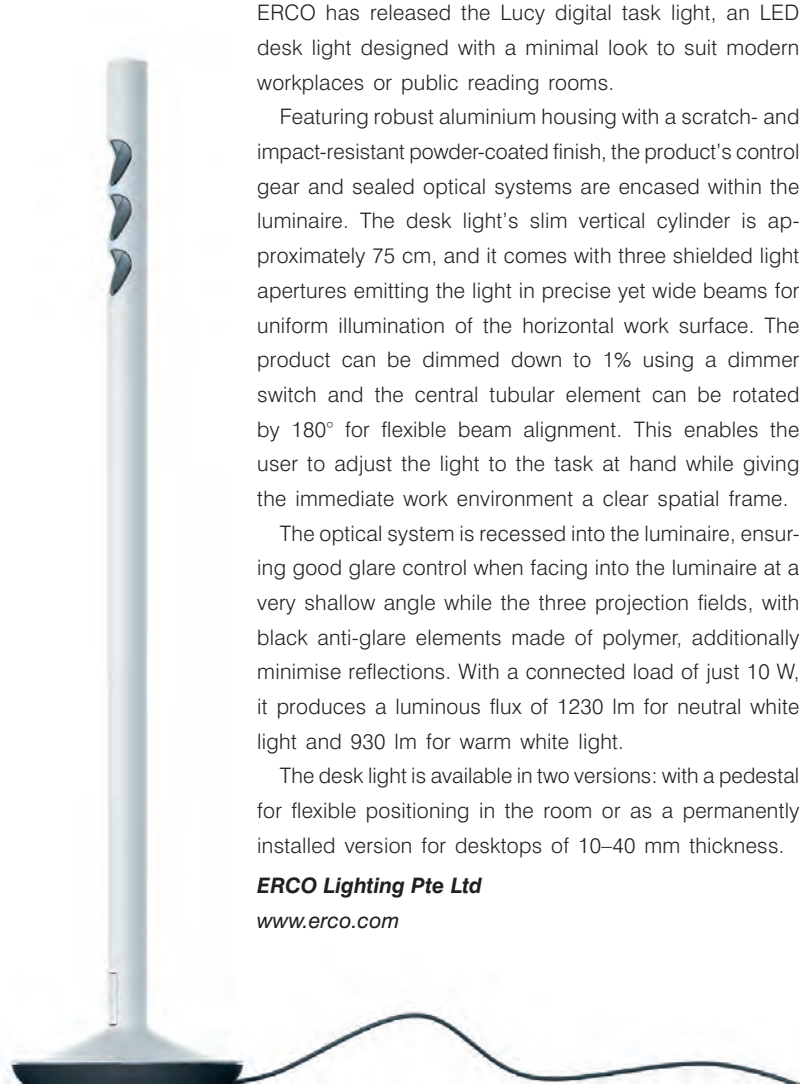
The Chalmit Scotia Ex LED floodlight, available from J.T. Day, is a low-energy, 'instant on' floodlight designed for harsh and hazardous area locations.

The unit has been manufactured to offer 110,000 maintenance-free hours when used at a mean 25°C and high-output lighting in extreme temperatures with a range of -50 to +50°C. It is also suitable for conditions where moisture, dirt or dust is present.

The floodlight is vibration resistant and can be used in locations where flammable vapours, gases or combustible dusts exist (classification Zone 1 and Zone 21). It has an aluminium alloy enclosure with stirrup mounting bracket and is available in four output variants: 7182, 8362, 10,590 and 11,560 lm with 90, 105, 110 and 125 W power consumption respectively.

JT Day Pty Ltd
www.jtday.com.au

Digital task working light



ERCO has released the Lucy digital task light, an LED desk light designed with a minimal look to suit modern workplaces or public reading rooms.

Featuring robust aluminium housing with a scratch- and impact-resistant powder-coated finish, the product's control gear and sealed optical systems are encased within the luminaire. The desk light's slim vertical cylinder is approximately 75 cm, and it comes with three shielded light apertures emitting the light in precise yet wide beams for uniform illumination of the horizontal work surface. The product can be dimmed down to 1% using a dimmer switch and the central tubular element can be rotated by 180° for flexible beam alignment. This enables the user to adjust the light to the task at hand while giving the immediate work environment a clear spatial frame.

The optical system is recessed into the luminaire, ensuring good glare control when facing into the luminaire at a very shallow angle while the three projection fields, with black anti-glare elements made of polymer, additionally minimise reflections. With a connected load of just 10 W, it produces a luminous flux of 1230 lm for neutral white light and 930 lm for warm white light.

The desk light is available in two versions: with a pedestal for flexible positioning in the room or as a permanently installed version for desktops of 10–40 mm thickness.

ERCO Lighting Pte Ltd
www.erco.com

Uninterruptible power supply

Automated Control and FEAS have introduced the Accupack FEAS LDR40MH24-RS uninterruptible power supply (UPS). The unit features an onboard 24 VDC switchmode power supply, integral batteries and serial communications, and is suitable for industrial applications requiring a compact and robust power source.

The Accupack LDR connects between the line voltage (85–270 VAC or 120–400 VDC) and the field equipment, and is capable of supplying full load currents of up to 5 A at 24 VDC. To allow for intermittent high current demands on the system, the full load current can be exceeded by up to 50% for limited periods of time. Additionally, the output is short-circuit and polarity protected to prevent damage caused by incorrect installation.

During mains operation the AC/DC converter supplies the load with power while also providing the sealed batteries with an optimal charging voltage. In the event of a mains power failure, the easily replaceable sealed batteries supply the load until the mains power is restored. Using the LDR's RS232 or RS485 interface, status messages relating to input voltage, temperature and battery capacity can be communicated to the upstream control system.

Automated Control Pty Ltd
www.automatedcontrol.com.au

Cordless press tools

The Milwaukee Force Logic press tool range provides an ergonomic solution for navigating around installed pipes and delivers high levels of press accuracy and reliability.

The new method involves flame-free installation where fittings are consistently pressed, improving joint performance and minimising gas leaks and risk of fire. The tools eliminate the need to drain plumbing systems, but do not require hot works permits.

The initial offering will consist of an M12 tool and M18 tool with jaws and slings available to press high force applications for respective diameters. The hydraulic driven cordless tools are an effective alternative to traditional methods and engineered specifically for the plumbing, electrical and utilities markets.

The compact and lightweight designs feature a battery indication light, which means they will not start the press unless they can finish the press. Intelligent performance electronics monitor force, ensuring that quality connections are maintained and that the user is alerted when servicing is required.

Techtronic Industries (Milwaukee)

www.ttigroup.com

MASTER ELECTRICIANS AUSTRALIA

We've listened, and we've delivered

Malcolm Richards

Our members always tell us that they are looking for ways to make their business more efficient, save precious time and costs, and become more profitable.

As Australia's premier electrical industry association, we stick to what we do best — providing top-of-range advice and advocating on your behalf. So when we were looking at expanding our membership offering, we called on experts in the field so that we could provide you with a well-rounded member experience. We searched and reviewed many providers and have decided to partner with the best of the best. We looked for those who could deliver a nationwide service, had good standing and a stellar reputation within their industries, had a solid and proactive customer service philosophy, and would provide ease of access, and the very best deals for our members. The result is an outstanding new membership offering for both existing and new members.

There are five unique elements to the innovative offering. The first, our partnership with Tradify. Under the fresh membership model, we're giving every existing and new member a single user licence for six months. Tradify is the job management software that makes quoting, scheduling and invoicing easy and seamlessly integrates with existing accounting software. The software will help you get your nights back, freeing you from after-hours work and allowing you to concentrate on your number one priority — customers!

As an electrical contractor, it can be challenging to keep across the accounting side of your business. That's why we're partnering with William Buck, a leading firm of chartered accountants with offices across ANZ, to take the pressure off your shoulders. Under this partnership arrangement, you'll receive two months' free access to the accounting package of your choice through premier cloud-based accounting software, Xero.

And for the first time, we're offering a lite version of our world-class safety system. ME Safety Express is an introduction version of our current tested and trusted management system. We're pleased that since the introduction of ME Safety, we've had many members tell us how the system has taken their business's safety and management to the next level. Under the lite version, users will have access to functionality never seen before, in one comprehensive package. The system makes use of cloud-based accounting software, meaning you can use ME Safety Express while you're on the road — you can track, report and protect individual employees with a range of different tools.

Our new membership offering also includes a free Master Electricians Training (MET) course. The MET courses have been developed to meet the needs of busy electrical contracting businesses, and this great offer includes an online asbestos awareness course.

And to top it all off, the membership package includes an outstanding offer from SAI Global that'll help you, as an electrical contractor, manage risk, achieve compliance and drive business improvement. All members will receive 14 important standards, for free, that seamlessly embed in the ME Safety system.

At Master Electricians, we understand that there are so many different areas that steal your attention — from day-to-day customer service, to marketing and social media, to business development, to organising staff and assigning jobs, to handling the accounting side of business and many more. But you shouldn't have to navigate the ins and outs of business alone. As a valued Master Electricians member, you have access to direct advice and advocacy on your behalf, as well as the support of our partner organisations. Our new member inclusions will enable you to take day-to-day business practice to the next level, by employing cutting-edge tools and cloud-based technology to improve processes and systems and free up your precious time to focus on the people that are at the centre of your business activity — your customers!

Master Electricians Australia
www.masterelectricians.com.au

Electrical modules portfolio

Siemens has added a range of modules and functions to the Simatic S7-1200 Basic Controllers. This includes the SM1238 Energy Meter module; the Safety CPU 1212FC for failsafe applications in the lower power range; and the latest firmware 4.2 version of the TIA Portal V14 engineering framework.

For operators looking to branch out into the field of machine-related energy management, the SM1238 energy meter module is a suitable choice. At only 45 mm wide, the module can be used to record energy flows precisely, directly on the machine. The measurements are processed in the CPU and visualised with a human machine interface system, such as a Basic or Comfort Panel. The module also records measured electrical values, such as voltages up to 480 VAC, in a 1- or 3-phase network with a direct connection but without a transformer.

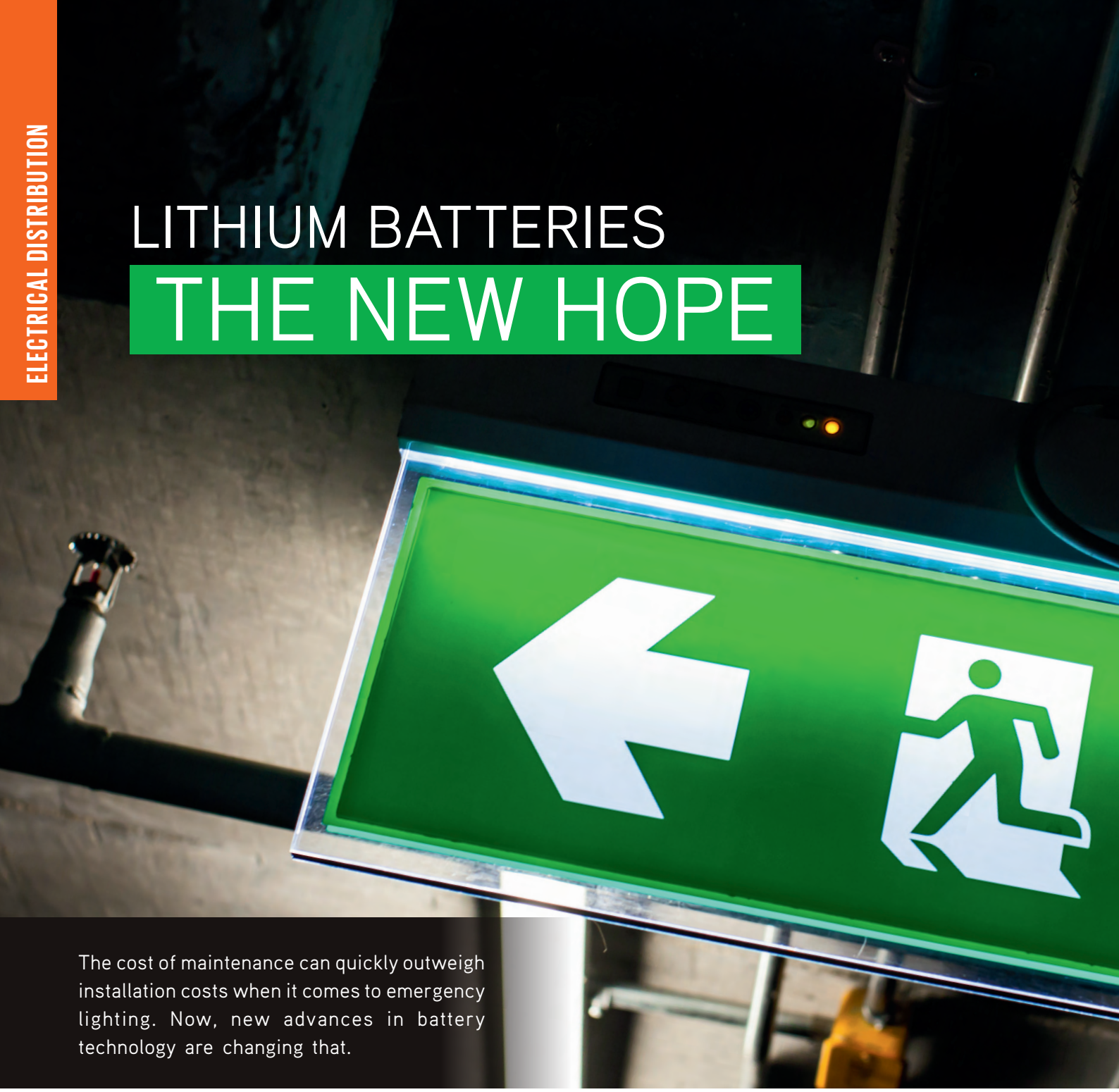
The Safety CPU 1212FC can handle standard and safety-related automation tasks, such as protective door monitoring, in a single device, reducing the wiring required in comparison to conventional solutions. Supporting Profisafe enables safety-related devices to be connected via Profinet, which also reduces wiring outlay, saves space and allows more flexible safety concepts.

Version 4.2 firmware has also been updated and expanded to include additional functions. This version includes the Media Redundancy Protocol (MRP) for the 2-port CPUs 1215 and 1217, increases network availability and offers greater flexibility for network configurations, eg, in ring topologies. Also included is a backup/restore function for backing up project data with up-to-date values to prevent data losses.

Siemens Ltd

www.siemens.com.au

LITHIUM BATTERIES
THE NEW HOPE



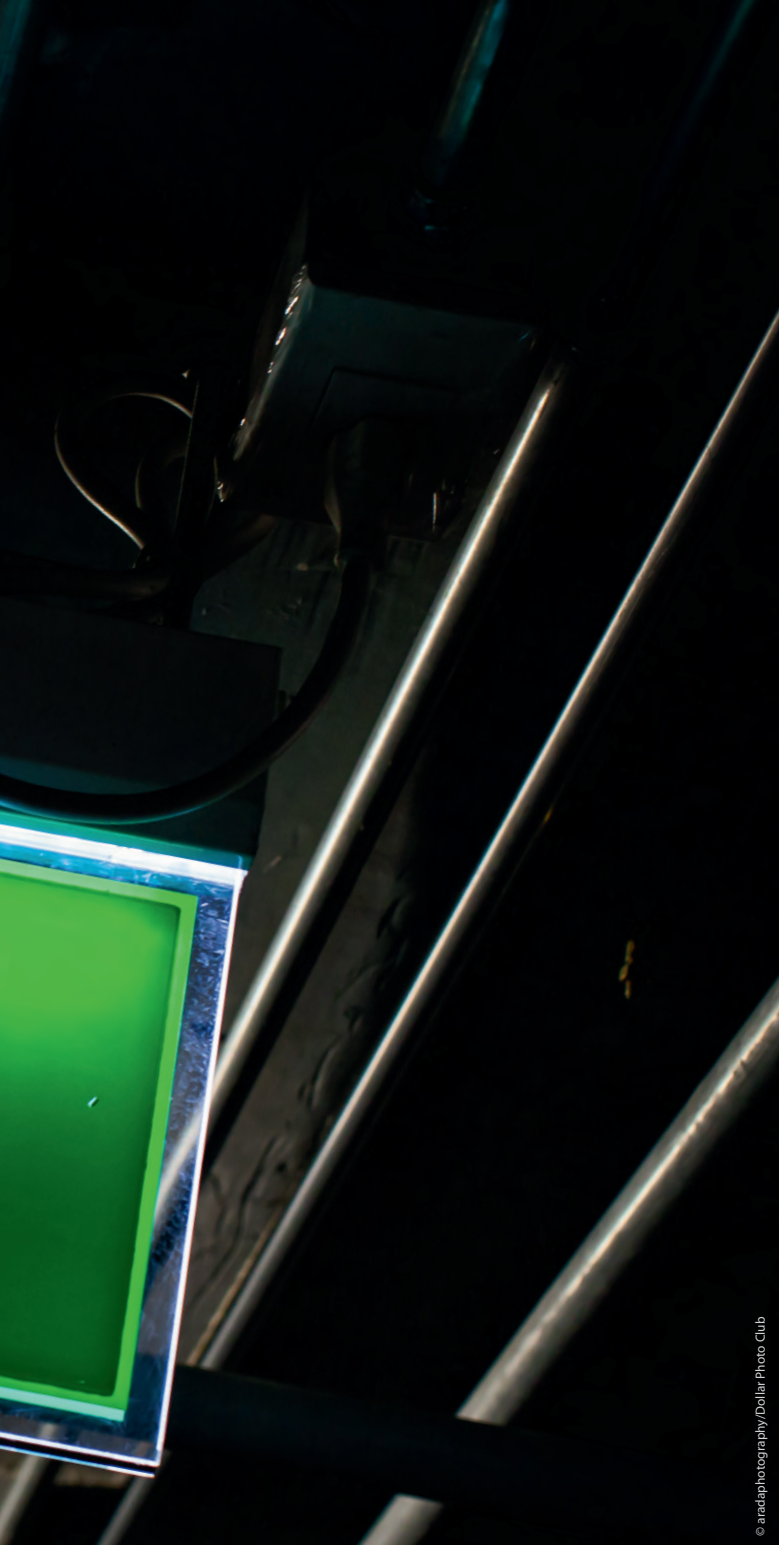
The cost of maintenance can quickly outweigh installation costs when it comes to emergency lighting. Now, new advances in battery technology are changing that.

Emergency lighting and exit signage are essential to ensure safe egress by building occupants when the normal lighting fails, including during a fire or other crisis. The right product selection has a significant effect on both the compliance outcome and the overall cost of ownership for the end user. Once installed, the cost of maintaining the emergency lighting system to ensure compliance has been a significant issue. In many cases, the maintenance cost exceeds the cost of installation when using old technology batteries including nickel-cadmium (NiCd), nickel-metal hydride (NiMH) and sealed lead acid (SLA). In short, the real costs begin after installation.

With recent advancements in lithium iron phosphate (LFP) battery technology, combined with some clever engineering design, the issues around high maintenance costs can be a thing of the past for building owners and facilities managers. It is important to note that different LFP batteries will produce large variations in maintenance cost savings; therefore, it is very important to ask manufacturers for actual site results before making a selection based on your requirements. As an example, Clevertronics has two ranges fitted with LFP products. The Lithium Premium (LP) range produces around 50% maintenance savings range compared to NiCd products, while the L10 Optimum range, fitted with Lithium Nanophosphate technology batteries, is able to produce an unmatched 85% in maintenance savings.

Other benefits that can be achieved with select LFP products include energy savings of up to 80% and the important fact that lithium is a much safer option for humans and the environment due to the absence of dangerous toxic substances of cadmium, nickel and lead, which will be covered later in the article.

To review the performance difference select LFP products can have over old technology batteries, a case study at Etihad Stadium was undertaken. Over three years ago, the Clevertronics L10 product range with Lithium Nanophosphate battery technology was installed on-site and is well on track to deliver an incredible saving of over $1 million during the seven-year maintenance period.



Etihad Stadium is a 52,000-seat multipurpose facility designed to cater for major sporting and entertainment events, as well as social, business and private functions. The venue hosts as many as 80 arena sports and entertainment events and 600 non-event day functions annually in its 15 different function spaces. Since opening on 9 March 2000, well over 32 million people have passed through the venue's turnstiles.

The stadium now hosts in the vicinity of 50 AFL matches a season, as well as A-League games and Big Bash League cricket matches. The venue also regularly stages international sporting events such as Rugby League World Cup matches, Rugby Union test matches and soccer World Cup qualifiers.

In 2012, Honeywell was tasked with a review of the emergency lighting within Etihad Stadium as the maintenance and energy costs continued to climb. The existing fittings were nearing end of life, which had created the need for a major components replacement. With 2756 exit and emergency lights installed within the facility and a high volume of foot traffic, quality and performance of emergency lighting and escape signage is critical, so a decision was made to refurbish the entire stadium.

Honeywell Victoria TAM Operations Manager Matthew Parisi was involved in reviewing the options available to ensure the stadium met the standards required and also provided the best total cost solution for his customer.

After considering the options, Parisi selected an LFP product from Clevertronics and was amazed at the performance this product could achieve over previous alternatives.

"The L10 lithium range is the way of the future," said Parisi.

"I believe the move away from NiCd batteries will be quite swift as building owners and facility managers become aware of the numerous advantages that lithium batteries offer. The added advantage of low environmental impact and also less waste through longer replacement intervals also makes it a far more sustainable technology compared to existing practice. Having no memory effect and being smaller in physical size are also advantageous qualities that attracted us to the product.

"During the installation period, Clevertronics also provided outstanding technical support to assist with the installation, ensuring a swift and uncomplicated installation of the L10 product. We estimate that the total energy and maintenance costs will drop from $1,083,830 to $178,867 over a seven-year period, which is an 83.5% saving. The switch will also ensure an energy saving of approximately 70%, equating to a reduction in carbon dioxide emissions of 932 tonnes over the same seven-year period, which is quite remarkable," he said.

The project was a 12-month staged upgrade, completed in August 2013, which involved installing 2756 exit and emergency lights integrated into a Zoneworks computer monitoring system. The Zoneworks monitoring system allows for automatic compliance testing of the system, real-time luminaire reporting and access to testing and reporting over the internet.

Interestingly, the product selected by Honeywell was also the world's first LFP-powered emergency light designed and manufactured by Australian-based company Clevertronics. The development of the Clevertronics L10 range was no small feat and took over three years of research, development and testing by a team of Australian-based engineers. The L10 range installed throughout the stadium has a maintenance-free design life of 10 years, which is approximately double that of emergency lighting products powered by NiCd or NiMH batteries.

Recent results from the site in late 2015 have shown that the L10 batteries still have 95% capacity after three years in service, which indicates that the batteries are well on track to outlast the 100,000-hour LEDs. The site is well on track to deliver the 83.5% reduction in maintenance and energy costs estimated at the time of installation.

To understand the challenges of incorporating an LFP battery into an emergency light, and why long-term testing and making it work in harmony with the total product is vital to ensuring long-term reliability, Michael Duce, national systems and engineering manager from Clevertronics, provided some insight.

"When we were embarking on this project, we knew the reliability of the product was centered around the impact heat would have on the components inside the emergency luminaires, so we put significant resources into redesigning products to place batteries away from heat sources. In the case of batten luminaires, we developed a thermally isolated section or POD at the end of the batten to house the LFP battery and the emergency LED light source," said Duce.

Testing was rigorous and Duce and his Australian-based team spent over two years testing the product before it was released on the market.

"The second challenge was to ensure we could incorporate the battery into the various range of fittings. Our customers needed a complete range of emergency, exit and batten fittings for their projects, and to realise the 80% plus maintenance savings from the L10 range we needed to deliver the entire range as a package. This was challenging from an engineering perspective due to the massive scale of the development task, given the large number of different products in our range.

"It meant that we had to structure the development team to work on several product families concurrently and work very closely with the production team to ensure a smooth transition to full-scale production. To see the results now, after having them on-site for close to four years, provides great satisfaction, especially being the global innovators," he said.

What impact are the nickel-cadmium, nickel-metal hydride and lead alternatives having on the environment?

One of the other benefits of moving to the LFP battery technology is a significant concern around the toxic and harmful substances found in NiCd, NiMH and SLA batteries. These toxic substances can cause harm to humans and the environment if not disposed of and recycled correctly. There is concern that the expected increase in LFP battery-powered products coming into the market will result in an increase of old batteries finding their way to landfill.

The harmful substances in questions come in the form of the following three battery types:

1. Nickel-cadmium (NiCd)
2. Nickel-metal hydride (Ni-MH)
3. Sealed lead acid (SLA)

These three substances are known to have a harmful impact on both human and the environment — so much so that the National Pollutant Inventory produced by the federal government lists cadmium, lead and nickel among it 93 priority hazardous substances.

Also, the recycling rate of these batteries is understood to be less than 5%, which is of major concern, given the amount of these substances entering landfill.

With an estimated five million NiCd batteries ending up in landfill each year, the Queensland Government and the Lighting Council Australia have partnered in a program called EXITCYCLE, which is aimed at increasing the recycling rate of emergency and exit lighting batteries and preventing toxic metals ending up in landfill. The dumping of batteries equates to approximately 90 tonnes of cadmium entering our environment annually, which urgently needs to be addressed.

The Department of Environment and Heritage Protection and Lighting Council Australia are encouraging corporate organisations, shopping centres and councils to sign up to EXITCYCLE to show their commitment to recycle their emergency lighting batteries.

Queensland Minister for Environment and Heritage Protection Dr Steven Miles says the EXITCYCLE battery recycling initiative will begin with a 12-month pilot in Queensland.

"We're encouraging voluntary recycling action from big business and corporate groups to prevent emergency and exit light batteries from ending up in landfill," he said.

"The pilot will provide valuable information to feed into the development of a national rechargeable battery product stewardship scheme. We are proud to support Lighting Council Australia and encourage the use of environmentally appropriate solutions to managing our wastes."

The pilot is an initiative of Lighting Council Australia, with funding provided by the Queensland Department of Environment and Heritage Protection.The EXITCYCLE program is a great initiative and will play a significant part in reducing the impact of these hazardous substances making it into our landfill and our environment.

The good news is that the remaining and growing 25–30% of the market is powered by an alternative battery — lithium iron phosphate (LFP).

From an environmental and health perspective, LFP contains no toxic heavy metals and no carcinogens. A variant of LFP batteries using a patented 'Nanophosphate' for the cathode material achieves at least twice the calendar life of the existing battery technologies and, because it features a much higher energy density, is less than half the size and weight. These LFP batteries have a much lower self-discharge rate, and that translates to lower power charging circuitry than ever before possible.

The environmental impact of LFP battery technology is tiny compared with the damage caused by any of the three current technologies, as shown in the following table:

	SLA	NiCd	NiMH	LiFePO4/LFP
Contains heavy metals or carcinogens	Yes (lead)	Yes (nickel and cadmium)	Yes (nickel)	No
RoHS compliant	No (exempt)	No (exempt)	Yes	Yes
ATSDR rating	#2 (lead)	#7 (cadmium) #57 (nickel)	#57 (nickel)	#334 (lithium)
Carcinogen free	No (lead)	No (nickel and cadmium)	No (nickle)	Yes
Recyclable	Yes	Yes	Yes	Yes
Recycle cost to user	Equal	Equal	Equal	Equal

Clevertronics Pty Ltd
www.clevertronics.com.au

Fibre and copper cable finder kit

The Kurth Electronic KE801 Kit, which includes the EasyTest KE800 and PROBE KE410, is a fibre and copper cable finder that improves speed in the installation and maintenance of multimedia communications cabling.

The EasyTest KE800 instrument can transmit either three continuous tones (solid) or three alternating tones. The Continuity function allows users to check for shorts or opens up to 40 kΩ, visible by a green LED and audible by a resistance depending tone. The instrument can also send the tone into live telephone lines without disturbing services, while overvoltage protection is in any mode up to 500 VAC. It also provides solid Alligator Clips, RJ11 and RJ45 plugs with strain relief and PIN 1+8 protection slots.

The PROBE KE410 is highly sensitive when working from the EasyTest KE300 to identify and trace wires or cables. The double, high and low volume switch, made of high dust and moisture resistant mylar membrane, allows fast operation. It can detect a cable from a distance of up to 100 cm, while the tip, made of carbon fibre, prevents shorts or disturbance of telephone or data lines. The slender design also allows high-precision tracing of pairs, even in bundles or 110/KRONE blocks. An LED filtered green signal strength lights up only if the signal from the toner is detected, while a bright white LED replaces the need for a torch light in dark distribution boxes.

The kit also comes with a belt pouch.

TelecomTest Solutions
www.telecomtest.com.au

LED downlight

Brightgreen's third-generation D900 Classic LED downlight features the brightness of a 50 W halogen, offering higher impact lighting, and is suitable for fitting into smaller ceiling cavities.

Featuring an improved compact heatsink for increased thermal efficiency, the product also contains advanced electronics in Brightgreen's new Gen3 driver, which eliminates the need for troubleshooting compatibility problems with dimmers and automation systems. This helps to ensure flicker-free, deep dimming and advanced protection against power surges.

The downlight also features 920 lm of Tru-Colour brightness with 15.7 W, while its directional beam gives more control over lighting design than is possible with diffused alternatives. It also offers good LED dimming performance, 70,000 h lifetime and an IP44 rating.

Brightgreen Pty Ltd
www.brightgreen.com

Framing light

The XR 1000 Framing light from PR Lighting is based on the Osram 1000 W metal halide lamp and is designed for demanding lighting applications. The compact and lightweight product promises a brighter output than a conventional 1200 W discharge lamp from a 1000 W metal halide lamp source.

The fixture has been built with a wide beam angle of 11-51°, which is linearly adjustable in 16 bit, and also features a good cooling system.

Other features include: smooth CYM colour mixing, with CTO and macro; colour wheel with seven colour filters; linear colour temperature correction; seven replaceable rotating high-speed gobos and seven fixed gobos; DMX control; linearly adjustable focus and dimmer from 0-100%; DMX linear zooming; linearly adjustable iris from 5-100%; adjustable pan and tilt speed; 3-facet bidirectional, variable speed prism wheel; frost filter; double strobe/shutter blades, 0.3~25 fps; RDM control protocol and Wireless DMX; input signal isolating protection; and a built-in analyser for fault finding and error messages.

PR Lighting
http://www.pr-lighting.com/show_list.php?id=23

Intelligent light switch and plug

The Lightify Switch and Lightify Plug from Osram provide smart home functionality. The switch can be individually configured for use with all Lightify products and the plug enables lights and other devices to be operated via smart control.

The switch combines the convenient operation of a standard light switch with the mobility and functional diversity of the Lightify app, meaning smartphones and tablet computers are not needed for operation. After initial set-up via the app, the mobile switch adopts up to eight different freely configurable functions, including scene recalls such as dimming or colour change. The commands are transmitted directly to Lightify components without the need for a gateway.

The Lightify Plug enables luminaires to be switched via the intelligent control system. In addition to radio-based operation, the plug can also be switched with a button on its upper side. Other electronic or electrical devices can also be operated as long as relevant safety precautions are observed.

Osram Australia Pty Ltd
www.osram.com.au

Residential energy storage

The Magellan residential hybrid energy storage system (HESS) is a complete inverter and storage system that takes DC power from the solar panels, converts it into useable AC power and stores it in lithium batteries.

The system is a bidirectional energy manager, which means it can also charge its battery from the grid at night, at a cheaper rate.

Features include: an integrated switchboard, back-up power in the event of power failure, 3.2 to 19.2 kWh high-efficiency long-life batteries, an energy flow diagram displayed on a touch screen and a monitoring app for mobile devices. HESS is IoT ready and features data logging via internal non-volatile memory and cloud storage.

Magellan Power
www.magellan-power.com.au

CASE STUDY

Solar project saves more than just energy

A 6 kW_p ground-mounted solar system for rail freight business Pacific National is expected to generate over 12,000 kWh of clean energy annually in sun-saturated Parachilna in South Australia.

Designed, constructed and installed by YINGLI 4 YOU partner, Linked Group Services, the north-orientated Parachilna Wayside Rail Monitoring Site, was connected in May 2015 and consists of 24 YGE Polycrystalline 250 W panels from Yingli Solar, four Schneider Electric MPPT60 inverters as well as the Schneider SW4024 inverter.

Pacific National required a stand-alone power supply that included a 6 kW_p ground-mounted solar system and a building that would house rail monitoring equipment, which can be accessed remotely, all confined within an eight-metre rail corridor.

Located north of Port Augusta, Parachilna is an area that sees hundreds of compartments filled with cargo that travels across the railway tracks of interior Australia.

Not only does the installation generate enough energy to meet required load and air conditioning as well as provide two days of autonomy with a back-up generator, it also significantly reduces the chances of derailment of a train in the Flinders Ranges.

Pacific National's Mechanical Equipment Specialist, Matthew Robertson, said the company is thrilled with the project outcomes.

"We are so impressed with the result of the monitoring site in Parachilna, South Australia, we are looking to develop more in Queensland," said Robertson.

"Our focus is to reduce Pacific National's carbon footprint by implementing environmentally sustainable changes whilst accessing remote areas more efficiently."

Yingli Green Energy Australia Pty Ltd
www.yinglisolar.com/au

Industrial handheld oscilloscope

The Fluke ScopeMeter 120B Series Industrial Handheld Oscilloscope is designed to improve the speed, efficiency and accuracy of troubleshooting complex electromechanical systems.

The compact instrument features Connect-and-View technology that recognises signal patterns and automatically sets up the scope's triggering, amplitude and time base, eliminating the typical trial-and-error set-up process. Once the waveform is captured, the IntellaSet intelligent measurement detection automatically selects key measurements based on the acquired waveform type and displays the most relevant measurement values (eg, Vrms and Hz for a line voltage signal or Vpeak-peak and Hz for a square wave), helping technicians easily identify and characterise potential signal faults.

The handheld oscilloscope also features an Event Capture function that captures and identifies intermittent events and lists all those events that exceed a predetermined threshold. This lets technicians identify key events quickly, rather than combing through large data sets, reading by reading. The wireless device enables technicians to place the meter in locations that are difficult to access or are potentially hazardous, then take measurements from a safe distance.

The device can also record waveform data to the Fluke Connect app on smart devices, ensuring accuracy and eliminating the need to manually record data. Those measurements are then wirelessly uploaded to the cloud and can be combined with measurement data from multiple Fluke Connect test tools to create and share reports from the job site via email, and collaborate in real time with other technicians.

Fluke Australia Pty Ltd
www.fluke.com.au

Surge protection device

ABB has launched the next-generation QuickSafe surge protection device (SPD). The device combines the company's patented thermal disconnection technology with a new integrated safety backup system to ensure electrical equipment — including mission-critical installations for data centres, hospitals and banks — is continuously protected from damage, otherwise caused by surges in the power supply.

SPDs protect electrical equipment from transitory surges caused by operations on the grid or lightning and are used in industrial and residential applications. Powerful surges literally melt solid-state circuits and components, but even small surges, repeated many times over, cause damage and can lead to the loss of priceless stored data.

QuickSafe includes safety backup technology that features two electronic components per device compared to the standard of only one.

The device features an indicator showing which component needs replacing, enabling maintenance personnel to easily identify and safely replace the damaged component, while the second component continues to protect the equipment. This reserve system means the risk of a device being left unprotected is eliminated, allowing operators to plan necessary SPD replacements at convenient times with little, or no, disruption to operations and services.

ABB Australia Pty Ltd

STRENGTHENING POWER NETWORK AT WORLD'S BUSIEST INTERNATIONAL AIRPORT

ABB is set to upgrade its SCADA (supervisory control and data acquisition) system for the power network at Dubai International Airport (DXB), the world's busiest airport by international passenger traffic.

ABB's SCADA solution provides a common power distribution automation system and today handles data signals from approximately 100,000 sources distributed over the entire power network at any given time.

The upgraded system includes replacement of the central computers and deployment of the latest version of ABB's Network Manager software. This will connect to the existing field devices (remote terminal units, bay control units and main distribution boards) and increase the operational reliability and efficiency of the power network to support a large-scale airport expansion plan.

ABB delivered the first SCADA system to Dubai International in 2004 and the monitored network has grown five-fold since then. In addition to augmenting capacity and offering, advanced features include highly efficient real-time alarm and event handling.

As part of the current system, field-based sensors continuously monitor detailed data related to the power network in real time and provide the operator with analytics to support decision-making processes and optimise operations.

"Grid automation and leveraging our software portfolio to deliver enhanced customer value are key elements of our Next Level strategy supporting our Internet of Things, Services and People approach," said Claudio Facchin, president of ABB's Power Grids division.

A SCADA system can be combined with a data acquisition system to acquire information about the status of the remote equipment. These computer-based systems help monitor and control industrial, infrastructure and facility based processes and are extensively used in applications like electrical power transmission and distribution.

ABB Australia Pty Ltd
www.abbaustralia.com.au

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