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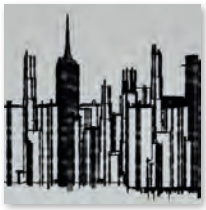

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FROM THE EDITOR

September is here and spring should now be in the air, if the seasons have any regard for the calendar.

Weather aside, it's difficult to believe we are nearly three-quarters of the way through the year... and what a year it has been. In my last column, I hoped that getting to the other side of a federal election would mean things would settle down and that we could all get on with it... government included. I didn't quite predict the protracted outcome, however.

It's difficult to know how it will all pan out, but a few significant items have come about post-election: business confidence is on the rise (which is always a welcome harbinger) and, most recently, the Turnbull government has done a complete 180-degree turn when it comes to climate change and investment in the CSIRO. What a difference a few months makes!

This is significant in terms of this issue of ***ECD***, as we look at where Australia's evolving energy industry is headed. One of the biggest deterrents for investment in renewable energy technologies on home soil has been the lack of clarity, or consistency, when it comes to policy and targets. In the space of six months the same government has gone from cutting both jobs and funding — and actively directing all efforts away from climate science — to announcing a $37 million boost and job creation in the very same field. This comes on the back of a few successive governments whereby the sole objective seemed to be undoing what the previous party had implemented. Carbon tax, I'm looking at you. According to a new report from the Clean Energy Council, we'll need firm, clear, long-term targets and strategies in place if we are ever going to lessen our reliance on coal. Let's hope the powers that be can provide that.

Best regards,

Dannielle Furness – Editor
ecd@wfmedia.com.au

EVOLVING ENERGY

Dannielle Furness

By the time the 2015 Paris climate talks wrapped up, Australia had committed to doing its part to curb global warming. To help meet the international target of less than a two-degree temperature rise this century will require significant changes to our energy system. How, exactly, will this play out?

A discussion paper released by the Clean Energy Council (CEC) in May, titled 'Power Shift: A blueprint for a 21st century energy system', makes it clear that some pretty extensive modification is needed.

There's no denying that Australia's existing electricity system is outdated. We rely heavily on brown and black coal and most of our generators are at or beyond their expected operating life, according to the CEC. These two factors combined means that our energy generation system is one of the most carbon-intensive in the world. Not exactly a good starting point for emissions reductions.

If we have a hope of meeting our targets, the CEC says that a complete overhaul is required and this will mean not only modernising energy infrastructure, but also reducing our reliance on carbon in favour of alternate energy sources... and it all needs to be in play by 2050. No pressure.

Being naturally planted firmly in the renewables space, the CEC is aiming high; suggesting that both zero emission generation and 100% uptake of clean energy is possible, technologically, economically and societally. As part of the discussion paper, the CEC has developed a range of policy and regulatory reforms it sees as essential in the transition to an ideal scenario.

One of our biggest advantages is access and availability of renewable resources. We've got plenty of land and sunshine and are completely surrounded by water, making wind, solar and marine sources viable options. Easier said than done, of course, but at least the bare bones are there.

Five-point plan

Having capability isn't enough, however. Advances in technology requires substantial investment and the landscape has been a bit volatile in recent years — renewable energy targets have been a moving feast and this does not inspire investor confidence. The CEC sees the setting of strong, long-term targets as key to a successful transition, but this is only part of the picture. The Power Shift report details the following five-point plan to get us on the road to a new system.

1. Ensure long-term and transparent carbon targets that apply to the energy sector, recognising the important interaction between energy policy and climate change policy. This should facilitate the closure of Australia's most carbon-intensive coal-fired generation over time.
2. Set strong and long-term renewable energy targets that ensure the continued and steady deployment of renewable energy. This can be achieved by an increase and extension of the Renewable Energy Target beyond 2020.
3. Foster innovation that delivers the next generation of clean energy solutions with appropriate institutions and support for R&D, demonstration and innovation financing for the clean energy sector.
4. Devise smart regulation for a 21st-century energy system that creates a competitive market and empowers consumers. Reform the energy market and current regulatory framework to facilitate greater competition, empower consumers and overcome the barriers to unlock the commercial opportunities to transition to smarter, cleaner energy technologies.
5. Cement public support through ongoing focus on improving the way in which the sector interacts with consumers and communities.

The plan seems straightforward enough, yet the CEC concedes that there are challenges to overcome. Earlier this year, there were widespread cuts to CSIRO funding, specifically in the area of monitoring and modelling of climate change. The federal government has since had a complete turnaround, now telling the organisation to focus on climate science, dedicating $37 million in funding and creating 15 new positions to implement the new strategy. What a difference six months and a close election makes.

Obviously, there will be significant pressure from the coal industry to keep things as they are, with some recent media coverage even suggesting that published criticism of renewables, such as wind farms, was coming directly from that quarter.

For years, the threat of a renewable future was assuaged by the theory that alternative energy types were simply too expensive. Not so, says the CEC. As the largest outlay associated with renewable energy is in the upfront capital infrastructure, with no ongoing fuel costs, we would no longer be subject to the cost volatility associated with fossil fuels (particularly those linked to international markets).

Declining costs

The report cites some significant falls in renewable energy costs over time. It says that the cost of solar power systems is less than a quarter of what they were a decade ago and, according to a research paper from University of NSW, the manufacturing cost of solar

panels is estimated to drop by an additional 30–50% by 2019. Analysis by the Australian Renewable Energy Agency (ARENA) shows that the average cost of large-scale solar in Australia has dropped from $200/MWh in 2013 to around $130/MWh today.

While pricing may be tracking in the right direction, there are wheels within wheels when it comes to our energy system, something that the CEC acknowledges. Government, industry and community collaboration is required to make the dream a reality.

The CEC five-point plan is backed by a series of actions aimed at facilitating change through cooperation and recognises that a commitment to long-term change in the electricity sector is essential.

Pre-emptive policy

The process begins with policy change. Based on current projections, carbon emissions from the electricity system (the single largest contributor of total emissions in Australia) are likely to increase over the next 20 years. We have an oversupply of power generation capacity, which the CEC says is "in part a consequence of the absence of any long-term carbon price signal". This makes investment in new infrastructure challenging. The answer, the council says, is to ensure that long-term and clear energy and carbon policies are developed, to ensure that we remain "internationally competitive and prepared for an increasingly carbon-constrained world".

So, we'll need to close down existing coal-fired power generation facilities, but not before there are suitable and, most importantly, reliable alternatives in place. The CEC said that the uncertainty created by major changes to national energy and climate policy in recent years is partly to blame for a slower than desirable rollout. The fact that these facilities were built and funded many decades ago means there is no cost to produce electricity other than short-run costs — a direct contrast to new energy investment undertakings. To deploy new technologies is obviously regarded as more expensive when viewed in relation to existing plants that are fully depreciated.

The council also concedes that factors including employment and local economic activity will be impacted through the phase-out of existing facilities, many of which are located in regional areas, so a strategy to support communities including training and redeployment is required to minimise the disruption.

Renewable energy targets

Renewable energy targets (RET) have been on the table since 2000, when they were legislated, and the CEC said they have contributed to slowing emissions growth in the energy sector. The report cites modelling conducted by the federal government that shows Australia would not have met its commitment to the Kyoto Protocol without having RETs in place.

> THE CURRENT REGULATORY STRUCTURES ARE A SIGNIFICANT BARRIER TO CHANGE.

As a result, the CEC regards the targets as a vital tool in the transition to a cleaner energy future. RETs were redesigned in 2009, when it was assumed that a mechanism for carbon pricing would be in place and that this would drive investment into renewables. Since the carbon tax was repealed, uncertainty has abounded. The CEC recommends that RETs remain to support renewable investment, particularly in the absence of a strong carbon price signal. The council also sees increases in RETs as required to provide a stable growth pipeline and to allow the renewables sector to mature and develop.

Paying for innovation

Steering the industry through policy change is one thing, but the CEC argues that innovation must be fostered through schemes that support new development. A range of initiatives is identified in the report including:

- Funding of R&D to support the development of new technologies or applications that have a potential to drive higher-efficiency renewable energy manufacturing or deployment.
- Capital grants or other innovative programs that leverage private investment for the demonstration of renewable energy projects, and help to build scale, local capability and confidence with the deployment of technology in Australia.
- Provision of concessional finance and equity that addresses the capital-intensive and long-term nature of renewable energy investments, as well as helping to build confidence among debt and equity suppliers and driving innovation in renewable energy financing.
- A strategic and coordinated approach to identifying the opportunities and barriers for these solutions and a plan for addressing them. A recent example of this is the Clean Energy Council's Australian Energy Storage Roadmap which provides a platform for collaboration between industry, regulators, policymakers and consumers to ensure the development of this technology.

Much of the current available funding comes from ARENA and the Clean Energy Finance Corporation (CEFC). ARENA works primarily in large-scale solar deployments, aiming to reduce costs and consequently enable access to competitively priced finance. The CEFC provides finance to emerging parts of the clean energy sector, co-funding projects, lowering risk and attracting the private finance required to foster the industry.

Regulation requirements

Given the age of the Australian energy market, the CEC thinks that the current regulatory structures are a significant barrier to change. The framework in place was designed for a centralised market model which no longer applies, so the council believes that substantial reform is required to enable an accelerated market transition.

Power to the people

The CEC recognises that the Australian public strongly supports an increased uptake in renewable energy and that this support cannot be taken for granted. To cement this public view, it says that a commitment to integrity and community engagement should be evidenced via the following means:

- In the case of large-scale renewable energy, this means community engagement and consultation, as well as respectful and transparent relationships with the people living in proximity to a project.
- Small-scale renewable energy deployment is based on a retail relationship with an end consumer. The integrity of this relationship provides the basis for the sector's social licence to operate, including the way the consumer is treated, the management of expectations and the system's satisfaction of performance and quality standards.
- Public support for the transition of the energy sector will also be enhanced by measures that can provide consumers with greater control and choice in their own electricity generation and consumption, and the management of their electricity costs. This must include protection of the most vulnerable electricity consumers and targeted support for all electricity consumers to take advantage of low-cost clean energy solutions.

In such turbulent political times it is difficult to ascertain which, if any, of the CEC recommendations will be implemented. In fact, many of us won't be around to see the 2050 Australian energy landscape, let alone if we made it to zero emissions. At least the wheels are in motion.

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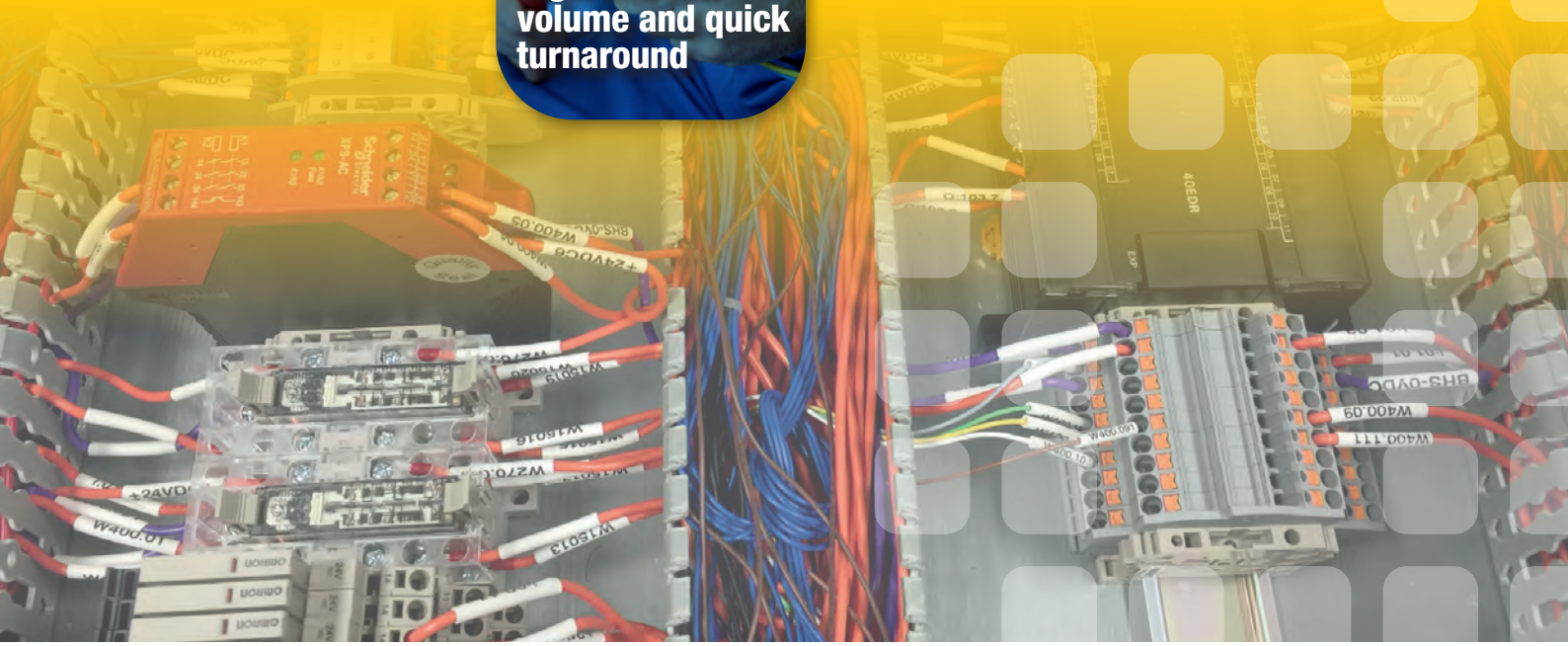

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SECURING WIRELESS NETWORKS IN THE IoT ERA

Ilan Rubin, Managing Director

Organisations must make strategic changes to effectively secure wired and wireless LANs while supporting business applications for use on mobile and desktop devices alike. This means taking a 'mobile-first' mentality.

IT organisations face constant change, which only seems to be speeding up with technology transformations such as the Internet of Things (IoT), anything-as-a-service (XaaS) and artificial intelligence. Security has always been important but it has become more complicated to secure wireless networks in the face of these new technologies.

Deploying ad hoc security is no longer good enough; enterprise networks need a secure access architecture for end-to-end protection.

We have identified three key steps for IT teams looking to improve security:

1. Review access layer security

Mobile workers use multiple devices to access mission-critical applications. The addition of IoT devices introduces new security challenges, with unsecured wireless devices being connected to networks. The nature of IoT devices means the consequences can be significant if they are hacked, resulting in equipment failure, financial losses and even personal injury. The burden is on the network to keep these devices secure.

2. Consider new access layer defence strategies

Most organisations already have basic defences in place, but should add intrusion prevention and application control for maximum protection. Defence strategies should include policies that cover all devices across all environments, mitigating the risk of users unintentionally creating openings for attacks. Technologically, companies should have multiple layers of defence, such as internal network segmentation, which makes it difficult for attackers to spread widely across the network including:

- wireless intrusion protection (WIP) systems to safeguard against rogue devices, unauthorised access and ad hoc networks;
- next-generation firewalls (NGFW) to fight advanced threats and respond to new cybercriminal tactics;
- visibility and control tools to enable configuration and management via an integrated, end-to-end security strategy;
- continuous scanning for malware to prevent access to malicious websites, end-point integrity checking and controlling application usage.

3. Select a secure WLAN solution

Companies need to implement multiple layers of defence against the increasingly sophisticated and persistent threats facing organisations. The security strategy should include an integrated wireless solution where control and security are combined in a single portfolio. All network components should be included: wireless, switching and security.

Companies should look for the most flexible WLAN options to mix and match deployment models for different use cases, locations and IT resources. The solution you choose needs to match your network and organisational structure, delivering the functionality and access you need without sacrificing protection. An integrated, end-to-end solution is more secure, scalable and cost-effective than piecemeal solutions.

Additionally, IT administrators need a single pane of glass view now more than ever to simplify the deployment and management of enterprise networks, applications and devices.

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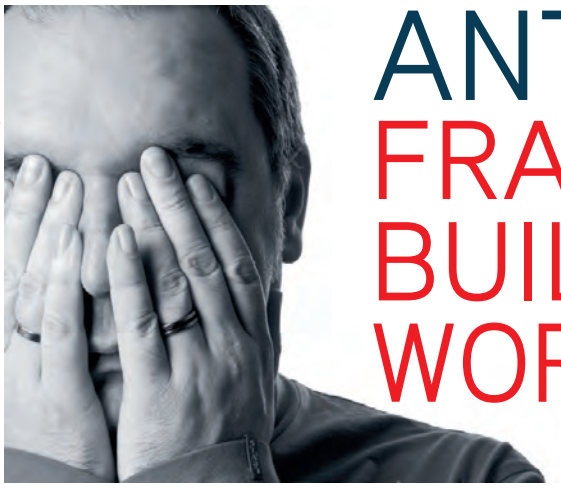

ANTI-BULLYING FRAMEWORK FOR BUILDING SAFE WORKPLACES

Workplace bullying is a serious issue and a major risk factor for anxiety and depression.

Employers have a duty of care under work health and safety legislation to provide a safe working environment — and that includes banishing workplace bullying. Although bullying is often seen as an individual issue, research suggests organisational culture is a significant influencing factor. As well as focusing broadly on creating a more mentally healthy workplace, the following tips can provide a framework to help you ensure your workplace is a bully-free zone.

1. Learn to identify bullying

Workplace bullying is defined as repeated and unreasonable behaviour directed towards a worker or group of workers that creates a risk of health and safety. Bullying at work can take a range of forms, many of which may not be obvious or overt. Examples may include repeated hurtful remarks or verbal attacks by colleagues or managers; excessive criticism; any form of physical harassment such as pushing or threat of bodily harm; social exclusion from the team; and the spreading of malicious rumours or misinformation. A single incident of unreasonable behaviour is not considered to be workplace bullying; however, it may have the potential to escalate and should not be ignored.

2. Set a zero-tolerance approach

Employers should develop a workplace bullying policy that establishes guidelines for employees to lodge complaints and have their claims investigated, as well as a clear process to resolve disputes through conciliation. This could be a standalone policy or incorporated into a broader workplace health and safety code of conduct document, and should ideally outline the consequences of breaching the policy.

3. Consult with your workers

Consistent dialogue with your employees helps identify bullying behaviour within the workplace, empowering them by providing a forum to have a say about policies and procedures that best suit the business. This may include open meetings with all staff, management meetings with health and safety representatives on behalf of staff, or anonymous feedback.

4. Promote an open-door policy

Encouraging employees to approach managers or HR to discuss bullying behaviour will help to ease the reluctance of people who have been bullied to come forward. You can effectively communicate this to employees through newsletters, staff meetings, communications around the office, or in-house or online training sessions.

5. Be an effective leader

A reluctance to address bullying issues within the workplace can be a factor in allowing negative behaviour to exist and sometimes flourish. Focus on developing a positive leadership style by providing training for managers and supervisors to communicate effectively with staff. Providing constructive feedback to staff, building teamwork skills, mentoring poorly performing managers and making sure all supervisors act on unreasonable behaviour immediately are all ways to ensure bullying has no place in your business.

6. Identify the signs of bullying

Even if you have a sound structure to deal with workplace bullying, some employees may be reluctant to speak up.

Someone being bullied at work may:

- be less socially active or confident;
- appear to be scared, stressed, anxious or depressed;
- be absent more often or less productive;
- display physical signs of stress such as headaches, backaches and not getting enough sleep.

7. Seek the source

Bullying in the workplace is not always immediately visible. Employers should be aware that while bullying can happen face to face within the workspace, it can also occur via email, text message, social media and instant messaging.

8. Watch out for those most at risk

According to statistics from Safe Work Australia, some workers are more susceptible to bullying. Being mindful of the more vulnerable among your staff may help to identify and prevent bullying. These include:

- casual workers;
- young workers including apprentices and trainees;
- new employees;
- injured workers and those on return-to-work plans;
- people who are part of a minority group because of ethnicity, religion, disability, gender or sexual identities.

9. Scale back on stress

Bullying is more likely to occur in stressful work environments. Consult with line managers and take steps to ensure staff workloads are monitored and manageable.

10. Review your success

A policy is only as good as its implementation and uptake. Think about how you will monitor your progress. The ways in which bullying claims are handled, levels of sick leave, and gauging staff morale and engagement through consultation, surveys or exit interviews are all good indicators.

Further information about beyondblue's Heads up workplace initiative is available at www.headsup.org.au. This article was republished with permission from NECA and beyondblue.

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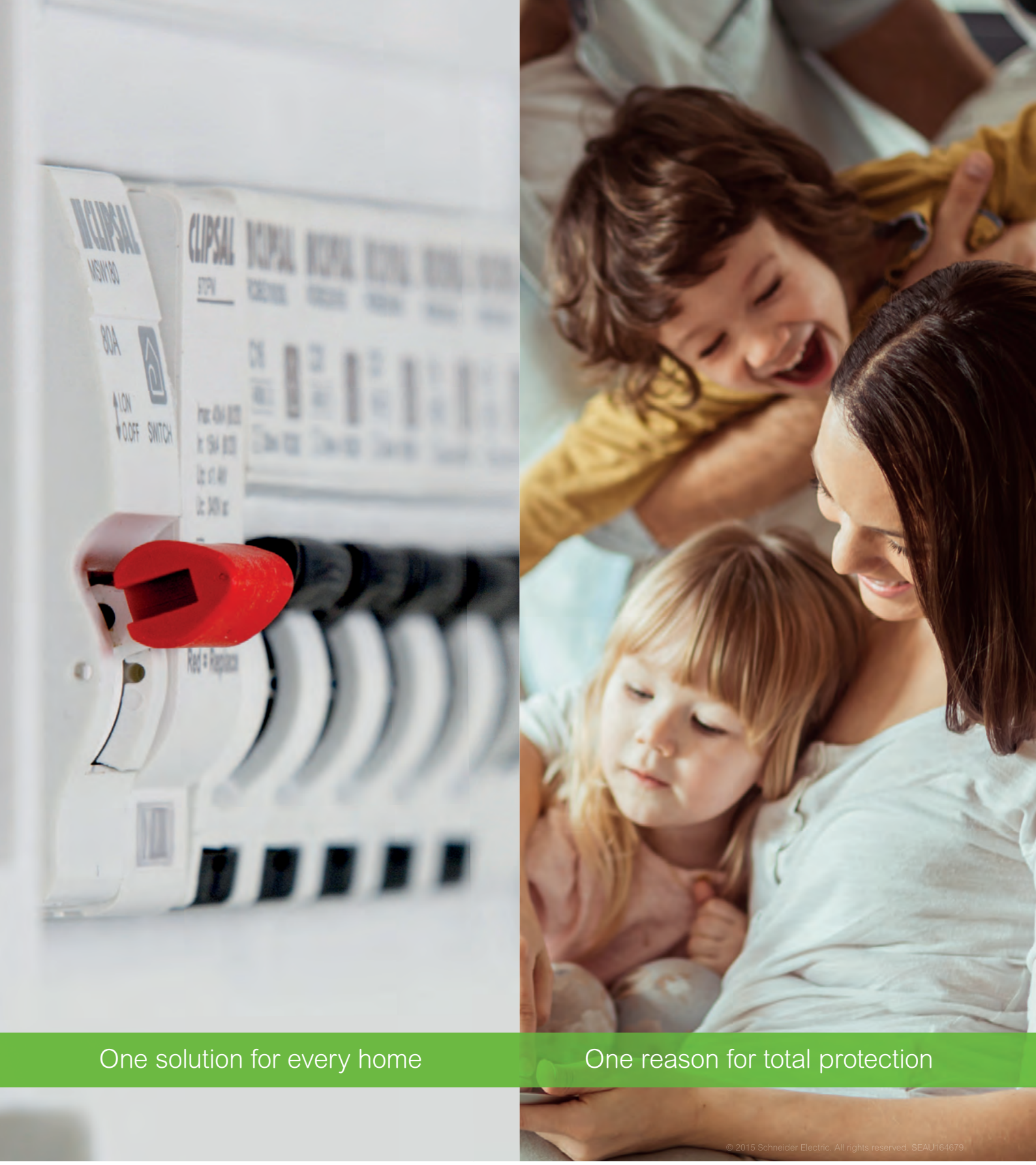

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AUSTRALIAN UTILITY WEEK 2016

Australian Utility Week 2016 is a large-scale expo dedicated to the theme 'Building digital futures'. It takes place from 29–30 November 2016 at Australian Technology Park, Sydney.

The event is now in its 14th year and will attract 1500 utility professionals from the electricity, gas and water sectors. The speakers are a mix of Australian and international utility leaders, smart grid technology innovators and R&D professionals. It is the largest event of its kind in Australia and the only event that focuses exclusively on digital and customer-facing innovations.

Attendees can visit over 150+ exhibitors plus other free sessions on the expo floor, including the Innovation Zone, Technical Zone, Start Zone, Focus Groups and Track 1 of the conference on both days. This is your one-stop shop for you to gain new knowledge, discuss the current issues facing the industry and network with 1500+ utility professionals. Register for your free visitor pass now at http://www.australian-utility-week.com/.

CABLING PLANNING GUIDE FOR INTELLIGENT BUILDINGS RELEASED

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Network infrastructure specialist Siemon has released a new guide to assist infrastructure architects design flexible zone cabling solutions for use in intelligent buildings. The growing adoption of the Internet of Things (IoT) will be optimally supported by a cabling design where low-voltage building, network and security systems are converged on a single IP network infrastructure and powered by advanced Power over Ethernet (PoE) technology.

Ideally suited to these converged infrastructures, zone cabling consists of horizontal cables run from telecommunications rooms to intermediate connection points housed in zone enclosures typically placed in the ceiling space. Cables from zone unit enclosures connect directly to building devices such as sensors, wireless access points, cameras and digital signage or to outlets serving any such device. Combining these connections within zone enclosures supports rapid, less disruptive changes and reorganisation of work areas while simplifying deployment of new devices and applications.

"Deploying a zone cabling approach that facilitates building device connections within zone enclosures saves significant cost for automated buildings where a variety of low-voltage systems are converging on a single unified physical infrastructure," said Valerie Maguire, global sales engineer for Siemon.

"It's important for those designing these converged infrastructures to realise the benefits of this highly economical and functional standards-based design and to understand how best to deploy it," she said.

The Zone Cabling and Coverage Area Planning Guide explains the various patterns that designers and architects can use for effective arrangements of coverage areas and their associated zone enclosures. It also highlights best practices for optimising device density, scalability and flexibility. In addition, it covers considerations for selecting cable media and complying with industry standards.

NBN SECOND SATELLITE LAUNCH DATE ANNOUNCED

nbn's new satellite, Sky Muster II, will blast off 5 October this year from the French Guiana Space Centre in South America. The company says it weights 6.400 kg, making it one of the world's largest communication satellites, and it is set to orbit 36,000 km into the sky.

The satellite joins its predecessor, Sky Muster, to provide additional data capacity to support delivery of the nbn co's satellite broadband service and will help bridge Australia's digital divide for around 400,000 homes and businesses in regional and remote Australia.

nbn has also revealed the first glimpse of the artwork that will be printed on the nosecone of the rocket, which will launch Sky Muster II into orbit. Representing the millions of people in every corner of Australia who will be connected to the nbn network, the mosaic-style image is made up of more than 700 lucky Australians who won the chance to include an image of their face on this historic piece of national infrastructure.

nbn's Satellite Architect Julia Dickinson said:

"The nbn Sky Muster satellite service is transforming the day-to-day lives of people from all over the country. We are already seeing how access to fast broadband for small businesses and farms in the most remote outback and offshore locations can improve productivity by better enabling the ability to store files in the cloud and avoid lengthy business trips by communicating with customers and suppliers through more reliable videoconferencing.

"To ensure every Australian, no matter where they live, could have the chance to be a part of this history-making moment, we held a nationwide call-out for people to win the opportunity to 'blast their face into space'. Representing the millions of connections made through the nbn network, the winners' faces make up a national portrait of our country, which will be printed on the nosecone of the rocket that will launch the Sky Muster II satellite into the sky.

"This is an enormous project and we are doing our best to deliver the nbn Sky Muster service as fast as we can, but reaching all corners of the country will take some time."

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Hot water heat pumps

Stiebel Eltron has released a range of hot water heat pump models to the Australian market. The range features two models: the WWK 222 (H) and WWK 302 (H).

The latest range of air source hot water heat pump systems harvests natural energy to reduce electricity consumption, lower hot water energy bills and reduce environmental impact.

Compared to conventional electric hot water systems, energy consumption for heating water can be reduced by more than 70% by using the units, therefore making them eligible for government rebates. The sophisticated design has been engineered to work efficiently even at minus temperatures, and a current impressed anode ensures a long life cycle regardless of the water quality.

Stiebel Eltron Australia
www.stiebel.com.au

Data centre cooling solution

Schneider Electric has introduced the second generation of the InRow DX (direct expansion) 600 mm to meet the evolving cooling needs of an ever-changing data centre environment. Providing high-density cooling for data centre managers, the product features enhanced controls and an updated user interface.

The device improves cooling efficiency by reducing power consumption while also increasing capacity. Capable of high-density cooling up to 42 kW with a 4000 SCFM max airflow in a 600 mm-wide footprint, the second-generation solution cuts energy consumption by 50% compared to its predecessor. This is enabled by the use of brushless variable speed scroll compressors and EC fans.

The design closely couples cooling with the IT heat load, preventing hot air recirculation while improving cooling predictability. Available in self-contained, fluid-cooled and air-cooled configurations with or without humidity control, the products meet the diverse requirements for closet, server room and data centre cooling.

The addition of active flow control, which measures air pressure inside the containment system and automatically adjusts fan speed to match the exact airflow of the IT equipment, increases precision and efficiency. With an improved user-friendly design, the unit also features an intuitive 4.3″ colour touch-screen display and network card to provide fast, easy access to data and increased visibility into cooling system performance.

Schneider Electric IT Business
www.apc.com

Fibre channel switch

Brocade has announced the Brocade G620, a Gen 6 Fibre Channel switch for storage networking.

The high-density SAN switch delivers high performance and scalability designed to support data growth and demanding workloads from mission-critical applications. Gen 6 is the next-generation Fibre Channel technology that will enable organisations to address performance, reliability and scalability requirements for hyperscale virtualisation, data centre architectures and next-generation storage technologies.

The switch delivers increased performance across 32 and 128 Gbps links and exceeds application performance barriers with up to 100 million IOPS. It includes four Q-Flex ports that can support 128 Gbps or be split out into four 32 Gbps links. Delivering high port density in a 1RU chassis, the switch offers 24 to 64 ports for ‘pay-as-you-grow’ flexibility and scalability.

The Brocade G620 with Gen 6 Fabric Vision technology also includes IO Insight to help organisations achieve greater visibility into performance monitoring. This capability helps ensure critical SLAs can be met by monitoring IO statistics, including device latency and IOPS metrics, to provide intelligence for early detection of storage performance degradations. IO Insight extends and complements automated monitoring, diagnostic and management capabilities enabled by Brocade Fabric Vision technology to further simplify storage networking environments.

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PAVING THE WAY TOWARDS A SMART CITY REALITY

Laura Valic

With around three-quarters of Australia's population living and working in our regional and metropolitan cities, and this only going to rise, the idea of the 'smart city' and how to achieve this is gaining momentum. This is in part evidenced by the launch of the Turnbull government's Smart Cities Plan earlier in the year.

Exactly what a 'smart city' is appears largely up for debate, although the term has broadly been used to explain urban areas that are embedded with digital technologies that make these areas more accessible, productive and liveable.

Some examples include smart parking, where networked sensors help ease congestion, or smart street lighting, where LEDs and controllers reduce energy consumption based on pedestrian movement and traffic analysis.

As stated in the plan, the government takes the following viewpoint:

By taking advantage of the unprecedented pace of technological progress, governments and the community can make cities more prosperous and sustainable. Real time data and smart technology will lead to better utilisation of infrastructure, clean energy and energy efficiency, improvements in services and better benchmarking of cities performance.[1]

If buildings are the bedrock of our cities, and where many of us spend most of our time, it stands to reason they must play a key role in this new reality. Speaking recently at the On2016 event, Schneider Electric (Australia) Vice President, Strategy & Transformation Preeti Bajaj said that our buildings offer a huge amount of untapped potential.

"We have buildings we can expect more out of," she said. "Technology can help us drive that. We can get up to 10 times better ROI by using analytics, the interoperability of devices and integrated platforms of the built environments to deliver value in a stretched environment."

Bajaj spoke of the current trend to build a 'digital building' in parallel with the buildings we are constructing. This way a digital platform can connect to devices within these buildings to intuitively inform us about the patterns of how we use those environments to improve our use of energy and resources.

"We as consumers want more out of the data that is coming to us, and we want our environments to be connected. The smart city reality cannot be reality without smarter buildings being in those precincts," she said.

Smart buildings of today

According to a new report released by Schneider Electric, we are on the brink of an evolution of smart buildings — and the technology that powers them is transforming our old buildings from "inert containers of siloed information and services, into hyper-connected responsive and controllable machines". These are activated buildings with apps as the user interface between the person and the building, offering a "neural network of devices, sensors and equipment" which connect and communicate, predict and react.

These buildings know what is going on inside them in real time and actively respond. Information is received from sensors and devices that are spread around the building and can then adjust settings for things such as temperature or light. The building management systems (BMS) in many structures today only regulate critical systems, but the next generation can do much more to maximise sustainability.[2] Leading the way are commercial buildings such as The Edge in Amsterdam — considered the most intelligent and sustainable building in the world — which can perhaps offer a glimpse into the smart office of the future. This 40,000 m^2, 15-storey glass building is designed to be 'smart' not only in its use of infrastructure but also the use of its people.

To encourage creativity and collaboration, no-one has an assigned work desk — a direct challenge to traditional organisational work culture. Its architecture uses the natural path of the sun to activate its solar panels, producing about 102% of the building's energy. 28,000 sensors monitor motion, light, temperature, humidity and infrared.

Employees with a smartphone or tablet can use a mobile app to control lighting and climate in their workspaces, locate a parking spot, find a desk upon arrival or manage their gym routine. Some of the exercise stations will actually harness the energy from people's workouts, sending watts back to the grid.

To achieve all this, The Edge features a range of integrated facility management and energy solutions from Schneider Electric, including an electrical distribution system, IT infrastructure, control devices and Power Monitoring Expert software. The single IP backbone is the SmartStruxure solution BMS, which enables data to be collected and monitored, and provides real-time analytics to facility managers about how the building is operating to optimise where it's needed and to reduce waste.

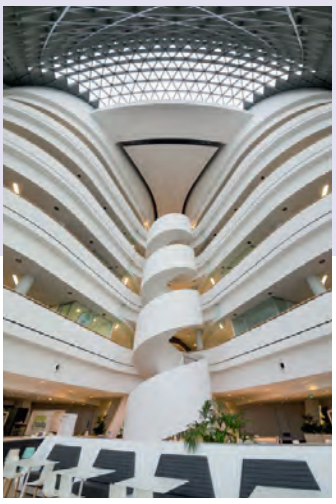
Closer to home, another smart building example is the South Australian Health and Medical Research Institute (SAHMRI), which can be found in Adelaide — fittingly, given the City's ambitious smart city policies and projects. The institute uses an Integrated Building System (IBS) called EcoStruxure, also from Schneider Electric, which incorporates technologies in heating, cooling, hydraulics, fire and electrical monitoring, lighting, security and lab controls. An intelligent metering system provides real-time data on energy and water usage, which is already contributing to 18% savings in energy consumption.

Driving change

Despite examples of smart buildings like the SAHMRI, Bajaj said Australia is lacking firm investment in these buildings of the future. Schneider Electric conducted a survey of around 100 industry experts from the corporate real estate sector and found that while 83% of organisations see smart buildings as important, less than half are willing to pay for them or pay to relocate to one.

"The challenge we have in Australia is that the industry is hesitant to invest in change. With the evolution of smart buildings well underway in Europe, developers, tenants and advisors here in Australia need to work together now to reap the rewards of these technological advancements and make next-generation workplaces a reality," she said. It's possible, however, that we may see increased adoption under the 'City Deals' concept specified in the Smart Cities Plan. This model, taken from the UK, encourages all levels of government to sign contracts to

The South Australian Health and Medical Research Institute in Adelaide has achieved an 18% saving on energy by using an intelligent metering system and is futureproofed by using an integrated building system based on open communication protocols.



Images supplied by Schneider Electric

deliver major infrastructure projects, while setting targets for things like jobs creation, housing construction and environmental outcomes. According to Ken Morrison, chief executive of the Property Council, the City Deals are a real innovation in policy.

"They break down the barriers between federal, state and local government — and make all of them partners in economic growth," said Morrison, in a statement. "All too often, planning and infrastructure are not linked together and we don't get growth — or we get the infrastructure, but it's too late. We need an integrated approach to help our cities grow and prosper. UK City Deals are a successful model."

A smart agenda to watch

Probably the closest illustration Australia has of peering into what life in a smart city may look like is Adelaide. The City's council has a goal of becoming the world's first carbon neutral city by 2025 and has been actively driving 'smart' initiatives, such as preparing for the trial of driverless cars by rolling out Bluetooth receivers in traffic signal boxes. Under the City's digital strategy 'Connect Adelaide', the council has also partnered with the state government to offer free high-speed Wi-Fi across the public spaces of the CBD and North Adelaide, which is due to be completed this year. It's the first capital city to commit to such an expansive wireless network to promote affordable digital connectivity for its citizens.

Another initiative has included fitting streetlights in the CBD with smart technology. A partnership with Cisco, Sensity and iiNet saw more than 60 lights modified with LEDs in a recent trial. These can be monitored on a light-by-light basis to check energy consumption and automatically adjust through sensors from a low dim to full strength depending on activity around them. They can also send alerts in real time when maintenance is required. If the trial is a success, the council will consider rolling the lights out in more areas across the City. According to a news.com.au article, Adelaide now has its eye set on an ambitious plan by becoming the nation's first 10 GB "smart city", prioritising "soft infrastructure" as a means of growth. Provided that fibre to the premises is available, it is reportedly a relatively straightforward upgrade to achieve these new high speeds. While it hasn't been achieved anywhere yet, there are cities in the US that are well on their way. Lord Mayor Martin Haese said the City must innovate in the face of the manufacturing downturn, and is quoted as saying, this "could be the most transformational piece of infrastructure that our city has ever seen". Haese said Adelaide was currently debating what the opportunities for data and internet speeds faster than the NBN may be and what that would mean for attracting businesses, residents and knowledge economies.

> THE FACT OF THE MATTER IS THE TRANSFORMATION IS COMPLEX.

While a number of initiatives can give the appearance of moving towards a smart city reality, the fact of the matter is the transformation is complex. Smart city applications tend to be expensive and can require huge upfront investments. Since the sensor networks, intelligent meters, smartphones and IoT devices residing within our cities all generate huge volumes of data, the infrastructure will need to strong and futureproofed to enable and sustain these applications.

It's not a feat governments can overcome single-handedly; therefore, there will be considerable need for robust policy environments that encourage private sector investment in infrastructure as well as innovation to bring projects from concept to fruition.

References

[1] Commonwealth of Australia, 2016, 'Smart Cities Plan', Department of the Prime Minister and Cabinet, p. 3.

[2] UnWork & Schneider Electric, 2016, 'Activate to Collaborate - The evolution of the smart workplace', Report, Unwired Ventures, UK, 〈www.schneider-electric.com.au/documents/buildings/activate-to-collaborate-full-report.pdf〉, p. 9.

Wireless infrastructure

Aerohive Networks has added to its to its cloud managed wired and wireless portfolio for connected enterprises with the release of the AP250 and the AP245X 802.11ac Wave 2 access points, a line of switches and an update of the HiveManager NG network management platform.

The cloud-managed AP250 and the AP245X access points deliver adaptable wireless functionality while operating on existing standard wired infrastructure of 802.af PoE. They feature integrated Bluetooth Low Energy (BLE) and are both built on Aerohive's RF-IQ technology, which incorporates distributed control radio intelligence, such as automated channel and power selection, load balancing and band steering. The AP250 offers users a dual 5 GHz mode, which can double network capacity, while the AP245X delivers Wave 2 with external antennas and a rugged design, suitable for warehouses, manufacturing floors and extreme temperature environments.

Four cloud-managed enterprise switches (the SR2208P, SR2224P, SR2324P and SR2348P) are also now available in a range of port densities, from desktop to stacking-capable rack mount, which are managed through HiveManager NG. This network management platform is designed for enterprise-grade scalability and is available for private or public cloud deployment. It is now architected for on-premises deployments of up to 20,000 access points, and offers the centralised management and powerful functionality that enterprises require, as well as streamlined user experience and simplified troubleshooting.

Aerohive Networks

www.aerohive.com

NBN enclosure

Built Boards has released the BBNBNV1 model NBN Enclosure, which includes updates to previous models including a lighter aluminium gear tray and individual mounting boxes for power and data.

The NBN enclosure measures 700 mm high x 400 mm wide x 150 mm deep. It comes supplied with a double GPO and 6-gang CAT6 outlet to help keep down costs. When surface mounting installers can now access the mounting holes through the gear tray without having to remove it. Knockouts and a cable entry window also enable a faster and easier install time. An optional flush frame kit is available to hide the cut-out hole.

The product has been lab tested and is Wi-Fi friendly. It is also fully compliant with NBN, OptiComm and Telstra regulations. The product is available nationally through reputable data and electrical wholesalers.

Built Boards

www.builtboards.com.au

POWER MANAGEMENT FOR ANY WEATHER CONDITIONS

Until recently, the increasingly widespread use of digital technology — including the emergence of the Internet of Things — means that well-regulated and reliable power is required in a wide variety of environments. Previously, the requirement for clean power supplies with protection from outages was largely limited to data centres and offices.

The growing impact of the Internet of Things and the more general use of digital and communications technologies to automate processes and ensure business continuity means it is increasingly important to maintain the integrity of the entire system to ensure that a key component is not knocked offline by a brief power fluctuation.

Data centres are generally clean places, with temperature and humidity carefully controlled to suit the computing and communications equipment they house. Consequently, the environmental requirements of the power management equipment used in such premises are similarly narrow.

By contrast, industrial equipment operates under a much wider range of conditions than experienced in a data centre, and that is reflected in the design of IT and communications equipment intended for deployment in such situations. But there is little point installing sensors designed and manufactured for use in a mine or under other demanding conditions if the power management equipment that keeps them supplied with electricity is unable to cope in that environment.

The upshot of unreliability

Unreliable power supplies can result in lost revenue (eg, if a toll point cannot capture vehicle details, the road operator cannot collect tolls) or lost work in progress (eg, crops can be lost if the environmental control system in a commercial greenhouse fails and temperatures rise too high, or fish may die in an aquaculture facility if the chemical balance of the water is not correctly maintained), or there may be risks to human safety (eg, if a CCTV system goes down, or a gas detection system fails in a hazardous area).

Power management systems play a key role in keeping these smart industrial systems running, but they must be able to withstand the same environmental conditions as the devices they are intended to protect. Key environmental considerations include temperature, humidity and dust.

Power management should match the environment it demands

The effects of temperature on electronics — including devices used to deliver a clean and reliable supply of power — are well known. But outdoors and in non-air-conditioned premises, temperature and humidity combine to cause condensation. Even if the degree of condensation is not be enough to cause short circuits or corrosion, it may be sufficient to encourage the growth of mould which, over time, can degrade printed circuit boards and the electronic components they carry.

If dust gets inside equipment, it tends to act as a blanket, and higher temperatures reduce the lifespan of electronics. Dust can also trap moisture, boosting the problems mentioned above. A further issue is that some dusts are corrosive, and the resulting chemical reaction may eat away the metals used in electronic devices.

> DON'T OVERLOOK THE POSSIBILITY THAT DIFFERENT PARTS OF A SYSTEM OPERATE IN VERY DIFFERENT CONDITIONS.

Other environmental factors that should be taken into account include the stability of the mains supply in the area, vibration, vermin, public accessibility with the consequent risk of vandalism and the need to operate within audible noise limits (eg, fibre to the node cabinets in residential streets).

It is also important to ensure that the selected UPS has adequate battery capacity and can meet the peak load, and that the installation complies with applicable building codes. There may also be a need to provide redundancy so that if one UPS fails the remainder can cope with the load. Different industries operate in different conditions, and these factors should be considered when selecting power management equipment.

Categorising industries into the heavy, medium and light categories is a convenient starting point, but requirements vary even within those groups. To give one example of each:

- Oil and gas operations have indoor and outdoor components, exposure to explosive gases and salty air, and may be subject to high ambient temperatures. They also tend to be in areas where the electricity supply is unstable.
- Railway operations face similar issues in terms of indoor and outdoor equipment and high temperatures, with the added problem of being located in publicly accessible areas so there is a possibility of vandalism.
- Rural industries such as farms and market gardens also need equipment that can operate reliably in damp and dusty conditions.

One system, many conditions

Don't overlook the possibility that different parts of a system operate in very different conditions. One example is that while an air traffic control centre has office-like conditions, it may rely on radar feeds from remote locations that provide much greater environmental challenges to electronic equipment.

A UPS designed for office/data centre use is likely to fail prematurely if used in a more adverse environment, so buying a more rugged unit from the outset will cost less over time as well as increase the reliability of the systems it supports.

As a power management specialist, Eaton offers multiple product ranges to cope with different conditions, from standard commercial units designed for traditional office and server room environments through industrial models intended for outdoor deployment to customised units that can tolerate dust and water splashed from any direction, and are rustproof and vandalproof.

Giving proper consideration to power supplies will have a very real effect on the ongoing success of an Industrial Internet or Internet of Things deployment.

Eaton Power Quality Pty Ltd
www.powerquality.eaton.com/australia

Hot-swappable uninterruptible power supply

Eaton has released the 93PS hot-swappable uninterruptible power supply (UPS). Achieving up to 99% efficiency, the 93PS is both virtualisation- and cloud-ready. It features Eaton's Intelligent Power Manager (IPM) and Intelligent Power Protector (IPP) software, which integrate with leading virtualisation and storage platforms so that IT administrators can monitor and manage their complete system from a single pane of glass.

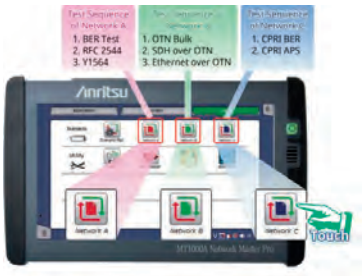
IPM enables the use of simple, policy-based controlled automation, which can be configured to trigger on certain power and environmental events. Load-shedding functionality increases battery run time to provide a larger window of opportunity for SRM disaster recovery.

The 93PS features Eaton's Energy Saver System (ESS) technology, which enables it to deliver up to 99% efficiency by suspending power modules when power conditioning is not required. It can also switch to double-conversion mode in under 2 ms when needed. ESS enhances reliability by reducing stress on the electrical components, extending the unit's life and reducing total cost of ownership.

To ensure high efficiency, the product uses Eaton's Variable Module Management System (VMMS), which optimises the load levels of power modules in a single UPS or in parallel systems by suspending extra UPS capacity.

The device is scalable and comprises a 20 or 40 kW central frame, which can take plug-and-play models. Hot-swappable and hot-scalable modularity means replacement and upgrades typically take less than 10 min. The system can be scaled up to four units in parallel, without increasing the footprint.

Eaton Industries Pty Ltd
www.eatonelectric.com.au



Automated feature for multifunction tester

Anritsu has added an automated testing feature to the all-in-one MT1000A/MT1100A Network Master Pro multifunction tester, which supports all types of communications infrastructure installation, including Ethernet, OTN and SDH/SONET, Fibre Channel and CPRI.

Traditional testing of these types of networks requires well-trained technicians and the establishment of detailed testing plans; however, the new testing feature only requires the technician to load the test procedure in the instrument, connect to the equipment under test and run a single test or multiple test sequences. The need to load and run multiple tests and repeat tests due to operation errors is eliminated by the automated test pass/fail evaluation and report-creation functions.

The automated test feature is available at speeds up to 10G for the MT1000A and up to 100G for the MT1100A. This feature is designed to reduce technician workload, eliminate user configuration errors and shorten the test time required. It is now available for all new and existing instruments.

Anritsu Pty Ltd
www.anritsu.com

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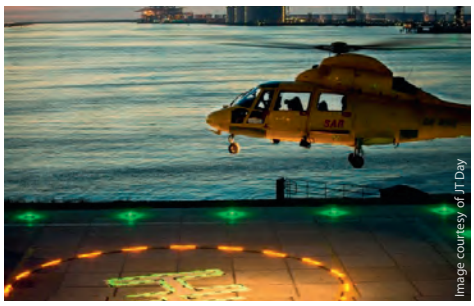
LIGHTING THE WAY TOWARDS SAFER HELIPAD LANDINGS

Landing a helicopter on an onshore or offshore facility is still regarded as one of the most hazardous operations when flying — especially at night — but a new lighting system is now changing that.

After almost a decade of trials, the Circle-H LED lighting system from navigational manufacturer Orga is being hailed as breakthrough technology.

Developed in collaboration with the UK Civil Aviation Authority (UKCAA), Orga's touchdown/positioning marking and heliport identification marking (TD/PM) LED lighting system can replace the use of floodlights, which cause glare and the so-called 'black hole' effect that leads to loss of pilot vision.



This new technology has been proven to radically improve visual cueing for pilots during landing approaches in all weather conditions.

The helideck lighting system is now in mass production and has already been installed on oil and gas platforms around the world, from the Gulf of Mexico through to the North Sea, Asia–Pacific and the Middle East.

Orga has also announced the release of an illuminated windsock with integrated aviation obstruction light (AOL) option, and a touch-screen digital navaid central control panel (DNCCP), to its LED lighting system.

Critical information can be rapidly viewed, accurately analysed and immediately actioned from one central location for the safe and efficient control of operations.

SOUTH AUSTRALIA'S NEWEST WIND FARM STARTS UP

South Australia's newest wind farm, the Neoen and Siemens-developed Hornsdale project, has been switched on to the grid in a special 'energisation ceremony' that brought together South Australian and ACT government officials, as well as members of the local community.

Neoen's global CEO Xavier Barbaro was in Australia for the celebration and said he was proud to see his company's ability to deliver on ambitious clean energy targets.

"Hornsdale is a great example of the global strength of France and Germany working together to provide clean energy for 70,000 Australian homes and new employment, training and investment opportunities in South Australia and the ACT. With almost 40% of the country's clean energy produced by wind farms, Australia's renewable energy footprint is increasing in size and global relevance — making it a great place to invest and do business," Barbaro said.

"Local communities play a big role in the success of wind farms and in creating a sustainable economy, and it's encouraging to see how welcoming people in Hornsdale and surrounding communities have been," Barbaro said.

The wind farm features the latest in blade technology that harvests more wind energy — increasing the annual energy yield of the turbines. Each rotor of the 32 state-of-the-art turbines sweeps a total of 10,000 m^2 — an area equal to 320 school buses parked together.

The high-tech Hornsdale wind farm uses the latest data and digitalisation platforms; every rotation is remotely monitored to increase effectiveness and efficiency. Siemens Australia is the turnkey builder and the local head of Energy businesses, David Pryke, said that it reinforced the company's commitment to investing in Australia's future.

"This project is the epitome of partnership combined with the best technology to bring ingenuity to life for the benefit of society. It's good for the environment, good for the economy and good for the community — all critical ingredients for sustainable success," said Pryke.

Since the start of the Hornsdale project, Neoen has worked with the Northern Areas Council in Jamestown by funding community grants for projects. Speaking about the support to local communities, Colin Byles, the CEO of the Northern Areas Council, highlighted the many benefits to the local area.

"You can see the impact through increased patronage of hotels and other accommodation, cafes and small retailers. Also, farmers benefit by having a regular source of income and road infrastructure that even benefits local volunteer firefighters with new access roads," said Byles.

"The council believes that the Hornsdale Wind Farm Community Funding is of immense value to our small community organisations. The small organisations do not qualify for the major grants offered by government and the funding from the Hornsdale wind farm provides them with the opportunity to undertake projects that they would never have been able to commence. All these organisations are run by volunteers with minimum income streams coming from their day-to-day operations," he said.

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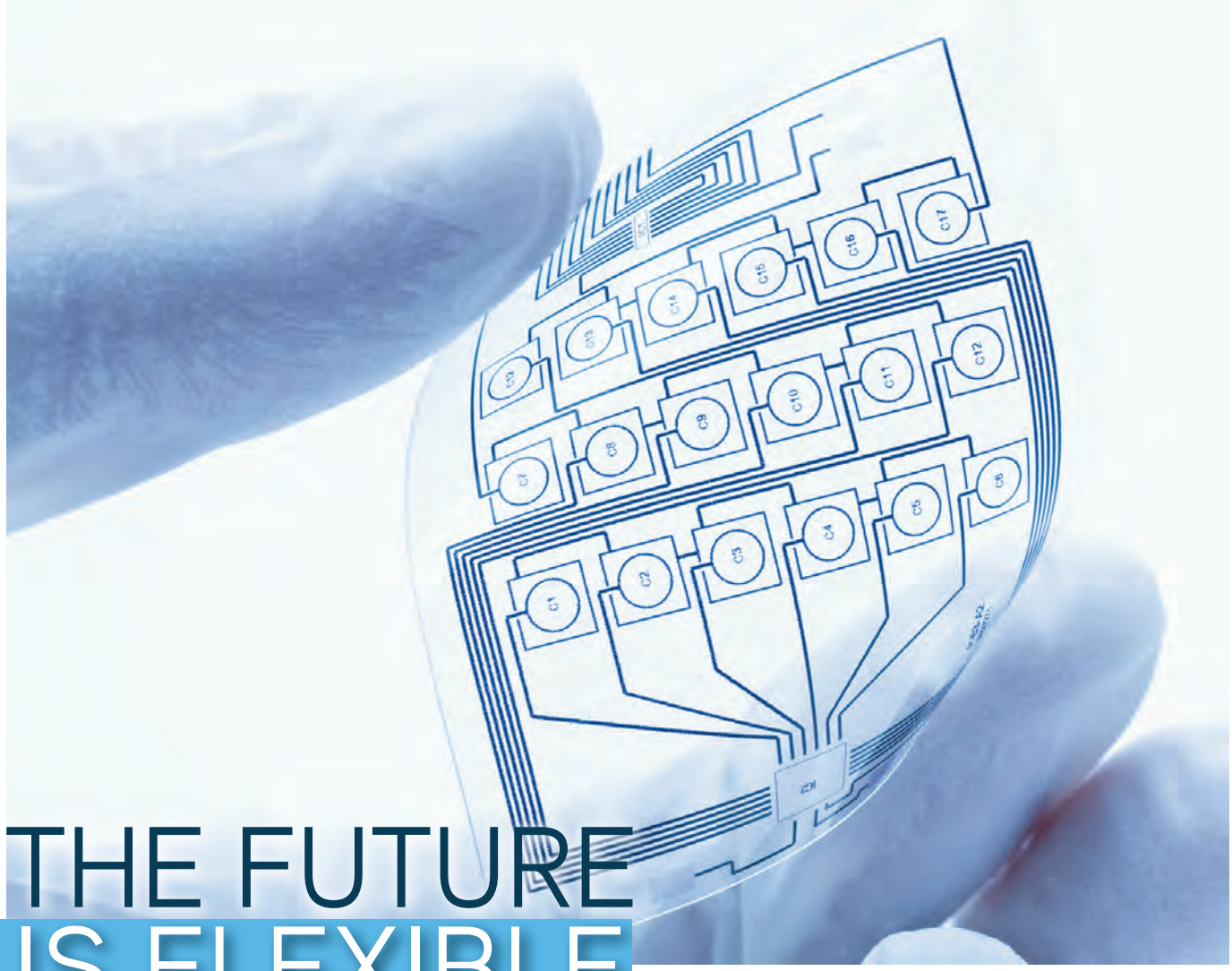

THE FUTURE IS FLEXIBLE

A European Union-funded project that has created flexible lighting foils produced in a roll-to-roll method holds potential for the large-scale production of low-cost LED lighting panels and solar cells.

The TREASORES project received just over €9 million in funding and aimed to find innovative solutions and develop new technologies to reduce the manufacturing costs of LED lighting, solar cells and other organic electronic devices. Its most important contribution has been the development and scaling-up of manufacturing processes for new barrier materials and transparent electrodes used in advanced flexible optoelectronics.

Transparent electrodes to reduce cost and improve efficiency

It is anticipated that three electrodes on flexible substrates (using thin silver, metal fibres or carbon nanotubes) will start commercial production this year. Tests were carried out with different types of optoelectronic devices, using rolls measuring 100 metres in length.

The use of such roll-to-roll (R2R) processing is comparable to the methods used for newspaper printing and the new electrodes produced have demonstrated suitability for complex solar cells and light sources.

These innovative processing methods hold the potential to make solar cells and light sources less expensive. This would bring benefits to consumers, but would also facilitate the growth of more environmentally friendly lighting solutions, contributing to the EU's ambitious climate change objectives.

The electrodes developed by the project are technically equivalent to those currently used by the lighting industry, which are made from indium tin oxide. However, the new electrodes are cheaper to produce and do not depend on the use of indium. Efficacy is not compromised as the new electrodes are able support a stable light source over a wide area and attain an efficiency of 25 lumens/W.

The project consortium also devised new techniques to ensure that the electrodes are able to operate even when they are bent repeatedly — a test that has the potential to be come an industry standard.

New and novel transparent barrier foils

The project also had another outcome — successful testing, development and scale-up of new manufacturing methods to create transparent barrier foils. Low-cost and high-performance barriers were created and are now being further advanced and commercially developed by Swiss-based consortium partner Flexibles Kreuzlingen.

These types of barriers are required to maximise the lifetime and efficiency of the device, a crucial element when ensuring the economic and environmental viability of solar cells.

By integrating the production of electrodes and barriers (rather than using two separate plastic substrates), the project has demonstrated that manufacturing costs can be significantly reduced, as well as allowing for thinner and more flexible device designs.

Challenges and next steps

Yet, there are challenges in producing flat, clean and smooth electrode and barrier foils; optoelectronic devices feature active layers that measure several hundred nanometres, which means that even miniscule dust particles or slight surface irregularities can affect the device yield, or could result in a shorter lifetime and inconsistent, less effective illumination.

The research formally wrapped up in October 2015, but the project partners have been continuing to address challenges, preparing patents for the technology and moving towards full commercialisation.

Floth has become the first company to achieve a six star NABERS Indoor Environment rating, as the wellness revolution in the building sector continues.

The NABERS Indoor Environment tool measures factors such as air quality, thermal comfort, lighting, office layout and occupant satisfaction. On the NABERS scale, one star indicates poor performance, while a score of six demonstrates market leadership.

Floth is a building services and engineering consultancy practice with offices in Brisbane, Sydney, Perth and Jakarta. The company was awarded a six star rating for their new head office based in Fortitude Valley, Brisbane.

Anthony Marklund, ESD principal at Floth, said that the result is very pleasing.

"We care about buildings, moreover we care about the people who work and live in buildings. At Floth we strive for best practice and wanted to demonstrate leadership by caring for our own people first.

"NABERS Indoor Environment provides office building owners, managers and occupants with simple and reliable benchmarking of operational Indoor Environment Quality. A third-party occupant satisfaction survey is combined with spot measurements in the space. The rating report now gives clear advice on performance against the IEQ areas.

"Happily, our six star outcome proves that a highly energy efficient and economical building can also provide an excellent indoor environment."

Tom Grosskopf, director of the Metro Branch at NSW OEH, said that the number of ratings had been slowly increasing over the past few years. Many stakeholders are also predicting that demand will continue to rise sharply as property owners seek to position themselves as a healthy workplace.

"It is important that we address both the social and environmental impact of buildings," Grosskopf said.

"Better indoor environment quality in our workplaces will lead to healthier, more productive staff. Healthy productive staff will lead to a more competitive economy, and more vibrant communities."

MASTER ELECTRICIANS AUSTRALIA

Major skills shortage on the horizon if we don't reverse apprenticeship slowdown

Malcolm Richards

We've seen a great deal of coverage of late about the plummeting number of apprenticeships in Australia, with the most worrying falls in the traditional trades — like electrical.

We understand that there are so many questions you have to ask yourself when considering putting on an apprentice, like how it could enhance, or hurt, your business, or whether it could end up costing you more than it could make you. And that's before you even think about how to find the right candidate, and then how to keep the right candidate. Getting an apprentice through their four years isn't always an easy task!

Unfortunately, as of March, trend estimates showed a decrease over the previous three quarters for trades commencements, which has business groups warning there will be significant skills shortages in the not-too-distant future.

In Australia, the number of people starting apprenticeship training fell by almost 20% throughout 2015. Four years ago, there were 516,000 people in apprenticeships and traineeships, but at last count, that number stood at 278,600.

So as it stands, there's never been a more important time to put on an apprentice, so we have developed a new program — Master Electricians Mentoring — aimed squarely at turning this worrying trend around.

But to compound an already worrying situation, completion rates are also falling, with half of all apprentices throwing in the towel before they make it to the end.

This dropout trend costs your business time and money, it costs the electrical industry time and money, and it costs the federal government time and money. You are investing in up to four years of on-the-job training, so finding, and hiring, the right candidate has never been more critical!

Master Electricians Mentoring, which replaces the current ApprenticeConnect, is a multilevel, joint initiative with recruitment company Add Staff, which allows both teams to combine their industry expertise to develop an electrical apprentice recruitment and mentoring service, aimed squarely at getting this apprenticeship slowdown back on track, and getting you the best value for your investment.

Our goal to increase apprentice completion rates and minimise the impact of apprentice cancellations is supported by a structured recruitment process for apprentices, which is a critical element for determining apprenticeship suitability, incorporating aptitude and job suitability assessments, combined with face-to-face interviews to ensure the apprentice fully understands their four-year commitment, before they get started.

Master Electricians Mentoring has been designed so that it can do the hard work for you, by preselecting three apprentices to meet the needs of your business. The recruitment services have been developed specifically for the electrical industry and include:

- electrical apprentice aptitude and readiness assessments;
- Harrison's Career Assessment tool, which compares candidate answers against the criteria of hundreds of job titles, including over 500 Australian apprenticeships and traineeships. This assessment tool is part of the federal government's Gateway Services initiative;

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- face-to-face interviews with experienced recruitment specialists;
- reference checks, identification verification and apprenticeship eligibility criteria evaluation.

But on the flipside, we can all remember how daunting starting a new job is, and how much we relied on the positive guidance of others, so apprentice mentoring will also form a key component of this revamped system.

Apprentices can flourish with the right guidance — it's one of the fastest ways to build strong self-esteem among younger workers: the very people we desperately need to take the reins in the coming years. Advice, support and constructive criticism from trusted mentors is critical to creating skilled workers. They don't often figure this stuff out on their own!

The new system will provide support to employers and their indentured apprentices for the duration of their apprenticeship contract, alongside business administrative processes and compliance documentation.

Apprentices will have full access to:

- a dedicated mentor who will be their chief contact person throughout their entire apprenticeship, and who will include a monthly review to track their progression, the coordination of all off-the-job training and who will monitor the scope to make sure they're getting a diverse offering;
- meetings to discuss college progression, eProfiling, government incentive entitlements and any general concerns they may have as they go along;
- completion planning, including help with their application forms to secure an Electrical Workers Licence, plus coordination of all parties to plan for an agreed completion meeting date, and a liaison to schedule tutorials and capstone bookings with their RTO;
- ongoing industry updates, special offers and rewards;
- access to events with like-minded apprentices.

Master Electricians Mentoring will reach further than ever before to create highly skilled electrical apprentices and create a brighter future for the electrical industry.

To find out more, head to the Master Electricians Mentoring information page on our website.

Master Electricians Australia
www.masterelectricians.com.au

We're not good at everything...

But, we're really good at providing technology for data centres

Sometimes the pros make things look easier than they really are. We're not professional mountain bikers, but when it comes to data centres, we can make things easy by maximising the performance and scalability of your data centre applications. Whether it occupies one room, one or more floors, or an entire building, AFL can supply any or all of the components for an end-to-end Tier 1 to Tier 4 operation.

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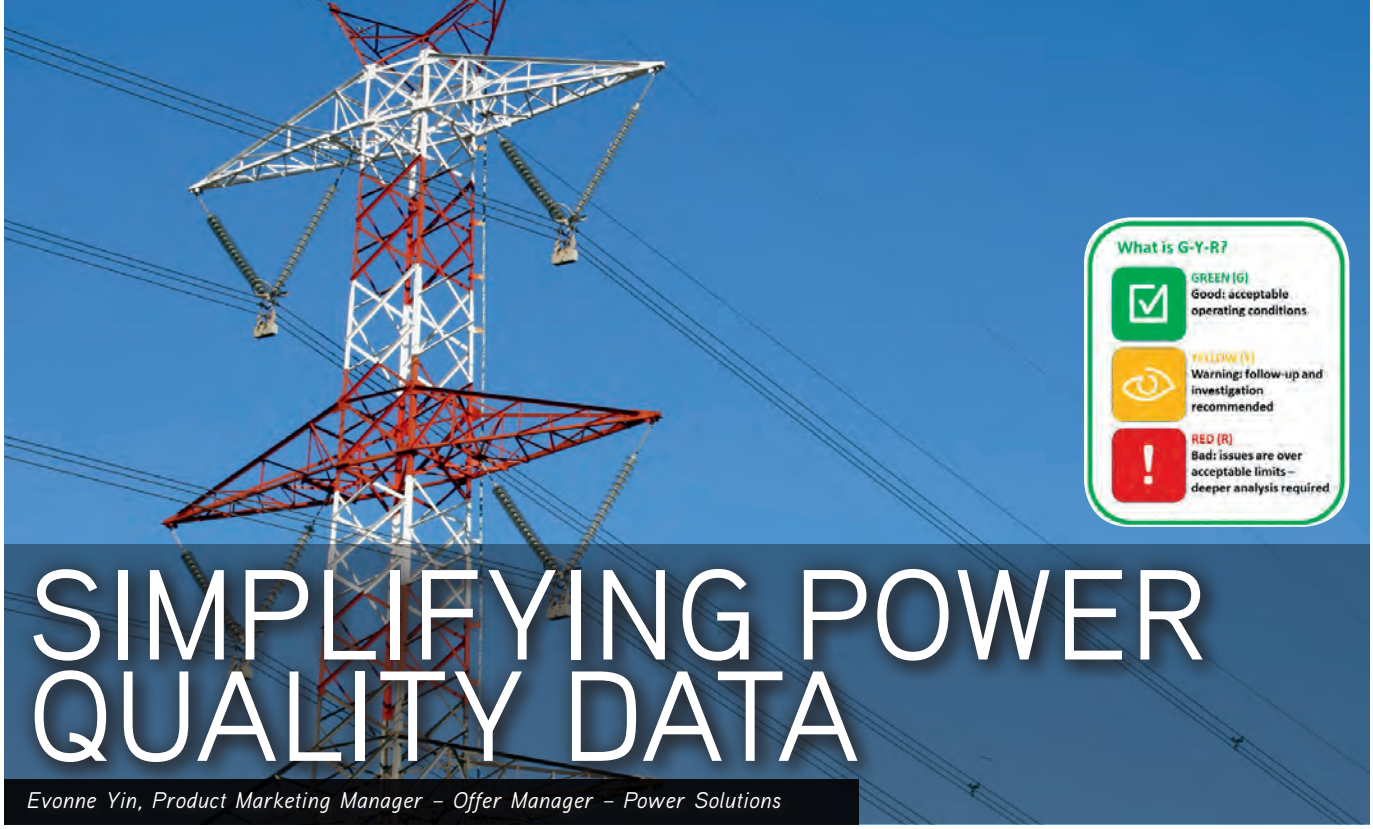

SIMPLIFYING POWER QUALITY DATA

Evonne Yin, Product Marketing Manager – Offer Manager – Power Solutions

Australia's energy market is transforming. Thanks to technology, businesses across a range of industries are increasingly looking to integrate off-grid solutions.

As organisations begin to steer away from traditional energy sources and towards renewables, monitoring and maintaining power quality will become more crucial than ever. In light of this, understanding power quality levels, and how they can be improved, is an increasingly important issue for personnel charged with maintaining a facility's electrical system.

Today's power quality metering devices can capture data on issues ranging from transients and surges to harmonics and power interruptions — but that raw data needs be analysed for real improvement to be made to systems. The good news is new products are addressing this challenge with embedded intelligence to show trends and alerts, with at-a-glance displays designed to meet the needs of many different staff members.

Continuous power quality monitoring is the best way to both maintain current equipment performance and support a facility's continuous improvement efforts. The new displays make such programs easier in a number of ways. For example, with trend graphs, personnel can obtain a clear indication of many long-term, steady-state power quality disturbances over time. In addition, facility staff can easily see if recommended limits on harmonics, power factor or other potential problem areas have been exceeded.

Short-term disturbances, such as voltage sags, swells, transients and interruptions, are represented in a more snapshot fashion, using a variety of statistical widgets, charts and counters. Such a presentation can offer a range of views — from a pie-chart-style breakdown of the kinds of power quality events a facility might be experiencing to bar charts comparing the impact of events either upstream or downstream of the measured location.

Figure 1: Trend graphs provide an indication of events or disturbances over time.

Figure 2: The dashboard provides a range of views for simple analysis.

Several new-to-market Schneider Electric meters are taking this graphical approach a step further. The systems feature a simplified user interface that uses the green/yellow/red visual metaphor familiar to just about any automobile driver to indicate both short- and long-term power quality issues. In this application, green obviously indicates no critical issues with the characteristic being measured, while yellow and red indicators suggest performance is approaching or exceeding limits outlined in related electrical codes and standards.

The green/yellow/red approach solves a common problem of those whose job it is to monitor and maintain power systems: the wide diversity of potential power quality problems and their related metrics and applicable standards can be overwhelming. This methodology converts this multitude of taxonomies into meaningful, unified and easy-to-understand indicators for each specific power quality characteristic.

The new systems also are able to calculate an overall power quality index that amalgamates the data on individual measured characteristics into a 0–100% rating — kind of like a report card for a single metered connection or an entire facility.

Schneider Electric Eco Building
www.schneider-electric.com

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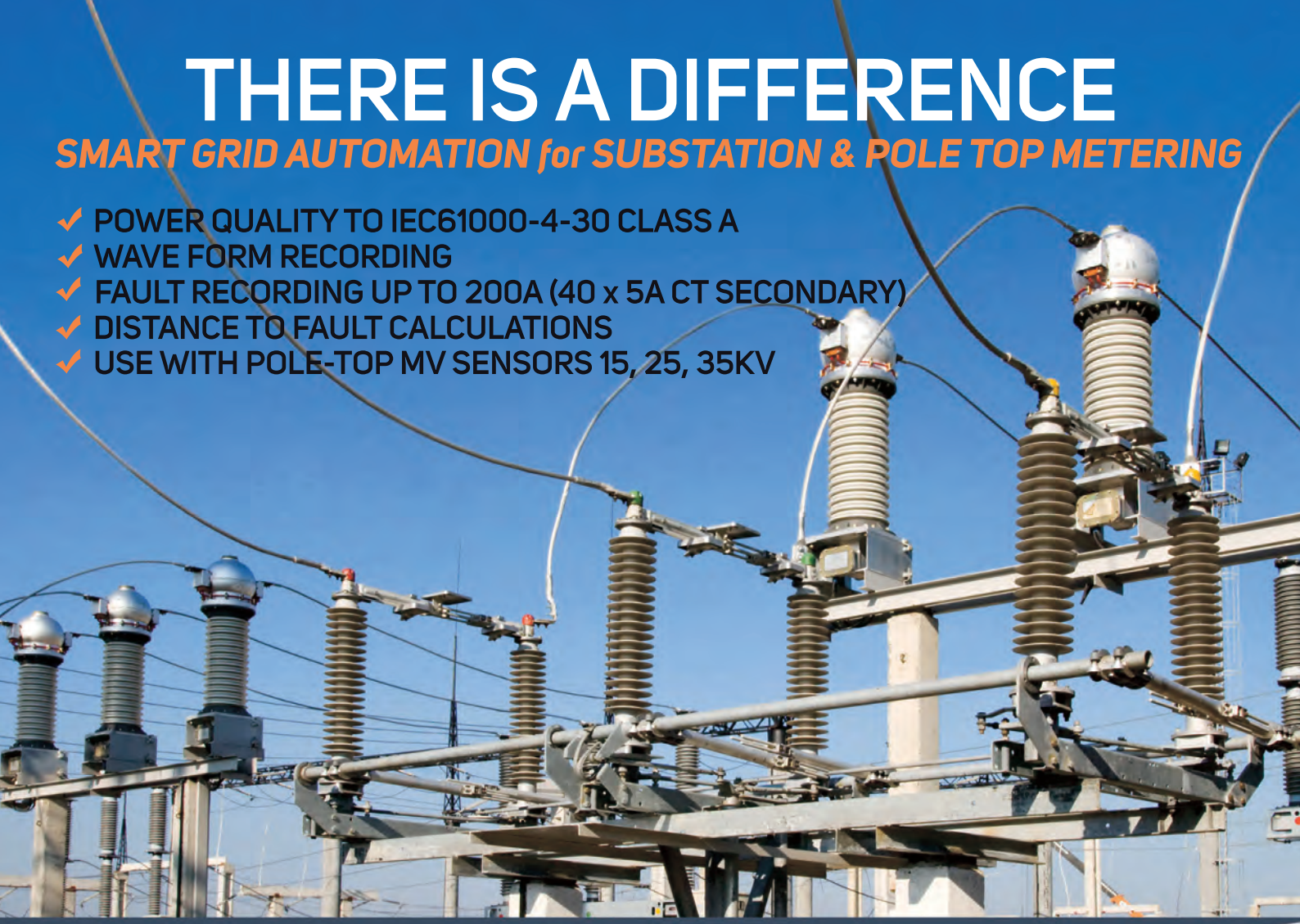

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LED well glass lamp

Chalmit has introduced the Eclipse II lamp, which is an LED well glass/high-bay luminaire that can be retrofitted onto a traditional Eclipse base, enabling an easy and low-cost conversion from high-pressure sodium lamps to LED technology.

The product offers a light output up to 15,640 lm and can last up to 120,000 h. The energy-efficient luminaire has been designed for quick and simple installation, removing the need for special cable or cable glands. The lamp glass has a screwed thread for quick access, while the control gear housing hinges on the mounting and termination cover, and is held in position by a single screw barrel nut. This nut allows easy access and closure of the luminaire during installation and whenever maintenance is required.

The product features a lightweight corrosion-resistant aluminium body, heat-resistant glass and stainless steel fasteners. It has been tested to IP66 and is suitable for use in Zone 2 environments. The luminaire also comes with Ex nA protection, incorporating an LED lamp chamber, a non-sparking control gear and terminal housing.

A range of wall, surface and stanchion mountings, which may be integrated in the design, as well as an enclosed reflector for high-bay applications, is also available.

JT Day Pty Ltd
www.jtday.com.au

Digital storage oscilloscopes

RS Components has extended the ISO-TECH range of test and measurement equipment with handheld two-channel digital storage oscilloscopes including the IDS-200 and IDS-300 models.

Both feature touch-screen capacitive-LCD technology, which enables fingertip control of the device. Using only one finger, a waveform can be moved and a line position can be triggered, while using two fingers allows the adjustment of voltage levels and time-division scales.

The touch-screen technology also offers an intuitive menu that enables operations such as fingertip control over the location of measurement functions and the ability to save and retrieve both diagrams and data.

The devices weigh 1.5 kg are robust and easily portable, providing easy measurement and fast data analysis. They are supplied with: a 150 MHz probe for use with IDS-207/307/210/310 or a 250 MHz probe (for use with IDS-220/320); test lead; power cord; soft carrying case; soft carrying bag; AC-DC adapter; wrist strap, Quick Start guide; and CD user manual.

RS Components Pty Ltd
www.rsaustralia.com

TEN TIPS FOR IMAGING

Using advanced technology, leak detection and repair programs will not only improve operator safety, but also protect the environment from potentially harmful gases.

Optical gas imaging (OGI) cameras use spectral wavelength filtering and sterling cooler cold filtering technology to visualise the infrared absorption of VOC/hydrocarbon, SF_6, refrigerants, carbon monoxide and other gases whose spectral absorption matches the response of the camera.

The development of OGI technology means that the industry can carry out a 'Smart LDAR' (leak detection and repair) program, allowing operators to safely and efficiently visualise gas leaks. Using OGI means the industry can reduce industrial emissions and allows operators to conform to future regulations. In addition, the technology saves money as it delivers a more efficient process. Most importantly, it improves the safety of both assets and personnel.

To get the most out of your OGI equipment, you should consider the following 10 tips.

1. Understand the application and needs

Different applications require different cameras. One camera will not detect all gases, so you'll need to be clear on which type of gas you are dealing with. For example, a VOC/hydrocarbon OGI camera will not see SF_6 and a CO camera will not see refrigerants.

2. Take into account the environmental conditions

The success of passive optical gas imaging depends on environmental conditions. The greater the background energy differential, the easier the camera will be able to visualise the gas leak and pinpoint its source.

Active optical gas imaging (ie, using a laser-based backscattering technique) relies on a reflective surface in the background. This presents a significant challenge when looking at components high up and pointing the camera at the sky. Additionally, weather conditions such as rain and strong winds need to be taken into account. Rain can make detection very difficult, but wind can actually help visualise the gas because it makes the gas move.

3. Keep in mind that optical gas imaging is qualitative, not quantitative

Due to the environmental variants, background energy differential and variations, an OGI camera will not be able to tell which amount of gas is leaking or what gas it is. An OGI camera will, however, pinpoint the source of the leak in the most efficient and effective way.

4. Combine an optical gas imaging camera with a sniffer probe

Use an OGI camera to visualise the leak and trace its source as the first step. To quantify the leak, you'll need a sniffer probe — a toxic vapour analyser (TVA) or an organic vapour analyser (OVA). Using this combined approach is referred to as Smart LDAR.

5. Use all the available features and functions

Certain OGI cameras — including all of FLIR's GF-Series cameras — are dual-use systems. They can also be used for industrial maintenance inspections, including high- and low-voltage electrical installations, mechanical installations, pipework and insulation, ovens and more. The thermographic function on an OGI camera will also help determine the background temperature/energy the gas

is absorbing. Unlike other thermographic applications, the object of detection (gas) has no visual representation and it is moving constantly. Therefore, a continuous focus is most important, and so is the thermographic capability to determine the temperature range settings. An OGI camera also allows users to record a movie to capture the movement and pinpoint the leak. It is always advised to take a visual image.

6. Keep it safe

A gas imaging camera is a quick, non-contact measuring instrument that can also be used in hard-to-access locations. It can detect small leaks from several metres away and big leaks from hundreds of metres away. It can even show leaks on moving transport vehicles, hereby greatly improving the safety of both the inspector and the plant.

Thanks to great performance, sensitivity and (in some cameras) a high-sensitivity mode (HSM), users can scan for leaks from a safe zone or from a greater distance when compared with traditional gas detection methods.

7. Consider future industrial emissions regulations

Fugitive gas emissions contribute to global warming and pose deadly risks to both workers and people living close to these facilities. FLIR optical gas imaging cameras detect dozens of volatile organic compounds, including the greenhouse gas sulfur hexafluoride (SF_6), thereby efficiently contributing to a better environment.

Optical gas imaging cameras also allow users to comply with new industrial emissions regulations and procedures, such as those

> TAKE INTO ACCOUNT THE ENVIRONMENTAL CONDITIONS.

set by the new EU Industrial Emissions Directive (IED) in Europe and some EPA regulations in the United Sates.

8. Keep track of your return on investment

In many cases, the cost of the camera is paid for within its very first survey and in some cases with the finding of the very first leak.

9. Work with permits

OGI cameras in general are not Zone 1 ATEX certified. Therefore, you will need to apply for a hot work permit or use it under a permit to work scheme. Remember, you can see significant and dangerous leaks with the right camera from a safe zone, even outside of the facility perimeter.

10. Utilise training

Learn from experienced and qualified OGI users to get the most out of your camera and consider additional training from organisations such as Infrared Training.

FLIR Systems Australia Pty Ltd
www.flir.com.au

CASE STUDY

Waste not, want not

The Polish city of Krakow has a new US$250 million waste-to-power plant thanks to Korean engineering company POSCO E&C.

The facility is the largest daily waste incinerating plant in Poland, capable of processing 220,000 tonnes of household waste annually using eco-friendly methods. By using the heat from the incineration process, the plant produces 11 MWh of electricity and supplies 35 MWh of district heating. In addition, the ash by-product is used as material for road construction.

The project took three-and-a-half years to complete, including trial operations over a seven-month period. The plant was awarded the SARP Award of the Year 2015 by the Association of Polish Architects, in recognition of its design, and it was also among the top 10 public investment projects for 2016. Poland has strict environmental standards in place, overseen by the Department of Labor and Regional Environmental Protection Agency. The first deputy mayor of Krakow, Tadeusz Tzmiel, hailed the project a success in terms of adherence to the strict standards.

"I am deeply impressed by POSCO E&C's technology and its ability to implement such strict management of the site. Also, I really appreciate the cutting-edge facility that will be responsible for protecting our environment," Tzmiel said.

Completion of the facility delivers benefit on two levels; allowing Krakow to meet the stringent EU standards imposed around acceptable levels of landfill and enabling Green Energy Certification from the Polish government for the power generated by the plant.

Enclosed direct-on-line starters

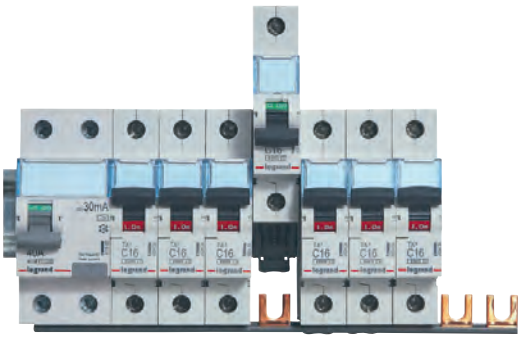
The DRAF enclosed starter embeds AF technology, with an electronically controlled coil of AF contactors. The product is an enclosed direct-on-line starter, used for three-phase motor control up to 7.5 kW (400 V) and 10 hp (440 V).

The starter is suitable for both IEC and UL markets and is suitable for control of stand-alone motors including heat pumps, air-conditioning units, small machine tools, irrigation and dairy shed applications.

The plug-and-play starting solution combines the benefits of AF technology with few product variations, allowing customers to simplify logistics and lower administration costs.

ABB Australia Pty Ltd

www.abbaustralia.com.au



Circuit protection range

Designed to meet the requirements of modern installations in residential and commercial applications, the new modular range of RCBO, RCCB and MCB products from Legrand provides effective protection of cabling against short circuits, overloads and residual current faults, avoiding risk of fire and electric shock.

The range is easy to install, featuring rising cage clamp terminals designed to provide durable connection and to limit contact impedance, temperature rise and heat loss.

A two-position DIN clip makes it simple to position or remove the product from a DIN rail without disconnecting and removing other breakers and a wire guide flap prevents connection errors and increases safety.

HPM Legrand

www.hpmlegrand.com.au

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Custom panels and switchgear

Rittal has announced Rittal Automation Systems, a new business unit that builds on its existing portfolio for panel building and switchgear manufacture, and developed also in response to the increased focus manufacturers are placing on automation.

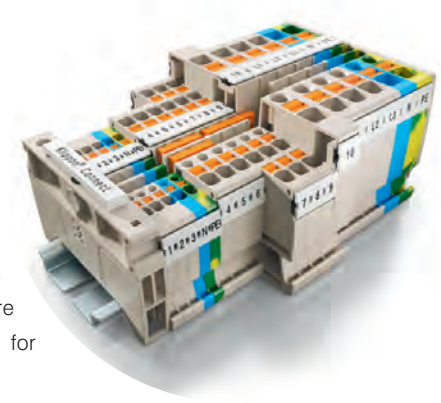
The enterprise is assuming responsibility for, and expanding, the product range provided by its sister company Kiesling. The result is a comprehensive one-stop offering, from simple, manual tools to highly automated machining systems, terminal configuration/labelling machines and fully automated panel wiring systems. This provides the machining and handling technology needed for time- and cost-efficient production.

The manufacturing of custom-configured solutions for panels and switchgear are much sought after but they typically require multiple manual steps. Implementing easily assembled enclosure systems and a wide selection of accessories and intelligent software solutions will help to enhance efficiency. The business unit therefore offers panel building and switchgear manufacturers, who are looking for ways to improve productivity, a portfolio that enables them to leverage the latest machining technology to increase automation in their value-creation.

The business unit also offers a variety of automation solutions to accelerate individual manufacturing tasks. These offerings can be scaled to a business's size and tailored to its specific imperatives.

Rittal Pty Ltd
www.rittal.com.au

Terminals



The Weidmüller A-series PUSH IN terminals are designed to reduce connection times for both solid conductors and conductors with crimped-on wire-end ferrules. The conductor is inserted into the contact point as far as the stop, creating a gas-tight connection. Stranded-wire conductors can also be connected without the need for special tools.

The product is available as a 2-, 3- or 4-connection terminal, with matching feed-through, test-disconnect and ground terminals. Conductors with cross-sections ranging from 1.5 to 10 mm^2 can be connected. Flexible potential distribution can be made with the cross-connection facility, and faster maintenance is possible with available test points supported by an identification marker system.

Weidmuller Pty Ltd
www.weidmuller.com.au

CASE STUDY

Taking the drag out of pumping

A new CSIRO technology that takes the energy-sapping 'drag' out of industrial pumping has been adopted by Glencore's Minara Resources following a successful full-scale trial.

The drag reduction technology can save mining companies energy and water use each year while boosting their productivity.

Minara's technical and engineering manager, Paul Wiltshire, said the company installed the technology to improve the feed ore slurry pumping capacity at its Murrin Murrin nickel operation in Western Australia, which was overloading as the ore throughput increased.

"Working together with CSIRO, we were able to identify a low-cost installation point with good potential for reducing the slurry drag effect in the piping system," Wiltshire said.

"The technology freed up capacity, which meant we could avoid an expensive plant upgrade to meet throughput demand.

"It was an immediate success and CSIRO's drag reduction technology is now part of our toolkit when considering other slurry pumping constraints on-site," he said.

Almost all mineral processing plants need to transport slurry — a semiliquid mixture that can include water, ore and other material — through pumps at various process steps.

CSIRO senior engineer Dr Rueben Rajasingam said that reducing water content, power demand and pumping inefficiencies always results in significant operational and cost improvements.

"The thicker the material, the more friction or 'drag effect' you get, which makes it hard to pump and more energy- and capital-intensive," Rajasingam said.

"Water is typically added to dilute the material before pumping, but only as a last resort because the more water you add, the less throughput you achieve.

"Our technology combats both these challenges: it introduces a thin, uniform and long-lasting ring of fluid between the slurry and the inside of the pipe so that thick material can be efficiently pumped without friction at a high throughput," he said.

CSIRO's drag reduction technology offers a welcome boost to the mining and minerals processing industry, which is in the midst of challenging times brought on by low commodity prices and the shift to increasingly lower-grade ores.

Image courtesy of CSIRO

It's simple, cost-effective and easy to implement, and could be applied to a broader range of industrial processes where there's a dewatering aspect that results in a sludge, slurry or paste that needs to be transported, such as in construction, waste management, coating services and food processing.

"For example, the construction industry is increasingly needing to pump concrete up higher and higher to build skyscrapers, and so this could be a cost-effective solution for them to overcome challenges like blockings," Rajasingam said. For the mining industry, the technology means that variation in the ore's viscosity or water content can be easily managed. It also offers a solution for backfill — a common mine site remediation technique where materials are pumped back into an exhausted open pit or underground mine to return ground stability and regenerate the site.

"The idea of using a lubricant is not new, but we've come up with a better technology that overcomes issues with coating uniformity.

"The way we introduce the coating creates a thin, uniform sheath around the slurry, whereas other methods coat sporadically," said Rajasingam.

CSIRO Head Office
www.csiro.au

Service bodies

MFI Service Bodies provides fleet and service vehicle design and manufacture. The company's vehicles meet the required OH&S safety standards, with ROPS compliant specifications included where necessary.

The company provides vehicle customisation to ensure suitability. Designs include colour-matched two-pack finish, dust-tight and watertight compartments, LED lighting and self-closing latches. Power outlets, camera systems, central locking and a Harrier ladder rack can also be added.

MFI Service Bodies
www.mfiservicebodies.com.au

Modular safety fencing

Satech offers a perimeter guarding solution that meets the required international standards for correct implementation of a fixed or removable safety guard. It is available from Control Logic.

With special attention given to the design of the guard itself and the patented mounting and fixing hardware, installation is made as quick and simple as possible using specially designed captive fasteners and pre-punched holes. All aspects of AS and ISO standards are taken into consideration in every aspect of the guarding range ensuring a fully compliant end result with minimal intrusion to the surrounding environment.

Uneven ground surfaces are covered through innovative adjustable mounting brackets, and the patented 'clip' system allows users to fix or remove fence panels in seconds. The clips are simply positioned over the post and fastened in place, another is then installed over the top once the guard has been put into place. Removal is as simple as undoing two captive bolts and sliding out the guard. It can be tailored to meet unique machine layouts, custom shapes and sizes.

Control Logic Pty Ltd
www.control-logic.com.au

Modular safety controller

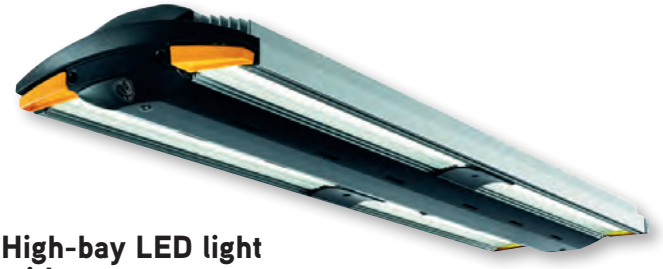
Schneider Electric has added to its range of Preventa safety products with the Preventa XPS MCM, a modular safety controller designed to protect industry machines and operators from incidents involving moving machine parts.

The configurable, embedded safety controller is capable of monitoring multiple safety functions, including emergency stop, guard monitoring, perimeter guarding, position and speed monitoring. It features eight digital inputs and two digital outputs and can be expanded to up to 128 digital inputs and 16 digital outputs (relay or solid state). It is simple to expand a configuration from small to large due to a range of communication modules. It is also possible to build up to six island architectures via safe communication, with a distance of up to 50 m between each island. Expansion is possible directly on the controller backplane bus as well as via the safe expansion bus.

The safety controller is suitable for safety applications requiring conformity with Category 4 standards EN ISO 13849-1 and SIL3 EN/IEC 61508. An intuitive software and hardware layout optimises the system configuration, allowing the controller to be connected anywhere. To simplify the machine maintenance, the system has a removable memory card which can be used to transfer the configuration to another controller in a single step.

Schneider Electric Industry

www.schneider-electric.com



High-bay LED light with occupancy sensor

The Big Ass Light is a high-bay LED from Big Ass Fans, which features an occupancy sensor that maximises energy efficiency. The product is suitable for large warehouse spaces such as distribution centres.

Designed for long-term performance, the fixtures are constructed from a single piece of anodised, extruded aluminium, which acts as a heat sink and helps the fixtures reach a rated life of up to 150,000 h. The occupancy sensor is a low-profile device that offers 360° of monitoring to automatically turn the light on and off when people enter and leave the space. The turn-off timer can be programmed from floor level using a remote, while the sensor can be adjusted to dim or turn off during daylight hours if natural light is present.

The lights offer 26,000 lm, while the occupancy sensor can reduce energy consumption of the already efficient LED by an additional 30–65%.

Big Ass Fans Australia Pty Ltd
www.bigassfans.com.au

Electrostatic meter

The Vermason 222ES is a handheld precision field meter that measures electrostatic voltage potential. It is available to rent from TechRentals.

The unit is suitable for monitoring packaging, materials, machines and other electrostatic generative equipment or processes, as well as conducting periodic facility audits in accordance with EN 61340-5. The meter measures electrostatic voltage potentials over selected distances from 1 to 200 mm using the field-mill influence principle. Calculations are automatic and results are shown on the LCD display.

Other features include: measurement range 0 to 200 kV (default 20 kV at 20 mm); and two range, three-digit display in V or kV.

TechRentals
www.techrentals.com.au

Modular mobility

ABB is providing a complete automation solution for the world's first portable solar-diesel/gas microgrid provider, SunSHIFT, a modular hybrid power system designed for quick installation that can also be easily dismantled and moved according to the changing needs of energy users in remote locations.

A pilot system, consisting of 141 kilowatt peak (kWp) of solar PV, was successfully deployed at a construction worker village in remote Queensland, Australia. Within one week of leaving the factory, 1000 km from the village, the system was unpacked and energised, augmenting four brownfield diesel generators and reducing diesel fuel consumption thereafter.

After six months of operation, during which ABB's cloud-based remote monitoring was used, the pilot system was packed up in less than 170 person-hours and successfully relocated.

Hybrid microgrid power systems benefit customers in off-grid areas by reducing their dependence on diesel/gas generators, which are expensive to maintain and operate on fuel that must be transported to the site and is subject to volatile pricing.

By contrast, solar PV and wind generation are already cheaper than diesel/gas in some off-grid locations and, when complemented with backup or storage technologies, can bring remote operations and communities closer to energy autonomy. They also reduce emissions created by burning diesel/gas fuel.

Furthermore, in some areas the mining sector is already acknowledging that offsetting on-site fossil fuel power generation with renewable energy can reduce operating costs and improve energy security and productivity.

The portable hybrid power plant, branded SunSHIFT, combines solar modules, conventional diesel/gas generators and optional energy storage so that users can benefit from the advantages of renewable solar power without having to commit to a permanent traditional solar installation.

SunSHIFT is being developed and commercialised by the global, UK-headquartered, engineering and construction company Laing O'Rourke, in collaboration with the Australian Renewable Energy Agency (ARENA), as a modular system that will be manufactured off-site and transported to installation sites in container-sized, prefabricated modules. This will enable contractors to quickly assemble the power plant at a chosen location or later disassemble and redeploy it to new sites as needed.

Image courtesy of ABB

The system operates with ABB's Microgrid Plus System, a proven distributed control system for microgrids that integrates all plant components. Microgrid Plus System has been specially designed to coordinate the operation of hybrid power stations, stabilising and integrating renewable power generation into microgrid systems.

The external, prewired connections of the ABB control centre and inverters enable fast, easy set-up and dismantling. The distributed, modular design of Microgrid Plus Systems will make future control upgrades easy and risk-free. Another important factor that led to the selection of ABB is the ability for the system capacity to be expanded easily and for a modular concept the ABB solution is well suited. ABB is also supplying other equipment, such as solar inverters, controllers, remote access routers and Ethernet switches.

Portable hybrid systems such as this have the potential to provide both industries and communities in remote off-grid locations with a viable and portable renewable energy alternative, and would also be useful in emergency activities, such as relief efforts.

ABB Australia Pty Ltd
www.abbaustralia.com.au

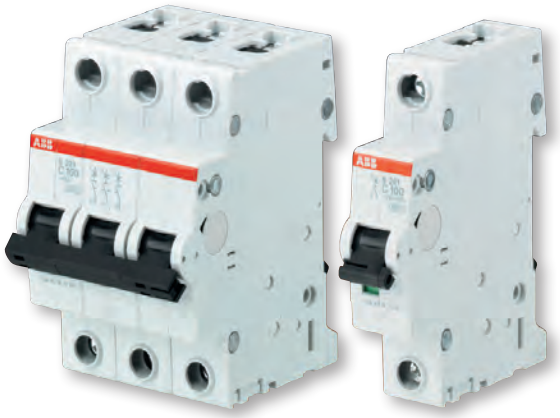
Outdoor luminaires

The ERCO Quintessence Downlight IP65 features innovative digital photometrics to produce an extrawide batwing light distribution with a 90° emission angle and 40° cut-off for optimal uniformity. This means the luminaires can be spaced a further 50% apart, minimising hardware investment, installation and operating costs.

The optical system, consisting of diffusing a lens and darklight reflector, produces a uniform beam with cylindrical illuminances that enhance facial recognition and, therefore, security. The range offers lumen packages as high as 3300 lm, with a connected load of up to 24 W, resulting in powerful illumination — particularly from large heights such as cantilever roofs or open atriums.The minimised recess depth facilitates an effective lighting solution in projects involving tight spaces.

ERCO Lighting Pte Ltd

www.erco.com



Miniature circuit breaker

ABB has released the miniature circuit breakers of the System pro M compact series S200 which offer high performance and safety in building installations and industrial applications up to 6 kA at Ue=400 V AC. This is according to IEC/EN 60947-2 and IEC/EN 60898-1 standards.

These circuit breakers offer more amps per millimetre width and feature clear contact position indicators in red and green ('real CPI'). The additional electrical currents 80 A and 100 A complement the current System pro M compact portfolio, providing good performance in a single module width.

The product also features a patented twin terminal with captive screws and an increased opening for cables up to a maximum of 50 mm^2. A busbar slot in the back is designed for good visibility during installation. A wide range of accessories is also available.

ABB Australia Pty Ltd

www.abbaustralia.com.au

Handheld industrial camera

The FLIR T440 industrial handheld camera features Multi Spectral Dynamic Imaging (MSX) technology that allows for faster and more detailed electrical, mechanical and building inspections.

Key details apparent to the naked eye such as numbers, labels, signage and structural features can get lost in a regular thermal image, often requiring a separate digital photo to reference the location of the temperature issue that has been found. A regular thermal image only displays heat signatures, which can cause details to get lost if they present a similar temperature. To overcome this, MSX technology uses an internal digital camera to enhance the thermal image. The high-contrast skeletonised visual image allows for key aspects of the visible spectrum to be overlaid on top of the thermal output, while still keeping the important thermal information prominent.

The MSX mode combines both visual and thermal spectrums, which instantaneously generates a definitive, all-in-one thermal picture that easily orients users to the location of a problem as soon as it is discovered on-screen or in a report. MSX technology extracts high-contrast details from the images taken by an onboard visible light camera, and etches or superimposes them onto the thermal images that the camera is taking in real time.

FLIR Systems Australia Pty Ltd

www.flir.com.au

REMOTE POWER GENERATION

Renewables will become 'the' power source of the future for regional and remote Australia, with energy consumption set to be transformed by innovations in power generation, new lows in solar pricing and the anticipated rapid price reduction in batteries.

Clean Energy Finance Corporation (CEFC) CEO Oliver Yates said a pioneering solar and battery storage project in remote Western Australia, which has just become fully operational, demonstrates that renewable energy will increasingly become the preferred energy of choice.

The CEFC helped finance the innovative solar and storage project at Sandfire Resources' DeGrussa Copper-Gold Mine, which will substantially reduce the mine's diesel consumption and cut overall emissions.

"This is an important project of scale that demonstrates the potent combination of solar and battery storage and the benefits this brings to remote regions," Yates said.

"DeGrussa has delivered a unique combination of an off-grid, high-capacity solar power array and battery storage fully integrated with an existing diesel-fired power station.

"The $40 million DeGrussa Solar Project has involved the installation of a 6 MW lithium-ion battery storage facility, powered by more than 34,000 solar PV panels on a 20-hectare site near the mine. The CEFC committed $15 million in debt finance to the project, which also received $20.9 million in recoupable grant funding from the Australian Renewable Energy Agency (ARENA).

"While this development also benefited from grant funding, the project shows the clear economic potential for off-grid renewables in regional and remote Australia. With this project now operational, and given the price reductions we are seeing in solar and batteries, the economics of remote solar and storage are becoming attractive even when oil prices are low.

"Soon remote communities and mines will be able to reduce the need for expensive trucked-in diesel used in dirty generators. This project demonstrates the financial, health and environmental benefits that moving towards renewable energy solutions can provide," Yates said.

In 2013, AECOM estimated that using diesel for electricity generation cost between $240 and $300/MWh (for diesel costs only) for larger mines and up to $450/MWh for communities and smaller industrial loads, depending on the efficiency of the diesel unit. By contrast, AECOM found that the levelised cost of electricity (LCOE) of solar PV on a typical remote mine site was around $226/MWh without grants or subsidies.

"Today the LCOE has fallen to below $100/MWh, meaning adding batteries to systems is increasingly making good economic sense," said Yates.

The DeGrussa project is the largest integrated off-grid solar and battery storage project in Australia. The project is owned by leading French renewable energy firm Neoen, with juwi Renewable Energy responsible for the project development, EPC and O&M.

Perth-based surveying and infrastructure construction company OTOC Limited constructed the plant.

The project is expected to reduce the mine's annual diesel consumption by about 5 million litres and cut carbon emissions by more than 12,000 tonnes of CO_2 annually — a reduction of more than 15% based on reported emissions for the 2015 financial year.

Clean Energy Finance Corporation
www.cleanenergyfinancecorp.com.au

Multichannel circuit breakers

Phoenix Contact has released highly compact, all-in-one, multichannel CBM electronic device circuit breakers, designed to help save on panel space.

With a choice of either a 4- or 8-channel CBM electronic device circuit breaker, users no longer need to stack single 18 mm wide circuit breakers together in a control cabinet. The multichannel circuit breakers combine up to eight channels within the one unit to reduce the need for space. The 41 mm-wide breakers are extra slim for ease of use and the compact design ensures technicians can place the device into smaller cabinets. The unit has a smaller footprint, so there is greater space within the cabinet for other components.

Purpose-built, the circuit breakers protect susceptible electronic equipment against voltage dips, overloads and short circuit currents, and help deliver maximum system availability.

The devices feature a remote reset to clear a tripped channel, which eliminates the need to physically open a cabinet to reset a circuit. The channel can be cleared from a programmable logic controller or at the operator interface. The breaker comes with sophisticated remote status signalling concepts, which enable easy monitoring from any location.

The devices feature an adjustable current per channel of 0.5 to 10 A, allowing technicians to choose from six ranges and to set the required protection level for individual circuits. This eliminates the need for individual circuit breakers to be placed in the cabinet. An electronic locking mechanism prevents accidental changes to the set nominal currents.

Each unit also comes with an in-built alarm that delivers an early warning when a channel exceeds 80% of the set nominal current. The multistage status indicator that is available for each channel provides constant information on load status. The devices are available in 4- and 8-channel configurations to protect loads at 24 VDC against overload or short circuit currents. They feature push-in technology for fast, tool-free connection and wiring.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

THE WIDENING HORIZON FOR MULTIMODE FIBRE

*Matias Peluffo**

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While singlemode fibre gets the headlines, mulitmode is the real workhorse.

Connected and efficient buildings and data centres increasingly rely on a state-of-the-art physical layer infrastructure to support growing bandwidth needs over copper, fibre and wireless technologies. When it comes to optical fibre transmission, singlemode fibre often gets the headlines with high-speed transmission records over long distances; however, multimode fibre is the workhorse media of local area network (LAN) backbones and storage area networks (SAN) in buildings and data centres.

The reason is because multimode fibre offers the lowest cost means of transporting high data rates for the distances aligned with the needs of these environments. We can expect multimode fibre's dominance in buildings and data centres to continue because of recent developments in multimode technology and international standardisation that will extend the value proposition offered by multimode fibre for today's and tomorrow's networks.

Since its original inclusion in the international cabling standard ISO/IEC 11801, multimode fibre has evolved from supporting multimegabit per second transmission using light emitting diode (LED) light sources to being optimised for multigigabit transmission using 850 nanometre (nm) vertical cavity surface emitting lasers (VCSELs). With the introduction of laser optimised multimode fibre in the late 1990s, a significant update to the ISO/IEC 11801 standard included the addition of cabled optical multimode (OM) fibre categories — OM1, OM2 and OM3.

OM1 and OM2 were defined for legacy LED optimised fibres. OM3 was defined for multimode fibre optimised for laser transmission at 850 nm. A few years later, an OM4 category was added, to recognise multimode fibre with more than double the effective bandwidth at 850 nm, supporting extended distances for gigabit and multigigabit applications.

Another significant update to the multimode fibre categories is currently underway with the development of the third edition of ISO/IEC 11801 (expected for publication next year). Due to the success and prevalence of 850 nm VCSELs in today's networks, the third edition will 'grandfather in' the LED optimised OM1 and OM2 fibre categories. They may only be used for changes and additions to existing installations. As a result, OM3 will be the minimum requirement for new installations.

Today, OM3 and OM4 fibres are increasingly being used in parallel fibre infrastructures using MPO connectors. They support speeds up to 100 gigabit per second (Gbps) using multiple parallel VCSELs with standards in development to support up to 400 Gbps using parallel technology.

The most significant optical fibre development in the third edition of ISO/IEC 11801 is the recent addition of a wideband multimode fibre (WBMMF) category allowing simultaneous transmission of at least four different wavelengths over each fibre, expanding per-fibre capacity with support for short wave division multiplexing (SWDM). The new WBMMF category will be included in the standard's final draft to be circulated shortly. The naming of the new WBMMF category will be selected by national votes. The choices proposed are OM4W, OM5 and OM5W.

Regardless of the name selected, one thing is clear: WBMMF is set to widen the applications horizon for multimode fibre in connected and efficient buildings and data centres worldwide.

**Matias Peluffo is Vice President, Intelligent Buildings, Asia Pacific. He has overall responsibility for CommScope's strategy to deliver breakthrough innovations and customer value in the building segment with a broad range of solutions. He has more than 25 years' experience in the telecommunications industry. He plays a leading role in CommScope's contribution to the international organisations that develop standards for cabling systems and contributes to the strategic direction and establishment of industry governing standards.*

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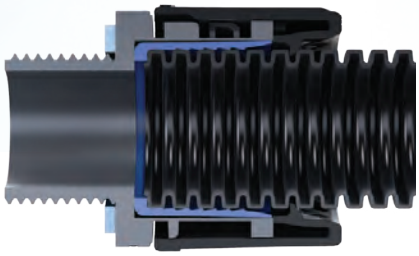

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Minimising downtime

Scottish and Southern Energy Power Distribution (SSEPD) is responsible for maintaining the electricity networks supplying over 3.7 million homes and businesses across central southern England and north of the Central Belt of Scotland. The company owns one electricity transmission network and two electricity distribution networks, comprising 106,000 substations and 130,000 km of overhead lines and underground cables across one third of the UK. Its first priority is to provide a safe and reliable supply of electricity to the communities it serves in Scotland and England.

As in many electricity distribution networks across Europe, SSEPD uses SF_6 gas as an insulator in its substations. Across its two distribution networks and its transmission network, SSE Power Distribution has a total of 11,475 items of switchgear using SF_6 gas. Switchgear is often insulated with SF_6, which works by extinguishing sparks caused by operation of the switchgear. The possibility of leaks generally increases as equipment ages. Fugitive emissions can escape through valve fittings and at joints between flanges and porcelain bushings.

SF_6 is over 23,000 times as potent as carbon dioxide as a greenhouse gas, so SSEPD wants to make sure that SF_6 assets are carefully managed.

"We take our safety and environmental responsibilities very seriously, with regular maintenance and protection of equipment. We have a very large fleet of switchgear and we work constantly to ensure its safe operation," said Tawanda Chitifa, project manager at SSEPD.

"As part of an internal R&D project, we investigated ways to improve our environmental impact. The challenge was to be more efficient in handling possible SF_6 leaks. Thermal imaging cameras from FLIR have helped us reduce that risk, because they allow us to detect possible leaks quickly and with high certainty.

"Conventional leak detection methods include the use of sniffers. While the use of sniffers can quickly detect that a leak is present, it can be difficult to pinpoint the source, according to Chitifa. "The problem is that with a sniffer you cannot get close enough to the equipment you are investigating. That is why it is sometimes difficult to pinpoint exactly where an SF_6 leak is. You are aware there is a leak somewhere, but it's hard to locate. SF_6 gas is also heavier than air. This means that you have an indication of a leak but don't know the source," said Chitifa. As part of the R&D project, SSEPD learned about thermal imaging cameras that could do a better job in detecting possible leaks. After a thorough selection process, SSEPD decided to purchase two GF306 cameras from FLIR. The GF306 has a highly sensitive detector specifically designed to visualise SF_6 gas.


© urbans78/Dollar Photo Club

"The FLIR cameras allowed us to work in a totally different and more efficient way. With the GF306 camera, you can look at the switchgear equipment from a safe distance, allowing you to cover a wider area. At the same time, the thermal imaging camera allows you to exactly pinpoint where the leak is, up to the actual source. Even very small leaks can be detected clearly. This has proved to be invaluable and saved us a lot of time."

Normally, in order to access the switchgear equipment, SSEPD schedules an outage.

"It goes without saying that closing down the equipment results in an economical cost. Every hour of downtime is money lost. With the FLIR GF306, we can significantly reduce downtime, because you can just take the camera out in the field and start your detection routine while the equipment is live," said Chitifa.

An important objective of the SSEPD R&D project was to be less dependent of third-party suppliers. The company usually relies on other companies to help them detect the gas leak, repair the equipment, replace it if necessary and do gas refills. The problem is that lead times can sometimes be very long, resulting in lost time and money.

"With the FLIR thermal imaging, we can find the leak ourselves immediately. This saves us a lot of time. During a familiarisation exercise, we were able to quickly detect a leak and the source. We made a short video and emailed it to our repair company. This way, they could directly start repairs and leave out the detection process, because they already knew exactly where to look," said Chitifa.

The investment quickly provided return. "We attended training courses to better learn the benefits and operation of the thermal imaging camera. During the first course, we took the camera out in the field and identified a leak on a recently installed high-voltage circuit breaker. Talk about return on investment!" said Chitifa.

Users of the GF306 at SSEPD especially value the High Sensitivity Mode (HSM), which is included in all GF-Series optical gas imaging cameras. It is an image subtraction video processing technique that effectively enhances the thermal sensitivity of the camera. The HSM feature subtracts a percentage of individual pixel signals from frames in the video stream from the subsequent frames, thus enhancing the differences between frames, which make leaks stand out more clearly in the resulting images.

"To have the most reliable detection results, we make sure we capture the leak in different image modes: the IR image, the HSM mode and the visual image. This way, we are sure we don't miss out on anything and we can provide a reliable briefing to anyone who needs to repair the leak," Chitifa said.

FLIR Systems Australia Pty Ltd
www.flir.com.au

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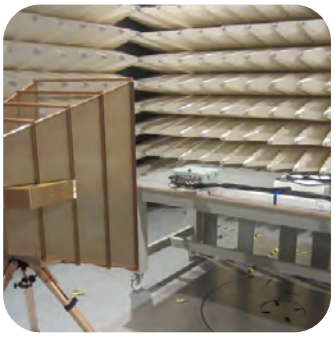

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CASE STUDY

Container convenience

Image courtesy of Schneider Electric

NZ-based multi-utility contractor Northpower has clocked up first — an engineering and technology collaboration with Schneider Electric to design and construct the first prefabricated portable data centre of its kind in the Asia–Pacific region.

The 6 m data centre, officially unveiled at Northpower's Whangarei headquarters on 26 April, was designed to significantly increase availability and redundancy of internal IT systems.

Innovative solutions such as this are proving to be game changers for industries throughout the region looking for cost-effective solutions for secure portable data centres. Compared to traditional data centre designs, the new concept was hundreds of thousands of dollars cheaper and, using the template created with Northpower, Schneider Electric has already been commissioned to construct a similar design in Australia.

Northpower Chair Nikki Davies-Colley says the data centre is a superb addition to the Northpower business due to energy efficiency, greater security and lower operational costs.

"The complexity of this design and build created numerous challenges but the success of the project meant that when the container landed at Northpower's Whangarei head office, it was plugged in and instantly operational," said Davies-Colley.

"The facility also has provision for the future requirements of Ultra-Fast Broadband points of presence and could expand into co-location services for resellers (eg, other companies storing their servers in the data centre)."

Schneider Electric NZ Country President Ray Dunn said the prefabricated portable data centre has set a benchmark for the future and generated widespread industry interest for other entities seeking such solutions.

"We are proud to have collaborated with such a forward-thinking New Zealand company. Northpower's challenge was testament to their growth and a changing business environment, which is increasingly dependent on IT convergence and data," said Dunn,

This is the first prefabricated SmartShelter container in the Asia–Pacific region and was in planning for 12 months. The build time required a quick turnaround — it took only eight weeks to deploy.

The compact design allows for medium server density and the container features fire suppression, LED lighting for health and safety, and enhanced security through biometric entry.

The end result represents significant cost savings through a reduced building footprint, as well as reduced impact on the environment. The commonly used IT measure — power usage effectiveness (PUE) — is substantially lower in this installation (at around 1.3) than in typical data centre applications. The centre incorporates energy management and is monitored with StruxureWare software.

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