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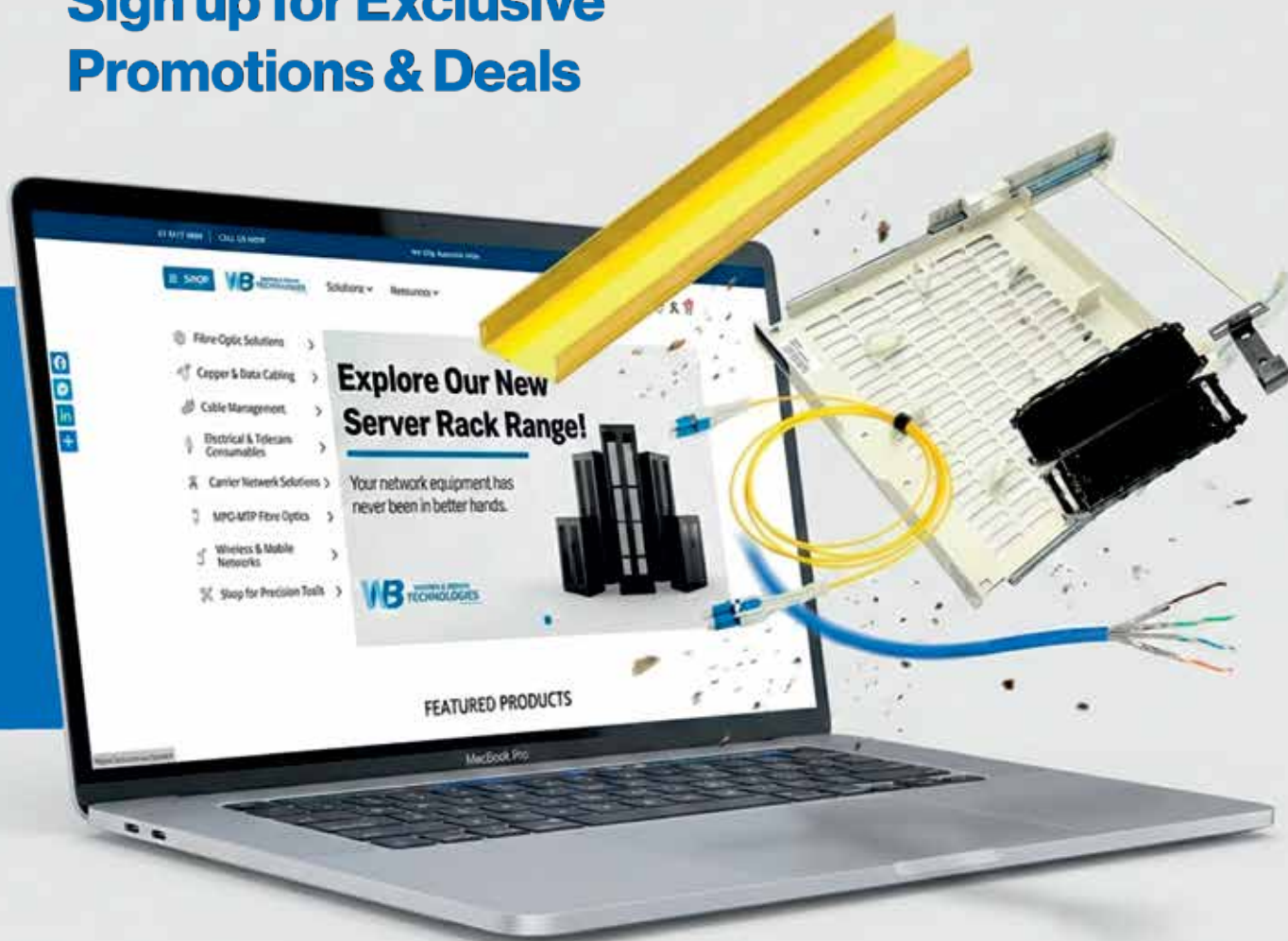
**WHY AUSTRALIA'S FIRE SAFETY
FUTURE NEEDS MORE WOMEN**

**PASSIVE COOLING AND
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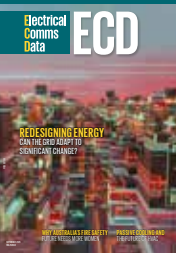
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Is it too much to say that September's *ECD* comes to you at a time of crisis for the Australian grid? Maybe, but it's certainly a time of uncertainty and profound potential change. Somewhat reassuringly, AEMO's most recent electricity outlook report forecasts an improvement in grid reliability, thanks in part to new generation and storage capacity, as well as 40 GW in projects expected to be delivered by the early 2030s. Will this be adequate? What's certain is that the grid is going to have to adapt and even transform to a raft of challenges, as laid out in this issue's feature on page 4. Data centres, of course, are an unavoidable part of this discourse, and they appear throughout this issue of the magazine, both in the feature and two other articles. On page 14, in what could be an interesting case study for Australia, research company Wood Mackenzie examines the situation in the US, where data centre development is creating various technical, regulatory and economic issues in relation to the grid. On page 20, Thiru Prakassh from OVHcloud lays out how Australian data centre infrastructure can be designed with sustainability as a priority — a pertinent discussion given the fast-tracking of these facilities in this country.

Workforce shortages are another hurdle for Australia's energy and electrical infrastructure goals, with an extra 42,500 electricians needed by 2030, according to Powering Skills Organisation. While there's no single solution to this problem, Brooks CEO Cathy Brand draws our attention on page 10 to an untapped pool of talent: women. Focusing on the fire protection industry, Brand makes the case for a larger female electrical workforce, and suggests strategies for attracting them into these careers.

Other engaging stories in this edition include a Lismore switchboard manufacturer's survival after devastating floods (page 26), and an exploration of future HVAC solutions (page 16).



Katerina Sakkas — Editor
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REDESIGNING ENERGY

CAN THE GRID ADAPT TO SIGNIFICANT CHANGE?

Katerina Sakkas

Whether you're an electrical worker, a renewable energy proponent, a data centre operator or someone who works with energy technology, this is an interesting time for Australia's grid, to say the least.

Just as renewables are truly beginning to pull their weight, 225 proposed hyperscale data centres loom on the horizon. Will they overburden the grid, set back Australia's climate goals and siphon off talent from an under-resourced electrical sector that's sorely needed for housing construction? Or will they boost the electrical workforce through training, contribute electricity to the grid and be a catalyst for the creation of more renewable power assets? Time will tell.

To further complicate this picture, various ambitious transmission projects are being held up by community opposition, and climate change continues to produce the kind of extreme weather that strains energy supply.

As uncertainty prevails, here's a rundown of the main challenges faced by Australia's grid.

Data centres

According to the Australian Energy Market Operator's (AEMO) 2026 Electricity Statement of Opportunities report, data centre electricity consumption in the National Electricity Market (NEM) is predicted to increase from about 5 TWh in 2025–26 to 34 TWh by 2035–36, rising from approximately 3% to 13% of electricity supplied through the grid.

In anticipation of a data centre boom, various organisations are trying to ensure that these massive pieces of infrastructure operate in a way that contributes to Australian society without stripping the nation's precious resources. The Australian Energy Market Commission (AEMC) has submitted four suggested reforms to the government, stipulating that data centres provide their own clean energy; prove their demand is backed by new firm capacity, so their connection doesn't tip the supply–demand balance and push up wholesale prices for everyone else; become registered market participants; and ease pressure on the network through flexible connection agreements.

In a move that places it ahead of the curve, the South Australian Government has announced a Royal Commission into Artificial

Intelligence that is expected to commence on 1 October, with a final report to be handed to government no later than 1 July 2027. Included in its terms of reference are “opportunities related to AI-related infrastructure including the interrelationship with energy transformation, water usage and associated impacts (such as electricity grid implications)”.

Dr Mehdi Ghazavi Dozein, from Monash University's Low-Carbon Energy Lab, Department of Electrical and Computer Systems Engineering, believes Australia is well placed to support the growth of AI-driven data centres, but success will depend on establishing the right technical and regulatory frameworks for grid connection and operation.

Via a research partnership with AusNet Services, Dozein and his colleagues have been investigating how data centres behave under both steady-state and transient conditions.

“We use advanced modelling to understand how large loads, including large data centres, interact with the electricity system, how their demand changes over time, and what that means for reliable and stable grid operation,” Dozein said.

“This includes how they respond during power system disturbances and what is needed to ensure reliable grid connection and operation, with the focus on modelling framework development, grid-code compliance analysis, and system level impact studies.”

Dozein emphasised that data centres are fundamentally large electricity loads, not generation assets. “That distinction matters for how we plan, connect and operate them within the electricity system.”

Ambitious transmission infrastructure

As coal-fired power stations retire, the move to integrate renewables into the nation's grid has seen some impressive transmission projects come to fruition. For example, construction and initial energisation are now complete on Transgrid's massive EnergyConnect project, which is expected to be integrated into the NEM by the end of 2026. The 900 km project connects the New South Wales, Victorian and South Australian grids for the first time, providing a means for solar, wind and other renewable energy to be plugged in as coal is phased out. >



Image credit: Transgrid

VNI West, the high-voltage, double-circuit overhead transmission line connecting NSW and Victoria, is not faring so well. Though identified as a priority project in AEMO's 2026 Integrated System Plan, VNI West has been held back by community opposition for several years, with Victorian landholders refusing access to their properties and some local governments formally opposing the project (eg, Buloke, Northern Grampians and Gannawarra Shire Councils in regional Victoria).

Community submissions protesting the NSW section of VNI West have criticised the utility for a lack of consultation with the community and landholders, as well as rushed, one-directional consultation which lacked transparency, among other perceived failures.¹ In Victoria, politicisation of the energy debate is a clear factor in anti-VNI West sentiment, with renewable options characterised in some sections of the media and politics as left-wing and anti-rural.

In contrast, another one of AEMO's priority projects, Project Marinus — the planned interconnector running between Tasmania and Victoria — has cleared its various approvals and is on track to start construction this year. Delivered by Marinus Link Pty Ltd, the project will enable the two states to pair Victoria's wind and solar with Tasmania's flexible hydropower system and geographically diverse wind. Maybe the fact that it largely runs undersea has limited community opposition...

Workforce shortages

All this grid transformation requires a skilled workforce, both now and into the future. We're facing a shortfall of 42,500 electricians by 2030, according to energy training advocacy group Powering Skills Organisation (PSO)², many of whom will be needed to work in the energy field. Electricians account for around seven in every 10 energy trades workers, PSO has found.

In its August 2026 Electrician Workforce Capacity Study, PSO identified clear structural issues in the systems that currently exist to train electrical apprentices. While surveys



WE'RE FACING A SHORTFALL OF 42,500 ELECTRICIANS BY 2030, ACCORDING TO POWERING SKILLS ORGANISATION.

consistently demonstrate there is no shortage of candidates who wish to become electricians³, there is a striking lack of positions available for these would-be apprentices.

Apprenticeship pathways are limited: the majority of energy apprentices (59%) are employed by electrical contractors, followed by Group Training Organisations (GTOs) at 7%. This is a problem if you want to grow the electrical workforce, for a couple of reasons. Firstly, electrical apprentices need to be trained and supervised by licensed electricians. The latter are concentrated in the small to medium electrical contracting sector (56%), with the others dispersed across a wide range of industries. All of this indicates that the future electrical workforce is largely dependent on the relatively small private electrical sector.

But while electrical contractors train 71% of all electrical apprentices, only 1 in 3 currently employs an apprentice. Since apprentices need to be supervised by a licensed electrician who could be engaged in other work, it's not hard to see why apprenticeships might represent a financial loss for electrical contractors.

The PSO report's purpose is to collect data rather than pushing future policy settings. However, it does suggest various measures that could make it more attractive for the contracting sector to train apprentices, including procurement settings, industry partnerships, tax measures, and training and innovation funds.

It's not all up to the contracting sector to solve the workforce shortage problem, though,

and the report emphasises that addressing the challenge will require a coordinated response across the training and employment ecosystem.

Extreme weather

With CSIRO projecting a continued increase in the number of dangerous fire weather days and a longer fire season for much of southern and eastern Australia⁴, climate-proofing the grid is an ongoing challenge. In its State of the Climate 2024 report, the national science body also recorded an intensification of heavy rainfall.

While extreme weather might be intensifying, it's not a new issue, and utilities have been combating it through a range of technologies, including powerline drone inspections for bushfire preparation, remote smart monitoring of line faults, covered conductor for high-voltage powerlines, and strategically placed reclosers. Digital twins, geospatial mapping and AI have also helped to model natural disaster scenarios for energy companies, informing their response during real-world emergencies.

No easy solution

The challenges are formidable, but they also represent opportunities for significant growth and innovation within the electrical sector. Whether these opportunities are realised will hinge on research, government policy, funding and — in the case of major infrastructure — getting communities onside.

1. Victoria to New South Wales Interconnector West (VNI West) NSW | Submissions Report | 184.
2. Based on Powering Skills Organisation's analysis of data from Jobs and Skills Australia.
3. Electrician is the most preferred trade pathway among Australian high school students and the highest-ranked vocational career overall, according to PSO's 2026 Electrician Workforce Capacity Study. It ranks in the top 10 for all students across various states, including New South Wales, Queensland, Western Australia and South Australia. For males in high school across the country, it ranks as the third most common career choice.
4. CSIRO State of the Climate 2024 report.

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EXPANDED SOLAR SCHEME A BOON FOR ELECTRICIANS: ETU

Energy Minister Chis Bowen's recent announcement that the Small-scale Renewable Energy Scheme is expanding to cover installations of up to 1 MW (from 100 kW) has been welcomed by the Electrical Trades Union (ETU).

The change will reduce the cost of solar installations by about 20% for eligible participants, lowering upfront costs for organisations with medium-sized buildings that want to generate their own renewable energy.

Under the expanded scheme, support will be available for solar systems large enough to power commercial operations like restaurants, manufacturers or light industrial energy users. This opens up energy independence to a significant economic group: the 'missing middle' between households and heavy industry.

A solar set-up at the larger end of the revised cap could produce cost savings to an energy user of more than \$150,000 per year.

"Licensed electricians who are wiring Australia into the future

economy welcome this announcement," said ETU National Secretary Michael Wright.

"You know who doesn't care whether the strait of Hormuz is open? The sun. It shows up on time every morning no matter what is going on in the world," he said.

"The shortest, most secure supply chain that a fuel source can have is from the roof of a building to the light switch inside.

"Households around Australia have already recognised this in world-leading numbers, and taken advantage of policy settings that make it easier to generate secure, reliable power on their own roof," Wright said.

Now, he added, farms, businesses, schools and community organisations would be able to join them.

Wright said this would mean more work for union electricians across the country, placing licensed electricians at the heart of Australia's economy.



Image courtesy of Marinus Link Pty Ltd.

PROJECT MARINUS CONFIRMED AS KEY PROJECT IN INTEGRATED SYSTEM PLAN

The Tasmanian and Victorian energy interconnector Project Marinus has been listed as a critical part of AEMO's latest Integrated System Plan (ISP).

The project consists of Marinus Link and the North West Transmission Developments (NWTG), with the latter managed by TasNetworks.

When Project Marinus is completed, Tasmania and Victoria will be able to share much more electricity, pairing Victoria's wind and solar with Tasmania's flexible hydropower system and geographically diverse wind.

The organisation in charge of the project, Marinus Link Pty Ltd (MLPL), welcomed the ISP, saying it reinforced Project Marinus's role in underpinning system resilience, efficiency and affordability across multiple future scenarios.

The core of the ISP is the optimal development path (ODP), which sets out the least-cost way to support secure and reliable electricity supply as coal power stations retire and electricity consumption near doubles, while meeting government policy through to 2050.

Project Marinus stages 1 and 2 are listed as key projects on the optimal development path. Compared to a pathway without the investment in Project Marinus, the ODP is forecast to result in significant savings from avoided capital, operating and fuel costs.

MLPL CEO Stephanie McGregor commended AEMO's extensive consultation in shaping a set of robust inputs, assumptions and scenarios.

"Marinus Link stands as a critical asset in the National Electricity Market, delivering value for all consumers in a world of increasing energy demand and need for diversified, reliable and secure energy supply," she said.

Project Marinus Stage 1 is among three projects that have advanced since the 2024 ISP and is now listed as a committed and anticipated transmission project. The report also lists Stage 2 as 'actionable'.

"Delivery is ramping up with preparatory works well underway across the project and major construction kicking off in the coming months," McGregor said.

"Marinus Link is essential infrastructure for grid reliability, resilience and the efficient use of energy resources, with the benefits of this ultimately flowing through to consumers."

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HIDDEN POTENTIAL

WHY AUSTRALIA'S FIRE SAFETY FUTURE NEEDS MORE WOMEN

Cathy Brand, Chief Executive Officer, Brooks Australia

As Australia's population grows, our cities expand and fire safety standards continue to evolve, the responsibility placed on our industry continues to increase. Every residential development, commercial office, hospital, school, warehouse and industrial facility relies on compliant fire detection systems to help protect lives and property. Yet behind every smoke alarm, detector and fire panel is another critical component of life safety: people.

The professionals designing, manufacturing, specifying, supplying, installing, commissioning and maintaining fire protection systems are the foundation of our industry's success. Without a skilled workforce, even the most advanced technology cannot achieve its purpose. One of the biggest challenges facing our industry isn't technological: it's human.

I've seen first-hand what a rewarding and meaningful career the fire protection industry can offer, yet it's still an industry many women simply don't consider because they don't know it exists or they have outdated perceptions about the types of roles available.

I've worked in the fire protection industry for almost a decade, with a focus on helping deliver fire safety solutions that protect people, property and businesses. Throughout my career, I've had the opportunity to collaborate with contractors, engineers, wholesalers and industry partners to improve fire safety outcomes. One of the things I value most about this industry is knowing that the work we do has a real impact. Every product, every installation and every project ultimately contributes to keeping Australians safe.

For me, it's about leaving the industry stronger than we found it and ensuring the next generation has every opportunity to contribute. While women are making inroads, they remain significantly underrepresented across

many fire protection and firefighting roles.

Attracting and supporting more women into the industry starts with changing the conversation. We need to do a better job of raising awareness about the breadth of careers available in fire protection, particularly among students, graduates and people considering a career change.

We also need visible role models, mentoring programs and clearer career pathways so women can see not only how to enter the industry, but how to progress into leadership roles.

Employers have an important role to play too. Inclusive recruitment practices, supportive workplace cultures, flexible career pathways where possible and ongoing professional development all contribute to attracting and retaining talented people.

Ultimately, this isn't just about increasing female participation. It's about ensuring the fire protection industry has the people, skills and perspectives needed to continue protecting Australian homes, workplaces and communities for generations to come.

An untapped workforce

Despite the breadth of opportunities available across fire protection, women remain significantly underrepresented throughout the industry — this isn't simply a diversity statistic, it's a workforce challenge.

Like many technical industries, we're competing for skilled engineers, electricians, technicians, project managers, product specialists and compliance professionals at a time when demand for their expertise continues to grow. If we continue recruiting from the same traditional talent pool, we'll continue facing the same workforce constraints.

According to the latest Productivity Commission data, women make up fewer than one in 10 firefighters nationally, accounting for



around 9% of Australia's firefighting workforce. Among volunteer firefighters, women represent around 23%.¹ [Editor's note: Based on data from Powering Skills Organisation, women make up approximately 17% of the energy sector workforce, but only 4% of hands-on trade roles, such as electricians.]

Those figures highlight that there is still significant opportunity to broaden participation across the industry. Whether it's engineering, manufacturing, product development, compliance, project management, technical support or leadership, increasing female representation will help build a stronger and more resilient workforce.

Fire protection is more than people think

One of the biggest barriers for women getting into the roles within the fire protection industry is also awareness. Many people still associate fire protection solely with frontline firefighting when, in reality, it's a diverse industry with careers spanning engineering, electronics, manufacturing, software, compli-



ONE OF THE BIGGEST CHALLENGES
FACING OUR INDUSTRY ISN'T
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ance, technical support, project management, sales and leadership.

There's also a legacy perception that it's a male-dominated industry, which can discourage women from considering it as a career option. If you don't see people like yourself represented, it's harder to imagine yourself succeeding there.

Every smoke alarm installed in an Australian home represents the work of countless professionals long before it reaches the ceiling. For many women considering STEM, engineering or technical careers, these opportunities simply aren't visible. That's something our industry has the power, and responsibility, to change.

Broader perspectives, better businesses

As manufacturers, we understand that innovation comes from diverse thinking. Different experiences lead to different questions, different ideas and, ultimately, better solutions.

Whether we're developing new smoke alarm technologies, improving installation

processes, simplifying compliance or designing products that are easier for contractors to install and maintain, diverse teams help us better understand the needs of the people using our products every day. That benefits manufacturers, contractors and, most importantly, the communities we all serve.

The good news is that more organisations are actively showcasing female role models, investing in mentoring and creating workplaces where everyone has the opportunity to thrive. However, encouraging more women into fire protection requires more than recruitment campaigns.

It starts with changing the way we talk about our industry. We need to engage schools, universities and apprenticeship providers earlier. We need to showcase successful women already working across manufacturing, engineering, technical services and leadership.

We need mentoring, flexible career pathways and workplaces where people can see long-term futures — and we need every business, including manufacturers, distributors, contractors, consultants and industry

associations, to recognise that attracting diverse talent is a shared responsibility.

A stronger industry protects more Australians

The fire protection industry has always adapted. Technology, regulations and buildings have all evolved. Now our workforce must evolve too.

The conversation about bringing more women into fire protection isn't about meeting quotas. It's about ensuring our industry has the people, skills and perspectives needed to continue protecting Australians in an increasingly complex built environment.

Every compliant installation, every correctly specified system and every functioning smoke alarm starts with skilled professionals. The future of fire protection depends not only on the products we manufacture, but on the people who stand behind them. If we're serious about building a stronger, more resilient industry, we can't afford to overlook a large segment of the available talent.

1. Productivity Commission's Report on Government Services 2026



UNDERGROUND INFRASTRUCTURE AT RISK

Before You Dig Australia (BYDA), an Australian Government body that provides excavation safety advice, has urged the Australian Energy Regulator (AER) to update its Network Resilience Guidelines to recognise the risk posed by costly excavation damage to utility infrastructure.

In its submission to the AER's consultation on the draft guidelines, BYDA emphasised that the protection of underground utility assets from third party excavation damage was a critical aspect of network resilience.

"The common goal here is reducing the risk and impact on consumers of interruptions to essential services," BYDA CEO Mell Greenall said.

"The regulator identifies the option of 'undergrounding' — or burying — electricity infrastructure as a resilience measure that improves reliability and safety."

However, Greenall said that every kilometre of network infrastructure placed underground to withstand storms and bushfires becomes exposed to a different, persistent and costly threat: damage from excavation and other ground-disturbing works.

"A network insulated from weather but struck by an excavator has not delivered the consumer or community outcome any resilience expenditure was approved to secure," she said.

According to BYDA's overview of available data, electricity outages make up at least 12% of the more than 15,000 reported underground utility strikes that cost the economy almost \$5 billion each year.

The organisation said these statistics greatly increased when telecommunication assets — as an interdependent infrastructure class — are included, with the true collective utility strike numbers likely three times higher.

BYDA's recommendations to the AER include addressing the definition of network resilience; the evidence base for investment; data standards and reporting; community resilience; and critical infrastructure interdependency.

GOVT SEEKS ADVICE ON DATA CENTRE ENERGY POLICY

How can we ensure data centres operating in Australia's electricity grid are not disadvantaging other electricity consumers?

This is the question posed by Australian Energy Ministers to the Australian Energy Market Commission (AEMC), which in turn has produced a package of suggested reforms.

"Data centre growth does not have to come at a cost to other consumers, but that depends on getting the settings right from the start. Our starting point is simple: this growth must not leave other consumers worse off," said AEMC Chair Anna Collyer.

Considered by the Energy and Climate Change Ministerial Council on 28 July 2026, the AEMC's four recommended changes are as follows:

- **Bring clean energy:** data centres would surrender Renewable Electricity Guarantee of Origin (REGO) certificates from new, additional generators to offset the power they use.
- **Prove they're covered:** data centres would need to show their demand is backed by new firm capacity, so their connection doesn't tip the supply-demand balance and push up wholesale prices for everyone else.
- **Register and play by market rules:** data centres would become registered market participants.
- **Be flexible:** connection agreements would encourage data centres to shift demand and co-locate with generation, easing pressure on the network.

So that smaller facilities do not have to face the same requirements as the largest connections, the AEMC has advised these reforms could be staged and applied differently depending on a data centre's size and load impact.

To manage the gap between a data centre's connection and new renewable generation coming online, the advice also identified options for data centres to temporarily draw on existing renewables and make up any shortfall by surrendering additional certificates in later years.

Various other data centre reforms are currently before the AEMC. These include a rule change request submitted by the Australian Energy Market Operator (AEMO) to give it and networks better real-time visibility of large loads. Minister for Climate Change and Energy Chris Bowen has also lodged two related rule change requests to close gaps in how data centres pay for the network upgrades their connections trigger.

Additionally, the AEMC is progressing a rule change to update technical access standards for large inverter-based loads like data centres. A draft determination was published in March, and a final determination is due in late October.

The AEMC said that all these reforms aim to ensure that the businesses building large loads bear the costs and risks they create, not the households and small businesses connected to the same grid. It advised that further design work is needed, with federal, state and territory governments to determine how the package is implemented through legislation, new electricity rules, or both.



Upgrading electrics at the Smithsonian



The Central Rotunda in the Smithsonian Arts and Industries Building.

When the Smithsonian Institution was preparing to celebrate the United States' 250th anniversary this year, an overhaul of electrical infrastructure was an integral part of the plan.

Founded by the United States Government in 1846, the renowned US museum and research institution has holdings over a host of museums, libraries and educational institutions. It engaged ABB to upgrade critical power infrastructure at its second-oldest building: the Arts and Industries Building in Washington, DC.

Opening in 1881, this historic museum has over the years showcased transformative inventions such as Edison's lightbulb, the first telephone and rockets from the Apollo missions. As part of a larger 'Historic Core' renovation project, ABB stepped in to carry out the intricate modernisation of the building's electrical systems.

Ensuring the reliability of crucial electrical infrastructure was essential. Modernisation was a priority, not only to enable the building's reopening for 250th celebrations, but also to strengthen its ability to operate safely, reliably and sustainably.

ABB retrofitted the site's switchgear with custom-engineered circuit breakers manufactured at its US Electrification Service factory in Florence, South Carolina. These breakers were designed with integral fusing to meet the site's specific fault current protection needs, and to support increased operational demand, especially as visitor numbers surged during the celebrations.

As well as powering lighting and exhibits, the building's electrical infrastructure supports the south side of the National Mall and neighbouring Smithsonian facilities, contributing to the operations of the wider campus.

ABB's Electrification Service team began with detailed maintenance across existing equipment, including three switchgear line-ups and six network protectors. Every component was assessed, tested and prepared to ensure a strong foundation ahead of the upgrade.

The project then progressed to modernisation, integrating circuit breakers with enhanced system protection designed to respond more quickly to faults. Additionally, new safety features and labelling were updated to help reduce risk for personnel working on or near energised equipment, strengthening overall operational safety.

The upgrade also allows the Smithsonian to manage its infrastructure using integrated monitoring and data capabilities that enable continuous visibility into system performance, allowing potential issues to be identified and addressed proactively.

"It's been a complex project involving some agile thinking and great collaboration between our team and that of the Smithsonian," said Pedro Robredo, Senior Vice President of Electrification Service – Americas Region, ABB.

"We were delighted to have a role in strengthening the critical infrastructure of one of the country's most prestigious institutions, and at such a significant time. It's been an honour to support the Smithsonian's priorities of safe and reliable operations both now and into the future."

The building has now reopened for a four-month period as a central gathering point for the 250th anniversary celebrations, welcoming visitors to the nation's capital.

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IS DATA CENTRE DEVELOPMENT OUTPACING THE GRID?

A report from Wood Mackenzie has identified a concerning disparity between data centre collocation plans and the necessity for a reliable grid.

The UK-based research group's analysis is focused on US data centre development, but its findings have implications for countries like Australia that are facing a potential boom in data centre construction.

In the US, the race to power artificial intelligence is pushing data centre development to outpace grid development, creating significant risk for projects, markets and consumers, Wood Mackenzie said. Its report, 'Breaking the speed limit: Can US data centre development outpace grid development?', warns that such projects will face far greater technical, regulatory and economic hurdles than the industry understands.

"The power sector is fixated on data centre flexibility, but that is not the end-game for grid operators or data centre operators," said Ben Hertz-Shargel, Global Head of Grid Transformation and Large Loads, Wood Mackenzie.

"Firm grid service is the goal, backed by new transmission superhighways. But there is a lack of awareness throughout the power

sector about the technical and regulatory risk confronting collocation projects, and the business risk of conditional interconnections."

For deregulated markets, the challenge is existential. Wood Mackenzie brings up the example of Mid-Atlantic grid operator PJM, which has 78 gigawatts of committed data centre load against only 36 gigawatts of accredited generation capacity in its pipeline. In Texas, current market prices of US\$30–\$40 per megawatt-hour fall far below the US\$78–\$100 needed to attract new gas generation. Wood Mackenzie's 'Accelerated case for data centre load growth' found that 16.4 GW of gas capacity additions will be required per year through to 2035 to meet projected demand, despite there having been only 4 GW per year from 2023 to 2025.

"Load growth and affordability are in direct opposition in the deregulated markets," said Chris Seiple, Vice Chairman, Energy Transition and Power and Renewables, Wood Mackenzie. "If prices rise to the level necessary to incentivise new generation, it will raise prices for all customers, prompting a political outcry."

To manage this issue, PJM is bifurcating its generation market — creating one elevated

price tier for new resources contracted by large loads, and a lower tier for existing resources. The unintended consequence, according to Wood Mackenzie, is that existing gas and coal plants receiving lower capacity prices may retire, threatening reliability even as PJM struggles to bring new supply online. Texas, meanwhile, has no comparable plan to incentivise new grid-connected generation, and is trusting that competitive power markets will deliver the new supply. That typically happens by prices rising to levels that attract new investment.

Further regulatory intervention in deregulated markets is likely as affordability pressures mount, with potential knock-on consequences for existing asset valuations. The report warns that developers and investors should be prepared for market rule changes driven not by grid planning, but by political pressure.

Collocation: a possible fix?

Collocation, or a bring-your-own-generation (BYOG) approach, has been widely touted as a solution to grid constraints. With more than 90 GW of collocated generation now in US interconnection pipelines, it is clear the industry is relying on this model. However, the



Data centre facility in Vernon, California, USA.

turbines. While lithium-ion batteries can be used as a shock-absorber to prevent this, they risk running through their useful lifespan rapidly; also, battery response time must be extremely short, relying on technology that has not been widely commercialised.

Additionally, the irregular manner in which AI cooling and GPU loads consume power introduces power harmonics, which if unfiltered cause equipment to overheat and degrade. These loads can also cause sub-synchronous oscillations, posing fundamental stability risk to local generators and to distant ones on the transmission system.

Minimising downtime vs protecting the grid

The need to minimise downtime exposes data centre companies to significant regulatory risk, Wood Mackenzie said. US grid operators are fast-tracking rules for conditional interconnections to meet data centre companies' demand for speed-to-power, but their ultimate priority is grid reliability — and some recent decisions risk severely undercutting data centre business models.

"PJM's and [transmission operator Southwest Power Pool] SPP's rules are understood to give the regional grid priority rights over colocated generation," Hertz-Shargel said. "During shortages, data centres would be forced to reduce demand to their firm service level, even as their onsite generation was instructed to supply the grid. For some companies, this model is unworkable."

Meanwhile, the Electric Reliability Council of Texas (ERCOT) has been working with stakeholders to update its voltage and frequency

ride-through requirements — rules designed to prevent data centres from reverting to back-up power prematurely during minor grid disturbances. The risk is not hypothetical: in 2024, 60 data centres in Virginia dropped off the grid simultaneously following a minor disturbance, nearly causing a grid collapse.

However, data centres in late-stage development are unlikely to be able to comply with these proposed changes, which would potentially require a site redesign and the purchase of new uninterruptible power supplies and other electrical equipment.

With rules still being written and late-stage changes already threatening project viability, regulatory risk remains one of the most significant — and underappreciated — challenges facing the industry.

Wood Mackenzie also highlights the fundamental question of cost allocation. Grid operators are planning close to \$100 billion in transmission investments, in part to support data centre load growth. Without modification of traditional cost allocation rules, a significant portion of these regional investments could be spread across all existing ratepayers, rather than being assigned specifically to the data centres driving their urgency.

"Grid operators are positioning flexible interconnections as a stopgap, not a long-term solution," Seiple said. "The expectation — and often the requirement — is that transmission will eventually provide complete, firm service to large loads. That could cause costs to rise for existing customers if cost allocation methodologies aren't changed and if the data centre demand doesn't materialise as forecast."



THE POWER SECTOR IS FIXATED ON DATA CENTRE FLEXIBILITY, BUT THAT IS NOT THE END-GAME FOR GRID OPERATORS OR DATA CENTRE OPERATORS. – BEN HERTZ-SHARGEL

report finds that collocation is only achievable for the most sophisticated and well-capitalised hyperscalers, and that for many developers these projects will not materialise, making the model unscalable.

"Even for developers that see collocation as a viable bridging solution to grid power, the costs and technical challenges are formidable," Hertz-Shargel said. "Technology providers are only beginning to come to terms with this challenge, the mitigation of which is site-specific, making solutions hard to scale."

Collocation comes with technical challenges, such as the near-instantaneous changes in AI power demand potentially damaging reciprocating engines and gas



PASSIVE COOLING AND THE FUTURE OF HVAC

WHY AIRCON IS NOT THE (ONLY) ANSWER

In a rapidly heating world, researchers have looked into the future of cooling technologies and found that air conditioning must take a back seat.

While air conditioning undoubtedly saves lives, its growing use is straining the electricity grid, increasing greenhouse gas emissions and making cities hotter in the process.

UNSW Sydney Professor Mat Santamouris AM has co-authored a review of passive cooling technologies that indicates keeping buildings cool without relying solely on air conditioning will be critical for adapting to climate change.

Published in *Nature Reviews Clean Technology*, the review examines in detail the latest advances in passive cooling technologies, listing both benefits and drawbacks. It explores emerging materials for radiative, evaporative and combined radiative/evaporative cooling, as well as solar control systems and intelligent ventilation technologies that can help buildings shed heat without consuming electricity.

Santamouris, an expert in innovative heat mitigation technologies and strategies for cities, said passive cooling should no longer be viewed as a niche architectural feature, but as essential infrastructure for a warming world.

"Air conditioning saves lives and will remain essential during extreme heat," he said.

"But we cannot air-condition our way out

of climate change. If every building depends entirely on mechanical cooling, we create enormous pressure on electricity systems while adding even more heat to our cities."

A voracious demand for cooling

The review charts a rapid global growth in cooling demand, with electricity consumption for cooling accounting for almost 10% of total electricity use. Ten new air conditioners are sold every second and by 2050, the number of residential air-conditioning units is projected to increase to almost 5.6 billion worldwide.

At the same time, billions of people living in hot climates still lack access to affordable cooling.

Stark findings

The review gives examples of grids being overloaded during heatwaves thanks to continuous AC use — causing blackouts, transformer failures and unstable supply. Such events are becoming more common: in the US, grid failures increased by 151% between 2015–2016 and 2020–2021, while heat-related outages rose by 60% in 2024 compared to the prior decade.

In Asia, extreme heat in 2024–2025 triggered major outages in Laos, the Philippines, Bangladesh and Pakistan, leading to fatalities

and health system disruptions. Meanwhile, in Europe, 2025 heatwaves reportedly drove a 14% surge in electricity use in France, Germany, Italy and Spain, doubling daily power prices and stressing utilities.

Avoiding reliance on AC

The researchers have presented passive cooling technologies as a way to reduce energy demand while making buildings safer and more comfortable, particularly for vulnerable communities.

"The best cooling strategy is to stop unwanted heat entering buildings in the first place," Santamouris said. "Shading, reflective materials, smarter ventilation and new cooling materials can dramatically reduce indoor temperatures before an air conditioner even needs to switch on."

Rather than replacing air conditioning, Santamouris and co-author Dr Konstantina Vasilakopoulou from RMIT argue passive cooling should become the first layer of defence, with mechanical systems providing additional cooling only when required.

According to the review, integrating passive cooling strategies with efficient building design could reduce cooling demand by as much as 80% in hot climates while lowering peak electricity demand and improving resilience during power outages.

The review examined passive cooling technologies that are already in use, including reflective cooling materials that release heat directly into the atmosphere and hybrid



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AIR CONDITIONING SAVES LIVES AND WILL REMAIN ESSENTIAL DURING EXTREME HEAT, BUT WE CANNOT AIR-CONDITION OUR WAY OUT OF CLIMATE CHANGE. – PROFESSOR MAT SANTAMOURIS

An example tested in Australia is ‘cool roofs’ — roof systems designed to reflect a large fraction of the solar radiation that hits them, efficiently releasing absorbed heat back to the atmosphere. According to modelling cited in the review, use of cool roofs in air-conditioned buildings would provide estimated energy savings of 10–60% in Darwin. And in non-air-conditioned housing, cool roofs can lower peak indoor temperatures by up to 10°C, again based on a scenario considering buildings in Australia.

A whole-system approach

Santamouris said the greatest benefits will come from combining passive cooling with efficient air conditioning, rather than treating them as competing approaches.

“There is no single solution to keeping cities cool. We need a whole-system approach that starts with climate-responsive building design, shading and better materials, then uses the most efficient cooling technologies only when they are really needed.”

The review calls for stronger building standards and planning policies that encourage climate-responsive design, alongside investment in technologies that reduce heat entering buildings and lessen demand on electricity infrastructure as cities continue to warm.

‘Passive cooling for the built environment’ can be read at doi.org/10.1038/s44359-026-00177-y.

cooling systems that combine multiple passive approaches.

It also evaluated emerging technologies such as super-cool materials, combined radiative/evaporative coatings, sophisticated external shading systems and personalised ventilation.

Cool benefits

As well as reducing energy use, the researchers said passive cooling can make cities

healthier and more resilient as extreme heat events become more frequent.

Keeping buildings and neighbourhoods cooler can reduce the risk of heat-related illness, ease pressure on electricity networks during heatwaves and improve comfort for people who cannot afford to run air conditioners. Passive cooling measures can also help buildings remain safer during power outages, when mechanical cooling systems are unavailable.

Hazardous-area cooling systems for electrical enclosures

EXAIR's Dual Hazardous Location Cabinet Cooler Systems are designed to provide a maintenance-free solution for protecting large electrical enclosures in hazardous environments. Designed for classified areas, including Class I Div 1, Groups A, B, C and D; Class II Div 1, Groups E, F and G; and Class III, these high-capacity cooling systems help prevent overheating of sensitive electronics while eliminating the need for costly air conditioners or vortex fans. With cooling capacities up to 5600 Btu/h, the coolers are suitable for oversized control panels, motor control centres and other electrical enclosures exposed to explosive gas or combustible dust atmospheres.

The systems use two engineered Cabinet Coolers working together to evenly distribute cold air throughout large enclosures, maintaining safe operating temperatures for critical electrical components. The systems are UL-tested for hazardous locations and preserve the enclosure's integrity by mounting through standard electrical knockouts. Each system includes an automatic drain filter separator to prevent moisture from entering the enclosure, while optional electronic temperature controls are also available. With no moving parts to wear out and no refrigerants to maintain, the systems are designed to provide long-lasting protection in the harshest industrial environments.

Dual Hazardous Location Cabinet Cooler Systems are part of EXAIR's complete family of cabinet cooling systems, offering solutions for NEMA 12, 4, 4X and ATEX-rated enclosures ranging from 1000 to 5600 Btu/h.

Compressed Air Australia Pty Ltd

www.caasafety.com.au



Cable glands

Reliable cable termination is an important part of any electrical installation, particularly in industrial environments where cables can be exposed to vibration, mechanical stress, dust, moisture and electromagnetic interference.

The LAPP SKINTOP range of cable glands provides secure cable entry, strain relief and sealing across a wide variety of industrial and electrical applications. Available in polyamide, nickel-plated brass and stainless-steel versions, the range includes solutions for standard installations through to demanding industrial environments.

For applications requiring electromagnetic compatibility, the SKINTOP MS-M BRUSH cable gland is designed to provide effective 360° contact with the cable screen. Its integrated brush design makes contact with the cable braid, helping to provide a low-resistance path to earth and maintain EMC performance at the termination point.

This is particularly important in variable speed drive (VSD) installations, where high-frequency electrical noise generated by the drive can interfere with nearby control, communication and instrumentation systems. Correct termination of the cable screen helps minimise electromagnetic interference and supports reliable system operation.

SKINTOP glands are designed for fast installation and dependable cable retention, with options available to suit different cable diameters, environmental requirements and protection ratings. When combined with correctly specified EMC or VSD cable, SKINTOP cable glands provide a complete approach to cable entry and termination — helping electrical contractors achieve secure, professional and reliable installations.

The SKINTOP range is available in Australia through Treotham Automation, with technical support available to help select the correct gland for the cable and application.

Treotham Automation Pty Ltd

www.treotham.com.au



Cable reel for HFOC Universal Drops

The ReelSm@rt Plastic Drum is a reusable, installer-friendly cable reel designed specifically for fast, single-person deployment of HFOC Universal Drops.

Built to remove friction from field installs, ReelSm@rt features two detachable flanges that allow quick loading of cable coils and simple reassembly onsite. This means less time preparing and more time getting cable in the ground.

On deployment, the reel is designed to deliver smooth, controlled payout of loose coils, reducing snags and making lead-in cabling easier to manage — especially for solo installers working under pressure. At 3.30 kg, it is lightweight enough for one-person handling but tough enough for repeated field use. Because it is manufactured from recyclable materials and removes the need for cardboard packaging, it supports a more sustainable install process.

Measuring 440 mm diameter x 200 mm barrel x 120 mm traverse, the reel is fully compatible with Prysmian HFOC Universal Drops.

Warren & Brown Technologies

wbt.com.au

Emergency lighting range

Legrand's Integrated Satellite emergency lighting range is intended to meet demand in the standard and premium D50 segment, where design flexibility and footprint matter as much as compliance.

Traditional satellite designs often involve separate heads and powerpacks, multiple loose components in ceiling cavities and antenna positioning requirements that can be missed onsite. These factors can increase installation time, complexity and commissioning risk.

The Integrated Satellite is designed to address these challenges with a fully integrated, single-body design that combines the head and electronics into one compact unit. Available in recessed and surface-mount options, the fitting suits a standard 76 mm ceiling cut-out and requires a single hole drill and plug-in connection, streamlining installation.

Designed for both standalone and Galaxy connected system applications, the range features three conduit entry points for surface mounting, a large terminal block, black and white finishes, and a compact profile that enhances ceiling aesthetics while improving shelf efficiency for wholesalers.

The new range has also been designed to be more sustainable, reducing product weight by more than 30%, incorporating 75% recycled plastic content and achieving a 5% reduction in CO₂ emissions while maintaining a 10-year design life, the company says.

Legrand Australia P/L

www.legrand.com.au

Tough cabling for agricultural equipment

HARDI is a supplier of agricultural spraying equipment, from compact 1.5-litre hand sprayers through to 10,000-litre trailer sprayers and 54-metre booms.

The Danish company has an Australian subsidiary based on a 10-hectare site in Adelaide, where it manufactures the majority of equipment in-house. This facility is HARDI's largest outside its Danish headquarters.

When searching for tough cabling solutions to withstand the Australian climate, HARDI chose local manufacturer LAPP Australia.

"Australian conditions are often harsher than those typical in Europe, so our gear needs to be manufactured to withstand the elements," said HARDI Australia Chief Commercial Officer Zac Harnett. "Having a local manufacturing facility allows us to tailor our equipment to Australian conditions."

Agricultural spraying equipment must operate under particularly demanding conditions, placing significant stress on electrical systems. Using quality cable assemblies can minimise maintenance requirements and costly downtime.

"We chose LAPP's harnessing solutions because their cables and components ticked all our boxes, including chemical resistance, UV resistance, overmolding of connectors, energy chain-rated cables capable of withstanding bending motions on booms, and an overall level of robust quality that we were seeking," Harnett said.

LAPP said its Harnessing Solutions Division is able to provide pre-assembled, standards-compliant cable assemblies that are fully traceable and ready to install, helping reduce assembly time and complexity.

"Agricultural spraying equipment contains a significant number of cables and components," said LAPP Harnessing Solutions' General Manager, Stuart Fleming.

"We deliver these assembled, labelled and ready to go, which means the HARDI team can install them quickly, and deliver faster to their customers."



With a large number of individual components going into each machine, traceability is important for serviceability and maintenance.

"Traceability is huge for us," Harnett said. "We serialise every part for every customer, and we provide training on this for our dealers across Australia. If anything needs replacing or repair, we can find the exact component without delay."

Another requirement for agricultural customers is for equipment to be delivered within tight seasonal timeframes.

"LAPP has helped us meet fast installation times and has worked with us to meet any challenges. They've been helpful and easy to work with, and I particularly appreciate that we can get on the phone and talk with a real person," Harnett said.

"At the end of the day, quality product backed by quality service is what we're looking for in our suppliers, and LAPP has always gone above and beyond. We're already looking at some new projects that we can involve the Harnessing Solutions Division in."

LAPP Australia Pty Ltd

lappastralia.com.au



Images: Supplied



SUSTAINABLE CLOUD IN AUSTRALIA

CUTTING CARBON WITHOUT CUTTING PERFORMANCE

Thiru Prakassh, Regional Data Centre Lead APAC, OVHcloud

Cloud adoption is accelerating. AI workloads are expanding. Data volumes are rising at an unprecedented rate.

Australia's digital economy is entering a new phase of growth, and organisations are generating and processing more data than ever before. But alongside this progress sits a growing challenge: how to scale digital infrastructure without proportionally increasing its environmental impact.

The reality is that data centres carry a significant energy and resource footprint. Cooling systems alone account for a substantial share of energy consumption, with traditional air-cooled environments relying heavily on electricity and large volumes of water to maintain stable operating temperatures. As scrutiny around resource use intensifies, this has become a critical issue for industry and government alike, with organisations increasingly prioritising transparency and factoring in sustainability to their procurement decisions.

Transparency as a baseline

Transparency is becoming foundational to the cloud conversation. As organisations deepen their reliance on cloud infrastructure, they are also being asked to take greater responsibility for the environmental cost of their operations. Historically, however, visibility into energy use, water consumption and full lifecycle emissions has been limited.

Without consistent and verifiable data, it is difficult for businesses to make informed decisions or to meet growing regulatory and stakeholder expectations.

Sustainability as a procurement driver

Sustainability is also rapidly becoming a core procurement requirement for Australian enterprises. Environmental considerations are no longer isolated to corporate responsibility teams. They are now embedded in vendor selection, risk management and long-term strategy.

As regulatory frameworks expand and emissions disclosure becomes more rigorous, organisations are expected to demonstrate not only their own commitments, but also the performance of their technology partners. This extends sustainability accountability across the entire supply chain.



Engineering efficiency into infrastructure

The role of infrastructure design is central to this transition. Innovation in data centre engineering is demonstrating that environmental impact can be reduced without compromising performance.

Cooling technologies are a clear example. Moving beyond conventional air cooling, newer approaches use direct water cooling to manage heat at the component level.

By circulating cooled water through systems that directly connect to high-intensity components such as CPUs and GPUs, these designs remove heat more efficiently and reduce reliance on energy-intensive fans. Complementary systems, including heat exchangers and dry coolers, enable heat to be transferred and dissipated outside of the data centre environment, while adapting in real time to temperature conditions.

The impact of these approaches is measurable. Some modern data centre environments are achieving power usage effectiveness levels around 1.24, compared to a much higher industry average. Water consumption is also more controlled, with systems designed to use minimal volumes under standard conditions and only increase usage during periods of higher temperature. This demonstrates that efficiency gains can be engineered directly into infrastructure.

The role of accountability and measurement

Innovation alone is not sufficient. Visibility and accountability must sit alongside it.

Tools that enable organisations to track and understand the environmental impact of their cloud usage are therefore becoming increasingly important.

With more advanced measurement capabilities, businesses can assess emissions across the full lifecycle of infrastructure including manufacturing and operation, with visibility across Scope 1, 2 and 3 emissions. This enables alignment with recognised standards and supports more accurate reporting.

As organisations evaluate cloud providers, the questions being asked are becoming more rigorous:

- What are the provider's energy efficiency metrics, including power usage and water usage effectiveness?
- How is infrastructure powered, and what visibility exists across emissions?
- Is reporting available across Scopes 1, 2 and 3?
- How is hardware lifecycle managed, including reuse and reconditioning?
- Are sustainability claims supported by transparent, verifiable data?

The path forward

The answers to these questions will define the next stage of Australia's digital growth. As demand for cloud infrastructure continues to rise, the industry must ensure that performance gains are not achieved at the expense of environmental impact.

The path forward is clear. It requires continued innovation in infrastructure design, greater transparency in reporting, and stronger alignment between customer expectations and provider capabilities. Just as importantly, it requires recognising that sustainability is no longer a differentiator but the baseline — embedded in how services are designed, delivered and evaluated.

Sustainable practices are now inseparable from operational resilience and efficiency. Lower energy consumption reduces exposure to cost volatility, while improved resource efficiency supports long-term scalability. In this context, sustainability and performance are not competing priorities but intrinsically linked drivers of future success.

If these elements come together, Australia can scale its digital economy with confidence — delivering the performance required for growth while upholding the environmental responsibility increasingly expected by customers, stakeholders and society at large.



Water cooling technology inside OVHcloud data centre.



PoE powered device evaluating platform

The Sifos Technologies MPD-600 is an advanced Power over Ethernet (PoE) powered device (PD) evaluation platform designed to simplify compliance testing, qualification and troubleshooting of IEEE 802.3at and 802.3bt devices. Built for engineering labs, manufacturing environments and field service applications, the MPD-600 is designed to provide a comprehensive one-box solution that replaces multiple test instruments including PoE injectors, cable spools, DC power supplies, breakout boards and power meters.

The compact 1RU platform can evaluate up to six powered devices simultaneously, supporting all PoE Classes 0 through 8 with more than 480 W total power capacity and over 80 W available per port. Users can select operating voltages of 43, 49 or 55 V to simulate long, medium and short network cable conditions while validating device performance under real-world operating scenarios.

A key differentiator of the MPD-600 is its ability to automatically monitor and detect critical PoE compliance issues, including inrush current violations, overload conditions, transient power events and Maintain Power Signature (MPS) failures. Advanced Group Interop testing evaluates power demotion behaviour, signature validity and power loading compliance across multiple devices concurrently.

The platform also includes automation capabilities through its Windows and Linux software environment, intuitive MPD Interactive software, and programmable API support. With integrated 10/100/1000Base-T connectivity, IP address discovery, detailed diagnostics and real-time power monitoring, the MPD-600 is designed to deliver a faster, more accurate, standards-based approach to PoE device verification and qualification.

TelecomTest Solutions

www.telecomtest.com.au

UL-certified cables and connectors

Australian machine builders targeting North America can avoid costly delays and compliance issues by specifying cables and connectivity components designed for UL requirements from the start.

LAPP Australia's extensive range of UL-approved products provides machine manufacturers with locally available solutions for export-ready electrical systems, helping simplify approvals for machinery destined for the US and Canadian markets.

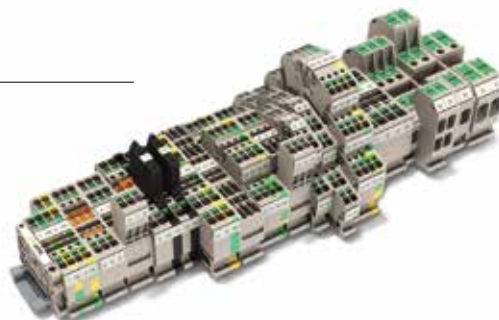
UL compliance applies across many critical machine components, including control wiring, servo and motor cables, industrial Ethernet, cable glands, and connectors. Selecting compliant products during the design phase can help reduce the risk of rejected inspections, onsite rewiring and expensive commissioning delays.

LAPP's portfolio includes the ÖLFLEX range of control and power cables, SKINTOP cable glands, EPIC industrial connectors, ETHERLINE data cables, and specialised drag chain cables — providing a complete connectivity solution for automated machinery and industrial equipment.

With decades of global experience supporting machine builders, LAPP combines international product approvals with local technical expertise to help Australian manufacturers confidently deliver compliant equipment worldwide.

LAPP Australia Pty Ltd

lappaustralia.com.au



Terminal blocks with SNAP IN technology

Klippon Connect terminal blocks with Weidmüller's SNAP IN technology are designed to make the wiring of control cabinets intuitive and simple. The pre-loaded clamping point allows direct and tool-free wiring of solid and flexible conductors even without ferrules.

Stripped fine-stranded conductors just need to be inserted into the connection point, and the connection point snaps shut with a clearly audible click — the conductor is now permanently contacted. To release the connection, users simply need to press the green pusher. All terminal functions can be easily distinguished from each other.

Klippon Connect products feature standardised test points which make automated testing and checking processes possible. This means maintenance and testing tasks can be carried out more safely and quickly.

APS Industrial

www.apsindustrial.com.au

Switchboard surgery at Sydney high-rise



Images courtesy of Fuji SMBE Macquarie.



When a high-rise commercial and retail building in Sydney's CBD needed to upgrade its switchboards, the contractors involved knew they were in for a challenging task.

The project, at 580 George St, above Town Hall Station, entailed replacing three main switchboards, nine main distribution boards and 22 smaller boards, as well as modifying existing tenant distribution boards across the building's 30 levels — all without disrupting tenant activity.

Electrical contractor Fredon partnered with Australian switchboard manufacturer Fuji SMBE Macquarie to carry out the work.

"This job was a bit like taking out the brain, nervous system and heart, while keeping the patient alive as new ones are put in," said Tim Botskor, Senior Project Manager, Client Services Group – NSW, at Fredon Electrical.

"We worked closely with Fuji SMBE Macquarie in the pre-design phase, which was essential in ensuring full Standards compliance, and making sure the job could be completed in stages, in tight spaces, and with minimal disruptions."

The team also worked closely with ER&D, a specialist electrical engineering consultancy that provides end-to-end design and project management services across the commercial, industrial and retail sectors.

Fuji SMBE Macquarie Director Peter Silsby said that the project was able to be delivered in a short timeframe due to all three companies working well together.

"We've worked with both Fredon and ER&D on a number of projects over many years, which means we are all on the same page when it comes to delivering the best outcomes to the end client," he said.

Early in the design phase, prior to the project being awarded, ER&D worked with SMBE to develop concept designs.

"This early collaboration was essential to ensure the switchboards would fit within the physical space and the rigid staging constraints, allowing for a staged replacement without impacting normal building operations," said Ben van Dyk, Project Engineer, ER&D.

"Fuji SMBE Macquarie provided us with different switchboard systems tailored to the unique constraints of each switchroom. This flexibility was critical in overcoming the spatial and staging constraint, leading to successful project delivery."

Limited time and space

Fredon was given just four Ausgrid shutdown windows for the entire project, so careful planning was essential.

"The client advised us of the shutdown windows, so the switchboards were specifically designed to fit these constraints, and be able to be cut over in sections, not all at once. Fuji SMBE Macquarie were heavily involved in this process, with their expertise proving highly valuable," Botskor said.

Not only was space limited, but every floor was different, so modifying the tenants' existing switchboards could not follow a template for each upgrade.

"We had to modify the tenant boards while they were still online, and customise this process for every floor of the building," Botskor said.

"Different measurements, different requirements, different boards. We then had to stage connection points and integrate the control network. Fuji SMBE Macquarie is highly experienced in this area and helped make it all work seamlessly."

Shared history at heart of project success

Fredon's long history of collaboration with Fuji SMBE Macquarie was instrumental to this project's success, Botskor said.

"Fuji SMBE Macquarie has been highly accommodating with design options, and works with us to meet ambitious lead times and project deadlines set out by end customers. They truly go above and beyond, and this is the type of supplier we like to build long-term partnerships with," he said.

"The Fuji SMBE Macquarie team works through problems with us, and often we find they are looking at things from a different perspective and identify potential issues we have not seen, so they can be addressed before they even arise."

3D tech improves visibility

"Fuji SMBE Macquarie also use 3D models where we can see all components from all angles, which is particularly valuable for our team," Botskor said.

"We work in high-risk, highly technical environments, where safety and compliance are essential. The Fuji SMBE Macquarie team are the ultimate professionals in this area, and we plan to continue this long and productive relationship."

Fuji SMBE Macquarie

www.smbmacquarie.com.au

Industrial remote access device

For process engineers managing distributed assets, remote sites and critical control systems, maintaining secure and reliable connectivity is essential. The Tosi Lock 675 industrial remote access device is designed to deliver robust, reliable communications, even in harsh environments.

Built for industrial applications, the Tosi Lock 675 combines high-performance networking with advanced cybersecurity in a compact, rugged enclosure. Integrated LTE Cat-6 connectivity, with dual-SIM support, makes high mobile data speeds and carrier redundancy possible, helping maintain uptime when network conditions change. This makes it suitable for remote process plants, utilities, water and wastewater infrastructure, mining sites and energy assets.

The device supports up to 50 concurrent secure VPN connections, allowing engineers, system integrators and service teams to access PLCs, HMIs, SCADA systems and instrumentation remotely without compromising security. End-to-end encryption and a built-in firewall protect operational technology networks from unauthorised access.

Integrated Wi-Fi, Ethernet and USB interfaces provide flexible connectivity options for both legacy and modern equipment, while GPS/GNSS support enables asset tracking and location-based applications. Automatic network recovery functions help provide continuous connectivity by handling mobile network interruptions without manual intervention.

Designed for industrial environments, the Tosi Lock 675 features a rugged aluminium housing, DIN-rail mounting and a wide operating temperature range, making it suitable for installation in control panels, cabinets and remote enclosures.

LAPP Australia Pty Ltd
lappaustralia.com.au



Electronic temperature switch

The HYDAC ETS 3200 Electronic Temperature Switch is designed for demanding hydraulic and industrial applications where reliable temperature monitoring is critical. Featuring a compact design with an integrated 18 mm temperature probe, the ETS 3200 can be installed directly inline or on hydraulic blocks, with pressure resistance up to 600 bar.

Its 4-digit display and VDMA menu navigation allow fast and simple set-up, while configurable switching points and switch-back functions help improve system control and reliability. The unit is available with one or two switching outputs, with the option of an additional analog output (4–20 mA or 0–10 V) for greater integration flexibility.

With adjustable switching delays, N/O and N/C functions, and a display that rotates in two axes for easier viewing, the ETS 3200 offers a practical solution for improving monitoring, efficiency and protection in hydraulic systems.

HYDAC International
www.hydac.com.au

Automotive-grade optocouplers

Vishay's VOWA617A and VOWA618A automotive-grade optocouplers feature phototransistor output in a widebody package with a comparative tracking index (CTI) of 600. Designed to deliver signal transmission with high galvanic isolation for electric vehicles and solar inverters, the optocouplers provide VIORM of 1500 V_{peak}, VIOWM of 1060 V_{RMS}, and external creepage and clearance distances of ≥ 11 mm.

The optocouplers each consist of an infrared-emitting diode, which is optically coupled to a silicon planar phototransistor detector in a widebody SMD-8 package. While standard solutions typically offer a CTI of 175, the 600 CTI of the VOWA617A and VOWA618A gives them a Material Group 1 rating, the highest insulation group. In addition, their 80 V collector-emitter voltage rating allows more design flexibility.

Compared to consumer-grade solutions that typically feature operating temperatures to +85°C, the optocouplers operate over a wider -40 to +125°C temperature range, with a junction temperature capability up to +145°C. RoHS-compliant, halogen-free and Vishay Green (the company's sustainability rating), the devices feature a wide current transfer ratio (CTR) range from 50% to 600% at low input currents of 5 mA for the VOWA617A and 1 mA for the VOWA618A.

The optocouplers are available in Australia from Mouser Electronics.

Mouser Electronics
au.mouser.com



Supporting stranded EV drivers

From July this year, Victorian automobile association RACV has been helping out stranded EV drivers by trialling a mobile DC fast charger as part of its Emergency Roadside Assistance patrol fleet.

The trial involves a single patrol van fitted with a 20 kW DC onboard charger, providing RACV members with about one kilometre of range per minute of charging. Drivers will be able to gain enough charge to reach their next charging stop or get home safely in as little as 20 minutes, the organisation said.

RACV said its roadside patrols have recorded an average year-on-year increase of more than 50% in EV out-of-charge callouts since 2023, reflecting growing EV uptake across Victoria.

Makarla Cole, RACV's General Manager Automotive Services, said the trial reflects RACV's focus on shaping its services to meet the changing needs of its more than 1.4 million Emergency Roadside Assistance members.

"As EV ownership continues to grow, we're seeing a steady increase in out-of-charge callouts," Cole said.

"This trial is about looking ahead to what roadside assistance needs to deliver as more Victorians make the switch to electric vehicles."

Cole said the trial points to the future of roadside assistance.

"A fast roadside charge can significantly reduce disruption and complements RACV's broader investment in public charging infrastructure across Victoria, including the Chargefox network.

"While traditional mobile charging solutions provide a small top-up, DC charging allows us to deliver a more meaningful boost in a shorter time, helping drivers get moving again sooner."



RACV began the trial with a Melbourne-based van, assessing demand, performance and operational fit before considering a broader rollout.

Later this year, the organisation will also begin trialling an EV-powered roadside patrol vehicle to understand how it performs in real-world conditions, including load capacity, range and suitability across different job types.

"We need to understand how an EV patrol vehicle performs operationally, including whether it can carry the equipment required for roadside assistance," Cole said.

"These trials are about understanding how roadside assistance will evolve as more Victorians move to electric vehicles, and ensuring RACV is ready to support members at every stage of that transition."

RACV

www.racv.com.au

Semiconductor circuit breakers

Siemens has partnered with semiconductor company Infineon Technologies on circuit breaker technology for data centres, production facilities and battery storage systems.

The collaboration involves Infineon supplying its 62 mm CoolSiC MOSFET 1200 V silicon carbide (SiC) power modules for use in Siemens' SENTRON 3QD2 semiconductor circuit breakers. This is intended to increase the circuit breakers' efficiency, power density and reliability.

Also known as solid-state circuit breakers, semiconductor circuit breakers are electronic devices that protect electrical circuits from damage caused by excessive current flow, such as short circuits or overloads. Unlike traditional electromechanical circuit breakers, which rely on mechanical parts to interrupt the flow of current and typically operate on the millisecond scale, the Siemens SENTRON 3QD2 uses semiconductor components and smart protection algorithms to perform this function.

Siemens said this enables ultra-fast interruption in the microsecond range: up to 1000 times faster than conventional systems. This capability is essential for direct current (DC) grids and offers an increase in protection and system availability — important in applications like industrial manufacturing and AI data centres, where even a slight delay can cause costly downtime, data loss or expensive hardware damage in the event of electrical failures.

Siemens Ltd

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OVERCOMING NATURAL DISASTER

HOW AN AUSTRALIAN SWITCHBOARD MANUFACTURER RECOVERED FROM FLOOD DEVASTATION

When Australian switchboard manufacturer Marelex Electrical's factory was hit by the 2022 Lismore floods, Managing Director Brad Harrang faced a mammoth recovery effort.

Marelex services much of rural NSW and central Queensland, specialising in projects for councils, government, pump stations and wastewater treatment plants. Since many of the locations it services are close to either rivers or the beach, the company manufactures aluminium switchboards to avoid any issues with rust.

In February 2022, Lismore NSW experienced its highest flood on record, reaching 14.4 m and causing widespread devastation.

Harrang was at home, a few suburbs over from the factory, when the floods first hit — but when the news broke, it was already too late to do anything.

"By the time the warnings came in, the causeways were already flooded over. Hearing the reports of it being above 14 m, I thought to myself, the factory must be underwater," he said.

Harrang's home was cut off for a week by landslides in both directions, so even if he had wanted to leave, he couldn't.

"We were lucky that one of the residents had an excavator that they brought down to clear the landslides — who knows how long we would have been stranded without that?" he said.

"I'm still luckier than some. Those that lived and worked in Lismore lost both their home and their business. I just lost a lot of the business, but I still had my home."

Once he was able to travel back to the factory to survey the damage, Harrang was confronted by a chaotic scene. The facility was so far underwater, it reached the upper level offices. A shipping container full

of stock had floated away, becoming lodged over the front gate.

"Everything was waterlogged, muddy and damaged. Just about everything had to be thrown out," he said.

Some larger machinery, such as the folder, welders and guillotine, could be salvaged, however. Harrang set about pulling it apart, hosing it out, replacing parts (such as relay controls or transformers), leaving it to dry, then putting it back together again.

"We also had to get the shipping container craned off the front fence, but once we cleared it out, it became an effective space to dry

items, since it could get quite hot inside a shipping container in February."

The recovery effort

Rebuilding was a daunting process.

"Everything was caked in mud," Harrang said. "In the beginning, my wife and I were working 15 hours a day cleaning the factory, but I realised this just wasn't sustainable. We'd burn out if we kept this up."

The couple made the decision to put in typical eight-hour days, rather than working round the clock.

"I had to treat it like it was just another workplace, and not a business I owned and ran, or I would have become too emotionally invested, and it would have been too devastating," Harrang explained.



The shift in attitude made a difference. Within a few weeks, the highways were open again and workers could come back and help, too. Volunteers also helped out, as did the Australian Army a couple of weeks later — Harrang set them to work clearing out the entire upstairs office.

“The community really pulled together,” he said. “The council was focused on the Lismore CBD, so the industrial estate was left largely to manage its own recovery. My staff, friends, family, the volunteers and the army did a phenomenal job, and I don’t know what we would have done without them.”

Disaster leads to a rethink

Once the office had been fully cleared, it was time to assess where the business sat. Prior to the floods, the factory had seven partially built and two complete switchboards on the floor.

“These all had to be stripped out, all switchgear thrown out, and the boards rebuilt. It was hard to accept, but our suppliers helped out enormously, offering us special rates on gear that we had to re-purchase due to the floods,” Harrang said.

“Another major help was the Business Council of NSW who set us up with a flood grant, which meant we could keep paying our staff while we got the business back up and running again.”

Within about six months, Marelex was ready to take on new work again.

“Honestly, I wouldn’t wish it on anyone. I’m the type of person that finds it hard to ask for help, but I really had to this time, or I just wouldn’t have coped,” Harrang said.



“Once we were finally back up and running, I needed a little break, so my wife and I went camping for a couple of days, somewhere high up and with no mud!”

The business revives

The business might have been ready to go, but there was still no power. Due to the extent of the water damage, the local authorities had the overhead powerlines disconnected, and each business had to have a qualified electrician come to certify that their premises were safe to connect to the grid.

“For a little while there, we missed out on a lot of work, while we were using petrol power, and waiting to be reconnected to the grid,” Harrang said.

“But after we connected ourselves back to the grid, we made a lot of main switchboards. With most buildings in the region being damaged in the floods, we had a lot of work coming in, probably two to three years of being absolutely flat out.

“I went from having my worst year on record that year, to immediately having two of my best ever, so that can fix a lot of things.”

A new chapter

Harrang took the opportunity to invest in the business, while also making sure it was better prepared for future floods.

He bought all-new office furniture with metal legs, not chipboard, so that it wouldn’t warp underwater. He also installed shelving to keep stock upstairs, not on the ground floor, and had a new logo designed.

“About a year later, I hired a new engineer, and he came full of enthusiasm and fresh ideas,” Harrang said. “He encouraged me to put a new sign on the business, to look at certifications, and to join NESMA.”

Harrang then attained ISO 9001 certifications for Quality Management Systems, Environment, and Work Health and Safety.

“Being part of NESMA helped me learn a lot. Their conferences are highly educational, and give good updates on Standards. But for me, the most valuable part of all is the one-on-one conversation you have with people in the same industry.”

Looking to the future of the industry, with the grid decentralising, Harrang said switchboards would be more important than ever.

“Battery, solar, wind... it all needs to connect, and that’s where we — and all of NESMA’s members — are well positioned to be essential suppliers.”

“EVERYTHING WAS WATERLOGGED, MUDDY AND DAMAGED. JUST ABOUT EVERYTHING HAD TO BE THROWN OUT. – BRAD HARRANG

Images supplied



Remote telemetry for Tasmanian irrigation



All images courtesy of Ovarro.

Cromarty is an Australian automation and electrical engineering business that has been tackling industrial automation, measurement and control challenges for more than 35 years. Recently, the company worked with Ovarro, a specialist in remote telemetry systems, to develop a monitoring solution for the Don Irrigation Scheme in Tasmania.

For large-scale irrigation networks such as this one, reliable remote monitoring is essential to help operators manage water distribution across geographically dispersed and often challenging locations.

The Don Irrigation Scheme is a major regional infrastructure project for north-west Tasmania, supplying high-reliability irrigation water to the Don, Forth, Barrington and Sheffield districts. It delivers 4750 megalitres of summer water and 4750 megalitres of winter water, supporting irrigators across a 180-day summer season and a 180-day winter delivery period.

Drawing water from the Forth River catchment, the scheme uses three pump stations, balance tanks and 53 km of distribution pipeline to deliver water to irrigators at a peak flow rate of 39.6 ML per day. Operators need to manage flow and pressure across remote outlet installations while maintaining dependable water delivery throughout the irrigation season.

For local agricultural businesses, dependable irrigation can influence planning decisions, crop choices and investment confidence, so the supporting monitoring infrastructure is particularly important.

For Cromarty, the project required a solution that could perform consistently across remote property outlet installations. Many of these sites are located away from mains power and fixed communications infrastructure, meaning the telemetry system needed to combine low power consumption, reliable cellular communications and robust field performance. The project therefore required more than a standard monitoring device; it needed a remote telemetry platform capable of supporting dependable data acquisition across a distributed irrigation network.

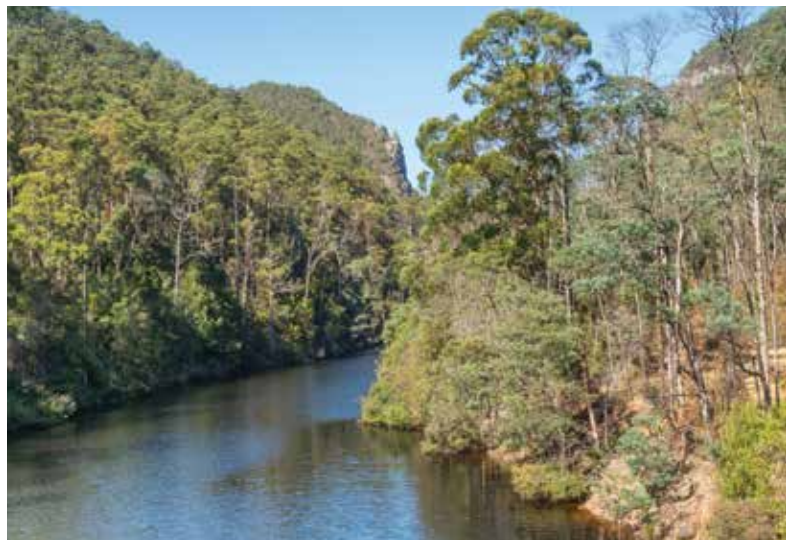
The scheme required a reliable, low-powered and solar-charged telemetry approach capable of communicating over cellular networks.

Previous alternative telemetry technology had been trialed, but was found to be insufficiently robust for the remote signal strengths across the scheme. To address this, Cromarty worked with Ovarro to deploy a telemetry solution based around Ovarro's TBox remote telemetry units (RTUs).

When resilience is critical

The selected technology needed to handle the realities of remote communications, limited power availability and changing field conditions, while continuing to provide data to Tasmanian Irrigation's central SCADA system.

Ovarro's TBox RTUs were selected for the project due to their compact form factor, all-in-one design, temperature rating, communication protocols and proven reliability. They also support physical I/O, DNP3 protocol capability and integration with the existing SCADA environment.



"The devices have to be robust. They have to be able to work in the environment and also needed to be practical for repeat deployment," said Paul Stute, Product Sales Manager for RTUs at Ovarro. "They need to have the communications capability and the protocols required for this type of infrastructure."

Importance of remote and local support

During integration, early technical challenges were resolved with support from Ovarro's technical team, while suitability testing was carried out before final decisions were made with the client. This support included assistance around the communications set-up, including virtual private network configuration and the allocation of IP addresses to the RTUs through the telecommunications provider.

Cromarty also developed and tested code offsite, creating a template that could be rolled out across multiple installations. This helped ensure that the selected approach could be tested, refined and confidently rolled out before being deployed across remote property outlet installations.

Improving visibility of remote assets

The TBox RTUs provide monitoring for property outlet installations across the Don Irrigation Scheme. These assets enable Tasmanian Irrigation to monitor farmers' water allocation usage through flow and pressure data, requiring field devices that can support reliable communications and data acquisition in remote environments.

By enabling remote visibility of flow and pressure data, the telemetry system supports more effective management of irrigation assets and helps operators identify issues without relying solely on site visits. While no quantified reduction in site visits has been confirmed, the system gives operators better visibility of remote assets and reduces the need to depend on manual checks alone.

"The TBox is well suited to remote site applications like this one," said Michael Holmes, Manager Engineering and Asset Intelligence at Tasmanian Irrigation. "It is proven on our network, integrates cleanly with our SCADA and performs reliably in the conditions we deploy it into."

A robust and scalable solution

"Ovarro's support helped resolve the early integration challenges and gave us confidence in the suitability of the solution before deployment," said Eric Goh, Automation Engineer at Cromarty. "The system has been reliable since deployment, with minimal issues."

Operators can now maintain oversight of the network, while farmers benefit from infrastructure designed to support dependable water delivery. The success of the project has also helped establish a repeatable approach for future schemes. Following the Don Irrigation Scheme, Cromarty has been awarded further work involving additional TBox RTUs for the Northern Midlands Irrigation Scheme, demonstrating the value of a scalable telemetry architecture that can be replicated across wider irrigation networks.

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Industrial switch range

D-Link ANZ's expanded industrial switch range provides enterprise-grade networking solutions purpose-built for Australia

and New Zealand's harshest operational environments. The new range is designed to give systems integrators, IT managers and operations leaders the durability, speed and intelligence they need to maintain mission-critical connectivity where standard enterprise equipment cannot survive.

The expanded portfolio comprises four new models: the DIS-310G-24X Layer 3 Managed Switch; the smart-managed DIS-210G-12 and DIS-210G-12UP PoE switches; and the compact DIS-100E-05 entry-level model. Together, they span the full spectrum of industrial networking requirements, from high-density aggregation to simple edge connectivity.

As Australian and New Zealand industries accelerate digital transformation, edge networks are being pushed into environments they were never designed for. Extreme temperatures, electrical noise, vibration and power surges are daily realities in manufacturing plants, mining operations, agricultural facilities and outdoor CCTV deployments. D-Link's Industrial Switch Range is designed to address these pain points with IP40-rated metal housings, fanless thermal designs, 6 kV surge protection across all Ethernet ports, and operating temperature ratings from -40 to +75°C.

The DIS-310G-24X is a 24-port Gigabit industrial managed Layer 3 switch designed for larger-scale industrial networks that demand both high availability and advanced traffic management. It features 16 x 10/100/1000BASE-T copper ports, 4 x Gigabit SFP fibre uplinks, and 4 x 10G SFP+ ports for high-speed backbone or aggregation connectivity, all packed into a compact 100 x 140 x 170 mm chassis that maximises cabinet space.

For mid-sized deployments, the DIS-210G-12 is a 12-port Gigabit industrial smart managed switch with 8 x Gigabit copper ports plus 4 x SFP fibre uplinks, smart management via an intuitive web interface and Ethernet ring protection switching (ERPS) to keep networks running even if a cable is severed.

The DIS-210G-12UP takes the smart-managed foundation of the DIS-210G-12 and adds high-power PoE capability, making it suitable for deployments where both data and power must be delivered over a single cable to remote devices.

The DIS-100E-05 is a 5-port unmanaged industrial switch with five Fast Ethernet ports, a fanless metal casing and DIN-rail mounting. It delivers plug-and-play connectivity for small sensor clusters, remote monitoring nodes and legacy equipment retrofits.

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ARE WE READY FOR A SURGE IN CHARGING DEMAND?

With NSW about to introduce Right to Charge reforms for strata owners, is building infrastructure ready for a surge in charging demand?

There's a growing appetite for electrification and energy technology investment among Australian businesses, but many organisations are being held back by financial and implementation challenges.

This is according to Schneider Electric's 2026 Energy Tech Pulse Survey, whose findings come at the same time as NSW prepares to introduce Right to Charge reforms that will make it easier for strata owners and residents to install EV chargers.

The survey found that more than half of business leaders (56%) identify upfront capital costs as the biggest barrier to adopting advanced energy and infrastructure technologies, while one-third (33%) cite internal capability and skills gaps. Regulatory and permitting complexity was identified by 30% of respondents.

While the Right to Charge reforms, currently before the NSW Legislative Council, are expected to help address some of these barriers by simplifying approval pathways for apartment EV charging installations, Schneider Electric said they also highlight the need for safe, scalable infrastructure as charging demand grows. EV adoption is accelerating, with more than 410,000 electric vehicles now on Australian roads.

Without appropriate planning, buildings risk fragmented installations and unmanaged electrical loads as more residents adopt EVs. Technologies such as dynamic load management and energy monitoring can help buildings support future demand while reducing the need for costly upgrades, according to Schneider Electric.

"The reforms are a positive step because they remove a significant barrier for apartment residents who want to charge at home," said Tim Pratt, Vice President, Power Products, Pacific Zone at Schneider Electric.

"But the right to install a charger is only part of the equation. Safe, efficient and

future-proofed charging depends on the right infrastructure and the right expertise.

"Our research shows organisations are grappling not only with cost pressures, but also skills shortages and implementation complexity. As EV adoption accelerates, ensuring buildings have access to qualified expertise and scalable infrastructure will be just as important as removing regulatory barriers."

Many apartment buildings were designed long before widespread electrification was considered and may require upgrades to accommodate multiple chargers operating simultaneously. As EV adoption increases, buildings will need to balance charging demand alongside existing electrical loads such as lifts, lighting, air conditioning and other critical services.

Electrify EV is a Schneider Electric EcoXpert partner supporting EV charging projects across residential and strata developments. The company's Managing Director, Andrew Hardingham, said the reforms will significantly improve access to charging for apartment residents, but successful projects still depend on understanding a building's electrical infrastructure and planning for future demand.

"As more residents adopt EVs, buildings need infrastructure that can accommodate more chargers safely and efficiently. Technologies such as energy monitoring and busway-based electrical distribution can simplify retrofits and support future charger expansion," Hardingham said.

Pratt said building owners and strata committees should be thinking beyond individual charger installations and taking a longer-term approach to electrical capacity and infrastructure planning.

"We cannot approach apartment EV charging as a series of one-off installations. A single charger may solve today's problem, but buildings need infrastructure that can support dozens more as demand grows."

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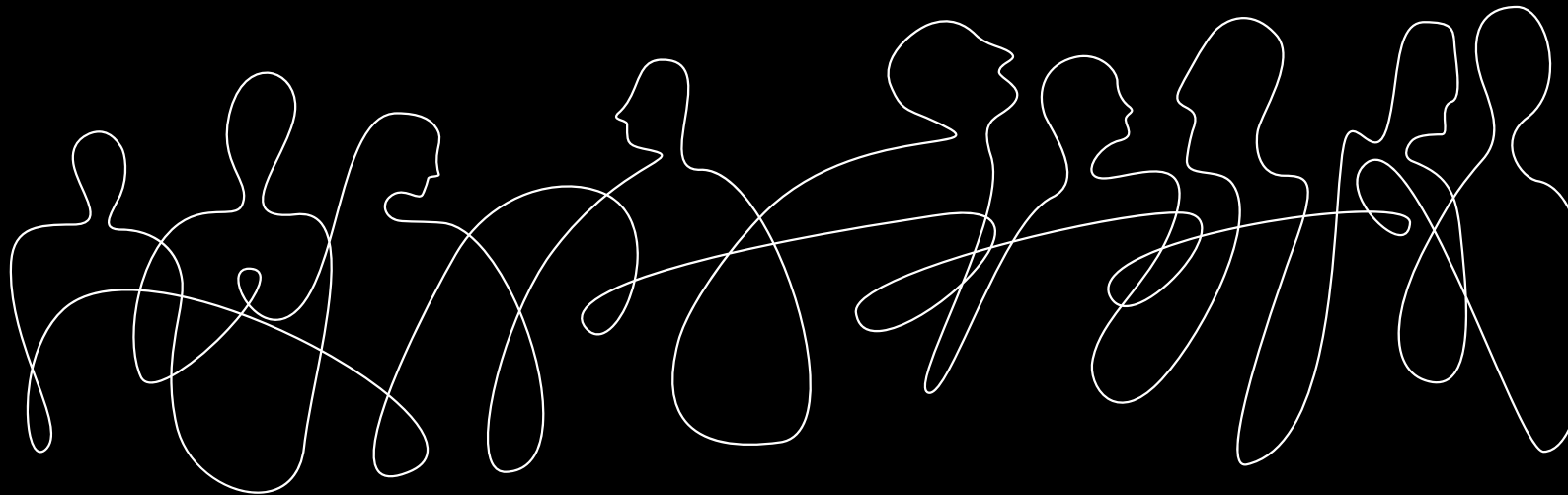
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