

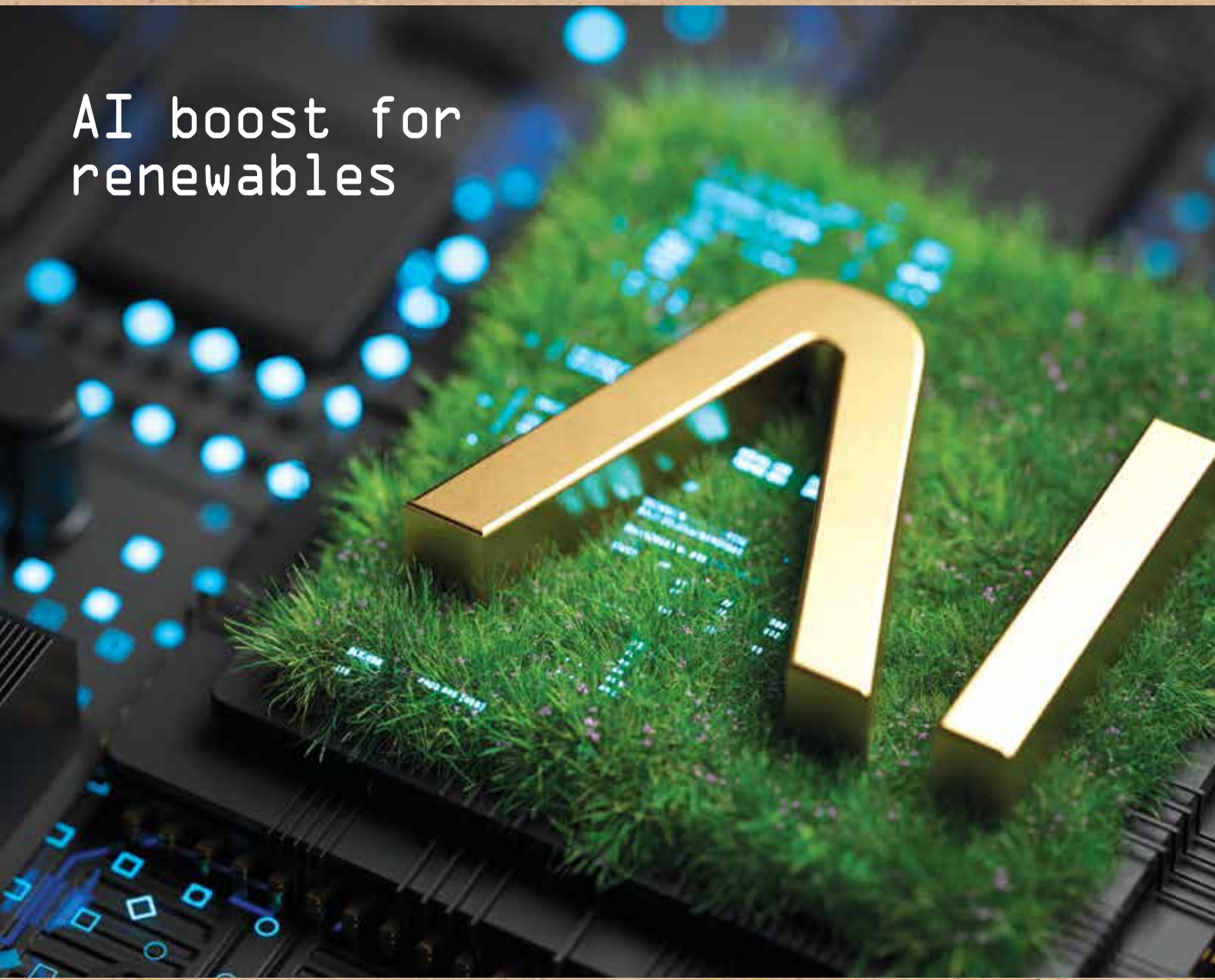
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sustainability matters

AI boost for renewables



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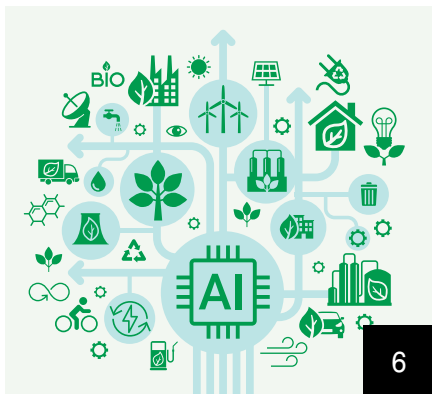


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SEPTEMBER 2025

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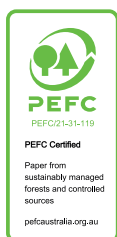
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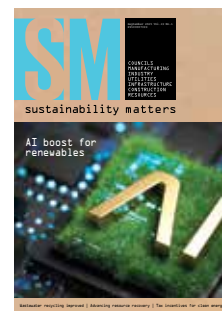
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WORDS from the EDITOR

AI (artificial intelligence) is certainly becoming more and more a part of all our lives, so in this issue we take a look at how it can help with many sustainability initiatives.

When it comes to sustainability and renewable energy in particular, AI can have many useful applications. It can help to predict demand for energy and optimise its usage to help improve energy efficiency and eliminate wastage. AI can also help reduce grid load by moving activities, such as electric vehicle charging, to off-peak hours (p6).

AI workloads, however, clearly require a tremendous amount of energy for powering all the processing requirements of IT infrastructure and data centres, which must be managed before AI can provide real sustainable benefits.

Sustainability of IT infrastructure could be improved by right-sizing infrastructure to fit workloads, using more renewable energy sources and hosting equipment in data centres that are rated to be efficient with power and water consumption.

We have also included details on how direct liquid cooling (DLC) technology and other techniques could help to reduce cooling cost and improve the sustainability of data centres (p8). And we look at how cybersecurity can become more focused on energy efficiency and sustainability (p20).



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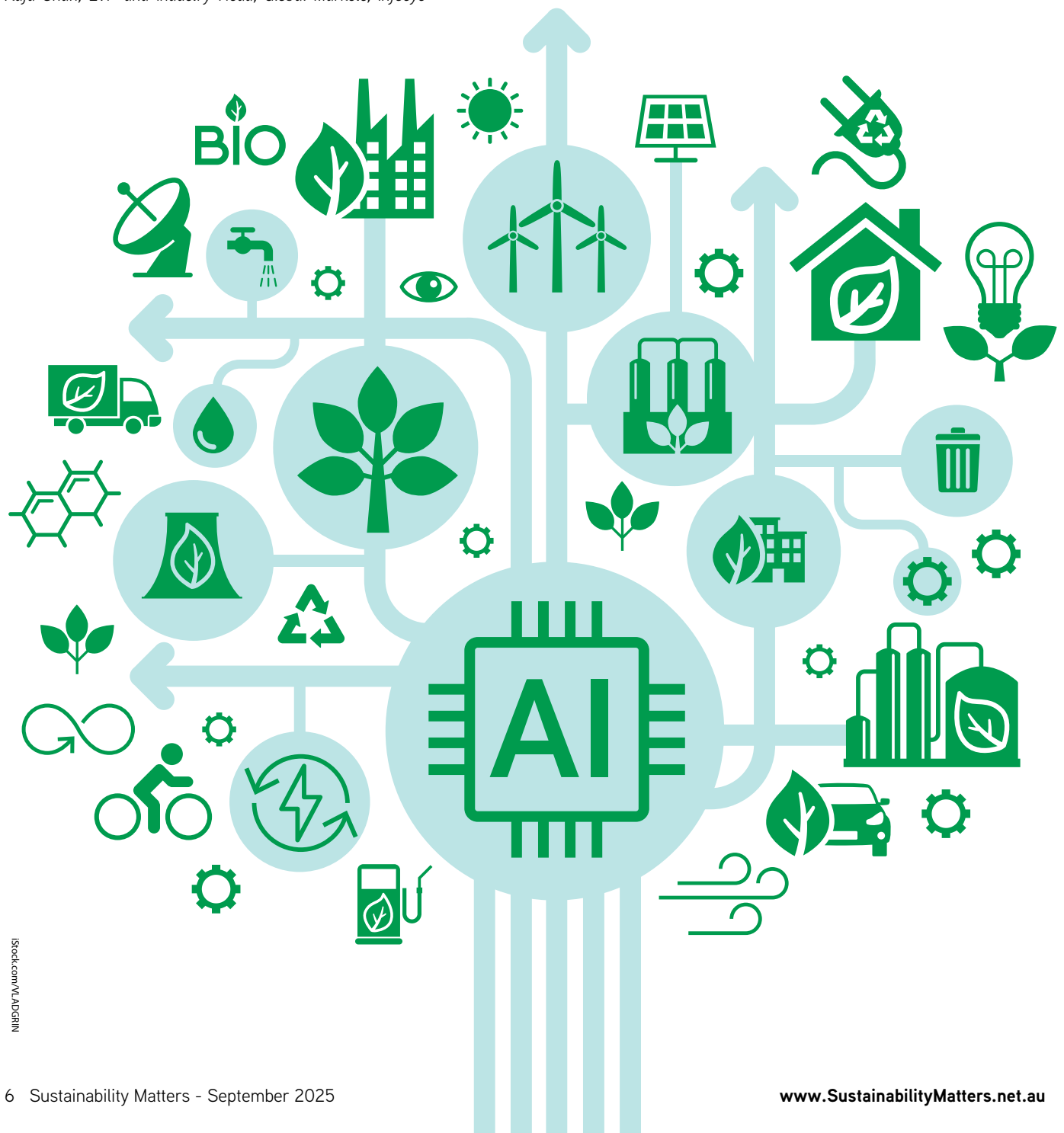


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Putting the smarts into sustainability

Raja Shah, EVP and Industry Head, Global Markets, Infosys





Queensland has cut energy wastage by 15% and improved renewable power delivery with the help of AI-enabled smart grids. By using AI-powered sensors to monitor and optimise conditions for biogas production, a bioenergy plant in Western Australia has increased energy yield by as much as 25%.

At the Bundaberg Bioenergy Project, sophisticated algorithms analyse agricultural waste composition in real time to adjust processing parameters and maximise energy yield, improving energy production efficiency by 35%. Across the continent, artificial intelligence technology is playing a pivotal role in taking Australia to its target of net zero by 2050.

Local governments are leading the way. Merri-bek City Council has been working with Moreland Energy to reduce greenhouse gas emissions and improve energy efficiency within the community. The City of Melbourne is also setting up solar and battery storage systems in public buildings as part of its 'Power Melbourne' project. AI is enabling such initiatives by automating energy management to lower consumption, optimising battery and solar systems, and providing various insights to drive sustainability.

Across Australian cities, smart grid systems are using machine learning algorithms to monitor and streamline the distribution of energy from large renewable energy installations to meet demand in real time. The models analyse a host of historical usage data as well as current information, about temperature conditions or special requirements for example, to predict demand. Further, AI-enabled systems optimise energy resources and cut waste during peak production time (for example, when the sun is out) by automatically sending excess energy to be stored or to power high-consumption activities. Conversely, during peak consumption hours, the systems draw from battery, wind



Across the continent, artificial intelligence technology is playing a pivotal role in taking Australia to its target of net zero by 2050.

and solar energy sources to meet demand.

By predicting demand based on analysis of consumption habits, weather patterns, etc, AI is transforming the way Australia's power grid manages and distributes renewable energy. AI-driven smart grid management enables real-time load balancing — adjusting distribution according to demand — to not only improve energy delivery but also support the integration of renewable energy sources with the existing grid. Intelligent drones are revolutionising renewable energy infrastructure inspection by using thermal imaging and pattern recognition to survey installations and identify potential problems that might be overlooked during manual inspection. By enabling proactive maintenance of facilities, the technology has greatly improved the reliability of renewable energy while moderating operating costs.

When integrated with smart grids and devices, AI can automate load shifting, that is, shifting energy consumption so as to optimise usage, or reducing grid load by moving activities, such as electric vehicle charging, to off-peak hours. By optimising energy consumption patterns, AI reduces the strain on the grid, enhances grid stability and saves energy expenses.

In smart cities across Australia, sensors are monitoring public infrastructure — from buildings to traffic management systems — to make instant decisions about how to distribute energy. For example, based on occupancy, they automatically adjust room temperature settings to maintain comfort. AI-managed renewable energy networks have reduced energy consumption by as much as 30% in certain districts.

Artificial intelligence technology is also driving novel business models, such as energy performance contracts, where an energy services company (ESCO) and a building enter an agreement to make energy-saving improvements that the building pays for through the savings that are guaranteed by the company. Although energy performance contracts are best suited to large buildings and complexes, they can also benefit small enterprises which can optimise energy consumption without making capital investments in energy infrastructure.

Australia's renewable energy sector has found an invaluable ally in artificial intelligence technology. From accurately predicting energy demand, to streamlining generation and distribution, to enabling proactive maintenance of assets, managing grid functions, and recommending ways to improve energy efficiency and eliminate waste, AI is transforming every aspect of sustainable energy management in the journey to net zero.



*Raja Shah, EVP and Industry Head,
Global Markets, Infosys*



Turning down the heat

How innovative cooling techniques are tackling the rising costs of AI's energy demands

Chris Weber, VP and MD of HPE South Pacific

As enterprises accelerate their AI investments, the energy demand of AI's power-hungry systems is worrying both the organisations footing the power bills as well as those tasked with supplying reliable electricity. From large language models to digital twins crunching massive datasets to run accurate simulations on complex city systems, AI workloads require a tremendous amount of processing power.

Of course, at the heart of this demand are data centres, which are evolving at breakneck speed to support AI's growing potential. The International Energy Agency's AI and Energy Special Report recently predicted that data centre electricity consumption will double by 2030, identifying AI as the most significant driver of this increase.¹

The IT leaders examining these staggering predictions are rightly zeroing in on improving the efficiency of these powerful systems. However, the lack of expertise in navigating these intricate systems, combined with the rapidity of innovative developments, is causing

heads to spin. Although savvy organisations are baking efficiency considerations into IT projects at the outset, and are looking across the entire AI life cycle for opportunities to minimise impact, many don't know where to start or are leaving efficiency gains on the table. Most are underutilising the multiple IT efficiency levers that could be pulled to reduce the environmental footprint of their IT, such as using energy-efficient software languages and optimising data use to ensure maximum data efficiency of AI workloads. Among the infrastructure innovations, one of the most exciting advancements we are seeing in data centres is direct liquid cooling (DLC). Because the systems that are running AI workloads are producing more heat, traditional air cooling simply is not enough to keep up with the demands of the superchips in the latest systems.

DLC technology pumps liquid coolants through tubes in direct contact with the processors to dissipate heat and has been proven to keep high-powered AI systems running safely. Switching to DLC has had measurable and transformative impact across multiple en-



cooling techniques



For AI sustainability to succeed, it must be driven by policy to set actionable standards, which then fuel innovative solutions.

March 2024, the Australian Senate established the Select Committee on Adopting Artificial Intelligence to examine the opportunities and impacts of AI technologies⁴. Among its findings and expert submissions was a clear concern about the energy intensity of AI infrastructure. The committee concluded that the Australian Government legislate for increased regulatory clarity, greater energy efficiency standards, and increased investment in renewable energy solutions. For AI sustainability to succeed, it must be driven by policy to set actionable standards, which then fuel innovative solutions.

Infrastructure solutions like DLC will play a critical role in making this possible — not just in reducing emissions and addressing the energy consumption challenge, but also in supporting the long-term viability of AI development across sectors. We're already seeing this approach succeed in the real world. For example, the Pawsey Supercomputing Centre in Western Australia has adopted DLC technology to support its demanding research workloads and, in doing so, has significantly reduced energy consumption while maintaining the high performance required for AI and scientific computing. It's a powerful example of how AI data centres can scale sustainably — and telegraphs an actionable blueprint for others to follow.

Furthermore, industry leaders are shifting how they handle the heat generated by these large computing systems in order to drive further efficiency in AI. Successfully using heat from data centres for other uses will be a vital component to mitigating both overall energy security risks and the efficiency challenges that AI introduces. Data centres are being redesigned to capture by-product heat and use it as a valuable resource, rather than dispose of it as waste heat. Several industries are already benefiting from capturing data centre heat, such as in agriculture for greenhouses, or heating buildings in healthcare and residential facilities. This has been successfully implemented in the UK with the Isambard-AI supercomputer and in Finland with the LUMI supercomputer — setting the bar for AI sustainability best practice globally.

The message is clear: as AI becomes a bigger part of digital transformation projects, so too must the consideration for resource-efficient solutions grow. AI sustainability considerations must be factored into each stage of the AI life cycle, with solutions like DLC playing a part in a multifaceted IT sustainability blueprint.

By working together with governments to set effective and actionable environmental frameworks and benchmarks, we can encourage the growth and evolution of the AI industry, spurring dynamic innovation in solutions and data centre design for the benefit of all.

vironments, showing reductions in cooling power consumption by nearly 90% compared to air cooling in supercomputing systems².

Thankfully, the benefits of DLC are now also extending beyond supercomputers to reach a broader range of higher-performance servers that support both supercomputing and AI workloads. Shifting DLC from a niche offering to a more mainstream option available across more compute systems is enabling more organisations to tap into the efficiency gains made possible by DLC, which in some cases has been shown to deliver up to 65% in annual power savings³. Combining this kind of cooling innovation with new and improved power-use monitoring tools, able report highly accurate and timely insights, is becoming critical for IT teams wanting to optimise their energy use. All this is a welcome evolution for organisations grappling with rising energy costs and that are carefully considering total cost of ownership (TCO) of their IT systems, and is an area of innovation to watch in the coming years.

In Australia, this kind of technical innovation is especially timely. In

1. AI is set to drive surging electricity demand from data centres while offering the potential to transform how the energy sector works - News - IEA
2. <https://www.hpe.com/us/en/newsroom/blog-post/2024/08/liquid-cooling-a-cool-approach-for-ai.html>
3. HPE introduces next-generation ProLiant servers engineered for advanced security, AI automation and greater performance
4. https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Adopting_Artificial_Intelligence_AI



A sustainable approach to increase wastewater recycling

Rising rural populations, drought and climate change are making water scarcity a problem in country townships — with more efficient handling of sewage system wastewater part of the solution.

Pioneered by Flinders University environmental health experts, local councils in South Australia are operating sustainable energy-efficient sewage treatment operations with low-cost high-rate algal pond (HRAP) systems. Now new research led by the university is investigating improved effluent treatment and biosolids removal with 'sequencing batch reactors' — or low-cost 'SBR-HRAP' technology field trials — installed at SA Water's Angaston wastewater treatment plant in the Barossa Valley.

The newer systems under development are designed to work better and faster without major capital expense — due to the latest research of new approaches for the bioprocessing inside them, said Professor Howard Fallowfield from the Flinders College of Science and Engineering. The SBR techniques under development involve a new kind of algae and improved removal of waste from the water, for better-quality non-potable water for use in parks, gardens, sporting fields and other purposes.

"Supported by SA Water and the ARC Biofilm Research and Innovation Centre at Flinders, we are trialling selective enrichment of algal-bacterial combinations to produce higher-quality treated effluent," Fallowfield said.

"Using wastewater from the Angaston community, our six pilot-scale HRAP tanks will compare the performance of these improved processes against the original HRAP operations."

Large high-rate algal pond systems, which have been treating wastewater at local council-owned facilities near Kingston-on-Murray and Peterborough in South Australia, use low-energy paddlewheels to move township and business organic waste along shallow channels where harmless green microalgae and bacteria remove pathogens and contaminants. PhD candidate Felipe Sabatté, who has used a native freshwater filamentous algal population to produce higher-quality clarified treated effluent, said the latest developments will be scaled up in the Angaston field trials.

"While high-rate algal ponds are an accepted method of wastewater treatment, particularly for regional and rural communities, they utilise microalgae which are difficult to remove from the treated wastewater, leading to unacceptably high suspended solids in the discharge," Sabatté said.

"These larger filamentous algae offer the prospect of easier separation from the treated wastewater, significantly improving treated effluent quality."

The outcome of this research provides a new operational strategy for wastewater HRAPs, particularly for the benefit of regional and rural communities challenged with water restrictions and to help meet UN SDG6 (clean water and sanitation) targets in the long run, he said.

This research was conducted by Flinders University-based Australian Research Council Training Centre for Biofilm Research and Innovation and funded by the Australian Government. The Training Centre is working with industry on a range of sustainable and environmentally friendly research solutions.

Also at the Angaston trial site, Training Centre PhD researcher Sam Butterworth is investigating how to use this new technology to



Image supplied.

Algal ponds as SBRs.

develop dense algae-bacterial granules, which can be more readily removed from wastewater and potentially reduce phosphorus levels.

"Algae-bacterial granule formation is a positive way for biofilms to form dense, fast-settling biomass and improve treated wastewater quality," Butterworth said.

"Using microalgae in high-rate algal ponds is increasingly seen as a better alternative to other wastewater treatment systems, such as activated sludge." Indeed, traditional wastewater treatment methods can use more energy and water and be less sustainable due to higher greenhouse gas emissions.

An independent validation of the HRAP projects approved the treated wastewater to be used for non-food crop irrigation. For example, the Kingston-on-Murray ponds supply reuse water to irrigate a woodlot, and the ponds in Peterborough provide reuse water for a golf course and a sports field.

Flinders University
www.flinders.edu.au



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NEW BREDEL HEAVY DUTY PUMP OFFERS ADVANCED SAFETY AND RELIABILITY IN THE TOUGHEST CONDITIONS WITH SUSTAINABILITY BENEFITS

Bredel hose pumps, part of Watson-Marlow Fluid Technology Solutions, has engineered the new Bredel Heavy Duty pump with advanced safety and reliability features specifically for the mining and construction sectors. For mining companies that prioritise protecting their employees and the local environment, while ensuring reliable operations in the toughest conditions, Bredel has designed the Heavy Duty pump for an enhanced level of safety and durability.

The Heavy Duty pump is a perfect peristaltic pump solution for handling abrasive high-solid content slurries, thick sludge and corrosive fluids due to its enhanced features:

- Heavy duty frame that enables safer pump transportation using a forklift truck
- Heavy duty bearings that provide an extended lifetime when pumping high-solid content slurries
- Window guard that offers extra protection
- Robust flange bracket that reduces the risk of lubricant leakage and simplifies maintenance
- C4H paint coating that brings superior resistance in highly corrosive environments and protects against acids, bases

Jose Longo, Head of Process Industries, APAC, WMFTS, gave his input: "By handling the unique challenges mining companies face around the world, the Heavy Duty pump enhances productivity, making it a safer, more efficient, reliable and sustainable solution for the toughest conditions."

Bredel hose pumps has recently switched its painting process during manufacturing from solvent-based paints to waterborne paints, resulting in a 90% reduction in volatile organic compounds (VOCs) emissions. Grace Madden, Bredel Product Manager, said: "The Bredel Heavy Duty pump offers exceptional safety and durability for mining and construction companies, significantly reducing downtime and increasing efficiency. Its advanced features ensure reliable performance in harsh environments, preventing costly downtime."

The Heavy Duty pump can be used for: slurry transfer with minimal wear and tear; precise chemical dosing to enhance operational efficiency; dewatering to avoid the risk of flooding and environmental damage, and for safely transporting tailings to ensure compliance with regulations. In a nutshell, Bredel Heavy Duty Pump not only meets the tough demands of the mining and construction industry, but the pump also contributes to sustainability by reducing environmental risks and leaks, lowering energy and resource use, and supporting safe, circular and efficient industrial processes.



Our reliable and efficient peristaltic pump technology for mining procedures can achieve water savings of 71% compared to typical centrifugal pumps. Clog-free, robust and reliable Bredel hose pumps can handle undiluted tailings and thickener underflow with up to 80% solids. As Bredel hose pumps do not have seals, they eliminate the need for water flushing, so reduce the treatment of process wastewater and the need for pump service water.

Watson-Marlow Australia team will be showcasing Bredel Heavy Duty Pump at Booth D25 at the International Mining and Resources Expo, 21-23 Oct at ICC Sydney, Australia. For further enquiries please contact the team at info.au@wmfts.com or +61287871400.

Bredel is the market leader in hose pump technology for transferring viscous and abrasive fluids and solids. Bredel users enjoy sustainable, low maintenance performance through an advanced, robust pump design which includes a precision manufactured hose. Bredel peristaltic pumps and hoses are used for a wide range of applications in the mining, industrial, water and wastewater and food and beverage industries.

Bredel is part of Watson-Marlow Fluid Technology Solutions (WMFTS), a Spirax Group company. WMFTS is a world leader in manufacturing peristaltic pumps and associated fluid path technologies for the life sciences and process industries. Further information can be found at www.wmfts.com.



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www.wmfts.com/en-au/#



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HUMIDITY, TEMPERATURE AND DEW POINT TRANSMITTER

The HygroFlex HF5A transmitter for the combined measurement of humidity, temperature and dew point has been launched by Rotronic with standard and custom options. It is an improved model of the HF5, designed for all applications where fast, accurate and repeatable measurement is critical. It features the latest near-field communication (NFC) technology, allowing it to be programmed and interrogated by a smartphone or NFC-equipped computer, helping to simplify operation and minimise setup time.

Supplied as a compact, wall-mounted unit in a rugged IP65 sealed enclosure, the device is built to withstand demanding environments. The device is compatible with various humidity and temperature sensors. It covers a range from 0–100% RH and -100°C to +200°C. Additional measurement options include CO₂ and differential pressure.

The front-panel LCD displays three measurement parameters simultaneously. Depending on operational status, readings are shown in green, orange or red. Both analog 4–20 mA and digital RS485 outputs are included as standard.

The HF5A can be configured and monitored remotely using Rotronic's HygroSoft app or PC software via a smartphone or laptop with an optional NFC-USB reader. The HF5A comes with a choice of Rotronic's interchangeable measurement probes.

For further information, contact AMS Instrumentation & Calibration Pty Ltd on 03-9017 8225 or Freecall (NZ) 0800 442 743. Alternatively, email sales@ams-ic.com.au or visit the website at www.ams-ic.com.au.

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Time to burn rubber on tyre recycling

Richard Roberts, Beacon Events

Shifting end-of-life tyres into advanced recovery pathways could unlock tens of millions in added resource value each year.



ast tailings dams, giant-tyre burial grounds and leaky water stewardship will all be regulated out of mining's future. Tyre Stewardship Australia's

Lina Goodman thinks one part of that future could be just around the corner.

The TSA CEO described the recently released National Project on Options for End-of-Life Tyres as a significant piece of research into how Australia managed used tyres, including more than 100,000 tonnes of tyres buried at mine sites each year.

The Western Australian Government-led project reported that a national industry-led Tyre Product Stewardship Scheme was gen-

erating benefits but fell short in key areas. The scheme was set up to boost resource recovery and recycling and to minimise environmental, health and safety impacts of used tyres. But to achieve more a regulated framework was vital, according to the TSA.

"As with all voluntary schemes it faces inherent limitations including free riders, the ongoing cost burden on communities and missed opportunities for advanced manufacturing," the body said.

"For the first time, governments now have a substantial evidence base to inform next steps. TSA calls on federal and state environment ministers to progress to a comprehensive cost-benefit analysis of a regulated product stewardship scheme for tyres.

"This is a pivotal moment to secure better environmental, economic and industry outcomes."

Australia is a major global market for ultra-class surface mining trucks and the industry's biggest underground vehicles. It has been one of the world's largest markets for off-the-road (OTR) tyres, which can cost US\$40,000 each, for 50 years.

The International Council on Mining and Metals (ICMM) said earlier this year improving circularity in mining was critical to achieving a "net-zero, nature-positive future" underpinned by responsibly sourced materials.

The council, whose members include a number of the world's largest mining companies, referenced a 2023 TSA report that indicated the industry accounted for 80% of an estimated 245,000 tonnes of OTR tyre, conveyor belt and vehicle track waste generated annually.



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"Yet less than 5% of OTR tyres used in mining are recovered," the ICMM said. "Mine sites are reliant on a range of resources and produce a number of different waste streams. A key waste stream is tyres, essential components of haul trucks and other vehicles used to transport ore and other materials."

"Circularity can be an important approach to meeting the [minerals and metals] demand required for the energy transition while limiting waste production and its impacts on the environment. Through the development of new and innovative approaches, tyre waste and associated environmental impacts can be reduced and new value unlocked."

"But close collaboration between industry, local communities and stakeholders is key for circular strategies to succeed."

TSA's 2023 report said Australia's OTR tyre market was forecast to grow at more than 6% a year from 2022–2027. Its latest

annual review again highlighted a "tale of two sectors", with about two-thirds of the 537,000 t of end-of-life tyres generated in the country in 2023–24 recovered through reuse, recycling or energy recovery. An estimated recovery rate of 87% was achieved for passenger, truck and bus tyres, but only 13% for mining and agriculture OTR tyres. For mining alone the recovery rate was put at less than 5%, with most waste buried onsite.

Goodman said available data shows mining presents a "complex picture of excellence and failure". When mining companies recover tyres they demonstrate a commitment to circular outcomes by prioritising repair and high-value recycling. However, recovery rates are miniscule. "The mining industry does the right thing when they recover tyres ... but they shouldn't get a free pass to bury 109,000 t annually onsite while every other industry faces strict waste disposal requirements. That's not sustainable and it's not fair," she said.

She said Australia's high on-road tyre recovery rate also masks "an underlying failure to create genuine circular economy outcomes" since more than half of Australia's recovered tyres were used in fuel and other energy applications, much of them offshore, and not recycled into products with continuous lifecycles. Recycling capacity is a barrier, but wider changes are needed to accelerate change.

"Australia's accredited tyre recyclers should be commended for their pursuit of end-of-life tyre recovery in the passenger, truck and bus sectors," Goodman said.

"They've built collection networks and processing infrastructure that works, and proven that high recovery rates are achievable when there's commitment to proper stewardship."

"The challenge is extending this success to the mining sector, which generates the heaviest tyres but has the lowest recovery rates."

"Each sector has half the solution."

"The passenger, truck and bus tyre value chain has mastered recovery logistics but needs to focus on circular value."

"Mining knows how to create better circular economy outcomes but lacks recovery infrastructure."

"Although the overall recovery rate of mining tyres is low we're seeing encouraging signs that mining companies are demanding — of themselves and their downstream partners — greater circular outcomes for the valuable resources contained in tyres."

"If this current trajectory continues, the mining industry will drive significant improvement in the reuse and recycling of tyres in Australia."

"We believe it's now time to give TSA-accredited recyclers the reins to support the OTR sector and show the world that Australia can set the pace in transforming how we manage these giant tyres."

Intelligent public policy and regulated product stewardship can speed this process, TSA believes.

It said the WA Government-led tyre management project report "identifies a critical opportunity for governments to expand recovery systems and stimulate higher-value markets".

"Shifting end-of-life tyres into advanced recovery pathways could unlock tens of millions — and potentially more than A\$100 million — in added resource value each year."

Goodman said, "Nothing will change unless government steps in with proper regulatory measures."

"Every tyre we export for tyre-derived fuel is a missed opportunity for resource recovery, local jobs and investment. We have the collection systems, we're building the end markets and we have companies committed to doing the right thing: we just lack the regulatory backbone to make it happen."

"Now is the time to unlock the full potential of this industry and show that Australia can lead the world in tyre circularity — not just recovery rates, but genuine circular value creation."

'The challenges of making circularity business as usual', an important panel discussion at this year's International Mining and Resources Conference + Expo (IMARC) in Sydney, will feature Goodman; Vale's general manager, future use, Gustavo Roque; Viva Energy Australia's head of future fuels and decarbonisation, Vanessa Lenihan; and Katherine Courtney, principal adviser, strategy and growth, at consulting firm Xenith.

The Off-the-Road Mining Tyre & Belt Forum, hosted by TSA, will also be held during IMARC, which runs from 21–23 October at ICC Sydney.

For more information and to register, please visit <https://imarc-global.com/events/tyre-stewardship-australia-off-the-road-mining-tyre-and-belt-forum>.



ENERGY CHAIN RANGE WITH RECYCLED MATERIAL

igus is converting the range of its standard energy chain series E2.1 to the recycled material known as igumid CG LW. The E2.1 energy chain series now consists of post-consumer recycle, such as old fishing nets and discarded energy chains, which are recycled and processed into recycle as part of the in-house 'Chainge' program.

Not only do the energy chains have mechanical specifications that are comparable to those of standard chains, they are also available at the same price as the previous E2.1 series. Even in terms of wear behaviour, stability and continuous flexing cycles, the updated chains provide the same quality.

Compared to the standard material, the recycled material has an 80% lower CO₂ footprint. The series is also characterised by a long service life, particularly quiet operation, and easy filling and installation.

An online platform was added back in 2022 to the recycling initiative, through which customers can also recycle other components made of technical plastics while purchasing processed material in the form of regrind and regranulate. In addition to taking back old energy chains, igus also takes back old material as part of assembly orders.

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LASER DISTANCE SENSORS

The Dimetix D-Series Laser Distance Sensors are designed to measure long distances with precision and speed, even in difficult situations. The series can measure on dark surfaces — even in exterior applications with solar irradiation.

Designed for industrial applications, the series provides a measurement rate up to 250 Hz; 1 kHz update rate for real-time data acquisition; extended temperature range up to 60°C; and industrial Ethernet compatibility, supporting PROFINET, EtherNet/IP and EtherCAT.

Now available in a modern design, the series measures distances of up to 500 m, with an accuracy of ±1 mm. It can be used in a variety of industries, such as metal, wood, hydro tech, railways, paper, mining, glass, process, transport, automotive and cranes.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au



ONLINE AMMONIUM ANALYSER

The NH6000sc is Hach's latest innovation in online ammonia analysis, delivering reliable, reagent-optimised performance for wastewater applications.

Built on advanced gas sensing electrode (GSE) technology, the NH6000sc helps ensure accurate and continuous ammonia monitoring, enabling operators to stabilise nitrification processes even under fluctuating influent conditions.

Engineered for minimal intervention, the analyser features automatic calibration, validation and cleaning, reducing routine maintenance to just twice a year.

Its verification grab sample is designed to ensure consistency with lab data, while predictive diagnostics and guided workflows support long-term operational uptime.

With lightweight, durable filtration options, the system supports robust sample handling and remote monitoring.

Designed for ease of use, the NH6000sc offers a user-friendly interface and simplified maintenance, making it suitable for municipal and industrial wastewater treatment plants aiming to improve efficiency and compliance.

Hach Pacific Pty Ltd
www.au.hach.com

Engineers create high-power zinc-air batteries



In the lab, Monash engineers are driving the next big leap in battery technology.

Monash University engineers have discovered a catalyst that could provide more power, longer life and lower costs for next-generation batteries.

While zinc-air batteries are currently used in small devices like hearing aids, this opens the door to rechargeable, high-power applications, moving the technology closer to real-world, grid-scale and transport uses.

Using a heat treatment, researchers have turned a 3D material into ultra-thin carbon sheets and added individual cobalt and iron atoms, creating a catalyst that makes the battery’s oxygen reactions much faster and more efficient.

Lead authors Saeed Askari and Dr Parama Banerjee, from the Department of Chemical and Biological Engineering, said it outperformed standard commercial catalysts made from expensive metals like platinum and ruthenium.

“By engineering cobalt and iron as individual atoms on a carbon framework, we achieved record-breaking performance in zinc-air batteries, showing what is possible when catalysts are designed with atomic precision,” Askari said.

“Our advanced simulations revealed that the cobalt-iron atom pairs, combined with nitrogen dopants, enhance charge transfer and optimise reaction kinetics, solving one of the biggest bottlenecks for rechargeable zinc-air batteries.”

Banerjee said the principles behind this design could also be applied to other clean energy technologies including fuel cells, water splitting and CO₂ conversion.

“Running a rechargeable zinc-air battery continuously for more than two months is a milestone for the field. It demonstrates that this technology is ready to move beyond the laboratory and into practical applications,” Banerjee said.

“These catalysts not only solve a key bottleneck for zinc-air batteries, but their design principles can be applied across the energy landscape — from fuel cells to water splitting — offering broad impact for clean energy.”

Monash University
www.monash.edu

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PFAS MANAGEMENT SOLUTIONS

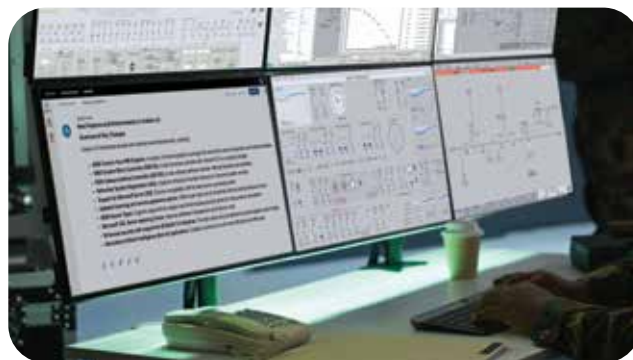
Veolia has launched its end-to-end BeyondPFAS management solutions in Australia, which are designed to detect, treat and safely remove PFAS from sensitive ecological settings.

Found in everything from non-stick cookware to firefighting foam, certain PFAS chemicals have become an environmental and health concern across the globe, particularly at locations such as airports, military bases and industrial facilities.

In Australia, Veolia has treated 75 million litres of PFAS-contaminated water and managed 200,000 tonnes of contaminated soil.

The company's BeyondPFAS range is designed to detect PFAS contamination, treat affected soil and water, and manage disposal of the contaminated materials by thermal treatment, physical-chemical removal or in special landfill depositories.

Veolia Australia and New Zealand
www.veolia.com.au



AI-ENABLED VIRTUAL ADVISOR

The Emerson Ovation AI-enabled Virtual Advisor is a generative artificial intelligence (GenAI) advisor integrated into an automation system specifically designed for the power and water industries.

The addition of an AI-enabled virtual advisor, as part of the Ovation 4.0 Automation Platform, provides real-time insights to increase efficiency, detect anomalies, forecast maintenance issues and empower strategic decision-making.

The Ovation Virtual Advisor embeds localised GenAI to provide dynamic system guidance and contextual support. The solution helps users quickly gain access to Ovation system documentation, perform troubleshooting, proactively address maintenance issues and uncover optimisation opportunities — all through natural language interaction.

As part of its growing suite of AI-based tools, the system uses Emerson's power and water domain expertise to enable future AI-powered insights to help optimise processes and equipment performance.

Secure by design, the advisor uses local, pre-trained AI models based on the company and customer-provided system information that captures qualitative behaviour at the control layer to provide safe and accurate results.

The AI models that power the Ovation Virtual Assistant can be further customised and tuned by uploading domain-specific data and operator feedback.

The Ovation 4.0 platform with its GenAI-enabled Ovation Virtual Advisor can be provided for new and system upgrade projects.

Emerson
www.emerson.com/au/automation

BATTERY-FREE LED HYBRID SIGNAGE

Smarterlite photoluminescent, battery-free LED hybrid signage is suitable for safety and emergency use, providing energy and cost savings over its extended lifetime.

Photoluminescence technology absorbs and stores light. When the light source is removed, like during a power outage, the stored light is released as a bright, highly visible glow which can be used to guide people to safety. It is designed to operate with little to no power, no batteries, and low operating, maintenance and energy costs.

The photoluminescent LED hybrid signage range includes environmental exit signs, warning signs and safety signage for buildings, public spaces, paths and roads.

The Australian-made signage meets the National Construction Code (2022) requirements for photoluminescent exit signs.

The range is also durable, with the products claimed to last up to seven times longer than conventional exit signage.

Unlike traditional signs, which can fail 20–40% of the time, the LED hybrid signage range doesn't rely on batteries, so the risk of the signs failing in an emergency is reduced.

Smarterlite Pty Ltd
smarterlite.com





Lagoon cover dewatering solution for Gippsland Water

Gippsland Water provides quality water and wastewater services to the Gippsland region of Victoria, supplying drinking water to 76,490 households and businesses and wastewater services to more than 69,000 households and businesses, across 43 towns. With 375 operational, engineering, financial, environmental and administrative employees, it is a major local employer for the region, serving an estimated population base of over 165,000.

With a number of sites with floating covers, the utility was experiencing issues with its cover dewatering pumps. Motors were burning out due to dry running; pump suction lines were clogging with debris, plant material and sludge build-up; pumps were not priming; and mechanical seals were breaking. This all created a lot of maintenance issues, both on the cover and with replacing, priming or repairing pumps.

The solution

Justin Tile, Project Engineer Asset Delivery, reached out to Hydro Innovations' Regional Manager, Graeme Spence, to discuss a better solution.

With long suction lines of 40–50 m, low flow requirements and discharge to nearby drains, it was decided to trial a Ragazzini peristaltic pump. Hydro Innovations offered a trial based on performance. The pump utilises a 'roller-on-bearing' design, which eliminates the need for lubrication fluid inside the pump housing because there is no friction on the surface of the tube/hose. This minimises the chances of contamination and results in a longer tube life. The pump also requires smaller drives, so less power is needed compared to other peristaltic pumps to get the same rpm and capacity.

With no lubrication fluid required, hose replacement is greatly simplified and cheaper without having to drain and dispose of a messy and expensive oil or glycerine solution. The dry casing



Gippsland Water Lagoon cover dewatering.

Image supplied

also allows for the use of Ragazzini's early leak detection system — standard with the pumps — to alert operators when hoses need replacing.

The results

The Ragazzini pump is robust and is suitable for the hydraulics of the duty. As the pumps are self-priming, there is no need for a foot valve out on the cover.

The pump was installed with little fuss as minimal pipework adjustment was required. Once it was turned on, it quickly proved how effective it is in this application. Priming of the long suction line was achieved in approximately 25 seconds with no foot valve. The pump has been successful in this application, reduced the need for access to the cover and decreased maintenance callouts.

Tile said he has been very happy with the whole process, with honest support from Hydro Innovations and proven performance from the pump. He said this will be the way forward now for cover dewatering.

Hydro Innovations

www.hydroinnovations.com.au



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Cybersecurity is about more aspects of ESG than just governance

*Les Williamson, Regional Director Australia and New Zealand,
Check Point Software Technologies*

Security operations teams must increasingly do their bit to help their employers achieve environmental targets, which may require some system and strategic changes.

For several years now, annual sustainability reports by listed Australian companies have provided a window into cybersecurity strategies employed at these companies. But in spite of the report name, there is often no link between security and sustainability in the information presented.

As these reports cover environmental, social and governance (ESG) practices, addressing cyber risks comes under the governance piece. Yet, the security team — through its choices of hardware, software and services — has a contribution to make on the sustainability front as well.

It is commonly acknowledged that IT infrastructure and data centres are large

energy users. Teams in these spaces have worked to become more efficient: rightsizing infrastructure provisioning to fit workloads, utilising more renewable energy sources, hosting equipment in data centres that are rated to be efficient with power and water consumption and the like.

That same level of investment and effort is yet to be brought to bear on the work of the security team and their technology stack. One reason for this is likely to be the intense pressure that security teams are under to protect ever-increasing attack surfaces and ward off a constantly evolving spectrum of cyber threats.

But this is likely to change.

Security teams need to be prepared to contribute to more than the governance aspect of ESG — they need to contribute to the environmental goals of the organisation as well.

This is starting to be seen in several initiatives. These include the adoption and im-

plementation of more energy-efficient security systems, together with a greater emphasis on proactive and preventative security.

Energy-efficient systems

As with other types of information technology, it continues to be the case that the efficiency of security systems is improving over time with each iteration or update.

A key performance indicator is the energy consumption per gigabit of data throughput for a piece of equipment. Next-generation security gateways are a security-specific example of hardware that continues to get more efficient with each new generation of the technology.

As a case in point, a recent Check Point ESG report showed that a current-generation security gateway uses 73% less power consumption per throughput (Gbps) compared to the previous model. This reduction comes alongside a 112% improvement in threat prevention capabilities, meaning the newer



of attacks can run up big energy bills if they go undetected. Cryptomining malware, for example, remains a persistent threat despite its peak in 2018 when it affected 40% of analysed organisations. Even recently, malware such as XMRig has been detected targeting gaming engines. The collective energy consumption of cryptomining is estimated at a staggering 125 terawatt-hours annually — highlighting the need to quickly detect this kind of malicious payload before it can be used to run up a big bill.

Data poisoning in AI systems represents another emerging concern. These attacks compromise machine learning models, often requiring complete retraining to remediate — an extremely energy-intensive process. As organisations increasingly rely on AI-powered tools for decision-making, protecting these systems also means avoiding redundant and costly training cycles that consume substantial computational resources.

The combined benefit

Cybersecurity is more than a governance play — it also has a growing role in helping meet the environmental aspects of an organisation's ESG strategy. By considering the energy implications of security operations, maintaining infrastructure that is both secure and sustainable, and prioritising a proactive security approach, organisations can protect both their business interests and environmental resources.

version is more efficient than its predecessor in multiple contexts, not just in energy usage concerns. And, to be clear, this kind of improvement is seen consistently between versions of systems.

This illustrates that next-generation security technologies can simultaneously enhance protection and energy efficiency. By aligning to this cadence of technology upgrades, organisations can consistently reduce their environmental footprint while maintaining effective security controls.

Proactive detection and remediation

Another beneficial strategy when seeking to run security operations more efficiently is to focus more on preventative and proactive forms of security.

The logic here is that reactively dealing with security incidents is an intensive exercise. It is taxing on the individuals that have

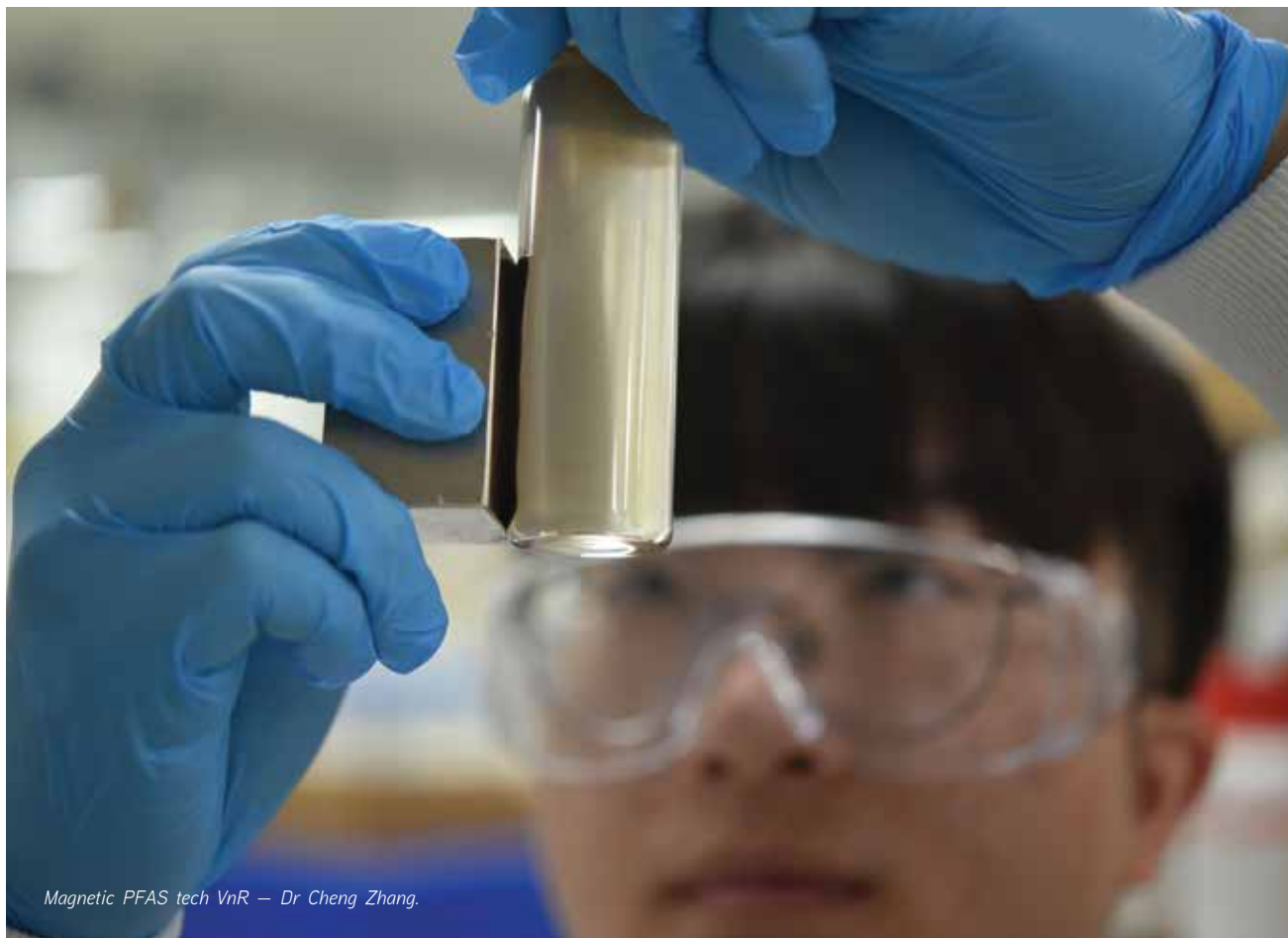
to perform this work, but also in financial terms. We know that the financial implications of a breach continue to increase over time. One aspect of financial implication is the energy-intensive processes such as restoring backups, along with rebooting, restoring and/or rebuilding entire systems.

Clearly, energy efficiency is not the primary goal of incident response. But from a broader ESG perspective, there is interest in organisations having strong cyber risk and security controls together with layered protections in place to mitigate against the risk of an attack, and/or to detect and isolate any infected infrastructure early on, such that any financial, productivity and bottom-line costs can be avoided. As energy is a considerable financial input to IT costs, it makes sense not to add to these costs due to a cyber incident taking place.

Preventative measures are also required because some existing and emerging types



Les Williamson, Regional Director Australia and New Zealand, Check Point Software Technologies



A magnetic resin invented at The University of Queensland will be trialled at wastewater treatment plants to remove harmful 'forever chemicals' so sewerage can be safely reused as fertiliser.

The sorbent developed by Dr Cheng Zhang at UQ's Australian Institute for Bioengineering and Nanotechnology (AIBN) has already shown promise as a safe and cost-effective filtration tool that removes per- and polyfluoroalkyl substances (PFAS) from water.

Zhang will lead a \$7 million project with AIBN colleague Dr Zicheng Su and a consortium of commercial partners led by ViridAU to show his magnetic resin can also remove PFAS from semi-solid effluent.

The group plan to trial and scale up the resin at Australian treatment plants over the next three years using \$5 million from commercial partners and a \$2 million federal government Cooperative Research Centres Project (CRC-P) grant.

"Australia has about 700 wastewater treatment plants and they are among

the last lines of defence we have when it comes to PFAS," Zhang said. "But completely removing PFAS from the materials we flush down the drain — especially heavier organic matter — is not a simple task."

"What we have created is a product that protects human and environmental health without completely re-engineering the systems already in place."

Dual-purpose technology

Current biosolids treatment technologies for PFAS include high-temperature pyrolysis and incineration, both of which are energy-intensive and generate secondary pollutants.

Zhang said the resin removes PFAS through a magnetic ion-exchange technique that operates at room temperature.

Biosolids treated with Zhang's magnetic resin can then be safely re-used as PFAS-free compost for agricultural and landscaping applications.

"Australia already produces more than a million wet tonnes of biosolids each year for

land rehabilitation and agriculture," Zhang said. "But PFAS is so pervasive that biosolids sold as fertiliser can still trigger environmental and regulatory concerns."

"The beauty of our technology is therefore in its dual purpose: protecting the environment from PFAS — and safeguarding downstream compost use and agricultural products."

Zhang said the aim of the three-year CRC-P project was to produce a scalable product that puts Australia at the forefront of global PFAS management.

"As global regulations on PFAS discharge tighten — particularly in Europe and the US — there will be a growing need for advanced remediation solutions," Zhang said. "Our technology will not only improve compliance with international standards, it provides safer access to products for irrigation and land management."

Zhang's PFAS sorption technology has been patented by UQ commercialisation arm UniQuest.

Tax incentives fuelling Australia's clean energy future

*Holding Redlich Partner Dhanushka Jayawardena,
Associate Alice Wu and Undergraduate Giselle Croker*

Recent tax initiatives are driving momentum in Australia's renewable energy sector, with a raft of measures being introduced to help operators, developers and investors maximise tax efficiencies across existing and future clean energy projects.

The Future Made in Australia initiative, announced as part of the 2024–25 federal Budget, encourages investment in renewable hydrogen, green metals, low-carbon fuels, critical minerals and clean energy manufacturing. Central to this initiative are two tax measures: the Hydrogen Production Tax Incentive and the Critical Minerals Production Tax Incentive. Both incentives were introduced in the Future Made in Australia (Production Tax Credits and Other Measures) Bill 2024 passed in February 2025.

Another development is the proposed extension of the Clean Building Managed Investment Trust withholding tax concession to include data centres and warehouses. While initially proposed to commence from 1 July 2025, the 2025–26 federal Budget deferred the start date to the first 1 January, 1 April, 1 July or 1 October following Royal Assent of the relevant bill. At the time of writing, no draft legislation has been released.

Hydrogen Production Tax Incentive

The Hydrogen Production Tax Incentive (HPTI) is a refundable tax offset of \$2 per kilogram of renewable hydrogen for eligible producers. It applies to income years commencing on or after 1 July 2027 but ending before 1 July 2040, subject to a maximum of 10 years. Jointly administered by the Australian Taxation Office (ATO) and the Clean Energy Regulator (CER), the incentive targets medium- to large-scale production of renewable hydrogen in Australia.

This program is separate from the Hydrogen Headstart Program, administered by the Australian Renewable Energy Agency (ARENA),



which supports large-scale renewable hydrogen projects through competitive hydrogen production contracts. Companies eligible for both programs will see reduced payments from the Hydrogen Headstart Program to reflect any refundable tax offset received under the HPTI, ensuring the two schemes work in parallel without duplicating benefits.

To be eligible, a producer must be a constitutional corporation subject to Australian tax and hold a production profile that allows for the issuance of a production guarantee of origin (PGO) certificate for the hydrogen produced. They must also comply with community benefit principles set by the Treasurer, including commitments to local communities, skills development, job security and tax transparency.

An eligible producer may only claim the tax offset in an income year if the hydrogen is produced in Australia between 1 July 2027 and 30 June 2040. The hydrogen must be produced within the facility's 10-year offset period and at a single site in Australia with a production capacity equivalent to at least a 10 MW electrolyser. A registered PGO certificate is also required for each kilogram of hydrogen claimed, verifying that emissions intensity does not exceed 0.6 kilograms of carbon dioxide per kilogram of hydrogen, and that grid electricity, if used, meets grid matching requirements. The certificate must not be subject to correction by the CER.

Critical Minerals Production Tax Incentive

The Critical Minerals Production Tax Incentive (CMPTI) provides a refundable tax offset equal to 10% of eligible expenditure for income years starting on or after 1 July 2027 and ending before 1 July 2040. This limited period applies regardless of how long a specific processing activity has been registered. There are currently 31 critical minerals eligible for the offset.

Reduced withholding tax rate for Clean Building Managed Investment Trusts

For income years commencing on or after 1 July 2012, a reduced 10% withholding tax rate applies to fund payments by Clean Building Managed Investment Trusts (MITs) to foreign investors from information exchange countries. To qualify, a building must be a commercial office, hotel or shopping centre with construction commencing on or after 1 July 2012. It must also meet and maintain either a 5 Star Green Star rating from the Green Building Council of Australia or a 5.5-star energy rating from the National Australian Built Environment Rating System.

Investors, developers and operators across the clean energy sector are encouraged to obtain structuring advice early to ensure eligibility and to minimise the risk of losing access to the available tax incentives.

The path to decarbonisation: collaborative change for our cities

James Wewer, General Manager, Sustainability - Development & Construction, Lendlease

As our population grows, the race to address a worsening climate emergency accelerates. Our cities are at the forefront of this challenge, accounting for more than 70% of global carbon emissions. If we are to achieve deep, impactful change, cities must be at the heart of the transformation — and that transformation requires steady collaboration between government, industry and communities.

At Lendlease, we believe lowering emissions starts at conception. At Lendlease, we believe that it's not just what we build, but how we build it that defines our impact. From all-electric buildings to green rooftops and recycled materials, our precincts are living, breathing testbeds for how we can shape more regenerative, low-carbon cities.

We have ambitious net-zero targets, pledging to reach Absolute Zero by 2040. We are dedicated to reaching these benchmarks,

not just for regulatory compliance but to be known as leaders in sustainability.

Electrifying the old and new

The key to decarbonisation is electrification. Approximately 80% of the buildings that will exist in 2050 have already been built. That's why retrofitting them for all-electric operation is just as important as building smarter from the ground up. By phasing out fossil fuels and integrating electric systems powered by



istock.com/DjAllen123

renewable energy, we reduce operational emissions and enhance energy efficiency.

A leading example of this is VicX Tower in North Sydney. It represents the future of commercial buildings by adopting a fully electric operating model. This ensures the base building is powered by 100% renewable energy, eliminating reliance on fossil fuels and reducing associated emissions.

We're also advancing plans to upgrade existing building infrastructure by assessing technical feasibility and prioritising assets across our portfolio for all-electric retrofits, in alignment with our Mission Zero targets.

Grid stability and resilience is critical to keep pace with electrification. Building a grid that can adapt relies on balancing supply and demand, optimising energy storage through wind and solar and regulating response times to grid disturbances. Through upgrading our existing infrastructure and collaboration with suppliers, we are primed to support the broader energy transition.

One Melbourne Quarter has taken a significant step towards cleaner energy use with

the installation of a 200 kW rooftop solar PV system. The system supplies around 17% of the base building's annual electricity needs, directly contributing to its market-leading 6-Star NABERS Energy rating. By generating renewable energy on-site, the building reduces its carbon footprint, showcasing our unwavering commitment to decarbonising operations through practical, scalable solutions.

But it's not just about energy. It's about nature. Tree canopy and vegetation can help mitigate urban heat effect, manage stormwater, promote carbon sequestration and support biodiversity. The vegetation lowers surface temperatures and boosts solar efficiency, a perfect harmony of technology and nature.

Public spaces are fundamental to these changes. At Melbourne Quarter, over 50% of the precinct is dedicated to green and open areas. At its heart is Sky Park — Melbourne's first elevated park, boasting 75 m of urban greenery in the centre of the city.

Decarbonising construction practices and materials is also critical. We are moving towards our goal of fossil-fuel free con-

struction, prioritising electric construction machinery and equipment and using biofuels such as biodiesel and renewable diesel where electric options are not available. At Melbourne Quarter West residential, we are using renewable diesel to power a stationary concrete pump. As of March this year, using renewable diesel in place of mineral diesel has saved 30 tonnes of CO₂, which is equivalent to 420 Sydney–Melbourne flights.

Decarbonising supply chains is one of the biggest challenges we face. Reducing embodied carbon in common construction materials like steel, cement, glass and aluminium requires the focus and investment of the whole value chain. We continue to specify, procure and trial lower carbon materials and develop tools to measure impact. Our in-house Lendlease Embodied Carbon Advisor (LECA) tool is aimed at helping project teams set and deliver project-specific embodied carbon targets.

Decarbonising our cities is a complex but urgent undertaking. Not only an environmental imperative, but a shared responsibility that demands a system-wide shift, reliant on government policy, industry innovation and community engagement moving in lockstep. At Lendlease, we're committed to driving this change by embedding sustainability into every stage of development. By electrifying our buildings, investing in greener infrastructure, adopting circular practices and reimagining our public spaces, we're proving that progress is possible. The solutions exist; what we need now is the collective will to accelerate them.



Credit: Marie-Luise Photographer

James Wewer, General Manager, Sustainability — Development & Construction, Lendlease.



Alternative for plastic



The Bioplastics Innovation Hub (BIH), a joint venture between Murdoch University and CSIRO, is responding to the plastic waste crisis with the development of a bioplastic alternative that vanishes over time — leaving no trace on land or in water.

The BIH brought together microbiology, molecular genetics, synthetic biology and biochemical engineering experts with advanced manufacturing to develop bioplastics alternatives.

BIH director Professor Daniel Murphy said creating “completely compostable products” for the food industry was a priority, and working with industry partners would lead to a more seamless transition from the lab to the shelves.

“A key product that industry is asking for is a compostable lining for recycled paper or cardboard-based food packaging,” Murphy said. “In market currently, for example, there are some packaging products made from waste materials that are compostable. However, they can only be used for foods with outer layers such as eggs and fruit.

“Foods without a natural protective layer require packaging to have a plastic lining to be ‘food safe’. If this lining was made from bioplastic, it would meet industry requirements, be welcomed by consumers looking for greener alternatives, and leave no lasting legacy in the environment.”

Murphy said some of the Hub’s most promising research uses microorganisms native to WA, which could help to create a robust circular economy.

“Synthetic plastics break down into microplastics — and those microplastics can move through the water, they can move through the food chain, they even move through the atmosphere through clouds,” Murphy said.

“We’re looking at plastics that are biodegradable and environmentally benign as in they’re not having any impact on the

environment. And that’s really important because otherwise we’ll continue to have a build-up of plastic in terrestrial environments on land and in the oceans — which is obviously not what we want for future generations.”

And the answer to the green alternative may come from within WA’s unique environment, with WA scientists using microbes found in local environments to make these bioplastics. BIH researcher and PhD candidate Harrison O’Sullivan is among those working with these naturally occurring microbes.

“At the moment, we’re working with some pretty cool bacteria we’ve pulled out of the environment ... Australia-made as you might say,” O’Sullivan said.

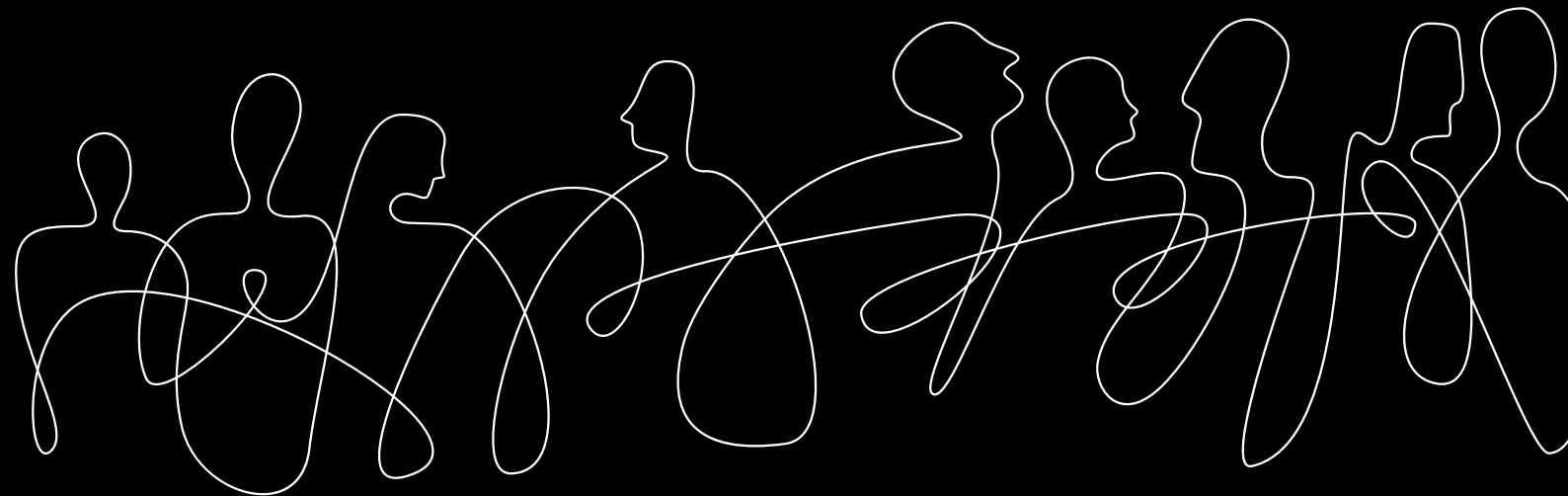
“A lot of these microbes are living in a wild state. They don’t often know where their next food is going to come from — so, in circumstances where they have a lot of extra food, what they’ll do is begin storing organic molecules within the cell, and then we recover these molecules to make the bioplastic material.”

In the WA Government’s 10-Year Science and Technology Plan 2025–2035, a research priority and focus area is “recycling for a circular economy”. BIH environmental microbiologist Dr Sakshi Tiwari said the Hub’s goals were just as ambitious for industry, and the community.

“We are hoping to reach a level where bioplastics and biopolymers reach every household. I believe it’s a longer-term plan, but will be our end goal,” she said.

The Murdoch University Bright Lights story, ‘Solving the plastic waste crisis’, can be viewed in the video below.

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