

Cause for DRED?

A deep dive into demand response

Skills workshop

Air balancing procedures

HVAC & R NEWS

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Shadow of doubt

How Donald Trump's new world order could affect Aussie HVAC&R

APRIL-MAY 2025 | ISSUE 163



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Address

National Office
James Harrison Centre
3/1 Elizabeth Street,
Melbourne VIC 3000

Contact

03 8623 3000
airah@airah.org.au
hvacnews.com.au

Magazine team

Editor
Nick Johns-Wickberg
nick.johnsw@airah.org.au

Contributing writers

Laura Timberlake
Louise Belfield
Mark Vender

Advertising sales

John McGrath
john.mcgrath@airah.org.au
Tel: 0419 556 108
ISSN 1834-9522

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A fresh look

Welcome to the new-look HVAC&R News!

If you've been a long-time reader of this magazine, you might not know where to look right about now. I want to assure you that, yes, this is still *HVAC&R News*, and no, we haven't actually changed it that much.

Since the launch of AIRAH's new brand identity last year, we've been discussing what the next logical step for our publications would be. We decided it was time for a refreshed look, one that aimed to fulfil three goals:

- ▶ Better align the magazine's design with AIRAH's branding
- ▶ Make our feature stories more visually engaging
- ▶ Improve the magazine's readability.

I feel that this first redesigned issue of the magazine achieves those goals, and I hope you agree. I want to congratulate our designer, Justin Smyrk, on bringing this vision together in a short timeframe. He is currently working on a similar redesign for *Ecolibrium*, which we can't wait to show you in late May.

Justin began his in-house graphic design and web development role with AIRAH in late January. It's fair to say that he's in high demand across all aspects of AIRAH's operations, and we're already noticing the benefits of having his skillset and experience as part of our in-house team.

I also want to acknowledge and thank Stephen O'Connor and Toby Hines from Artfishal Studios for their design work on AIRAH's publications over nearly two decades. Having already worked on *Ecolibrium* for two years at the time, Artfishal designed the first ever issue of *HVAC&R News* – then known as *HVAC&R Nation* – way back in 2008. Since then, they have been diligent, professional, and a pleasure to work with in designing all 162 issues of the magazine.

Our cover feature for this issue is one of the more challenging stories I've ever written. It looks at the flow-on effects Donald Trump's radical policy announcements could have on the Australian HVAC&R industry, both economically and environmentally.

Louise Belfield's feature on demand response programs for residential air conditioning is perhaps the most comprehensive story ever

written on the topic, offering perspectives from energy advocates, HVAC&R manufacturers, and fridgies. It explores the potentials of demand response while acknowledging what we need to do to get these programs right.

Our skills workshop – generously provided by the Testing and Commissioning Association (TACA) – guides technicians through air balancing, a process in HVAC commissioning designed to optimise comfort and indoor air quality. We also reflect on lessons learnt from AIRAH's 2025 Refrigeration Conference, analyse the recent Federal Budget, announce a revamp of the best practice guideline on cooling towers, look at some initiatives for improving diversity in the industry, and discuss expert insights into the HVAC&R skills shortage.

I hope you enjoy this issue of the magazine as much as we enjoyed creating it! Please reach out and let us know what you think.

Nick Johns-Wickberg

EDITOR

✉ nick.johnsw@airah.org.au



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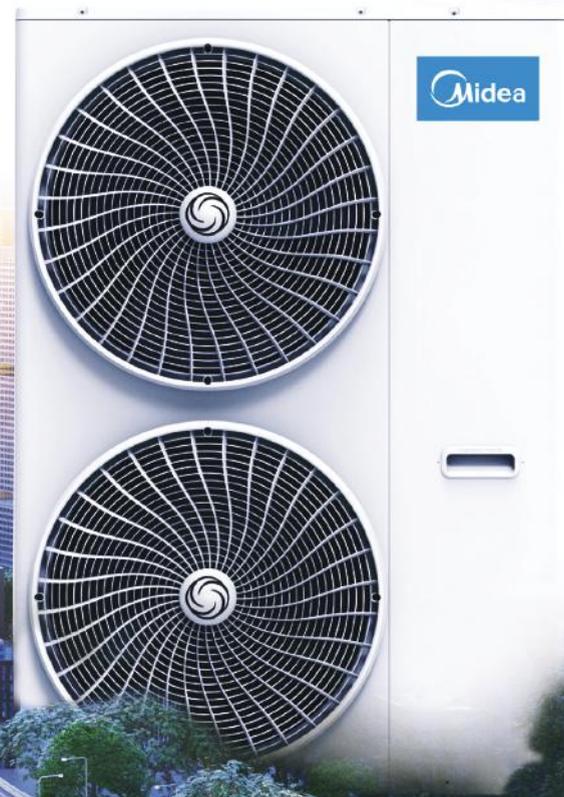
Installation of max. 6 IDUs in one system



Mdhome.com.au



1300 726 002



Midea Air Conditioner Australia

Impressive inversion

Daikin Australia is introducing a new heating and hot water solution called the EWYE-CZ air-to-water inverter heat pump.

Featuring R454C refrigerant with a lower global warming potential (GWP) of 148, the heat pump produces hot water up to 70°C with high energy efficiency, making it appropriate for low-carbon commercial heating solutions.

The heat pump is available in eight capacities, ranging from 15kW to 73kW. Daikin says it is capable of operating in diverse environmental conditions, with outdoor ambient temperature operating ranges from -25°C to +40°C while producing hot water from +20°C to +70°C.



daikin.com.au

It can also function with significant temperature difference between the water entering and leaving the system, ensuring that hot water can be supplied to different heating applications.

The product comes in four designs offering one to four in-line fans, and the heat pump is available in reduced noise configuration. This allows Daikin to facilitate projects with limited floor space and noise-sensitive applications (including hospitals and hotels).

Pursuit of BAPIness



Building Automation Products, Inc. (BAPI) has announced the launch of its new ZPM Standard Accuracy ($\pm 1\%$) Pressure Sensor in a BAPI-Box. BAPI describes the sensor as rugged, innovative, and designed for quick and easy installation, with field-selectable outputs and ranges set without powering the unit.

Key features of the sensor include:

- ▶ Standard accuracy of $\pm 1\%$
- ▶ Complements the company's current precision accuracy unit of $\pm 0.25\%$
- ▶ IP66 or NEMA 4-rated enclosure
- ▶ 10 field-selectable pressure ranges and three field-selectable outputs
- ▶ Ranges and outputs can be set without powering the unit
- ▶ Pressure status LEDs for "line of sight troubleshooting"
- ▶ Available in low, standard and high range models.

bapihvac.com

Truly cool

Truwater has released an induced-draft, counterflow square PVC film-filled, FRP cooling tower called the EC-S Series cooling tower. Truwater says the EC-S Series is designed to provide high performance and reliable equipment cooling, industrial process cooling, and air conditioning applications.

The cooling tower is certified for thermal performance by the Cooling Technology Institute (CTI) under CTI Standard STD-201, and according to Truwater, requires minimal maintenance.

The EC-S Series comes equipped with either a V-belt and pulley drive system or a right-angle gear reducer drive system, which Truwater says helps the cooling tower operate effectively in demanding environments.

Truwater says the EC-S Series has several defining features:

- ▶ Efficient drift eliminator: up to 0.001% drift loss
- ▶ Reduced plan area: spray nozzle pressure less than 1m
- ▶ Reduced energy consumption
- ▶ Simplified piping layout
- ▶ Reliable mechanical driver system
- ▶ Safety maintenance platform
- ▶ Compliant with Australian Standards: AS/NZS 3666 – Microbial Control Standards, AS/NZS 1657 – Fixed Platforms, Walkways, Stairways and Ladders, AS/NZS 4024 – Safety of Machinery Standards, as well as compliance with minimum energy performance standards.



truwater.net.au

Get Smardt!

Smardt Chiller Group has introduced the AeroPure AF Series of air-cooled chillers, which operate with oil-free, magnetically suspended compressors.

The series is available in 72 models – 36 models for data centre cooling, with capacity ranging from 211–2,500kW (60–710TR), and 36 models for comfort air conditioning, with capacities ranging from 211–1,800kW (60–510TR). They are available with low-GWP refrigerants such as R513A (GWP 631), R515B (GWP 293), and R1234ze (GWP <1), as well as R134a.

Smardt says the configurable options include extensions for extreme high and low ambient temperatures, harmonic filters, and ultra-quiet variable speed fans.

According to Smardt, the chillers operate with an energy efficiency ratio (EER) from 10.1–13.4 and an integrated part-load value (IPLV) from 19.3–25.9 depending on ambient conditions.

Smardt says the chillers' modular design allows for quick and easy maintenance on-site. The chillers have been designed to fit into 20- or 40-foot high-cube shipping containers for most configurations to allow for easier transport.



smardt.com

Passing the Testo

Testo has released its 174 series of data loggers for long-term temperature and humidity monitoring, which the company says provides efficient support for commissioning, inspection and maintenance of HVAC&R systems, as well as for monitoring comfort levels in workspaces.

The data loggers connect via Bluetooth to the Testo Smart App, which the company says allows for fast, paperless and accurate documentation of readings and reporting. Each individual data logger can be configured with unique limit values individually via the app.

There are four separate models in the range:

- ▶ Temperature only
- ▶ Temperature + humidity probe
- ▶ USB-C connection for PC readouts and reporting via free Testo software
- ▶ Bluetooth model that connects with the Testo Smart App with a range of up to 30m.

The data loggers come with a wide temperature measuring range from -30°C to +70°C and can store up to 16,000 measured values with automatic data backup.



testo.com

Loungin' about

Ventrix has launched its Pipelounge multi-pipe support solution, which it says will reduce time for HVAC&R professionals installing pipe brackets.

The company originally developed the product for internal use. However, after 12 months of in-house testing and successful use in Ventrix projects, the company decided to manufacture the system for external sale.

The Pipelounge system is available in sizes ranging from a mini bracket for two insulated pipes to a 600mm option. It can be hung using either one or two rods and can be used with or without strut, saving time on cutting

ventrix.com.au

and hauling materials. Ventrix says the system improves the look of exposed pipework and can be used in retrofit applications.

Ventrix manufactures the Pipelounge system in Australia.





temperzone.com

In the (Temper)zone

Temperzone has launched its Clever MT series of all-aluminium air handling units (AHUs), which it says are lightweight and highly corrosion-resistant.

The MT series consists of eight EC Plug fan units with maximum nominal airflow ranges from 750L/s to 15,000L/s, each capable of a minimum 400Pa external static pressure. Epoxy-coated cooling and heating coils are available in 11 combinations with one or two-row heating coils and four, six or eight-row chilled water coils.

Temperzone says the T2/TB2 65mm tropical profile and 50mm thermal break panels improve thermal performance to prevent condensation in high humidity locations or with very low supply air temperature.

The EC Plug fans are wired to an electrical interface cabinet with an external isolator and a potentiometer that can control the internal fan speed. The electrical interface cabinet allows for Modbus serial communication protocol, all internal control terminations, and multiple controller modules for pressure, volume and temperature.

All units come with a moulded UV-resistant, anti-fungal ABS drain tray designed with a sloped design to the drain connection, which Temperzone says eliminates water pooling and allows for efficient condensate removal.

Nice, Gary!

AI-powered lead conversion platform Podium has unveiled "Gary", its AI employee designed to help HVAC&R, plumbing, and electrical businesses engage and convert leads. Podium says AI employees like Gary allow businesses to manage leads, communicate with customers, and streamline operations all from the one inbox.

Gary is designed to handle lead management across all channels, responding instantly to missed calls, messages, and online inquiries, both during and after hours. Podium says Gary has been trained to understand specific services and fields of specialisation – including HVAC&R – allowing him to ask the right questions, prioritise urgent issues, and hand over fully qualified leads to the business's team for final scheduling.

According to Podium, Gary helps HVAC&R businesses filter and connect with the most appropriate customers by:

- ▶ Asking key questions like equipment age, homeowner versus renter status, and service area
- ▶ Instantly answering common customer queries
- ▶ Integrating with existing workflows for smoother operations.

podium.com.au



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IAQ25 lineup

AIRAH has announced two international keynote speakers and the full schedule for its 2025 Indoor Air Quality Conference (IAQ25), which will take place in Melbourne on May 26–27.

Dr Max Sherman from Lawrence Berkeley National Laboratory in California will open proceedings with a keynote on airborne infection control, referring specifically to how ASHRAE Standard 241 applies. The day two keynote will come from Dr Richard J Shaughnessy, head of the IAQ research program at the University of Tulsa, who will speak about the link between cleaning and health outcomes.

“This year’s conference will be bigger and better than ever, featuring an expanded lineup of workshop sessions led by world-class leaders in indoor air quality,” says AIRAH Conference and Events Manager Marie Karekla.

The Sunday before the conference will see an additional half-day workshop, where presenters and attendees will debate whether 800ppm CO₂ is an appropriate benchmark for indoor air quality.

airah.org.au/iaq



Tonning up

Australian owned and operated firm Embelton Engineering is celebrating 100 years of operation. Founded in February 1925, the company now specialises in acoustical engineering.

“As Embelton embarks on its second century, it remains a leader in engineering solutions,” the company says in a statement. “With an unwavering commitment to delivering cutting-edge noise and vibration isolation systems, Embelton continues to shape the future of Australia’s built environment, driving innovation for generations to come.”

embeltonengineering.com



abc.gov.au

NCC delay

In a short statement on its website, the Australian Building Codes Board (ABCB) has confirmed that the 2025 edition of the National Construction Code (NCC) will not be published in line with the usual timetable, in May.

“Practitioners should continue working in accordance with the NCC version, and adoption timeline, currently in place in the jurisdiction relevant to their work,” the statement reads.

The delay is significant not just because of the provisions in the code, but because the NCC is the path through which new standards such as AS 1668.2:2024 will be called up into state and territory regulations.

The ABCB says it will provide another update when more information is available.



rinnai.com.au

Well warranted

Rinnai air conditioners now come with a seven-year warranty on a selection of systems. Rinnai says the extending the standard warranty from five to seven years offers long-term performance and peace of mind for homeowners and installers.

The new seven-year warranty applies to a range Rinnai air conditioning products purchased from April 1, 2025, including:

Split systems

- PB series: 2.6–8.0kW
- J series, T series: 2.5–8.0kW
- CJ1 series: 2.6–7.0kW
- CJ series: 2.5–7.0kW
- Floor consoles: 5.0kW

Multi-split systems

- Outdoor units:
- MON3H07B
 - MON4H09B
 - MON5H13B
 - MON6H18B
 - MON6H18B
- Indoor units:
- Slim ducted
 - Hi-Wall PB series
 - Floor console
 - Compact cassette

Ducted reverse-cycle inverter systems

Sizes: 7.0kW to 24.0kW

Rinnai notes that the warranty does not apply to home controllers or portable air conditioners.



Skilling up

National registered training organisation (RTO) Get Skilled is calling for expressions of interest for the remainder of its HVAC&R 2025 training courses. The courses are for ARC-licensed refrigeration and air conditioning technicians.

The RTO’s 2025 offer includes two courses specifically focusing on hydrocarbons: *UEERA0007 – Apply safety awareness and legal requirements for flammable refrigerants* and *UEERA0084 – Service and repair self-contained flammable refrigerants air conditioning and refrigeration system*.

“With more self-contained systems containing hydrocarbon refrigerants, this training is vital for technicians working on these systems,” Get Skilled says.

For the full list of training courses and dates, call 1300 856 832 or visit getskilledtraining.com.au

getskilledtraining.com.au



dcceew.gov.au

Auto licensing

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) has amended its regulations to reflect qualifications for automotive industry professionals who require a licence to handle refrigerants safely.

The following automotive qualifications are now recognised for granting a refrigerant handling licence (RHL) under the *Ozone Protection and Synthetic Greenhouse Gas Management (Refrigerant Handling Licences – Qualifications and Standards) Amendment Determination 2025*:

1. AUR32721 Certificate III in Automotive Electric Vehicle Technology, if the unit AURETU104 Diagnose and Repair Air Conditioning and HVAC Components is completed (either as part of or in addition to the qualification).
2. AUR32120 Certificate III in Automotive Body Repair Technology, if the units AURETU103 Service air conditioning and HVAC systems and AURETU104 Diagnose and repair air conditioning and HVAC components are completed (either as part of or in addition to the qualification).

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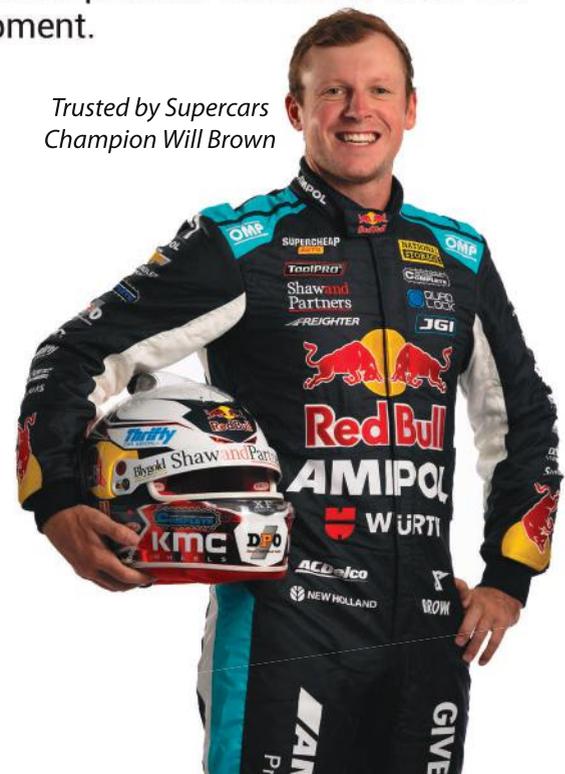
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NSW

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E: sa-nt@blygold.com.au

VIC/TAS

E: vic@blygold.com.au

WA

E: wa@blygold.com.au

New Zealand

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E: xavier@blygold.nz

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Finding the real wins in an election-focused Budget

AIRAH has noted the positives in an election-focused Federal Budget 2025–26, while also signalling missed opportunities.

AIRAH CEO Sami Zheng, Affil.AIRAH, says that with a federal election to be held in early May, it was no surprise that the Albanese government would look to provide immediate wins for voters.

“But we also need to remember the bigger picture,” says Zheng. “The world has just tipped over the 1.5°C temperature increase that the Paris Agreement was supposed to prevent. In fact, the Budget was only handed down because a tropical cyclone intensified by climate change delayed the election announcement. We can’t take our eyes off these major issues.”

Forward thinking needed

A headline announcement from the Budget was the \$1.8 billion over two years from 2025–26 to continue energy bill rebates of \$75 per quarter for eligible Australian households and small businesses until December 31, 2025.

Zheng says that while this money will help, it would ideally be directed to energy-efficiency initiatives.

“Paying part of someone’s bill is good in the short term,” she says, “but if we invest in better performing buildings that cost less to cool or heat, we can reduce their energy costs into the future – and reduce emissions at the same time.”

Although the Albanese government has invested strongly in supporting Australia’s net zero commitments during its term, there is less focus on the environment in this Budget.

“We do welcome the \$2 billion the government has allocated to recapitalise the Clean Energy Finance Corporation to invest in renewable energy, energy efficiency and low-emissions technologies,” says Zheng.



Sami Zheng

Training win

AIRAH has also applauded the provision of 100,000 free TAFE places every year from January 1, 2027, to help address the trade labour shortage.

“To make the most of this investment, we need to support our TAFEs with direct funding,” says Zheng. “It’s no good sending more students to facilities that are already struggling. Air conditioning and refrigeration, for example, is not a cheap course to run – the equipment and materials are expensive. AIRAH supports

increasing the government payment to TAFEs for each student. That way we can ensure that students who enjoy free education still have a valuable experience.”

As part of a push for greater productivity, the government has announced national licensing for electrical trades that will enable people to work seamlessly across state and territory borders without reapplying for a separate licence or paying additional fees.

“One of the biggest issues faced by HVAC&R technicians and contractors is the patchwork of licence conditions across the country,” says Zheng, “and AIRAH has long advocated for a harmonised system. We will be engaging in the development of this national licensing framework to ensure it also supports air conditioning and refrigeration trades.”

Overall, Zheng says the Budget contains highlights, despite being released in the shadow of an election.

“We understand the context and focus on the positive outcomes,” she says. “Whichever party wins the upcoming election, we will collaborate with them to strengthen our sector and achieve our vision of HVAC&R for a better world.”



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New mentorship program

The International Network of Women in Cooling (INWIC) has launched a new mentorship program.

The free online service aims to connect women professionals in the HVAC&R sector globally, fostering knowledge exchange and career development.

INWIC President-Elect and AIRAH President Mikaila Ganado, M.AIRAH, says the initiative is pivotal in connecting professionals globally, providing a free platform for women who may not otherwise have access to mentors, and offering invaluable insights from industry professionals worldwide.

“I am confident the program will facilitate long-term change, yielding benefits

for both the HVAC&R industry and the communities in which we live,” she says.

The program aims to build a skilled and empowered workforce by offering an accessible platform for women and is designed to be inclusive and accessible to professionals at all levels – such as technicians, engineers, managers, and industry leaders.

Women from the cooling sector are invited to join as mentors or mentees. To learn more about the INWIC mentorship program, scan the QR code:



Gender pay report released

The Workplace Gender Equality Agency (WGEA) has released its annual report on gender pay gaps in Australia, showing some progress towards equality during the 2023–24 financial year.

The WGEA says 56% of the 7,800 individual employers and 1,700 corporate groups surveyed reduced their gender pay gap during 2023–24.

The report also shows that 21% of employers meet the WGEA’s target of a gender pay gap of between -5% and +5%.

Encouraging signs

WGEA CEO Mary Wooldridge says it is encouraging that an analysis of both indicators shows that more than 1,100 employers (15%) are already in the target range of +5% for both measures.

“Each employer has a unique set of circumstances that impacts the size of their gender pay gap,” Wooldridge says.

“Where an employer’s gender pay gap is beyond the target range of +5%, it indicates one gender is more likely to be over-represented in higher paying roles compared to the other. This can be a sign of structural or cultural differences for one gender within an occupation, organisation, or broader industry.”

The WGEA notes that the gender pay gap is different to equal pay for equal or comparable work – which has been a legal requirement for employers since 1969.

Industry-specific data

While the WGEA sorts the statistics by industry and subcategories, there’s no specific data for the HVAC&R sector.

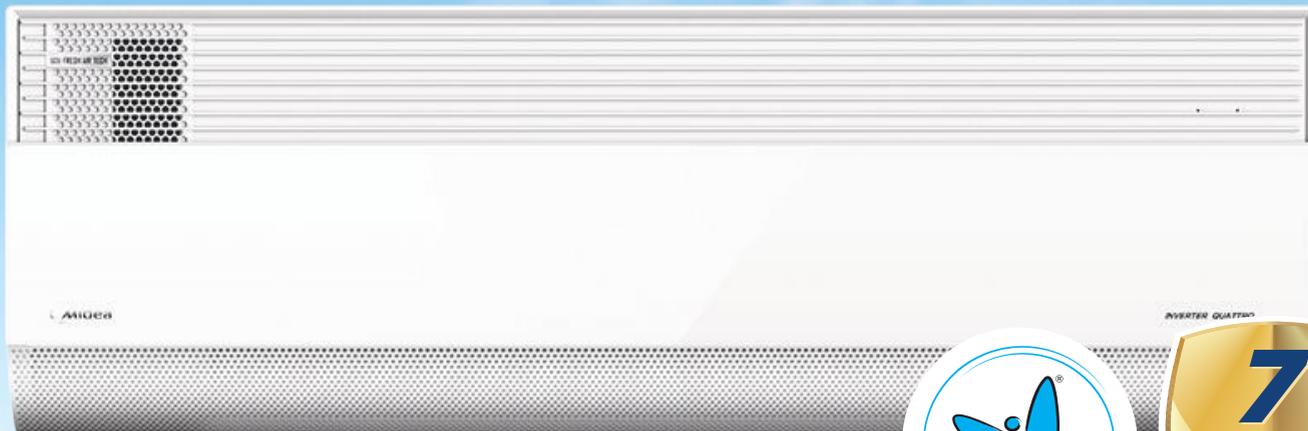
Data for the construction industry shows that the midpoint gender pay gap of 25.3% is more than double that of the overall midpoint gender pay gap, which sits at 12.1%. For comparison, the reported pay gap in construction in 2022–23 was 31.8%, although this wasn’t a midpoint figure, meaning that the results aren’t necessarily comparable.

Despite the apparent improvement, the construction industry remains the most imbalanced in Australia, both in terms of the overall percentage of women working in the industry (21%) and the pay gap.

Explore the data

You can access the free data explorer via the QR code.



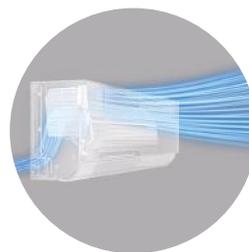


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Bring the outdoor fresh air in to replace the stale indoor air, while purifying air up to 60m³/h**.



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Control your air conditioner anytime, anywhere.



Quiet Operation

In Silence mode, the A/C can operate as low as 19.3dB (Example: Breathing).

*The test conducted at Intertek Testing Services Shenzhen Ltd., in 30.0m³/h air flow with DEHS Aerosol, report No. 230504050GZU-001. **The data is tested by Midea Laboratory, and based on the maximal fresh air volume 60m³/h with the room size of 20 square metres and 3 metres high. The product is equipped with 30m³/h fresh air as standard, while the maximum air flow can reach to 60m³/h if the hole is enlarged and the chamber is expanded in A/C installation. ***Self-cleaning mode reduces coil-trapped bacteria by 99.9% after 2 cleaning cycles, tested by UL Solutions (No. A802784). Visit <http://verify.ul.com> for further details.

Raising the bar for cooling towers

AIRAH, with support from the ARBS Foundation, is redeveloping DA17 to help improve the efficiency and safety of cooling tower systems.

Evaporative cooling towers remain one of the backbones of many HVAC&R and industrial cooling systems. DA17, AIRAH's design application manual for cooling towers and cooling water systems, is over 10 years old. It primarily discusses wet type evaporative cooling towers, however, wet and dry closed-circuit towers (hybrid, dry, adiabatic pre-cooled) and alternative methods of heat rejection (air-cooled, natural heat sinks) are also covered.

DA17 will be updated to promote the energy efficient application of evaporative cooling towers in the HVAC&R industry. This will include:

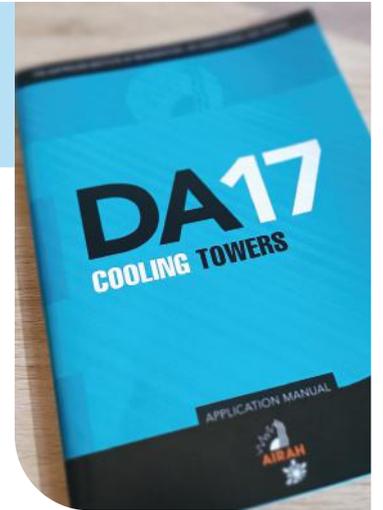
- ▶ Development of a set of industry-derived energy protocols for evaporative cooling towers
- ▶ Updating to reflect the latest developments in the industry, including changes to regulations, risk assessment, tower technology and system management via the cloud
- ▶ Updating to reflect any changes to AS/NZS 3666 standards
- ▶ Updating the resources on improving energy and water efficiency in existing cooling towers.

The manual is aimed at system manufacturers, designers, installers and

maintenance providers, as well as system owners and managers, operators and users.

AIRAH is inviting input from technical experts, industry practitioners and other stakeholders to assist with the review, either in developing new and alternative content, or in reviewing the proposed changes and updates and providing feedback.

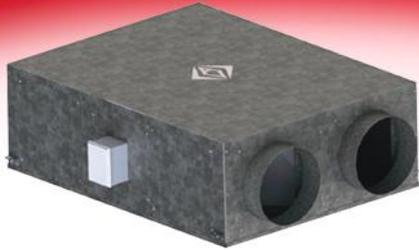
- ▶ Is there too much material on some topics or not enough?
- ▶ What is covered well and what is covered poorly?
- ▶ Is all of the material relevant to the Australian/New Zealand application?
- ▶ Can you propose material that will improve and enhance the document?



Get involved

If you have an interest in cooling towers and cooling water systems and would like to participate in the review project, please contact technical@airah.org.au.



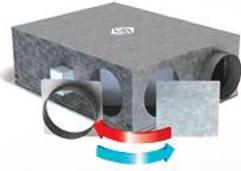


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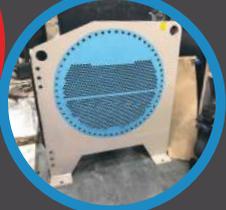
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HVAC&R SKILLS WORKSHOP

Air balancing procedures

MODULE 163

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WHAT'S IT ABOUT?

This skills workshop provides guidance on the importance of air balancing for thermal comfort and indoor air quality.

WHO'S IT FOR?

Relevant for HVAC&R technicians involved in the commissioning of HVAC systems in buildings.

This skills workshop, taken from the *TACA Standards and Procedures Manual*, covers air balancing – the process of testing, adjusting and balancing (TAB) air distribution systems, supply and return, intake and exhaust.

Introduction

No single balancing procedure is appropriate for all systems, as every system is unique, with its own set of characteristics. The proportional index method works effectively in most situations to minimise system resistance and is the accepted TACA method.

Index run

A supply air distribution system consists of duct runs from the fan discharge to terminals in the conditioned space. Air either returns to the suction side of the fan or air handling unit, or is relieved via another air path.

The pathway to the terminal with the highest resistance is called the **index run**.

During balancing, the manipulation of balancing dampers and other devices raises the operating point on the fan curve, which subsequently reduces the total supply airflow.

The internal static pressure (ISP) represents the losses associated with the air handling equipment internal componentry such as coils, dampers and sometimes filters. The external static pressure (ESP) represents the sum of the pressure losses imparted by the ductwork and any components or accessories along the index run (such as branch dampers, VAV terminals and air terminals). The total static pressure (TSP) is the sum of the internal and external static pressures ($TSP = ISP + ESP$).

The TSP required by the fan is therefore determined by the overall duct run with the highest pressure drop. This includes all fan suction side terminals, ductwork, components and accessories plus all fan downstream discharge terminals, ductwork, components and accessories. The duct run with the highest-pressure drop is often the duct path with the longest duct length, however this is not always the case.

Proportional index method

The index outlet must be identified prior to the commencement of any balancing when using the index method. It is typically the furthest terminal from the fan and is the terminal that has the highest pressure drop and the lowest ratio of measured airflow compared to its design airflow while the system is in the open unbalanced state.

During balancing, the terminal that has been identified as the index – along with the duct pathway to the terminal – is left in its fully open state.

The technician then closes the balancing mechanism on the terminal with the second lowest airflow ratio, until this terminal and the index terminal have close to matching airflow ratios. The process then repeats for the third lowest terminal where it is referenced back to the index terminal and the whole process continues as per the procedure below until all terminals have been adjusted and balanced.

Balancing procedure

Pre-balancing procedure

For new systems, carry out the following pre-commissioning steps first:

1. Perform electrical checks prior to starting the system.
2. Confirmation overload protection is set correctly.
3. Perform a dry run of equipment controls and electrical systems prior to energising air handling equipment.

⚠ CAUTION

Electrical works should be conducted by a licenced and competent electrical tradesperson.

4. Once power is activated, check fan direction.
5. Measure current draw of the motor, and confirm it is within the limits of the motor's full load amperage. Determine the reason or adjust the fan speed if excessive.
6. Confirm any drawings used are the latest revision and verify that the mechanical system is installed according to the drawings.
7. Inspect and confirm all volume control dampers, (including branch dampers and outlet dampers) are in the fully opened position.
8. Inspect and confirm all outlet/terminal deflection vanes are pre-set.



9. Consider the most accurate means of determining airflow rate for the applicable airflow paths in the system.

Ideally a pitot traverse should be performed in appropriate locations, away from areas of flow disturbance such as bends and transitions. Pitot traverses for the following airflow paths should be considered where a suitable location is available.

- ▶ Total supply air
- ▶ Total return air
- ▶ Outdoor air and minimum outside air
- ▶ Floor zone locations
- ▶ VAV terminals

10. Set the system to its normal operating system resistance mode. Typically, the system is set to full cooling mode with maximum return airflow and minimum outside air (assuming no return air fan is utilised by the system).
11. If necessary, measure and confirm the total supply airflow rate is within 100–110%. Adjust the fan speed if required.

NOTE:

On small systems or duct branches, there is no need to set the total airflow within 100–110% of the design prior to reading the outlets or terminals. Setting small systems or the branch as close to design airflow as practical, prior to balancing, reduces the amount of rebalancing when the outlets or branches are delivered with design airflow. Generally, when airflow is increased or decreased to a duct or branch, all outlets will increase or decrease proportionally; however, when the airflow is increased or decreased outside of 70% to 130% of design, many of the outlets can become out of balance due to the large change in duct velocity.

12. Conduct air balance of system inlets or outlets in accordance with the procedures detailed below.

Proportional index method air balancing procedure

1. Establish a hood K-factor for each outlet type.
2. Measure the airflow of each outlet and calculate the ratio of actual airflow to design airflow.
3. The outlet with the lowest percentage of design is designated as the index and its balancing damper is set in the fully open position. This index outlet should be inspected to ensure its associated flexible duct is not restricted or its terminal cushion head to outlet interface adaptor is not leaking prior to commencement of balancing. Rectify any problems relating to leakage and duct restrictions if found, then repeat the air measurement at step 2.
4. Once the index outlet has been checked and verified, balance the outlet with the next lowest percentage of design until both outlets measure the same percentage of design.
5. Continue to adjust dampers in order from the next lowest percentage of design to the highest, by comparing the percentage of airflow of each subsequent grille to the index grille percentage until all dampers have been adjusted and in proportional balance.
6. Following completion of the air balance, it may be necessary to adjust the fan speed to ensure all outlets are +/-10% of design.

Commissioning completion

1. Set the total return air and outdoor air to within 100% to 110% of design airflow. Should the outdoor airflow drop below 100% of design during this procedure, then it is acceptable for the return air to be adjusted just below design to ensure outdoor airflow design is achieved.
2. On completion of air balancing, conduct pitot traverses of the total supply air, return air and outdoor air to confirm that the system is still within a 100–110% range. Make any necessary adjustments to dampers, fan speed and other system components as necessary to ensure the airflows are within the acceptable tolerances.
3. Conduct a final complete set of airflow measurements and record.
4. Measure and record final fan speed information, including motor amperages and voltages, RPM and speed, in addition to duct static pressures, filter and coil pressure drops and final damper positions.

NOTE:

To capture the final operating pressures, it is acceptable to provide a sketch of the unit including the fan, dampers, coils, filters and any other apparatus contained within the unit, and provide a complete pressure profile. Each pressure reading shall be referenced to atmosphere or the same location.

Pressure-independent VAV overview

This type of VAV box modulates its internal automatic control damper in response to the airflow measured by its integrated velocity sensor. The VAV controller compares the measured velocity with its target airflow setpoint, which is calculated as a function of the associated room temperature and modulates a control damper within the VAV terminal accordingly.

The VAV controller will attempt to maintain the target airflow rate regardless of changes in VAV inlet pressure.

Pressure-independent VAV balancing and calibration

Pre-commissioning procedure

1. Check that all the associated VAV terminal controls to be balanced are operative, accessible, and adjustable by the balancing technician. Assistance may be required from the controls contractor to manipulate and adjust the VAV controls during balancing and calibration.
2. Verify that the correct V_{max} and V_{min} airflow design quantities have been programmed into the VAV terminal controller.
3. Check that the BMS is operative so that the AHU can be adjusted as required.
4. Set all VAV terminals to V_{max} position.
5. Set the AHU static pressure set point to a nominal figure. This will ensure that the AHU maintains a constant static pressure in the branch duct. Ensure all boxes are controlling (VAV damper position must be below 100%; it is recommended that boxes control between 60% and 90% to assist with calibrations).

VAV calibration

Calibrating VAV terminals is an important process to ensure correct operation once installed. It is important to note that if a box has been factory-calibrated, site installation factors such as the location of bends and other duct fittings can impact the accuracy of the VAV terminal airflow readings.

1. Drive the VAV terminal to its V_{max} position via the BMS. This can be done with a proprietary balancing tool or with the assistance from the control's contractor.
2. Traverse the inlet of the VAV terminal to confirm the airflow volume once the VAV terminal stabilises.
3. Calibrate the VAV controls to align the actual V_{max} air volume measured with the VAV terminal V_{max} air volume reading. This is often accomplished by adjusting a K-factor within the VAV controller program.
4. Drive the VAV terminal into V_{min} position via the BMS.
5. Traverse the inlet of the VAV terminal to confirm airflow rate once the VAV terminal stabilises.



6. Calibrate the VAV terminal to match the actual V_{min} air volume measured to the VAV terminal V_{min} air volume reading.
7. Record the measured V_{max} and V_{min} airflows and flow K-factor.
8. Set the VAV to V_{min} once calibration has been completed.
9. Note: If the VAV terminal uses electric duct heaters, they should be tested at this stage in accordance with the applicable local codes and standards.

Proportional balancing VAV box diffusion

The following steps are to be taken to proportionally balance outlet air diffusion following the calibration of the VAV terminal.

1. Drive the VAV terminal to its design V_{max} position airflow via the BMS.
2. Conduct a proportional balance as per the procedure detailed in section 5.4.2.
3. Once all outlets are in proportion with each other, confirm VAV air volume is still at V_{max} and traverse the inlet.
4. Apply a hood K-factor to the outlet readings based on the ratio of outlet readings versus the VAV inlet traverse.

NOTE:
The hood K-factor correction should not exceed 110% of the traversed actual airflow. Should the K-factor calculation exceed 110% of the actual airflow, determine the reason for the error and correct or document the findings.

5. Record the factored V_{max} outlet airflows.
6. Set the VAV terminal to V_{min} once the proportional balance has been undertaken and record airflows.

NOTE:
Do not re-adjust the outlet balance at minimum airflow, as it's common for them to go out of balance.

7. Complete these steps for all VAVs in the system.

Setting AHU static pressure setpoint

Following the calibration of the VAV and proportional balancing of associated diffusion, the AHU target static pressure (SP) setpoint is derived.

The first step is to determine whether airflow diversity needs to be considered when determining the SP setpoint. If the sum of the maximum airflow (V_{max}) setpoints for all downstream VAVs is greater than the total design airflow of the AHU, then diversity has been designed into the system.

In this case, not all VAVs are required to achieve their maximum airflow setpoint (V_{max}) at the same time. The designer should ideally specify the locations, zones, and areas where system diversity is required (diversity profile) to ensure the proper setting of the system.

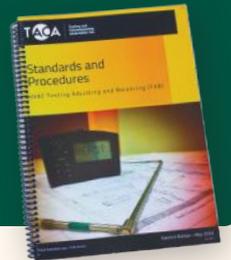
The following steps are to be taken to correctly derive the AHU static pressure setpoint:

1. Calculate system diversity by dividing design AHU air volume by the sum of the design VAV V_{max} air volume (where AHU airflow is less than the sum of all VAV airflows at their maximum design flow)
2. If diversity is built into the system, then VAVs will be set to either V_{max} or V_{min} according to the designer's airflow profile. If the AHU design airflow is equal to or greater than the sum of all VAV airflows at their maximum design flow, then all VAV terminals on the system can be set to maximum (V_{max}) airflow.
If no diversity is built into the system, then all VAVs will be set to V_{max} .
3. Manually raise the system static pressure and monitor VAV damper positions via the BMS until the index VAV damper is controlling its V_{max} airflow in the 80–95% range.

4. Record the static pressure measured on the BMS; this is to be set as the static pressure set point for the AHU.
5. If a suitable location exists, traverse the main supply air branch. This air volume should equate to the sum of the VAV terminal volumes read by the BMS.

NOTE:
On large systems that may serve several floors of VAVs, there is likely to be a difference in the airflow measured at the AHU and the total sum of the downstream calibrated VAV terminal airflows. This difference is generally due to leakage in the high-pressure duct from the discharge of the AHU to the inlet of each VAV. The difference between the two measurements should not exceed 110% of the VAV total to ensure that the cooling coil face velocity and fan power is not excessively exceeded at maximum airflow.

This month's skills workshop is taken from chapter 5 of the *TACA Standards and Procedures Manual*.



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Shadow of doubt

Donald Trump's return to office has had a seismic effect on global markets and muddied the pathway to net zero emissions. Will the Australian HVAC&R industry feel the aftershocks?

Nick Johns-Wickberg

EDITOR

✉ nick.johnsw@airah.org.au



Whatever your thoughts on him politically and personally, there's no denying that US President Donald Trump is a human headline. Since returning to office in January 2025, Trump and his allies have dominated the news cycle with sweeping tariffs on imports, widespread and aggressive cutbacks on US government jobs, and a few scandals for good measure.

By April 2, 2025 – dubbed "Liberation Day" by Trump – the administration had imposed:

- A baseline of 10% tariffs on all imports, including those from Australia
- Higher tariffs on countries deemed to have "mistreated" the USA, including 34% for China (with the possibility of further huge increases), 20% for the European Union, and 24% for Japan
- 25% tariffs on cars and car parts
- 25% tariffs on aluminium and steel imports, including metals produced in Australia.

The situation is unpredictable and evolving rapidly; by the time you read this, there's every chance several other controversial trade policies could have come into effect. Global markets have already plummeted in the wake of the news, with more short-term pain expected.

But while the steel and aluminium tariffs were stealing global headlines, the US Environmental Protection Agency (EPA) announced something potentially more consequential on March 12. In what it described as the "biggest deregulatory action in US history", the EPA announced 31 "actions" that would weaken protections around carbon emissions, air and water quality.

In this article, we'll look at both the economic and environmental ramifications of the Trumpian revolution, and how these could potentially flow on to affect the Australian HVAC&R industry.



Tariffs explained

Before we explore the issue any further, it's worth clarifying how tariffs work and what they aim to achieve.

Tariffs are taxes on imported goods. They are paid by the domestic companies that import the goods, and not – as Trump has insinuated on several occasions – by the foreign companies that sell those goods.

Let's use a hypothetical scenario to see how this could play out.

A US company – let's call it Yankee HVAC Wholesales – wants to buy US\$1 million worth of steel from an Australian company called True Blue Steel. Before the recent imposition of tariffs, Yankee would have simply paid US\$1m in total for the steel. That's thanks to the free trade agreement between the two countries, which has been in place since 2005.

Now, because of the 25% US tariff on steel and aluminium that came into effect on March 12, Yankee will have to pay US\$1.25m in total: \$1m to True Blue and \$250K as tax to the US government.

While the tariff on steel directly increases costs for Yankee, it could well have flow-on effects for other businesses and consumers. As a wholesaler, Yankee might pass part or all of the cost of tariffs on to retailers, who could then pass those costs on to consumers.

Even True Blue in Australia could feel the effects; they might have to lower their prices to encourage companies like Yankee to continue buying their products. If they can't reduce their prices enough, they might lose access to the US market altogether.

Insular America

Tariffs are considered a protectionist economic policy. They aim to stimulate local manufacturing and discourage American businesses from looking elsewhere for goods and raw materials. Trump often describes them as a way to "make America great again" and get back at trade partners who he says have been exploiting his country.

The problem is that the USA simply doesn't have the capacity to manufacture everything it consumes. Even if these protectionist policies are successful at encouraging companies to bring manufacturing back to the USA, it will take years to establish the facilities and infrastructure to do this successfully at scale. And higher US labour costs mean that, even taking the tariffs into account, it will still likely be cheaper to import many goods and materials from abroad.

Given that these tariffs are likely to increase out-of-pocket costs for consumers, several political commentators have questioned whether Trump actually understands how tariffs work. Some theorists even argue that implementing tariffs is a socialist policy, as it increases tax revenue and stifles free trade.

Whether or not tariffs are a good idea, it's clear that the USA is committed to going down this path for at least the next four years. So how will this policy affect us in Australia?

Flow-on effects

Mark Padwick is the treasurer and former president of the Air-Conditioning & Refrigeration Equipment Manufacturers Association of Australia (AREMA). He notes that, as it stands, the direct effects of US tariffs on the Australian HVAC&R sector will be minimal.

"The current tariff changes in the USA reflect the import of materials into the USA," Padwick says. "Little of our industry is affected by this, as we import far more products than we currently export, and the US is not a large market for these exports."

"It is our understanding that the buyers in the USA will manage the cost increases by pushing them onto their domestic consumers for those products they cannot source locally."

However, there's more to the story. As Padwick notes, while US buyers will have to bear the direct costs, price increases in the US could eventually cause prices in Australia to rise too.



"Whatever the impacts are here, they are insignificant compared to those in other markets globally"

Mark Padwick
AREMA Treasurer

"For some products exported from the USA, the higher costs imposed on US manufacturers because of the tariffs will eventually be passed on to their export customers, including in Australia," Padwick says. "That said, how much and when the price changes will come is a big unknown."

AREMA has had conversations with HVAC&R industry bodies in the US, Canada, Europe and Asia. Padwick points out that these industry bodies are bracing themselves for the worst.

"Each of those organisations made it clear that the tariffs are by far the most profound impact on the RAC industry in their countries for a generation," he says. "Whatever the impacts are here, they are insignificant compared to those in other markets globally."

A silver lining?

With the USA withdrawing from the global economy, Australia could become a more attractive market for businesses from abroad.

"As tariffs are imposed on their exports of metals to the USA, global businesses may look to other markets to fill their sales gaps because of reduced sales to the US market," Padwick says. "Manufacturers based in Asia and Europe will likely look to other market opportunities – including Australia – should price impacts in the US mean their products are uncompetitive there."

However, Padwick warns that there are also risks associated with increased involvement in the global market.

"We will need to guard against the dumping of products in Australia," he says.

Home ground advantage

Damien Walsh is the Chief Customer Officer at Temperzone, an HVAC&R manufacturer that sells primarily to the Australian, New Zealand, and Asia-Pacific markets, with manufacturing facilities located in Sydney, Auckland and Hamilton.

Walsh points out that, while nobody can use a "crystal ball" to forecast the effects of radical policy shifts like Trump's widespread implementation of tariffs, he doesn't see the news having an immediate or profound impact on Australian HVAC&R manufacturers.

"From a local perspective, with Australia and New Zealand being our principal market, we don't see too much changing at the moment," Walsh says.

However, he notes that companies that rely more heavily on international trade are likely to be affected, with economic concerns running deeper than just the tariffs themselves.

"If you're a global company and you've had a large part of your global market impacted, then that will have a huge effect," he says.

“The weakening dollar will be a greater concern for those who do not manufacture locally.”

Damien Walsh
Temperzone CCO



“What’s more of a factor is what happens with the economy. The weakening dollar will be a greater concern for those who do not manufacture locally.”

Indeed, the Australian dollar has fallen around 12% against the euro in recent months. In the days after Liberation Day, its value dipped below 60 US cents. A weaker Australian dollar would increase the price of imports, including some HVAC&R components that can’t presently be manufactured locally.

Walsh identifies some similarities between Trump’s trade war and the last event to cause major disruption to global markets: the COVID-19 pandemic. He says the pandemic drove home the value of local manufacturing.

“We noticed more interest from clients buying locally during COVID,” Walsh says. “Having continuity and stability with local products and expertise became more important to clients as global supply chains were disrupted.”

“People should be considering buying Australian-made products anyway,” he adds. “But the most important factor in encouraging people to buy locally was the shift in the mindset around supply chain disruption during COVID.”

While the pandemic caused major delays in physically transporting goods, Walsh doesn’t expect Trump’s trade war to have the same effect.

“What is happening is not interrupting supply chains,” he says.

Uncertain times

Despite Australia’s relatively strong position in all of this, uncertainty is insidious. Padwick notes that disruptions in the USA could have flow-on effects to Australia, with uncertainty playing a key role.

“We may see reductions in freight as product movement in and out of the USA reduces,” Padwick says. “We might also see changes in our market should tariffs be imposed on other sections of our economy, which could result in changed market conditions for air conditioning and refrigeration equipment.”

Padwick acknowledges that there is concern about this market uncertainty within the Australian HVAC&R manufacturing sector. However, he is optimistic that things will settle down both in Australia and abroad.

“There are a broad range of market and policy/

regulatory issues at play,” Padwick says. “The market is dynamic and likely entering a period of change. Hopefully the international trade settings become clear and Australian policy initiatives become more certain post-election, which will provide market stability.”

Slashing and burning

Tariffs are only part of the Trump effect. Another move that could have longer-term impacts is a widespread rollback of environmental regulations, which the EPA says will “unleash American energy”. While these rollbacks have not yet been finalised, it seems deregulation will advantage fossil fuel companies while weakening restrictions on carbon emissions and pollution. And if we’re to believe the administration’s rhetoric, there are many more environmental rollbacks to come.

Alison Scotland is the CEO of the Australian Sustainable Built Environment Council (ASBEC). She notes that, while the Trump administration’s targeting of environmental protections is disheartening, it’s not the first time that the climate movement has faced hurdles of this kind.

“The clean energy transition needs to be like water and flow towards other channels,” she says. “Having lost the US global leadership on climate, that’s a blow. But leadership is happening in other countries and coming from the investment community as well.

“When I think of ASBEC’s 20-year history, there also have been times when there hasn’t been any sort of government leadership around net zero. Nevertheless, progress still occurs because there are productivity arguments, health arguments, economic arguments for positive and sustainable change in the built environment ... regardless of emissions reduction commitments. Those commitments definitely help though!”

Smart money

While Scotland acknowledges the possibility that Trump will embolden climate deniers to abandon net zero goals, she doesn’t expect that to be the case in the built environment sector in Australia or elsewhere.

“I think it still makes economic sense to invest in the clean technology transition,” Scotland says. “Regardless of the what the USA does during one term of government to blow up whatever progress they’ve made, there’s still hope and action happening across the globe.

“It still makes economic sense to invest in the clean technology transition”

Alison Scotland
ASBEC CEO



“Europe, the UK, and even China are making great progress on sustainability because it’s good for business and creates new revenue streams. Even the principles of circularity make economic sense – for example, if this crisis drives up the cost of building materials, we need to focus on making the most of our resources, reducing waste, changing our behaviours and construction practices.”

Amid all the uncertainty, one thing seems clear: the next four years will be a roller coaster, and Australia will need to brace itself for the unexpected.

Kigali Amendment at risk?

One policy that is particularly relevant to the HVAC&R industry is the Kigali Amendment to the Montreal Protocol, which aims to phase down the use of hydrofluorocarbons (HFCs) such as those present in many synthetic refrigerants. Australia led negotiations around the amendment and signed on in October 2017. The Biden administration ratified it in 2022.

While the Trump administration has not yet made any moves to withdraw the USA’s ratification of the amendment, the fact that the previous Trump administration withdrew from the Paris climate agreement – coupled with the EPA’s recent push for mass deregulation – suggests such a move might be on the cards.

Demand response: cause for DRED?

Demand response programs for residential air conditioning have raised concerns about invasions of privacy and interference from the all-seeing eye of government. But as Louise Belfield discovers, this power saving measure is less scary than it seems.

Reporting on demand response for air conditioner use is often sensational, drilling home the claim that “the government can turn off your air conditioner.” While this might technically be true, it’s not the whole story.

Demand response is currently a voluntary or incentivised shift in electricity consumption by consumers, including households, businesses, and government agencies. It’s designed to help reduce peak demand, improve grid reliability, and lower electricity costs. The key word is “voluntary” – nobody is forced to sign up to these programs, although that might change in the future.

What’s not voluntary in some places is the technology itself. In South Australia, manufacturers must now build demand response enabling devices (DREDs) into all new air conditioners. DREDs allow electricity providers to remotely control how much power appliances such as air conditioners can use during peak demand periods.

Mandatory for manufacturers

Mandatory DREs for air conditioning “absolutely need to be part of the energy mix”, says Dr Greg Picker, Executive Director at the Air Conditioning and Refrigeration Equipment Manufacturers Association (AREMA). “But genuine consultation is needed to achieve real recognition of what the equipment can and can’t do.



“To think that we will get good products specially designed for Australian Standards that are specific to us, at less than 2% of the global market, is naive.”

Dr Greg Picker

“Mandatory Australian Standards are a great place to start, but you have to actually engage with the industry sector to understand the nuances.”

For instance, “from 2010 through to around 2012, the expectation was that demand for electricity across Australia, particularly on hot afternoons, was going to skyrocket and be unsustainable”.

“As part of that, we had the development of voluntary Australian Standards that looked at capacity and equipment. This was before WiFi, so all the standards were wired standards.”

The 2012 standard had three levels of response, all of which were voluntary, he says. At the time, almost everybody who manufactured equipment implemented the standard, but nobody took it up, other than in the small Magnetic Island project, Picker says.

But when the South Australian power grid collapsed for four or five days in 2019, something had to be done.

“They tried to implement regulations that called on the 2012 standard, but they started with a 2014 standard that was also voluntary, that no one could meet,” Picker says.

This standard talked about percentages, “not in terms of an absolute but as a reduction from what the equipment was already driving. So a 50% reduction wasn’t 50% output. If you were already at 70% it was a 35% outcome, or if 40% it was a 20% outcome”.

“But inverter technology doesn’t work like that; it’s not infinitely scalable. So the proposal that South Australia came up with was technically not possible, which is the reason why, when everybody started looking at the voluntary standard, nobody went ahead with it.

“Eventually, the South Australians agreed that they would have a longer period using the 2012 standard, but from July 1, 2025, would revert to their preferred approach of a 2014 standard, or any subsequent revised standard.”

Keeping people safe

While Memery acknowledges that automated demand response could take people by surprise, he cites a successful program on Queensland’s Magnetic Island where all participation was voluntary.

Air conditioners were modified “by something like just one degree” to acclimatise people to the change, then that change increased incrementally. This was a user-friendly way to identify anyone who had health concerns about having the temperature varied in their energy-inefficient home, he says.

“In Australia, we’ve got really strong consumer protections for retail energy customers, so that prevents people getting nasty surprises.”

Queensland’s PeakSmart group program, offered by Energen (southeast Queensland) and Ergon Energy (regional Queensland), provides incentives – including cashback up to \$400 – for installing or converting air conditioners to PeakSmart-compatible models. This helps manage peak electricity demand and allows people to save on air conditioning.

That works well, but it’s important that people aren’t harmed. For example, PeakSmart has to ensure people with thermoregulatory illnesses don’t accidentally sign up for something that endangers them during a heatwave.

“We still need to ensure that consumer protections are in place so people aren’t disadvantaged or harmed by any voluntary demand response program,” Memery says. “We already have protections in other areas throughout the energy system; for example the life support register, which allows certain people to maintain their power if it’s about to be cut off.

“My job is to help people understand their systems, such as how the simplest thermostat can work. You can set a thermostat to 22°C, but at certain times of day, different buildings can be two or three degrees above or below that position depending on the orientation of the building and the thermal qualities of the home.”

There is a real opportunity to make demand response work for the HVAC&R industry through standardisation and interfaces that allow for flexibility in how the demand response is enacted at a physical level, Memery says.

With the world facing climate change and a host of other issues, “we need the smart stuff to help protect against those temperature extremes”.



“We still need to ensure that consumer protections are in place so people aren’t disadvantaged or harmed by any voluntary demand response program.”

Craig Memery



Louise Belfield

CONTRIBUTING AUTHOR

The energy market

Craig Memery is Senior Advisor for Energy at Sydney’s Justice and Equity Centre and a champion of demand response programs. He is an energy policy expert and consumer advocate who focuses on ensuring people are not disadvantaged by voluntary participation.

“The demand response rule aims to save hundreds of millions annually by avoiding high wholesale energy spot prices,” Memery says.

“There have been many attempts to get this mechanism up and running, but there have been some challenges with implementing it because of a combination of invested interests.”

Electricity generators protecting their profit margins tend to see demand response as competition, and many consumers don’t understand changes like this at first, he says.

Despite this, he says demand response is a great opportunity to improve efficiency and fair access to energy.

“By using energy voluntarily, we can produce it more flexibly, help alleviate thermal constraints and constraints on distribution and transmission networks, and it can be used by customers themselves to shift demand from up-peak to off-peak.”

It can also help to integrate variable renewable energy sources such as solar and wind into the grid by providing flexibility in demand.

“Demand response is actually a reform of the national energy market,” Memery says. It has the potential to bring down the wholesale prices that all the states and territories currently pay, he adds.

It is entirely voluntary for consumers; mandatory involvement is only for manufacturers.

“For instance, all air conditioning units sold in South Australia now need to have the demand response capability and comply with the standards. And there’s a potential for this to come into effect in other states in the future.”

The new standard (AS4755.3.1:2025) is not yet available, but will be published soon. It is essentially a revamped, more precise version of its 2012 counterpart, Picker says, "because nobody can meet the 2014 standard".

Appreciating the complexity of the systems is just one of the issues. "Regulators don't understand that the computing power in air conditioners is extraordinarily limited. It's on, its off, there's temperature, and there's a variety of performance outputs that it can reach, and that's it."

"Nobody puts extra smarts in there because there's nothing for it to do, and asking it to do more becomes really problematic."

Global standards

One of the biggest issues with the development of an Australian Standard is that equipment is built to global standards, Picker says.

"Nobody's going to build for Australia and sure as hell no one is going to design a production line for an Australian Standard for an Australian state. We are far better off aligning ourselves with international standards and working through that. This is a global industry, with globally manufactured products."

Complicating this are moves to significantly enhance cybersecurity around the electricity grid, he adds.

"Air conditioning got thrown into it at the last minute, but we don't actually have the capacity to do everything that governments and regulators want us to do."

"An air conditioner that's WiFi-enabled goes to that company's proprietary server, typically located overseas. If implemented, the proposed requirements will have to go to an Australian server with special and higher-level intelligence. And air conditioning equipment just doesn't support that."

Companies don't have the money or the capacity for the investment, he says, "and we don't think it's needed, because it's not like something could somehow take control of all the air conditioners in the country, because they're all on different systems. So there's a failure to recognise the realities on the ground".



Slow progress

While Picker thinks demand response is a worthwhile policy initiative with strong interest, even in South Australia "nobody's taking it up".

He believes there are more efficient ways of saving energy, such as using smart meters, where, if electricity demand were high,

consumers would be offered an immediate payment of around \$30 off their bill to reduce their electricity demand by half over the next two or three hours.

Something like this would allow individuals to be in control of their decisions and doesn't require redesigning equipment, he says.

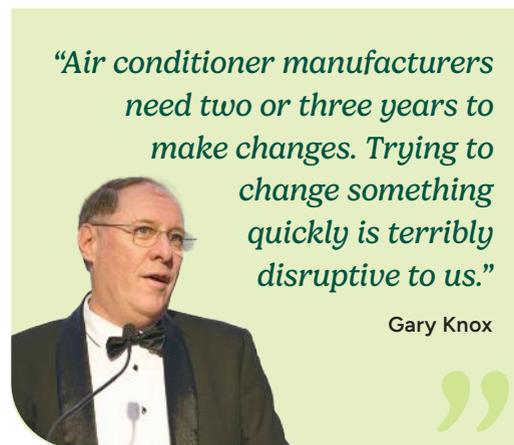
Excess solar destabilising the grid is another concern. "We need a national approach to all these issues. I get worried when states do it individually. And there are legislative changes that need to happen to cover demand response."

"Australia needs to be a little more sophisticated and align our approach with international standards. To think that we will get good products specially designed for Australian Standards that are specific to us, at less than 2% of the global market, is naive."

Unreasonable expectations

Gary Knox, F.AIRAH, is an engineering manager at Daikin. He agrees with Picker's concerns, highlighting the challenges in implementing the Australian Standards, and says manufacturers need reasonable timeframes to adapt.

"Currently, there are basically no rules for



consumers around demand response," he says. "For demand response to work you need a couple of entities. One is the electricity retailer, and the other is the demand response aggregator."

"But the electricity industry has to abide by national electricity law, and that's handled by the Australian Energy Market Commission (AEMC), the rule-maker for Australian electricity and gas markets."

"In Queensland, the peakSmart program has close to 200,000 participants. They don't get paid every time the electricity is turned down on their air conditioner, but receive one-off rebates of about \$400 when they sign up. So somebody who signed up five years ago is potentially getting their air conditioner reduced a few times during summer, and they're not really even noticing it."

"But if the energy companies aggressively reduce the air conditioner consumption on the hottest days so much that people notice, then these people would want to disconnect."

"South Australia is a different kettle of fish. They're actually not doing any demand response. Instead, they made it mandatory for equipment

that's installed to have the capability ... so that in three or four years' time, when the rules change, they can start up these programs."

"They want to create a program with an aggregator, like the Queensland example, and sign up maybe 20,000 people, and pay \$20 off their bill or something like that each time they reduce the power on the air conditioner."

The HVAC&R industry is basically supportive of demand response, Knox says, and the electricity industry is trying to come up with rules.

"But they're always in a terrible hurry. They make up a rule and want it enforced in six or 12 months' time. But 12 months is a terrible disruption to supply chains. Air conditioner manufacturers need two or three years to make changes. Trying to change something quickly is terribly disruptive to us."

"Manufacturers are happy to make these changes as long as they harmonise with international standards and are given adequate time. People think that we can just kind of do it, and it's done. But it's a big deal to change stuff."

No impact on fridges

The demand response rules in South Australia have barely caused a ripple for installer Mark Simmonds, who runs Simmonds Heating & Cooling in Adelaide.

While new air conditioners must have the capacity for direct control, the government has not yet implemented the necessary infrastructure, Simmonds says. As a result, the rules currently do not impact his business workload or costs at all. But he says manufacturers have been affected by needing to produce different parts for different states.

All new air conditioners sold in South Australia need to be able to manage power shortages and grid issues by allowing control panels to shut down suburbs for an hour, he says. But while the air conditioning units themselves comply, the infrastructure doesn't yet support demand response.



"The cost of air conditioners has increased by \$50 to \$100 to accommodate the potential future demand response controls, but nothing's actually changed. They've been talking about this for 10 years, and in 10 years they'll probably still be talking about it. And when there is infrastructure, everyone's going to disconnect it anyway," Simmonds says.

"There was a trial done 15 or 20 years ago in Glenelg, where the council wired up all these controls on houses so that they could turn air conditioners off during big heatwaves, but every man and their dog just turned them off.

"So every time we go to a house these days, everything's been disconnected and removed. I think the new plan is it for it to be a lot more controllable by a third party or a government infrastructure. But for now, there's no use having a Lamborghini if you can only drive on roads at 60 kilometres an hour!"

Getting it right

Ultimately, getting demand response right is "a very difficult area", Picker says.

"The cooling sector is responsible for 22% of electricity use in the country. Of course, we have to be part of the solution. I'm just saying it's important to get it right."

Australian Standards for demand response

Wired interface

AS/NZS 4755.1:2017

Demand response capabilities and supporting technologies for electrical products: Demand Response Framework and requirements for Demand Response Enabling Devices (DREDs).

AS/NZS 4755.3.1:2012

Demand response capabilities and supporting technologies for electrical products: Interaction of demand response enabling devices and electrical products – Operational instructions and connections for air conditioners (the 2014 version is not viable).

AS 4755.3.1:2025

Demand response capabilities and supporting technologies for electrical products, Part 3.1: Interaction of demand response enabling devices and electrical products — Operational instructions and connections for air conditioners (soon to supersede the 2012 and 2014 versions).

Wireless interface

DR AS 4755.2:2025

Demand response capabilities and supporting technologies for electrical products, Part 2: Demand response framework and requirements for communication between remote agents and electrical products.

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REFCON ♦ 25

AIRAH'S REFRIGERATION CONFERENCE

What we learnt at RefCon25



Pachai highlighted how carbon dioxide (CO²) and ammonia (NH₃) are becoming increasingly popular in European HVAC&R – the former for domestic and small business uses and the latter for large industrial solutions. He also shared his experiences from the recent Chillventa expo in Nuremberg, where propane (R290) was the refrigerant of choice for most exhibitors.

Jan Dusek from ATMOSphere – a global, independent market accelerator for clean cooling and natural refrigerant solutions – echoed the sentiment. His presentation focused on the prevalence of natural refrigerant installations in regions across the world.

Dusek's statistics reiterated Europe's status as the global leader in natural refrigerants. He showed that 30% of food retailers in the UK use transcritical CO² for refrigeration compared to just 8% in Australia and only 1.8% in the USA.



Dr Alemu Tiruneh Alemu, M.AIRAH,

AIRAH's 2025 Refrigeration Conference was billed as the hottest conference for the coolest industry, and it didn't disappoint.

Keynote speaker,
Alexander Cohr Pachai,
AM.AIRAH



Held at Rydges Melbourne on March 24, RefCon25 kicked off with a timely reminder from AIRAH President Mikaila Ganado, M.AIRAH, that our industry needs to break down silos, especially the perceived gulf between the refrigeration and HVAC sectors. The conference's content reflected this, with some presentations that focused heavily on the refrigeration sector and others discussing topics that affect the HVAC&R industry more broadly.

Here are some of the key themes and discussions that emerged during the conference.

News on naturals

The trend towards natural refrigerants, particularly in Europe, was discussed throughout the conference.

The keynote speaker at the event was Alexander Cohr Pachai, AM.AIRAH, who gave a European contractor's perspective on the refrigerant transition and the trends we may see accelerate in Australia over the coming years.

Pachai's message was clear: markets in Europe are moving away from fluorinated gases (F-gases) and refrigerants that break down into PFAS. He reiterated that the EU's latest directive will see HFCs phased out completely by 2050 and used the example of the United Kingdom – where HVAC&R accounts for 79.5% of all F-gas emissions – to illustrate just how important the industry's contribution is.

Refrigeration innovation

RefCon25 featured several technical presentations on innovative commercial refrigeration solutions that can improve energy efficiency and also integrate with HVAC systems to produce comfort cooling.

Dr Alemu Tiruneh Alemu, M.AIRAH, from Glacem Cooling Technologies presented on the performance of a CO² gas cooler/condenser integrated with an indirect evaporative cooler (dewpoint cooler) installed in an Adelaide supermarket. He demonstrated the system's significant energy savings of 11% on average and 20% during peak times compared to a chill-boost adiabatic gas cooler, also pointing out that the system remained subcritical on the hottest day of the year. The dewpoint cooler is also effective in more humid conditions, potentially paving the way for CO² systems in northern regions of Australia.

Fabio Ferrara, Affil.AIRAH, introduced a glycol chiller system equipped with a semi-hermetic compressor, an aluminum condenser with a micro-channel that allows for a reduced-volume refrigerant circuit, an electronic fan with variable speed and an electronic pump with constant Delta T (water in–water out) operation of the glycol. In his presentation, he compared energy consumption between this system and a transcritical CO₂ rack with parallel compressors, identifying situations in which the glycol system performs best.

Tricky leaks

Jelena Franjić from Expert Group – the organisation that publishes the biannual Cold Hard Facts report on behalf of Refrigerants Australia – spoke about refrigerant leak rates and the significant greenhouse emissions they generate. In 2022 alone, refrigerant leaks were directly responsible for 6.9 megatons of CO₂e emissions, with further indirect emissions coming through increased energy consumption from leaky units.

One of the most shocking statistics Franjić presented was the annual leak rate of refrigeration equipment, which is 11% for large chain supermarkets, 15% for independent supermarkets, 15% for industrial refrigeration and cold storage, and even greater for mobile refrigeration.

Jelena Franjić from Expert Group



Dario Ferlin, M.AIRAH, from Woolworths presented on repurposing transcritical CO₂ systems in supermarkets for space heating, focusing not just on how well TCO₂ systems work for such purposes, but on challenges such as cold ambient temperatures and stores with high ceilings. He outlined some solutions Woolworths is employing to improve performance in these conditions, while also reiterating the need to transition to 100% natural refrigerants in the future.

Propane, mo' gain

Ben Adamson, F.AIRAH, continued this theme, making a compelling case for the more widespread use of A3 refrigerants, especially R290, which he described as the "Goldilocks refrigerant": just right in all aspects. His presentation focused on safely installing R290 systems to manage flammability risks, taking into account factors such as safe proximity from ignition sources and ventilation requirements for safe dilution of the gas in case of a leak.

According to Adamson, there is a widespread misconception about the danger and difficulty of using R290 as a refrigerant, when in fact the industry has vast experience with safely handling flammable refrigerants such as R32. He pointed out that, as they gain experience with R290, technicians and designers can develop procedures to more easily install these systems in a range of locations and conditions.

Dario Ferlin, M.AIRAH



High maintenance

Another theme underpinning the conference was the importance of maintenance in refrigeration.

Nicholas Lianos, Affil.AIRAH, from Grosvenor Engineering Group demonstrated the value of AI-powered "virtual technicians" in HVAC&R maintenance, emphasising how they can save companies time and money by performing the "boring" tasks and allowing human technicians to focus on more interesting and difficult responsibilities.

One of the more interesting points raised in his presentation was that, in Grosvenor's experience, the largest category of service calls is actually "no fault", where the system is working well and only minor tweaks are required to improve occupant comfort. Lianos also highlighted the importance of presenting a value proposition for predictive maintenance to clients, showing them how they can improve performance and save money.

Not your fault, but your problem

Jonathan Fryer, M.AIRAH, delivered an engaging and at times humorous presentation outlining the effects of "interfaces": systems that interact directly with refrigeration equipment and can wreak havoc on performance. The key message of Fryer's presentation was that, even if the refrigeration system is working perfectly and being adversely affected by something external, "it's not your fault, but it's your problem."

One example of this is in cold storage facilities, where many doors are built 5m high to accommodate equipment that is used only a small fraction of the time. This causes significant air infiltration and loss of cooling, which according to Fryer can be offset by part-height strip curtains that form a thermal barrier at the top third of the opening.

With 160 attendees, RefCon25 was nearly twice the size of the previous AIRAH Refrigeration Conference, held in 2022.



Expert perspectives on the HVAC&R skills shortage

AIRAH's recent Industry Night in Melbourne kicked off with a panel session to explore the skills shortage in our sector.

Perspectives on the issue – and some potential solutions – were provided by Jenny Mitchell, General Manager, Policy & Advocacy, Engineers Australia; David Keegan, Principal Consultant, New Venture Recruitment; and David King, Program Manager – Air Conditioning and Refrigeration, RMIT.

Industry impacts

As a recruiter who has been sourcing engineering talent for Australian companies in HVAC and building services for more than 15 years, Keegan said that there has always been a talent shortage, but it has become more pronounced recently.

According to Keegan, the weeks or sometimes months it takes to hire new engineers is affecting project timelines. Also, due to labour shortages, people are progressing into more senior roles more quickly.

"The downside of that is we are probably seeing more burnout than in the past," he said. "People are taking on more responsibility in their position than they are necessarily ready for."

Jenny Mitchell said that Engineers Australia has long highlighted the perennial shortages in the engineering workforce.

"Some studies say we need about another 100,000 engineers by 2030. There's data that says 70,000 engineers are retiring in the next 10–15 years. And meanwhile, students in engineering are dropping."

But Mitchell says these numbers mask a more nuanced situation, including a massive underuse of skilled migrants.

"About 60% of our workforce are overseas qualified engineers, but they're facing barriers to getting employment. So you see reports of qualified engineers driving Ubers, for example," she says.

David King offered a perspective from both the engineering and trade perspective. He noted that one engineer needs multiple skilled people to do the hands-on work, making the shortage more acute at the trade level. He also noted that the TAFE system is under extreme pressure, in terms of teachers and resources.

Fixing problems – it's what we do

The panel then turned to potential solutions.

Keegan suggested some short-term measures, such as tweaking working holiday visa rules to allow engineers from the UK and Ireland to spend more than the current limit of six months with one company.

But he also highlighted other factors affecting migrant engineers in Australia – the cost of labour, for example.

"The cost of labour for the vast majority of projects that I'm seeing for my clients is somewhere around 70%," he said. "You compare that to other parts of the world and it flips – you have 70% cost of materials and 30% labour."

"So for overseas project managers to adapt to the Australia market is difficult," he said.

Mitchell said Engineers Australia's Global Engineering Talent Program is designed to do just that. The program is piloting in Queensland and the Northern Territory with government support.

"The idea is that overseas-qualified engineers can do a three-month placement, and there has to be a job available at the end of the placement," she said. "We are trying to overcome specific barriers that we found when we did research, and it did go a lot to those cultural things around workplace."

In the trade space, King noted that Australia is limited to how it can access migrant workers because of local licensing requirements and an inability to recognise some overseas qualifications.

"You bring someone in who's got a qualification, is earning a good income, then all of a sudden you tell them they have to go back and do a three-and-a-half-year apprenticeship. That's something they may not be interested in," he says.

King suggests that consistent licensing requirements across states would help, as would better recognition of qualifications, not just from overseas, but within in Australia, to build better pathways between the trade and engineering.

Left to right: David Keegan, Jenny Mitchell, David King



“Some studies say we need about another 100,000 engineers by 2030. There’s data that says 70,000 engineers are retiring in the next 10–15 years. And meanwhile, students in engineering are dropping.”



Jenny Mitchell

Trusting technology

During the Q&A session, one of the audience members asked whether technology, including AI, could help us overcome the skills shortage.

Mitchell noted that Engineers Australia recently completed research on how engineers are using generative AI.

“What we found was that AI is not coming for jobs, it’s coming for tasks,” she said. “We will still always need a human engineer to have that oversight and that ethics lens.”

According to Mitchell, another interesting finding was that newer engineers would rely on AI and not learn basic tasks and first principles.

King, meanwhile, shared a conversation from one of RMIT’s decarbonisation working groups, which investigated AI and found that the labour saved through the technology could actually lead to greater emissions because of the processing power required.

Future visions

The panellists finished the session by sharing their vision of where they would like the industry to be in five years.

Keegan said everyone has to sell the benefits of our industry, such as long-term job prospects and security.

King said he hopes there will be a better pipeline for talent, with stronger articulation between secondary school and VET, and better-defined pathways for students.

Mitchell said governments will need to take our engineering capability more seriously. This could be spurred by demand for engineering skills between areas such as the energy transition, decarbonising heavy industry, the infrastructure pipeline, housing, and AI systems.

“I think we will see some concerted effort from government around our engineering capability,” she said. “I’d like to see us setting some targets to grow that workforce. And I hope that if the government does that, it will attract more young people into these careers.”

AIRAH Industry Nights

The Melbourne Industry Night where the panel was held saw 80 exhibitors and more than 550 attendees, a record number for the event.

To attend an Industry Night in your local area, scan the QR code.



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1. Hot and cold

Trevor came across this hot water heat pump in what he aptly describes as a “downmarket” Sydney hotel. He points out that, as the weather gets colder, the unfortunate guests can expect “a hot shower in a sub-zero shower recess”.



This is the result when a heat pump hot water system is installed by people who have little to no understanding of the primary principle of operation: transferring heat energy from the surrounding air to the water. Guests will also experience difficulty when attempting to offset the chilly room temperature with the 45°C water being provided by the upgraded system.



2. Why is it leaking?

“I was called to a new house with extensive plaster damage to see why it’s leaking,” says John. “The installer didn’t know why,” he adds. Perhaps that installer could do with a refresher on basic physics...



The trap itself has been correctly constructed, but the execution in its attachment is a big fail ... perhaps due to minimal light availability, or a desire to lift the condensate line above the duct? Rotating it along the horizontal plane by 180° will solve the issue. Another observation: consider future-proofing the trap, as a time will come when it’s necessary to remove it for cleaning purposes.



3. Air strike

In recent iterations of *the lighter side*, we seem to have had a theme of animals interfering with HVAC&R equipment and coming to tragic ends. Frank continued the trend by sending this image of what he quite rightly describes as a “kamikaze pelican”. We hope this brave bird is now in a better place ...



I’ve seen plenty of cats, rats, mice and cockroaches causing mechanical and electrical issues, but this is the first “bird strike”. The level of damage to the fan guard suggests a fall from height, which leads me to ponder on the hazards of venturing outside. Skin cancer is already on the rise, and now there’s the possibility of a 15kg bird plummeting to earth at 120km/h!

4. Feeling bullish

Mick was blown away when he saw this “masterpiece” that he says “gives life after death” to some old HVAC&R equipment. We’re glad these rusty parts have been decommissioned and turned into art!



A fitting end for a Bitzer compressor cylinder head. This is a piece of art in its own right, being preserved for future generations in such a creative manner. Wait ... is that my Stanley stubby screwdriver I see??



Additional comments and observations provided by Steve Smith, Affil.AIRAH, Education Relationship Manager at Superior Training Centre. Please note that the comments are provided on the basis of the photos only and should be read with this in mind – not all issues or solutions are apparent from a 2D image.

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